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Plans

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Lighting Layout Plan	1/250	PEDL219/PLANNING/ STNICHOLAS /LIGHT LAYOUT180213
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Appendices

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1. Introduction

This application is submitted by Coastal Oil and Gas Limited.

The applicant seeks consent for one borehole for the purpose of testing strata for the potential production of methane on land in St Nicholas North West of Barry.

The application is for the purpose of drilling to take samples of Carboniferous, Devonian and Silurian aged strata to enable laboratory testing with a view to the utilisation of methane as a clean energy supply. This is a continuation of an ongoing sampling and testing program across South Wales, Bristol, Somerset and Kent.

The proposed borehole is on land as indicated on the accompanying plan marked "Borehole Location Plan". The borehole is aimed generally at the Devonian and Silurian aged strata. Samples will be tested as part of the process. If the borehole proved positive in terms of test results, a further planning application may be submitted to extract and utilise methane as a clean energy source for the local area or for electrical generation. Any methane produced could also be used as a lower cost, clean vehicle fuel as an alternative to petrol.

This application is for exploration works only and does not entail any fracking.

It must be stressed that if this borehole was determining the coal in-situ i.e. a mineral exploration hole, it could be carried out under the terms of a General Development Order if it was not proposed to drill for 24hrs and subject to the height of the rig: petroleum exploration (Coal Bed Methane is classed as petroleum) requires a planning permission to be granted before work commences. In practice there is no difference in the drilling techniques apart from the fact that drilling for CBM will employ more and better safety precautions. The technical aspects of the drilling will have to be assessed and approved in writing by the Health and Safety Executive Oil and Gas Division, The Coal Authority and the DECC before work starts.

2. Supporting Information

The information contained within this supporting documentation to the formal Planning Application is given to help promote the understanding of the operations involved and thereby to assist in the planning process. The supporting documentation has been expanded to include additional information, which will only be relevant to certain individual consultees. Others, who may be interested in the development scheme, will be able to better understand the concept of the overall project by reference to this document.

This supporting documentation and site design has been prepared giving consideration to the purposes of the current legislation governing planning and environmental matters. The aim being, to ensure as far as is practicably possible, that the development will not knowingly permit the introduction into the environment of any substances or energy liable to cause hazards to human health, harm to living resources and ecological systems, loss of any amenity, or interference with the legitimate use of the environment by the general public and especially those that are neighbours to the development.

3. The Applicant

Coastal Oil and Gas Limited is based at the Bridgend Business Centre, Bridgend, South Wales. It is principally involved in the exploration of UK onshore gas reserves. It has a 50% interest in 100 sq. km. of Petroleum Exploration and Development Licence (PEDL 219) which is part of a licence holding in South Wales of 1052.4sq. km. The remaining 50% is held by Adamo Energy (UK) Limited a wholly owned subsidiary of Eden Energy Limited of Perth, Australia. Coastal Oil and Gas Limited is approved as an operator for this licence by the Crown.

4. Unconventional Gas

Unconventional gas is natural gas produced from shale. Shale gas has become an increasingly important source of natural gas in the United States over the past decade, and interest has spread to potential gas shales in Canada, Europe, Asia, and Australia. One analyst expects shale gas to supply as much as half the natural gas production in North America by 2020.

A study by the Baker Institute of Public Policy at Rice University concluded that increased shale gas production in the US, Canada and Europe could help prevent Russia and Persian Gulf countries from dictating higher prices for the gas it exports to European countries.

Shale has low matrix permeability, so gas production in commercial quantities requires fractures to provide permeability. Shale gas has been produced for years from shales with natural fractures; the shale gas boom in recent years has been due to modern technology in stimulation techniques to create extensive artificial fractures around well bores.

The shales need to have sufficient Total Organic Carbon before it can produce gas, hence the need for coring and testing as per this planning application.

Until recently unconventional gas reserves haven't been exploited because the cost was too high or technology wasn't available. Technological advances mean it could be economically viable to extract methane from these sources.

5. Gas Availability

5.1 Testing

During the drilling samples will be taken for testing and analysis on site and in independent laboratories. The well will also be logged with geophysical tools. Permeability tests will be undertaken in the boreholes.

5.2 Gas Quality

Previous drilling in South Wales proved very high quality gas reserves of some 90-98% Methane, up to 5.3% Ethane and no Hydrogen Sulphide, a very high quality, clean gas.

6. Regulation of Onshore Oil and Gas

The Petroleum (Production) Act 1934, as amended by Section 18 of the Oil and Gas (Enterprise) Act 1982, provided for exploration of and production of onshore hydrocarbon resources. The Act vests ownership of petroleum underground in the Crown and empowers the Secretary of State for Energy to grant to such persons as he thinks fit, Licences to search, bore for and get petroleum.

