



HORSE HILL
DEVELOPMENTS LTD

Horse Hill Developments Ltd

Title: Odour Management Plan

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1	Summary of the Environmental Permit Application May 2019	23/11/2020	TH
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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.

HHDL is the holder of a number of Environmental Permits issued by the Environment Agency in accordance with the Environmental Permitting (England and Wales) Regulations 2016. The current permitted activities at the Horse Hill Well Site allow the undertaking of the following activities:

EPR/BB3300XG - A mining waste operation for the management of extractive waste from prospecting mineral resources, not involving a mining waste facility.

A mining waste operation for the management of non-hazardous extractive liquid waste and gas, from prospecting for mineral resources not including a waste facility resulting from well testing operation. No more than 10 tonnes of natural gas may be flared each day.

EPR/BB3691NN - The discharge of clean surface water off-site during periods of non-operational activity. Discharges to surface water may not take place during drilling, flow testing or well testing.

EPR/SP3339YS - The loading, unloading, handling or storage of, or physical, chemical or thermal treatment of crude oil with a capacity of no more than 500 tonnes.

EPR/AB3498DZ - SR 2014 No4 Permit () for the Accumulation and Disposal of radioactive waste from the NORM Industrial Activity of the production of oil and gas.

As the development continues to progress, additional permitted activities have been identified as being necessary. As a result, HHDL have prepared an application to vary the environmental permits with the purpose of gaining permission to undertake the following activities:

- Construct up to four (4) new additional boreholes (HH-3/HH-4/HH-5/HH-6) in addition to the current two (2) boreholes (HH-1/HH-2) already constructed at the Horse Hill Well Site (**EPR/BB3300XG**);
- Harness at least one (1) of the six (6) boreholes as a reinjection well for the purpose of providing production support (**EPR/BB3691NN**);
- Undertake well treatments such as an acid wash and solvent treatments (**EPR/BB3300XG**);
- Undertake a 90 day well test for each of the additional wells (HH-3/HH-4/HH-5/HH-6) before later being added to the portfolio of production wells at the site or being abandoned (**EPR/BB3300XG**);
- Undertake an injectivity test within HH-2 (HH-2z) and any other wells as dictated by HHDL (**EPR/BB3691NN**);
- Incinerate natural gas at a rate not exceeding 10 tonnes per day during production operations, until such a time that it can be demonstrated that the incineration of natural gas is no longer considered Best Available Technique through a cost benefit analysis (**EPR/BB3300XG**);

HHDL will continue to undertake the following activities at the site in accordance with the current permissions presented within the permit:

- Store and handle crude oil up to a capacity of 500 tonnes within the existing infrastructure and within the current permitted boundary. Permit **EPR/SP3339YS** will not be the subject of a permit variation.

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2. SCOPE

This Odour Management Plan is applicable to the Horse Hill Well Site and all operations conducted therein. It has been produced to present and outline the odour management arrangements for the Horse Hill well site during the proposed drilling operations, production operations, well maintenance operations, well abandonment operations and well site restoration operations.

It is applicable to HHDL, its contractor and subcontractors and can be used in support of an application to the Environment Agency under the Environmental Permitting (England and Wales) Regulations 2016 (EPR2016), where there is a requirement to provide an Odour Management Plan. This Odour Management Plan has been produced in accordance with the EA Horizontal Guidance Note H4 – Odour Management: how to comply with your environmental permit.

3. DEFINITIONS

BAT:	Best Available Technique
COSHH:	Control of Substances Hazardous to health Regulations 2002
EPR2016:	Environmental Permitting (England & Wales) Regulations 2016
HSE:	Health, Safety and Environmental
km:	Kilometre
LNR:	Local Nature Reserves
MCERTS:	Environment Agency’s Monitoring Certification Scheme
MPA:	Marine Protection Area
NNR:	National Nature Reserves
PEDL:	Petroleum Exploration and Development Licence
SAC:	Special Areas of Conservation
SPA:	Special Protection Area
SSSI:	Site of Special Scientific Interest
UK:	United Kingdom
Odour:	<p>The term ‘Odour’ in this document refers to odours from those activities listed in Schedule 1 of the Environmental Permitting (England and Wales) Regulations 2016, which for the Horse Hill exploratory operations include:</p> <ul style="list-style-type: none"> • The loading, unloading or handling of, the storage of, or the physical, chemical or thermal treatment of crude oil; • The incineration of hazardous waste gas regardless whether above or below 10 tonnes; • Odours from activities not covered by Schedule 1 of EPR2016. <p>Not all odours identified on site will be generated by these activities and therefore will not necessarily be identified in this Odour Management Plan.</p>

Table 3.1: Definitions

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4. ROLES AND RESPONSIBILITIES

Role	Key Responsibilities
Chief Executive	<p>Overall responsible for all business activities and must ensure that suitable and sufficient systems, processes and resources are provided to adhere to the HSE Management System (HSEMS) and legislative requirements in relation to this plan. They shall:</p> <ul style="list-style-type: none"> • Apply HSEMS standards and procedures throughout the project; • Provide suitable and sufficient input and resources required to maintain an effective HSEMS; • Stipulate project requirements and conditions, e.g. budget, time constraints, milestones and feedback; and • Ensure a proactive and robust system is in place for the management of leaks during well site operations.
Commercial Director	<ul style="list-style-type: none"> • The communication of the HSEMS structure and responsibilities to the Well Site Supervisor; • Co-ordinate the implementation of the Odour Management Plan; • Providing assistance and guidance in the update and approval of the Odour Management Plan; • Ensuring that legislative compliance is maintained through the provision of adequate competent resources; • Ensuring competent personnel are available to monitor and assess the requirements of the Odour Management Plan; • Ensuring that roles and responsibilities are identified and the assessment of individuals is recorded; • Selecting contractors who can meet all standards through a robust tendering and/or selection process and the monitoring of contractors to ensure that these standards are being met; • The development and training of staff or assessing the competence of contractors so that they are competent and capable of carrying out their work to the required standards; • Conducting periodic audits of compliance and communicating environmental performance, significant findings and non-conformances. • Ensuring that suitable and sufficient resources are provided to implement the Odour Management Plan.
Well Site Supervisor	<ul style="list-style-type: none"> • Ensuring that leadership is clearly established and promoting a high degree of HSE awareness through communication of HSE Policies and responsibilities; • Ensuring that defined practices and processes are communicated; • Ensuring that, where required, monitoring and reporting relating to regulatory compliance is carried out; • Ensuring that odorous emissions are reported and investigated in accordance with HHDL’s HSE policies; • Ensuring that where required, odorous emissions are sampled to determine source and composition of the emission; • Ensuring that spillages are remediated as soon as reasonably practicable; • Ensuring that all incidents, involving, or having the potential to cause, injury or harm to personnel, damage to infrastructure or the environment are thoroughly investigated; • Ensuring that emergency response plans are tested on a regular basis, recording the results, identifying, implementing and communicating corrective actions; and • Ensuring that complaints are reported to HHDL and thoroughly investigated.
All personnel	<p>All personnel are to follow the requirements of this Odour Management Plan and cooperate fully with senior management. All personnel must take reasonable care to ensure that their actions do not have an adverse impact on the environment. Personnel must not intentionally or recklessly interfere with, or misuse anything that is provided in the interest of health, safety and the environment.</p>

Table 4.1: Roles and Responsibilities

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5. ODOUR MANAGEMENT PLAN

This Odour Management Plan covers the following operations to be conducted at the Horse Hill Well Site:

- Drilling operations;
- Production operations;
- Well maintenance operations;
- Well abandonment operations; and
- Well site restoration operations

5.1 Objectives of the Odour Management Plan

The Odour Management Plan is designed to consider odour sources, releases and impacts of potential odours and the implementation of appropriate methods to control and minimise any potential odours. This objective will be achieved through:

- Assessment of Risks;
- Identification of odorous materials subject to the plan;
- Arrangements for additional control measures;
- Identification of potential odour release points;
- Arrangements for controlling evaporation of odorous products;
- Arrangements for the containment of odorous emissions;
- Arrangements for the implementation of odour abatement techniques;
- Arrangements for the dispersion of odorous emissions;
- Arrangements for odour monitoring;
- Arrangements for odour investigation;
- Training of personnel;
- Audit Requirements; and
- Arrangements for reviewing and revising the Odour Management Plan.

5.2 Distribution of the Approved Odour Management Plan

HHDL will communicate the Odour Management Plan to the Well Site Supervisor. The Odour Management Plan may be issued as an electronic version or paper copy and a copy of receipt or transmittal will be recorded by HHDL. A copy of the Odour Management Plan is to be held within the Well Site Supervisor's office and be available for review by regulatory bodies.

The Odour Management Plan will be communicated to site personnel during site induction and a record of induction will be recorded. A copy of the Odour Management Plan will be displayed and made available on site to all personnel during operations.

