Cloughton 2 Wellsite

Site Condition Report

Environmental Permitting (England and Wales) Regulations 2016

- **Application for a Bespoke Mining Waste Operation**
- **Application for a Bespoke Installation**
- **Application for a Bespoke Groundwater Activity**

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250424	Initial issue for an Application for a Mining Waste Operation with Flare, a Mining Waste Facility and a Groundwater Activity	Tony Fildes (Zetland Group)	Jamie McGill (Europa)	Alastair Stuart (Europa)

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1. PURPOSE AND CONTEXT

This Site Condition Report forms part of an application to the Environment Agency to authorise the undertaking of specific 'permitted activities' at the Cloughton 2 Wellsite (herein referred to as the 'Wellsite'). With regards to onshore oil and gas operations, a number of activities are considered applicable to the environmental permitting regime.

The Wellsite within which the 'permitted activities' are undertaken is considered a 'regulated facility' under The Environmental Permitting (England and Wales) Regulations 2016, as amended (EPR2016) [Ref.1].

The purpose of the Site Condition Report is to set out the current condition of the Wellsite prior to the undertaking of the proposed operations by Europa Oil & Gas Limited (herein referred to as the 'Operator').

The Operator is proposing to construct a wellsite ~0.34 km southeast of Burniston, a village and civil parish in the Scarborough borough of North Yorkshire, England.

The Wellsite will be constructed to accommodate the drilling of an appraisal borehole to evaluate the potential for dry natural gas accumulations within the target formations, namely the Carboniferous Sandstones (primary target formation), and the Permian Brotherton Limestone (Plattendolomite) and the Kirkham Abbey (Hauptdolomite) formations (secondary target formations).

An application to the Environment Agency is being proposed under EPR2016 to apply for a 'Mining Waste Operation and Mining Waste Facility with Fracturing and Flare' and for a 'Groundwater Discharge Activity', as defined by reference 1.8.8 and 1.3.12 respectively of the Environment Agency (Environmental Permitting and Abstraction Licensing) (England) Charging Scheme [Ref.2].

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

All figures included in this document, for example, volumes, tonnages, distances represent best estimates at the time of document production, and may change, as operations develop.

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2. SCOPE

This Site Condition Report is applicable to the Cloughton 2 Wellsite and all operations conducted therein. It is applicable to the Operator, its contractors and subcontractors and may be used in support of an application to the Environment Agency for an environmental permit under EPR2016.

This Site Condition Report has been produced following the Environment Agency H5 guidance [Ref.3] and is broken down into three sections covering:

I. **Application Section** – Issued as part of an application for an environmental permit for the purpose of demonstrating the condition of the land, groundwater and air prior to proposed development.

II. **Operational Section** – Maintained throughout the lifetime of the 'regulated facility' and includes details of the as built site (including embedded pollution mitigation) and environmental sampling and analysis data.

III. **Surrender Section** – Summarises the impact the 'regulated activity' has had on the environment by comparing the baseline and operational sampling and analysis report. It also provides details on any pollution incidents that may have occurred and the remediation taken.

As the purpose of this Site Condition Report is for a new bespoke environmental permit application, and for the purpose of demonstrating the condition of the land, groundwater and air prior to the proposed development, Section I has been included only.

Section II and Section III will be completed and issued to the Environment Agency as part of an application to surrender the environmental permit issued by the Environment Agency.

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3. Abbreviations and Definitions

%:	Percentage
~:	Approximately
AOD:	Above Ordnance Datum
AONB:	Areas of Outstanding Natural Beauty
AQIA:	Air Quality Impact Assessment
BAP:	Biodiversity Action Plan
BGS:	British Geological Survey
CIRIA:	The Construction Industry Research and Information Association
EPR2016:	The Environmental Permitting (England and Wales) Regulations 2016, as amended
FRA:	Flood Risk Assessment
Groundwater Activity:	Has the meaning given within Regulation 2 of EPR2016
Groundwater Discharge Activity:	Has the meaning given within Regulation 2 of EPR2016
ha:	Hectare
HDPE:	High Density Polyethylene
HIA:	Hydrogeological Impact Assessment
IED:	Industrial Emissions Directive
Installation Activity:	Has the meaning given within Regulation 2 of EPR2016
JAGDAG:	Joint Agencies Groundwater Directive Advisory Group
Km:	Kilometre
LNR:	Local Nature Reserves
LTA:	Long-Term Average
m^3:	Cubic Metre
m:	Metre
mAOD:	Metres Above Ordnance Datum
mbgl:	Metres Below Ground Level

mm:	Millimetre
Mining Waste Facility:	Has the meaning given within Regulation 2 of EPR2016
Mining Waste Operation:	Has the meaning given within Regulation 2 of EPR2016
NGR:	National Grid Reference
NNR:	National Nature Reserves
NNW:	North-Northwest
Operating Technique:	Documents approved by the regulator to ensure compliance with the issued permit
Operator:	Has the meaning given within Regulation 7 of EPR2016
Permitted Activities:	Any activity or operation defined within Schedule 1 to 29 of EPR2016
Regulated Facility:	Has the meaning given within Regulation 8 of EPR2016
RSPB:	Royal Society for the Protection of Birds
SAC:	Special Areas of Conservation
SE:	Southeast
SFRA:	Strategic Flood Risk Assessment
SPA:	Special Protection Areas
SPZ:	Source Protection Zone
SSE:	South-Southeast
SSSI:	Sites of Special Scientific Interest
SW:	Southwest
UK:	United Kingdom
WR11:	Environment Agency's form for 'Notice of the intention to drill for minerals'

