1.0 INTRODUCTION

1.1 This Environmental Statement has been prepared by Celtique Energie Weald Ltd ("the Applicant") to accompany a planning application for the development of an exploratory well site on Northup field, south of Boxal Bridge, Kirdford Road, Wisborough Green, West Sussex. The application has been submitted to West Sussex County Council (WSCC) under the provisions of the Town and Country Planning Act 1990 as amended by the Planning and Compulsory Purchase Act 2004 (Ref. 1.1). The development (the "Proposed Development") comprises the siting and construction of a temporary well site including access track and ancillary infrastructure, for the exploration, testing and evaluation of hydrocarbons in the Central Weald Basin within PEDL 234.

1.2 Full details can be found in Chapter 4 Project Description but the works would initially involve drilling a vertical well to explore for the presence of hydrocarbons and to test any found. Following the results of the vertical well, a horizontal well may be drilled and would extend to the south west of the surface Application Site within the dashed zone ("deviation tolerance zone") shown on **Figure 1.1**. This horizontal well would not affect the surface of the land and would be at a depth of almost 9,000ft. Therefore other than Chapter 11 Ground and Groundwater Protection, the ES focuses on the Application Site as the above ground infrastructure as shown on **Figure 1.2**. The red line boundary encompasses the land required to construct and carry out the Proposed Development although the well site and access road will require a smaller land take, as illustrated on **Figure 1.3**.

1.3 It is anticipated that construction will commence in the first half of 2014, subject to gaining planning permission.

Environmental Impact Assessment (EIA)

1.4 The Proposed Development does not fall within Schedule 1 of the Town and Country Planning (Environment Impact Assessment) (England) Regulations 2011 (Ref. 1.2). It would be classified as "deep drilling" or "surface industrial installation for the extraction

of petroleum" in accordance with Sections 2(d) or 2(e) respectively of Schedule 2 of the Regulations. The indicative threshold for a deep drilling above which EIA is more likely to be required is a site area exceeding 1ha whilst the threshold for a surface industrial installation is an area exceeding 0.5ha.

1.5 Having referred to the EIA Regulations including Figure 1 of Circular 02/99: Environmental Impact Assessment (Ref. 1.3), the Proposed Development does not fall within but is close to a "sensitive area". The Application Site is 1.65ha (4.07 acres) comprising an access road and well site which will encompass all associated infrastructure.

1.6 Although the Application Site is not classified as a "sensitive area" the boundary to the South Downs National Park is approximately 500m south of the Application Site and incorporates The Mens Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC). Northup Copse to the north of the Application Site is designated by WSCC as a Site of Nature Conservation Importance (SNCI) as are part of The Mens. The Application Site is surrounded by woodland some of which consists of ancient woodland that is likely to have ecological value, and there are also watercourses and ponds near the proposed Application Site. There is only one Listed Building in the vicinity of the Application Site which is Skiff Farmhouse (Grade II) located approximately 450m to the north east.

1.7 For the reasons outlined above, the Applicant has chosen to prepare and submit an ES with the planning application to allow the likely significant effects of the Proposed Development to be determined.

1.8 An EIA is the process of collection, publication and consideration of environmental information in the determination of a planning application. Consequently information on the likely significant effects of the Proposed Development has been gathered and is presented in this document, the Environmental Statement (ES). The ES will inform the decision-maker (in this case WSCC) of the likely significant environmental effects of the Proposed Development both during construction and once completed, and proposes

mitigation measures to prevent, reduce and offset any significant adverse effects on the environment.

Planning Policy

1.9 The EIA Regulations do not require assessment of planning policy or guidance, however where appropriate, national and development plan policies of relevance to the Proposed Development have been considered under each of the technical chapters of this ES.

ES Structure

1.10 Reg. 2(1) of the EIA Regulations state that an ES should include:

> **"…information referred to in Part I of Schedule 4 as is reasonably required to assess the environmental effects of the development and which the applicant can, having regard in particular to current knowledge and methods of assessment, reasonably be required to compile".**

1.11 An outline of this information in respect of the Proposed Development and where it can be found in the ES is presented in **Table 1.1**.

Table 1.1: Location of Information within the ES Required by Part I and Part II of the EIA Regulations

Specified Information		**Location within ES**
1	Description of the development, including in particular –	
(a)	a description of the physical characteristics of the whole development and the land-use requirements during the construction and operational phases.	Chapter 4 (Project Description), Chapter 6 (Construction Programme and Management)

Specified Information		Location within ES
(b)	a description of the main characteristics of the production processes, for instance, nature and quantity of materials used.	Chapter 4 (Project Description), Chapter 6 (Construction Programme and Management)
(c)	an estimate, by type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the Proposed Development.	All technical chapters (7-13)
2	An outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for its choice, taking into account the environmental effects.	Chapter 5 (Need and Alternatives)
3	A description of the aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and inter-relationship between the above factors.	All technical chapters (7 – 13)
4	A description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and	All technical chapters (7 – 13)

Specified Information		Location within ES
	negative effects of the development, resulting from:	
(a)	the existence of the development;	Chapter 14 (Summary of Significance)
(b)	the use of natural resources;	Chapter 7 (Ecology), and Chapter 8 (Landscape and Visual Impact)
(c)	the emission of pollutants, the creation of nuisances and the elimination of waste; and	Chapter 9 (Noise and Vibration), Chapter 10 (Transport and Access), Chapter 11 (Ground and Groundwater Protection), and Chapter 12 (Lighting)
d)	the description by the applicant of the forecasting methods used to assess the effects on the environment.	Chapter 2 (EIA Methodology) and all technical chapters (7 – 13)
5	A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.	All technical chapters (7 - 13)
6	A non-technical summary of the information provided under paragraphs 1 to 5 of this Part.	Non-Technical Summary (provided as a separate document)
7	An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information.	Chapter 2 (EIA Methodology) and in technical chapters where appropriate

1.12 The ES comprises three separate volumes, namely:

- The ES Main Text: The full text of the ES which comprises a total of 15 chapters, illustrated throughout by tables and figures;
- The ES Figures, Plans and Technical Appendices: A complete set of the figures, plans and technical documents undertaken as part of, or in support of, the ES. The figures, plans and technical appendices are provided in a separate volume to limit the size of the ES main text; and
- The Non-Technical Summary (NTS): The NTS provides a concise and straightforward summary of the Proposed Development, the likely significant environmental effects and the measures proposed to mitigate or to avoid these effects.

Project Team

1.13 The ES has been coordinated by the Applicant and presents the results of technical studies carried out in conjunction with a number of specialist consultants appointed by the Applicant. The ES project team is listed in **Table 1.2** along with their respective disciplines and contributions to the ES.

Table 1.2: Project Team

Organisation	**ES Input**
ACIA Engineering Acoustics	Noise and Vibration
EDP	Arboricultural Impact Assessment
Barton Willmore LLP	Summary of Significance; ES Review
Celtique Energie Weald Limited	Town Planning; ES Coordination; Project Description; Need and Alternatives; and Socio Economic Assessment
Hydrock	Ground and Groundwater Protection
Richard Elliott Associates Limited	Construction Programme and Management;

Organisation	ES Input
	planning application drawings
Royal Haskoning DHV	Transport and Access; Flood Risk Hydrology and Drainage; and Lighting
Terra Firma Consulting	Landscape and Visual Impact
URS Scott Wilson	Ecology

Other Documents

1.14 A number of other documents have been submitted to WSCC as part of the planning application including:

- Planning Statement – Celtique Energie Weald Limited;
- Alternative Sites Assessment – Celtique Energie Weald Limited;
- Statement of Community Involvement – PPS Group;
- Archaeology Statement – CBAS;
- Flood Risk Technical Note – Royal Haskoning DHV;
- Air Quality Statement – AQ Consultants Limited;
- Groundwater Risk Assessment - Hydrock; and
- Road Safety Audit (Stage 1) – Road Safety Consulting Limited.

ES Availability and Comments

1.15 Additional paper copies of the ES and the Technical Appendices can be purchased at a cost of £125. The Non-Technical Summary can be obtained free of charge.

1.16 Copies of the ES, Technical Appendices and NTS can be obtained on CD at a cost of £25. All documents are available from:

Celtique Energie Weald Limited
4th Floor Newlands House
40 Berners Street
London
W1T 3NA
0207 255 6100

1.17 Additional copies of this ES are also available for viewing by the public during normal office hours in the planning department of WSCC. Comments on the planning application should be forwarded to:

County Development
West Sussex County Council
2nd Floor
County Hall
Chichester
PO19 1RQ
strategic.planning@westsussex.gov.uk

References (Ref)

1.1 Town and Country Planning Act (1990) as amended by the Planning and Compulsory Purchase Act (2004)

1.2 Town and Country Planning (Environment Impact Assessment) England Regulations (2011)

1.3 Environmental Impact Assessment, DETR Circular 02/99 (1999)

2.0 ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY

Introduction

2.1 This chapter explains the EIA methodology and describes the ES structure and content. In particular, it details the process of identifying and assessing the likely significant environmental effects of the Proposed Development. The content and conclusions of the ES are based on an assessment of the Proposed Development plans, as set out in Chapter 4 of this ES, baseline surveys and a series of technical studies.

General Approach

2.2 The ES has been prepared in accordance with the EIA Regulations which implement European Council Directive No. 2011/92/EU. Reference has also been made to currently available good practice guidance on EIA, including:

- Environmental Impact Assessment – A Guide to Procedures, Department of the Environment, Transport and Regions (DETR) 2000 (Ref. 2.1);
- Environmental Impact Assessment, DETR Circular 02/99 (Ref. 2.2);
- Guidelines for Environmental Impact Assessment, Institute of Environmental Management and Assessment (IEMA) 2004 (Ref 2.3);
- Amended Circular on Environmental Impact Assessment – A Consultation Paper, Department for Communities and Local Government (DCLG) (2006) (Ref. 2.4);
- Environmental Impact Assessment: A Guide to Good Practice and Procedures, A Consultation Paper, DCLG (2006) (Ref. 2.5);
- Planning Practice Guidance for Onshore Oil and Gas – DCLG (2013) (Ref. 2.6).

Scoping

2.3 Scoping involves focusing the content of the ES on those issues of greatest potential significance. It is an important tool for identifying the likely significant effects of a

proposed development through its design, construction and completed phases and ensures that appropriate mitigation options are considered, where necessary.

2.5 An ES Scoping Report was submitted to WSCC on 8 April 2013 (**Appendix 2.1**) and included input from the specialist consultants appointed by the Application to prepare the ES. The Scoping Report was informed by the following sources;

- Review of the current situation through existing information, including data and reports;
- Desk-top and on site studies;
- Pre-application consultation with stakeholders;
- Consideration of relevant national and development plan policies; and
- Use of technical guidance and best practice.

2.6 The Applicant's Scoping Report concluded that the following environmental issues should be addressed within the ES:

- Landscape and Visual Impact;
- Ecology;
- Transport and Access;
- Noise;
- Ground and Groundwater Protection;
- Lighting; and
- Socio-Economics.

2.7 The Applicant's Scoping Report also concluded that the following environmental issues should be scoped out of the ES:

- Air Quality;
- Vibration;
- Flood Risk, Hydrology and Drainage;

- Archaeology (Heritage Statement to accompany the planning documents);
- Agricultural Land and Soils; and
- Waste.

2.8 WSCC adopted a scoping opinion on 5 July 2013 (**Appendix 2.2**) which in the most part, agreed with the scope set out above. The issues raised by WSCC during the EIA Scoping are outlined in **Table 2.1** below.

Table 2.1: Comments on the Scoping Report

Consultee	Matters Raised	Chapter(s) where addressed
WSCC	• An extended Phase 1 habitat survey should be completed with follow up surveys as required, potential ecological impacts arise from the proximity to the Dunhurst and Northup Site of Nature Conservation Importance (SNCI) and Ancient Woodland; • The ES should consider the impacts of lighting on protected bats and a bat-sensitive scheme should be prepared by ecologists and submitted; • The ES should identify the potential impact of development on trees on the highway particularly as the site entrance is adjacent to Ancient Woodland and mature trees. Potential impacts on adjacent receptors should be identified at an early stage and a tree constraints plan submitted to identify root protection areas (RPA) and avoid them; • Impact of noise, air quality, vibration and traffic on ecological features within the site and	Chapter 7 Ecology

Consultee	Matters Raised	Chapter(s) where addressed
	affected by its operation; • Mitigation plan to be submitted addressing the identified impacts with measures as required including regard to restoration and European protected species; • Some form of enhancement should be provided.	

WSCC	• the potential for impacts should be considered during all phases as the site is 550m from the National Park boundary and within a rural area;
	• A Landscape and Visual Impact Assessment (LVIA) should be carried out taking into account, in particular:
	  • the WSCC Land Management Guidance Sheet LW2 – North Western Low Weald;
	  • the WSCC Landscape Strategy (in particular guidelines for conserving historic landscapes; guidelines for commercial and industrial development including rural diversification; and guidelines for protecting the character of rural roads and lanes); and
	  • the WSCC Historic Landscape Character Analysis;
	• The LVIA should appraise the potential impact of the rig height and location, access road, fencing, offices and machinery, mitigation proposals and site restoration proposals;
	• A Tree Survey and Arboricultural Impact
		Chapter 6 Construction Programme and Management; and Chapter 8 Landscape and Visual Effects

Consultee	Matters Raised	Chapter(s) where addressed
	Assessment should be included; • The application should also include landscape and visual impacts from lighting.	
WSCC	• Noise and potential vibration impacts should be assessed during different phases of the proposed development taking into account impacts on nearest sensitive receptors including dwellings, public rights of way (PROW), ecological features (habitats of the SNCI and Ancient Woodland) and publicly accessible areas; • Sensitive receptors should be agreed with CDC Environmental Health team; • Noise assessment should be undertaken in accordance with BS4142 and BS5228 and take into account the National Planning Policy Framework (NPPF) and World Health Organisation (WHO) Community Noise Guidelines; • It is considered that the methodology for quantifying noise and vibration emissions from road traffic should follow the methodology set out in the DfT Control of Road Traffic Noise, and Design for Roads and Bridges. The outcome of the study should feed into the ES.	Chapter 9 Noise and Vibration

Consultee	Matters Raised	Chapter(s) where addressed
WSCC	• Issues to be considered in the Transport Assessment and Chapter include the additional number of heavy goods vehicle (HGV) movements arising from the development and any resulting implications for highway safety and capacity, the environment and identify if any improvement works (eg. At Boxal Bridge) are required; • The impact of HGVs travelling along rural roads before reaching the A272 should be considered, and any mitigation identified; • Given the rural location of the site the impact on routing through Wisborough Green should be justified and alternatives considered should be identified; • The environmental assessment of the transport section should be informed by the Environmental Assessment of Road Traffic (Guidance Note no.1), the Design Manual for Roads and Bridges and Guidance on Transport Assessment.	Chapter 10 Transport and Access
WSCC/EA	• The EIA should consider the implications of the development on the water environment including Flood Risk, hydrology, drainage and groundwater protection; • This should include a detailed assessment of potential impacts on both ground and surface water and surface water protection as the site	Chapter 11 Ground and Groundwater Protection

Consultee	Matters Raised	Chapter(s) where addressed
	is within 50m of Boxal Brook and 450m of the River Kird; • The site lies on a non-productive aquifer, the Weald Clay, and liaison with the EA is recommended. It is also recommended that a qualitative Environmental Risk Assessment (ERA) is produced that includes a detailed Conceptual Site Model; • A suite of Method Statements that provide details on drilling operations, storage of substances, drilling mud management plan, pollution prevention measures, pollution incident plan, environmental monitoring and management and surface water drainage scheme need to be covered in detail in any future planning application; • In respect of drilling methodology and consents the following may potentially be required if hydraulic fracturing is to take place - a notice served by the EA under Section 199 of the Water Resources Act, and Environmental Permits; • A full Flood Risk Assessment will be required to accompany the application considering the impacts on Boxal Brook, wider drainage of the area and the topography of the area.	

