4.0 A PROJECT DESCRIPTION

Chapter Alterations

A4.1 This chapter of the ES Addendum updates the ES with respect to the following:

- **Clarification of the 'worst case' scenario assessed so that likely significant effects on the environment would be no worse regardless of the rig specification and site layout chosen and secured through a planning condition;**
- **Clarification of Phasing for testing phases 3a and 3b and when the drill would be on site;**
- **Clarification of operations during Phase 3 Testing;**
- **Clarification that the total programme would not exceed the 3-year temporary application period sought;**
- **Clarification of terminology and definitions of horizontal exploration well and extended well test;**
- **Refinement of details around borehole casing;**
- **Clarification on procedure for gas venting and flaring; and.**
- **Clarification of plans for access track removal during the restoration period.**

A4.2 The following figures have been updated and are included after this chapter:

- **Figure 4.1A Drilling Process Chart**
- **Figure 4.2A Proposed Site – Construction Mode**
- **Figure 4.3A Access Track – Existing Ground Plan**
- **Figure 4.6A Access Track – Proposed Ground Plan**
- **Figure 4.7A Proposed Site – Drilling Mode**
- **Figure 4.8A Proposed Site Sections – Drilling Mode**
- **Figure 4.9A –Site Construction Sections**
- **Figure 4.11A Proposed Site – Drill Stem Testing Mode**
- **Figure 4.12A Proposed Site Lighting Layout**
- **Figure 4.13A Proposed Site – Reinstatement Plan**

A4.3 The following new figures have been produced and are included after this chapter:

- **Figure 4.14 Cabin Plans and Elevations**
- **Figure 4.15 Proposed Site Sections - Construction**
- **Figure 4.16 Entrance Perspective Images**
- **Figure 4.17 Swept Path at Boxal Bridge**
- **Figure 4.18 Swept Path at Wisborough Green**
- **Figure 4.19 Parameter Plan**
- **Figure 4.20 Parameter Plan – rig and equipment parameters section**
- **Figure 4.21 Parameter Plan – rig parameters.**

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 **hydraulically** 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, a **further planning application would be made and** ~~planning permission would be sought~~ **submitted** for the drilling of a new well and **ancillary operations.** 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 **access road and** well site compound ~~and access road~~ **including the setting of the conductor pipe using a Conductor Setting rig,** before ~~a~~ **the main** drilling rig is mobilised ~~on~~ **to** site. Initially a vertical well will be drilled to explore for the presence of hydrocarbons, and ~~if~~ **the formations in the borehole will be evaluated to assess their commercial potential. If hydrocarbons are encountered** ~~encountered~~ a short term test may be undertaken ~~to assess their commercial viability~~ **in the vertical wellbore**. ~~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 **then** existing vertical well. The horizontal well is contingent on the results of the vertical well and ~~may~~ **if it is drilled would** be drilled **by the same rig on location** immediately after the vertical well **and any testing**~~, 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~~ **may** be undertaken to confirm the commercial viability of the hydrocarbons. Having ~~completed testing of~~ **drilled** 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 **graded**, 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~~ **four** key personnel **and seven security 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~~ **up to** 50m³;

ix) Construction of a concrete chamber **and setting of 30" casing at a depth of 20ft,** sunk into the ground (**forming** the "cellar") **followed by 20"** ~~to include large diameter~~ conductor pipe which will be pre-set using **a conductor setting rig** to a depth of ~~around~~ **up to** ~~65ft~~ **200ft**. The **main** 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 of **up to 45m above ground level** 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~~ **and ancillary site infrastructure;**

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

xiv) Mobilisation of ancillary testing equipment and carrying out of ~~either~~ a short term **and/**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 **via condition with approval from WSCC**. **The parameters assessed are set out in Table 4.1. A generalised plan showing the parameters tested is at Figure 4.19. Cross sectional views are at Figure 4.20 and 4.21.**

Table 4.1 Parameters for assessment

Parameter	Phase 1				Phase 2		Phase 3	Phase 2		Phase 3			Phase 4a			Phase 4b
	Construction	Mobilise Conductor Setting Rig	Drill and set Conductor pipe	Demobilise Conductor Setting Rig	Main Rig Mobilisation	Drilling (Vertical)	Testing – short term (Vertical)	Drilling (Lateral)	Main Rig Demobilsation	Workover Rig Mobilisation (occurs twice during testing)	Testing – extended well test (Lateral)	Workover Rig Demobilsation (occurs twice during testing)	Main Rig or Workover Rig Mobilisation	Restoration	Main Rig or Workover Rig Demobilisation	Retention
Timescale	8 weeks	1 day	12 days	1 day	1 week	14 weeks	2 weeks	12 weeks	1 week	1 week	26 weeks	1 week	1 week	10 weeks	1 week	Unknown (approx. 6-24 months)
Maximum width and length of pad	55m x 95.8m				55m x 95.8m		55m x 95.8m	55m x 95.8m		55m x 95.8m			55m x 95.8m			55m x 95.8m
Rig on site?	No	Yes	Yes	Yes	Yes - Main Rig		Yes - Main Rig	Yes - Main Rig		Workover rig or no rig			Main Rig or Workover rig			No
Max height of rig	N/A	17m			45m		45m	45m		35m			45m			N/A
Max height and width of rig and ancillary equipment	Please see accompanying drawings: Drawing 3582 P26 E, Drawing 3582 P27 A and Drawing 3582 P 28 A															
Max height of ancillary on-site infrastructure excluding rig equipment	4m welfare and security cabins, and 3m lighting towers	2 x 6m high squat tanks, all other infrastructure is 4m			2 x 6m high squat tanks, all other infrastructure is 4m		7m including 7m high CEB in a 5x5x5m enclosure, 4 x 6m high surge tanks, all other equipment 4m and below	2 x 6m high squat tanks, all other infrastructure is 4m		7m including 7m high CEB in a 5x5x5m enclosure, 4 x 6m high surge tanks, all other equipment 4m and below			4m			4m mesh fence around well site, 4m high container around well head
Max height of security fence	4m	4m			4m		4m	4m		4m			4m			4m mesh fence around well site, 4m high container around well head

Parameter	Phase 1		Phase 2		Phase 3	Phase 2		Phase 3			Phase 4a			Phase 4b
Generator operating parameters - power/emissions; based on Cummins KTA50-G3 x3 at 70% for 20/24 hours	NOx emissions 6.6 g per HP-hr; PM emissions 0.11 g per HP-hr; Exhaust gas temp 520 degrees C; Exhaust gas flow 7900 CFM; Power supply = 3 no. KTA50-G3 units (+1 standby) with a total output of 4.5MW Exhaust exit height = 3m Exhaust exit diameter = 100mm		NOx emissions 6.6 g per HP-hr; PM emissions 0.11 g per HP-hr; Exhaust gas temp 520 degrees C; Exhaust gas flow 7900 CFM; Power supply = 3 no. KTA50-G3 units (+1 standby) with a total output of 4.5MW Exhaust exit height = 3m Exhaust exit diameter = 100mm		NOx emissions 6.6 g per HP-hr; PM emissions 0.11 g per HP-hr; Exhaust gas temp 520 degrees C; Exhaust gas flow 7900 CFM; Power supply = 3 no. KTA50-G3 units (+1 standby) with a total output of 4.5MW Exhaust exit height = 3m Exhaust exit diameter = 100mm	NOx emissions 6.6 g per HP-hr; PM emissions 0.11 g per HP-hr; Exhaust gas temp 520 degrees C; Exhaust gas flow 7900 CFM; Power supply = 3 no. KTA50-G3 units (+1 standby) with a total output of 4.5MW Exhaust exit height = 3m Exhaust exit diameter = 100mm		NOx emissions 6.6 g per HP-hr; PM emissions 0.11 g per HP-hr; Exhaust gas temp 520 degrees C; Exhaust gas flow 7900 CFM; Power supply = 3 no. KTA50-G3 units (+1 standby) with a total output of 4.5MW Exhaust exit height = 3m Exhaust exit diameter = 100mm			NOx emissions 6.6 g per HP-hr; PM emissions 0.11 g per HP-hr; Exhaust gas temp 520 degrees C; Exhaust gas flow 7900 CFM; Power supply = 3 no. KTA50-G3 units (+1 standby) with a total output of 4.5MW Exhaust exit height = 3m Exhaust exit diameter = 100mm			N/A
Flare operating assumptions - type of flare and max volume per day	N/A	N/A	N/A	N/A	Enclosed design; Limit is 10 tonnes/day (450 mscf/day); Operates daylight hours (08:00 – 20:00) Shielded flare Back calculate an acceptable emission rate: Height = 5m, Diameter = 1m. Calculations based on the proposal to use BEKAERT CEB Modular 2400-	N/A	N/A	N/A	**As during Phase 3 Vertical test**	N/A	N/A	N/A	N/A	N/A

Parameter	Phase 1		Phase 2		Phase 3	Phase 2		Phase 3			Phase 4a			Phase 4b
					4800LP at 6.2m high (rounded to 7m) in a 5x5x5m enclosure in the flare pit with a stack at 4m-7m high and 1m wide. Exhaust gas temp 1200 degrees C. NOx emission rate (g/s) is back calculated from allowable headroom. PM emissions minimal, so will not be modelled. Assume no H2S in gas, so no SO2 emitted.									
Lighting - max number and type of lights	3 x 500W Towers, 1 x 35W bulkhead on welfare unit	6 x 500W lighting towers, 6 x 35W bulkhead lights, 2 x 18W tank lights, 8 x 35W strip lights, 2 x 500W flood lights	All lighting units - 18 x 35W bulkhead lights, 2 x 18W tank lights, 6 x 500W lighting towers, 10 x 500W floodlights and rig lighting - 18 x 35W strip lights or 1 x 500W flood light		All lighting units - 18 x 35W bulkhead lights, 2 x 18W tank lights, 6 x 500W lighting towers, 10 x 500W floodlights and rig lighting - 18 x 35W strip lights or 1 x 500W flood light	All lighting units - 18 x 35W bulkhead lights, 2 x 18W tank lights, 6 x 500W lighting towers, 10 x 500W floodlights and rig lighting - 18 x 35W strip lights or 1 x 500W flood light		All lighting units - 18 x 35W bulkhead lights, 2 x 18W tank lights, 6 x 500W lighting towers, 10 x 500W floodlights and rig lighting - 18 x 35W strip lights or 1 x 500W flood light			For 2 weeks only during plugging of the borehole all lighting units will be required - 18 x 35W bulkhead lights, 2 x 18W tank lights, 6 x 500W lighting towers, 10 x 500W floodlights and rig lighting - 18 x 35W strip lights or 1 x 500W flood light. For the remainder of Phase 4a, lighting reverts to Phase 1 lighting units			No lighting
Max 2-way daily vehicle movements	average (max lasts 5 days): 9 Light (max: 10) 20 Heavy (max: 40) **29 Total (max: 50)**		38 Light 24 Heavy **62 Total**	38 Light 6 Heavy **44 Total**	38 Light 6 Heavy **44 Total**	38 Light 6 Heavy **44 Total**	38 Light 24 Heavy **62 Total**	**16 Light 20 Heavy 36 Total (occurs twice during testing)**	8 Light 4 Heavy **12 Total**	**16 Light 20 Heavy 36 Total (occurs twice during testing)**	16 Light 20 Heavy **36 Total**	average (max lasts 5 days): 9 Light (max: 10) 20 Heavy (max: 40)	16 Light 20 Heavy **36 Total**	Equivalent of 1 light vehicle a week (2 movements)

Parameter	Phase 1				Phase 2		Phase 3	Phase 2		Phase 3			Phase 4a			Phase 4b
														29 Total (max: 50)		
Drill sound power level (noisiest rig)	N/A	N/A	110dB(A)	N/A	N/A	110dB(A)	110dB(A) and 84dB during testing	110dB(A)	N/A	N/A	107dB(A) and 84dB during testing and EWT	N/A	N/A	110dB	N/A	N/A
Max depth of borehole	20ft		200ft		8,750 ft		8,750 ft	8,750 ft		8,750 ft			8,750 ft			8,750 ft

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~~2**).

Table 4.~~1~~2: 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" **(minimum time)** and "worst" **(maximum time)** 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~~ **So if, for example,** 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 4.1 ~~2 a~~ and Table 4.3** 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.

4.11a **A three-year temporary consent is sought. The sum of the worst case scenarios equates to just over 18 months although it is very unlikely that the worst case scenario time frame would be required for every phase. It is also important to note that the four phases will not be carried out immediately one after the other resulting in pauses between particular phases. For example, there may be a period of a few months between Phase 1 and Phase 2 whilst a rig is contracted, or a period of several months between Phase 2 and Phase 3 whilst test results are analysed. During operation, if some phases do require the worst case time frame or there are longer pauses between phases, time would be made up later in the programme to keep to the 3 year period. The Applicant commits to undertake the whole operation within the three year consent and would make up time in later phases of the programme should earlier phases require their worst case timescales.**

4.11b **For clarity, a small Conductor Setting rig will be mobilised to site during construction of the well site to set the conductor pipe at a depth of 200ft and will be demobilised at the end of Phase 1. The main drilling rig is likely to be removed from site at the end of Phase 2 following the drilling of the vertical and/or horizontal borehole and any testing undertaken during this period (see Table 4.1). Should testing of the horizontal well be carried out at a later date, a smaller rig referred to as a workover rig, may be mobilised to site as part of Phase 3 and an extended well test (EWT) would be run on the well.**

Table 4.3~~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~~ **15 weeks**
Phase 3~~a~~	Testing ~~(gas)~~	~~1~~ **2** week	~~26~~**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	1~~0~~**2** 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**3** weeks
~~**Phase 3a**~~	~~Testing (gas)~~	~~1 weeks~~	~~2 weeks~~
Phase 3~~b~~	Testing ~~(oil)~~	2 weeks	2~~6~~**8** weeks
Phase 4a	Restoration	6 weeks	1~~0~~**2** weeks
Phase 4b	Retention	Prior to Appraisal or Production (subject to planning)	

4.11d The timescales set out in Table 4.3 include periods of rig mobilisation and demobilisation, as shown by the parameters in Table 4.1.

4.11e Phase 1 comprises the construction of the well site and access road which takes between six and 10 weeks to complete. During Phase 2, the main rig is mobilised for vertical ~~or~~ and horizontal drilling if applicable. Whether to drill the horizontal well will depend on the data collected in the vertical well. For both borehole options, the main rig requires a week to be mobilised and a week to be demobilised. As a "worst case", vertical drilling takes 15 weeks to complete (14 weeks to drill plus an additional week for main rig mobilisation) and horizontal drilling takes 13 weeks (12 weeks to drill plus an additional week for main rig demobilisation). Phase 3 involves testing for both borehole options. Testing would take place for two weeks for the vertical borehole option. However, the horizontal borehole may require an extended well test (EWT) which could take up to 28 weeks as a "worst case", including 26 weeks for testing and an additional two weeks for workover rig mobilisation and demobilisation if required. The restoration phase (4a) for both borehole options requires 12 weeks to complete (as a "worst case"), which includes two weeks for workover rig mobilisation and demobilisation, and up to 10 weeks to restore the site to its former use. Retention (Phase 4b) would involve suspending the well after the completion of Phase 3 and would occur prior to appraisal or production (subject to planning).

4.12 Both a best case and worst case scenario have been illustrated in **Table 4.3~~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 4.1A**).

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**A** 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~~ **Topsoil** 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 4.2A**). 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**A** 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 4.3A**. 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 4.4A**). 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 **temporary** 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 4.6A**, 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**A** 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 **which would be reinstated when the site is restored**. 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 **which can be easily removed without damaging the existing tarmac entrance following the cessation of works**. ~~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. **This construction will comply with the West Sussex Highways specification for**

such entrances.