The main objectives of the Licensing regime are to further the general Government policy of establishing the extent of the Country's indigenous hydrocarbon resources. The regime is also intended to provide a framework within which the search for and production of oil and gas onshore can be undertaken in a safe and orderly manner, and to provide a satisfactory balance of safeguards and rights between the Government and Licensees. This regime also maintained unproved acreage on short licence and provided a satisfactory longer-term licence for production.

The Petroleum (Production) (Landward Areas) Regulations 1995, introduced on 30 June 1995 comprises a single exclusive and unitary licence now known as a "PEDL", Petroleum Exploration and Development Licence. Licences are awarded for an initial period of six years although some flexibility may be allowed and then, if required and commitments are met, for further terms. Additional acts were passed in 1998 and 2007 to provide further and better governance.

Planning permission will be required before the deep drilling of exploratory wells can be undertaken. DECC will require proof that the necessary planning permission has been obtained for deep drilling and production also that all necessary consultations have been completed before authorising commencement of these activities.

There had been considerable debate between the industry and the former British Coal, as to the ownership of the gas, in this case Coal Bed Methane and Coal Mine Methane. For the avoidance of any doubt Coal derived Methane was confirmed as a Crown Mineral (hydrocarbon) by virtue of Section 9 of the Coal Industry Act 1994.

Forecast future energy shortages are putting pressure on unconventional gas producers to develop suitable fields.

7. The Site

7.1 Location

The site is located near Dyffryn, South West of Cowbridge in the St Nicholas and Bonvilston community council's areas of Vale of Glamorgan Borough Council. The national grid co-ordinates for the site are:-

Eastings 308215 Northings 171623

Shown on the Borehole Location Plan –

PEDL219/PLANNING/STNICHOLAS/LOC180213



Figure 1: Location of site

7.2 Current Use

The land currently used for farming.

7.3 Ownership

The site is in private ownership and this application is made with full consent of the landowner.

7.4 Site Infrastructure

The site is located in a field next to an existing field entrance. No additional roads are required.

7.5 Ground Conditions

A thin layer of glacial alluvium overlies the Jurassic Limestone. The thickness of the Jurassic limestone is around 20-50m thick. Under the Jurassic limestone is a small thickness on Carboniferous limestone. A detailed survey will be conducted during the development process.

7.6 Access

To access the site from the main public highway the A48, turn south on A4226 (Five Mile Lane) then turn east towards Dyffryn on an unnamed road. The site is 400m from the A4226. The site is 400m from the A4226. At the entrance / exit from the unnamed road onto the A4226 the visibility is good, however, to minimise risks the rigs are to travel in very early in the morning when traffic is minimal. The drill rigs are truck mounted or track

mounted carried on a trailer. They will be ensured that sufficient area is available to allow the heavy vehicles to gain entry to the site without stopping on the highway. Once on site, traffic will consist of minimal numbers of cars at the beginning and end of shift and occasional van visits. The rigs are not overweight neither are the supply vehicles. The vehicles create no more noise than other heavy goods vehicles.

To make the overall drilling process more efficient, two drilling rigs will be utilised:-

- An initial drilling rig will set the surface casing to protect any groundwater near to the surface.
- The second drilling rig will set up over the borehole and drill and sample the coal measures.

The un-named road is generally a single carriageway with plenty passing place. During the delivery of the main site equipment the access can be managed with the use of banksmen at either end of the lane to warn other road users that the lane will be congested for the short period during the mobilisation and demobilisation from the site. The travel time down the lane will be approximately 2-3 minutes and access in the site will be designed that they can enter without having to stop on the road.

Dependant on weather and site conditions a portable wheel wash may be provided to ensure no mud is taken onto the highway from traffic leaving the site. If this facility is installed, water from the wheel wash will be collected using a suitably designed collection system and disposed of in a licensed disposal facility.

Again, depending on weather and site conditions, consideration will be given to the surface of the parking area. If wet weather persists a membrane surfaced with rolled chippings will be established in conjunction with the aforementioned wheel wash. If this is required an area on the site plan is shown for topsoil storage.

A summary of proposed traffic flows into the site is as follows: -

<i>Drill rig</i>	<i>2</i>
<i>Drill Pipe</i>	<i>4</i>
<i>Casings</i>	<i>5</i>
<i>Tanks and other equipment</i>	<i>5</i>
<i>Survey equipment</i>	<i>1</i>
<i>Cabins</i>	<i>5</i>
<i>Tankers used water</i>	<i>3</i>
<i>Steel linings</i>	<i>2</i>
<i>Foul sewerage tanker</i>	<i>1 per week</i>
<i>Skips</i>	<i>4 per week</i>
<i>Drilling supplies (transit)</i>	<i>3 per week</i>
<i>Personnel (cars/vans)</i>	<i>2/3 per 12 hr shift</i>

It is therefore proposed that the existing road infrastructure be utilised and that no additional highway amendments are required.