Table 1: Abbreviations and Definitions

SECTION I – CONDITION AT APPLICATION

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4. SITE DETAILS

The proposed wellsite is located in the countryside in the county of North Yorkshire. It is centred on grid reference TA 02081 92802 and located at the following address:

Cloughton 2 Wellsite
Land east of The Mill Yard
Burniston Mill
Coastal Road
Burniston
Scarborough
YO13 0DB

Figure 1: Cloughton 2 Wellsite – Proposed (Source: Google Earth 28/08/2024)

4.1 Site Location Plan and Site Layout Plan

A number of site plans have been provided within Site Plans (04 – Site Plans) and details the extent of the Wellsite, including its location, site layouts and point source emissions.

A copy of the following plans are provided within the Site Plans document (04 – Site Plans) provided in support of the environmental permit application.

- 04A – ZG-EOG-CLTN-EPR-04-01 Location Plan 10000 Scale A3
- 04B – ZG-EOG-CLTN-EPR-04-02 Location Plan 2500 Scale A3
- 04C – ZG-EOG-CLTN-EPR-04-03 Site Layout Plan - Indicative Construction Phase 500 Scale A3
- 04D – ZG-EOG-CLTN-EPR-04-04 Site Layout Plan - Indicative Drilling Phase 500 Scale A3
- 04E - ZG-EOG-CLTN-EPR-04-05 – Site Layout Plan - Indicative Proppant Squeeze Phase with Workover Rig 500 Scale A3
- 04F - ZG-EOG-CLTN-EPR-04-06 – Site Layout Plan - Indicative Proppant Squeeze Phase with Coil Tubing Unit 500 Scale A3
- 04G – ZG-EOG-CLTN-EPR-04-07 Site Layout Plan - Indicative Well Testing Phase 500 Scale A3
- 04H – ZG-EOG-CLTN-EPR-04-08 Extent of Mining Waste Facility Plan 10000 Scale A3

5. CONDITION OF THE LAND AT PERMIT ISSUE

5.1 Sources of Information

The Site Condition Report has been compiled using a range of information sources, including:

- Multi-Agency Geographic Information for the Countryside (MAGIC) website [Ref.4]; and
- British Geological Survey [Ref.5].

For clarity, all figures included in this document, for example, distances and areas, represent best estimates at the time of document production, and may change, as operations develop.

5.2 Environmental Setting

The proposed Wellsite currently comprises farmland adjacent to an existing ground-mounted solar photovoltaic array. The Wellsite lies to the south east of the village of Burniston and is accessed from the A165 Coastal Road. The Wellsite falls within Burniston Parish Council and covers an area of approximately 1.2 ha.

The Wellsite lies within a rural area. However, there are a number of industrial units served by the existing access track to the south. An animal feed mill, served by a separate access, lies 200m to the southwest of the Wellsite.

The Wellsite is partially screened by existing woodland on its southern boundary and intermittent (gappy) hedgerows to the wider field boundaries to the north sides.

The Wellsite lies at approximately 57m AOD on the northern edge of the Wellsite and falls in a southerly direction to around 49m AOD in the southern part of the Wellsite.

The closest residential receptors are:

- Wayside Farm – 280m West; and
- Burniston – 310m West.

Other residential properties nearest to the 'Wellsite' are provided within Table 2.

Residential Receptor	Distance from Site	Direction from Site
Ians Field Farm	0.77 Km	South
Cliff Top House	0.94 Km	Northeast

Table 2: Residential Receptors Located within 1 Km of the 'Wellsite'

Details of receptors identified within 2 Km and 10 Km of the Wellsite are provided within the Environmental Risk Assessment (07 – Environmental Risk Assessment) provided in support the environmental permit application.

5.3 Designated Sites

A search of the Multi-Agency Geographic Information for the Countryside (MAGIC) website was undertaken to identify statutory receptors within 10 Km and 2 Km of the 'Wellsite'. The search resulted in five (5) designated receptors, which are provided within Table 3.

