



**HORSE HILL**  
DEVELOPMENTS LTD

## Horse Hill Developments Ltd

**Title: Non-Technical Summary**

**Document Number: HHDL-EPR-HHP-NTS-003**

**Revision: 1**

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Details to include revision number, a description of the revision indicating paragraphs and pages that have been revised, together with the date and approved signature.

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## 1. INTRODUCTION

Horse Hill Developments LTD (HHDL) is a Limited Company that was formed to manage the exploration and production activities at the Horse Hill Well Site. HHDL is a consortium of natural resource companies and owns a 65% interest and operatorship of Petroleum Exploration and Development Licence (PEDL) 137 within which the Horse Hill Well Site is located.

In accordance with the Environmental Permitting (England and Wales) Regulations 2016 HHDL have prepared an application to vary its environmental permits. The purpose of the permit variation is to:

- Consider changes to waste streams and quantities from additional drilling operations and production operations;
- Vary the current standard rules permit for the storage of crude oil to a bespoke permit following the proposed expansion of the site boundary, whereby the conditions of the standard rules permit can no longer be met.
- Add an additional two (2) outlets to the water discharge activity. One for reinjection (groundwater activity) and one for surface water discharge.

Following the advice from the Environment Agency an additional application will also be submitted for the operation of specified generators for the production of electricity for export. This Non-Technical Summary does not consider this activity.

The proposed activities for the well site include:

- 1) Construction of five new drilling cellars and the construction of a new plateau east of the existing well site.
- 2) Drilling of four new hydrocarbon wells, making a total of six production wells and one new produced water re-injection well within the existing well site.
- 3) The Installation of oil processing, storage and tanker loading facilities to enable the export of oil from the well site with maintenance workovers and sidetrack drilling (if necessary).
- 4) The removal of all surface production equipment followed by the plugging and abandonment of the six production wells and one produced water re-injection borehole.
- 5) The removal and disposal of all surface bunding and stone surfacing followed by the regrading of the soils and subsequent aftercare monitoring.

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## 2. SCOPE

This Non-Technical Summary is applicable to the 2019 environmental permit application submitted. It is applicable to HHDL, its contractors and subcontractors and can be used in support of applications to the Environment Agency under the Environmental Permitting (England and Wales) Regulations 2016 (EPR2016), where there is a requirement to provide a Non-Technical Summary.

## 3. DEFINITIONS

<b>%</b>	Percentage
<b>AOD</b>	Above Ordnance Datum
<b>BAT</b>	Best Available Technique
<b>BS</b>	British Standard
<b>CaCl<sub>2</sub></b>	Calcium Chloride (Salt)
<b>CaCO<sub>3</sub></b>	Calcium Carbonate (Rock)
<b>CO<sub>2</sub></b>	Carbon Dioxide (Gas)
<b>CQA</b>	Construction Quality Assurance
<b>EPR2016</b>	Environmental Permitting (England and Wales) Regulation 2016
<b>g/m<sup>2</sup></b>	Grams per square metre
<b>H<sub>2</sub>O</b>	Water
<b>HCl</b>	Hydrochloric Acid
<b>HDPE</b>	High Density Polyethylene
<b>HH-1</b>	Horse Hill 1 well
<b>HH-11Z</b>	Horse Hill 1Z well
<b>HH-2</b>	Horse Hill 2 well
<b>HHDL</b>	Horse Hill Developments LTD
<b>HSE</b>	Health and Safety Executive
<b>km</b>	Kilometre
<b>LTD</b>	Limited
<b>m</b>	Metre
<b>mm</b>	Millimetre
<b>m<sup>2</sup></b>	Metres squared
<b>m<sup>3</sup></b>	Metres cubed
<b>mg</b>	Milligram
<b>MOT</b>	Ministry of Transport
<b>NORM</b>	Naturally Occurring Radioactive Material
<b>PEDL</b>	Petroleum Exploration and Development License
<b>QA</b>	Quality Assurance
<b>QC</b>	Quality Control
<b>RPS</b>	Radiation Protection Supervisor
<b>RWA</b>	Radioactive Waste Advisor
<b>SCC</b>	Surrey County Council
<b>UK</b>	United Kingdom

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## 4. ENVIRONMENTAL LEGISLATION AND APPLICABILITY

The Horse Hill Well Site is the subject of a number of activities which, under current environmental legislation, requires an environmental permit. The Environment Agency regulate all permitted activities under the Environmental Permitting (England and Wales) Regulations 2016, as amended (EPR2016). Under EPR2016, Operators are required to submit environmental permit applications to the Environment Agency to seek approval to undertake such activities.