7.7 Environment Agency - Flood Risk

The Environment Agency do not class the site as being in a flood plain, the scheme is in an area that is unlikely to flood.



Figure 2: Potential for flooding from Rivers and Sea. Taken from the Environment Agency Website

7.8 Area

The enclosed area of the application site is 0.199 hectares.

The areas are made up as follows: -

ITEM	AREA (HA)
Drilling Compounds	0.071
Portable Apparatus and Parking	0.078
Topsoil Storage Area	0.050
Total Area per Borehole Site	0.199

7.9 Planning Policy

National Policies

The Department of Energy and Climate Change (DECC) published the Overarching National Overarching National Policy Statement for Energy EN-1 in July 2011

Para 3.6 states that fossil fuel power stations play a vital role in providing reliable electricity supplies: they can be operated flexibly in response to changes in supply and demand, 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,

Para 3.7 states that -Fossil fuel generating stations contribute to security of energy supply by using fuel from a variety of suppliers and operating flexibly. Gas will continue to play an important role in the electricity sector – providing vital flexibility to support an increasing amount of low-carbon generation and to maintain security of supply

Para 6.3 states that- Some of the new conventional generating capacity needed is likely to come from new fossil fuel generating capacity in order to maintain security of supply, and to provide flexible back-up for intermittent renewable energy from wind.

Energy Wales: A Low Carbon Transition (March 2012) states - Gas will be a key transitional fuel because greenhouse gas emissions from gas are significantly less than coal subject to the method of extraction. Gas is a flexible, responsive and reliable source of energy which can play a key role in the transition to a genuinely low carbon energy system.

Local Policy

Vale of Glamorgan Unitary Development Plan

The site is situated in the countryside and the most relevant policies are considered to be the following.

Policy MINS1-MINERAL EXPLORATION

Proposals to carry out mineral exploration will be permitted unless there would be an unacceptable impact on any of the following

- (i) Landscape Character
- (ii) Visual Amenity
- (iii) Nature Conservation
- (iv) Residential Amenity
- (v) The Glamorgan Heritage Coast
- (vi) Surface Water and Ground Water Resources
- (vii) Scheduled Ancient Monuments and Historic Landscapes

Policy ENV29- PROTECTION OF ENVIRONMENTAL QUALITY

Development will not be permitted if it would be liable to have an unacceptable effect on either people's health and safety or the environment:

- (i) By releasing pollutants into water, soil or air, either on or off site; or
- (ii) From smoke, fumes, gases, dust, smell, noise, vibration, light, or other polluting emissions

ENV27- DESIGN OF NEW DEVELOPMENT

Proposals for new development must have full regard to the context of the local natural and built environment and its special features, new development will be permitted where it:

- (i) Compliments or enhances the local character of buildings and open spaces
- (ii) Meets the council's approved standards of amenity and open space, access, car parking and servicing
- (iii) Ensures adequacy or availability of utility services and adequate provision for waste management
- (iv) Minimises any detrimental impact on adjacent areas
- (v) Ensures existing soft and hard landscaping features are protected and complemented by new planting, surface or boundary features
- (vi) Ensures clear distinction between public and private spaces
- (vii) Provides a high level of accessibility, particularly for public transport, cyclists, pedestrians and people with impaired mobility
- (viii) Has regard to energy efficiency in design, layout, materials and technology: and
- (ix) Has regards to measures to reduce the risk and fear of crime.

It is considered that the proposal complies with the above policies.