Consultee	Matters Raised	Chapter(s) where addressed
WSCC	• The lighting attributed to the site operations shall include impacts on the surrounding landscape and visual impact, and ecology; • This should be undertaken in accordance with Defra's document Lighting in the Countryside: Towards Good Practice.	Chapter 12 Lighting
WSCC	• An assessment should focus on the impacts of the proposed development on the community living and working within the locality including the potential to impact on the countryside and South Downs National Park, conserving and enhancing natural beauty, opportunities for enjoyment by the public and wildlife of the National Park.	Chapter 13 Socio Economics

2.9 The WSCC Scoping Report concluded that the following topics should be "scoped out" of the ES;

- Air Quality (although a standalone Air Quality Statement is submitted as a standalone document in support of the planning application in accordance with WSCC's validation requirements);
- Archaeology (though a Heritage Statement is submitted in support of the planning application);
- Agricultural Land and Soils; and
- Waste.

Consultation Process

2.10 The following organisations were approached as part of the EIA process to identify baseline information and to enable the Proposed Development to be refined in relation to environmental issues raised, where appropriate:

- WSCC - transport, landscaping, archaeology, and other departments;
- South Downs National Park – socio-economic data on tourism and nature conservation and management;
- Chichester District Council (CDC), environmental health, arboriculture and other departments;
- Environment Agency;
- Natural England;
- West Sussex Wildlife Trust; and
- West Sussex Biological Record Centre.

Public Consultation

2.11 A comprehensive programme of public consultation was undertaken to inform the Proposed Development. An invitation to the two day exhibition was published in the local press and posted via Royal Mail to local stakeholders and almost 1,000 residents within a one mile radius of the Application Site, and the villages of Kirdford and Wisborough Green. The public exhibition was held at Kirdford Village Hall on Friday 17 and Saturday 18 May 2013 and included almost 30 exhibition boards on drilling, geology and environmental studies associated with the Proposed Development. Residents were provided with a brochure of the exhibition boards and a questionnaire to fill in and return which were also made available to download or view on the Applicant's website along with a dedicated community consultation telephone number and email.

2.12 Following the two day exhibition and on receipt of all the questionnaire responses, it was clear that transport and access was an important community issue with residents

asking that traffic be routed outside of the village. The Applicant organised and held a meeting with Wisborough Green and Kirdford Parish Councillors on Monday 24 June 2013, to discuss the results of the public exhibition and the transport concerns.

2.13 Further details on the consultation process and the feedback received are contained within the Statement of Community Involvement that accompanies the Planning Application. Involvement with the local community will continue throughout the planning process and during the construction and operational phases of the Proposed Development.

Assessment Methodology

2.13 The EIA Regulations stipulate that an ES should, where possible, identify, describe and assess the likely significant effects of a development on the environment. Therefore, this ES identifies and assesses the likely significant effects of the Proposed Development in relation to all phases of development including site restoration. Environmental effects have been evaluated with reference to definitive standards and legislation where available. Where it has not been possible to quantify effects, qualitative assessments have been carried out, based on available knowledge and professional judgement. Where uncertainty exists, this has been noted in the relevant assessment chapter.

Determining Significance

2.14 Guidance on significance has been mainly of a generic nature (e.g. DETR Circular 02/99 (Ref. 2.2) and DCLG draft Amended EIA Circular (Ref. 2.4), and practitioners have been obliged to develop definitions for specific topics and projects. It is broadly accepted, however, that significance reflects the relationship between two factors:

- The actual change taking place to the environment (i.e. the magnitude or severity of an effect); and
- The sensitivity, importance or value of the affected resource or receptor.

2.15 The magnitude of an effect is often quantifiable in terms of, for example, the extent of land take, or predicted change in noise levels. The sensitivity, importance or value of the resource or receptor is normally derived from:

- Legislative controls;
- Designated status within the land use planning system;
- The number of individual receptors such as residents;
- An empirical assessment on the basis of characteristics such as rarity or condition; and/or
- Ability of the receptor to absorb change.

2.16 Determination of significance also includes consideration of:

- Extent and magnitude of the effect;
- Type of effect (beneficial or adverse);
- Duration of effect (whether short, medium or long term; permanent or temporary);
- Nature of effect (whether direct or indirect, reversible or irreversible);
- Whether the effect occurs in isolation, is cumulative or interactive;
- Performance against environmental quality standards or other relevant pollution control thresholds; and
- Compatibility with environmental policies.

2.17 Significant effects occur where valuable or sensitive resources, or numerous receptors, are subject to effects of considerable magnitude. Effects are unlikely to be significant where low value or non-sensitive resources, or a small number of receptors, are subject to minor effects. Allocation of significant effects in intermediate situations will be a matter for professional judgement in each topic area.

2.18 Where an effect is considered to be significant, this significance will generally be classified as major, moderate or minor (with these descriptions again being based on

precedent or current guidance). Within this ES, the significance matrix in **Table 2.2** has been used to define the level of significance of effects. In some cases analogous matrices for the various specialist topics are used, and where these use different assessment criteria this is clearly stated within the relevant chapter.

Table 2.2: Significance Matrix

Sensitivity /Value of Receptor	**Magnitude of Effect**		
	High	**Medium**	**Low**
High (England, UK, International)	Major	Major/Moderate	Moderate
Medium (County, Regional)	Major/Moderate	Moderate	Moderate/Minor
Low (Local, Borough)	Moderate	Moderate/Minor	Minor

2.19 The three levels of significance defined by the generic matrix are:

- Major – an effect which in isolation could have a material influence on the decision making process;
- Moderate – an effect which on its own could have moderate influence on decision making, particularly when combined with other similar effects; or
- Minor – an effect which on its own is likely to have a minor influence only on decision making but when combined with other effects could have a more material influence.

2.20 Effects are also described as:

- Adverse – detrimental or negative effects to an environmental resource or receptor; or

- Beneficial – advantageous or positive effect to an environmental resource or receptor.

2.21 Where an effect is considered to be not significant or have no influence, irrespective of other effects, this is classified as “negligible”. Some disciplines have adopted bespoke significance criteria. They are explained in the relevant technical chapters.

2.22 Each of the technical chapters or accompanying technical appendices provides the criteria, including sources and justifications, for quantifying the different levels of effect. Where possible, this has been based upon quantitative and accepted criteria, together with the use of value judgements and expert interpretations to establish to what extent an effect is likely to be environmentally significant.

2.23 In the context of the Proposed Development, short term effects are considered to be those associated with the initial three Phases of the Proposed Development including construction, mobilisation, and drilling and appraisal operations. Medium and long term effects are those associated with the final Phase of development - retention, should the Application Site be retained whilst further planning permission for production is pending. If the site is not retained it would be restored. Effects from this Phase are also assessed as long term.

Baseline Conditions

2.24 The ES includes a description of the prevailing environmental conditions, the “Baseline Conditions”, against which the likely significant environmental effects of the Proposed Development have been assessed. These are taken to be the conditions at the time or immediately prior to the submission of the planning application in 2013. Each technical assessment has also identified the Future Baseline conditions in the absence of the Proposed Development.

Cumulative and Interactive Effects

Cumulative Effects

2.25 The WSCC Scoping Opinion did not identify any committed developments for consideration in the assessment of likely significant cumulative effects on the environment. However, two forthcoming developments have been identified on the planning register as requesting EIA Screening Opinions. It is possible that they may come forward and have cumulative effects so have been considered in each technical chapter of this ES as a precaution:

- Ref. 13/00593/EIA – 31 hectare solar farm on land at Crouchlands Farm, Kirdford; and
- Ref. 13/01190/EIA - 30 houses on land south of Petworth Road opposite Meadowbank, Wisborough Green.

Interactive Effects

2.26 Interactive effects are also considered in the ES. Interactive effects arise where effects from one environmental element bring about changes in another environmental element. These effects are also reviewed in each of the technical chapters of this ES. Examples of the main potential types of interactive effects are as follows:

- effects of traffic on noise;
- effects of lighting on ecology; and
- effects of landscaping on ecology.

Structure of Technical Chapters

2.27 Through the EIA process, the likely significant environmental effects of the Proposed Development will be assessed. Each key environmental topic has been assigned a separate chapter in the ES (Chapters 7 - 14), and within each of these chapters the

information that will inform the EIA process has been set out in the following way:

- **Introduction** – a brief summary of what is considered in the chapter.

- **Planning Policy Context** – a review of relevant National and Development Plan policies related to the technical issues;

- **Assessment Methodology** – an outline of the methods used to undertake the technical studies with reference to legislation, published standards, guidelines, best practice and any relevant significance criteria;

- **Baseline Conditions** – a description of the environmental conditions against which the likely significant environmental effects of the Proposed Development have been assessed;

- **Likely Significant Effects** – identification and assessment of the likely significant environmental effects of the Proposed Development during each of the four stages of the project.

- **Mitigation Measures** – development of measures to avoid, offset or reduce any significant adverse effects of the Proposed Development. These measures can relate to any of the phases of the project. Where any significant adverse environmental effects have been identified, a commitment is made by the Applicant to implement mitigation measures, either during the construction works or the operational phase;

- **Residual Effects** – identification of the remaining effects of the Proposed Development, assuming implementation of available mitigation measures, and includes an assessment of the significance of those effects in accordance with the criteria set out in paragraphs 2.13 – 2.22; and

- **Summary** – a summary of the key finding/s of the ES chapter.

Assumptions and Limitations

2.28 The principal assumptions that have been made and any limitations that have been identified, in preparing this ES are set out below. Assumptions relevant to specific topics have been made in the appropriate chapter:

- All of the principal existing land uses adjoining the Application Site remain;
- Information received by third parties is complete and up to date;
- The design, construction and operational stages of the Proposed Development will satisfy minimum environmental standards, consistent with contemporary legislation, practice and knowledge;
- Significant environmental effects have been assessed using the Proposed Development Plans (see Chapter 4 of this ES).

References (Ref)

2.1 DETR, Environmental Impact Assessment – A Guide to Procedures, Department of the Environment, Transport and Regions, 2000

2.2 DETR, Circular 02/99 Environmental Impact Assessment, 1999

2.3 IEMA, Guidelines for Environmental Impact Assessment, Institute of Environmental Management and Assessment, 2004

2.4 DCLG, Amended Circular on Environmental Impact Assessment – A Consultation Paper, Department for Communities and Local Government, 2006

2.5 DCLG, Environmental Impact Assessment: A Guide to Good Practice and Procedures, A Consultation Paper, 2006

2.6 DCLG, Planning Practice Guidance for Onshore Oil and Gas, 2013

3.0 APPLICATION SITE AND SURROUNDINGS

3.1 The aim of this Chapter is to describe the baseline characteristics of the Application Site and its surroundings. To avoid repetition and duplication in the ES, this Chapter provides an overview of the existing conditions with more detailed descriptions provided in the respective ES Chapters and accompanying Figures.

Application Site

3.2 The Application Site falls within the jurisdiction of West Sussex County Council and Chichester District Council, and the boundary of the South Downs National Park is approximately 500m south of the Application Site beyond the River Kird.

3.3 The Application Site lies between the villages of Wisborough Green approximately 1.2km to the south east, and Kirdford approximately 1.8km to the west. The Application Site falls within the Ward of Wisborough Green and the Parish of Kirdford. Other settlements in the vicinity of the Application Site include the villages of Cranleigh (11.6km north), Billingshurst (4.5km east) and Pulborough (8.1km south), and the towns of Petworth (7.5km south west) and Horsham (12km north east).

3.4 The Application Site currently forms part of an intensively managed arable field which is used for growing cereal. Under the Agricultural Land Classification system, the Application Site is classed as Grade 3 although there is no information available on the subsection classification - Grade 3a or 3b. The Application Site is not subject to any international, national or local designations, and there are no Public Rights of Way (PROW) on the Site.

3.5 Access to the Application Site is obtained from Kirdford Road and through an existing metal post and rail agricultural field gate which adjoins an existing wooden post and rail boundary fence. The existing access track is loosely stoned from the junction with Kirdford Road which is tarmaced, and there are ditches either side of the entrance road. There are four common oak trees adjacent to the existing agricultural gate, the crowns

of which overhang the Application Site, and two soil heaps between the access and proposed well site compound.

3.6 Sloping downwards from south (20.5m AOD) to north (16.5m AOD), the Application Site falls relatively evenly along the western and eastern boundaries. From the access point on Kirdford Road which lies at 18m AOD, the existing access track rises gently to 19.5m AOD at the south western corner of the Application Site which encompasses the proposed well site compound.

3.7 There are no important aquifers under the Application Site, and it is not in an area where people use water from aquifers for water supply, either public or private. The Application Site is located on the southern side of the Weald Basin, and is underlain by Weald Clay which contains minor and sometimes discontinuous bands of sandstone.

3.8 More details on the Application Site can be found in the Planning Statement, Chapter 5 Need and Alternatives and the planning application drawings.

Surroundings

Vegetation and Woodland

3.9 The Application Site is situated within an intensively managed arable field which is used for growing cereal. The field margins are managed as semi-improved grass headlands. Both invasive and rare plants have been recorded within 1km of the Application Site including Japanese Knotweed and true fox-sedge. On the northern boundary of the Application Site is Northup Copse which is designated as ancient woodland comprising of oak, hazel, birch, ash and field maple, with the ground flora consisting of bluebell and ground ivy. There are no Tree Preservation Orders on or adjacent to the Application Site.

3.10 Notwithstanding the designated ancient woodland to the north of the Application Site at Dunhurst Copse and Northup Copse, there are further blocks of ancient woodland to the east, south and west. Skiff Copse lies to the east abutting the River Kird with Nonesuch,

Woodfield and Jacksland Copses to the south providing a buffer between Northup field, within which the Application Site lies, and the South Downs National Park. Kiln Copse and Furzefield Rough to the north west are designated as ancient woodland, with the latter being adjacent to Dunhurst Copse.

3.11 More details on vegetation and woodland can be found in Chapter 7 Ecology, Chapter 8 Landscape and Visual Impact and the Arboricultural Impact Assessment.

Landscape

3.12 By day, the Application Site is generally screened on the northern boundary by the dense woodland of Furzefield Rough, Northup Copse and Dunhurst Copse with Nonesuch, Woodfield and Jacksland Copse providing screening on the southern boundary of Northup field with further woodland screening provided by Idehurst Copse to the south.

3.13 There are a number of residential and agricultural properties within the locality of the Application Site, however, other than the large barn located directly adjacent to the Site, these are generally not visible from the Site itself owing to the tree cover around the perimeter of the Site. There are electricity pylons which run in a southwest to northeast direction through the south eastern quadrant of the field within which the Application Site falls.

3.14 By night, the rural nature of the immediate vicinity is confirmed with the Application Site itself and the surrounding woodland and farmland, being in total darkness. The local network of "B" roads and country lanes has no street or road lighting although there are localised areas of lighting affording to private developments and residential properties within Wisborough Green and its surrounding agricultural properties.