Onshore oil and gas developments have been the subject of the environmental permitting regulations since 1<sup>st</sup> October 2013, and as such a number of environmental permits have already been obtained. This Non-Technical Summary aims to update the Environment Agency on the proposed drilling and production activities to be conducted at the Horse Hill Well Site.

### 4.1 Industrial Emissions Activity

The Industrial Emissions Directive 2010/75/EU lays down rules on integrated prevention of pollution arising from industrial activities, whilst also laying down rules designed to prevent or, where that is not practicable, to reduce emissions into the air, water and land and to prevent the generation of waste, in order to achieve a high level of protection of the environment taken as a whole.

Schedule 1, Part 2 of EPR2016 details a number of activities that are classified as an Industrial Emissions Activity including 'Energy Activities' (Chapter 1) and 'Waste Management' (Chapter 5). Energy Activities include the storage of crude oil, whilst Waste Management includes the incineration of waste, a description of each has been provided below.

Schedule 25A and Schedule 25B details a number of activities that fall within the regulatory regime of medium combustion plants and specified generators.

#### 4.1.1 Oil Storage

Schedule 1, Part 2, of EPR2016 transposes the requirements of the Industrial Emissions Directive, which requires an environmental permit to authorise an installation for gasification, liquefaction and refining activities, as detailed within Section 1.2, Part A(1) including the loading, unloading, handling or storage of, or the physical, chemical or thermal treatment of crude oil.

The operations will involve the handling and storage and unloading of oil or condensate and therefore under EPR2016 an oil storage permit will be applied for. Due to the permitted site boundary being located within 50m of a water course a SR2015 No2 permit cannot be applied for. Therefore, an application for an environmental permit is being sought to include a bespoke oil storage activity. The current SR2015 No2 permit cannot be used for the proposed development

##### 4.1.1.1 Incineration of Natural Gas

Schedule 1, Part 2 of the EPR2016 transposes the requirements of the Industrial Emissions Directive, which requires an environmental permit to authorise an installation operation for Incineration and co-incineration of waste, as detailed within *Section 5.1, Part A(1)*:

- (a) *The incineration of hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity exceeding 10 tonnes per day;*

The operations will not involve the incineration of natural gas exceeding 10 tonnes per day and therefore under EPR2016 a permit is not required. HHDL are currently in possession of an environment permit (EPR/BB3300XG) which allows for the incineration of natural gas no greater than 10 tonnes per day. Natural gas is only expected to be incinerated as a safety measure to ensure that excess gas is safety disposed of in an emergency scenario.

##### 4.1.1.2 Medium Combustion Plants and Specified Generator

Operators of medium combustion plant and specified generators that are in scope will require an environmental permit under schedule 25A and 25B of EPR2016. A permit to operate both is determined by the capacity, emissions and operating hours of the plant.

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Medium Combustion Plant applies to combustion plants with a rated thermal input (th) equal to or greater than 1MW (Megawatt) and less than 50MW regardless of the fuel type.

Specified Generators are combustion plants which are used to generate electricity and are on a site aggregated to less than 50MWth (Megawatt Thermal). Specified generators are also divided into Tranche A and B depending on the electricity supply contract they may have.

The proposed operations will involve the operation of Specified Generators with an aggregated capacity of less than 50MWth. Following advice from the Environment Agency an application for a MCP permit should be applied for independent from this mining waste permit variation.

#### **4.1.2 Mining Waste Activity**

Schedule 20 of EPR2016 defines a mining waste operation as being the management of extractive waste, whether or not it involves a waste facility. Under EPR2016, an environmental permit is required to authorise a mining waste operation.