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 4.2A**, and the compound during drilling operations (Phase 2) is illustrated in **Figure 4.7A** with cross sectional views illustrated in **Figure 4.8A**. 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 4.2A**, 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 4.9A**).

4.30 **The concrete "cellar" will be built during site construction and will be sunk into the ground along with a 30" section of casing that will be set at a depth of 20ft. A Conductor Setting rig will then be used to set a 20"** ~~A large~~ diameter pipe, called the Conductor Pipe, **through the 30" casing and drilling to a depth of 200ft. The Conductor Pipe** is **then cemented in place** ~~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.~~ **The Conductor Setting rig would take one day to mobilise to site and drilling would take just under two weeks as a worst case. The Conductor Setting rig would be demobilised over one day and removed from site ahead of Phase 2.**

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**A** Construction Programme and Management and Chapter 10**A** Transport and Access.

Phase 2: Mobilisation of the Drilling rig and Drilling Operations

Mobilisation

4.32a Periods of rig mobilisation and demobilisation are shown in Table 4.1.

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**A** Construction Programme and Management and Chapter 10**A** Transport and Access.

4.34 The drilling rig will not necessarily arrive on the **Application** 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~~ **soon after** 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~~ **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. **It is intended that rig specification would be secured by planning condition.** 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 **along with the ancillary equipment and infrastructure of the HH220 drilling rig**. 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. **As explained above, the ES addendum assesses the parameters shown in Figures 4.19 and 4.20 to**

ensure that the 'worst case' effects of all potential rigs have been assessed.

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~~ **four** key staff **and seven security personnel** including canteen, shower and toilet facilities, are contained within the main drilling compound, as shown in **Figure 4.7A**. 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 4.7A** 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 1~~0~~**5** weeks during the vertical well **(14 weeks drilling and one week of rig mobilisation)** and up to 1~~2~~**3** weeks during the contingent horizontal well **(12 weeks drilling and one week of rig demobilisation)**. 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.

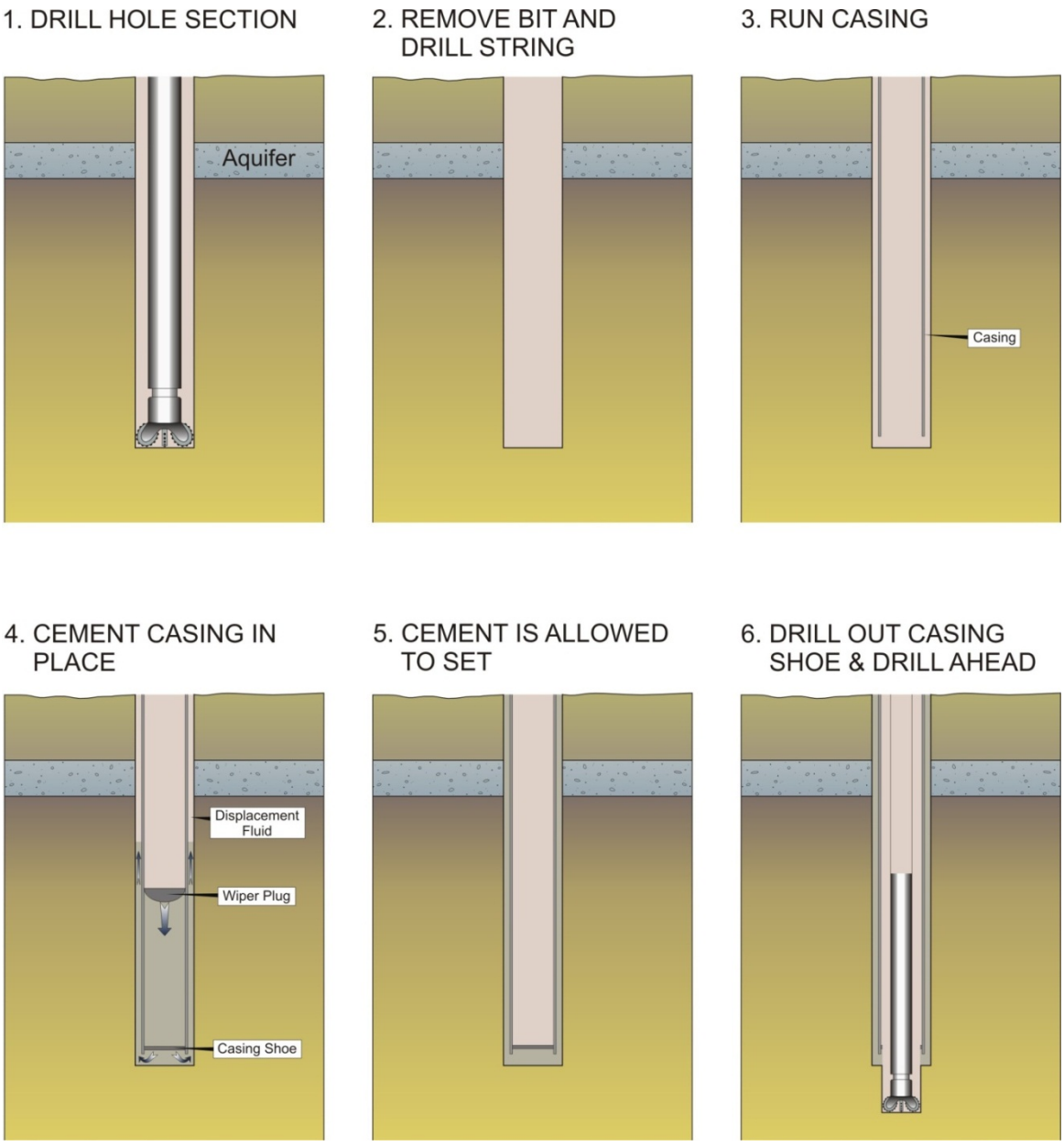
4.40 The drilling mud provides a number of key functions:

- 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,~~ **secure sections of hole and provide pressure containment to the well, it** ~~isolate difficult hole sections it is not possible to drill the entire well~~ **is not drilled** in one hole size. Concentric strings of casing ~~have to be~~ **are** run to provide the necessary isolation and require a smaller bit size **for the subsequent drilling** 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



Vertical Well

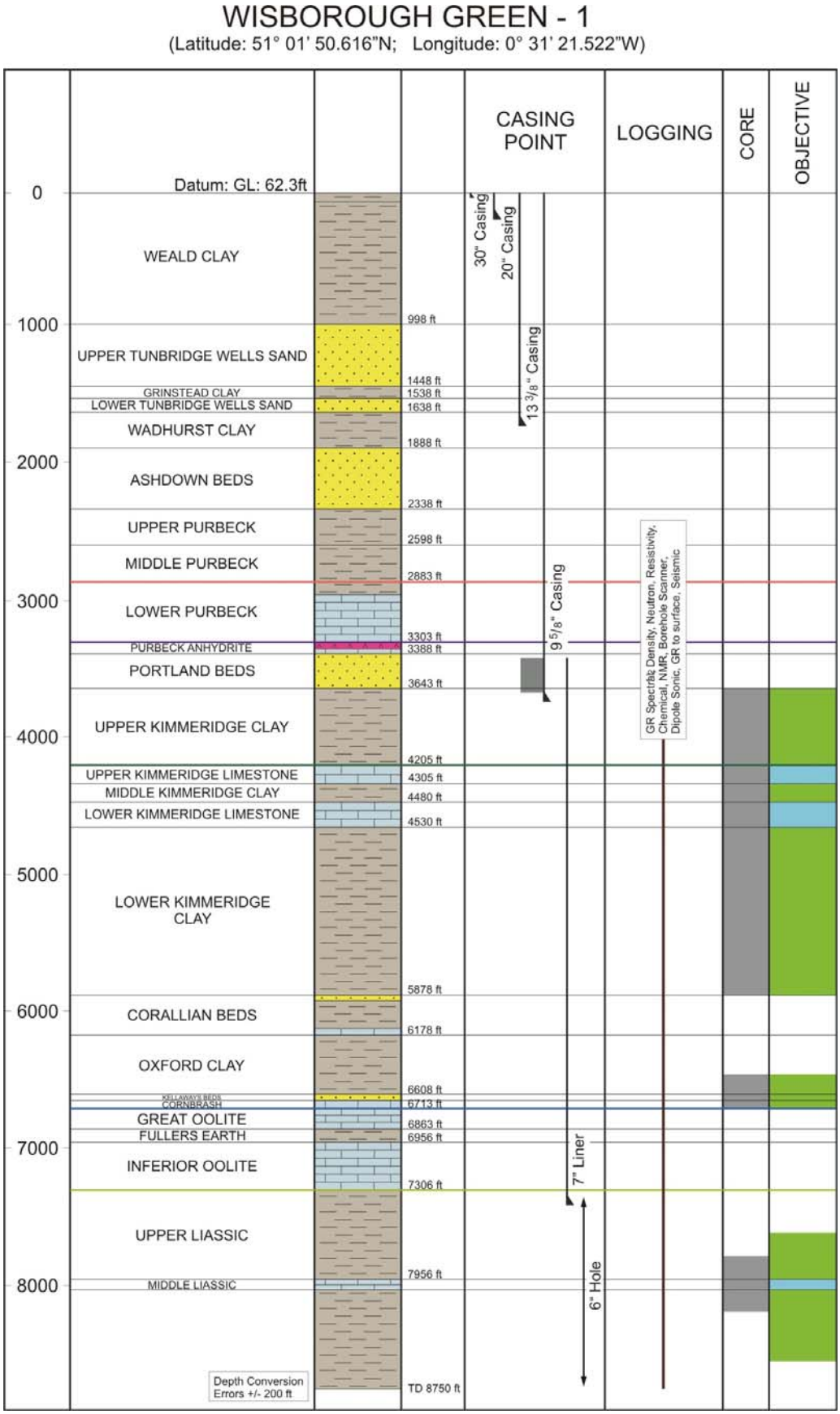
4.43 In Wisborough Green 1 the ~~13¾"~~ **20"** conductor may be pre-set using a small ~~augur rig~~ **Conductor Setting rig during Phase 1** before the **main** drilling rig is moved onto location **during Phase 2**. This conductor is required to provide mud returns to the cellar while drilling the ~~surface~~ **17½"** hole and prevent the cellar being washed out underneath the drilling rig. ~~A 12¼~~ **The 17½"** hole is then drilled down **to 1,690ft in**to the ~~Upper Purbeck~~

~~Claystone~~ **Wadhurst Clay** at which point ~~9⅝"~~**13⅜"** 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.~~ **In granting a Waste Management permit for the well, the Environment Agency (EA) permit conditions will assure the effectiveness of this aquifer isolation programme.** Then the ~~8½"~~**12¼"** hole is drilled **down to 3,700ft** ~~with some coring in the Kimmeridge Clay and Kimmeridge Limestone,~~ to the top of the ~~Upper Lias~~ **Kimmeridge Clay** at which point ~~7"~~ **9⅝"** casing is then run and cemented to surface to isolate the ~~Kimmeridge, Corallian and Oxford Clays~~ **Ashdown and Portland Beds. Again, the EA permit conditions would assure the effectiveness of the isolation programme**. ~~Finally, a~~ **An** ~~6"~~ **8½"** hole is **then** drilled **and cored, taking core samples through the Upper Kimmeridge to the base of the Lower Kimmeridge Claystone. The section will be drilled to 7,320ft and a 7" liner is then run and set in the Upper Lias, and cemented in place. A 6" hole is then drilled with cores taken in the Upper and Middle Lias formations. The total depth is planned for 8,750ft.** ~~to the target Middle Lias, and cores taken~~

Horizontal Well

4.**43a The vertical well would be plugged and abandoned, in accordance with Oil & Gas UK Guidelines to above the 7" liner top packer. The "sidetrack" or horizontal well, comprising an (initial) 8 ½" hole, would start at around 2,900 ft MD in the Lower Purbeck and initially be drilled using water based mud. As a "worst case", the sidetrack would use water based mud to drill down to the Upper Kimmeridge Clay. The 7" liner and shoe would then be run, setting at the base of the Upper Kimmeridge Clay, cementing in place and sealing off the Portland Beds. Oil based mud would be used below this point, as the well is drilled horizontally into the Upper Kimmeridge Limestone.**

Schematic 4.2A: 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:~~ **safety and operational reasons and is accepted practice worldwide including onshore and offshore within the United Kingdom. The reasons include:**

- 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 3 ~~3a: Short Term3~~ Testing

- ~~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~~ **In the event that hydrocarbons are discovered 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~~ **which** 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~~ **production and** fluid ~~samples~~ **properties**. ~~The testing programme would begin with a short clean-up flow of the oil and/or gas.~~ The ~~flowstream~~ **hydrocarbons produced** will be passed through a separator, where it is split into oil~~, water~~ and gas. The oil and **any produced** 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 **during a test** (**Figure 4.10**). **It is intended that any gas discovered would be flared rather than released untreated into the atmosphere. However, there may be some very limited amounts of gas being vented prior to the flare being operated. Flaring would be undertaken in accordance with an Environmental Permit. Testing would require the following equipment on site:**

- **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 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 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.**

4.45 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).

4.46 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.~~ **Flaring would be the subject of an Environmental Permit issued by the Environment Agency and approved by DECC, and it is the Applicant's intention that the flare type with the least impact would be installed. For air quality, noise, visual and lighting assessments, a CEB burner has been assumed as is shown on the plans.**

4.47 ~~As illustrated in **Figure 4.11**, t~~ **T**he flare pit is located on the eastern boundary of the proposed well site compound **(shown in Figure 4.11A)** and is enclosed by soil bunds of approximately **1m** ~~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. **The Applicant is proposing to use a Clean Enclosed Burner (CEB) with a maximum height of 7m within a 5m x 5m x 5m enclosure to limit radiated heat and obscure the flame.**

4.48 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**A** Noise of this ES.

~~***Phase 3b: Testing (oil)***~~

~~*Short term testing*~~

4.49 ~~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.~~

4.50 ~~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

4.51 In the event that the initial short term testing **of the vertical well** provides encouraging results, the Applicant may decide to **drill and** run an Extended Well Test (EWT) **on the horizontal well. The workover rig may need to be mobilised and demobilised to site twice during an EWT because it would not be needed on site for the full 26 week period.** Should **an EWT be undertaken** ~~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~~ **a** beam or linear pump including all of the associated infrastructure ~~would~~ **may** 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**.

4.52 An EWT could run for 90 days **and may be extended** up to 180 days **or 26 weeks** with permission from DECC and other regulatory agencies. This planning application assesses up to ~~180 days~~ **28 weeks (including 2 weeks for rig mobilisation and demobilisation)** 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.

4.53 ~~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~~ **Cummins 880DFHD** generator **(see Table 4.1 for generator parameters assessed)** ~~or similar which is stated as being 70dBA at 7m~~. Further details on noise **and air quality effects of the generators** can be found in Chapter 9**A and Chapter 15**.

4.54 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~~.

4.55 ~~Initially,~~ **T**he producing well will be monitored in accordance with health and safety regulations and good oilfield practice~~.~~ **during all testing operations.**

4.56 All produced fluids (oil and water) during the testing phase will be exported from the well site by road tanker. Chapter 6**A** Construction Programme and Management and Chapter 10**A** Transport and Access set out the likely traffic movements during this phase of the Proposed Development.