3.15 More details on landscape can be found in Chapter 8 Landscape and Visual Impact and Chapter 12 Lighting.

Topography

3.16 To the north the land falls downwards to Boxal Brook rising up within the woodland of Northup Copse. To the east, the land falls to the Brook before rising gradually beyond Skiff Copse and towards Wisborough Green village. To the south, beyond the River Kird the land rises gradually towards Idehurst Copse and the A272. To the west the land lies relatively flat although it is lower lying towards the river, and rises beyond this towards Kirdford village.

3.17 More details on topography can be found in Chapter 6 Construction Programme, Chapter 8 Landscape and Visual Impact and Chapter 11 Ground and Groundwater Protection.

Access and Public Rights of Way

3.18 The closest PROW to the Application Site includes a footpath (PROW ref. 768) approximately 100m to the north, running in a westerly direction from its junction with Kirdford Road towards Kirdford. A second PROW, a bridleway (PROW ref: 2851/1) is 625m to the west, running in a westerly direction for 125m and then turns running northwards. A third PROW lies at approximately 625m from the Application Site and runs between Kirdford Road and a small lane off the A272 on the western edge of Wisborough Green.

3.19 The Application Site is directly accessed from Kirdford Road which is a single carriageway road that connects Wisborough Green/A272 to the south with Kirdford to the west. The route continues westwards after Kirdford to connect with Petworth. Kirdford Road in the vicinity of the Assessment Site is rural in nature being derestricted and unlit. It is generally between 4m and 6m wide and there are no weight restrictions on Kirdford Road between Wisborough Green and the Application Site.

3.20 Within Wisborough Green there are a number of side roads accessed from Kirdford Road together with residential frontage and driveway accesses. The speed restriction is 30mph with limited street lighting. As Kirdford Road enters Wisborough Green it skirts the north

of a cricket ground, and at this point footways are provided which when combined with footpaths within Wisborough Green, provide continuous segregated facilities for pedestrians throughout the majority of Wisborough Green.

3.21 The A272 is the main east-west route through West Sussex and the wider region. In the local context it connects Petworth, Petersfield and the A3 to the west of the Application Site with Billingshurst, Haywards Heath and the A23 and A24 to the east. The A272 is a single carriageway road with one lane in each direction. It is predominantly rural in nature being generally derestricted and unlit, and there are no continuous footways along the route.

3.22 More details on access and PROW can be found in Chapter 6 Construction Programme, Chapter 8 Landscape and Visual Impact and Chapter 10 Transport.

Designated Sites

3.23 The Mens including Idehurst Copse, is designated as a Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC). It is approximately 500m to the south of the Application Site and is designated for its fungal and lichen species, structural diversity and size. The South Downs National Park (SDNP) lies approximately 500m south of the Application Site and represents a chalk downland landscape with heavily wooded sandstone and clay hills.

3.24 Dunhurst Copse and Northup Copse Sites of Nature Conservation Importance (SNCI) are adjacent to the northern boundary of the Application Site and are designated as ancient woodland. Part of The Mens is also designated as a SNCI.

3.25 More details on designated sites can be found in Chapter 7 Ecology and Chapter 8 Landscape and Visual Impact.

Archaeology and Cultural Heritage

3.26 The Wisborough Green Conservation Area is focused on the village centre approximately 1.1km east of the Application Site. There are no Scheduled Monuments (SM) within 1km of the Application Site although there are two within 3km of the Application Site including Wephurst Glass House which is 2.8km to the northwest, and Brownings Moated Site which is 2.5km to the southwest.

3.27 There are a number of Listed Buildings in the surrounding area including four within a 1km radius of the Application Site, all of which are Grade II Listed. The closest Listed Building to the Application Site is Skiff Farmhouse, an 18th century or earlier building which stands circa 350m to the east on Kirdford Road. Two of the Listed Buildings stand at Sparr Farm on Skiff Lane approximately 650m to the northwest of the Application Site. This includes Sparr Farmhouse which is of 17th century construction or earlier whilst its barn dates to the 18th century. Barkfold House is the fourth Listed Building which although built in the early 19th century at the wide bend in Kirdford Road to the west of the Application Site, it incorporates an L-shaped portion that dates to the 17th century.

3.28 More details on Archaeology and Cultural Heritage can be found in Chapter 8 Landscape and Visual Impact and the Archaeology Assessment.

Hydrology and Hydrogeology

3.29 The northern boundary of the Application Site is located approximately 100m south of Boxal Brook which flows south-eastwards to join the River Kird at Skiff Copse. The River Kird runs from east to west, and falls on the southern boundary of the field separating it from the border of the South Downs National Park. A tributary of the River runs around the eastern boundary of the field joining Boxal Brook to the north.

3.30 The Application Site is classified as having a “Low Probability” of flooding with less than 1 in a 1,000 year annual probability of flooding. The Application Site lies on higher ground, 100m south of Boxal Brook and outside of the 1 in 100 year flood extent.

3.31 There are no important aquifers under the Application Site, and it is not in an area where people use water from aquifers for water supply, either public or private. Groundwater in the Weald Clay is unclassified chemically or quantitatively which is indicative of its general status as unproductive strata.

3.32 More details on hydrology and hydrogeology can be found in Chapter 11 Ground and Groundwater Protection and the Flood Risk and Drainage Technical Note.

Geology

3.33 The Lower Cretaceous Weald Basin basins dip southwards towards the South Downs where they become overlain by younger Lower Greensand and Chalk sequences. Arun Terrace deposits are present in patches to the south and south-east of the Application Site. There is a thin strip of alluvium associated with Boxal Brook which extends as far as the northern boundary of the Application Site. The Wealden Beds are underlain by a progressively older sequence of Mezonic and Palaeozoic strata.

3.34 More details on the geology of the area can be found in Chapter 11 Ground and Groundwater Protection.

4.0 PROJECT DESCRIPTION

Introduction

4.1 The Proposed Development involves the siting and development of a temporary well site compound and access road including all infrastructure, equipment and operations associated with the drilling of a vertical borehole and a contingent horizontal borehole from the same well, for the purposes of exploring for hydrocarbons, and the testing and evaluation of any discovered. This Chapter provides a description of the various engineering operations, equipment and infrastructure, phasing and timescales associated with the Proposed Development.

Hydraulic Fracturing

4.2 For the avoidance of doubt, this planning application is for a conventional exploration well and does not seek permission for or require the use of hydraulic fracturing. The Applicant has made a commitment not to fracture this well – Wisborough Green-1, and it may be the case that hydraulic fracturing is not required in the future if hydrocarbons are free flowing.

4.3 Should planning permission be granted for the Proposed Development and the results of the exploratory drilling indicate that hydraulic fracturing would be required to allow production of hydrocarbons, planning permission would be sought for the drilling of a new well. The drilling of a new well and the use of hydraulic fracturing would be subject to further planning approval and all other permitting and regulatory consents including those from the Environment Agency and DECC.

General Overview

4.4 The Proposed Development would begin with the construction of the temporary well site compound and access road before a drilling rig is mobilised on site. Initially a vertical well will be drilled to explore for the presence of hydrocarbons, and if encountered a

short term test may be undertaken to assess their commercial viability. If no hydrocarbons are discovered or the short term tests indicate that the hydrocarbons are not commercially viable, the site will be restored.

4.5 Should short term testing of the vertical well be inconclusive, a horizontal well may be drilled from the existing vertical well. The horizontal well is contingent on the results of the vertical well and may be drilled immediately after the vertical well, or up to 12 months later if further analysis of data from the vertical well is required. If a horizontal well is drilled and oil is discovered either short term testing or an Extended Well Test (EWT) will be undertaken to confirm the commercial viability of the hydrocarbons. Having completed testing of the vertical and/or horizontal well, a decision will be made by the Applicant to either restore the site or retain it whilst a planning application is submitted to WSCC for appraisal and/or production under a DECC approved field development programme.

Principal Elements of the Proposed Development

4.6 In general terms, the Proposed Development consists of the following engineering operations, equipment and infrastructure:

i) Site clearance involving the excavation and storage of top soil;
ii) Construction of temporary earth bunds on the northern and eastern boundaries of the well site compound to store excavated topsoil and subsoil;
iii) Construction of the access track using tarmac at the entrance and crushed stone delivered by HGVs, for its length;
iv) Construction of a temporary well site compound using crushed stone over an impermeable geotextile membrane and including security gate and fencing, an interceptor ditch and small retaining bund;
v) Creation of a staff car park to provide up to 12 spaces within the compound but outside of the drilling area;
vi) Erection of eight portable cabins providing temporary office accommodation, living accommodation for 2 key personnel who need to be on-site to provide 24hr

supervision, plus canteen, toilet and shower facilities for the crews;

vii) Portable skips for on-site refuse collection;

viii) On-site water storage tanks and a separate dedicated fire water supply of at least 50m³;

ix) Construction of a concrete chamber sunk into the ground (the "cellar") to include large diameter conductor pipe which will be pre-set using an augur rig to a depth of around 65ft. The drilling rig will be placed over the cellar, and the well will be drilled through the conductor pipe;

x) Delivery of a drilling rig, most likely a 750 - 1,000 horsepower rig with around a 45m mast including substructure from ground level, and all infrastructure and equipment associated with the drilling of an exploration well including cabins, storage containers and lighting;

xi) The installation of purpose built tanks for the temporary storage of drilling mud and rock cuttings;

xii) External lighting to the drilling rig illuminating of the mast, the rig floor, mud tanks and pumps, catwalk, doghouse and site cabins;

xiii) The use of noise attenuation and dust control measures including effective silencers and wheel washing facilities; the

xiv) Mobilisation of ancillary testing equipment and carrying out of either a short term or an extended well test (EWT); and

xv) The retention or restoration of the site (as applicable).

4.7 The Proposed Development described herein and assessed in the ES, illustrates the worst case scenario or maximum parameters for development. The exact specification of the rig will not be known until a contractor has been chosen and therefore the maximum extent of development has been assessed in the ES and is illustrated on the planning application drawings. The built development will not exceed these parameters in accordance with the "Rochdale Envelope" principle but a degree of flexibility is required before a rig is chosen and the detailed design is finalised.

Phasing of the Proposed Development

4.8 The Proposed Development can be broadly separated into four Phases – construction, rig mobilisation and drilling, testing and aftercare. However, to ensure the EIA accurately assesses the effects of the Proposed Development, the Phases are broken down into sub-Phases, where appropriate, and are referred to throughout the ES (**Table 4.1**).

Table 4.1: Phases and Sub-Phases of the Proposed Development

Phases of the Proposed Development	
Phases	**Sub-Phases**
Phase 1: Construction	-
Phase 2: Mobilisation and drilling	-
Phase 3: Testing	Phase 3a: Testing (gas)
	Phase 3b: Testing (oil)
Phase 4: Aftercare	Phase 4a: Restoration
	Phase 4b: Retention

4.9 The Phases may not be carried out continuously for a number of reasons such as, but not limited to, the availability of a rig or the undertaking of further data analysis. The applicability of the Phases is also dependent upon whether hydrocarbons are encountered or not.

Timescales

4.10 The timescales proposed by the planning application are generally accepted by the Applicant to be a strong indication of the "best" and "worst" case scenarios for the completion of each Phase of the Proposed Development based on their experience, and the geological and seismic data collected to date. However, the unpredictability associated with the drilling of exploration wells means that until operations on site are far advanced, it is impossible to confirm exactly how long it will take to complete each Phase of the Proposed Development.

4.11 For example, if during drilling operations it becomes clear that an extra week is required to complete the well due to unpredictable drilling performance and maintenance or operational delays, the effects of this limited time increase would be negligible and would not warrant the submission of a new or amended planning application. To this end, operations are not expected to exceed the "worst" case scenarios identified in **Table 4.2** but due to the changeable nature of exploration drilling, it is proposed that a method for permitting minimal increases to the proposed timings such as an exchange of letters, is agreed with the Planning Authority should planning permission be granted.

Table 4.2: Timescales and Phasing of the Proposed Development

Vertical Exploration Well			
Phase of Activity		**Best Case Scenario**	**Worst Case Scenario**
Phase 1	Construction	6 weeks	10 weeks
Phase 2	Mobilisation and drilling	6 weeks	10 weeks
Phase 3a	Testing (gas)	1 week	2 weeks
Phase 3b	Testing (oil)	1 weeks	2 weeks
Contingent Horizontal Exploration Well (if applicable then move to Phasing below)			
Phase 4a	Restoration	6 weeks	10 weeks

Contingent Horizontal Exploration Well (up to 12 months after vertical Phase 3)			
Phase of Activity		**Best Case Scenario**	**Worst Case Scenario**
Phase 2	Mobilisation and drilling	6 weeks	12 weeks
Phase 3a	Testing (gas)	1 weeks	2 weeks
Phase 3b	Testing (oil)	2 weeks	26 weeks
Phase 4a	Restoration	6 weeks	10 weeks
Phase 4b	Retention	Prior to Appraisal or Production (subject to planning)	

4.12 Both a best case and worst case scenario have been illustrated in **Table 4.2** with the Applicant using their best endeavours not to exceed the "worst" case scenario during the undertaking of any works. The best case scenario represents the most likely phasing of works but due to the unpredictable nature of exploration drilling, the Proposed Development will be assessed on the worst case scenario so that environmental impacts will not be "worse" than those identified in the ES, although it should be reiterated that the impacts are anticipated to be considerably less. The timescales and phases of the Proposed Development have been presented in a flow diagram to help illustrate the

various outcomes of the Proposed Development (**Figure 4.1**).

Phase by Phase Project Description

4.13 The main elements of the Proposed Development and the associated processes are described in more detail below. This Chapter should also be read in conjunction with Chapter 6 Construction Programme and Management which repeat the programme and describes the mitigation measures, controls and site management principles to be adopted for the Proposed Development.

Phase 1: Construction of the Well Site and Access Road

4.14 Phase 1 is estimated to last for around 6-10 weeks and involves the construction of the highway entrance, modifications to the existing access track, the laying of the new access track and the construction of the well site compound.

Site Clearance and Top Soil Removal

4.15 Sloping downwards from south (20.5m Above Ordnance Datum or "AOD") to north (16.5m AOD), the Application Site falls relatively evenly along the western and eastern boundaries. From the access point on Kirdford Road which lies at 18m AOD, the existing access track rises gently to 19.5m AOD at the south western corner of the Application Site which encompasses the proposed well site compound. As a result of the existing site levels, surplus soil will be excavated to level the site in a 'cut and fill' operation with top and subsoil retained in separate on site bunds.

4.16 All excavated soils will be retained on site for future reinstatement of the Application Site and access road. The topsoil will be stripped off using an excavator and placed in a stockpile as close as possible to the point of excavation. This limits the disturbance of the soil structure and the amount of tracking over both the topsoil and the exposed site formation.

4.17 Topsoil removed from the access road and main well site will be placed as a bund along the northern boundary of the well site compound with subsoil being placed in a separate bund on the eastern boundary of the well site compound (**Figure 4.2**). The height of the bunds will not exceed 3m. A more detailed description of the ground works associated with the site clearance and top soil removal is contained within Chapter 6 Construction Programme and Management.