5.3 Alterations to the Odour Management Plan

Any required changes or deviations from this Odour Management Plan are to be referred to HHDL or to the Well Site Supervisor in the first instance. No changes to, or deviations from, this Odour Management Plan are to be implemented until the required changes or deviations have been reviewed and approved by HHDL. Alterations to the plan will be submitted to the Environment Agency for approval; however, alterations may be implemented as an immediate control measure to resolve an identified odour problem prior to notification to the Environment Agency.

5.4 Changes to Operations, Processes or Equipment

In the event of significant or material changes to operations, processes or equipment during the proposed operations, HHDL will review the Odour Management Plan and communicate a revised Odour Management Plan to the Well Site Supervisor and forward a copy to the Environment Agency.

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5.5 Odour Risk Assessment

In support of the Odour Management Plan, a risk assessment of potential odours generated during the proposed drilling operations, production operations, workover operations and well abandonment operations has been undertaken.

The Odour Risk Assessment is qualitative and details the activities and events that may lead to environmental impact on one or more receptors.

The Odour Risk Assessment has assessed the potential odour risks from the proposed operations to be undertaken and includes the following information:

- Potential odour release points;
- Potential sources of odour;
- Operations being carried out which may lead to odour emissions;
- Receptors;
- Pathway;
- Probability of exposure;
- Consequence;
- Magnitude of Risk;
- Risk management to control or minimise odour release;
- Residual Risk; and
- Responsible Person for monitoring release points.

A copy of the Odour Risk Assessment is included in Appendix 1 of this Odour Management Plan.

5.6 Pre-Task Odour Risk Assessment

A pre-task odour risk assessment will be undertaken by HHDL prior to commencement of changes within the proposed operations.

The pre-task odour risk assessment will be undertaken to identify any alterations or changes to processes, equipment or odour control measures that had originally been assessed in the Odour Risk Assessment. This may include alterations or changes due to equipment availability or equipment replacement etc.

If alterations or changes to the Odour Risk Assessment are identified, a revised Odour Risk Assessment will be produced and communicated by HHDL. HHDL will forward a copy of any revised Odour Risk Assessment to the Environment Agency.

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6. SOURCE MATERIALS

6.1 Use of Alternative Products

Products known to emit odour or products that may emit odour when reacting with other products will be substituted where possible, for alternative non-odorous products which are deemed safe and effective. Service providers will be asked to provide non-odorous products where possible prior to mobilisation and commencement of operations. If odorous products cannot be substituted these products will be identified prior to mobilisation and arrangements will be established for the segregation of these products during transportation, storage, handling and disposal.

If odorous products cannot be substituted, quantities and holding time onsite of odorous products are to be kept to a minimum where possible.

6.2 Identification of Odorous Source Materials

An inventory of potentially odorous products including description and quantities will be undertaken by service providers during initial mobilisation and installation. Inventories are to include all potential odorous liquid, solid and gaseous materials that have been mobilised and held onsite. Inventories of potential odorous products are to be recorded and a copy held within the Well Site Supervisor's office.

The Well Site Supervisor will collate service provider inventories and produce a consolidated potential odorous product inventory which will be held in the Well Site Supervisor's office for review by external regulatory bodies.

The Well Site Supervisor is to ensure that the odorous product inventory is updated on receipt/disposal of odorous products and a current copy is available for review.

6.3 Use of Odorous Products

If there is a requirement for the use of or transferring of odorous products on site, control measures to eliminate or reduce potential odorous emissions detailed within this Odour Management Plan are to be followed. These include, but are not limited to:

- Containers are to be sealed when not in use;
- Spillage pads / containers are to be used to ensure any spillages are contained and can be remediated effectively and efficiently;
- Avoid direct sunlight where possible; and
- Reduce evaporation rate by eliminating air flow and surface area.

6.4 Storage Arrangements

Storage areas will be provided onsite for equipment, chemicals, materials and waste receptacles. Storage areas will be clearly marked and site personnel informed of specific storage requirements for individual areas when receiving site induction. Specific storage areas will be provided for waste, hazardous materials (COSHH) and operational materials. Materials are to be segregated where possible and monitored for signs of degradation.

It is not envisaged that materials will be held onsite for a period of time that will allow for waste degradation and production of odorous emissions.

6.5 Management of Storage Areas

The Well Site Supervisor is responsible for ensuring that storage areas are kept clean, tidy, monitored regularly for signs of odour, leaks or damage to containers or collection of surface water. Containers identified as leaking or damaged, are to be segregated and provisions implemented for the containment, immediate use or offsite disposal by an Environment Agency licensed waste carrier to an Environment Agency licensed waste facility.

6.6 Waste Storage

Waste products will be stored in a designated area onsite prior to disposal. The storage area will contain, where possible, enclosed skips for the containment, storage and collection of waste products.

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To ensure that potential reactions between waste products and degradation of waste is reduced or eliminated, waste will be segregated and stored in specific storage areas or waste receptacles prior to offsite disposal by an Environment Agency licensed waste carrier to an Environment Agency licensed waste facility.

It is not envisaged that waste will be held onsite for a period of time that will allow for waste degradation and production of odorous emissions.

To ensure that onsite waste storage procedures are followed the Well Site Supervisor is to undertake regular inspections of waste storage areas and receptacles.

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7. ADDITIONAL CONTROL MEASURES

7.1 Engineering Controls

Engineering controls eliminate or reduce exposure to odours through the use of or substitution of engineered machinery or equipment. HHDL will require, where possible, service providers to provide the Best Available Techniques (BAT) during operations. BAT machinery and equipment will assist in eliminating potential odours at source using oil and gas industry engineering control measures which may include, but is not limited to the following:

- Equipment designed to minimise potential odours;
- Design the process to minimise potential odours;
- Use of non-odorous products; and
- Enclosed liquid systems with raised vents.

7.2 Equipment Design

Equipment provided by service providers is to meet current oil and gas industry BAT. Equipment identified as not meeting the required oil and gas industry BAT will be notified to the service provider and they will be asked to source alternative and available equipment to ensure compliance with current oil and gas industry BAT.

7.3 Maintenance and Servicing Procedures

To ensure that maintenance and servicing of equipment is kept to a minimum, HHDL will request that general maintenance and servicing of equipment is conducted by service providers prior to mobilisation. This will ensure that the risk of potential odorous emissions during maintenance and servicing is reduced to a minimum and the potential for equipment failure is reduced.

If there is a requirement for maintenance or servicing of equipment on site, control measures to eliminate or reduce potential odorous emissions detailed within this Odour Management Plan are to be followed. These include, but are not limited to:

- Containment and removal of odorous waste materials;
- Controlling evaporation of odorous materials;
- Containment of odorous emissions; and
- Odour mitigation techniques.

7.4 Promotion of Good Housekeeping

HHDL promotes good housekeeping at all times ensuring that waste products are identified and the necessary actions for the storage and containment of waste products are implemented as soon as reasonably practicable.

Housekeeping is part of the site induction process and housekeeping audits are to be undertaken on a regular basis by the Well Site Supervisor and HHDL Senior Management.

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8. ODOUR RELEASES

8.1 Identification of Potential Odour Release Points

Potential odour release points have been identified within the Odour Risk Assessment and include, but not limited to, the following potential odour release points:

- Drilling Mud Systems;
- Well Head;
- Enclosed Ground Flare;
- Wireline Equipment;
- Specified Generators (Gas Engine Generator);
- Production Equipment;
- Storage Tanks / Storage Tank Vent Stacks;
- Storage Areas / Process Areas;
- Site Sewage Tank;
- Waste Skips and Waste Receptacles;
- Onsite Power Generation Equipment; and
- Spillages

Control measures for releases of potential odours are detailed within the Odour Risk Assessment included as Appendix 1 of this Odour Management Plan.

8.2 Controlling Evaporation of Odorous Products

In the event that odorous products cannot be substituted for non-odorous products, control measures will be implemented onsite to reduce the evaporation of the product thus reducing the potential for odorous emissions. This will be achieved by chemical or physical methods as detailed below:

- Avoid direct sunlight or otherwise reducing the water evaporation rate and the release of dissolved odorous chemicals;
- Increase humidity in the immediate environment to reduce evaporation;
- Reduce air flow over the surface of odour-releasing materials thus reducing evaporation rate;
- Control acidity / alkalinity of materials to make them more soluble in water and therefore less likely to evaporate; and
- Reduce surface area of odorous materials thus reducing evaporation rate.

8.3 Containment of Odorous Emissions

Potential odours may be contained within pipework and enclosed tanks of equipment used within operations. Where practicable, pipework and enclosed tanks will remain sealed until cessation of operations thus reducing the likelihood of potential odorous emissions.

In the event that containment is to be broken on pipework or enclosed tanks, where possible, purging of the system is to be undertaken prior to breaking containment. Liquids used for purging are to be transferred to sealed tanks where odour treatment or offsite disposal by an Environment Agency licensed waste carrier to an Environment Agency licensed waste facility for odour treatment can be undertaken.