Water Supply

4.57 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. **Vehicle numbers assessed in the ES addendum take into account vehicles required to transport water to and from the Application Site.**

4.58 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

4.59 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~~. **Lighting parameters have been assessed which cover all potential rig**

specifications. **Maximum lighting requirements for each phase are described on Table 4.1.** **The indicative positiong of lights within the Application Site can be seen on Figure 4.12A.** ~~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.~~

4.60 **Lighting would be cowled to prevent light spill and direct light into the Application Site. The lighting power used would be the minimum required for the purpose to minimise light spill. An opaque 3.4m screen, most likely hessian, would be installed on the security fence to limit light spill further.** A comprehensive assessment of the proposed lighting scheme is presented at Chapter 12**A** Lighting of this ES and the information therein assessed in **Chapter 7A Ecology. Figure 12.1 demonstrates the levels of light emanating from the Application Site.**

Phase 4a: Restoration

4.61 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~~ **seven** 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.

4.62 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.

4.63 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.

4.64 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 4.13A**. **The access track to the Application Site would be removed and the original access arrangement from the highway restored.**

Phase 4b: Retention

4.65 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.

4.66 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.

4.67 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.

FIGURE 4.1A

DRILLING PROCESS CHART

Timescales and Phasing

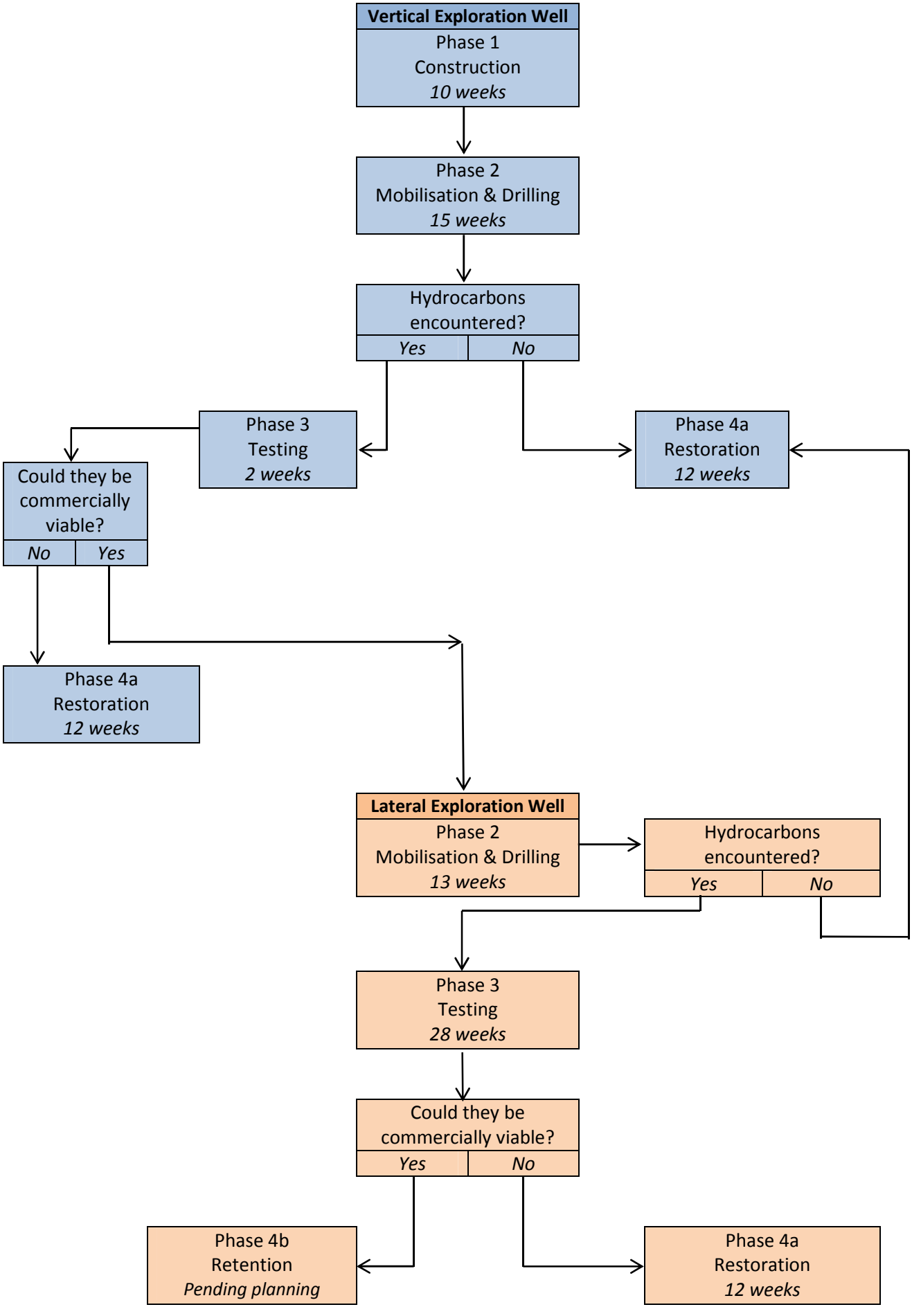
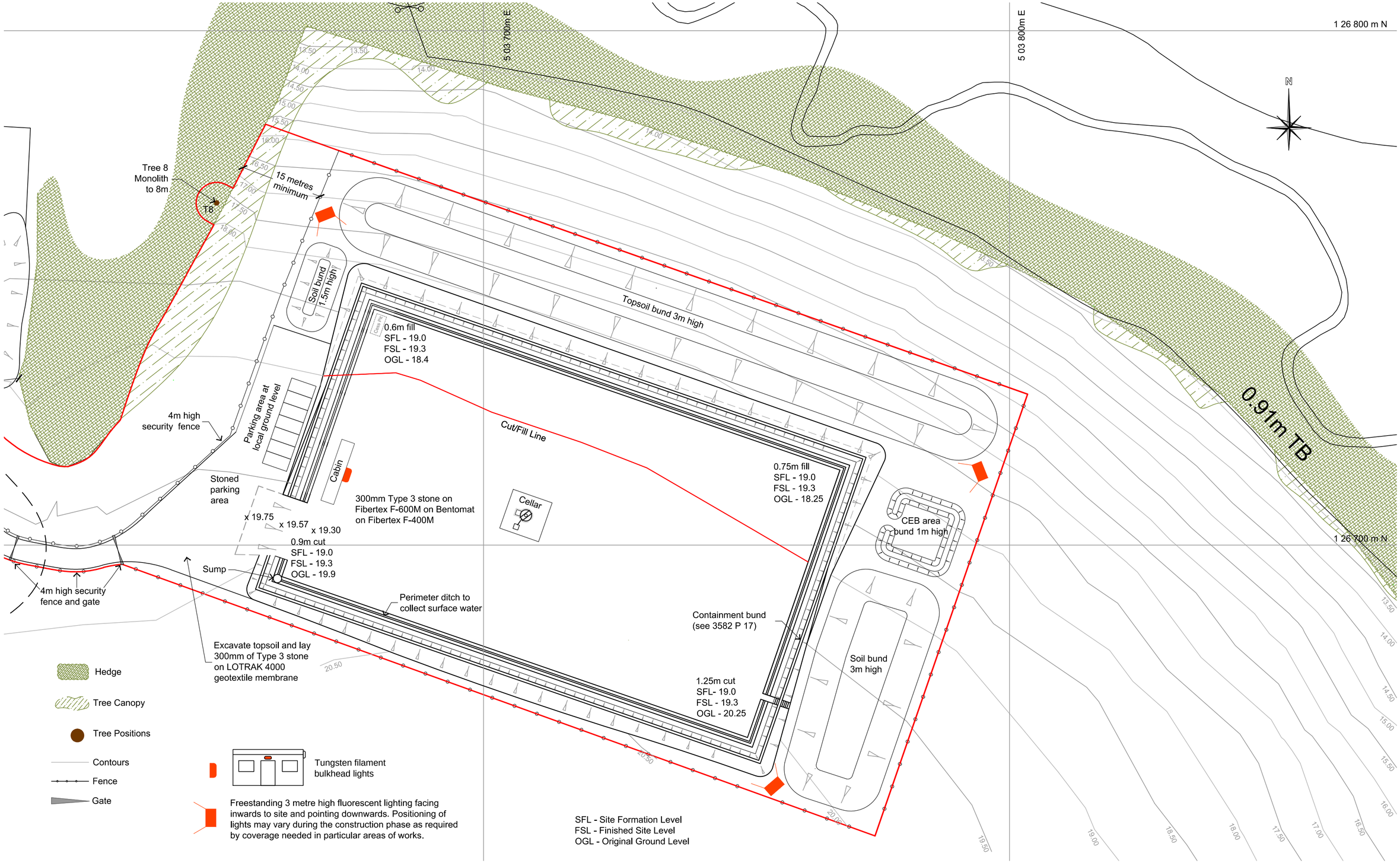


FIGURE 4.2A

PROPOSED SITE – CONSTRUCTION MODE



Proposed Site - Construction Mode

Scale 1:500

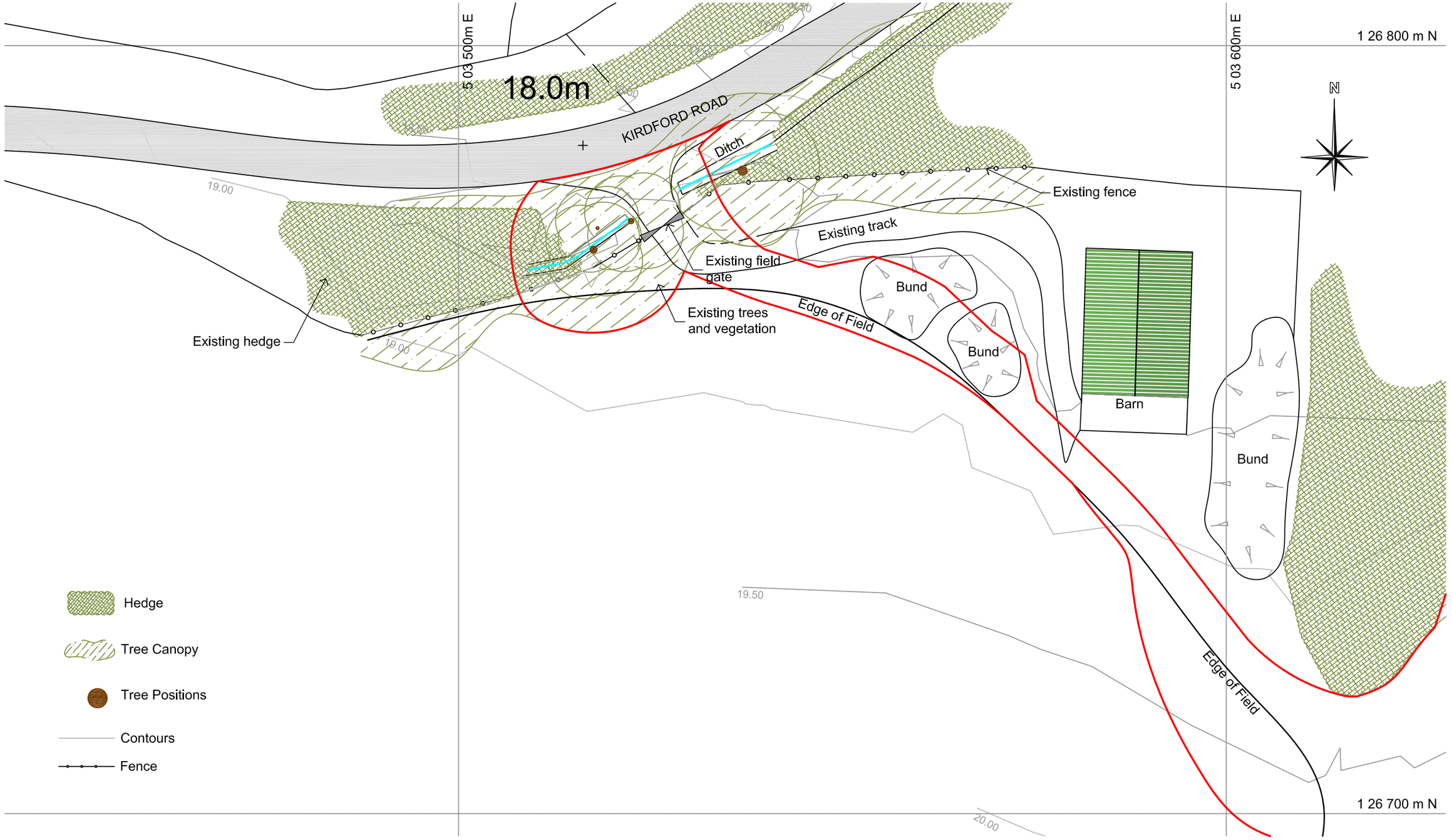
0 5m 10m

R ELLIOTT ASSOCIATES LTD
CONSULTING STRUCTURAL & CIVIL ENGINEERS
t: (01590) 683176 f: (01590) 683533 info@rea-ltd.co.uk www.rea-ltd.co.uk
Dennett House
Brighton Road
Sway
Lymington
Hampshire
SO41 6EB

Client	Celtique Energie Petroleum Boxal Bridge Wisborough Green West Sussex
Job Title	Wisborough Green-1
Drawn By	AJNE
Date	April 2014
Sheet Size	A2
Drawing Title	Proposed Site - Construction Mode (1:500)
Drawing Number	3582 P 07
Revision	J

FIGURE 4.3A

ACCESS TRACK – EXISTING GROUND PLAN



Access Track - Existing Ground Plan

Scale 1:500

R ELLIOTT ASSOCIATES LTD
CONSULTING STRUCTURAL & CIVIL ENGINEERS
t: (01590) 683176 f: (01590) 683533 info@rea-ltd.co.uk www.rea-ltd.co.uk