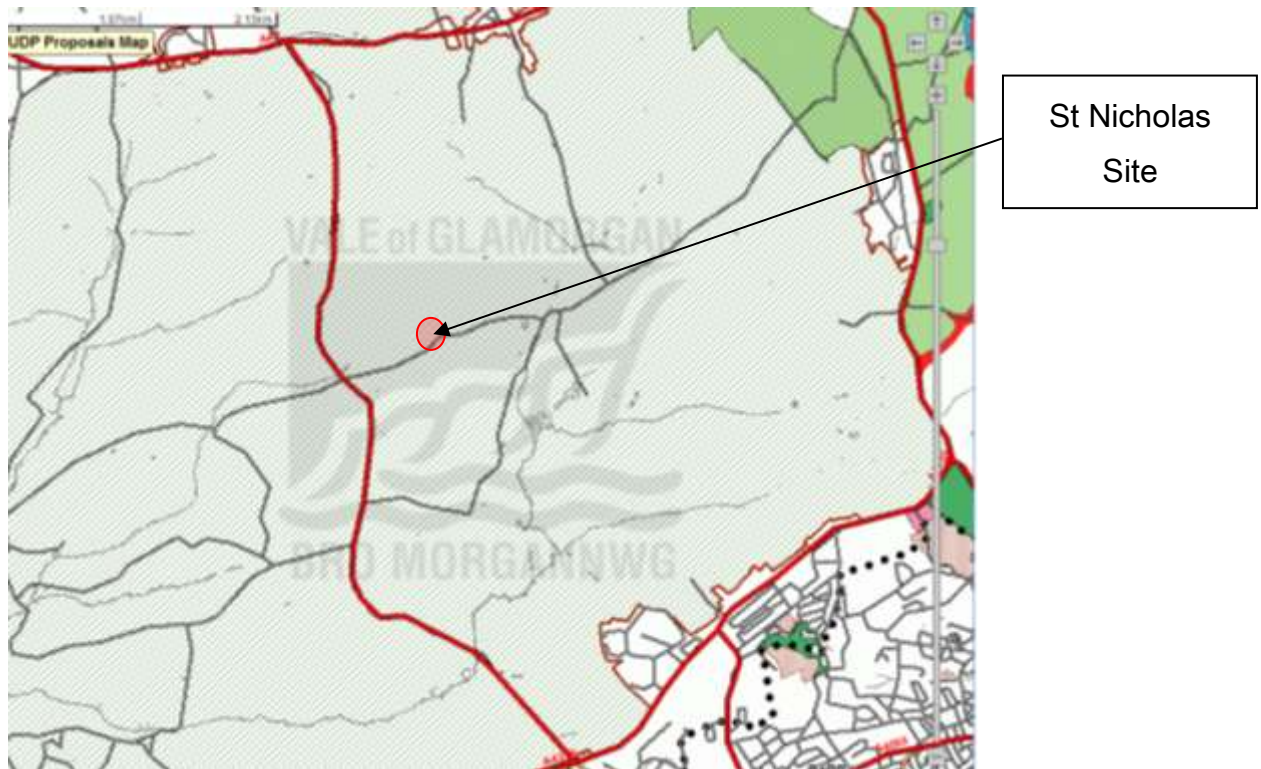


Figure 3: Extract from Vale of Glamorgan Councils UPD

7.10 Job Creation

For the duration of the site works there will be approximately 15 people employed. These jobs will generally be contractors that are used to work on the drilling rig and the geologist to sample and test the samples. Where ever possible local services and suppliers will be used to help maintain local jobs.

8. Details of Proposal

8.1 The Construction of the Exploration Borehole

The borehole will be constructed to comply with current legislation and applicable codes and rules. The hole will be constructed under the governance of the Health and Safety Executive Oil and Gas Division. A final Department of Environment and Climate Control permission in the form of a Well Operation Notice is required before work can commence.

The works for the boreholes will include: -

- ❖ Install 2m diameter concrete ring up to 3m deep
- ❖ Drilling a surface conductor hole at approximately 30cm diameter a sufficient distance into rock head.
- ❖ Cementing the surface completion in place.

- ❖ Pressure testing the surface completion.
- ❖ Drilling at approximately 25cm diameter into the strata, steel casing will be set to the necessary depth to protect any groundwater present.
- ❖ The initial drilling rig will then leave site, to await the arrival of rig 2.
- ❖ Drill to into the Silurian Measures and collect chipping samples utilising suitable Well Head Protection and Diversion System to a suitable vent system.
- ❖ Utilising suitable monitoring systems
- ❖ Geophysical logs will be completed in the borehole
- ❖ Upon completion of the drilling, casing will be installed in the borehole with a suitable well head assembly fitted
- ❖ Pump tests to indicate the permeability and suitability of the strata to produce gas will be undertaken