Receptors	Search Radius	Name	Distance from Site	Direction from Site	Grid Reference (Edge)
Special Areas of Conservation (SAC)	**10 Km**	Beast Cliff - Whitby (Robin Hoods Bay)	6.04 Km	North	TA 00520 98710
		North York Moors	7.58 Km	Northwest	TA 97485 98904
			9.03 Km	Northwest	TA 94765 98147

Receptors	Search Radius	Name	Distance from Site	Direction from Site	Grid Reference (Edge)
Special Protection Areas (SPA)	**10 Km**	North York Moors	7.58 Km	Northwest	TA 97485 98904
			9.03 Km	Northwest	TA 94765 98147
		Flamborough and Filey Coast	9.36 Km	Southeast	TA 09017 86446
SPA (Marine)	**10 Km**	Flamborough and Filey Coast	9.36 Km	Southeast	TA 09017 86446
RAMSAR	**10 Km**	No Receptors Found	-	-	-
SAC (Marine)	**10 Km**	No Receptors Found	-	-	-
Marine Conservation Zones	**10 Km**	No Receptors Found	-	-	-
World Heritage Sites	**10 Km**	No Receptors Found	-	-	-
Areas of Outstanding Natural Beauty (AONB)	**10 Km**	No Receptors Found	-	-	-
Sites of Special Scientific Interest (SSSI)	**2 Km**	Iron Scar and Hundale Point to Scalby Ness	0.64 Km	East	TA 02711 93128
			1.11 Km	Southeast	TA 02866 91953
			1.39 Km	Northeast	TA 02766 94133
National Parks	**2 Km**	North York Moors	0.81 Km	North	TA 02075 93717
			0.82 Km	Northwest	TA 01480 93448
Scheduled Ancient Monuments	**2 Km**	Post-medieval dovecote 40mk south of Cloughton Hall	1.77 Km	Northwest	TA 00881 94190
Local Nature Reserves (LNR)	**2 Km**	No Receptors Found	-	-	-
National Nature Reserves (NNR)	**2 Km**	No Receptors Found	-	-	-
National Forest	**2 Km**	No Receptors Found	-	-	-
RSPB Reserves	**2 Km**	No Receptors Found	-	-	-
Registered Battlefields	**2 Km**	No Receptors Found	-	-	-
Registered Parks and Gardens	**2 Km**	No Receptors Found	-	-	-
Wood Pastures and Parkland BAP Priority Habitat	**2 Km**	No Receptors Found	-	-	-

Table 3: MAGIC Desktop Study Results – Designated Sites

5.4 Geological Setting

An Hydrogeological Impact Assessment (HIA) which includes a Flood Risk Assessment (FRA) has been undertaken by the Operator's Environmental Water Management Consultant. The HIA and FRA (08 – Hydrogeological Impact Assessment) has assessed the impact from the proposed development on the water environment.

Baseline conditions of the water environment were defined by collating and analysing existing data, field observations, a site walkover and communication with the client. The baseline conditions refer to the area in its current existing state, not the natural, pre-human intervention conditions. The potential effects of the development on the extant water environment have been assessed, and mitigation measures have been proposed where appropriate.

Section 5.4.1 to Section 5.7.7 have been extracted from the HIA and FRA. Drawings referenced within these sections are provided within the HIA.

A copy of the HIA is included within the Hydrogeological Impact Assessment (08 – Hydrogeological Impact Assessment) provided in support the environmental permit application.

5.4.1 Regional

Superficial deposits, predominantly comprising glacial-related material, occur extensively within the region. Most of these are diamicton, the primary component of which is assumed to be clay-rich. British Geological Survey (BGS) data indicates that the thickness of the superficial deposits is between 20m to 30m. Alluvium deposits are generally confined to valleys and round the headwaters of watercourses. Beach and Tidal Flat deposits occur at the shoreline to the east.

The bedrock in the region comprises a vertically extensive sequence of Middle and Upper Jurassic sedimentary strata. The lithology predominantly comprises mudstone, with sandstone, siltstone and argillaceous limestones also occurring within the sequence. They have a uniform easterly dip. They are primarily elastic, although calcareous strata are also present.

The superficial and bedrock geology are shown in Drawings 3729/HIA/05 and 3729/HIA/06, respectively. The latter is taken from the 1:50,000-scale BGS geological sheets 35 & 44 for Whitby and Scalby. The geological succession is summarised in Table 4.

Geological Succession in the Region		
Formation (Fm)	**Lithology**	**Thickness**
Superficial		
Alluvium	Clay, silt, sand, and gravel	Thin- variable
Beach, Tidal-Flat Deposits	Shingle, sand, silt and clay	Thin- variable
Till	Diamicton	20m – 30m
Bedrock		
Cayton Clay Formation	Dark grey, soft clay and mudstone laminated in part, silty at the top	Up to 3m
Long Nab Member	Laminated grey mudstones and siltstones with planar bedded sandstone	Up to 60m
Moor Grit Member	Grey, medium to coarse-grained trough cross-bedded sandstone	8m – 12m
Scarborough Formation	Fossiliferous argillaceous calcareous mudstone, siltstone	Up to 30m
Gristhorpe Member	Grey mudstone, yellow-grey siltstone and yellow fine sandstone	Up to 30m

Table 4: Geological Succession in the Region

Geological faulting in the area has a predominant north-to-northwest orientation. Younger rocks of Jurassic age are in contact with older rocks due to faulting.