Dennett House
Brighton Road
Sway
Lymington
Hampshire
SO41 6EB

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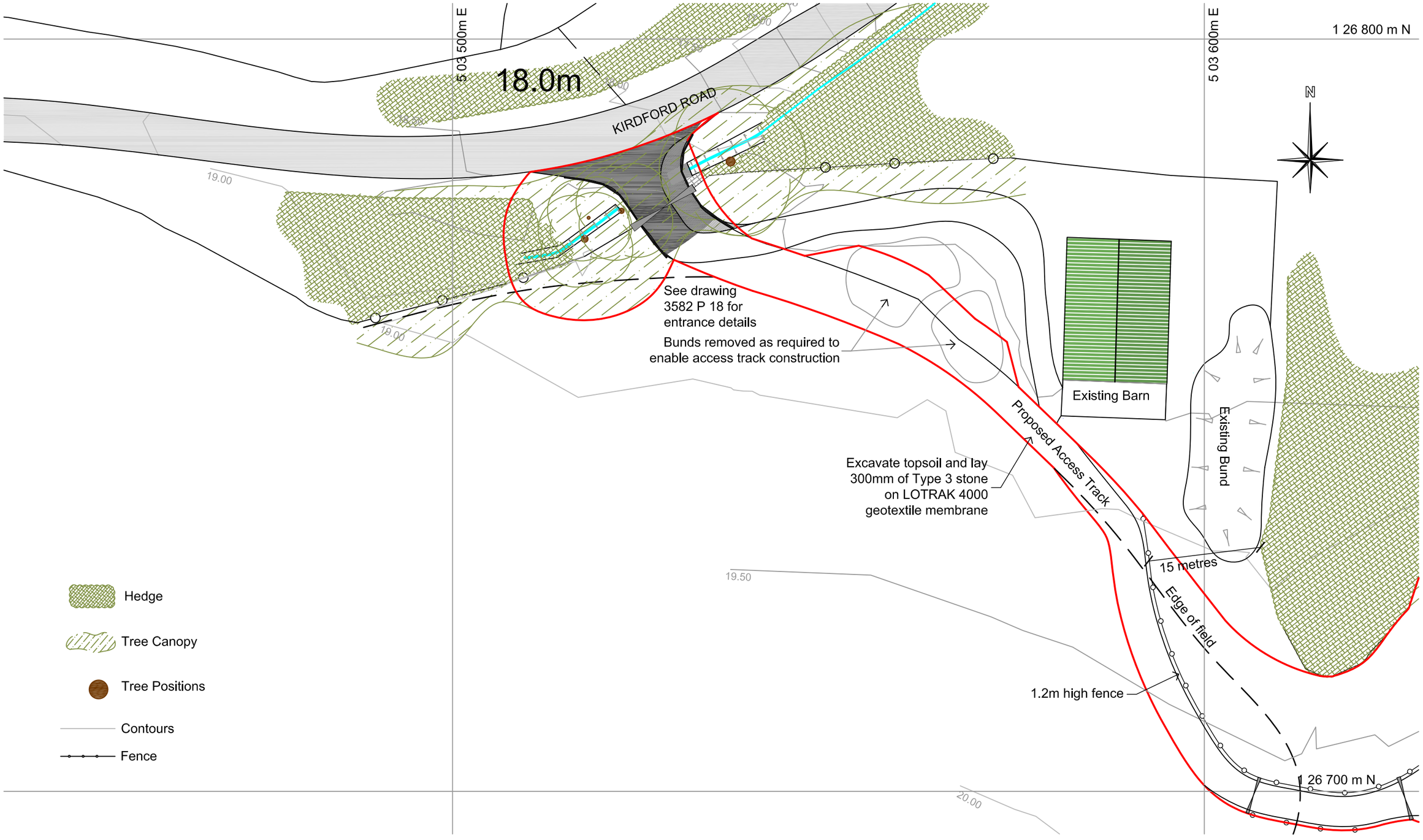
Job Title: Wisborough Green-1	Drawing Title: Access Track - Existing Ground Plan (1:500)		
	Drawing Number: 3582 P 04		Revision: E

FIGURE 4.6A

ACCESS TRACK – PROPOSED GROUND PLAN



Access Track - Proposed Ground Plan

Scale 1:2,500

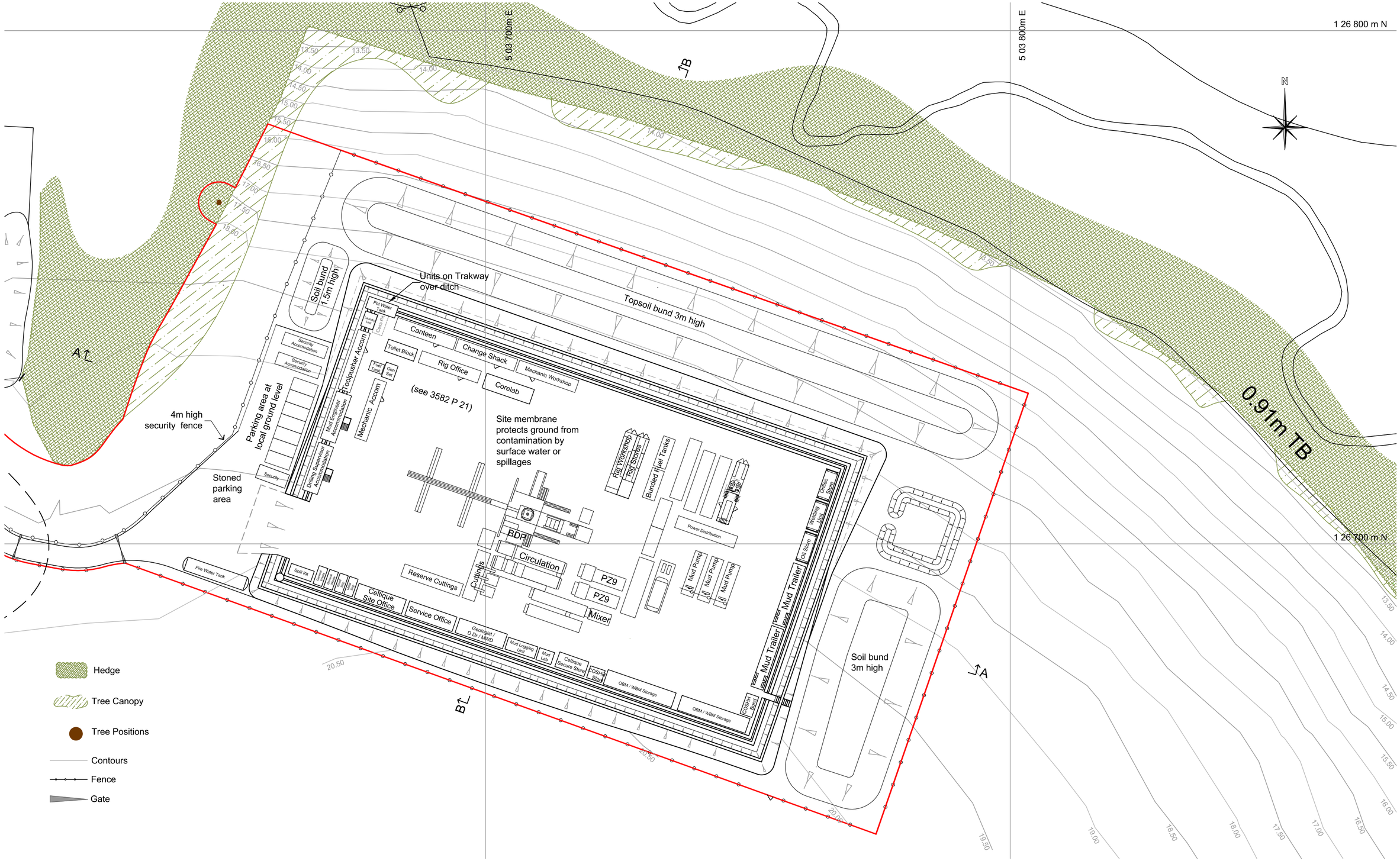
R Elliott Associates Ltd
CONSULTING STRUCTURAL & CIVIL ENGINEERS
t: (01590) 683176 f: (01590) 683533 info@rea-ltd.co.uk www.rea-ltd.co.uk

Dennett House
Brighton Road
Sway
Lymington
Hampshire
SO41 6EB

Client: Celtique Energie Petroleum Boxal Bridge Wisborough Green West Sussex	Drawn By: AJNE	Date: February 2014	Sheet Size: A3
	Drawing Title: Access Track - Proposed Ground Plan (1:500)		
Job Title: Wisborough Green-1	Drawing Number: 3582 P 06		Revision: G

FIGURE 4.7A

PROPOSED SITE – DRILLING MODE



Proposed Site - Drilling Mode

Scale 1:500

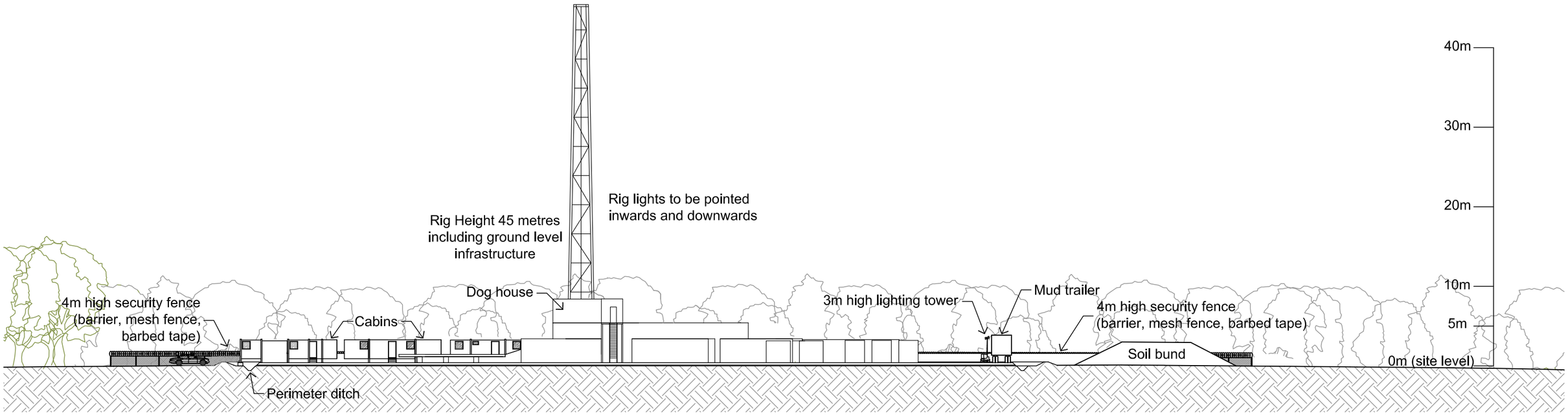
0 5m 10m

R ELLIOTT ASSOCIATES LTD
CONSULTING STRUCTURAL & CIVIL ENGINEERS
t: (01590) 683176 f: (01590) 683533 info@rea-ltd.co.uk www.rea-ltd.co.uk
Dennett House
Brighton Road
Sway
Lymington
Hampshire
SO41 6EB

Client: Celtique Energie Petroleum Boxal Bridge Wisborough Green West Sussex	Drawn By: AJNE	Date: April 2014
Job Title: Wisborough Green-1	Drawing Title: Proposed Site - Drilling Mode (1:500)	
	Drawing Number: 3582 P 08	Revision: H
		Sheet Size: A2

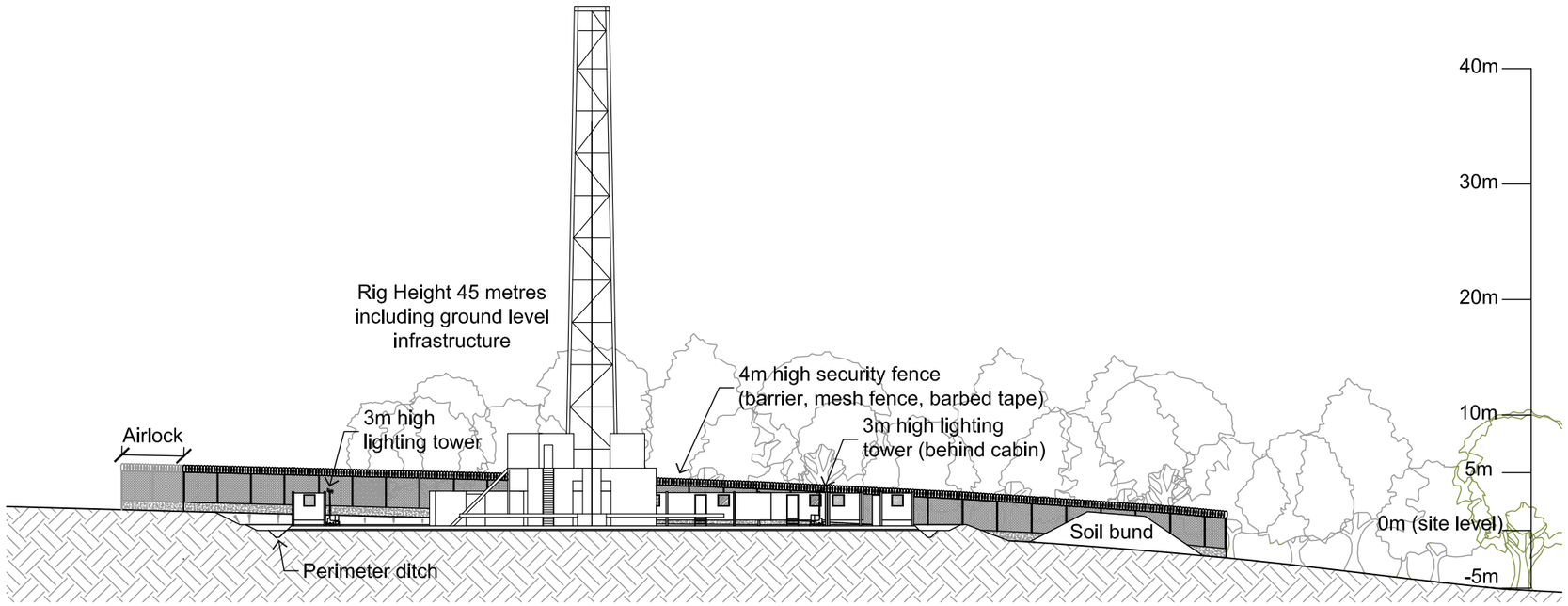
FIGURE 4.8A

PROPOSED SITE SECTIONS – DRILLING MODE



Proposed Site - Section A-A

Scale 1:500



Sections show the site at A-A and B-B with background landscaping - rig elevations are included for indicative purposes only

Proposed Site - Section B-B

Scale 1:500

0 5m 10m

R Elliott Associates Ltd
CONSULTING STRUCTURAL & CIVIL ENGINEERS
t: (01590) 683176 f: (01590) 683533 info@rea-ltd.co.uk www.rea-ltd.co.uk

Dennett House
Brighton Road
Sway
Lymington
Hampshire
SO41 6EB

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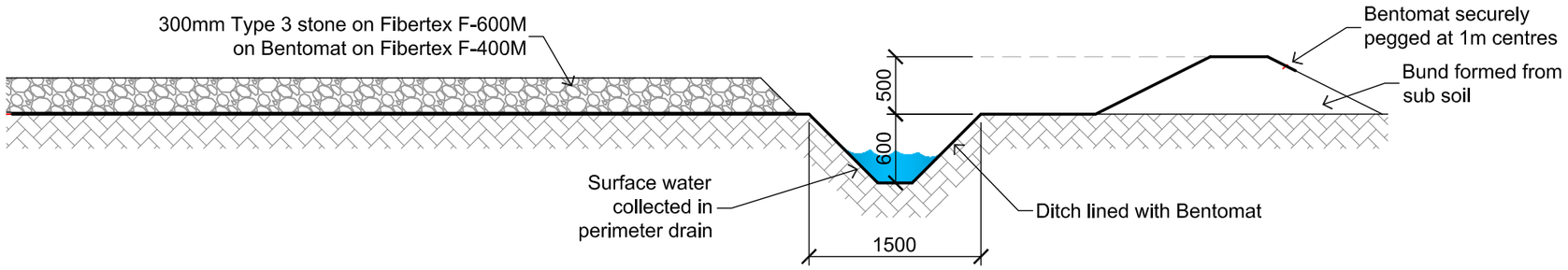
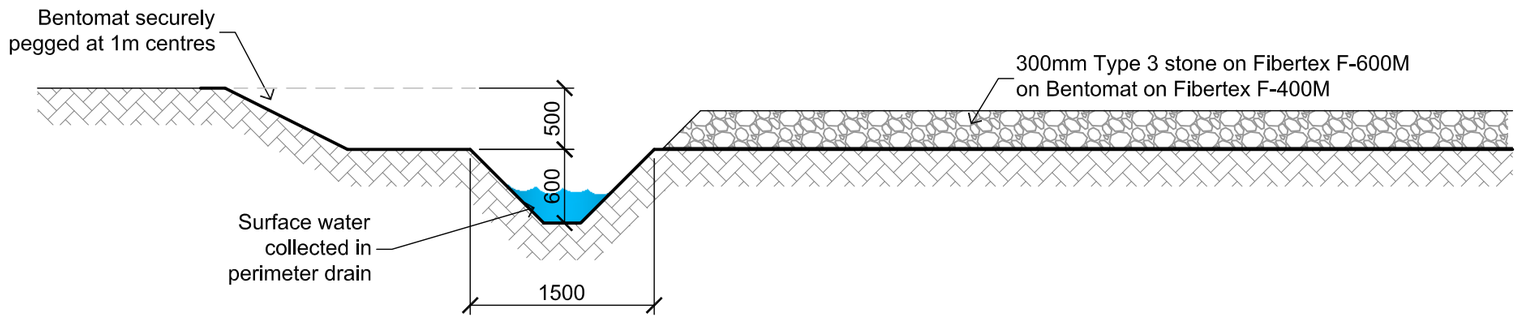
Job Title: Wisborough Green-1	Drawing Title: Proposed Site Sections Drilling Mode (1:500)		
	Drawing Number: 3582 P 14		Revision: L