The proposed operations involve the management of non-hazardous extractive waste, not including a waste facility. Environmental Permit EPR/BB3300XG has been issued by the Environment Agency which covers the mining waste activities being undertaken at the Horse Hill Well Site.

HHDL are applying to vary the existing permit to include waste streams associated with the drilling of a four new hydrocarbon wells with HH-1/1Z and HH 2 wells being retained for production, making a total of six production wells and one new produced water re-injection well within the existing well site.

#### **4.1.3 Water Discharge Activity**

Schedule 21 of EPR2016 relates to water discharge activities, including the discharge or entry to inland freshwaters, coastal waters or relevant territorial waters of any trade effluent. Environmental permit EPR/BB3691NN will be varied to include the discharge of surface water from the process facility through a second interceptor. It is anticipated that the current outlet (Outlet 1) will be the same outlet for the site extension.

#### **4.1.4 Groundwater Activity**

Under Schedule 22 of EPR2016, an activity that could involve the discharge of pollutants into groundwater must be notified to the Environment Agency, together with the nature of these pollutants. The Environment Agency will then determine whether the groundwater activity needs to be permitted.

The operations will involve a groundwater activity, specifically the re-injection of produced water for the purpose of providing production support. As such, a permit under Schedule 22 of EPR2016 will be applied for.

#### **4.1.5 Radioactive Substances Activity**

Schedule 23 of EPR2016 provides for the control of Naturally Occurring Radioactive Material (NORM). Schedule 23 defines the production of oil and gas as a NORM industrial activity and therefore any accumulation of radioactive waste, which exceeds concentration threshold set out in Table 1 of Schedule 23, and its subsequent disposal, requires an environmental permit to authorise a radioactive substances activity.

The operations may involve the production of produced water which may or may not contain NORM at levels exceeding those set out in Table 1 of Schedule 23, therefore, until such time as the concentration of NORM can be established a Radioactive Substances Activity Permit is required. A SR2014 No4 Permit (EPR/AB3498DZ) is currently in place but will be varied to expand the permitted area where activities are taking place.

## 5. DESCRIPTION OF THE FACILITY

### 5.1 Development Location

The Horse Hill Well Site is shown in Figures 1. It is located in Surrey, approximately 3.5km north-west of Horley and approximately 3km north of Gatwick Airport.

The site is situated on the south side of Horse Hill, which is a north-east to south-west ridge of agricultural land.

The site address is:

Land off Horse Hill  
Hookwood,  
Horley,  
Surrey  
RH6 0RB

Nation Grid Reference: TQ 25297 43588

A Site Location Plan has been provided within Site Plans Document (HHDL-EPR-HHP-SP-004).