Tanks and pipework containing potential odorous emissions are to be checked on a regular basis by the service provider and the Well Site Supervisor for leaks and/or damage to the containment system. All checks are to be recorded and records of checks are to be made available for inspection.

8.4 Odour Abatement Techniques

The only known odour abatement technique is the removal of the odorous product. Therefore odorous materials will be removed when safe and practical to do so. Other abatement techniques which may be used are:

- Adsorption using activated carbon;
- Absorption (scrubbing); and
- Odour treatment chemicals.

These methods can only be used once the method has been proved safe for the material being treated. Due to the nature of oil and gas operations it is not always possible to predict the odour causing substance prior to operations commencing.

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8.5 Dispersion

During operations, an enclosed ground flare will be located in the northwest corner of the processing facility and designed to meet the Environment Agency's best available technique standard. The enclosed ground flare will only be used in the event of an emergency or for well maintenance operations. The enclosed ground flare will ensure that all flammable gas mixtures will be incinerated, which in turn will minimise any potential odorous emissions from the well site.

Local meteorological monitoring will be undertaken to assist in providing local modelling for any air dispersion from the Horse Hill well site and will provide the Well Site Supervisor with an early indication of any odour control measures that may be required.

For clarity, local meteorological monitoring will consist of analysing local weather reports from the Met Office, monitoring wind direction, wind speed and weather conditions. Information from the local meteorological monitoring will provide the Well Site Supervisor with an estimated direction and range of any dispersion.

However, it is not always possible to manage the timing of activities to assist in any reduction of any potential impact of odour from dispersion.

The primary use of the flare system is for the safe disposal of natural gas and although odour dispersion will be managed where possible, there will be certain events when odour emission will not be controlled such as, but not limited to:

- A well control event or emergency shut down;
- Well clean up; and
- Unpredictable multi-phase flow or solids production.

9. IMPACTS

9.1 Local Receptors

Site selection, in particular the separation distance between the site and sensitive receptors, is an important factor when considering oil and gas operations and their potential impact upon the surrounding environment.

Receptors are classed in to the following categories:

- Low – Footpath or road;
- Medium – Industrial or commercial workplaces; and
- High (sensitive) – Housing, pubs, hotels etc.

The Horse Hill well site is located within a rural landscape within Surrey. A Receptor Plan identifying all receptors within 2km of the Horse Hill well site has been compiled and is provided within the Odour Risk Assessment included within Appendix 1 of this Odour Management Plan.

For clarity, receptors have been assigned to a ‘Receptor Area’ within the Receptor Plan to assist in identification. Each ‘Receptor Area’ has been classified as ‘High’ due to a high (sensitive) receptor being located within each receptor area.

The nearest receptor located within each ‘Receptor Area’ is provided within Table 9.1 including an indicative distance to the Horse Hill well site.

Local Receptor	Receptor Area	Distance from Site	Direction from Site	Grid Reference
Five Acres	1	0.20 km	East	TQ 25577 43493
High Trees	2	0.28 km	Northeast	TQ 25404 43948
Collendean Farm	3	0.58 km	Northwest	TQ 24671 43935
Spencers	4	1.01 km	North	TQ 25022 42529
Crutchfield Brae	5	0.89 km	Northeast	TQ 25672 44505
Derrinabrin Farm	6	0.78 km	Southwest	TQ 24558 43048
Westlands Farm	7	1.06 km	Southeast	TQ 26332 43076
Place of Worship	8	0.90 km	Northeast	TQ 26262 43883
Norwood Hill	9	1.16 km	West	TQ 24016 43507
Sidlow Manor	10	1.25 km	North	TQ 25525 44898
Hookwood	11	1.45 km	Southeast	TQ 26586 42720
Nutley Dean Business Park	12	1.41 km	Northwest	TQ 24164 44635
Hookwood	13	1.45 km	Southeast	TQ 26586 42720

Table 9.1: List of Nearest Receptors by ‘Receptor Area’ within 2km of the Horse Hill well site

The nearest conurbation is Hookwood, located 1.45 km southeast of the Horse Hill well site.

There is one (1) Special Areas of Conservation (SAC), Mole Gap to Reigate Escarpment, located within 10 km of the Horse Hill well site.

There is one (1) Local Nature Reserve (LNR), Edolphs Copse, located within 2 km of the Horse Hill well site.

Details of the designated sites identified are provided within Table 9.2.

Designation	Receptor	Distance from Site	Direction from Site	Grid Reference
Special Areas of Conservation (SAC)	Mole Gap to Reigate Escarpment	8.00 km	North	TQ 25011 51693
Local Nature reserves (LNR)	Edolphs Copse	1.69 km	Southwest	TQ 23909 42410

Table 9.2: List of Designated Sites

9.2 Community Tolerance

It is envisaged that the local community will not be familiar with some of the potential odours from the proposed operations to be conducted at the Horse Hill well site and therefore any odours emitted from the well site will be classed as offensive.

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10. ODOUR MONITORING

Odour monitoring will be carried out by site personnel throughout operations as detailed in Section 10.2 and Section 10.3 of this Odour Management Plan.

To ensure the effectiveness of odour control measures, monitoring shall be undertaken immediately following the assessment and implementation of control measures. Thereafter, periodic monitoring shall be undertaken to ensure the continued effectiveness of such control measures.

10.1 Monitoring Techniques for Exploratory Operations

All monitoring techniques will be carried out in accordance with the requirements of the Environment Agency guidance for H4 Odour Management; How to comply with your environmental permit and may include the following techniques:

- Sniff testing;
- Complaints investigation;
- Odour diaries;
- Emissions monitoring; and
- Grab sampling of source emissions.

10.2 Steady State Odour Monitoring

To ensure that odour monitoring is conducted across the entire well site, steady state odour monitoring will be undertaken. This will provide real time monitoring and ensure the early detection of any potential odours.

All personnel working on the Horse Hill Well Site shall receive steady state odour monitoring training and a record of training will be held by HHDL.

Steady state odour monitoring shall be carried out by means of sniff testing. All site personnel will conduct periodic sniff testing during their shift and are to report odours perceived to be strong or odours not associated with standard well site operations as detailed within Section 10.4 of this Odour Management Plan.

10.3 Release Point Monitoring

Potential release points shall be identified on the Odour Risk Assessment and shall be monitored, by means of sniff testing, for potential odour emissions. Site personnel involved in release point monitoring shall receive 'release point monitoring' training from HHDL and a record of training will be held by HHDL. If an odour perceived to be strong or odours not associated with standard well site operations are detected, the odour release point will be identified and odour control measures implemented.

To ensure that the odour control measures are sufficient, specific odour monitoring at the release point identified will be undertaken regularly throughout the operation.

10.4 Reporting and Recording of Odour Emissions

Due to the location of the Horse Hill well site, there is the potential for odours not associated with the oil and gas industry, i.e. from agriculture, manufacturing or chemical processes, identified within the well site or localised area.

To ensure that odours not associated with standard well site operations are recorded and identified, monitors are to report odours not associated with standard well site operations to the Well Site Supervisor using the HHDL Odour Report Form.

If an odour is reported, an investigation of the odour is to be undertaken as detailed in Section 11 of this Odour Management Plan. The Well Site Supervisor is to ensure that a record of the odour identified is recorded.

Strong Odours: easily attributable to oilfield operations which have not previously been reported shall be reported to the Well Site Supervisor or as soon as reasonably practicable and recorded on the HHDL Odour Report Form.

Strong Odours: easily attributable to offsite activities should be reported to the Well Site Supervisor as soon as reasonably practicable and recorded on the HHDL Odour Report Form.

All Odours: easily attributable to oilfield activities, which have previously been reported, should be reported to the Well Site Supervisor as soon as reasonably practicable and recorded on the HHDL Odour Report Form.

All Other Odours: from the well site or offsite, should be reported to the Well Site Supervisor as soon as reasonably practicable and recorded on the HHDL Odour Report Form.

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11. ODOUR INVESTIGATION

11.1 Odour Identification

As soon as reasonably practicable, once an unknown odour from the operations has been reported, an investigation will be conducted by the Well Site Supervisor to determine the odour release point, odour source and the substance creating the odour.

The Well Site Supervisor with assistance from suitably qualified personnel is to ascertain the odour release point and the potential substance causing the odour. If the substance cannot be identified, a sample of the odour will be taken either by means of point source sampling or grab sampling and sent for analysis at an MCERTS accredited laboratory.

11.2 Point Source Sampling

Point source sampling will be undertaken when the substance causing the odour cannot be determined. Point source sampling will be undertaken by a competent and suitable qualified person who may be an independent specialist or the operator of the equipment.