FIGURE 4.9A

SITE CONSTRUCTION SECTIONS



TYPICAL DITCH CONSTRUCTION IN FILL



TYPICAL DITCH CONSTRUCTION IN CUT

0 5m 10m

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t: (01590) 683176 f: (01590) 683533 info@rea-ltd.co.uk www.rea-ltd.co.uk

Dennett House
Brighton Road
Sway
Lymington
Hampshire
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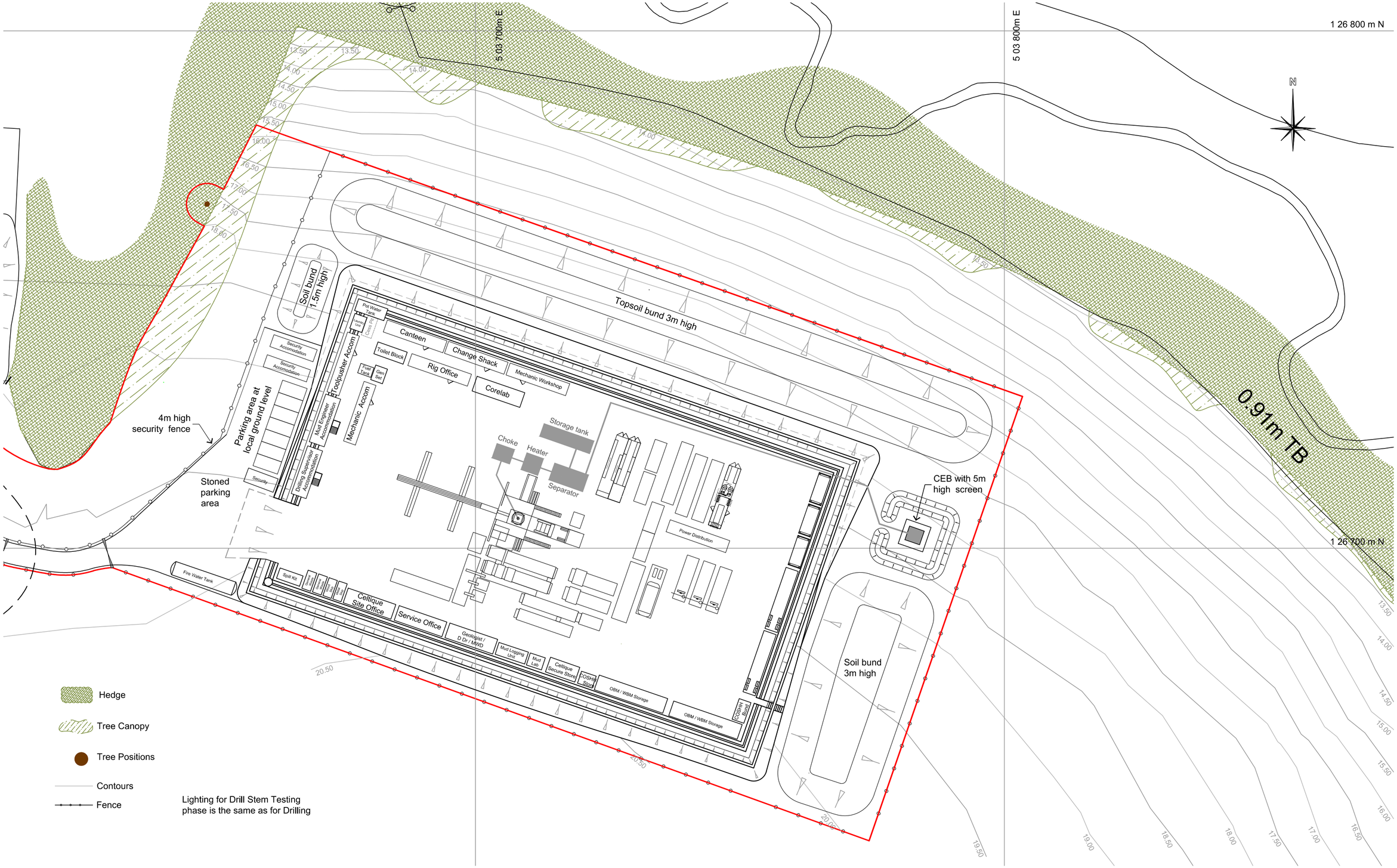
Client: Celtique Energie Petroleum Boxal Bridge Wisborough Green West Sussex	Drawn By: AJNE	Date: February 2014	Sheet Size: A3
Job Title: Wisborough Green-1	Drawing Title: Site Construction Sections (1:50)		
	Drawing Number: 3582 P 17		Revision: D

FIGURE 4.11A

PROPOSED SITE – DRILL STEM TESTING MODE



Proposed Site - Drill Stem Testing Mode

Scale 1:500

0 5m 10m

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Dennett House
Brighton Road
Sway
Lymington
Hampshire
SO41 6EB

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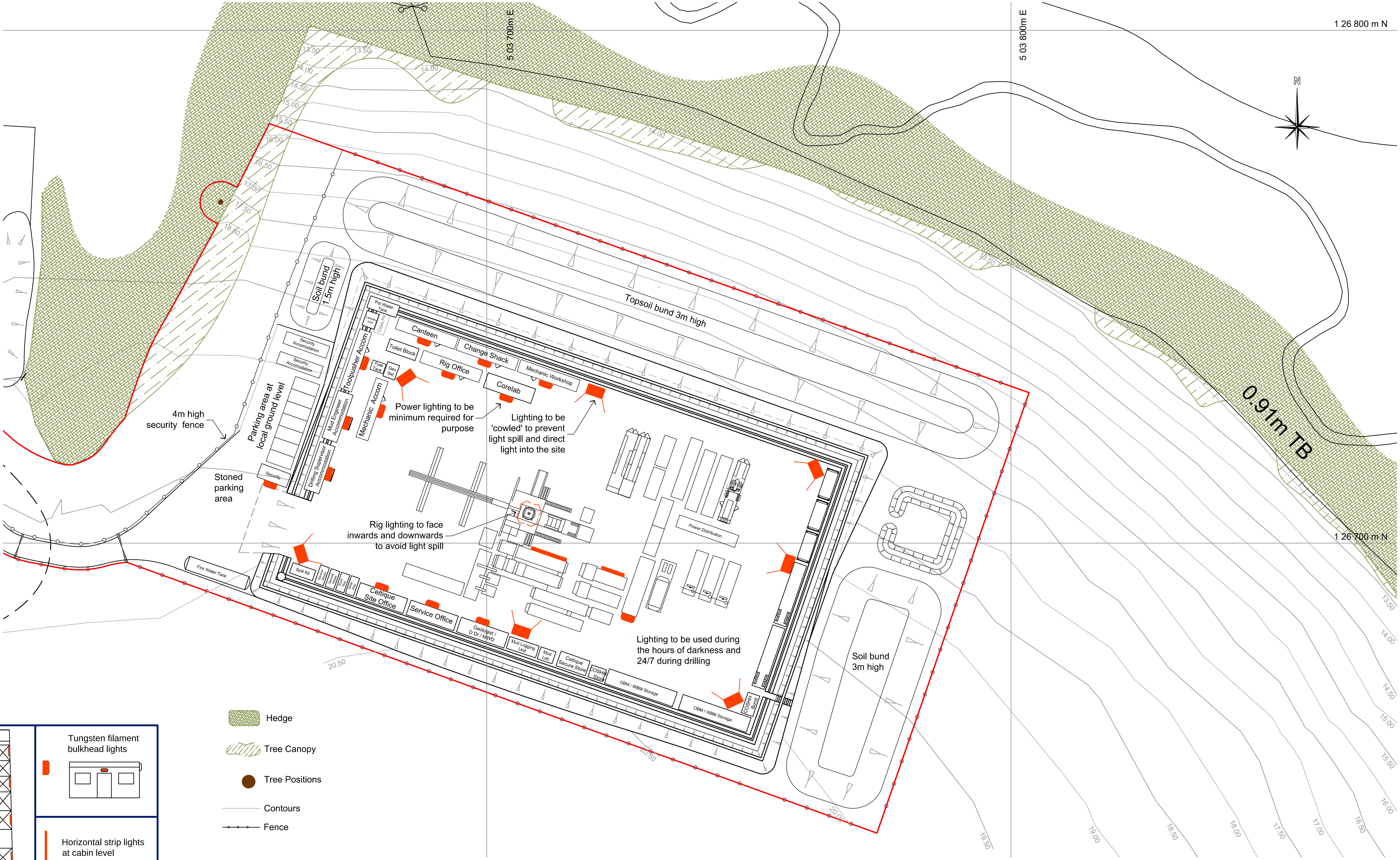
Job Title: Wisborough Green-1	Drawing Title: Proposed Site - Drill Stem Testing Mode (1:500)		
	Drawing Number: 3582 P 10		Revision: K

FIGURE 4.12A

PROPOSED SITE – LIGHTING LAYOUT



5 03 700m E
5 03 800m E
1 26 800 m N
1 26 700 m N
N
0.91m TB
Topsoil bund 3m high
Soil bund 1.5m high
Soil bund 3m high
4m high security fence
Parking area at local ground level
Stoned parking area
Power lighting to be minimum required for purpose
Lighting to be 'cowled' to prevent light spill and direct light into the site
Rig lighting to face inwards and downwards to avoid light spill
Lighting to be used during the hours of darkness and 24/7 during drilling
Canteen
Change Shack
Toilet Block
Rig Office
Mechanic Workshop
Corelab
Toolpusher Accom
Mechanic Accom
Mud Engineer Accommodation
Drilling Supervisor Accommodation
Security Accomodation
Security
Power Distribution
Fire Water Tank
Spill Kit
Celtique Site Office
Service Office
Geologist / D Dr / MWD
Mud Logging Unit
Mud Lab
Celtique Secure Store
COSHH Store
OBM / WBM Storage
COSHH Bund

Hedge

Tree Canopy

Tree Positions

Contours

Fence

Tungsten filament bulkhead lights	
Horizontal strip lights at cabin level	
Inwards facing lighting within derrick	
Freestanding 3 metre high fluorescent lighting facing inwards on site and pointing downwards	

Proposed Site - Lighting Layout

Scale 1:500

0 5m 10m

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Dennett House
Brighton Road
Sway
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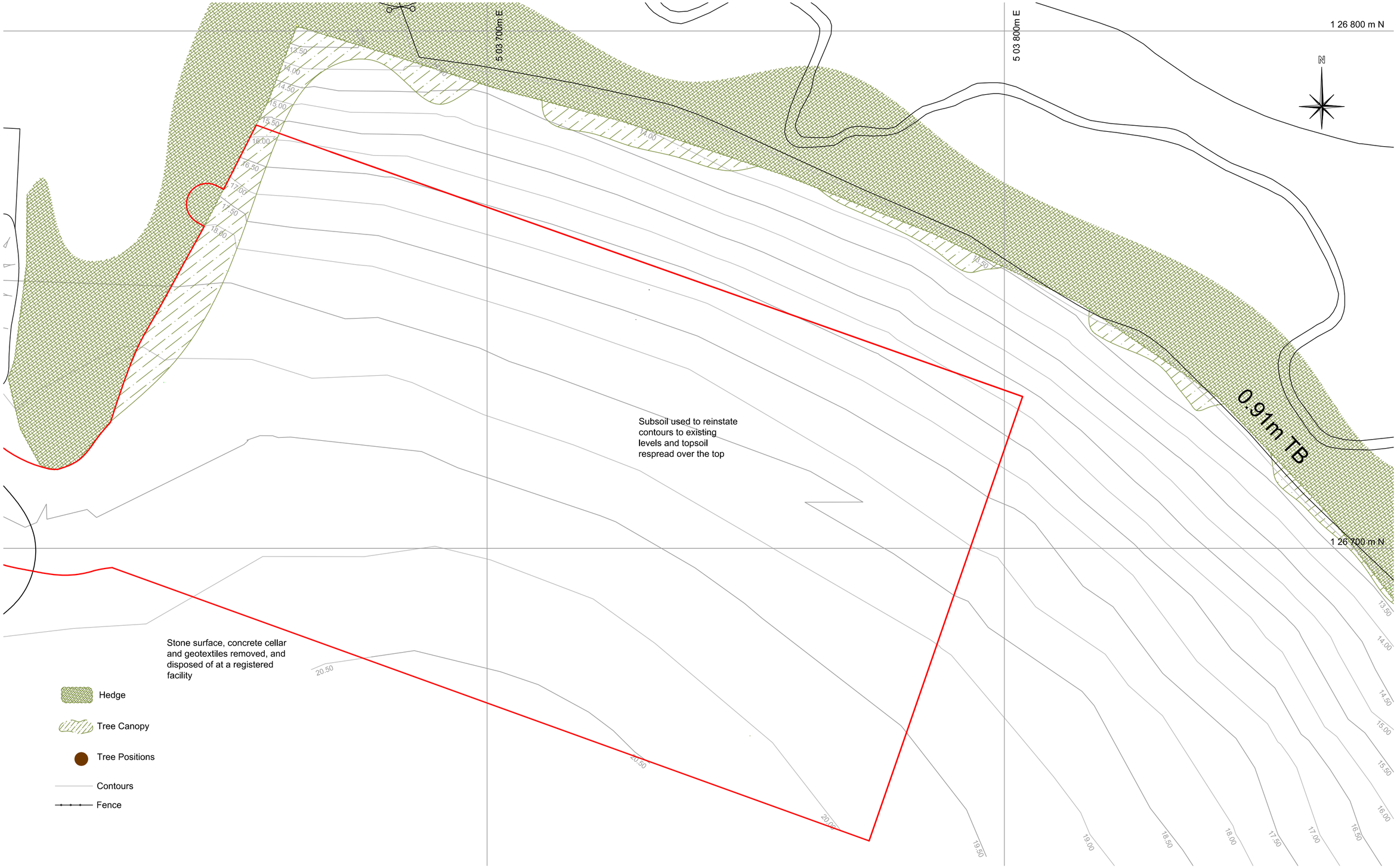
Hampshire
SO41 6EB

t: (01590) 683176 f: (01590) 683533 info@rea-ltd.co.uk www.rea-ltd.co.uk

Client	Celtique Energie Petroleum Boxal Bridge Wisborough Green West Sussex
Job Title	Wisborough Green-1
Drawn By	AJNE
Date	April 2014
Sheet Size	A2
Drawing Title	Proposed Site - Lighting Layout (1:500)
Drawing Number	3582 P 09
Revision	J