The geological feature targeted by the appraisal drilling is the Cloughton anticline, a NNW /SSE-trending feature with significant dip closure in all directions, where previously 60m of Carboniferous net sandstone was found.

5.4.2 Local

The local superficial geology predominantly comprises glacial deposits characterised by firm, stiff, brown sandy clay with angular gravel sandstone and mudstone pockets.

The local bedrock geology is the Long Nab Member of the Scalby Formation. *"It comprises grey laminated mudstones and siltstones with yellow-grey, fine- to medium-grained, planar-bedded and cross-stratified sandstones. Trough cross-bedded channel-fill sandstones are also present. Plant fragments, plant rootlets and drifted wood casts are common, with occasional thin coals and grey mudstone seatearths..."*

The Long Nab member is up to 60m thick. The 8m to 12m thick Moor Grit Member, comprises grey, medium to coarse-grained trough cross-bedded sandstone and occurs beneath the uppermost bedrock strata at the site. This, in turn, occurs above the Scarborough Formation and the Gristhorpe Formation; these two formations consist of a) limestone, calcareous mudstone, siltstone and b) grey mudstone, yellow-grey siltstone and yellow fine sandstone, respectively.

The four formations described above constitute a variable sequence of sedimentary strata dominated by argillaceous deposits. Their combined maximum thickness is approximately 130m, and their base is 150m below the surface, assuming a 20m thickness of superficial deposits. It is considered that the active groundwater system is substantially less than this depth; therefore, the deeper strata that the proposed drilling would encounter are not considered further.

5.5 Hydrogeological Setting

5.5.1 General

The hydrogeology at the site can be divided between superficial deposits and an underlying system within the sedimentary bedrock strata.

The superficial glacial diamicton deposits are classified by the Environment Agency as Secondary (undifferentiated) Unproductive Aquifers. This means that they are largely unable to provide usable water supplies and are unlikely to have surface water and wetland ecosystems dependent on them. However, sand and gravel pockets within the clay mass can lead to local perched aquifers in this unit - as evidenced by active springs nearby (250m to the northeast) and local borehole evidence. Details are provided in Table 5.

Selected BGS Boreholes				
BGS ID	**X, Y Coordinates**	**Elevation (mAOD) / distance (Km)**	**Water Strike (mbgl)**	**Geology – (mbgl)**
TA09S W242	501483 492650	40.5 / 0.54 SW	2.9	Alluvium 0 – 3.3 Glacial Diamicton 3.3 – 15
TA09S W191	502628 492199	49.4 / 0.77 SE	5	Topsoil 0 – 0.2
			4.5	Sandy Clay 0.2 – 5.5
			(Rest Groundwater Level)	Sand, Clay and Gravel 5.5 – 8.4 Clay 8.4 – 20

Table 5: Selected BGS Boreholes

The bedrock comprises a vertically extensive sequence of predominantly argillaceous sediments. The aquifer properties of the mudstones and siltstones are considered likely to be 'poor', with relatively small volumes of groundwater storage and low rates of groundwater flow. Slightly larger volumes of water could be expected within coarser deposits.

The lithology of the sequence is such that a multi-layered aquifer system with restricted vertical groundwater movement is anticipated.

A borehole drilled for the Scarborough Revised Bathing Water Directive (BH1-7-01, NGR: TA 03448 90543), 2.6 Km to the southeast, indicates that groundwater is derived from sandstone layers within the Long Nab Member at around 33 and 42 mbgl. In this borehole, two horizons, approximately 1m – 1.5m thick, were installed with a screen

The Environment Agency classifies the Jurassic bedrock as a Secondary A aquifer, which can support local water supplies and may form an essential source of baseflow to rivers.

The groundwater flow direction from regional geological mapping and cross-sections can be inferred to be eastwards.

Groundwater vulnerability mapping suggests a medium degree of vulnerability to surface-level pollutant discharge.

5.5.2 Licenced Abstractions

One licensed groundwater abstraction is located within a 3 Km radius of the site. It is 2.36 Km to the southeast and is used for 'spray irrigation' at the Scarborough North Cliff Golf Club. The licence allows a maximum abstraction of 3,000 m^3 per annum and 70 m^3 per day.

5.5.3 Unlicensed Abstractions

North Yorkshire Council has no records of unregulated private water supplies within a 3 Km radius of the centre of the Wellsite.

5.5.4 Source Protection Zones

The Wellsite is not within a Source Protection Zone (SPZ) for a public water supply.

5.6 Conceptual Hydrogeology

The hydrogeology at the site can be broadly subdivided into an upper unit within the superficial deposits above a laterally and vertically extensive sequence of sedimentary strata.

The superficial geology comprises a 20m to 30m thickness of glacially-derived diamicton, a predominantly clay-rich material. It is considered that the volume of groundwater within the superficial deposits and the flow rate through them will be minimal. Isolated sand pockets and silts are likely to occur within the superficial deposits and may store and convey small volumes of near-surface groundwater. The arenaceous sections of the superficial deposits are considered likely to source the springs which occur sporadically in the area.