Point source samples will be sent for analysis at an MCERTS accredited laboratory to ascertain the compound causing the odour and will include analysis of the following parameters

- 1,3 Butadiene
- Benzene
- Carbon Disulphide
- Carbonyl Sulphide
- Diethyl Sulphide
- Ethyl Benzene
- Hydrogen Sulphide
- m-p Xylene
- Methylcyclohexane
- Methylcyclopentane
- Sulphur Dioxide
- Toluene
- Volatile Suite including C1 - C8

If a direct sample cannot be attained, grab sampling will be conducted in the immediate vicinity of the odour by a competent person.

All samples will be transported to an MCERTS accredited laboratory for analysis under controlled conditions.

Results of the point source sampling will be reviewed by HHDL to determine the source of the odour. Results of the point source sampling will be made available to the Environment Agency for review.

11.3 Recording of Odour Investigations

Each odour investigation shall be recorded on the HHDL Odour Report Form and communicated to the HHDL Management Team. The HHDL Odour Report Form record is to include the following information:

- Date, time and location of odour;
- Weather conditions, incl. Temperature, wind strength and direction;
- Intensity of the odour;
- Odour release point identified;
- Constant or intermittent odour;
- Receptor sensitivity;
- Source of the odour (if evident);
- Description of the odour;
- Onsite activities being conducted at the time odour identified;
- Odorous substance identified;
- Details of any emission points sampled;
- Method of sampling;
- Procedures for the preservation and transportation of the Odour sample;
- Details of the laboratory undertaking the analysis;
- Details of the sample analysis including any observations;
- Odour control measures implemented; and
- Sketch of where the odour was reported including any potential odour sources.

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11.4 Odour Tracking

All odours due to the proposed activities reported shall be recorded on the HHDL Incident Report Form and, where actionable, HHDL Action Log. HHDL shall record all odour complaints on the HHDL Action Log to ensure that the complaint is tracked to conclusion and closed out.

The HHDL Action Log shall include all reports and investigations of the odour. The HHDL Action Log may help identify, if any, potential sources of odour, prevent potential reoccurrences of odour and assist in investigation of odour complaints.

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12. OVERVIEW OF ODOUR MANAGEMENT

12.1 Training of Personnel

All personnel involved in odour monitoring and odour management procedures will receive training prior to commencement of their responsibilities. Training will be undertaken by an independent air quality consultant or Well Site Supervisor and a record of training will be recorded by HHDL.

12.2 Odour Complaints

In the event that a complaint is received by HHDL from persons not associated with the proposed operations, the complaint shall be investigated with all the relevant information captured on the Odour Complaint Form. HHDL will follow up all complaints accordingly and seek to ensure some form of remediation is in place to prevent any reoccurrence. Complaints relating to the environment will be reported to the Environment Agency.

12.3 Recording Odour Complaints

Odour complaints shall be recorded on the HHDL Odour Complaint Form and an entry made in the HHDL Action Log to monitor the frequency at which complaints are received. The HHDL Action Log shall include a subjective description of each complaint, allowing HHDL to calculate the number of complaints received. The Well Site Supervisor is to record and investigate all odour complaints and communicate their findings and recommendations to HHDL Senior Management.

12.4 Odour Diaries

In the event of a complaint being registered, HHDL may ask residents of local sensitive receptors to maintain an odour diary throughout the exploratory operations. All information should be recorded on the HHDL Odour Diary Form. HHDL shall keep a copy of all Odour Diaries.

12.5 Audit Requirements

Senior management will conduct periodic audits of compliance with the Odour Management Plan and communicate environmental performance, significant findings and non-conformances.

The Well Site Supervisor will ensure sufficient priority is placed on undertaking audits and ensure that performance and findings from audits, inspections and non-conformances is communicated to site personnel and contractors.

12.6 Arrangements for Reviewing and Revising the Odour Management Plan

HHDL will periodically review the Odour Management Plan or when significant changes to operations or site equipment have occurred and amend where necessary in accordance with the HHDL's document review procedures.

12.7 Incidents and Emergencies

Unplanned incidents and emergencies may cause odour pollution. In the event of an unplanned incident or emergency there is the capacity to shut in the well and equipment to prevent the further release of reservoir and wellbore fluids. Site personnel are to follow emergency procedures and HHDL emergency response procedures. All emergency actions must be carried out to make the well site and personnel safe in the first instance before odour assessments can be conducted.

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APPENDIX 1 – ODOUR RISK ASSESSMENT

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Scoring Criteria

In order to establish a risk rating for each Source-Pathway-Receptor (S-P-R) linkage both the Likelihood (Probability of Exposure) and Consequence have been issued a score.

The score is used in conjunction with Table 1.1 to provide an overall risk rating of the activity. All scores and risk ratings are provided on the basis that the mitigation measures are in place.

Likelihood	Descriptor
Very Low	Rarely encountered, never reported or highly unlikely.
Low	Infrequent Occurrences.
Medium	Can be expected to occur several times per year.
High	Repeated Occurrences.

Table 1.1: Scoring System - Likelihood

Consequence	Descriptor
Very Low	Slight environmental effect that does not exceed a regulatory standard.
Low	Minor environmental effect which may breach a regulatory standard but is localised to the point of release with no significant impact on the environment or human health.
Medium	Moderate, localised effect on people and the environment in the vicinity of the incident.
High	A major environmental incident resulting in significant damage to the environment and harm to human health.

Table 1.2: Scoring System - Consequence

The risk matrix presented in Table 1.3 derives a risk rating for each S-P-R linkage identified within this Odour Risk Assessment.

Risk Rating		Consequence			
		Very Low	Low	Medium	High
Likelihood	Very Low	Not Significant	Not Significant	Low	Low
	Low	Not Significant	Low	Medium	Medium
	Medium	Low	Medium	Medium	High
	High	Low	Medium	High	High

Table 1.3: Risk Matrix

Odour emission risks are assigned a Not Significant, Low, Medium or High risk rating and coded using a colour coded system. A description of each risk rating is presented in Table 1.4.

Risk Rating	Acceptable?	Descriptor
Not Significant	Acceptable	Near-certain that an incident will not occur. If it did occur the consequences would not be significant.
Low	Acceptable	Unlikely an incident will occur or give rise to anything more than a minor consequence on the immediate area.
Medium	Tolerable	The activity can only take place provided that any impacts remain localised and risk remediation is readily available.
High	Unacceptable	The risk must be further reduced before the activity can commence.