Site Entrance and Access Track

4.18 The Application Site entrance is situated off Kirdford Road and utilises an existing field access located between two common oaks with a ditch either side, as shown in **Figure 4.3**. The access to the Application Site from Kirdford Road has been designed to allow for "left turn in/right turn out", so that neither of the oak trees adjacent to the entrance need to be removed (**Figure 4.4**). Whilst none of the oak trees need to be removed, remedial works are required for safety or their long term retention. This includes reducing the crown of the tree to the left of the entrance to 4m (T1), and reducing the smaller adjacent oak (T2) to a 4m monolith. No remedial works are required for the two other oak trees (T3 and T4) at the entrance (**Figure 4.5**).

4.19 An existing access off the south side of Kirdford Road has a wide entrance leading into the field, requiring two field gates to close the entrance. The existing gates and fence either side of the gates will be retained, as well as the trees on either side of the entrance. A ditch is culverted under the existing entrance and flows to the east, to discharge into Boxal Brook. The culvert pipe under the entrance will be extended beyond the width of the new entrance and a new headwall constructed of sandbags filled with concrete.

4.20 To allow sufficient width for vehicles to enter the Application Site it is proposed that the existing access will be widened to the to the east, with a temporary covering over the existing ditch of less than 3m which will be formed of a section of pipe with a stone surround.

4.21 As illustrated in **Figure 4.6**, the route of the proposed access track extends south east towards the proposed well site compound rather than following the exact route of the existing access track which extends east along the boundary of the woodland to the north, Northup Copse. This is because HGV traffic would not have been able to turn and pass behind the agricultural building which is required to be maintained in association with the farmer's agricultural workings. The access track as proposed also provides a greater distance from the Root Protection Areas of the woodland, and helps to limit impacts on ecology as explained in further detail in Chapter 7 Ecology.

4.22 The entrance will be widened by about 3m on the east side to enable articulated vehicles to remain on a hard surface, necessitating the removal of about 1.5m of low quality hedgerow. Topsoil will be stripped off this widened area and stockpiled in the area set aside for soil storage, after which the access will be built up with crushed stone laid on a geotextile. The construction would then be overlaid with tarmac. This construction will comply with the West Sussex Highways specification for such entrances.

4.23 The first 15m of the access road, measured from the edge of the road, already has a partial tarmac surface that will reduce the risk of dust or mud being tracked onto the highway. Further protection will be provided to the tree roots in the entrance by placing plates such as Ground-Guards© on top of the tarmac and a second layer of tarmac laid on top.

4.24 When the entrance has been constructed, welfare facilities for the workforce and temporary off-road parking will be prepared in the field within the redline boundary.

Well Site Compound

4.25 The compound as it will be constructed (Phase 1) is illustrated in **Figure 4.2**, and the compound during drilling operations (Phase 2) is illustrated in **Figure 4.7** with cross sectional views illustrated in **Figure 4.8**. The compound is rectangular with a width (east to west) of approximately 96m and a length (north to south) of approximately 55m.

4.26 An interceptor ditch and small retaining bund will be constructed around the compound to collect rain water runoff and contain any potential contaminants such as fuel and oils used in operating the drilling machinery. The fluid contents of the ditches will be used to build the drilling fluid which will help to reduce water requirements during drilling, or it will be removed from the Application Site by a tanker and will be taken to a registered disposal site.

4.27 Due to the contours of the land, some soil moving operations would be required to create a level platform. As stated earlier in this Chapter and as illustrated on **Figure 4.2**, the existing top and subsoil would be stripped and stored as temporary bunds along the northern and eastern boundary.

4.28 Once the topsoil has been removed from an area of the Site, the levelling of the formation will take place on the exposed formation to form the working platform. There is a slight diagonal fall across the Site with a height difference of just over 2.5m from south to north. Surplus soil will be excavated from the higher side and moved to the opposite side to level the site in a 'cut and fill' operation. If the excavated soil is unsuitable for use as fill it will be stockpiled in a separate bund away from the topsoil bund and the site level lowered to maintain a level area.

4.29 The internal site surface would be formed with crushed stone compacted on top of an impermeable Bentomat geomembrane or similar and geotextile layer with a nominal fall to a perimeter interceptor ditch. The interceptor ditch would be 600mm deep and 1.5m wide and lined with an impermeable Bentomat geomembrane or similar, falling to a corner sump area (**Figure 4.9**).

4.30 A large diameter pipe, called the Conductor Pipe, is set into the ground to provide the initial foundation structure for the borehole. We will most likely set the conductor pipe down to 65ft with an augur rig during the site construction process.

4.31 A low bund is formed around the site using excavated subsoil for containment purposes, merging with the ground level when the site is cut into a slope. This containment bund is

separate from the topsoil bund, which is kept separate to avoid contamination of the topsoil. When this work has been completed, the site is ready to receive the drilling rig and its ancillary equipment.

4.32 A number of the activities during the construction phase, such as the laying of crushed stone for the access road and the internal well site surface, require transportation. A detailed description of the anticipated traffic movements associated with this Phase and the potential impact on the local highway network is presented in Chapter 6 Construction Programme and Management and Chapter 10 Transport and Access.

Phase 2: Mobilisation of the Drilling rig and Drilling Operations

Mobilisation

4.33 Mobilisation and erecting the drilling rig takes place over a period of three to four days. A detailed description of the traffic movements associated with the mobilisation and drilling phase is contained at Chapter 6 Construction Programme and Management and Chapter 10 Transport and Access.

4.34 The drilling rig will not necessarily arrive on the Site immediately after the construction has been completed, as it may be committed elsewhere and arrive when that commitment has been completed. However, it is usual to try and synchronise timing so that the rig can move on as soon as substantial completion of the site has been achieved.

4.35 Moving the drilling rig and its ancillary equipment onto a site takes place over a period of up to three days when a haulage contractor transports the drilling rig and its components to the site.

4.36 The precise specification of the drilling rig will not be known until a contractor has been selected although is likely that the rig will be a 750-1,000 horsepower rig with a mast of up to 45m above ground level including the substructure. For the purposes of this planning application, the site layout has been based on an Edeco Rig 10 to illustrate a

typical rig footprint for onshore UK drilling. An example of the Edeco Rig 10 is contained at **Appendix 4.1** to illustrate a typical rig specification along with further examples of the BDF Rig 28 and Drillmec HH220 provided in **Appendix 4.2** and **Appendix 4.3** respectively.

4.37 All of the major components associated with the drilling rig including the on-site water tanks, pipe store, mud and fuel tanks and essential 24 hour staff living accommodation for two key staff including canteen, shower and toilet facilities, are contained within the main drilling compound, as shown in **Figure 4.7**. The mass and scale of the proposed well site compound is determined by the size and layout of the drilling rig including the associated equipment and infrastructure, and the processes which need to be undertaken to evaluate the well in a safe, sensitive and satisfactory manner. **Figure 4.7** shows the anticipated layout of the well site and the standard equipment and infrastructure that is necessary for onshore drilling. Should the rig selection change the well site layout significantly, the Applicant will advise and agree these changes with WSCC prior to works being carried out.

Drilling Operations

4.38 In accordance with DECC requirements, the Applicant will have a Well Examination Scheme in place, where an Independent Competent Well Examiner examines all well operations from design through to abandonment under the Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996. Once commenced, drilling and associated operations would be on a 24 hours per day basis and based on a worst case scenario could last for up to 10 weeks during the vertical well and up to 12 weeks during the contingent horizontal well. The drilling and casing programmes would be designed in accordance with good petroleum industry practice compliance with UK legislation and all regulatory requirements, taking into account the anticipated geology, pressures and objectives of the well.

4.39 The drill string consists of drill pipe, a bottom hole assembly (BHA) and a drilling bit. The drilling bit sits at the bottom of the drill string below the bottom hole assembly, consisting of drill collars and stabilisers. The stabilisers assist with drilling a straight hole

and the drill collars provide the weight on the drilling bit. The BHA is run in on drill pipe which is rotated by a motor at surface or a downhole motor if drilling directionally. The drill bit is designed to drill using a crushing/shearing motion. The weight required on the bit is up to 5000 lbs per inch of diameter, so an 8½" diameter bit will have up to 20 tons weight on it, provided by the drill collars, to drill. The drill pipe and collars are around 30ft in length and have special tapered threads so they can be screwed together. The entire drill string is hollow to allow drilling mud to be circulated while the pipe is rotated during the drilling process. As the hole gets deeper additional lengths of drill pipe are added to the drill string.

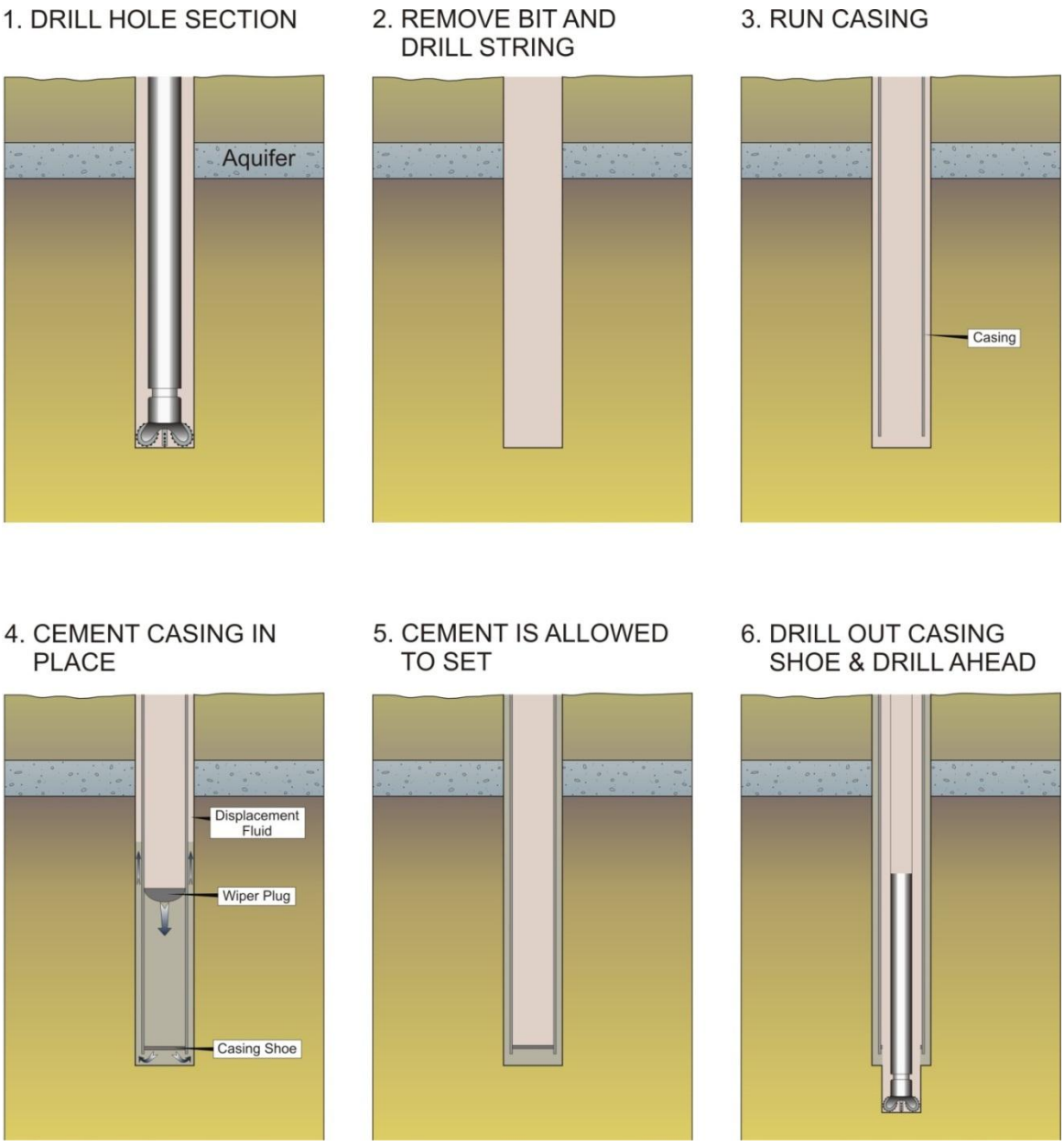
4.40 The drilling mud provides a number of key functions:

- Cleans the bit face and the hole and transports the cuttings away from the bit;
- Controls the fluid pressures in the formations being drilled;
- Maintains wellbore stability;
- Lubricates and cools the drill string and bit;
- Is designed to minimise impact on the environment; and
- The formulation of the drilling mud is carefully controlled by the Mud Engineer.

4.41 The drilling mud is circulated by the mud pumps down the drill pipe and through nozzles in the bit. After the mud passes through the nozzles in the bit it picks up the drilled cuttings and transports them up the annulus between the hole and the drill pipe to the surface.

4.42 Due to the need to protect aquifers and isolate difficult hole sections it is not possible to drill the entire well in one hole size. Concentric strings of casing have to be run to provide the necessary isolation and require a smaller bit size after each casing string is run. Casing is large diameter steel pipe with threaded connectors which allows it to be screwed together. A schematic diagram illustrating a typical casing programme is provided below (**Schematic 4.1**).

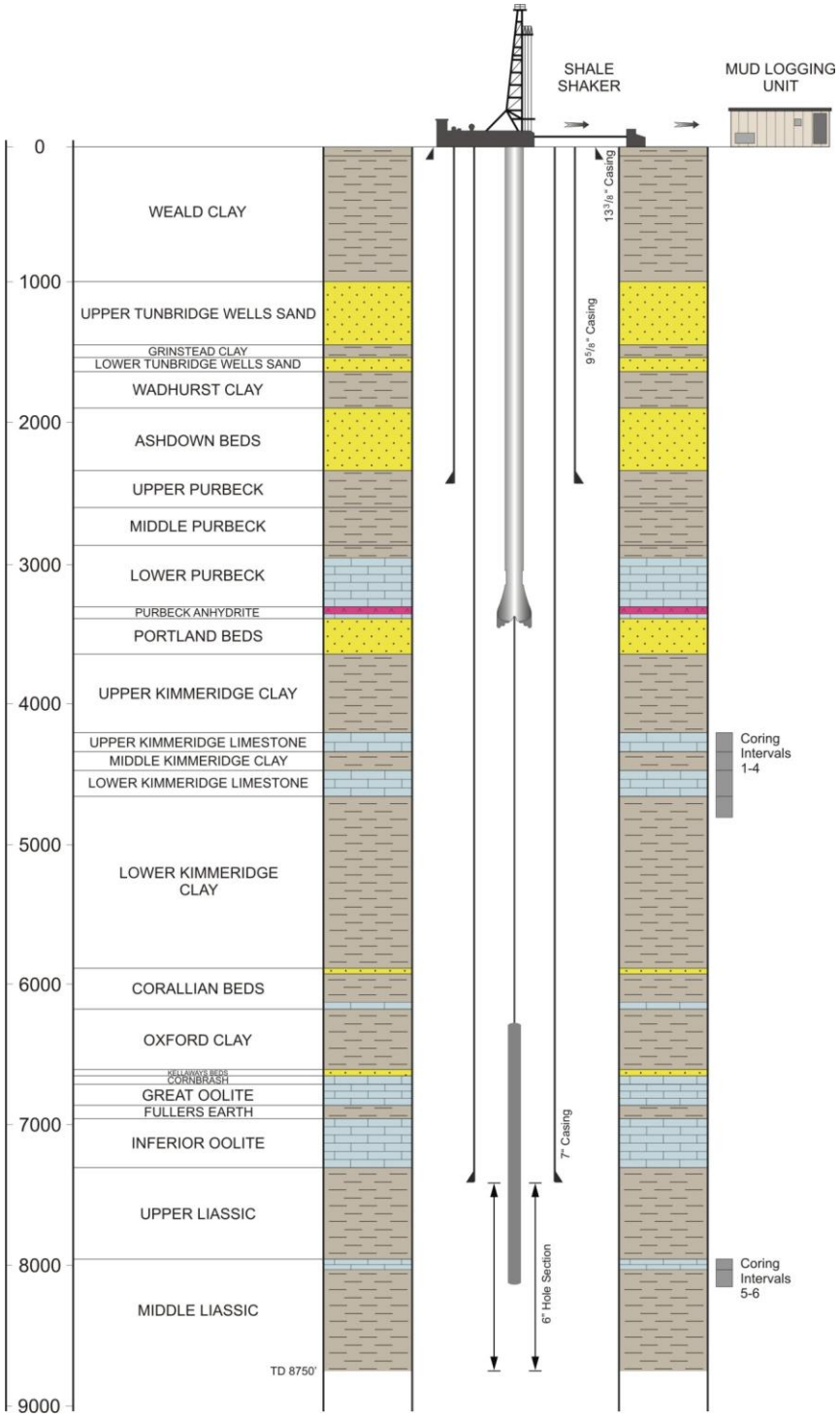
Schematic 4.1: Casing Running and Cementing



4.43 In Wisborough Green 1 the 13⅜" conductor may be pre-set using a small augur rig before the drilling rig is moved onto location. This conductor is required to provide mud returns to the cellar while drilling the surface hole and prevent the cellar being washed out underneath the drilling rig. A 12¼" hole is then drilled down to the Upper Purbeck Claystone at which point 9⅝" casing is run and cemented in place to surface to isolate and protect the Upper and Lower Tunbridge Wells Sand and Ashdown Sands aquifers. The aquifer isolation program will be approved by the Environment Agency. Then the

8½" hole is drilled with some coring in the Kimmeridge Clay and Kimmeridge Limestone, to the top of the Upper Lias at which point 7" casing is then run and cemented to surface to isolate the Kimmeridge, Corallian and Oxford Clays. Finally, a 6" hole is drilled to the target Middle Lias, and cores taken.