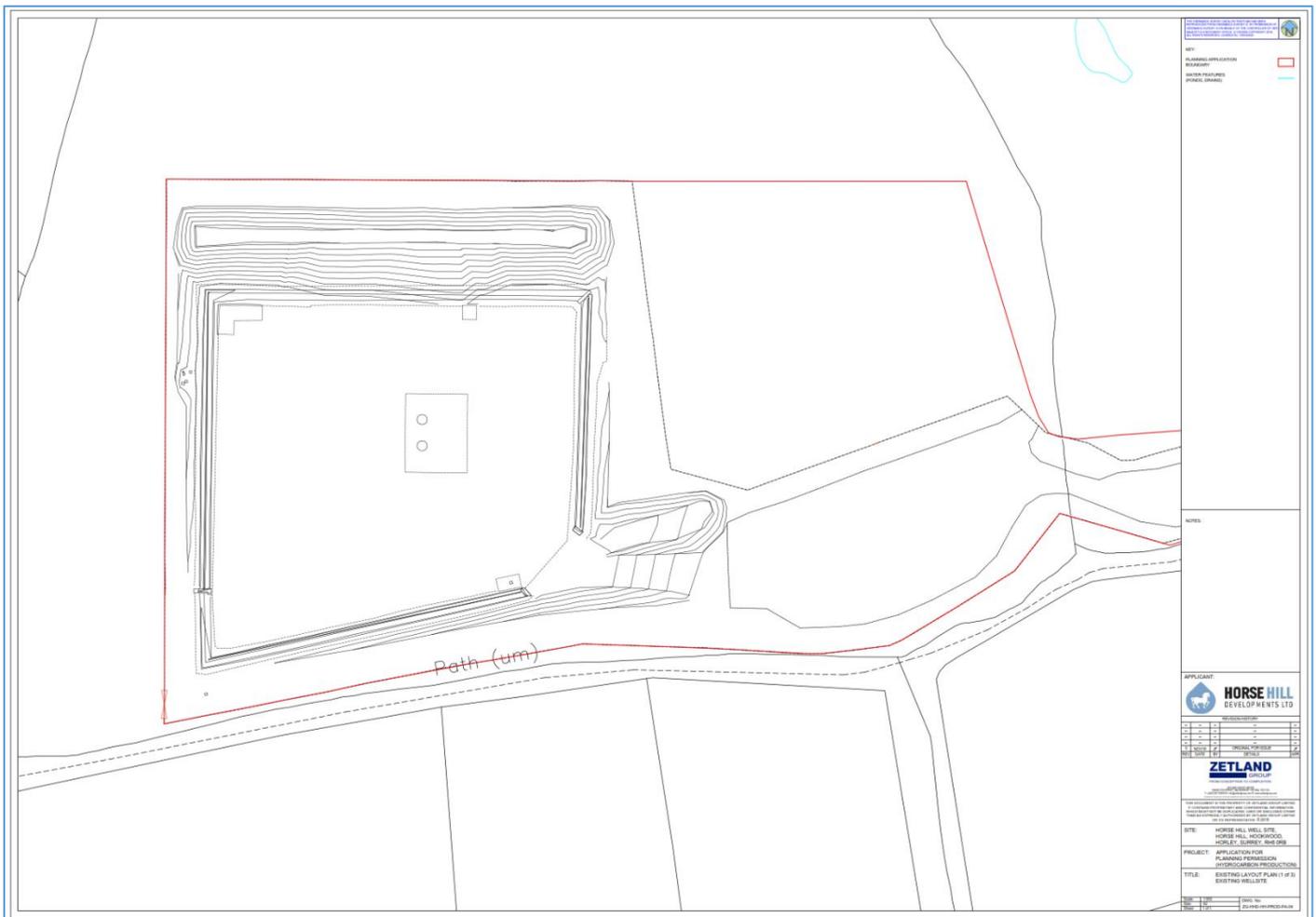


Figure 1: Site Location Plan

### 5.2 Site Description

The well site is located on agricultural land around 300m east of Horse Hill, a minor road running north off the A217 from Hookwood. It is bound by agricultural land and woodland on all sides.

The site is at around 65m (AOD), with ground levels rising to the north and falling to the south towards Spencer's Gill, a watercourse approximately 600m to the south of the site.

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### 5.3 Current Well Site Structure

The Horse Hill Well Site is designed, following standard industry practices, as a stable, level working platform to support a drilling rig and all associated equipment. The surface has been formed with a minimum of 300mm of granular material, compacted in accordance with the Specification for Highway Works on top of an appropriate geogrid for added strength.

The site is fully lined underneath the stone with a 1mm thick impermeable membrane made from Junifol High Density Polyethylene (HDPE) material, which is continuous through to a perimeter interceptor ditch. This impermeable membrane protects the surface water and groundwater from any site leakages, or potential spills. The membrane is further protected above and below using a 300g/m<sup>2</sup> non-woven geotextile. The use of crushed stone on top of an impermeable geomembrane layer is a standard and accepted method of site construction for onshore exploration well sites. The site was built by a competent contractor to industry standards, which included regular QA/QC checks on the site construction, as well as on the impermeable membrane, as outlined below.

All membranes delivered to site were accompanied by manufacturer's test data. The rolls of membrane were attached to a roll out frame, which in turn was attached to an excavator, the excavator tracked along unrolling the membrane, the membrane unrolled to the correct length, and once the correct length reached, the membrane was cut from the roll. The excavator then tracked adjacent to the panel of membrane laid and unrolled a further panel so that it overlapped the previous panel. This operation continued until the area was covered.