Table 1.4: Risk Rating Definitions

Horse Hill Well Site Odour Risk Assessment

ID	Potential Odour Release Point (Hazard)	Potential Sources of Odour (Source)	Operations being carried out which may lead to odour emissions	Receptors	Pathway	Probability of Exposure	Consequence	Magnitude of Risk	Risk Management	Residual Risk	Responsible Person for Monitoring Release Point
HH-001	Drilling Mud System • Storage tanks • Associated pipework • Flanges / Connections	Drilling Fluids: • Water Based Drilling Mud • Drill cuttings • Entrained hydrocarbons	Drilling Operations: • Water Based Drilling Mud storage • Water Based Drilling Mud use	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Use of secondary containment systems / bunds. Monitor levels to prevent overfilling / spillage. Ensure connections to storage tanks fitted correctly. Minimise flow through vents. Use enclosed tanks where possible. Avoid direct sunlight on open tanks. Increase humidity to reduce evaporation. Reduce air flow over surface fluids. Control acidity / alkalinity to make more soluble in water and therefore reduce likelihood of evaporation. Reduce surface areas of fluids to minimise evaporation rate. Pressure test equipment prior to use. Equipment to be serviced / maintained. Regular inspection of storage tanks, connections and pipes for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Use of secondary containment systems / bunds. Where possible, plan for breaking containment at cessation of operations. Purge equipment prior to breaking containment. Plug / cap tanks, pipework, flanges, connections etc. after breaking containment. Regular inspection of storage tanks, pipework, flanges and connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Rig Manager / Well Site Supervisor
HH-002	Drilling Mud System • Storage tanks • Associated pipework • Flanges / Connections	Drilling Fluids: • Water Based Drilling Mud • Drill cuttings • Entrained hydrocarbons	Drilling Operations: • Planned breaking of containment	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Tanks and associated pipework protected. Use of secondary containment systems / bunds. Well control procedures established and tested. Equipment to be serviced / maintained. Regular inspection of storage tanks, pipework, flanges and connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. Where possible, plan for breaking containment at cessation of operations. Purge equipment prior to breaking containment. Plug / cap tanks, pipework, flanges, connections etc. after breaking containment. Regular inspection of storage tanks, pipework, flanges and connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Rig Manager / Well Site Supervisor
HH-003	Drilling Mud System • Storage tanks • Associated pipework • Flanges / Connections	Drilling Fluids: • Water Based Drilling Mud • Drill cuttings • Entrained hydrocarbons	Drilling Operations: • Equipment failure	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Use of secondary containment systems / bunds. Well control procedures established and tested. Equipment to be serviced / maintained. Regular inspection of storage tanks, pipework, flanges and connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. Where possible, plan for breaking containment at cessation of operations. Purge equipment prior to breaking containment. Plug / cap tanks, pipework, flanges, connections etc. after breaking containment. Regular inspection of storage tanks, pipework, flanges and connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Rig Manager / Well Site Supervisor
HH-004	Well Head • Flanges • Connections	Wellbore Fluids: • Natural gas • Crude Oil / Condensate • Produced water	Drilling Operations / Well Maintenance Operations / Production Operations / Well Abandonment Operations: • Circulating the well • Killing the well	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Wellhead and associated pipework protected. Well control procedures established and tested. Equipment to be serviced / maintained. Regular inspection of wellhead connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. Where possible, plan for breaking containment at cessation of operations. Purge equipment prior to breaking containment. Plug / cap flanges and connections after breaking containment. Regular inspection of wellhead connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Well Site Supervisor
HH-005	Well Head • Flanges • Connections	Wellbore Fluids: • Natural gas • Crude Oil / Condensate • Produced water	Drilling Operations / Well Maintenance Operations / Production Operations / Well Abandonment Operations: • Planned breaking of containment	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Wellhead and associated pipework protected. Well control procedures established and tested. Equipment to be serviced / maintained. Regular inspection of wellhead connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. Where possible, plan for breaking containment at cessation of operations. Purge equipment prior to breaking containment. Plug / cap flanges and connections after breaking containment. Regular inspection of wellhead connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Well Site Supervisor
HH-006	Well Head • Flanges • Connections	Wellbore Fluids: • Natural gas • Crude Oil / Condensate • Produced water	Drilling Operations / Well Maintenance Operations / Production Operations / Well Abandonment Operations: • Equipment failure	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Wellhead and associated pipework protected. Well control procedures established and tested. Equipment to be serviced / maintained. Regular inspection of wellhead connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. Where possible, plan for breaking containment at cessation of operations. Purge equipment prior to breaking containment. Plug / cap flanges and connections after breaking containment. Regular inspection of wellhead connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Well Site Supervisor
HH-007	Enclosed Ground Flare: • Burner Tip	Partially Combusted Gases: • Methane • Volatile Organic Compounds (VOCs)	Safety / Well Maintenance Operations: • Flaring of natural gas	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Use of recognised standard oil field flare. Flare pilot light on prior to delivery of wellbore fluids. Competent flare operators. Installation and leak testing of flare equipment prior to commissioning. Equipment to be serviced / maintained. Regular inspection of connections and pipes for failure or leaks. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. Where possible, plan for breaking containment at cessation of operations. Purge equipment prior to breaking containment. Plug / cap flanges and connections after breaking containment. Regular inspection of wellhead connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Flare Operator / Well Site Supervisor
HH-008	Enclosed Ground Flare: • Burner Tip	Combustion Products from Incineration of Natural Gas: • Volatile Organic Compounds (VOCs)	Safety / Well Maintenance Operations: • Flaring of natural gas	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Use of recognised standard oil field flare. Flare pilot light on prior to delivery of wellbore fluids. Competent flare operators. Installation and leak testing of flare equipment prior to commissioning. Equipment to be serviced / maintained. Regular inspection of connections and pipes for failure or leaks. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. Where possible, plan for breaking containment at cessation of operations. Purge equipment prior to breaking containment. Plug / cap flanges and connections after breaking containment. Regular inspection of wellhead connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Flare Operator / Well Site Supervisor
HH-009	Wireline Equipment: • Wireline Cable • Lubricator	Wellbore Fluids: • Natural gas • Crude Oil / Condensate • Produced water • Lubricants • Entrained hydrocarbons	Wireline Operations: • Logging operations • Well intervention operations • Recovery operations	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Ensure connections to well head are correctly fitted and tested prior to commissioning. Competent wireline operators. Equipment to be serviced / maintained. Regular inspection of equipment, pressure containment, packing, fluid containment etc. for failure or leaks. Employ odour masking if necessary. Identification of short term or long term odour sources. Where possible, plan for breaking containment at cessation of operations. Purge equipment prior to breaking containment. Plug / cap flanges and connections after breaking containment. Regular inspection of wellhead connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Wireline Operator / Well Site Supervisor
HH-010	Gas Engine Generator: • Exhaust system	Partially Combusted Gases: • Natural gas • Volatile Organic Compounds (VOCs)	Production Operations: • Combustion of natural gas for power generation	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Equipment to be serviced / maintained. Regular inspection of exhaust system for failure or leaks. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. Where possible, plan for breaking containment at cessation of operations. Purge equipment prior to breaking containment. Plug / cap flanges and connections after breaking containment. Regular inspection of wellhead connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Well Site Supervisor
HH-011	Gas Engine Generator: • Exhaust system	Combustion Products from Incineration of Natural Gas: • Volatile Organic Compounds (VOCs) from exhaust emissions	Production Operations: • Combustion of natural gas for power generation	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Equipment to be serviced / maintained. Regular inspection of exhaust system for failure or leaks. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. Where possible, plan for breaking containment at cessation of operations. Purge equipment prior to breaking containment. Plug / cap flanges and connections after breaking containment. Regular inspection of wellhead connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Well Site Supervisor
HH-012	Production Equipment: • Flare Knock Out Pot • Vent Knock Out Pot • High Pressure Production Separator • Low Pressure Production Separator • Crude Oil Heater • Stock Tanks • Produced Water Storage Tank • Lubrication Oil Tank Dirty • Oil Booster Pump • Crude Oil Export Pump • Water Injection Pump • Fuel Gas Heater • Gas Filter Separator • Associated pipework	Wellbore Fluids: • Natural gas • Crude Oil / Condensate • Produced water	Production Operations: • Equipment used for the production / storage of wellbore fluids	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Use of secondary containment systems / bunds. Monitor levels to prevent overfilling / spillage. Ensure connections fitted correctly. Minimise flow through vents. Increase humidity to reduce evaporation. Reduce air flow over surface fluids. Control acidity / alkalinity to make more soluble in water and therefore reduce likelihood of evaporation. Reduce surface areas of fluids to minimise evaporation rate. Where required, pressure test equipment prior to use. Equipment to be serviced / maintained. Regular inspection of equipment, connections and pipes for failure or leaks. Equipment, connections and pipes to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. Where possible, plan for breaking containment at cessation of operations. Purge equipment prior to breaking containment. Plug / cap flanges and connections after breaking containment. Regular inspection of wellhead connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Well Site Supervisor