Schematic 4.2: The Wisborough Green Well showing geological formations, indicative depths and casing points



4.44 24 hour drilling operations are necessary for a number of reasons:

- The hole can become unstable in certain formations because of swelling clays, so it is beneficial to drill these sections as quickly as possible and isolate them behind casing. 24 hour operations keep the duration to a minimum and reduce the risk of these problems;

- If mud circulation is stopped for extended periods of time the drill cuttings settle to the bottom of the well and pack-off around the drill string. This results in the drill string becoming stuck, which presents a major problem. This could be avoided by removing the drill string from the hole, but this can take several hours and would then take several more hours to re-run back into the hole. This would become highly inefficient with the majority of the working day simply pulling out and re-running the drill string.

Phase 3a: Short Term Testing

4.45 The Applicant anticipates that they are more likely to discover oil (if anything) but the following provisions have been included in the event that gas is found. The Applicant plans to drill to the target formations, log the well and if hydrocarbons are found, run a short duration well test. A well test is a procedure for isolating and testing a potentially hydrocarbon bearing formation using a temporary well completion and production system. The test is designed to evaluate flowrates, deliverability and obtain fluid samples. The testing programme would begin with a short clean-up flow of the oil and/or gas. The flowstream will be passed through a separator, where it is split into oil, water and gas. The oil and water are stored in tanks prior to transportation to a refinery or water disposal facility and the gas is vented and flared in accordance with UK legislation and all regulatory requirements as enforced by the Environment Agency. The gas has to be vented and flared because there is no practical way to store it or introduce it to the gas distribution system (**Figure 4.10**).

4.46 A routine well test programme involves flowing the well to assess the flowrate and

acquire samples of the produced fluids, and is generally carried out in daylight hours unless an operational reason requires for evening or night time use. Memory pressure gauges are run into the well and record pressure and temperature data adjacent to the producing formation. The test is not continuous, but follows a sequence of flow and shut-in periods. It is likely that a series of tests will be run but these are likely to last for no longer than two weeks in total. This process requires a small amount of gas to be burnt off rather than released untreated into the atmosphere. There are three potential gas flaring systems which could be used on the site and are categorised as;

1. A basic flare;
2. A shielded flare; or
3. A Clean Enclosed Burner (CEB).

4.47 A basic flare consists of an open flame in an excavated pit surrounded by a bunded area on three sides with a designated safety exclusion zone, as shown in **Figure 4.11**. The flare pipe enters the pit on the open side and is laid horizontally at ground level to minimise the height of the flare above the bund. This method will create minimal noise, and will have limited visual impact due to the surrounding bunds. A shielded flare is similar to a basic flare but includes an external protective covering to provide a shield to the flame and heat. Both of these processes cause a slight rumbling noise. A CEB is a fully enclosed burner which completely encloses the flare so the flame is not visible. CEB's are only designed for use with high volumes of gas and are not usable with the low levels of oil associated gas. In the flaring process itself, inside a CEB the gas is mixed with air in a diffuser and burned to achieve total combustion. This process is the noisiest of the three flaring options, and a CEB is only used if high volumes of gas are produced which is not anticipated from this well.

4.48 As illustrated in **Figure 4.11**, the flare pit is located on the eastern boundary of the proposed well site compound and is enclosed by soil bunds of approximately 2.5m in height to limit radiated heat and obscure the flame. This flare area is constructed during the site construction phase to avoid disruption when the drilling rig is on site, and uses subsoil excavated from the Application Site to add screening to the flare.

4.49 Noise during testing will be no worse than the levels provided for the CEBs which is the noisiest flaring method, measuring at 65dB at 200 yards for CEB model 4500 (**Appendix 4.4**). Noise levels will be limited due to the short term nature of a routine gas flare programme. A comprehensive description of the anticipated noise levels associated with this testing phase and the potential impacts on local receptors is presented within the noise assessment at Chapter 9 Noise of this ES.

Phase 3b: Testing (oil)

Short term testing

4.50 If oil is detected in the cores and cuttings samples recovered whilst drilling the well, and subsequent analysis confirms the presence of oil, a Drill Stem Test (DST) may be run to see if the oil will flow freely and in sufficient quantities to justify further appraisal. The duration for DST testing of oil typically takes approximately two weeks to complete.

4.51 Flaring during testing will be at a lesser noise level as those identified above in Phase 3a, as the gas volumes will be significantly less. A generator would not be required on-site for power as the drilling rig will be on site during this time. Further details on noise can be found in Chapter 9 Noise.

Extended Well Testing

4.52 In the event that the initial short term testing provides encouraging results, the Applicant may decide to run an Extended Well Test (EWT). Should this be the case, the well would be completed, and the drilling rig would be dismantled and taken off site. The rig demobilisation is the reverse process to the earlier mobilisation, leaving the wellhead in place and a cabin on the Application Site for monitoring staff. A beam or linear pump including all of the associated infrastructure would be mobilised on site for the EWT. For the purposes of this planning application, the EWT equipment has been based on a linear pump, the Unico Linear Rod Pump, details of which can be found in **Appendix 4.5**.

4.53 An EWT could run for 90 days or up to 180 days with permission from DECC and other regulatory agencies. This planning application assesses up to 180 days as the worst case scenario and the EWT would involve installing the following equipment:

- Storage tanks for produced oil and formation water contained in a bunded area;
- An oil/water/gas separator for the separation of the produced well stream also contained within the bunded area;
- Transfer pumps to transfer fluids between the storage tanks and also to road tankers for export;
- A flare stack to vent or flare any produced gases;
- A pumping unit on the well, mostly likely a linear rod pump or similar, to draw oil to the surface (it is unlikely that the oil will flow to surface naturally);
- An emergency shutdown system on the well to stop production and shut the well in in the event of an emergency situation.
- Portacabin offices to house the pumping unit control equipment and provide an office and facilities for the well operators.

4.54 Flaring during testing will be at a lesser noise level than that identified above in Phase 3a due to the lower volumes of gas. A generator would be required on-site for power and this is likely to be the P165E1 generator or similar which is stated as being 70dBA at 7m. Further details on noise can be found in Chapter 9.

4.55 Once this equipment has been installed and commissioned, production operations would continue 24/7 throughout the designated period (**Figure 4.10**). Production and pressure data would be gathered to allow Celtique to evaluate the long term production potential of the well and collect bottom hole fluid samples for analysis.

4.56 Initially, the producing well will be monitored in accordance with health and safety regulations and good oilfield practice.

4.57 All produced fluids (oil and water) during the testing phase will be exported from the

well site by road tanker. Chapter 6 Construction Programme and Management and Chapter 10 Transport and Access set out the likely traffic movements during this phase of the Proposed Development.

Water Supply

4.58 Water would be required to make up the drilling mud used to drill the well. The supply of water would be delivered by tankers to two on-site storage tanks. It is estimated there would be an initial requirement of up to eight tanker loads for the first three days of drilling reducing to two tanker loads or less thereafter. Total water requirement for the drilling operation is anticipated to be around 1,000-3,000m³, which is re-circulated during the operations to minimise the volumes needed and then disposed of at the end of the well at an approved site.

4.59 Notwithstanding the two on-site water storage tanks, there will also be a separate dedicated fire water tank with a capacity of at least 50m³ which will be delivered to site using tankers.

Lighting

4.60 As discussed above, the drilling operation would be carried out for 24 hours per day. In order to operate 24 hours a day, lighting would be required during the hours of darkness. The indicative position of the lights within the Application Site and on the drilling rig can be seen on **Figure 4.12**, although different rigs are equipped with different lighting. The following lighting would be required for the Proposed Development;

- Five freestanding 3 metre high fluorescent lights facing inwards and downwards towards the Application Site;
- Eight Tungsten filament bulkhead lights located on site cabins;
- Two horizontal strip lights at cabin level adjacent to the rig; and
- Inward facing lighting within the derrick of the drilling rig.

4.61 A comprehensive assessment of the proposed lighting scheme is presented at Chapter 12 Lighting of this ES.

Phase 4a: Restoration

4.62 Should no hydrocarbons be encountered or upon completion of testing operations the results indicate that the hydrocarbons are not commercially viable, the well would be abandoned by plugging the well in accordance with standard industry practice. This involves setting cement plugs at various points within the wellbore to provide isolation, cutting the steel casing approximately at least 2m below the surface and capping the well with a steel plate. Rigging down and demobilisation of the drilling rig would take approximately three days. All structures including welfare and support buildings, the drilling rig and storage tanks would be removed. Any remaining drilling mud and cuttings waste would be removed from the site along with the perimeter ditch-lining and disposed of at an approved disposal facility.

4.63 In restoring the site, the well cellar and all stone is removed, and the soil which has been stored in the on-site bunds, is replaced. Post and wire fences would be erected to protect the freshly worked soils from livestock if required and the farmer would usually take them down at his own convenience. The aftercare of the site is also sub-contracted to the farmer so he can time the work to suit his own operations.

4.64 Stored subsoil and top soil would be loosely spread over the re-graded ground to relieve compaction. The Application Site would be re-contoured and allowed to regenerate naturally without the use of grass seed or planting and possibly replanted with trees in the future.

4.65 The proposed reinstatement programme would be agreed with West Sussex County Council in writing prior to commencement of the work but an indication of the proposed scheme can be seen in **Figure 4.13**.

Phase 4b: Retention

4.66 If commercially viable deposits of oil or gas are located and tests prove positive, the Application Site may be retained whilst the information that has been gathered is processed and analysed, and options for appraisal or production are considered.

4.67 In the event of retention, the well would be suspended. The Application Site would be cleaned as for restoration but the stone surface, drainage ditches and the cellar would be left in place. A safety cage would be built around the wellhead assembly and all valves closed, pending a decision to carry out further works. All fence lines would be retained and maintained, and gates across the entrance would be locked to deter unauthorised access.

4.68 Should the decision be made to undertake further engineering activities, a new planning application would be prepared and submitted to the Council for determination. The well site would be retained for a period of between 6-24 months pending the outcome of the planning application.

5.0 NEED AND ALTERNATIVES

Introduction

5.1 The first part of this Chapter assesses the need for the Proposed Development which primarily arises from:

- Depleting domestic reserves of oil and gas and a growing dependency on foreign imports; and
- A national energy strategy which seeks to maximise the economic production of the UK's domestic energy sources.

5.2 The demand for, and supply of hydrocarbons in the UK and the increasingly important contribution that onshore oil and gas production makes to the national energy market and economy, is also addressed. The second part of the Chapter describes the main alternatives to the Proposed Development which have been considered by the Applicant. Under the EIA Regulations, an ES is required to provide;

> "**an outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for the choice, taking into account the environmental effects**."

5.3 A detailed Alternative Sites Assessment Report has also been prepared as part of the planning application for the Proposed Development, and can be read for a more in depth review of the alternative sites considered (**Appendix 5.1**).

National Governance on Energy

The Department of Energy and Climate Change

5.4 Under powers granted by the Petroleum Act 1998, DECC is responsible for issuing

licences for onshore oil and gas exploration which are referred to as Petroleum Exploration and Development Licences (PEDL), and is also responsible for regulating field development and pipeline activities. Licences take the form of a deed which binds the licensee to obey the conditions of the licence and DECC expects companies to work their licences.

5.5 In recent years a number of rights and areas of acreage have been left untouched and unexploited limiting the economic recovery of oil and gas. Licences confer rights to the oil and gas company to pursue a range of oil and gas exploration and development activities and to "search for, bore for and get hydrocarbons" within a geographical area covered by the Licence. The issuance of a Licence, the duty to fulfil the associated conditions and the rights conferred by the Licence all support the need for oil and gas exploration in the UK at a national level.

National Energy Policy

The Energy White Paper: "Meeting the Energy Challenge" (2007) (Ref: 5.1)

5.6 The Energy White Paper was published by the former DTI in May 2007. It sets out the Government's international and domestic energy strategy in response to growing evidence of the impact of climate change and the need to cut greenhouse gases, rising fuel prices, a growing awareness of the risks of relying upon oil and gas imports from a small concentration of countries, and the need for the market to make substantial new investment in power stations, the electricity grid and gas infrastructure.

5.7 The need to reduce carbon emissions whilst ensuring secure energy supplies means that for now, the UK cannot rely on renewable energy sources alone. In terms of promoting a diverse energy mix it is stressed by the White Paper that fossil fuels will continue to play an essential role in the UK's energy system for the foreseeable future. To ensure 'security of the supply' a crucial element of the Government's energy strategy is to maximise the economic production of our domestic energy sources which, together with the UK's energy saving measures, will help reduce our dependence on energy imports.

Overarching National Policy Statement for Energy (EN-1) (2011) (Ref: 5.2)

5.8 On 18th July 2011 the House of Commons debated and approved the six National Policy Statements for Energy (NPS). The energy NPS's set out national policy against which proposals for major energy projects will be assessed. Whilst the proposed development is not classed as a major energy project, EN-1 adds context to the national overarching energy strategy.