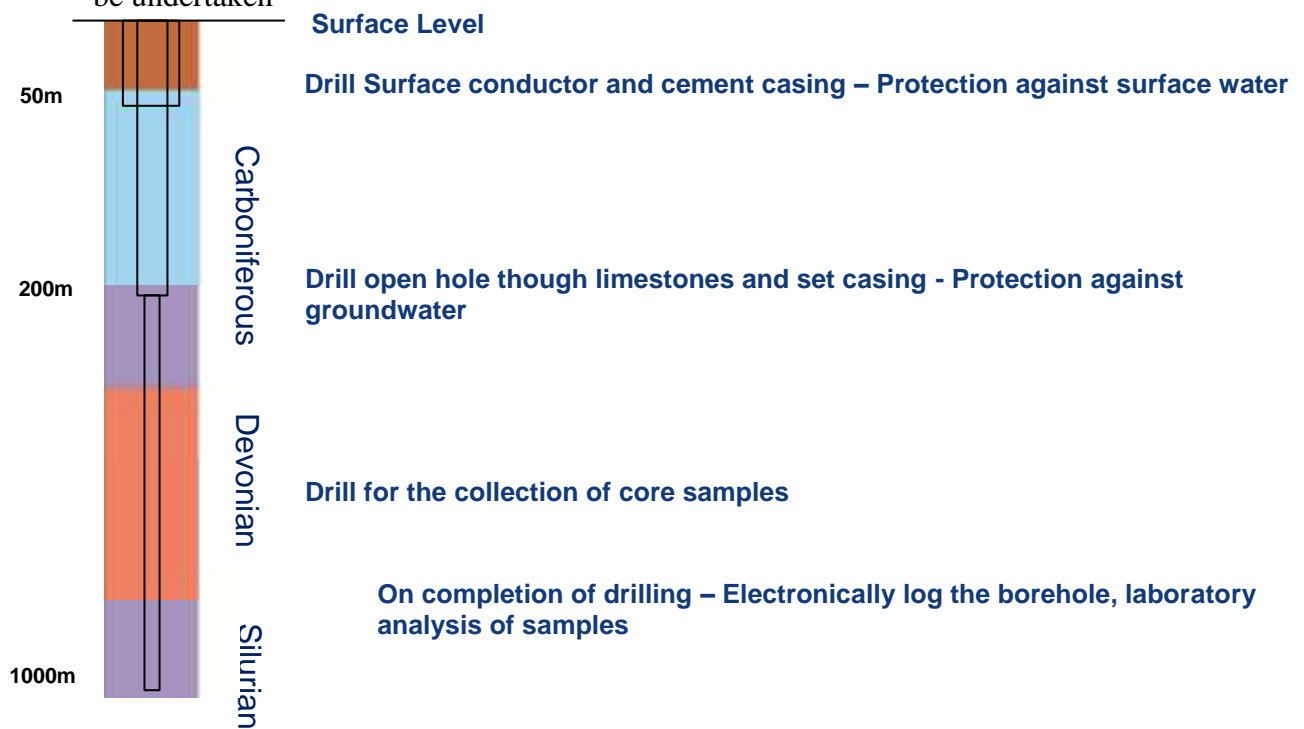


Figure 4: Proposed Section of the borehole

8.2 Site Layout

The layout of the proposed borehole site is included in this application and indicated on the attached plan reference: -

PEDL216/PLANNING/STNICHOLAS/SITELAYOUT180213

8.7 Noise

The site cabins and an existing tree line will be utilised as noise barriers. There are no dwelling houses within 300 metres of the site.

A noise report has been submitted with the application. The nearest noise sensitive property is approximately 650m away and it is concluded that the predicted noise levels will meet the guidelines contained within MPG11 and those of the WHO. To reduce the site noise to a minimum, additional screening around the noise sensitive equipment and around the site will be implemented. Soft noise absorbent matting will be used on the site fencing and around the main sources of noise. (Please see Appendix VII – Echo Barrier)

8.8 Lighting at Night

The lights will be on stands no more than 3m in height, the lights will be hooded and down pointing so that light cannot spill over the site boundary. No lights will be allowed to point directly at an existing dwelling or onto the highway. Please see attached plan titled Lighting layout plan PEDL219/PLANNING/STNICHOLAS/LIGHTLAYOUT150113. The lights will be positioned so that they do not cause distraction to drivers on the roads. The lighting will be positioned to cause no disturbance to wildlife within the adjoining vegetation.

8.9 Surface water protection

In order to prevent the discharge of surface water from the site a cut off ditch and a submerged sealed interceptor tank will be constructed on the southern boundary across the lowest point.

Please see attached drawing PEDL219/PLANNING/STNICHOLAS/CUTOFF150113 – Pollution Prevention Measures showing the location of the cut off ditch. A 10,000 gallon bowser will be kept onsite to allow the interceptor to be regularly emptied in the event of rain / surface run off. The bowser that the tank is pumped into will be sent off site to a licensed facility when it has been filled.

8.10 Ground Water protection

Following a review of other boreholes drilled in the local area a number of boreholes have been identified. These are generally shallow site investigation boreholes that have been drilled prior to houses and or roads to enable foundation design. These boreholes show that there are silts, sands and gravels over Jurassic that contains some groundwater. This will generally be hydraulically connected to the water level in the local rivers. Any shallow ground water will be cased off to stop the flow of ground water into the borehole.