The bedrock strata consist of a sequence of sedimentary strata of differing lithologies. Most nearer surface bedrock strata comprise argillaceous (clay-rich) units interbedded with thinner limestones, siltstones and sandstones. The whole sequence is considered to form an aquifer system with significantly greater horizontal than vertical permeability.

Based upon the strata dip and ground elevations, the overall groundwater flow direction within the bedrock is anticipated to be broadly eastwards. Egress of some groundwater from the aquifer will occur from the coastal cliffs to the east of the site.

The active zone of groundwater movement is considered likely to occur within the top 150m of the bedrock. Compaction with increasing depth will rapidly reduce the fracture sizes and associated secondary permeability of the bedrock aquifer system.

The low permeability characteristics of the superficial aquifer and the small volumes of water that are anticipated to be present within it are such that there is not anticipated to be any hydraulic connectivity between groundwater within the surface and bedrock aquifers.

5.7 Hydrology

5.7.1 Rainfall

Monthly rainfall data between 1999 and 2020 was obtained from the Meteorological Office for the Scarborough climate station located at Spring Hill Lane (NGR: TA 02921 87522). The Scarborough climate station is part of the Met Office's Climate Stations network and is close to the application site. The long-term average (LTA) annual rainfall is 705 mm.

The LTA monthly rainfall for this period is shown in Table 6.

Average Monthly Total rainfall (1990 – 2020) – Scarborough Climate Station												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (mm)	57	49	45	50	45	66	57	70	57	68	73	68

Table 6: Average Monthly Total rainfall (1990 – 2020) – Scarborough Climate Station

5.7.2 Watercourses

The site is located within the catchment of the River Derwent, which is situated approximately 5.7 Km southwest of the site boundary at its closest approach.

The closest watercourse to the site is the Burniston Beck, located approximately 115m southwest of the site's entrance. This watercourse flows south-eastwards, becoming the Cow Wath Beck before discharging into the Scalby Beck (Sea Cut), 2 Km south of the site. Daily river flow data is available for the Scalby Beck monitoring station (Grid Reference Location TA0271290737).

A small drainage ditch runs northwest to south-east, approximately 180m southwest of the centre of the site, between the photovoltaic panel array field and the Mill Yard Industrial units.

Another small drainage ditch is located on the southeast border of the site, southeast of the woodland and discharges into the Burniston Beck.

The locations of the water features described are shown in Drawing 3729/HIA/02.

5.7.3 Waterbodies

A small pond is located approximately 100m to the southwest of the centre of the site, immediately to the south of the photovoltaic panel array. Another small pond is located 80m north of the site's entrance. At least 20 other smaller ponds are present within a 3 Km radius of the site boundary.

5.7.4 Springs

Seven springs have been identified on OS mapping within a 3 Km radius of the site. Two are located upstream of the site, around the Burniston Beck and its tributaries. Several springs form headwaters of local watercourses, including the Lindhead Beck, Quarry Beck and Cloughton Beck.

The closest spring to the site is located 250m to its northeast, at an elevation of 49 mAOD. The remainder of the springs are located at some distance from the site. The locations of the springs are shown in Drawing 3729/HIA/02.

5.7.5 Surface Water Abstractions

North Yorkshire Council holds no records of unregulated private water supplies within a 3 Km radius of the centre of the site.

The Environment Agency holds no records of surface water abstractions in the area.

5.7.6 Surface Water Discharge Consents

Twenty-eight discharge consents to surface waterbodies exist within a 3 Km radius of the centre of the site; the closest is located 0.38 Km northeast of the site, at Flatts Farm. Six permits for discharge to groundwater through infiltration in drainage fields and soakaways exist within a 3 Km radius of the site. Their locations are shown on Drawing 3729/HIA/02.

5.7.7 Flooding

The site is located within an area designated as Flood Zone 1 by the Environment Agency.

A Flood Risk Assessment (FRA) compliant with the statutory requirements of the National Planning Policy Framework (NPPF) (December 2023) and associated Planning Practice Guidance (PPG) for Flood Risk and Coastal Change (last updated August 2022) has been undertaken due to the nature and scale of the development and the area of the application site boundary. Fluvial and surface water flood risk zones are shown on Drawings 3729/HIA/03 and 04.

The Northeast Yorkshire Strategic Flood Risk Assessment (SFRA) produced in March 2006 by Arup and updated in 2010 mapped the coastal area between Burniston and Filey as a soil zone where the dominant soil type is slowly permeable, seasonally wet, slightly acid but baserich loamy and clayey soils, indicating that this type of soil is prone to slight waterlogging.

The 1:250 000 scale reconnaissance soil map of the area (Soil Survey, 1983) shows the whole of the site to be mapped as soils of the Salop Association. Salop Association soils are briefly described by the Soil Survey (1983) as 'Slowly permeable seasonally waterlogged reddish fine loamy over clayey, fine loamy and clayey soils associated with fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging.