5.9 In terms of future energy supply the Government states at page 30 of EN-1, that fossil fuels play a vital role in providing reliable electricity supplies and;

> **'….provide diversity in our energy mix. They will continue to play an important role in our energy mix as the UK makes the transition to a low carbon economy, and Government policy is that they must be constructed, and operate, in line with increasingly demanding climate change goals'.**

5.10 In regard to the need for further infrastructure, in particular gas related development, Government policy states at page 38 that:

> **'whilst the gas market is largely robust to a range of adverse events, the risk of shortfalls in supply cannot be ruled out, nor the risk that there may need to be significant rises in wholesale gas prices in order to balance the market. Further infrastructure – beyond that which exists or is under construction at present – will be needed in future in order to reduce supply or price risks to consumers'.**

The Energy Act (2011) (Ref: 5.3)

5.11 On 18 October 2011, the Energy Bill received Royal Ascent and became the Energy Act

2011. The Energy Act is part of a step change from the Coalition Government to make energy more efficient for homes and businesses, and improve our energy framework to enable energy supplies from secure low carbon technology, and fair competition in energy markets.

5.12 Part 2 of the Act is entitled "Security of Energy Supplies" and Chapter 1, Part 79 sets out legislation for Ofgem to provide an Annual Report on "future demand for, and supply of, electricity in Great Britain" and under Part 80 what "electricity supply capacity is required". The first of these Annual Reports was published in 2010 and is considered below. Chapter 3 of the Act deals with "Upstream Petroleum Infrastructure" and Part 82 acknowledges that the Secretary of State should take into consideration "(f) the need to maintain security and regularity of supplies of petroleum".

Annual Energy Statement (2010) (Ref: 5.4)

5.13 The Annual Energy Statement (AES) published in 2010 acknowledges the mission of the Government to "support the transition to a secure, safe, low-carbon, affordable energy system in the UK". The AES at page 2, acknowledges the following;

> **"Demand for fossil fuels is set to increase with the huge rise in population and wealth of emerging economies. In parallel, as recent events in the Gulf of Mexico have shown, the costs and risks of extracting fossil fuels from more remote locations are rising. With the UK's own oil and gas resources declining, unless we act now, we will become more vulnerable to high and volatile oil and gas prices".**

5.14 In securing oil and gas supplies, the Government acknowledges the use of new sources of gas (including shale gas) and notes that in light of the Deepwater Horizon incident, there is a need for "the highest standards of safety management and tough environmental standards" rather than a moratorium against such developments. The AES states that recent gas disputes in Europe only underline the importance of the need

to improve our energy security, develop low carbon sources of supply while also reducing energy consumption. The AES notes that the UK's own indigenous supplies of oil and gas remain important and "we must maximise economic production while applying effective environmental and safety regulations" (page 9).

5.15 As a point of action (Action 11, page 10) the AES states that the forthcoming Energy Security and Green Economy Bill will seek to ensure that access to UK oil and gas infrastructure is available to all companies. The AES states that "this will help the exploitation of smaller and more difficult oil and gas fields, allowing us to make the most of our natural resources".

The Annual Energy Statement (2011) (Ref: 5.5)

5.16 The Annual Energy Statement (AES) was delivered by the former energy minister Chris Huhne, to Parliament on 23 November 2011, and describes the progress of the Coalition Government on their energy policies and emerging initiatives including the Green Deal. The AES reflects a crucial part of DECC's strategy to reduce the amount of energy we use. In respect of electricity, DECC are "working to secure Britain's energy supplies" and the AES notes that the UK needs "significant new investment in power plants and infrastructure to meet future demand". The 2011 White Paper on electricity market reforms aims to attract infrastructure investment for a diverse mix of energy sources including "renewables, new nuclear and fossil fuels – including carbon capture and storage". Each of these energy sources is considered as being "important" and over the past year, the Government has "introduced a range of policies to support them".

5.17 In respect of technologies, the AES (2011) again highlights that "fossil fuels will remain important" and that "gas will continue to feature strongly in our energy mix" with Government policies being "designed to allow new gas plant to be built". The AES also recognises that from 2001 to 2009, fuel poverty doubled due to the increasing cost of fuel. The AES states that the energy sector also makes a significant contribution to employment and the economy, providing more than half of our industrial development.

The AES concludes that the UK "must secure huge investment in our energy sector" to build the power plants that will fuel our prosperity and the infrastructure that will deliver it.

The Annual Energy Statement (2012) (Ref: 5.6)

5.18 The 2012 AES identifies "two immediate priorities for UK energy policy: upgrading our energy infrastructure in order to rebuild our economy, and putting households back in control of their energy bills" (page 6). The AES acknowledges that there is a cautious investment climate but that "energy projects represent the largest infrastructure investment opportunity in the UK and make up nearly half the total infrastructure investment pipeline in the UK". In 2011, the energy industry "contributed 4.4% to UK GDP" and around £12.7 billion of investment and 22,800 jobs in the UK from 1 April 2011 to 31 July 2012 (page 7).

5.19 In respect of oil and gas, at page 7 the AES states that "the Government continues to offer new licences and develop the fiscal regime to encourage investment in indigenous oil and gas production for the economy and security of supply". Moreover, the AES continues that;

> **"DECC will also support new ways of tapping our indigenous resources, where this proves economic, and subject to ensuring, through robust regulatory controls, that extraction can be carried out safely and with full regard for protection of the environment".**

5.20 The policy framework set out in the AES (2012) combined with other key strategic documents will show how the Government "will deliver a balanced energy policy acting to bring forward investment in every aspect of our energy infrastructure". This includes investment in "new gas power plants, in maintaining UK oil and gas production" and "gas infrastructure" amongst other opportunities (page 8).

The National Planning Policy Framework (2012) (Ref: 5.7)

5.21 The National Planning Policy Framework (NPPF) was published in March 2012 and recognises that minerals "are essential to support sustainable economic growth and our quality of life". In this regard, the NPPF also states at paragraph 142 that;

> **"it is therefore important that there is a sufficient supply of material to provide the infrastructure, buildings, energy and goods that the country needs".**

5.22 At a national level, the need for modern energy infrastructure and the development of indigenous supplies is clearly supported through policy. This is further evidenced by a number of Government reports and research on energy mix, security of supply and demand which has been considered herein.

5.23 Recent government documents identified above promote the development of renewable energy sources but also accept that fossil fuels will remain a significant part of our energy mix for the foreseeable future. The UK government promotes the development of our domestic fossil fuels to maintain security of supply, minimise our reliance on imports and vulnerability to shortages and high prices, and to support the economy particularly the oil and gas supply chain in respect of employment as well as tax revenues.

5.24 The government shows significant support for the development of new energy infrastructure especially for gas, and more recent publications and guidance make specific reference to emerging health and safety or environmental controls. Gas and oil supply also plays a role in supporting the development of renewable energy sources, and in particular wind power. The need for additional fossil fuel infrastructure is recognised in the following national policy documents.

5.25 National energy policy clearly identifies the need for additional oil and gas infrastructure

in the UK, in order to improve energy security and market efficiency. The need for additional energy infrastructure and supplies is urgent, and this is recognised in the preceding national policy.

The "No Development" Alternative

5.26 The "No Development" Alternative is the option of retaining the Application Site in its current use rather than carrying out the Proposed Development. The "no development" alternative would see the Application Site continuing in agricultural use with no corresponding effects arising from landscape and visual impact, ecology, noise, traffic, lighting and socio-economics associated with the construction, operation and restoration or retention of the Proposed Development.

5.27 The Department for Energy and Climate Change (DECC) is responsible for making sure "the UK has secure, clean, affordable energy supplies", and is responsible for issuing Petroleum Exploration and Development Licences (PEDL) for onshore oil and gas exploration. Licences take the form of a deed, binding the licensee to obey the conditions of the licence which DECC expect the operator to work (DECC website, 2013). The issuance of a Licence, the duty to fulfil the associated conditions and the rights conferred by the Licence all support the need for oil and gas exploration in the UK at a national level.

5.28 National Energy Policy set out in the Energy White Paper seeks to reduce the risks associated with relying on oil and gas imports from a small concentration of companies but acknowledges the need to reduce carbon emissions and ensure security of supply. On this basis national energy policy accepts that for now the UK cannot rely on renewables alone and promotes energy saving measures through the Energy Act (2011). The White Paper also advocates a diverse energy mix with fossil fuels being an important part of that mix for the foreseeable future and this is supported more recently by the National Policy Statement for Energy (EN-1) 2011.

5.29 Ofgem's Annual Energy Statements (AES) acknowledge that without action the UK will

become susceptible to high and volatile oil and gas prices. In securing our supplies, the 2010 AES recommends high standards of safety and environmental management rather than moratoriums on development. DECC's strategy is to reduce energy usage whilst also making the best use of our domestic oil and gas resources including shale, and the 2011 AES acknowledges that the UK needs significant new investment in energy infrastructure to meet future demand.

5.30 With fuel poverty having doubled from 2001 to 2009 due to the increasing cost of fuel and with the energy sector making a significant contribution to employment and the economy, the Government recognises the positive socio-economic aspects associated with energy developments. The 2012 AES notes that in 2011, the energy industry contributed 4.4% to UK GDP, around £12.7 billion of investment and 22,800 jobs in the UK. The UK planning strategy supports the Government's energy strategy and the NPPF recognises that minerals are essential to support sustainable economic growth and our quality of life. Therefore ensuring sufficient supply is essential.

5.31 The Proposed Development aims to establish if there is oil or gas present within this area of the Central Weald Basin and secondly to establish the unconventional potential, if any. By not developing the proposed well site and exploring the Basin within PEDL 243, the Applicant would be in breach of the Conditions of their Licence and would not be in compliance with the national strategy on energy. Exploration is just the first step in establishing new domestic resources which if discovered and producible, would increase our security of supply and reduce our dependency on other countries for fuel. In turn, a successful discovery could reduce the UK's susceptibility to volatile price rises whilst also providing socio-economic benefits including employment, reduced energy prices, investment and tax contributions.

5.32 The accompanying Environmental Statement (ES) concludes that all but one of the effects is temporary whilst the single permanent effect can be suitably mitigated from a moderate to negligible effect. The significance of the temporary effects range from moderate adverse to moderate/minor beneficial with mitigation being proposed as such that the residual effects are reduced to negligible, minor adverse or moderate/minor

beneficial. The only exception to this is Landscape and Visual Impact where the significance of effects were considered to be more adverse in comparison to the other disciplines and ranged from major/moderate to minor adverse. With mitigation the residual impacts are reduced to mostly moderate and minor adverse with two major adverse effects relating to landscape character during operation although these are all temporary effects.

5.33 Whilst the residual environmental impacts in the vicinity of the Application Site are expected to be temporary and mostly negligible or minor adverse with the exceptions identified above, the "no development" alternative would result in adverse socio-economic effects. It would also be contrary to national energy and planning guidance on the development of our domestic onshore oil and gas resources. These adverse socio-economic impacts outweigh any beneficial impacts that would arise from the "no development" alternative.

Assessment of Alternative Sites

5.34 Having established a need for the development of hydrocarbon supplies in order to meet growing demands, this part of the Chapter provides an overview of the Alternatives which were assessed as part of the site selection and design process. A full copy of the Alternative Sites Assessment accompanies this planning application submission and provides a more comprehensive review of the process undertaken (**Appendix 5.1**).

Search Area

5.35 The search area is defined following the collection and evaluation of geological and seismic data, and the identification of a structure or "target reservoir" within the geological basin which in this case is the Central Weald Basin. The target reservoir is the area that the Applicant will seek to explore and evaluate by drilling an exploratory borehole. Having undertaken a review of the data within Petroleum Exploration Development Licence (PEDL) 234, the Applicant and their team of geologists and drilling engineer, identified a target reservoir for exploration within the Central Weald Basin.

Using seismic and geological data, the Applicant defined a primary and secondary search area around the target reservoir where the Basin is at its greatest depth and maturity, therefore increasing the chances of encountering hydrocarbons and proving the concept of the geological play i.e. that there are hydrocarbons present.

Geographical Location

5.36 The search area is generally located in between the villages of Ifold to the north, Wisborough Green to the south east and Kirdford to the south west, and bound by the B2133 to the east and Plaistow Road to the west. The search area is approximately 4km in length and 2.5km in width but does not encompass any of the local towns and villages. The search area covers a number of farmsteads and agricultural land, and falls within the parishes of Loxwood, Wisborough Green, Plaistow and Kirdford.

5.37 The A272 is located to the south east of the search area near the village of Wisborough Green providing a main vehicular route. The B2133, Skiff Lane and Plaistow Road run in a north to south direction through the search area with Loxwood Road and Kirdford Road running in an east to west alignment along the northern and southern boundaries of the search area. Boxal Brook runs through Kirdford and Wisborough Green, and the South Downs National Park in the southern part of the search area.

Methodology

5.38 The identification of potential sites begins by marking out the primary and secondary target search areas which are based on geological and seismic data, using Geographical Information Systems (GIS). The primary search area represents the deepest part of the Basin within this part of the subsurface and the preferred area for drilling. The environmental constraints within these two search areas and the immediate surrounding vicinity are then layered onto the map using the same software. Finally, a 400m radius is plotted around all known residential buildings to represent a suitable “buffer zone” between residential properties and the development of any potential hydrocarbon well sites, to limit noise intrusion prior to the carrying out of a full noise assessment and the

identification of any necessary mitigation measures.

5.39 On the Constraints Plan, the parcels of land within the search area that are left unaffected by any of these constraints are the first to be appraised against planning policies and guidance in terms of suitability for a well site. These parcels of land may constitute several fields and when numbered on the plan, do not indicate the location of the site itself but an area within which a site might be accommodated.

5.40 There is a degree of flexibility with this Methodology as well as some limitations which should be taken into consideration:

- The 400m buffer zone process can sometimes identify non-residential buildings such as barns, garages and other outbuildings. Where a residential building appears to be an anomaly i.e. in a remote location or small in size, clarification over the building use can usually be obtained through the Council's Public Access website or through a site visit. This can, however, be time consuming and will only be carried out where without this building may be otherwise suitable for development i.e. there are no other buildings or environmental constraints, or where there is established natural screening;

- The 400m buffer zone can be reduced to 300m where no suitable sites are identified in the first instance. The industry standard for limiting noise intrusion is considered to be approximately 300m from the source although this distance can be decreased further with additional mitigation. Whilst our Methodology proposes 400m as a preferable distance, there are instances where it is acceptable or necessary to reduce this distance due to the significance of constraints. This is particularly the case where a site has other merits such as high tree cover, an existing access or is located on level ground;

- It is important that the Constraints Plan is read in conjunction with the adopted Local Plan and Proposals Map, and applied separately where applicable.

5.41 The site selection methodology adopted is considered to provide a robust and systematic process for identifying suitable sites.

Sites Identified

5.42 Using the Methodology as outlined above, a total of eleven potential sites were identified within the primary and secondary search areas. The potential Sites were identified from **1-11** in no order of preference, and a brief summary of the findings for each Site including the Application Site is provided below.

Site 1

5.43 The location around **Site 1** was discounted on the basis that vehicular access to the locality was heavily restricted, and a new access road would have long term and likely significant landscape and visual impacts. A new access road would need to be long to connect the Site to either Skiff Lane or Plaistow Road and this would extend works and disruption associated with the Proposed Development. Moreover, this would require trees to be felled and hedgerows to be removed which would have a more significant impact on the landscape and ecology whilst also causing visual impacts particularly to users of the Estate road leading up to the historic house.

Site 2

5.44 **Site 2** was considered to have some potential for development if a suitable vehicular access could be identified and providing that screening to the surrounding residential properties could be achieved. Any long term production site would require further landscaping to enhance views particularly from the south and south east, where landscaping exists only on the field boundary and not the Site boundary. Investigations into ecology and drainage would also need to be undertaken early due to the location of watercourses and the reservoirs, as well as the designation of Ancient Woodland.