The membrane was placed with seam overlaps and prior to forming the joints, these overlaps were checked to ensure the weld area was clean, dry and free from imperfections. Welding (either hot wedge or extrusion welding) was carried out by certified welding technicians. When extrusion-welding methods were to be employed, the surface oxidation was removed from the membrane by sanding. Prior to commencing welding, a test weld was completed using off cuts of membrane and tested to destruction using field clamps in both the peel and shear modes. Failure must occur in the parent material and not enter the seam. The installation supervisor recorded all materials placed, roll numbers, panel numbers, seams welded and tested, and weather conditions.

All welds were tested as follows: site fusion welds were tested using air; twin fusion welds (hot wedge) were tested by sealing the ends of the air channel then inducing air pressure into the channel; extrusion welds were tested using spark testing methods. Welds which failed to conform to these non-destructive tests were repaired.

The installation of membranes is sensitive to ambient temperature, moisture and high winds and no material installation or seam welding took place while adverse weather conditions exist. A concrete slab on site is formed around the well cellar. The cellar is sealed and the slab is set on top of the impermeable membrane layer, which is also sealed to the cellar so it is part of the overall larger impermeable site area. The surface water directed into the cellar can be disposed of off-site via a suction tanker to an authorised waste disposal facility.

The sealing of the cellar was tested by carrying out a 24-hour hydrotest: the cellar is filled with water and checks are made that this volume is retained over the 24-hour period. This was again verified on 10 October 2016. Both sets of results confirmed no leaks.

The interceptor ditch serves the purpose of collecting all surface drainage from the lined well site footprint. An earth bund has been constructed on the outside of the ditch. It has a cross-sectional area of around 1.7m<sup>2</sup> and a length of approximately 290m, which gives a volume of around 500m<sup>3</sup> (500,000 litres) of fluid.

Rainfall onto the compound and bund area, as well as any potential contaminants such as diesel fuel and oil and chemicals used in operating the site, are directed into the interceptor ditch and then under gravity, via an outfall pipe and Class 1 SPEL oil bypass separator, into a 150mm pipe buried in a gravel swale beyond the lined bunded compound area.

Isolation valves are installed both upstream and downstream of the separator (to allow full isolation of the site as well as isolation of the separator for maintenance works should they be required). The system is designed and operated to separate oil and water and fully conforms to both the Environment Agency pollution prevention guidelines and European Standard BSEN-858-1-2 (less than 5mg of hydrocarbons/litre of water). The use of the separator has previous been approved by EA and is in use when the site has no well operations being carried out.

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When any workover or drilling rig is on site, the separator isolation valves remain closed. After operations have been completed, the excess water is released to the environment, pending the testing of the ditch fluid and the results being sent to the Environment Agency as per the Water Discharge Permit, EPR/BB3691NN. Any oil contamination from the test equipment or site traffic will be retained in the separator and removed by road tanker off site at the end of the well work.

The separator is designed to address the risk of infrequent light contamination and small-scale spills and is sized as appropriate for the size of the site. It is not designed to manage a major spill of hazardous materials (considered extremely unlikely). In such circumstances, emergency procedures will define that the discharge valve on the separator remains closed and all contaminated water trucked off site for disposal at an approved facility.

The construction design and method was previously approved by the Environment Agency following previous environmental permit applications for the site.

#### 5.4 Proposed Construction for Processing Facility

It is expected that the construction of the processing facility immediately east to the existing well site will be the subject of a Construction Quality Assurance (CQA) Plan. A CQA plan will be submitted to the Environment Agency prior to the construction of the processing facility, which for clarity includes the processing, storage and loading of crude oil. A summary of the proposed construction method for the processing facility has been outlined below.

The selected site slopes from north to south. The site grade will be lower than the adjacent well site to achieve a zero-net cut and fill and reduce the visual impact of the facilities. The ground level in the northern end of the site will be lowered, with cut material used as fill at the southern end of the site. Topsoil will be removed and retained on site, including extension of the existing storage mound at the north end of the existing well site.

Primary containment is provided by equipment, secondary containment is provided by containment bunds and a membrane will be installed beneath the site to provide tertiary containment.