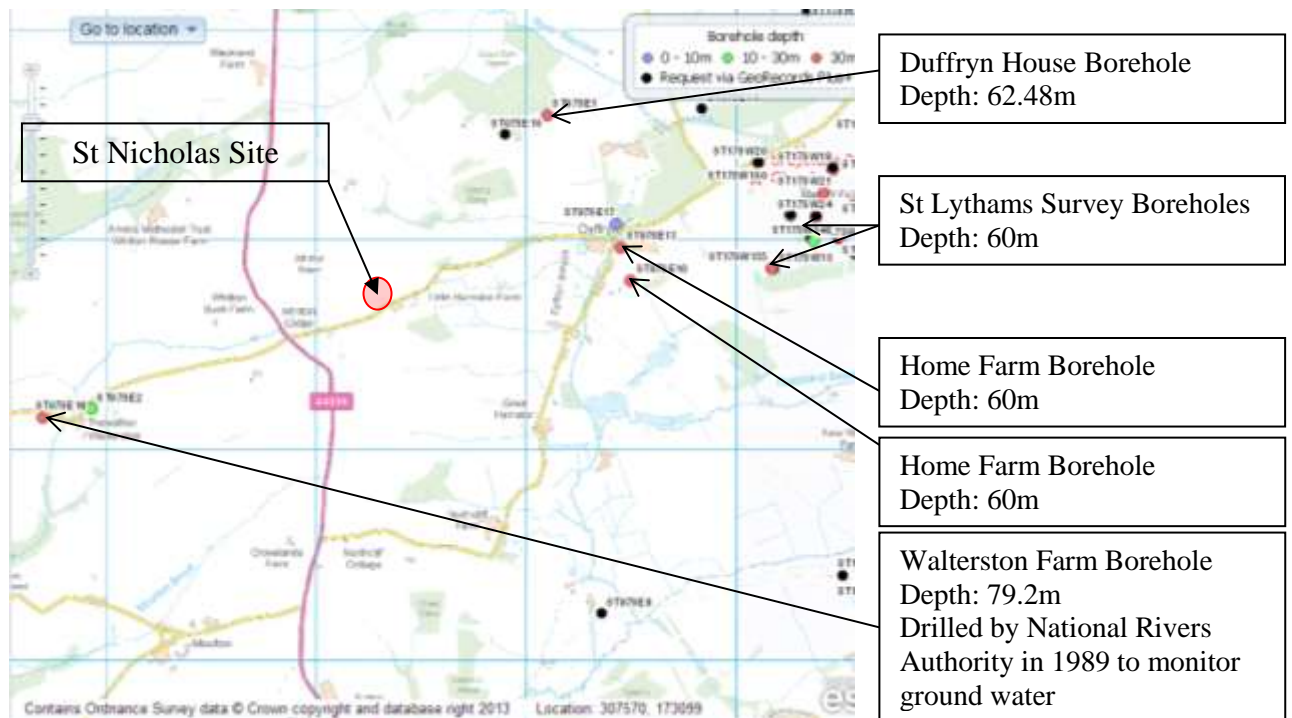


Figure 6: Boreholes listed on the BGS database

Duffryn House Borehole

This borehole was drilled in 1919 to 1920 to 62.48m. 2,000 gallons per hour was pumped from the well.

Walterston Farm Borehole

This borehole was drilled by the NRA in 1989. 6m of casing was installed in the borehole and a 100mm diameter borehole was continued to a depth of 79.2m.

Water was encountered twice in the borehole at depths of 64m and 76m. Following the drilling the water level was 52.5m.

Home Farm Borehole

This borehole was drilled in October 1992 to a depth of 60m. The borehole was drilled at 200mm for 7m then 150mm to the base of the borehole, a 100mm UPVC screen was installed at 60m. Water was encountered at 33m and rose to a resting level of 12m.

St Lythams Survey Borehole

This borehole was drilled in October 1977 to a depth of 60m. There is no record of any water encountered.

It has been known that farms use the local streams for the feeding of livestock.

The surface groundwater will be sealed off using steel casing and cement to a level below the groundwater encountered in the boreholes above.

This site is not in the catchment area that has been identified for the Schwyl Aquifer that has been identified by the Environment Agency.

8.11 The storage of oils or Chemicals (Including Drilling fluids)

The storage of all oils and Fuels will be within a bunded fuel tank where the volume of the bund is 1.5 times the capacity of the tank. During fuel transfer absorbent matting will be placed below the fuel fill point to catch any drips. Drip trays lined with absorbent matting will be placed under the drilling rig at all times.