Therefore, waterlogging is possible in winter months.

5.8 Pollution History

5.8.1 Pollution Incidents Affecting the Land or Controlled Waters

There are no recorded pollution incidents that may have affect the land prior to the commencement of the development.

5.8.2 Historical Land Uses and Associated Contaminants

Two historic landfills or active waste sites are located within a 3 Km radius of the site centre. The closest and largest of them is 0.6 Km southwest of the centre of the site and is associated with the Burniston Household Waste and Recycling Centre. The second is 1.2 Km south of the main site area off the Coastal Road.

5.9 Visual and Olfactory Evidence of Existing and Historic Contamination

There is no visual or olfactory evidence relating to either existing or historic contamination prior to the commencement of the development.

5.9.1 Evidence of damage to pollution prevention measures

Prior to the development of the 'Wellsite', no pollution prevention measures were in place.

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6. PERMITTED ACTIVITIES

6.1 Permitted Activities

The proposed wellsite has yet to be constructed and does not currently hold an environmental permit. No permitted activities are authorised under EPR2016.

6.2 Current Operational Status (Pre-Application)

The proposed Wellsite currently comprises farmland adjacent to an existing ground-mounted solar photovoltaic array. The Wellsite lies to the south east of the village of Burniston and is accessed from the A165 Coastal Road. The Wellsite falls within Burniston Parish Council and covers an area of approximately 1.2 ha.

The Wellsite lies within a rural area. However, there are a number of industrial units served by the existing access track to the south. An animal feed mill, served by a separate access, lies 200m to the southwest of the Wellsite.

The Wellsite is partially screened by existing woodland on its southern boundary and intermittent (gappy) hedgerows to the wider field boundaries to the north sides.

The Wellsite lies at approximately 57m AOD on the northern edge of the Wellsite and falls in a southerly direction to around 49m AOD in the southern part of the Wellsite.

The closest residential receptors are:

- Wayside Farm – 280m; and
- Burniston – 310m.

The proposal is to construct a temporary Wellsite within an enclosed and secure compound to drill an appraisal borehole. Should natural gas be encountered as predicated, the drilling rig will be demobilised from the Wellsite and the intention is then to undertake a production test. If natural gas is not encountered during the drilling phase, the appraisal borehole will be decommissioned (abandoned) in accordance with industry guidance, the drilling rig and associated equipment then removed from the Wellsite and the Wellsite restored to its former condition.

6.3 Proposed Development

The Operator is proposing to undertake four (4) phases of development as illustrated within Table 7.

Phase	Description	Approximate Timescale
Phase 1	Construction of the Wellsite	7 weeks
Phase 2	Operational Phase (Includes the drilling phase and demobilisation on completion of drilling operations)	8 weeks
Phase 3	Operational Phase (Testing)	(up to) 17 weeks
Phase 4	Site Restoration	6 weeks

Table 7: Phases of Development

Phase 1 – Wellsite Construction

Construction of the Wellsite will be undertaken during Phase 1 and will include construction of an access track, site clearance works, well cellar and hard standing construction.

The active area of the Wellsite hardstanding will be constructed with a perimeter containment ditch and underlaid with a fully welded HDPE environmental membrane. The environmental membrane and perimeter containment ditch ensures that any accidental spillages that may occur during the subsequent phases of operation are contained within the Wellsite.

Phase 2 – Drilling Operation

The second phase of the development is the drilling of an appraisal borehole, which will penetrate the soils from the well cellar. The appraisal borehole will be drilled to the target formations, taking rock samples as the drilling progresses and geophysical logging will then be acquired. If natural gas is encountered and is considered suitable for further testing, production casing will be installed in the borehole.

Phase 3 – Production Testing

Contingent upon natural gas being encountered during the drilling phase, the third phase of the development is to undertake a proppant squeeze to stimulate the well by creating new localised fractures near to the wellbore, improving the formations permeability.

The proppant squeeze will involve pumping of 300m^3 to 500m^3 of carrier fluid (predominantly water) and proppant into the target reservoir followed by a short period of flowback (proppant carrier fluid recovery) and well clean up.

The proppant squeeze, falls within the definition of a 'groundwater activity under Schedule 22 of EPR2016 and will be considered a groundwater activity for the purpose of EPR2016, namely the injection of any substance into groundwater to increase the flow of fluids or gas to a well or borehole in connection with the extraction or use of any energy source. As such, the proppant squeeze will require a permit.

Mining Waste Facility

During the proppant squeeze, ~50% to 70% of the proppant carrier fluid will be retained within the target formation, having been adsorbed on the charged, high surface area minerals.

As the proppant carrier fluid is retained within the formation, an application for a mining waste facility is being applied for. For clarity, the mining waste facility will not be located at the Wellsite, it will be located in excess of 2.0 Km below ground and up to 1.6 Km distance (deviated borehole). It will extend c.80m in height, c.200m in length and 1 – 2mm in width within the target formation where the proppant fluid will remain.