FIGURE 4.13A

PROPOSED SITE – RESTORATION PLAN



Proposed Site - Reinstatement Plan

Scale 1:500

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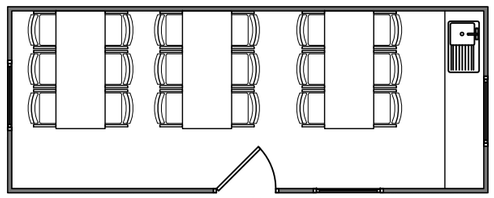
t: (01590) 683176 f: (01590) 683533 info@rea-ltd.co.uk www.rea-ltd.co.uk
Dennett House
Brighton Road
Sway
Lymington
Hampshire
SO41 6EB

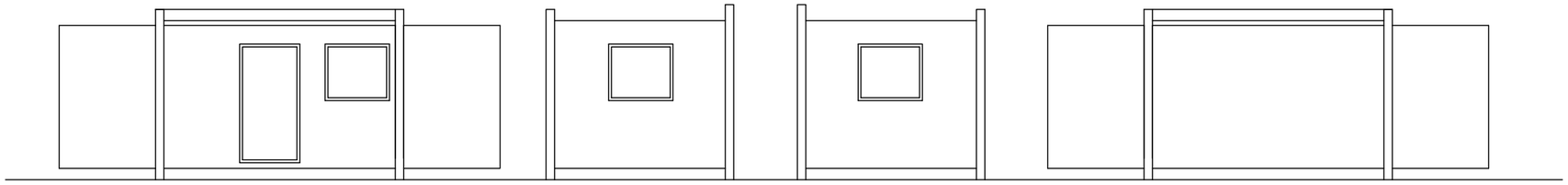
Client: Celtique Energie Petroleum Boxal Bridge Wisborough Green West Sussex	Drawn By: AJNE	Date: November 2013	Sheet Size: A2
Job Title: Wisborough Green-1	Drawing Title: Proposed Site - Reinstatement Plan (1:500)		
	Drawing Number: 3582 P 20		Revision: E

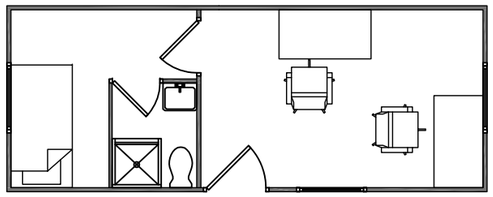
FIGURE 4.14

CABIN PLANS AND ELEVATIONS



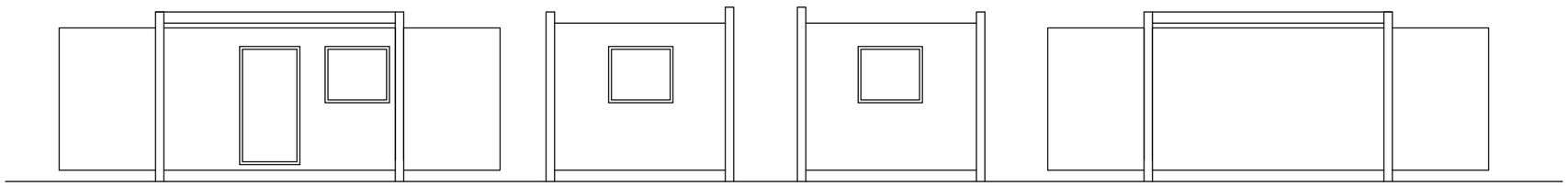
Mess Cabin

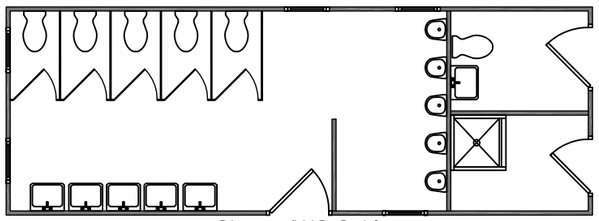




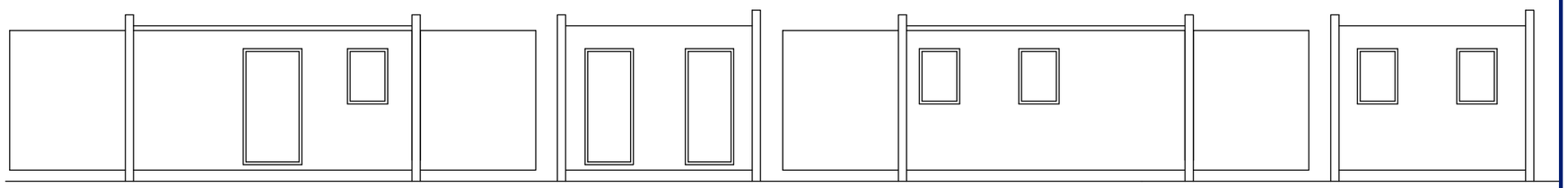
x2

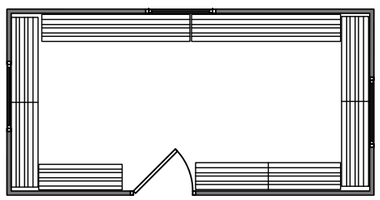
Supervisor/Foreman Cabin



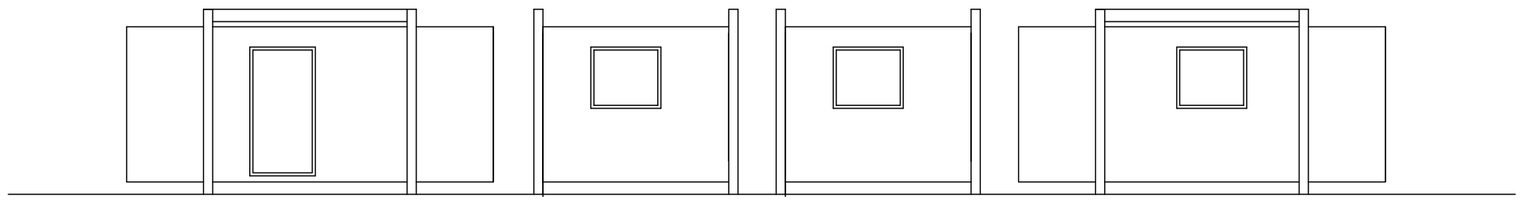


Shower/WC Cabin

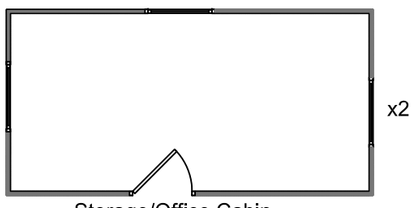




Change Cabin

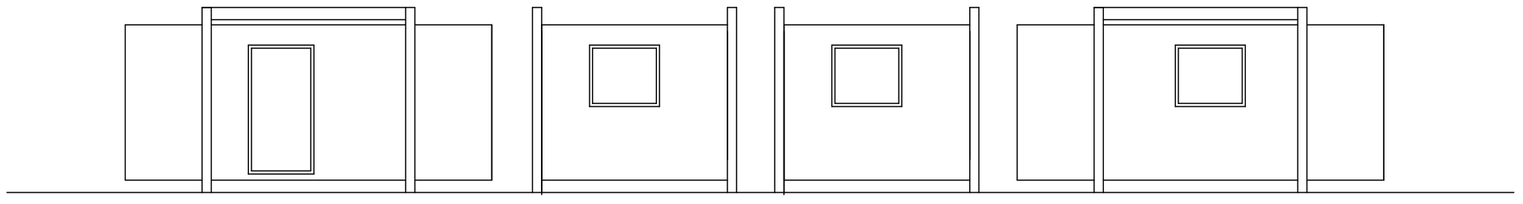


Typical cabin external finish - corrugated profile steel cladding or stippled plaster on plywood



x2

Storage/Office Cabin



Plans and elevations represent typical cabin layouts - actual cabins may vary from those shown

0 1m 2m

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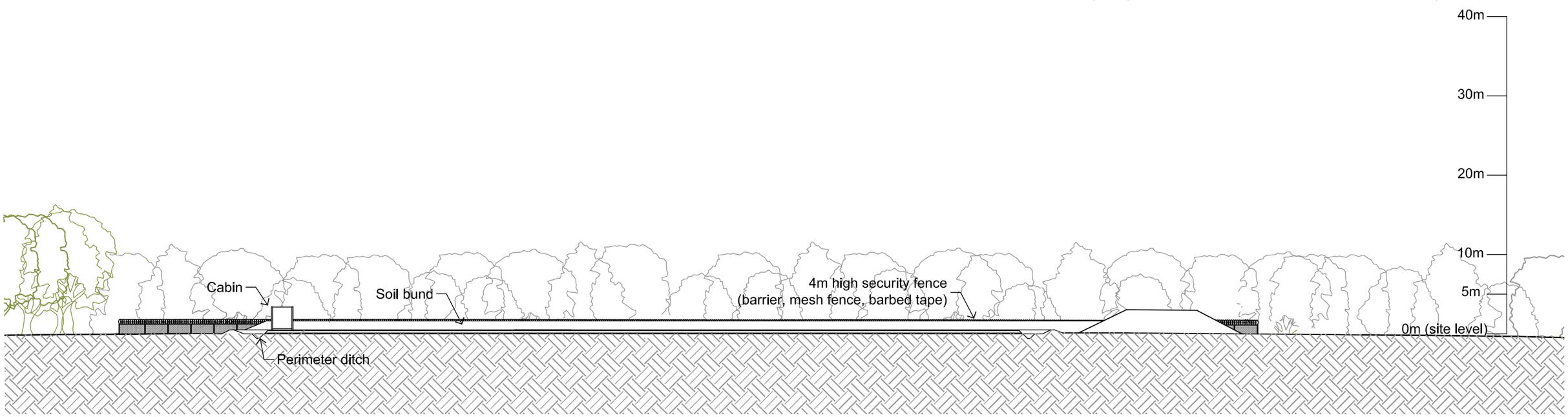
t: (01590) 683176 f: (01590) 683533 info@rea-ltd.co.uk www.rea-ltd.co.uk

Dennett House
Brighton Road
Sway
Lymington
Hampshire
SO41 6EB

Client: Celtique Energie Petroleum Boxal Bridge Wisborough Green West Sussex	Drawn By: AJNE	Date: November 2013	Sheet Size: A3
Job Title: Wisborough Green-1	Drawing Title: Cabins - Plans and Elevations (1:100)		
	Drawing Number: 3582 P 21		Revision

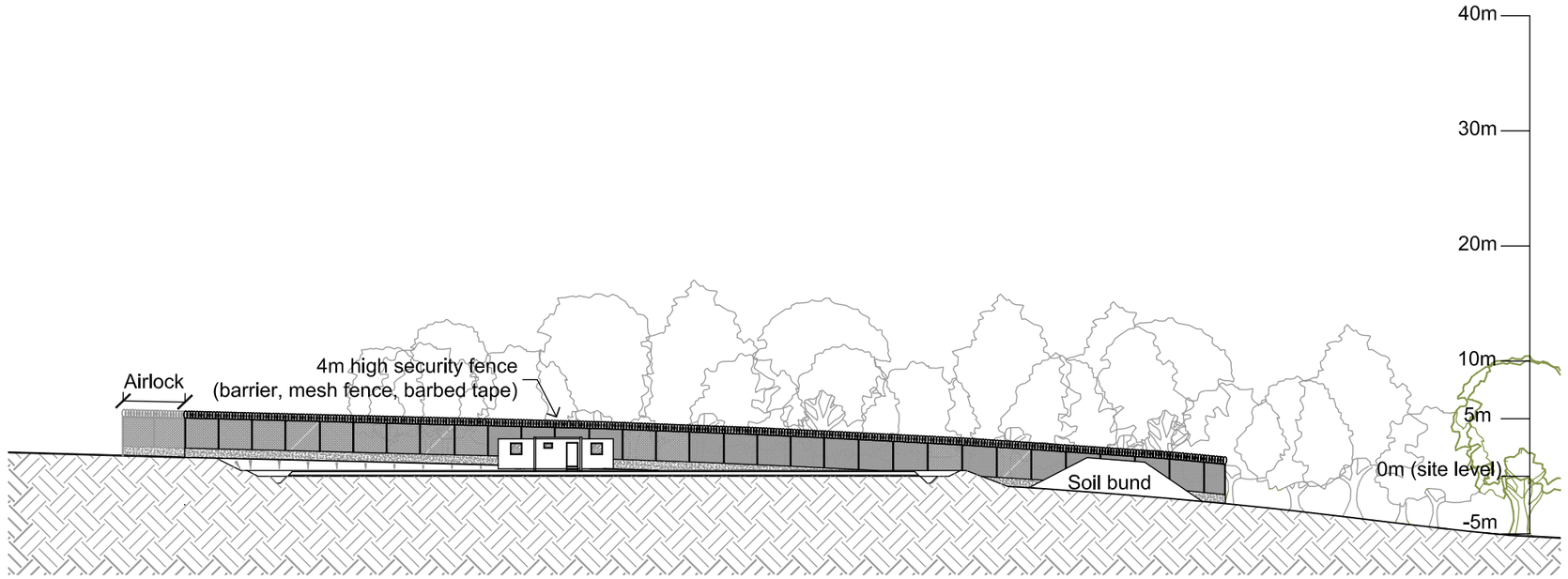
FIGURE 4.15

PROPOSED SITE SECTIONS – CONSTRUCTION MODE



Proposed Site - Section A-A

Scale 1:500



Proposed Site - Section B-B

Scale 1:500

0 5m 10m

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REA LIMITED
Dennett House
Brighton Road
Sway
Lymington
Hampshire
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	Drawing Title: Proposed Site Sections Construction Mode (1:500)		
Job Title: Wisborough Green-1	Drawing Number: 3582 P 22		Revision: D

FIGURE 4.16

ENTRANCE PERSPECTIVE IMAGES

View towards Site - Existing

View towards Site - Proposed (Construction Phase)