The storage of drilling fluids, prior to mixing the drilling fluids are in powder form in bags. These will be stored in the drilling store shown on the site layout plan.

8.12 The Disposal of foul water

The site toilet will be a hired 'portaloos' type and will be emptied weekly by a licensed operator.

8.13 The disposal of drilling fluids

The main purpose of the drilling fluids is to cool and clean the drilling bit and to assist with the lifting of the drilling cuttings to the surface. The drilling fluid also provides a hydrostatic head, this prevents formation fluids (Groundwater) entering the borehole. The drilling fluids will comprise of a viscosifier to increase the viscosity of the fluid to increase the ability to lift the cuttings to the surface. Appendix 4 shows the specification of Purebore which is a typical additive to the drilling fluids.

The water / fluids used for drilling are contained in a closed loop system; the volume of fluid required will depend on the depth of the well. The drilling fluid will be held in tanks on the surface so that they can be checked for levels and leaks. The returning cuttings are removed from the drilling fluids by:-

- Shaker screen – the drilling fluid is passed over a fine vibrating sieve of various sizes to allow the drill cuttings to pass into a covered skip for disposal and the drilling fluid to drop through and return to the closed loop system. This separates the solid drill cuttings from the fluid so that it can be re-circulated back down the wellbore.
- Cyclone – The drilling fluid is spun in a hydro cyclone, "closed system" to remove the finer grained material from the system. The fine drilling cuttings drop out into a covered skip for disposal at a licensed facility.

The drilling fluids are then re-circulated back in the system. As all drilling fluids are maintained in a closed loop system this can easily be monitored for leaks. In the event of a loss of fluid to the system the source of that loss will be investigated. If there is a leak to a tank / pipe then this will be repaired as soon as practical. The tanks will be placed so that they can be observed by the drilling crew and site staff. In the event that there is an increase in drilling fluid that may allow a spillage from the tanks, drilling will cease until additional tanks can allow for the increase in fluid or the additional fluid is tankered off site to an appropriate facility. The drilling fluid will not be allowed to enter any existing water courses. At the end of the drilling operation all excess drilling fluid will be tankered off site to a licensed disposal facility.

The volume of the borehole at 800m will be 15m³ the total volume of fluid in the closed loop system will be approximately 20m³ (4,400 gallons). The drilling fluids will be constantly monitored by the drilling crew.

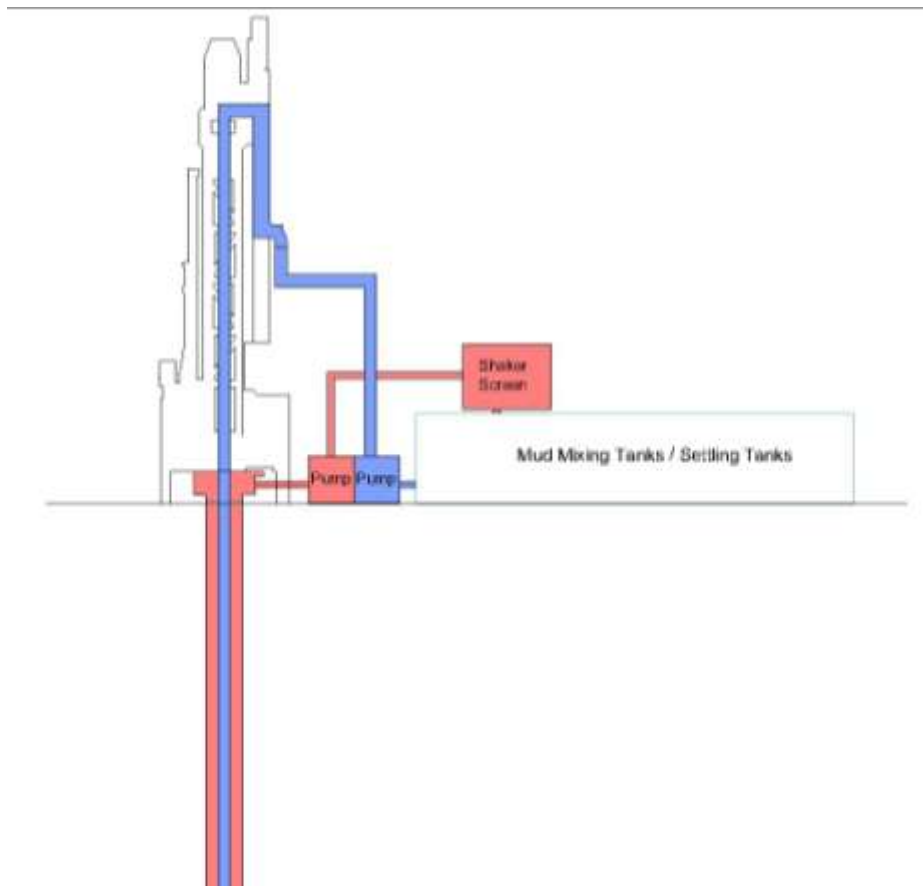


Figure 7: Close Loop System for the drilling fluids

8.14 Vibration

Perceived Risk Level – Zero

Reasons;