Site drainage will be managed as two discrete systems:

- Process areas and tanker loading areas which have a higher risk of contamination; and
- Roads and non-process areas which have a low risk of contamination

The drainage system has been sized to retain the runoff from a 1 in 100-year storm, with 10% climate change allowance.

The use of gravel for non-process areas will provide attenuation and some filtration of surface water flows and the installation of an impermeable membrane across the site will contain the water within the site. Water will be collected in a below ground tank or sump to enable isolation if required and pumping into a road tanker or pumping to the produced water system for reservoir pressure support if required. In normal operation, water from the holding tank will be discharged from the site via a dedicated oily water interceptor at a maximum flow rate of approximately 5 litre/second. Alarms and indicators will be installed to protect the environment against off specification discharge and a monthly monitoring schedule is anticipated.

The existing well site surface drainage system will continue to operate as installed currently and will be an isolated system.

Due to the different levels, retaining walls will be required at the interface with the well pad site and at the northern and southern boundaries. A shallow foundation, reinforced concrete cantilever retaining wall is proposed to resist the earth pressure from the higher levels.

This is to be backfilled with a cohesionless engineered fill (MOT Type 3 or similar) to avoid any impacts of swell from the existing weald clay. The back of the retaining walls will also be allowed to freely drain via weep holes (or similar) to avoid any significant build-up of water pressure.

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## 6. OPERATIONAL ACTIVITIES

A number of activities are already permitted at the Horse Hill Well Site. This variation seeks to add additional activities that are covered by the environmental permitting regulatory regime.

### 6.1 Drilling of Five (5) Hydrocarbon Production Wells and a Single Reinjection Well

HHDL are proposing to construct a number of hydrocarbon production wells from its existing well site and an additional re-injection well for the purpose of providing production support. Currently only a single borehole has been constructed as the well site which was used to explore and investigate the commercial viability of potential hydrocarbon reservoirs. Extended Well Testing undertaken within the HH-1 well has indicated that presence of hydrocarbons at a volume considered commercially viable. As such, additional production wells will be constructed.

Currently the HH-1 sidetrack and the HH-2 well are consented under the environmental permitting regime. This application seeks to add an additional four production wells and associated side tracks where necessary, to provide additional production capabilities. A re-injection well for the purpose of re-injecting produced water is also proposed to aid in production support.

### 6.2 Extended Well Testing

Following the drilling of each of the additional wells, but prior to production operations there may be a requirement to undertake an extended well test (EWT) for the purpose of ensuring that the well is sufficiently cleaned up for long term production. It may be necessary to undertake an EWT on each well i.e. HH-3, HH-4, HH-5 and HH-6. For clarity the HH-1 and HH-2 wells are currently permitted for an EWT activity.

The purpose of the EWT is to ensure that the characteristics (Inc. flowrate) of the associated gas is understood giving HHDL the confidence to utilise the associated gas effectively by means of specified generators for electricity generation at the site, when production operations commence.

During the EWT associated natural gas will be separated from the oil and formation water by means of a 3 phase separator and will be diverted to an enclosed ground flare for incineration. For clarity the activity will not include the incineration of natural gas in excess of 10 tonnes per day.

### 6.3 Production Operations

Once the wells have been drilled and production tubing, and downhole pumping equipment (if required) has been installed, production will be conducted through surface-based equipment, which provides for:

- Shutting in the well at any time with a remotely operable safety valves;
- Control of the production via a “choke manifold”;
- Flow of produced reservoir fluids through high-pressure pipework;
- Separation of the produced fluid’s 3 phases of oil, gas and water into individually controllable and metered flow streams; and
- Storage of produced oil and produced water in segregated, vented tanks;

Produced fluids (oil and production water) will either free flow to the surface naturally or with the aid of surface pumps, artificially lifting fluids to surface. For clarity, a permit subject to the Mining Waste Directive covers the management of extracted waste and not the extraction process, therefore, the method by which oil, natural gas and associated fluids come to surface is not a material consideration of this waste management plan and associated environmental permits.

At surface, produced fluids and associated natural gas will be diverted by pipework to a crude oil heater, preheating the fluid to aid in the three phase separation process, which will separate out oil, water (if present) and associated natural gas. Oil, which for clarity is not a waste, will be diverted via pipework to dedicated storage tanks onsite for subsequent offsite removal by a licenced haulier to a permitted refinery for sale.