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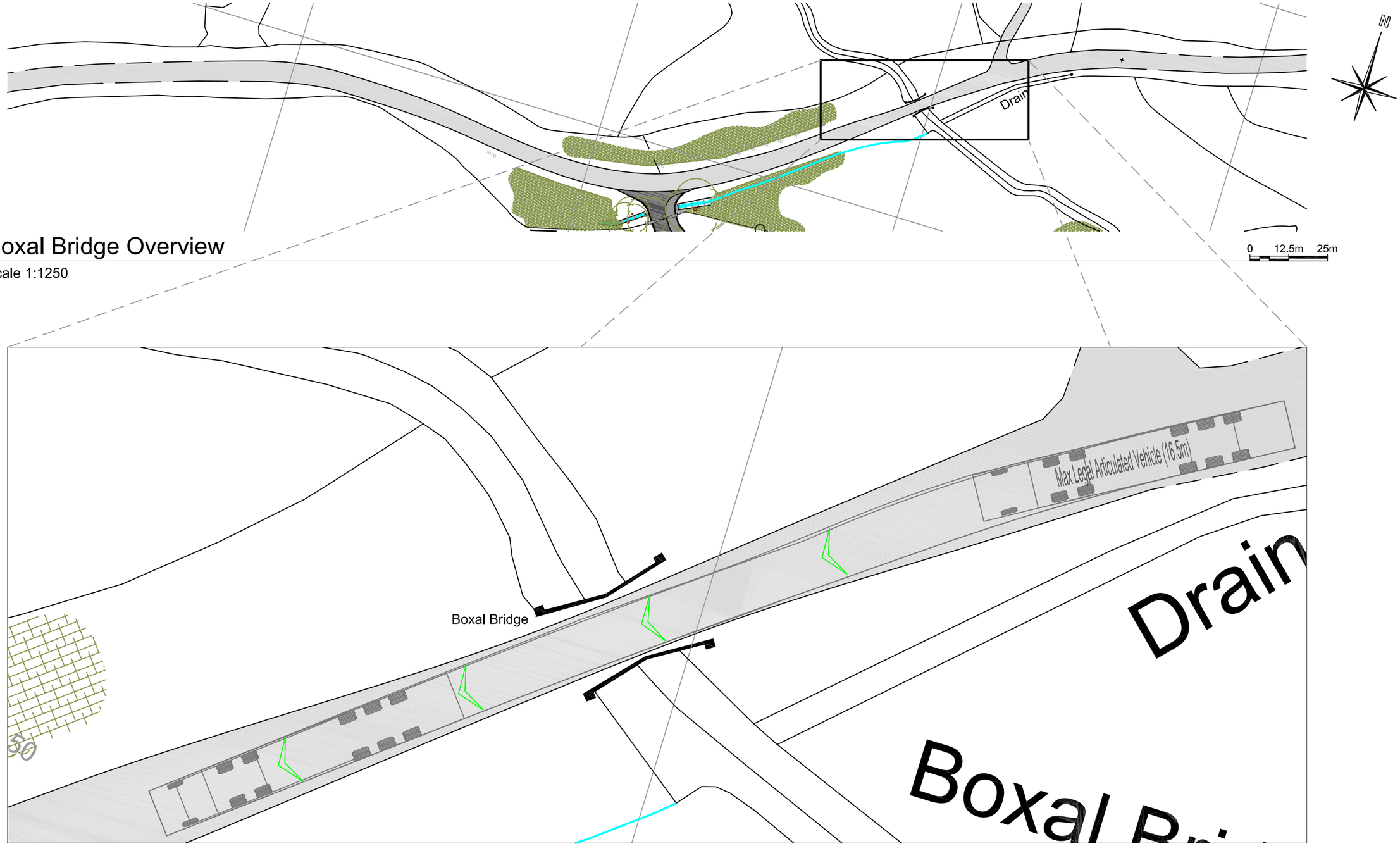
	Drawing Title: Entrance Perspective Images		
Job Title: Wisborough Green-1	Drawing Number: 3582 P 23		Revision: A

FIGURE 4.17

SWEPT PATH AT BOXAL BRIDGE



Boxal Bridge Overview

Scale 1:1250

HGV Swept Path at Boxal Bridge

Scale 1:200

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t: (01590) 683176 f: (01590) 683533 info@rea-ltd.co.uk www.rea-ltd.co.uk

REA LIMITED
Dennett House
Brighton Road
Sway
Lymington
Hampshire
SO41 6EB

Client: Celtique Energie Petroleum Boxal Bridge Wisborough Green West Sussex	Drawn By: AJNE	Date: December 2013	Sheet Size: A3
Job Title: Wisborough Green-1	Drawing Title: Swept Path at Boxal Bridge (1:1250, 1:200)		
	Drawing Number: 3582 P 24		Revision:

FIGURE 4.18

SWEPT PATH AT WISBOROUGH GREEN

HGV Swept Path through Wisborough Green (to Site)

Scale 1:500

0 5m 10m

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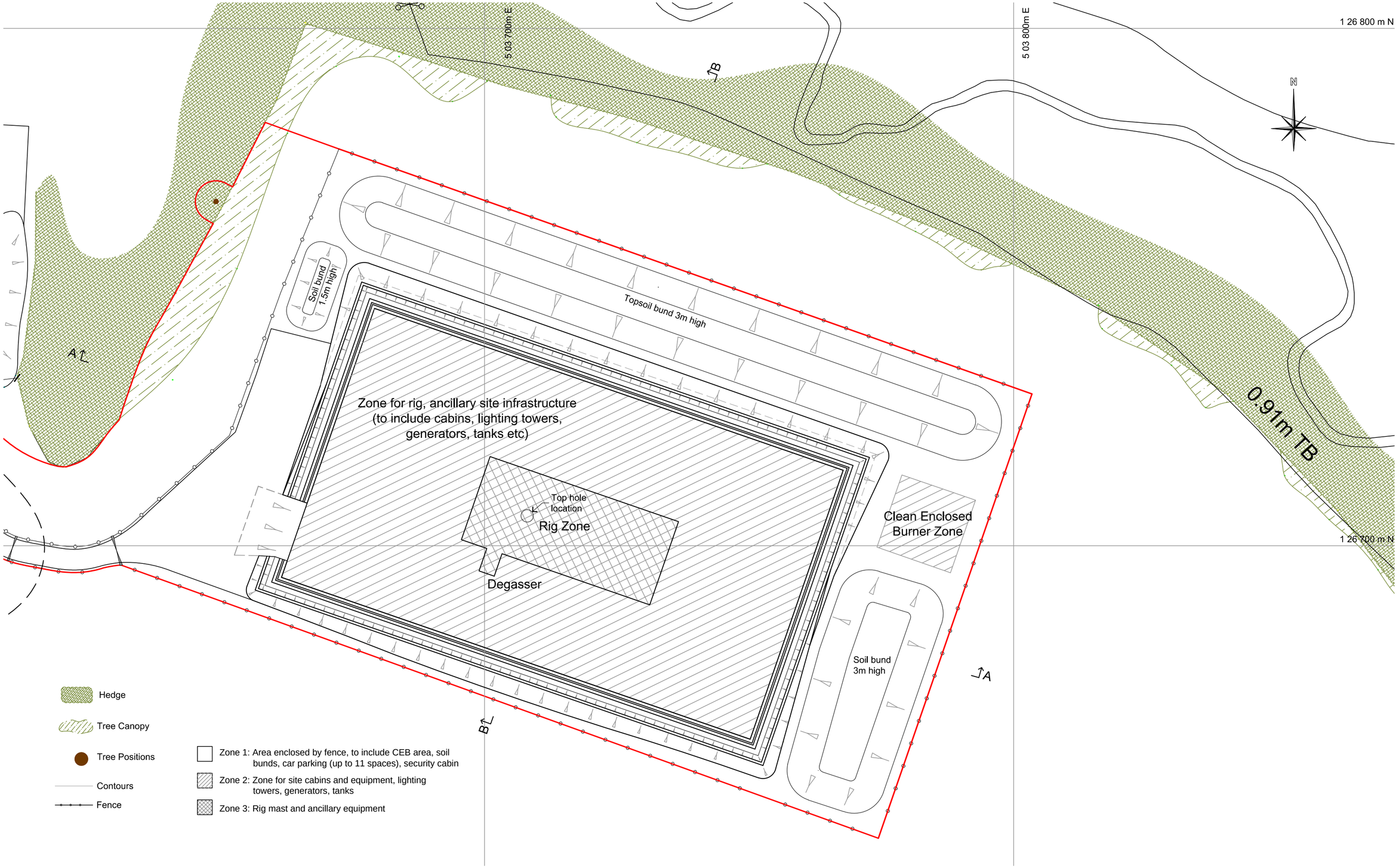
Dennett House
Brighton Road
Sway
Lymington
Hampshire
SO41 6EB

Client: Celtique Energie Petroleum Boxal Bridge Wisborough Green West Sussex	Drawn By: AJNE	Date: December 2013	Sheet Size: A1
Job Title: Wisborough Green-1	Drawing Title: Swept Path - Wisborough Green (1:500)		
	Drawing Number: 3582 P 25		Revision:

FIGURE 4.19

RIG AND EQUIPMENT PARAMETERS PLAN



Rig and Equipment Parameters Plan

Scale 1:500

0 5m 10m

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t: (01590) 683176 f: (01590) 683533 info@rea-ltd.co.uk www.rea-ltd.co.uk
Dennett House
Brighton Road
Sway
Lymington
Hampshire
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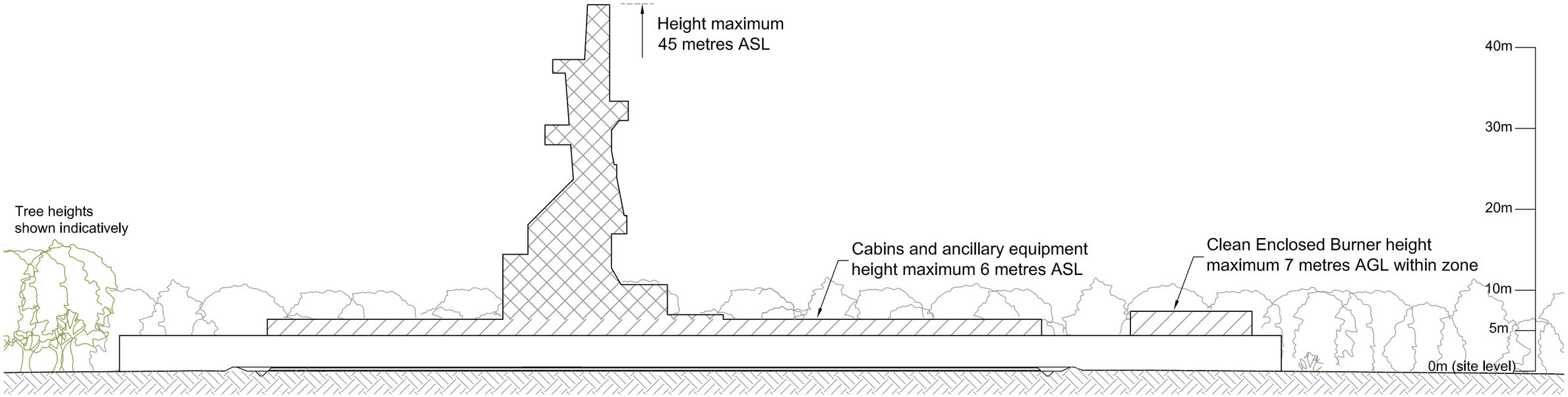
Client: Celtique Energie Petroleum Boxal Bridge Wisborough Green West Sussex	Drawn By: AJNE	Date: March 2014	Sheet Size: A2
Job Title: Wisborough Green-1	Drawing Title: Rig & Equipment Parameters Plan (1:500)		
	Drawing Number: 3582 P 26		Revision: E

FIGURE 4.20

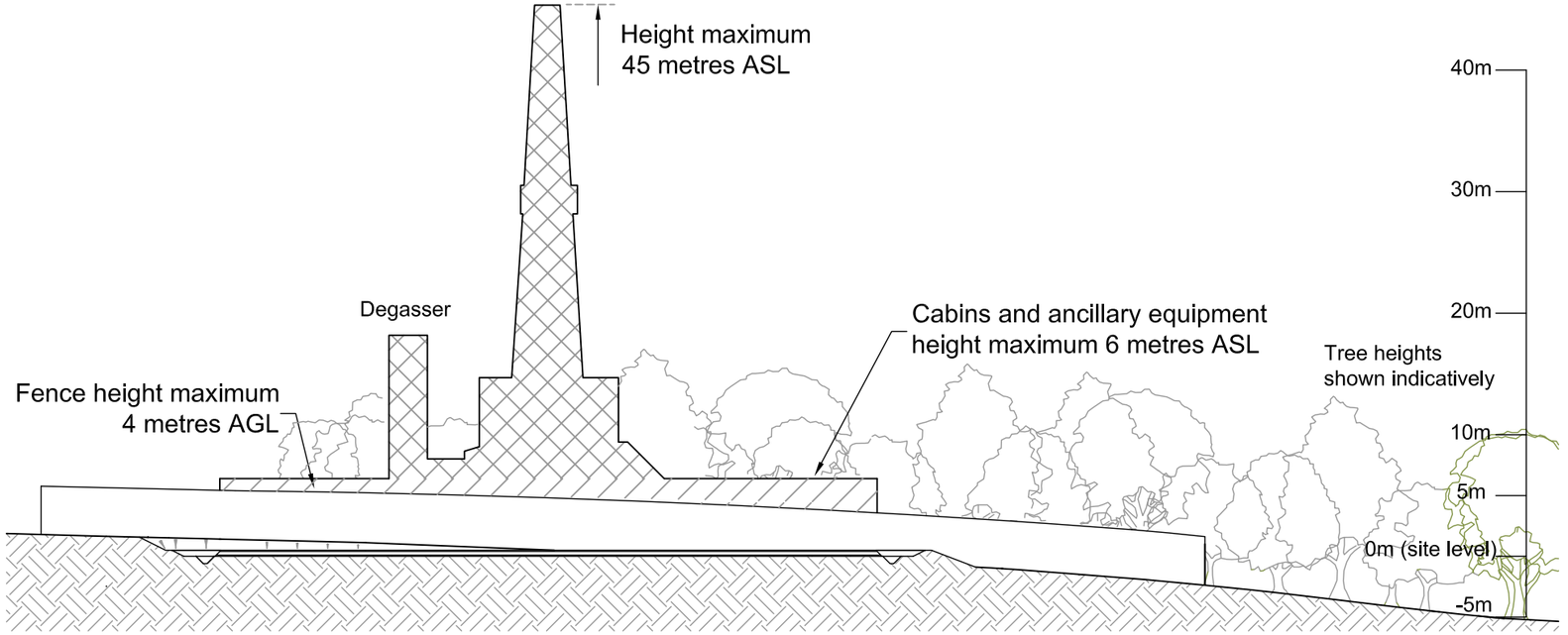
RIG AND EQUIPMENT PARAMETERS SECTION



Rig and Equipment Parameters Section (A-A)

Scale 1:500

0 5m 10m



Rig and Equipment Parameters Section (B-B)

Scale 1:500

0 5m 10m

AGL Above Ground Level

ASL Above Site Level

Zone 1: Area enclosed by fence, to include CEB area, soil bunds, car parking (up to 11 spaces), security cabin

Zone 2: Zone for site cabins and equipment, lighting towers, generators, tanks

Zone 3: Rig mast and ancillary equipment

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t: (01590) 683176 f: (01590) 683533 info@rea-ltd.co.uk www.rea-ltd.co.uk