1. Experience from drilling previous sites near housing and industrial premises
2. Early stage drilling is through soft overburden that will absorb vibration
3. Once the limestone is entered by the drill bit vibration will be cushioned by the over burden and distributed through low ground pressure tracks on the drill rig

8.15 Visual Amenity

The site is not prominent in the landscape. Any views of the drilling rig will be fleeting and the structure will not be dissimilar to other temporary structures/masts that are located in rural areas. The rig and equipment will only be in place for a short period of time and in this respect it is not intended to carry out any specific landscaping, as there would be insufficient time for any meaningful establishment.

8.16 Ecology

A habitat walkover survey has been submitted with the application. This stated that no rare or protected plants were noted, the farmland was intensively managed so is unlikely to hold important species. No signs of protected species such as badger were seen.

There are no ecological concerns about the proposed development on this site.

As the site is a much disturbed area of farmland and the drilling will only involve minimum disturbance to the site for three months it is considered little mitigation is required.

The site at St Nicholas is much disturbed farmland. The proposed drilling will cause disturbance to small areas of the site for a maximum of three months. The remnant hedgerow to the south will be unaffected by the proposed works.

It is therefore concluded that the proposed works will have no long-term impact on the site, and the habitat should recover post disturbance.

8.17 Restoration

On completion of the drilling steel casing will be installed into the well and a suitable well head assembly installed. If the testing is unsuccessful the borehole will be abandoned in accordance with Environment Agency and Health and Safety Executive practices. The surface will be restored to a condition similar to or better than prior to commencement of work and to the satisfaction of the planning officer and landowner. Any soils that are moved as a temporary measure will be stored on site and restored to their original position on completion.

If the borehole is shown to be not productive then it will be filled in accordance with the advice published by The Environment Agency - the Decommissioning Redundant Boreholes and Wells. This sets out the scope and legal framework for the decommissioning of borehole under the Water Resources Act 1991. This states '*Boreholes and wells that are no longer required therefore need to be made safe, structurally stable and backfilled or sealed to prevent groundwater pollution and flow of water between different aquifer units*'. This process is managed by completely filling the borehole with a similar density material that was removed i.e. cement.

The report states '*The following objectives may apply, although additional objectives may also be applicable;*

- *Remove the hazard of an open hole (safety issues).*
- *Prevent the borehole acting as a conduit for contamination to enter groundwater.*
- *Prevent the mixing of contaminated and uncontaminated groundwater from different aquifers.*
- *Prevent the flow of groundwater from one geological horizon to another.*
- *Prevent the wastage of groundwater from overflow to artesian boreholes.*

If required cement will be mixed on the surface in a grout mixer then pumped to the base of the borehole via a tremmy pipe. The tremmy pipe will be lifted out of the borehole in stages and more cement will be pumped into the borehole. The volume of the borehole

will be confirmed by the results of the geophysical logging. The casing that has been cemented in place in the borehole will be left in situ. The multi stage filling will ensure that the borehole is completely filled. The cement will have similar density to the surrounding rock. The filling of the borehole will seal the hole to stop the vertical migration of groundwater.

If the testing is successful then the well head will be adequately secured and an additional planning application for longer term pilot production will be submitted

8.18 Permissions to Drill

All permissions to drill will be in place before work commences.

Permissions required are: -

Petroleum Licence from the DECC - (In place PEDL 219)
 Planning Permission from Vale of Glamorgan Council
 Approval for Drilling from the Health and Safety Executive
 Well Operations Notice from DECC

8.19 Timescales

Summary of Time Scale

	Weeks
Drilling and associated operations	8
Establishment and Site Clearance	4
Laboratory Testing	4
Gas Testing	36

8.20 Hours of Work

Hours of work during the site establishment and site clearance period will be 10 hours per day 08.00 hrs until 18.00 hrs and drilling period will be 24 hour, seven days per week.

9. Conclusions

It must be emphasised that this is a short term sampling and testing facility and that there will be no detrimental impacts from this scheme. On completion of these short term works, if production is considered a viable option, further planning applications will be made or the land restored to its original or a better condition.