HH-013	Production Equipment: <ul style="list-style-type: none"> Flare Knock Out Pot Vent Knock Out Pot High Pressure Production Separator Low Pressure Production Separator Crude Oil Heater Stock Tanks Produced Water Storage Tank Lubrication Oil Tank Dirty Oil Booster Pump Crude Oil Export Pump Water Injection Pump Fuel Gas Heater Gas Filter Separator Associated pipework 	Wellbore Fluids: <ul style="list-style-type: none"> Natural gas Crude Oil / Condensate Produced water 	Production Operations: <ul style="list-style-type: none"> Planned breaking of containment 	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Use of secondary containment systems / bunds. Where possible, plan for breaking containment at cessation of operations. Purge equipment prior to breaking containment. Plug / cap tanks, pipework, flanges, connections etc. after breaking containment. Regular inspection of storage tanks, pipework, flanges and connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Well Site Supervisor
HH-014	Production Equipment: <ul style="list-style-type: none"> Flare Knock Out Pot Vent Knock Out Pot High Pressure Production Separator Low Pressure Production Separator Crude Oil Heater Stock Tanks Produced Water Storage Tank Lubrication Oil Tank Dirty Oil Booster Pump Crude Oil Export Pump Water Injection Pump Fuel Gas Heater Gas Filter Separator Associated pipework 	Wellbore Fluids: <ul style="list-style-type: none"> Natural gas Crude Oil / Condensate Produced water 	Production Operations: <ul style="list-style-type: none"> Equipment failure 	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Production equipment and associated pipework protected. Use of secondary containment systems / bunds. Well control procedures established and tested. Equipment to be serviced / maintained. Regular inspection of storage tanks, pipework, flanges and connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Well Site Supervisor
HH-015	Crude Oil Storage Tanks Atmospheric Vent Stack: <ul style="list-style-type: none"> VOC scrubber not installed 	Vapours containing VOCs: (Vapours assessed as containing very low volumes of VOCs)	Production Operations: <ul style="list-style-type: none"> Storage of Crude Oil 	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Monitor levels to prevent overfilling / spillage. Minimise flow through vents. Ensure connections to storage tanks fitted correctly. Competent operators. Equipment to be serviced / maintained. Regular inspection of storage tank connections and pipes for failure or leaks. Personnel inducted / trained on emergency response procedures. Use of secondary containment systems / bunds. Where possible, plan for breaking containment at cessation of operations. Purge equipment prior to breaking containment. Plug / cap tanks, pipework, flanges, connections etc. after breaking containment. Regular inspection of storage tanks, pipework, flanges and connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Well Site Supervisor
HH-016	Crude Oil Storage Tanks Atmospheric Vent Stack: <ul style="list-style-type: none"> VOC scrubber not installed 	Vapours Containing VOCs: (Vapours assessed as containing very low volumes of VOCs)	Production Operations: <ul style="list-style-type: none"> Planned breaking of containment 	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Production equipment and associated pipework protected. Use of secondary containment systems / bunds. Well control procedures established and tested. Equipment to be serviced / maintained. Regular inspection of storage tanks, pipework, flanges and connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Well Site Supervisor
HH-017	Crude Oil Storage Tanks Atmospheric Vent Stack: <ul style="list-style-type: none"> VOC scrubber not installed 	Vapours Containing VOCs: (Vapours assessed as containing very low volumes of VOCs)	Production Operations: <ul style="list-style-type: none"> Equipment failure 	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Production equipment and associated pipework protected. Use of secondary containment systems / bunds. Well control procedures established and tested. Equipment to be serviced / maintained. Regular inspection of storage tanks, pipework, flanges and connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Well Site Supervisor
HH-018	Crude Oil Storage Tanks Atmospheric Vent Stack: <ul style="list-style-type: none"> VOC scrubber installed 	Vapours Containing VOCs: (Vapours assessed as containing very low volumes of VOCs)	Production Operations: <ul style="list-style-type: none"> Storage of Crude Oil 	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Installation of VOC Scrubber. Monitor levels to prevent overfilling / spillage. Minimise flow through vents. Ensure connections to storage tanks fitted correctly. Competent operators. Equipment to be serviced / maintained. Regular inspection of storage tank connections and pipes for failure or leaks. Personnel inducted / trained on emergency response procedures. Use of secondary containment systems / bunds. Where possible, plan for breaking containment at cessation of operations. Purge equipment prior to breaking containment. Plug / cap tanks, pipework, flanges, connections etc. after breaking containment. Regular inspection of storage tanks, pipework, flanges and connections for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Well Site Supervisor
HH-019	Crude Oil Storage Tanks Atmospheric Vent Stack: <ul style="list-style-type: none"> VOC scrubber installed 	Vapours Containing VOCs: (Vapours assessed as containing very low volumes of VOCs)	Production Operations: <ul style="list-style-type: none"> Planned breaking of containment 	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Installation of VOC Scrubber. Monitor levels to prevent overfilling / spillage. Minimise flow through vents. Ensure connections to storage tanks fitted correctly. Competent operators. Equipment to be serviced / maintained. Regular inspection of storage tank connections and pipes for failure or leaks. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Well Site Supervisor
HH-020	Crude Oil Storage Tanks Atmospheric Vent Stack: <ul style="list-style-type: none"> VOC scrubber installed 	Vapours Containing VOCs: (Vapours assessed as containing very low volumes of VOCs)	Production Operations: <ul style="list-style-type: none"> Equipment failure 	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Installation of VOC Scrubber. Monitor levels to prevent overfilling / spillage. Minimise flow through vents. Ensure connections to storage tanks fitted correctly. Competent operators. Equipment to be serviced / maintained. Regular inspection of storage tank connections and pipes for failure or leaks. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Well Site Supervisor
HH-021	Crude Oil Storage Tanks Atmospheric Vent Stack: <ul style="list-style-type: none"> VOC scrubber not installed 	Vapours Containing VOCs: (Vapours assessed as containing very low volumes of VOCs)	Crude Oil Transfer Operations: <ul style="list-style-type: none"> Transfer crude oil from storage tank to road transport vehicle Back venting vapours containing VOCs during transfer / loading and unloading of crude oil 	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Monitor levels to prevent overfilling / spillage. Minimise flow through vents. Ensure connections to storage tanks fitted correctly. Competent operators. Equipment to be serviced / maintained. Regular inspection of storage tank connections and pipes for failure or leaks. Personnel inducted / trained on emergency response procedures. Installation of VOC Scrubber. Monitor levels to prevent overfilling / spillage. Minimise flow through vents. Ensure connections to storage tanks fitted correctly. Competent operators. Equipment to be serviced / maintained. Regular inspection of storage tank connections and pipes for failure or leaks. Personnel inducted / trained on emergency response procedures. Use of secondary containment systems / bunds. Monitor levels to prevent overfilling / spillage. Ensure connections to storage tanks fitted correctly. Minimise flow through vents. Use enclosed tanks where possible. Avoid direct sunlight on open tanks. Increase humidity to reduce evaporation. Reduce air flow over surface of fluids. Control acidity / alkalinity to make more soluble in water and therefore reduce likelihood of evaporation. Reduce surface areas of fluids to minimise evaporation rate. Equipment to be serviced / maintained. Regular inspection of storage tank connections and pipes for failure or leaks. Remove odorous fluids offsite where possible for odour treatment prior to disposal. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. 	Not Significant	Well Site Supervisor
HH-022	Crude Oil Storage Tanks Atmospheric Vent Stack: <ul style="list-style-type: none"> VOC scrubber installed 	Vapours Containing VOCs: (Vapours assessed as containing very low volumes of VOCs)	Crude Oil Transfer Operations: <ul style="list-style-type: none"> Transfer crude oil from storage tank to road transport vehicle Back venting vapours containing VOCs during transfer / loading and unloading of crude oil 	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Installation of VOC Scrubber. Monitor levels to prevent overfilling / spillage. Minimise flow through vents. Ensure connections to storage tanks fitted correctly. Competent operators. Equipment to be serviced / maintained. Regular inspection of storage tank connections and pipes for failure or leaks. Personnel inducted / trained on emergency response procedures. Use of secondary containment systems / bunds. Monitor levels to prevent overfilling / spillage. Ensure connections to storage tanks fitted correctly. Minimise flow through vents. Use enclosed tanks where possible. Avoid direct sunlight on open tanks. Increase humidity to reduce evaporation. Reduce air flow over surface of fluids. Control acidity / alkalinity to make more soluble in water and therefore reduce likelihood of evaporation. Reduce surface areas of fluids to minimise evaporation rate. Equipment to be serviced / maintained. Regular inspection of storage tank connections and pipes for failure or leaks. Remove odorous fluids offsite where possible for odour treatment prior to disposal. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. 	Not Significant	Well Site Supervisor
HH-023	Chemical Storage: <ul style="list-style-type: none"> Storage tanks Associated pipework Flanges / Connections 	Chemicals: <ul style="list-style-type: none"> Hydrochloric Acid Spent Hydrochloric Acid 	Drilling Operations / Well Maintenance Operations / Production Operations: <ul style="list-style-type: none"> Storage of Hydrochloric Acid Storage of spent Hydrochloric Acid 	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Use of secondary containment systems / bunds. Monitor levels to prevent overfilling / spillage. Ensure connections to storage tanks fitted correctly. Minimise flow through vents. Use enclosed tanks where possible. Avoid direct sunlight on open tanks. Increase humidity to reduce evaporation. Reduce air flow over surface of fluids. Control acidity / alkalinity to make more soluble in water and therefore reduce likelihood of evaporation. Reduce surface areas of fluids to minimise evaporation rate. Equipment to be serviced / maintained. Regular inspection of storage tank connections and pipes for failure or leaks. Remove odorous fluids offsite where possible for odour treatment prior to disposal. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. 	Not Significant	Well Site Supervisor