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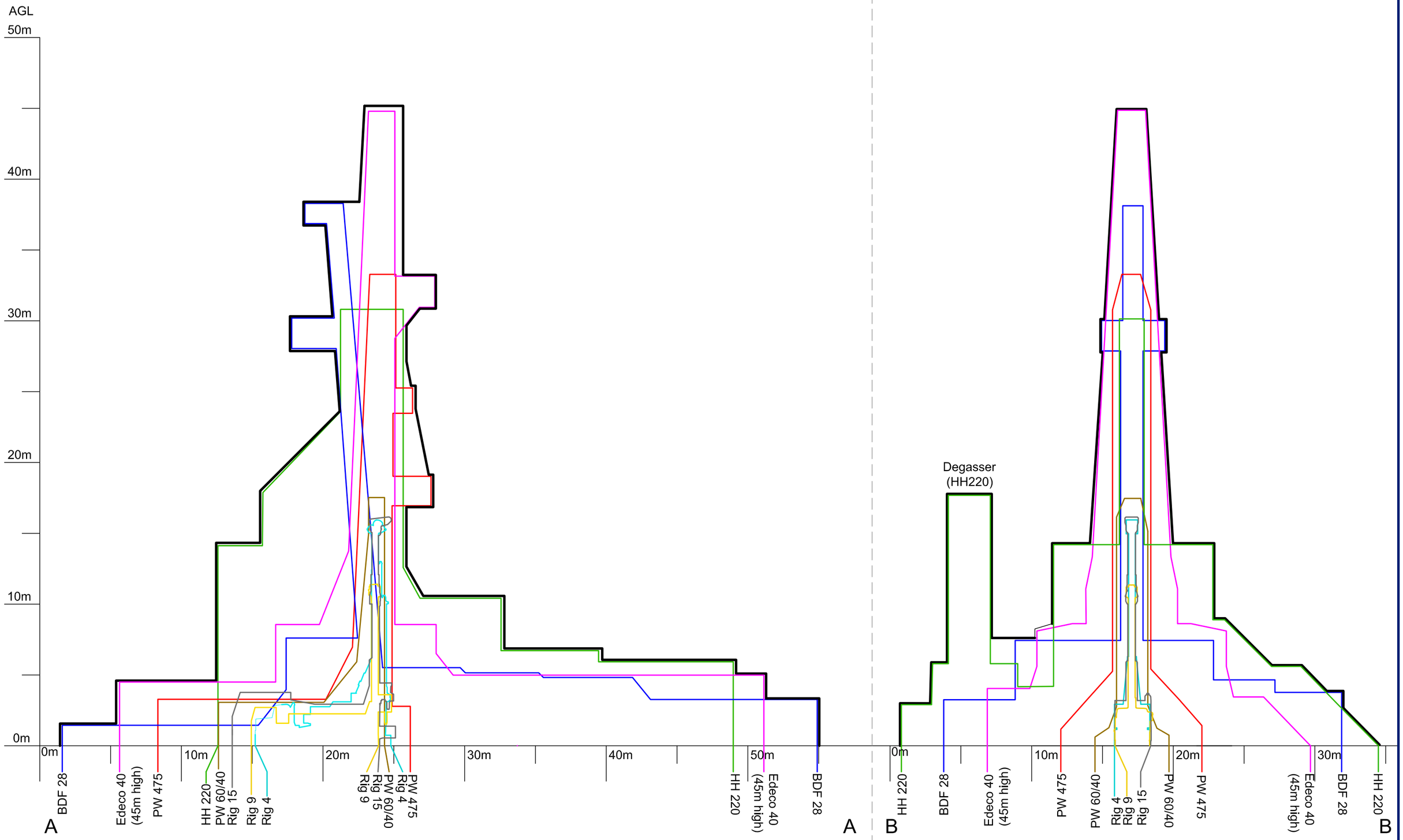
	Drawing Title: Rig & Equipment Parameters Section (1:500)		
Job Title: Wisborough Green-1	Drawing Number: 3582 P 27		Revision: B

FIGURE 4.21

RIG PARAMETERS



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t: (01590) 683176 f: (01590) 683533 info@rea-ltd.co.uk www.rea-ltd.co.uk

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Brighton Road
Sway
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	Drawing Title: Rig Parameters (1:250)		
Job Title: Wisborough Green-1	Drawing Number: 3582 P 28		Revision: B

APPENDIX 4.1

VEHICLE DATA CALCULATIONS

PROGRAMME

Tender Programme

Item	Operation	Quantity	Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	Notes
	Year																																											
	Month																																											
	W/C Monday																																											
	Week No			1					2					3					4					5					6					7					8					
	SITE CONSTRUCTION																																											
	Establish Site	2	Day																																									
	Strip Access Topsoil	3																																										
	Place Fabric and Stone to Access	7																																										
	Strip Site Topsoil	3																																										
	Cut to Fill	3																																										
	Surface entrance	2																																										
	Cellar construction	5																																										
	Place Site Liners	8																																										
	Place Site Stone	10																																										
	Water Pipes	2																																										
	Gates and Fencing																																											
	Clear Site	2																																										
																																										Total vehicle visits
	Articulated Low loader - plant delivery			2											1																1		2											6
	Rigid lowloader plant delivery			5								2			2																2		5											16
	Rigid delivery vehicle - curtain sider/truckmixer				1													2	2	4		2	3						1	1														16
	20t tipper lorry- aggregates				5	10	20	20	20	20	20	2	1					3				8	10	12	15	20	20	15	15	10	5													251
	Van/car			5	4	4	4	4	5	4	4	6	6	5	4	4	4	4	5	4	5	5	5	6	5	5	5	5	6	5	4	4	4											140

Rig crew:

1 x day toolpusher	24/7	Drilling	During DST if the rig is on site, this crew is on site
1 x night pusher			
2 x drillers 1 per shift			
2 x AD's 1 per shift			
2 x pump engineers 1 per shift			
2 x Senior floor hand 1 per shift			
2 x junior floor hand 1 per shift			
2 x lease hands 1 per shift			
Potentially spare lease hand on days to be confirmed			
1 x rig mechanic	24/7		
1 x rig electrician			
1 x welder			
1 x HSE – only 2 days per week			

Max rig crew per day (on days usually) = 13

Service crews:

1 x drilling supervisor	24/7	Drilling	DST and EWT
2 x mud engineers 1 per shift			
2 x data eng 1 per shift			
2 x sample catchers 1 per shift			
2 x MWD hands 1 per shift			
2 x DD's 1 per shift			
2 x waste disposal hands 1 per shift			
1 x well site geologist			
1 x well test supervisor			
4 x crew per 12 hours shift			DST and EWT

Service hands per day = 7 with the potential for additional as below

The above are onsite for the majority of the operations the following are on for 3-4 days at a time:

	total visits		
Coring crew – X 4 hands	1 visit	Drilling	
Cementers – X 2 hands	3 visits		
Wireline logging crews – X 5	2 visits		
TRS – x 4 – 2 guys per shift	2 visits		
Crane op ?	as needed during mobilisation of equipment		

Visitors	up to 3 per day during any phase

Marriotts HH220

Load Out List

EQUIPMENT LOADED	LOAD #	TRAILER	WEIGHT	DIMENSIONS
site office (lift frame)	1	40 ft	7 ton	12.18m x 2.42m x 2.60m
toolpushers shack	2	40 ft	7 ton	12.18m x 2.42m x 2.60m
mechanics shack	3	40 ft	7 ton	12.18m x 2.42m x 2.60m
change shack	4	40 ft	7 ton	12.18m x 2.42m x 2.60m
canteen	5	40 ft	7 ton	12.18m x 2.42m x 2.60m
company man shack	6	40 ft	7 ton	12.18m x 2.42m x 2.60m
cuadrilla shack	7	40 ft	7 ton	12.18m x 2.42m x 2.60m
toilet block & small generator	8	40 ft	7 ton	6.05m x 2.44m x 2.60m
ramps and front spreaders	9	40ft	15 ton	
mousehole pipe handler base	10	40ft	22 ton	12.80m x 2.12m x .68m
2 x bases ,bits and bobs	11	40ft	20 ton	12.00m x 2.30m x1.00m
rig carrier	12	low loader	65 ton	17m x2.80m 4.26m
HPU	13	low loader	36 ton	13.80m x 2.50m x 2.90m
shaker tank	14	45ft	32 ton	13.80m x 2.50m x 2.90m
settling tank	15	45ft	32 ton	13.80m x 2.50m x 2.90m
mix tank	16	45ft	32 ton	13.80m x 2.50m x 2.90m
active tank	17	45ft	32 ton	13.70m x 2.43m x 2.90m
pump stores & mix room(lift frame)	18	40ft	20 ton	6.05m x 2.43m x 2.90m
mix room & welding shack	19	40ft	10 ton	6.05 x 2.44m x 2.60m
walkway, flowline, delivery lines	20	45ft	5 ton	
water tank	21	45ft	14 ton	13.70m x 2.43m x 2.90m
Centrifuge and frame	22	40ft	7 ton	
degasser & desander	23	40ft	10 ton	6.05m x 2.43m x 2.90m
shaker 1 & 2	24	40 ft	14 ton	6.05m x 2.43m x 2.90m
40ft open top container(tank walkways)	25	40 ft	17 ton	12.18m x 2.42m x 2.60m
poor boy degasser	26	40 ft	14 ton	
mud pump 1(suction at the rear end of the trailer)	27	semi low loader	38 ton	7.80m x 2.55m x 2.80m
mud pump 2(suction at the rear end of the trailer)	28	semi low loader	38 ton	7.80m x 2.55m x 2.80m
mud pump 3(suction at the rear end of the trailer	29	semi low loader	38 ton	7.80m x 2.55m x 2.80m
PCR(air con unit towards rear of traailer)	30	45 ft	25 ton	13.60m x 2.50m x 3.10m
auxillary generator	31	40ft	14 ton	12.17m x 2.42m x 2.60m
Generator # 3 (starter panel to rer of trailer)	32	45ft	30 ton	13.80m x 2.50m x 2.80m
Generator # 2 (starter panel to rear of trailer)	33	45ft	30 ton	13.80m x 2.50m x 2.80m
Generator # 1 (starter panel to rear of trailer)	34	45ft	30 ton	13.80m x 2.50m x 2.80m
diesel tanks	35	40ft	12 ton	6.05m/7.40m x 2.50m x 2.93m
cable trays	36	40 ft	8 ton	
GDS shack shacks	37	40ft	10 ton	
koomey unit and centrifuge	38	40ft	20 ton	6.05m x 2.44m x 12.60m
13 5/8" BOP and bits and bobs	39	40ft	20 ton	4.00m x 1.95m x 2.45m
telescopic legs,rig legs,support legs & stairs for shacks	40	40 ft	12 ton	
rotary table & false floors	41	40 ft	14 ton	
dog house & spreaders	42	40 ft	12 ton	8.40m x 2.55m x 2.80m
toolhouse & spreaders	43	40 ft	12 ton	8.40m x 2.55m x 2.80m
standpipe manifold and HPU cable ramp/ stairs	44	40 ft	7 ton	10.53m x2.40m x 1.10m
general stores	45	40 ft	10 ton	12.18m x 2.42m x 2.60m
mechanics workshop	46	40 ft	14 ton	12.18m x 2.42m x 2.60m
drillmech stores & rig stairs	47	40ft	10 ton	6.05m x 2.44m x 2.60m
Pipe handler	48	low cab unit	17 ton	16m x .80m x 4.00m
BOP bolt stores, and carousel and v-door	49	45ft	12 ton	
strong backs & side arms	50	40ft	10 ton	
pipe bins 1-2-3	51	45ft	6ton	13.6m x 1.95m x2.45m
pipe bins 4-5-6	52	45ft	6ton	13.6m x 1.95m x2.45m
pipe bins 7-8-9	53	45ft	6ton	13.6m x 1.95m x2.45m
pipe bins 15-14-13	54	45ft	6ton	13.6m x 1.95m x2.45m
pipe bins 12-11-10	55	45ft	6ton	13.6m x 1.95m x2.45m
oil stores &chemical stores	56	40ft	12ton	
fishing store & shaker screen store	57	40ft	10ton	
chemical store x2	58	40ft	10ton	
half heights x2	59	40ft	15ton	
choke,wireline,	60	40ft	10ton	
storage racks & catwalk	61	40ft	7ton	
mud tank walkway & rig floor stairs landing	62	low loader	8ton	
security/ppe & trip tank	63	40ft	5ton	
fork lift	64	low loader	14ton	

LOAD OUT LIST FOR RIG10

	Item	Weight
1	Rig manager accommodation building	8t
2	Rig manager office/safety office building	8t
3	Crew change cabin	8t
4	Crew tea shack + forklift truck	15t
5	Rig sub-base	40t
6	Rig ramps, pipe racks, annular	22t
7	Combination building + dog house	25t
8	Rig carrier	47t
9	Mast	25t
10	Shaker tank	17.5t
11	Settling tank	17.5t
12	Active tank	17.5t
13	Storage tank	15t
14	Poor boy de-gasser, Double BOP, HCR valve	14t
15	Mud pump + Mud tank pipe work	10t
16	Mud pump No 3 + Store shack No 1	23.5t
17	Mud pump No 3 Engine + Store shack No 2	23t
18	Mud pump No 2	28.5t
19	Mud pump No 2 Engine	26t
20	Mud pump No 1	28.5t
21	Mud pump No 1 Engine	27
22	Choke, Koomey, de-gas, de-sand, de-silt	20t
23	Light plant, dog house frame, air receiver	16t
24	MCC building, small items	23t
25	Tool/Mechanic shack + Rigging loft	11t
26	Pump store + oil store	15t
27	Junk skip, Trip tank, counter weights	21t
28	Rig engine soundproof, steps,small items	10t
29	Catwalks, V-door, steps, small items.	15t
30	Counter weights, small items	20t
31	2nd pipe-racks,mouse-hole,rat-hole, pipe work	16t

EDECO RIG 40 TRANSPORTATION LOADING

Description	Size (m) Length	Width	Height	Weight (kg)
Main Pump & Tank Package				
1 Water Tank	12.68	2.44	3.10	15000
2 Mud Tank No 1	12.75	3.19	3.15	23000
3 Mud Tank No 2 (suction)	11.75	3.24	3.70	23000
4 Mud Tank No 3	12.35	2.52	3.25	17000
5 Quant Suction & HP lines	12.20	2.44	1.25	10000
6 Mud Pump No 1	9.00	3.37	3.07	42000
7 Mud Pump No 2	9.00	3.30	3.03	42000
8 Mud Pump No 3	6.08	3.00	2.30	18000
9 Mud Pump No 1 Engine	10.44	2.83	2.96	22000
10 Mud Pump No 2 Engine	10.44	2.83	2.96	22000
11 Mud Pump No 3 Engine	7.48	2.43	2.98	18000
12 M/P Fuel Tank	6.04	2.44	2.44	10000
13 Pump spares store	12.18	2.44	2.60	20000
14 Charge pumps and suction pipes	12.00	2.44	1.50	15000

15 Shakers and stand 8000	6.50	2.66	2.28
Generator & SCR Package			
16 SCR room No 1 27000	11.73	3.10	3.16
17 SCR No 2, Plug/ Switch Board 13000	7.32	3.10	3.29
18 Generator No 1 /Stores 25000	12.54	2.94	3.21
19 Generator No 2 / Stores 26000	12.54	2.94	3.21
20 Generator No 3 / Stores 23000	12.54	2.94	3.21
21 Toolhouse 20000	12.54	2.44	2.58
22 Gen F/ Tank & Koomy 2 x 20' 18000	12.20	2.44	2.60
Main Drilling Rig Package			
23 Matting (7) / BOP rails 18000	12.20	2.44	1.50
24 Cable / motor store 20000	12.20	2.44	2.60
25 Bottom Sub ODS (No Drilling line) 22000	16.17	2.51	3.14
26 Bottom Sub DS 22000	16.17	2.51	3.14
27 Top Sub ODS 20000	11.85	2.90	3.16
28 21.1/4" BOP / DB cooling unit 22000	3.46	3.15	2.80
29 Top Sub DS 16500	11.85	2.90	3.16
30 Sub Spreaders (5) 12000	12.20	2.44	1.80

31	Rotary Table/Skid/DC Skid 17000	12.20	2.44	1.80
32	Drawworks 24000	7.00	2.70	2.75
33	Windwall 13000	12.24	2.51	3.07
34	Doghouse 14000	12.24	2.44	3.13
35	Hydraulic Pipe Handler 20000	19.00	3.17	2.36
36	A Legs, Spreaders, Crown Stand 18000	10.74	2.44	2.94
37	Derrick Bottom Section 12000	9.75	2.74	2.40
38	Derrick Middle Section 7000	9.30	2.29	2.29
39	Derrick Crown Section 9000	15.24	3.35	1.98
40	Top Drive Power Pack (w/o cov) 22000	12.10	2.90	2.99
41	Top Drive & Torque Rail 12000	6.00	2.44	2.60
42	4 x Skidding rails 18000	9.50	2.44	1.50
43	Top Drive Fuel tank 4000	6.07	2.44	2.41
44	Required tubular			

In addition, approximately 16 vehicle loads will be required for office accommodation, drilling chemicals drilling logging unit etc.

This will be the main movement of the vehicles for the initial set up of the drill sites. The rig up of the unit also requires one 100 tonne crane and an 80 tonne crane.