Site 3

5.45 There was considered to be limited potential to develop a well site in this location because of the significant access, flood risk and topography issues. The positives of the Site are that it benefits from some screening, is located away from densely populated areas and is in the primary search area. The surrounding woodland at Hookhurst Copse, Naldretts Copse and Bittles Wood is all designated an Ancient Woodland and there is insufficient clearing within Hookhurst Copse to develop a well site when applying the RPA's. **Site 3** was therefore discounted.

Site 4

5.46 **Site 4** was discounted on the basis that there was limited land available to accommodate a well site and associated infrastructure at a suitable distance from surrounding properties and without extensive felling or disruption to field boundaries. In addition, the limited number of roads which lead towards the Site are rural - being narrow and tree lined, and would not be suitable for HGV access. The proximity of the Site to a number of watercourses, limited highway access with a new access road likely to require substantial tree and hedgerow removal, and the use of existing roads likely to cause disruption to a number of villages.

Site 5

5.47 The main field marked **Site 5** on the Constraints Plan was considered to have potential for development because it is well screened although views north to Dounhurst Farm may need enhancements through landscaping in the long term. The Site is also in the primary search area and outside of the SDNP. It would require only a small access road, albeit following the path of a PROW, into the southern part of the field and vehicles could reach the site using the A272 to the south which is a main road through the local area. The land is relatively flat and would provide sufficient acreage to accommodate a well site whilst also respecting the RPA's.

Site 6

5.48 **Site 6** was considered to have potential for development because of its vehicular access and proximity to the A272 – a main transport route, natural screening provided by the surrounding mature woodland and the suitable distances from residential properties. The existing pylons are around 80m high and therefore vertical structures are already present in this field of a greater height than a drill rig but at a sufficient distance from the site. It is not affected by PROW and does not fall within the SDNP. Falling within the primary search area and on a level topography the site was also considered suitable from a geology and engineering perspective. The site was unlikely to require substantial, if any, tree or hedgerow removal and therefore it would be unlikely to result in long term or likely significant landscape impacts as some of the other sites which were considered would have.

Site 7

5.49 **Site 7** is located to the south of **Site 6** within the same agricultural field but falls on the boundary of the South Downs National Park and on the edge of the primary search area. The Site was considered to be less favourable in comparison to **Site 6** because it was in greater proximity to the National Park and the environmental designations associated with The Mens. A Site in this southern part of the field would also need a longer access road, be in greater proximity to watercourses to the south and would need to pass under the electricity pylons. The Site was therefore quickly discounted from any further consideration as a potential well site location with **Site 6** offering greater potential for development in comparison.

Reducing the 400m buffer zone

5.50 Having identified 7 Sites using the 400m buffer around residential properties, for completeness, the buffer was reduced to 300m to see if this identified any other locations which may be suitable notwithstanding the merit of **Sites 2, 5** and **6** which had already been identified. A further four potential sites (**Sites 8-11**) were identified.

Site 8

5.51 The existing trees provide good natural screening to the Site from the road and surrounding area but the development would be limited to the small field marked as **Site 8** on the Constraints Plan. Taking into consideration the tree RPA's it would not be possible to locate a well site including HGV turning circle and passing places, and all the ancillary infrastructure including parking and bunds in this field without felling trees and changing field boundaries. This would have long term visual, landscape, drainage, heritage and ecology impacts as a result of material changes to the existing landscape. **Site 8** was therefore discounted for the reasons identified above.

Site 9

5.52 Due to the limited size of the field it would not be possible to accommodate a well site at **Site 9.** There is insufficient space within the field unless trees are felled and field boundaries are realigned and the PROW moved. The development in this location would also front directly onto the Wephurst Estate road which as previously discussed not suitable for HGV access as there are limited opportunities to widen the road. A development here would have long term visual, landscape, heritage and ecology impacts as a result of material changes to the existing landscape, and was therefore discounted.

Site 10

5.53 **Site 10** is limited in size which would constrain development and require changes to field boundaries, tree felling or hedgerow removal to accommodate the well site which would have long term impacts on the landscape, visual amenity, ecology and heritage. The field provides a maximum size of approximately 90m x 130m but tree root protection zones would reduce this size by a maximum of 15m on all boundaries with trees rendering the site unsuitable for development.

Site 11

5.54 The Site is in proximity to the South Downs National Park and other associated designations including The Mens SSSI and SAC. The Site was discounted relatively quickly considering the open landscape at a road junction, the proximity of sensitive environmental designations and residential properties, and because more favourable Sites had been identified as part of the original site search exercise.

Results of the initial desk based assessment

5.55 The initial site search exercise identified 11 sites including four in the primary search area and seven in the secondary search area. The exercise concluded that eight of these sites (**Sites 1, 3** and **4**, and **7-11**) should be discounted whilst the remaining three locations were worthy of further investigation (**Sites 2, 5** and **6**).

5.56 The site recommendations were reviewed by the Applicant's operations manager, drilling supervisor and geologists. A fault line to the north of **Site 5** determined that this site should be discounted and for the same reason **Sites 8** and **9** were deemed to be less geologically suitable in comparison to **Sites 2** and **6**. The operations manager and drilling supervisor confirmed that drilling from within the primary search area was preferable and that preference was to investigate **Site 6** further with **Site 2** as a secondary preference although the highway constraints in particular, were noted.

Site Visits

5.57 A site visit by the Applicant's planning consultant and drilling engineer in October 2012 concluded that the results of the desk based exercise were accurate with the search area being significantly constrained particularly in respect of highway access, topography and the need to minimise impacts on villages. It also concluded that Site 6 was the preferred option with Site 2 being a secondary option although highway access was likely to have significant constraints and greater environmental impacts. **Site 8** was given some further consideration because of its proximity to the road and natural screening although

concerns about site size and geological suitability remained. It was also noted that the land was for sale at the time.

5.58 The site visit concluded that **Site 6** was the most suitable option for development with very limited potential at **Site 2**. With such limited potential for development prior to even speaking with the landowners, it was decided that as the land at **Site 8** was for sale an approach would be made to the landowner for optionality.

Discussions with landowners

5.59 The landowners of the three potential well site locations were identified using the Land Registry. The landowner for **Site 2** which is managed by a Trust, did not want to enter into negotiations leaving only Sites 6 and 8 with any potential for development with the latter unlikely to be suitable. The landowner for **Site 8** was not in a position to enter into negotiations on the site because they were uncertain about the future of the land and its ownership. The Site was discounted on the basis of the information identified earlier in this report, and because the future ownership of the land was uncertain and the landowner unwilling.

5.60 **Site 6** was the preferred and only option for development following the desk based report and discussions with the other landowners. Having discussed the proposals with the landowner for **Site 6** who was interested in the development, an onsite meeting was organised to discuss matters further.

Site visit with the landowner and project team

5.61 A site visit to **Site 6** was undertaken in November 2012 and was attended by the Applicant's planning consultant, drilling manager, civil engineer and land agent along with the landowner. This site visit allowed a full on site review of the proposed site and face to face discussions on planning, engineering and land issues including topography, visual impact, access arrangements, and the design and location of the well site.

5.62 The site visit concluded that **Site 6** would be a suitable location for the development of a

well site in respect of planning, environmental and engineering requirements subject to further specialist studies and mitigation measures including a full Environmental Impact Assessment. The proposals would provide significant economic benefits to the farm diversity which would help support the farm's core agricultural workings.

Site Selection Summary

5.63 The Alternative Sites Assessment exercise concluded that **Site 6** was the only suitable location for the development of an exploratory well site in light of landowner, geology, planning, environmental and drilling constraints. Having assessed the site through a desk based appraisal and on site with the relevant specialists, it was considered that pre-application discussions should be held with the Planning Authority in this case West Sussex County Council (WSCC), to discuss the proposals.

Pre-Application Discussions with WSCC

5.64 A pre-application submission was made to WSCC in February 2013 and a meeting was held with the Planning Officer on 4 March 2013 with a site visit on 17 May 2013. Written advice was provided by WSCC on 3 July 2013. This advice has fed into the preparation of the ES.

Site Selection Summary

5.65 **Site 6** represents the Application Site and was identified following a robust and comprehensive assessment of the existing geological strata, technical limitations, planning policy and environmental designations and constraints within the search area. The identification of baseline conditions and the assessment of the identified sites including the Application Site, were carried out using a number of information sources;

- Geological and seismic data collection and evaluation;
- Geographical Information Systems (GIS);

- Desk based research on planning policy, environmental designations and landowner constraints;
- On site investigations and site visits;
- Discussions with landowners;
- Pre-application discussions with WSCC; and
- Preliminary discussions with environmental experts on transport, landscaping and ecology.

5.66 The use of a variety of sources illustrates the comprehensive nature of the Alternative Sites Assessment, and supports the conclusion which has been drawn that **Site 6** is the most suitable Site to accommodate the Proposed Development. In summary, the reasons for choosing **Site 6** as the Application Site are;

- Suitable vehicular access from the A272 and Kirdford Road including an existing access gate and track into the field;
- Natural screening provided by existing woodland in the local and wider vicinity;
- Non-designated woodland between the Site and Northup Copse;
- The distance of the Application Site from existing residential properties and other viewpoints;
- There are no Scheduled Monuments or listed buildings immediately adjacent to the site and it is outside of the National Park;
- Field boundaries are not affected;
- The predominantly flat topography of the field;
- Its location away from open watercourses and areas of flood risk;
- The technical and geological suitability of the subsurface including its location in the primary search area;
- The availability of a willing landowner.

5.67 If no development were taken forward at **Site 6**, the next best option would have been **Site 2**. The landowner did not want to progress with negotiations in this location but discussing hypothetically the implications of developing a proposal at **Site 2**, there would

have been more significant impacts for the environment, residents and visitors in comparison to **Site 6**.

5.68 The field itself is an open landscape with mostly hedgerows and trees on the field boundaries but no vegetation that would screen the well site compound itself but for the woodland to the north, leaving the site itself largely exposed. The field boundaries to **Site 2** consist of bridleways on the east and west, a PROW to the south, and ancient woodland including a watercourse to the north. Users of the rights of way (walkers, tourists and riders) would therefore be exposed to views of the site through gaps in the trees and hedgerow. It is likely that the surrounding farms – Fountain's, Walthurst, and Dounhurst, would be subject to views due to the limited screening and with the latter two farms being on higher ground.

5.69 The nearest main vehicular route is the A272 east of Wisborough Green with the A285, A29 and A264 being further away and requiring the use of smaller rural roads to access the site through a number of villages which would cause significant disruption for a more significant number of people. Use of the A272 would require going through Wisborough Green and Kirdford whereas the use of **Site 6** only requires going through Wisborough Green. Vehicular access into the field itself would require the use and extension of an existing private access road off Plaistow Road or the creation of a new road which would require the felling or trees and hedgerows, the loss of field boundaries, and significant environmental impacts on the landscape and ecology.

5.70 Depending on the position, a new access road would also need to cross watercourses and drains, or rights of way. The site is part of a Catchment Sensitive Farming Delivery Initiative scheme which seeks to protect and boost the health of watercourses and streams from agricultural pollution through improved infrastructure. Culverting or crossing drains or watercourse in this location may detract from the purpose of this scheme.

5.71 It is clear that **Site 2** would create more significant environmental impacts in comparison to **Site 6** for a number of reasons outlined in this Chapter and the Alternative Sites

Assessment. Locating the Proposed Development outside of **Site 6** would result in far greater environmental and social impacts.

Alternative Site Layouts

5.72 Originally the site layout placed the access road and well site immediately adjacent to the area of woodland south of Boxal Bridge which is designated as ancient but not part of the SNCI. The original layout can be seen in **Figure 5.1** with the proposed layout shown on the accompanying planning application drawings. Following discussions with the Applicant's consultant ecologist and arboriculturalist, part of the access road and well site were moved so that there was a 15m distance from the woodland edge to enable protection of the tree roots and to provide a buffer between the Proposed Development and the woodland including its ecology. An additional benefit was that the Proposed Development was now also further from the designated ancient woodland.

5.73 The site layout during testing was also changed with the storage tanks being moved away from the flare pit for health and safety reasons. The original location of the tanks during testing can be seen in **Figure 5.2** with the proposed layout shown on the accompanying planning application drawings.

5.74 Originally it was proposed that a 1.2m high post and wire fence would be erected around the edge of the access road and the well site compound to protect livestock. However following security threats to other well sites in West Sussex, the proposals were amended to include a 2m high wire mesh security fence around the well site compound, and a security gate between the access road and car parking area. The original layout which excludes the gate and shows only a 1.2m high fence around part of the site can be seen in **Figure 5.3**.

Alternative Design and Technology

5.75 The technology that is deployed will be fit for purpose both technically and geologically, and will meet and comply with all necessary health and safety requirements. There is no

opportunity to change the design of the drill rig and associated equipment. The rig must be chosen on the basis of the depth that will be drilled because different rigs are designed to drill to different depths depending on the length of the drill string.

5.76 The drill string is formed by lengths of drill pipe which is a hollow, thick walled steel pipe that connects the surface rig equipment with the drill bit (the tool used to cut the rock). The drill string sends drilling fluid via the mud pumps and torque via the top drive, to the drill bit. A 350 horsepower rig is designed to drill to 3,500ft and may only have a 20m high mast as it is designed to rack back the drill pipe in single lengths. A 750 horsepower rig is designed to drill to around 8,000ft and will have around a 30m high mast so it can rack back the drill pipe in doubles, whilst a triples rig has a 60m high mast so it can rack back the drill pipe in triple lengths and can drill to around +15,000ft.

5.77 The Applicant is proposing to drill to around 8,750ft and therefore initially a “triples rig” with a 60m high mast was considered for use at Wisborough Green. However, it was considered that a “doubles rig” could drill to the required depth thus helping to mitigate the visual impact of the rig by reducing the height of the mast by around a third from 60m to 40m (excluding the 5m substructure).

References (Ref)

5.1 The Energy White Paper: “Meeting the Energy Challenge”, DTI (2007)

5.2 Overarching National Policy Statement for Energy (EN-1), DECC (2011)

5.3 The Energy Act (2011)

5.4 Annual Energy Statement, DECC (2010)

5.5 Annual Energy Statement, DECC (2011)

5.6 Annual Energy Statement, DECC (2012)

5.7 The National Planning Policy Framework, DCLG (2012)

6.0 CONSTRUCTION PROGRAMME & MANAGEMENT

6.1 This Chapter describes the Construction Programme for the Proposed Development and management measures to be implemented throughout the project to mitigate environmental effects. A full project description is provided in Chapter 4.

Programme

6.2 The anticipated programme for the phases of the Proposed Development is set out in **Table 6.1** below;

Table 6.1: Phasing

Vertical Exploration Well			
Phase of Activity		**Best Case Scenario**	**Worst Case Scenario**
Phase 1	Construction	6 weeks	10 weeks
Phase 2	Mobilisation and drilling	6 weeks	10 weeks
Phase 3a	Testing (gas)	1 week	2 weeks
Phase 3b	Testing (oil)	1 weeks	2 weeks
Contingent Horizontal Exploration Well (if applicable then move to Phasing below)			
Phase 4a	Restoration	6 weeks	10 weeks

Contingent Horizontal Exploration Well (up to 12 months after vertical Phase 3)			
Phase of Activity		**Best Case Scenario**	**Worst Case Scenario**
Phase 2	Mobilisation and drilling	6 weeks	12 weeks
Phase 3a	Testing (gas)	1 weeks	2 weeks
Phase 3b	Testing (oil)	2 weeks	26 weeks
Phase 4a	Restoration	6 weeks	10 weeks
Phase 4b	Retention	Prior to Appraisal or Production (subject to planning)	

6.3 The worst case scenario (i.e. longest duration) has been assessed within the technical chapters of the ES.

Working Hours and Site Establishment

6.4 The location and layout of utilities would be confirmed prior to start of work on site.

6.5 A separate parking area will be provided for the contractor's cars, which will be used later by the drilling crews for their cars. Welfare facilities for the workforce would also be constructed in this area. Electrical supplies would be taken from the rig's power generators. The construction of this area will be the same as for the access track, using compacted stone on a geotextile membrane. The parking area will be 'at grade' with no specific excavations or levelling of the area.