HH-036	Storage / Process Areas: • COSHH Store • Work Areas	Chemicals: (Includes VOCs from vapours) • Engine oils • Hydraulic oils • Gear oils / Lubricants • Hydrochloric Acid (15%) • Site maintenance chemicals	Chemical Storage Operations: • Decanting chemicals	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Use of alternative non-odorous chemicals where possible. Use of secondary containment systems / bunds / drip trays. Containers are to be sealed immediately after use. Decanting / transfer of chemicals to be conducted inside buildings where possible. Spillages to be remediated as soon as reasonably practicable. Inspection of storage and work areas for signs of spillages. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Well Site Supervisor
HH-037	Waste Storage Areas: • Open Skips • Enclosed Skips • IBCs • Waste Receptacles	Non-extractive Wastes: • Engine oils • Hydraulic oils • Gear oils / Lubricants • Hydrochloric Acid (15%) • Site maintenance chemicals • Used chemical containers • General waste • Wood	Waste Storage Operations: • Storage of waste prior to offsite disposal	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Where required, use of secondary containment systems / bunds. Monitor waste levels to prevent overfilling / spillage. Segregation of waste. Equipment to be serviced / maintained. Regular inspection of waste skips and waste receptacles for failure or leaks. Competent operators. Personnel inducted / trained on waste management procedures. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Waste Management Contractor / Well Site Supervisor
HH-038	Waste Storage Areas: • Open Skips • Enclosed Skips • IBCs • Waste Receptacles	Non-extractive Wastes: • Engine oils • Hydraulic oils • Gear oils / Lubricants • Hydrochloric Acid (15%) • Site maintenance chemicals • Used chemical containers • General waste • Wood	Waste Storage Operations: • Equipment failure	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Where required, use of secondary containment systems / bunds. Waste skips / waste receptacles protected. Equipment to be serviced / maintained. Regular inspection of waste storage tanks, pipework, flanges and connections for failure or leaks. Competent operators. Personnel inducted / trained on waste management procedures. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Waste Management Contractor / Well Site Supervisor
HH-039	Waste Storage Areas: • Site sewage tank(s)	Non-extractive Wastes: • Sewage • Waste water	Waste Storage Operations: • Storage of waste prior to offsite disposal	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Where required, use of secondary containment systems / bunds. Monitor waste levels to prevent overfilling / spillage. Personnel inducted on waste procedures. Segregation of waste. Equipment to be serviced / maintained. Regular inspection of waste skips and waste receptacles for failure or leaks. Competent operators. Personnel inducted / trained on waste management procedures. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Waste Management Contractor / Well Site Supervisor
HH-040	Waste Storage Areas: • Site sewage tank(s)	Non-extractive Wastes: • Sewage • Waste water	Waste Storage Operations: • Planned breaking of containment	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Where possible, plan for breaking containment at cessation of operations. Purge equipment prior to breaking containment. Plug / cap tanks, pipework, flanges, connections etc. after breaking containment. Regular inspection of storage tanks, pipework, flanges and connections for failure or leaks. Competent operators. Personnel inducted / trained on waste management procedures. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Waste Management Contractor / Well Site Supervisor
HH-041	Waste Storage Areas: • Site sewage tank(s)	Non-extractive Wastes: • Sewage • Waste water	Waste Storage Operations: • Equipment failure	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Where required, use of secondary containment systems / bunds. Tanks and associated pipework protected. Equipment to be serviced / maintained. Regular inspection of waste storage tanks, pipework, flanges and connections for failure or leaks. Competent operators. Personnel inducted / trained on waste management procedures. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Waste Management Contractor / Well Site Supervisor
HH-042	Waste Storage Areas: • Site sewage tank(s)	Non-extractive Wastes: • Sewage • Waste water	Waste Transfer Operations: • Transfer of sewage and waste water to road tanker haulage vehicle	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Ensure correct connections. Pipes used within the transfer to be capped after use. Tanks sealed after transfer. Transfer operations monitored by site personnel. Equipment to be serviced / maintained. Regular inspection of connections and pipes for failure or leaks during transfer. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Waste Haulier / Well Site Supervisor
HH-043	Power Generation: • Diesel Generators	Partially Combusted Gases: • Natural gas • Volatile Organic Compounds (VOCs)	Drilling Operations / Well Maintenance Operations / Production Operations / Well Abandonment Operations: • Combustion of natural gas for onsite power generation	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Equipment to be serviced / maintained. Regular inspection of exhaust system for failure or leaks. Competent operators. Personnel inducted/trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Well Site Supervisor
HH-044	Power Generation: • Diesel Generators	Combustion Products from Incineration of Natural Gas: • Volatile Organic Compounds (VOCs) from exhaust emissions	Drilling Operations / Well Maintenance Operations / Production Operations / Well Abandonment Operations: • Combustion of natural gas for onsite power generation	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Equipment to be serviced / maintained. Regular inspection of exhaust system for failure or leaks. Competent operators. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Well Site Supervisor
HH-045	Power Generation: • Diesel Generators	Uncombusted Gases: • Natural gas	Drilling Operations / Well Maintenance Operations / Production Operations / Well Abandonment Operations: • Planned breaking of containment	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Where possible, plan for breaking containment operations at cessation of operations. Purge equipment prior to breaking containment. Plug / cap tanks, pipes, hoses etc. after breaking containment. Regular inspection of connections and pipes for failure or leaks. Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. Competent operators. Personnel inducted / trained on emergency response procedures. 	Not Significant	Well Site Supervisor
HH-046	Power Generation: • Diesel Generators	Uncombusted Gases: • Natural gas • Volatile Organic Compounds (VOCs)	Drilling Operations / Well Maintenance Operations / Production Operations / Well Abandonment Operations: • Equipment failure	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Generators and associated pipework protected. Equipment to be serviced / maintained. Regular inspection of generators, connections and pipes for failure or leaks. Competent operators. Personnel inducted / trained on emergency response procedures. 	Not Significant	Well Site Supervisor
HH-047	Various - within the site boundary	Potential Odour Emitting Products (Includes VOCs from vapours)	Spillages: • Wellbore Fluids • Fuels • Chemicals • Waste materials / products	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Low	Low	Low	<ul style="list-style-type: none"> Use of secondary containment systems / portable bunds / drip trays. Spillages to be remediated as soon as reasonably practicable. Where practicable, use of vacuums to remediate spillages. Used spillage equipment to be segregated and contained prior to offsite disposal. Competent operators. Personnel inducted / trained on waste management procedures. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	All Site Personnel
HH-048	Unplanned Venting • Enclosed Ground Flare	Uncombusted Gases: • Natural gas • Volatile Organic Compounds (VOCs)	Drilling Operations / Well Maintenance Operations / Production Operations / Well Abandonment Operations: • No ignition on pilot light for disposal of gas.	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Very Low	Medium	Low	<ul style="list-style-type: none"> Use of recognised standards on flare flare. Flare pilot light on prior to delivery of wellbore fluids. Competent flare operators. Installation and leak testing of flare equipment prior to commission. Equipment to be serviced / maintained. Regular inspection of connections and pipes for failure or leaks. Personnel inducted / trained on emergency response procedures. Employ odour masking if necessary. Identification of short term or long term odour sources. 	Not Significant	Flare Operator / Well Site Supervisor

HH-049	Catastrophic Failure	Wellbore Fluids: <ul style="list-style-type: none"> • Natural gas • Crude Oil / Condensate • Produced water 	Drilling Operations / Well Maintenance Operations / Production Operations / Well Abandonment Operations: Containment failure of tanks and other surface equipment.	Special Areas of Conservation (SAC) Local Nature Reserves Sensitive Receptors: Households / Businesses Water Features Surrounding Environment (Wellsite surface and wellsite subsurface soils, surface water, groundwater and atmosphere)	Air - Prevailing winds from south west (average statistics from the Met Office)	Very Low	Medium	Low	<ul style="list-style-type: none"> • Use of secondary containment systems / bunds. • Ensure connections to storage tanks fitted correctly. • Pressure test equipment prior to use. • Equipment to be serviced / maintained. • Regular inspection of storage tanks, connections and pipes for failure or leaks. • Equipment to be tested for leaks (Snoop Tested) as per Leak Detection Programme. • Personnel inducted / trained on emergency response procedures. • Employ odour masking if necessary. • Emergency procedures established and well to be shut in to stop flow. 	Not Significant	Well Site Supervisor
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Horse Hill Well Site Receptors