Phase 4 Wellsite Restoration

The fourth phase of the development is wellsite restoration.

Wastes generated during wellsite restoration phase are not considered extractive wastes and, therefore, not detailed within this application.

6.4 Non-Permitted Activities

Additional activities associated with the development, but not regulated under EPR2016 as a 'permitted activity' includes, but is not limited to:

- Car parking for staff vehicles;
- Provision of welfare facilities for site staff;
- Well and wellsite maintenance; and
- Storage and disposal of non-hazardous and hazardous wastes not directly associated with the permitted activities.

7. ENVIRONMENTAL LEGISLATION AND APPLICABILITY

The proposed Wellsite has yet to be constructed and does not currently hold an environmental permit. No permitted activities are authorised under EPR2016.

7.1 Proposed Permitted Activities

The Wellsite will be the subject of several activities which, under current environmental legislation, requires an environmental permit. The Environment Agency regulate all permitted activities under the Environmental Permitting (England and Wales) Regulations 2016, as amended (EPR2016). Under EPR2016, Operators are required to submit environmental permit applications to the Environment Agency to seek approval to undertake such activities.

Onshore oil and gas developments are the subject of the environmental permitting regulations, and as such a number of environmental permits will be required to be obtained from the Environment Agency.

The Waste Management Plan (05 - Waste Management Plan) provided in support of the environmental permit application, provides details on the proposed operations to be conducted at the Wellsite and provides an explanation as to which permitted activities will be required/applied for.

7.2 Environmental Permitting (England and Wales) Regulations 2016

The Environment Agency regulates all permitted activities under EPR2016 and require Operators to submit environmental permit applications to seek approval to undertake such activities. The Operator has assessed the activities associated with the proposed operations and considers certain activities to fall in scope of EPR2016 and therefore require the necessary environmental permits.

7.2.1 Industrial Emissions Activity

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

7.2.1.1 Incineration of Natural Gas

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

Part A(1)

- The incineration of hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity exceeding 10 tonnes per day.

The proposed production testing phase may involve the incineration of natural gas exceeding 10 tonnes per day and therefore an installation permit is being applied for.

7.2.2 Mining Waste Operation including a Mining Waste Facility

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

In order to drill, test and undertake well treatments from the proposed Cloughton-2 Well, it is necessary to apply for an environmental permit for a mining waste operation (which includes a flare, mining waste facility and a small fracture operation).

The 'mining waste operation' will consider the extractive waste volumes and waste streams created as a result of both the drilling process and any subsequent testing and well treatment operations.

In addition, the Operator is proposing to undertake a proppant squeeze, which will also require a 'mining waste facility' which permits the permanent storage of waste at the Wellsite, which in the case of the proposed development is the permanent disposal of proppant carrier fluid into the target formation.

7.2.3 Groundwater Activity

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

There is a need, due to the low permeability of the primary and secondary target formations, to undertake a proppant squeeze to stimulate the well by creating new localised fractures near to the wellbore, improving the formations permeability.

The proppant squeeze will involve pumping of 300m^3 to 500m^3 of carrier fluid (predominantly water) and proppant into the target reservoir followed by a short period of flowback (proppant carrier fluid recovery) and well clean up.

The proppant squeeze, falls within the definition of a 'groundwater activity under Schedule 22 of EPR2016 and will be considered a groundwater activity for the purpose of EPR2016, namely the injection of any substance into groundwater to increase the flow of fluids or gas to a well or borehole in connection with the extraction or use of any energy source. As such, the proppant squeeze will require a permit.

This activity falls within the definition of a 'groundwater activity under Schedule 22 of EPR2016. The proppant squeeze has been designed such that it will be confined to the saturated formations, which contain hydrocarbons.

The proppant squeeze is a 'groundwater activity', namely the injection of any substance into groundwater to increase the flow of fluids or gas to a well or borehole in connection with the extraction or use of any energy source, therefore, a groundwater activity permit is being applied for.

7.3 Water Resources Act 1991 (as amended by the Water Act 2003)

Under Section 199 of the Water Resources Act 1991 (as amended by the Water Act 2003), a notice of the intention to construct or extend a boring for the purpose of searching for or extracting minerals must be submitted to the Environment Agency using form WR11.

The WR11 requires that a method statement, including drilling and casing designs, together with storage and use of chemicals and drilling muds, accompanies the WR11 application form.

The Cloughton-2 Well will be the subject of an individual WR11 application.

8. RISKS POSED TO THE ENVIRONMENT AND HUMAN HEALTH

The risks posed by the 'mining waste operation' have been addressed within an Environmental Risk Assessment (07 – Environmental Risk Assessment) which forms part of any application to the Environment Agency and is considered an 'operating technique'.

The Environmental Risk Assessment (which is qualitative) considers activities which have the potential to cause harm to the environment and human health (pollution damage).