Water, if present, will be diverted via pipework to dedicated storage tanks onsite for subsequent reinjection into the formation for the purpose of production support. In the event production water cannot be re-injected it will be stored

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pending offsite removal by a licenced haulier to either Environment Agency permitted water treatment facility where it is processed, treated and discharged in accordance with the permitted controls of the water treatment facility.

Water produced during hydrocarbon production has the potential to contain low levels of Naturally Occurring Radioactive Material (NORM). HHDL will appoint a competent Radiation Protection Supervisor (RPS) and/or Radioactive Waste Advisor (RWA) to ensure that NORM is managed correctly.

### 6.3.1 Groundwater Re-injection

EPR2016 transposes the requirement of the Water Framework Directive (Directive 2000/60/EC) including the conditions required for the injection of water specifically:

*‘injection of water containing substances resulting from the operations for exploration and extraction of hydrocarbons or mining activities, and injection of water for technical reasons, into geological formations from which hydrocarbons or other substances have been extracted or into geological formations which for natural reasons are permanently unsuitable for other purposes. Such injections shall not contain substances other than those resulting from the above operations’.*

The term produced water refers to those waters which result from the exploration and extraction of hydrocarbons that are produced from a well alongside oil and gas.

The proposed activities include the reinjection of produced water into a geological formation from which hydrocarbons will be produced in order to provide production support. A groundwater activity permit is being applied for to facilitate the proposed reinjection activity.

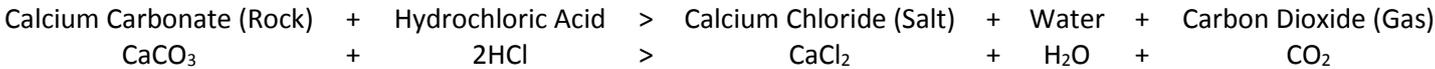
## 6.4 Workover and Well Treatments

A number of workover and well treatments are being considered for use at the well site. These operations are described below.

### 6.4.1 Acid Wash

The purpose of an acid wash is to clean the well after drilling. The operation is very much akin to acidisation of boreholes in the water well industry and results in improved permeability through which water or hydrocarbons can flow.

During drilling the geological formation(s) nearest to the wellbore may become damaged and the natural permeability of the target formation(s) may be reduced by the fine particles created during drilling, along with some of the drilling muds. The fine particles and drilling muds block, or blind, the natural pore spaces in the rock. An acid wash is used to clean the well out following drilling in order to return the natural porosity and permeability of the damaged formation. The proposed dilution of hydrochloric acid (HCl) is 15%.



Once the HCl acid has reacted with the formation it will form a waste stream known as ‘spent acid’ which, following the completion of the acid wash, will be circulated back to surface.

Whilst the injection of hydrochloric acid within deep saline water bearing formations is a ‘groundwater activity’, the activity is considered de minimis and can be excluded under Schedule 22 3 (3) of EPR2016. The acid wash does therefore not require a groundwater permit.

The acid wash is an activity that is currently permitted at the well site for the HH-1 and proposed HH-2 well. This variation seeks to permit acid wash activities across all wells including the use of soda ash to treat any acid returns that have not been spent to neutralise them.

### 6.4.2 Hot Oil Treatment

Earlier testing confirmed the presence of dissolved waxes in the crude oil that can precipitate in the production tubing and wellbore area, restricting both the flow of hydrocarbons to the well, and the passage of mechanical tools in the tubing. Hot oil washing is a process of removing the build-up of wax precipitates within the production tubing and casing (if affected).

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Heated oil, previously produced from the formation, is pumped from the oil storage tanks, via a heater and mobile hot oil pump, and circulated down the well. The hot oil is pumped down the tubing to immediately above the perforations and circulated back to surface, dissolving or dislodging wax precipitates. The returning oil is diverted from the well at surface back to the oil storage tanks, where it is commingled with the produced oil. No extractive waste is generated, as the returned waxy oil becomes part of the oil for export from site.