Receptor Type	Search Radius	Name	Distance from Site	Direction from Site	Grid Reference	Name	Distance from Site	Direction from Site	Grid Reference
RAMSAR	10km								
Special Areas of Conservation (SAC)	10km	Mole Gap to Reigate Escarpment	8.00 km	North	TQ 25011 51693				
Special Protection Areas (SPA)	10km								
Marine Protection Areas (MPA)	10km								
Sites of Special Scientific Interest (SSSI)	2km								
Scheduled Ancient Monuments	2km								
National Nature Reserves	2km								
Local Nature Reserves	2km	Edolphs Copse	1.69 km	Southwest	TQ 23909 42410				
Local Wildlife Sites	2km								
Sensitive Receptors: Households / Businesses	2km	Wrays Farm House	0.32	East	TQ 25610 43624	Wrays Wood	0.36 km	North	TQ 25295 44030
		Five Acres	0.34	East	TQ 25577 43493	Sunny Acres Farm	1.27 km	Northeast	TQ 26030 44800
		High Trees	0.34	North	TQ 25404 43948	Ingleside Dwellings	1.27 km	Southeast	TQ 26465 43074
		Wrays Farm	0.39	East	TQ 25708 43528	Sidlow Manor	1.28 km	North	TQ 25525 44898
		Rushmeads	0.4	Southeast	TQ 25708 43294	Duxhurst Lane	1.32 km	North	TQ 25431 45019
		Rushmeads Cottage	0.42	Southeast	TQ 25604 43287	Duxhurst Farm	1.33 km	North	TQ 25479 44941
		Wrayswood	0.45	North	TQ 25234 44087	Duxhurst Cottages	1.34 km	North	TQ 25197 44980
		Lomond	0.49	Southeast	TQ 25727 43456	Nuthurst Farm	1.37 km	Northeast	TQ 26030 44800
		Phoenix Lodge	0.5	Northwest	TQ 24838 43967	Rose Cottage Farm	1.37 km	Northwest	TQ 23934 44139
		Oakwood	0.5	North	TQ 25135 44137	Clifton Cottage Farm	1.37 km	West	TQ 23842 43846
		Rowgardens Wood	0.53	Northwest	TQ 24654 43804	Edolph Lodge	1.40 km	Southwest	TQ 24490 42334
		Horse Hills Farm	0.54	North	TQ 25127 44175	Edolphs Farm	1.40 km	Southwest	TQ 24345 42370
		Brittleware Farm	0.63	Southwest	TQ 24629 43274	Moat Farm	1.43 km	Northeast	TQ 26348 44596
		Collendean Farm	0.65	Northwest	TQ 24661 43997	Nutley Dean Business Park	1.44 km	Northwest	TQ 24164 44635
		Lincoln Lodge	0.66	North	TQ 25235 44302	Hookwood Manor	1.46 km	Southeast	TQ 26538 42807
		North Lodge	0.71	Northeast	TQ 25713 44213	Gatwick Business Park	1.47 km	Southeast	TQ 26420 42624
		Ferriers Grange	0.72	East	TQ 26021 43549	Ridgewood Stud	1.49 km	North	TQ 25016 45106
		Greenstead Hall Farm	0.72	Southwest	TQ 24671 43067	Horley	1.51 km	Northeast	TQ 26684 44252
		Rowgarth	0.72	West	TQ 24489 43707	Spartan Green Farm	1.52 km	West	TQ 23737 43138
		Wrays	0.74	Northeast	TQ 25784 44203	Crutchfield Cottages	1.53 km	Northeast	TQ 26113 44950
		Witherow Farm	0.75	North	TQ 25419 44380	Hookwood Lodge	1.54 km	Southeast	TQ 26695 42927
		Woodland Farm	0.8	East	TQ 26107 43744	Chantersluer Lodge	1.54 km	Northwest	TQ 23706 43993
		Little Wrays	0.8	Northeast	TQ 25861 44204	Hookwood	1.55 km	Southeast	TQ 26586 42720
		Crutchfield Farm	0.81	Northeast	TQ 25928 44137	Cams Farm	1.57 km	Southeast	TQ 26391 42447
		Derrinabrin Farm	0.82	Southwest	TQ 24558 43048	Horseshoe Farm	1.62 km	Northeast	TQ 26145 45023
		Oaklodge	0.83	East	TQ 26119 43663	Duxhurst	1.63 km	Northeast	TQ 25802 45179
		Khan Yunus	0.86	Northeast	TQ 26052 44049	Johnsons Common	1.66 km	Southwest	TQ 24410 42095
		Ferriers Forge	0.87	Southeast	TQ 26124 43311	Nutleydean Farm Cottage	1.66 km	Northwest	TQ 23897 44653
		Rosewood Cottage	0.88	Southeast	TQ 26123 43277	Green Farm Cottage	1.67 km	Northeast	TQ 25875 45208
		Oakside	0.92	East	TQ 26211 43517	Little Chantersluer	1.69 km	West	TQ 23572 44031
Crutchfield Brae	0.95	Northeast	TQ 25672 44505	Whitegates	1.70 km	Southeast	TQ 26859 42920		
Norwood Hill				Cherry Tree Farm	1.71 km	Northwest	TQ 23603 44232		
• Dwelling off Collendean Lane			0.95	West	TQ 24258 43690	Wolvers Home Farm	1.72 km	North	TQ 25056 45353

• The Morgans	1.03	Southwest	TQ 24221 43248	Ridgefield House	1.77 km	Southwest	TQ 23615 42767
• Roundabout Cottage	1.36	West	TQ 23839 43586	Hookwood Cottage	1.78 km	East	TQ 26356 43397
• Norwood Hill House	1.42	West	TQ 23788 43235	Willowdene	1.79 km	Southeast	TQ 26932 42869
The Lodge	0.96	East	TQ 26256 43525	Chantersluer Farm	1.79 km	Northwest	TQ 23435 43878
Roundwood Lodge	0.99	North	TQ 25278 44637	Lower Duxhurst Farm	1.80 km	Northeast	TQ 26107 45240
Hops Lodge	0.99	East	TQ 26293 43716	Ricketts Wood	1.80 km	Southwest	TQ 23460 43069
Dwellings on Reigate Road				Drummond House	1.82 km	Southwest	TQ 23472 42993
• Place of Worship	0.99	East	TQ 26188 44032	Little Mynthurst Farm	1.82 km	Northwest	TQ 23650 44586
• 31 Reigate Road	1.23	Northeast	TQ 26262 43883	Little Deeping Farm	1.86 km	Southeast	TQ 26188 41938
Spencers	1.03	South	TQ 25022 42529	Wolvers Home	1.87 km	North	TQ 24918 45483
Roundwood	1.08	North	TQ 25278 44721	Charwood Place	1.90 km	Southwest	TQ 24357 41848
Recycling Site	1.09	Northeast	TQ 25960 44510	Povey Cross Farm	1.91 km	Southeast	TQ 26692 42275
Westlands Farm	1.15	Southeast	TQ 26332 43076	Ricketts Wood Cottages	1.95 km	Southwest	TQ 23384 42859
Hopps House	1.16	East	TQ 26446 43718	Norwood Place Farm	1.96 km	Northwest	TQ 23435 44495
Hookwood House	1.17	Southeast	TQ 26427 43279	Deanoak Cottage	2.00 km	Northwest	TQ 24442 45461
Farmfield Hospital	1.24	Southeast	TQ 25788 42431	Longfield House	2.00 km	West	TQ 23216 43317

 HORSE HILL DEVELOPMENTS LTD	HORSE HILL DEVELOPMENTS LTD	HHDL-EPR-HHP-OMP-009	
	Odour Management Plan	Revision: 2	Date: 23/11/20

APPENDIX 2 – SUPPORTING DOCUMENTATION

 HORSE HILL DEVELOPMENTS LTD	HORSE HILL DEVELOPMENTS LTD	HHDL-EPR-HHP-OMP-009	
	Odour Management Plan	Revision: 2	Date: 23/11/20

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ODOUR REPORT FORM

Site:		Date:	
Time:		Location of odour:	
Weather Conditions		Wind Direction:	
Wind Strength:		Temperature:	
Intensity of the Odour:	1 – Very faint odour <input type="checkbox"/>	2 – Faint odour <input type="checkbox"/>	3 – Distinct odour <input type="checkbox"/>
	4 – Strong odour <input type="checkbox"/>	5 – Very strong odour <input type="checkbox"/>	6 – Extremely strong odour <input type="checkbox"/>
Odour Release Point Identified:		Constant or intermittent odour:	
Receptor sensitivity:	Low (e.g. footpath, road) <input type="checkbox"/>	Medium (e.g. industrial) <input type="checkbox"/>	High (e.g. housing, hotel etc.) <input type="checkbox"/>
Is the source of the odour evident:		Description of the Odour:	
Activities being undertaken:		Odorous Substance Identified:	
Emission Points Sampled:		Method of Sampling:	
Method of Sample Preservation:		Laboratory undertaking sample analysis:	
Details of Sample Analysis:			
Odour Control Measures:			

Other comments or observations:

Sketch a plan of where the odour was reported and any potential odour sources:

Name:		Company:	
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Signature:	
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HHDL Odour Complaint #			
Time of complaint:		Date of complaint:	
Name of complainant:			
Address of complainant:			
Telephone number of complainant:			

Date of odour:		Time of odour:	
Location of odour:			
Weather Conditions		Temperature:	
Wind Direction:		Wind Strength:	
Complainants description of the odour:			
What does it smell like?			
Intensity of the Odour:	0 – No Odour	1 – Very faint odour	2 – Faint odour
	3 – Distinct odour	4 – Strong odour	5 – Very strong odour
	6 – Extremely strong odour		
Duration of the odour:			
Does the complainant have any other comments about the odour?			
Constant or intermittent in this period or persistence:			
Are there any other complaints relating to the installation, or to that location? (either previously or relating to the same exposure):			
Any other relevant information:			
Do you accept that the odour is likely to be from your activities:			
What was happening on site at the time the odour occurred:			
Operating conditions at time the odour occurred:			



Actions taken:

Name:

Company:

Date:

Time:

Signature:

ODOUR DIARY FORM

Name:			Address:			
Telephone Number:						
Date of odour:						
Time of odour:						
Location of odour:						
Weather Conditions:						
Temperature:						
Wind Strength:						
Wind Direction:						
What does it smell like:						
How unpleasant is it:						
Do you consider this smell offensive:						
Intensity of the odour (see below):						
Duration of odour:						
Odour constant or intermittent:						
Odour constant or intermittent:						
What do you believe the source / cause to be:						
Any actions taken or other comments:	0 – No Odour		1 – Very faint odour		2 – Faint odour	
	3 – Distinct odour		4 – Strong odour		5 – Very strong odour	
	6 – Extremely strong odour					