6.6 The main site would be fenced off from the rest of the fields using a 2m high wire mesh security fence. The access road will remain unfenced except where it passes to the south of a screen of trees, where a 1.2m high post and wire fence will be erected on the north side of the track to maintain 15m clearance of the track from the trees. The fences would incorporate gates where agreed with the landowner. At the point where the 1.2m fence meets the 2m high security fence, there will be a security gate installed between the access road and car parking area to prevent unauthorised access into the well site compound or flaring area (**Figure 4.2**).

6.7 Working hours during Phase 1 would follow standard construction industry practice, with a part day on Saturday and no construction work on Sunday. Night time working would not be carried out in the construction phase. During the first part of Phase 2 (mobilisation) 12-hour days are likely to be necessary with working hours of 8am - 8pm.

6.8 As set out in Chapter 4 Project Description, drilling and well testing activities would be undertaken 24 hours a day. Mitigation measures to be implemented to minimise disturbance to the community are set out later in this chapter.

6.9 The Applicant's drilling supervisor would live on site during drilling operations and coordinate activities with the rig contractor.

6.10 Approximately 12 personnel will be required during the construction of the well site and access road and normally, 22 personnel will be on-site during drilling operations.

Health, Safety & Environmental Management & Permitting

6.11 The applicant has developed and applies its integrated health, safety and environmental management system (HSE MS) to all of its operational activities. This approach is fully consistent with the requirements of the UK safety and environmental regulators (Health & Safety Executive, DECC) and conforms to the principles of international standards such as ISO 14001 and OHSAS 18001.

6.12 The health and safety risks of all construction, drilling, testing and site restoration activities will be managed as required by the Borehole Sites & Regulations 1995 (Ref. 6.1), the Management of Health & Safety at Work Regulations 1992 (Ref. 6.2), the Construction (Design & Management) Regulations 2007 (Ref. 6.3), the Offshore Installations & Wells (Design & Construction etc.) Regulations 1996 (Ref. 6.4) and the Applicant's HSE Management System.

6.13 Site specific Emergency Response Procedures will be put in place in consultation with the emergency services and tested prior to the commencement of any work. Drilling and any subsequent testing operations will be conducted in accordance with good oilfield practice and all relevant controlling bodies, British and International Standards. Should any emergency situation occur the well would be instantaneously "shut in" by means of the fitted Blowout Preventer (BOP) during drilling operations or the Emergency Shut Down (ESD) during production. The adoption of normal emergency procedures applicable to oilfield operations would ensure compliance with the UK onshore environmental and safety control regimes.

6.14 The HSE aspects of all site operations will be managed through both a Safety Management Plan and an Environmental Management Plan. A Construction Environmental Management Plan (CEMP) would be submitted to WSCC for approval prior to commencement of works on site. This would describe the mitigation measures to be put in place by the Applicant and contractors throughout the works to minimise impacts on the environment. The CEMP would also define who would be responsible for

implementing each mitigation measure and contain a monitoring programme. A framework CEMP is set out below. These principles would be expanded upon during detailed construction planning.

6.15 The proposed development will also be regulated by the Environmental Agency (EA) as required by the Environmental Permitting Regulations (England and Wales) Regulations 2010 (EPR 2010). two permits are being applied for:

- Mining Waste Permit: This permit submission will be supported by the information contained in this ES report, specifically with regard to: ground and groundwater protection, waste management planning and air quality;
- Radioactive Waste Permit: In the event that the well is tested, the flow from the well is likely to include some normally occurring radioactive material (NORM) from the sub-surface geological formations. This material is likely to be assessed as radioactive under schedule 23 of EPR 2010. The permit submission will include a Best Available Technology (BAT) submission demonstrating the effectiveness of the waste management arrangements put in place by the Applicant.

Highways & Access

6.16 Traffic would be generated by workers travelling to and from their shifts, deliveries of stone for construction of the road and site during Phase 1, deliveries of water, cement, drilling materials and other supplies and removal of fluids generated during well testing and waste for disposal during the remaining phases of the Proposed Development. These deliveries would be made during the working day with all but essential deliveries being made during daylight hours. Only in exceptional circumstances which were operation or health and safety led, would deliveries be made at night.

6.17 There are no abnormal loads anticipated to be delivered to the Application Site however

there may be some loads which need police escort during the mobilisation or demobilisation of the rig. Abnormal loads would require pre-authorisation with WSCC.

6.18 Traffic warning signs conforming to Chapter 8 of the Road Signs Manual (Ref 6.5) would be erected along Kirdford Road either side of the entrance and sight lines will be cleared as necessary.

6.19 It is proposed to make modifications to the existing field access for the duration of the construction period for which a Road Safety Audit has been undertaken (**Appendix 10.7**) and the access would safely accommodate all vehicles anticipated.

6.20 Having regard to WSCC's approach to freight management which requires lorries to be kept on main routes for as long as possible and the independent safety audit, it is proposed that all construction traffic will route to the Application Site via the A272 and then Durbans Road / Kirdford Road.

6.21 The predicted volumes of traffic generated during each phase of the Proposed Development are set out in **Table 6.2**.

Table 6.2: Two-way Daily Vehicle Movements

Phase	Light Vehicle (LV) Movements	Heavy Vehicle (HV) Movements	Total 2-way Daily Movements
1 Construction of access road and well site	13	22	35
2 Mobilisation and drilling	40	28	68
3a/3b Testing of gas/oil	4	2	6
4a/4b Retention or restoration	13	22	35

6.22 The largest equipment to be moved to the Application Site would be the drilling rig during Phase 2. The haulage contractor has responsibility for traffic control and escort duties for the rig whilst it is under his command and would prepare for the rig movement

well beforehand to ensure all traffic movement orders and holding areas have been organised.

6.23 The rig components would be delivered to site in a strict sequence over the mobilisation period, preceded by one or two 100 tonne cranes. The mobilisation would proceed at a controlled rate to ensure that the deliveries are made to suit the construction of the rig. This would ensure that there would not be a build-up of stationary lorries on the public highway.

6.24 The effect of HGV movements on the highway network is assessed within Chapter 10 – Transport and Access.

6.25 A Traffic Management Plan (TMP) would be prepared with the focus of minimising disturbance which could potentially arise from construction traffic. The key elements of the TMP would include:

- Where identified as necessary for unconventional HV traffic, police presence and assistance with traffic control will be arranged;
- Routing traffic to the Application Site in order to maintain HV traffic on WSCC's advisory lorry route network for as long as possible and thereby minimise the impact of construction traffic on local communities;
- Provision of a hardstanding area within the Application Site in order to stagger vehicle arrivals and departures and therefore prevent queuing on the highway at the site entrance;
- Scheduling of construction traffic movements (equipment and materials), when possible, to avoid the peak traffic periods at the beginning and end of each day and other sensitive periods, in order to minimise any potential disturbance to local traffic or safety impacts at junctions;
- Provision of information to parish councils relating to the construction period, including any unconventional HV traffic which may be scheduled;
- Signage to identify access routes and to inform motorists that the local roads are accommodating construction traffic; and

- Wheel washing on site and road sweeping carried out to keep the local highway clear of mud and debris.

6.26 It is proposed that the preparation of the TMP would be a planning condition and that the TMP would be prepared and agreed with the Highway Authority prior to commencing activities on site.

Noise

6.27 The adoption of standard working hours during Phase 1 Construction would avoid the community being disturbed at night. It would be usual practice to allow potentially noisy activities only during the normal working week and on Saturday mornings.

6.28 Surrounding residents would be kept informed of the progress of works via regular correspondence from Celtique issued to coincide with key project and operational milestones. A notice would also be erected next to the entrance to the Application Site. On both materials a Freephone contact number would be available for any residents who wished to contact Celtique during works.

6.29 Quiet working methods would be adopted where feasible including the use of the most suitable plant and reasonable hours of working for noisy operations. Noise would be controlled at source using best practice means, such as the following:

- Unnecessary revving of engines would be avoided;
- Equipment would be switched off when it is not required;
- The drop height of materials would be minimised; and
- Where practicable, plant and vehicles would be started up sequentially rather than all together.

6.30 On-site noise levels would be monitored regularly.

6.31 During Phase 2 Mobilisation and Drilling, best practice means would be used to limit

noise from the rig. This would include the use of diesel exhaust silencers and attenuators allowing cooling air into and out of acoustically-enclosed machinery. All equipment would be kept in good repair to ensure the highest noise attenuation. Access doors to all noisy equipment would be kept closed unless being used for access.

6.32 No additional mitigation measures would be required for noise during Phase 3 Testing or 4b Retention of the Proposed Development.

6.33 During Phase 4a Restoration, similar mitigation measures would be implemented as for construction to ensure limited noise disturbance.

Soils and Ground Conditions

6.34 All excavated soils would be retained on site for future reinstatement during the restoration phase. The topsoil would be removed and stockpiled to avoid compaction that could lead to permanent loss of the soil structure. In order to suppress dust and particles, procedures for the dampening down of stockpiles will be put in place.

6.35 The topsoil would be stripped off using an excavator and placed in a stockpile as close as possible to the point of excavation. This limits the disturbance of the soil structure and the amount of tracking over both the topsoil and the exposed site formation. Topsoil and existing bunds removed from the line of the access road would be taken by dumper to a stockpile on the main site to avoid stockpiling soil on the RPA of the trees. The topsoil and subsoil bunds would be located outside the canopies of the trees (**Figure 4.2**).

6.36 If testing shows that extracting hydrocarbons is either not possible or not commercially viable, Phase 4a Restoration would be progressed. Following removal of the equipment, the stone surface would be stripped, the geomembrane and concrete removed and the subsoil pulled back from the stockpiles to re-form the original contours of the Application Site. No soil would be imported. The topsoil would then be spread over the Application Site in a uniform layer.

Ecology

6.37 The trees and hedgerows in the vicinity of the Application Site would be protected from possible damage arising from compaction by equipment or stockpiled soil.

6.38 Prior to any earthworks taking place a fence will be erected at a distance of 15m from the field boundaries or individual trees to protect the root systems of the trees.

6.39 The access track would be aligned to create a 15m wide buffer zone between its nearest point and the adjacent screen of trees to avoid the root protection area (RPA).

6.40 However, there would be one location where the access from the highway would pass over a tree RPA and protective measures would be taken to protect the roots of the adjacent trees. It is proposed to place a protective plate on top of the existing tarmac secured in position by railway sleepers positioned on the west side of the entrance with steel road pins driven into the ground to prevent the plates from slipping. Tarmac would then be laid on top of the plates to provide a slip-resistant surface and hold the plates in position.

6.41 The RPA for the trees adjacent to the access road and well site would be safeguarded by erecting a fence as shown on **Figures 4.6**.

6.42 During Phase 4a Restoration, removed hedgerows would be replaced with young whips of native hedgerow plants protected by wooden post and rail fences with rabbit netting. Any dead plants would be replaced. The post and wire fences would be left up to protect the freshly laid soil from livestock for the landowner to remove at his own convenience.

Landscape & Visual Impact

6.43 The topsoil stripped away to facilitate the works would be formed into soil bunds of circa 3m in height. They would screen the temporary site cabins and lower parts of the drilling infrastructure. The location of the bunds is shown on **Figure 4.7**.

6.44 A screening bund would be constructed from topsoil around the flare area to limit radiated heat during Phase 3 and also reduce visual impact.

6.45 The Application Site would be lit by free standing lighting towers during hours of darkness. The assessment of light spillage effects is provided in Chapter 12 Lighting. The following mitigation measures would be implemented throughout all phases of the Proposed Development:

- Lighting on the rig would be inward and downward pointing;
- The target lighting levels for the site to be set according to the relevant standards, Health and Safety and security requirements, but would be kept to a minimum to limit the effects of reflected upward light creating an aura above the site;
- If areas of the site are not used operationally throughout the night, the opportunity to dim fittings or switch some off would be taken, again subject to safety and security needs;
- Lighting would be angled away, and where possible positioned away, from the woodland edges; and
- The power of the lights would be the minimum necessary for purpose.

Water Resources

6.46 Septic tanks would collect shower and wastewater from the contractors' compound to avoid runoff to the ground and water pollution. Water supplied to the rig and cabins would be made by road tanker.

6.47 As the site is levelled during Phase 1 an impermeable Bentomat geomembrane (or similar) would be laid on the exposed and rolled surface, protected by a layer of geotextile. Ditches and bunds would surround the main part of the site (**Figure 4.2**) and the membrane would continue into the ditches to form a continuous lining (**Figure 4.9**). These structures would prevent runoff from going into the ground or off site into water courses.

6.48 The well head would be located within a concrete chamber (well cellar) with a sealed floor to contain any fluid arising from the drilling operations. The well cellar would comprise concrete manhole rings set into a concrete base with a concrete apron around the top to facilitate site cleanliness.

6.49 Liquids produced from the well during Phase 3 Testing would be stored in tanks contained within a bunded area with a perimeter bund to create sufficient storage capacity to equal 110% of one of the tanks as a precaution against leakage.

6.50 During Phase 4a Restoration, any land drains that were disturbed would be reinstated or a new system installed by agreement with the landowner. There are no watercourses adjacent to the Application Site but any ditches around the perimeter would be cleaned as necessary.

Waste Management

6.51 Drilling mud and rock cuttings would be collected in tanks which would be located on a concrete pad and transported from the Application Site by road for disposal at an authorised waste disposal facility. Concrete would be broken up and taken off site for recycling.

6.52 As discussed in 6.15, any NORM materials produced during the well test will be managed, under permit arrangements, through approved procedures and the use of authorised waste management contractors

6.53 The contents of the portable toilets and refuse skip would also be removed periodically to an approved waste disposal facility. The contents of the surface water collection ditch and compound sump would be used to build the drilling mud or emptied as necessary and transported by road tanker for disposal at an approved waste disposal facility.

6.54 During Phase 4a Restoration all loose debris and material would be taken off site for salvage or disposal at a licensed waste disposal facility in accordance with all relevant

legislation. The stone surface would be scraped clean of any mud or rock cuttings. An contaminated stone would be dug out and disposed off at a licensed site in accordance with relevant legislation. All containment ditches and the concrete cellar around the well would be pumped out and the water taken off site by tanker to an approved waste water treatment facility. The geotextile membrane would also be disposed of at an approved waste disposal facility.

References (Ref)

6.1 Borehole Sites & Regulations (1995)

6.2 Management of Health & Safety at Work Regulations (1992)

6.3 Construction (Design & Management) Regulations (2007)

6.4 Offshore Installations & Wells (Design & Construction etc.) Regulations (1996)

6.5 Traffic Signs Manual 2009 Chapter 8, London, The Stationery Office.