The hot oil treatment is an activity that is currently permitted at the well site for the HH-1 and proposed HH-2 well. This variation seeks to permit hot oil treatment across all wells.

## **6.5 Well Abandonment and Site Restoration**

If a decision is made to restore the well site, the boreholes will be abandoned in accordance with Oil & Gas UK Guidelines for the abandonment of wells, which requires all distinct permeable zones penetrated by the wellbore to be isolated from each other and from surface by a minimum of one permanent barrier. If any permeable zone penetrated by the wellbore is hydrocarbon-bearing or over-pressured and water-bearing then the requirement is for two permanent barriers from surface, the second barrier being a back-up to the first.

In addition to the Oil & Gas UK Guidelines for the abandonment of wells, the borehole abandonment(s) will be undertaken in accordance with the following regulations:

- The Borehole Sites and Operations Regulations 1995; and
- Offshore Installations and Wells (Design & Construction, etc.) Regulations 1996.

Prior to any abandonment a full wellbore abandonment programme will be submitted to the HSE and the HHDL Independent Well Examiner for review and examination. The wellbore abandonment programme does not form part of the Well Testing programme.

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## 7. PRODUCTION OF EXTRACTIVE WASTE

A list of the waste generating activities associated with operations at the Horse Hill Well Site is outlined below.

- Well Maintenance;
- Drilling of Hydrocarbon Production Wells and a Single Reinjection Well;
- Production Operations; and
- Workover and Well Treatments
- Well Suspension and Abandonment.

The anticipated extractive wastes which may be generated from these activities include:

- Water Based Drill Cuttings;
- Oil Based Drill Cuttings;
- Water Based Drilling Mud;
- Oil Based Drilling Mud;
- Well Suspension / Circulation Fluid;
- Production Water;
- Natural Gas; and
- Spent (Neutralised) Acid.

The arrangements for the management of extractive waste during the operations are detailed in the Waste Management Plan, submitted in support of this environmental permit application.

 <b>HORSE HILL</b> DEVELOPMENTS LTD	<b>HORSE HILL DEVELOPMENTS LTD</b>	<b>HHDL-EPR-HHP-NTS-003</b>	
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## 8. SUPPORTING DOCUMENTATION

In accordance with the requirements of EPR2016 the following documents have been prepared in support of an application for an Environmental Permit.

### 8.1 Site Location and Site Layout Plan

Site Plans have been provided to illustrate the location of the well site, together with an indicative layout plan throughout each phase of the development illustrating the location of well test equipment and flaring unit(s). Document Reference: HHDL-EPR-HHP-SP-004.

### 8.2 Waste Management Plan

The Waste Management Plan is the principal document of the Horse Hill environmental permit application. It is specifically drafted for an application to operate a Mining Waste Operation, whether or not it includes a Mining Waste Facility. Document Reference: HHDL-EPR-HHP-WMP-005.

Environmental permits, which are subject to the Mining Waste Directive, cover the management of extracted waste and not the extraction process. The Waste Management Plan has been drafted such that it aligns with the management of extracted waste and not the extraction process.

### 8.3 Site Condition Report

The Site Condition Report has been prepared as a record of the site condition prior to commencing operations. It will continue to be updated as the operations progress and will be used to identify any changes to the environment as a result of the operation when surrendering the environmental permit. Document Reference: HHDL-EPR-HHP-SCR-006.

### 8.4 Environmental Risk Assessment

The Environmental Risk Assessment is applicable to the Horse Hill Well Site. The structure of the Environmental Risk Assessment is consistent with the Environment Agency guidance using the Source-Pathway-Receptor model.

The Environmental Risk Assessment has concluded that the risk to the environment is low based on the control measures implemented by HHDL, including a contained well site incorporating a HDPE impermeable membrane. Document Reference: HHDL-EPR-HHP-ERA-007.

### 8.5 Gas Management Plan

A Gas Management Plan has been produced to outline the gas management arrangements to be implemented at the Horse Hill Well Site during operations. The Gas Management Plan also provides for the Assessment of Best Available Technique (BAT) for the management of waste gases and the type of safety flare to be used. Document Reference: HHDL-EPR-HHP-GMP-008.