The Environmental Risk Assessment has concluded that the risk to the Environment and Human Health is 'insignificant' not least due to the type of activities being undertaken, the nature of the waste and the mitigation measures adopted by the Operator.

The Environmental Risk Assessment follows the Environment Agency's source-pathway-receptor' model and includes the risks posed from the site operations in relation to:

- Accidents & Incidents;
- Air Emissions;
- Noise and Vibration;
- Odour Emissions;
- Releases to Surface Water;
- Releases to Groundwater;
- Visible Emissions;
- Climate Change; and
- Global Warming Potential.

A copy of the Environmental Risk Assessment (07 – Environmental Risk Assessment) is provided in support of the environmental permit application.

In addition, the Operator has employed the services of specialist consultants to address the risks posed specifically to air, groundwater, surface water and noise. Each impact assessment / risk assessment will be verified by the Environment Agency as part of the permit determination process.

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9. MEASURES TAKEN TO PROTECT THE LAND

9.1 Impermeable Liner and Containment Systems

Construction of the Wellsite will be undertaken during Phase 1 and will include construction of an access track, site clearance works, well cellar and hard standing construction.

The active area of the Wellsite hardstanding will be constructed with a perimeter containment ditch and underlaid with a fully welded HDPE environmental membrane. The environmental membrane and perimeter containment ditch ensures that any accidental spillages that may occur during the subsequent phases of operation are contained within the Wellsite.

9.2 Well Cellar Integrity Testing

The construction of the well cellar within the centre of the 'active area' of the Wellsite, forms a containment area from which the well will be drilled, whilst also housing the wellhead. A concrete drilling pad will be constructed at surface, immediately surrounding the well cellar.

Once the well cellar has been completed an integrity test will be carried out to confirm its integrity. The test consists of filling the cellar with water and monitoring water loss over a period of 24 hours. The water level is marked on the side wall of the cellar using marker dye to provide a reference point. The cellar is then covered to avoid both water fill (precipitation) and water loss through evaporation.

If no water loss within the drilling cellar is observed, the well cellar will be considered integral. This test will be repeated in line with the Operators procedures.

9.3 Materials and Storage

Dedicated CIRIA C736 [Ref.6] compliant bunds will be installed where required to act as secondary containment for the storage and handling of substances, in particular hazardous materials and produced water.

Spill kits will be available on site and close to identified pollution sources (e.g. fuel storage areas).

All oil containers, secondary containers and vehicles will be visually inspected on a daily basis to check for signs of damage, corrosion, bulging, leaks or unauthorised use.

No refuelling of plant and equipment will take place without the use of a drip tray and where practicable undertaken in close proximity to spill kits.

Emergency response plans for the site will also be established whilst also considering plans to manage any spills.

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10. POLLUTION INCIDENTS TO LAND

There are no recorded pollution incidents that may have affect the land prior to the commencement of the development.

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11. ENVIRONMENTAL MONITORING

To ensure that operations conducted at the Wellsite do not cause an adverse impact on the environment, the Operator shall undertake environmental monitoring in accordance with the methodologies presented to the Environment Agency.

This Section provides details of the environmental monitoring, which for clarity consists of sampling and analysis of a number of environmental parameters including:

- Air;
- Groundwater;
- Surface Water; and
- Soils.

The results of environmental monitoring will be issued to the Environment Agency in accordance with the requirements set out within the environmental permit.

11.1 Air Quality Monitoring

The Operators Air Quality Consultant has undertaken an Air Quality Impact Assessment (AQIA) (11 – Air Quality Impact Assessment) provided in support of the environmental permit application.

The AQIA has assessed the impact from the development including from the incineration of waste gases on air quality and dust from the construction activities.

The AQIA has assessed the air quality effects from the installation and the use of the proposed shrouded ground flare at the Wellsite as 'negligible'.

There is a risk of fugitive releases of natural gas during drilling and well testing operations. There is potential for Sulphur compounds within the fugitive releases which are potentially odorous. An Odour Impact Assessment has concluded that fugitive releases pose a negligible risk to loss of amenity due to odour at the nearest residential neighbours.

The AQIA has also assessed that the impact from dust from all proposed development operations will be 'negligible'.

The Operator is proposing a scheme of air quality monitoring to be undertaken at the Wellsite. The scheme will consist of three (3) rounds of air quality monitoring to establish a baseline, followed by subsequent rounds of air quality monitoring to be undertaken at intervals agreed with the Environment Agency in accordance with the requirements set out within the environmental permit.

11.2 Groundwater Quality Monitoring

The Operator is proposing to construct three (3) groundwater quality monitoring boreholes within the Wellsite to enable sampling of the shallow groundwater bodies underlying the Wellsite.

Following construction of the groundwater quality monitoring boreholes, the Operator is proposing a scheme of groundwater quality monitoring to be undertaken at the Wellsite.

The scheme will consist of three (3) rounds of groundwater quality monitoring to establish a baseline, followed by subsequent rounds of groundwater quality monitoring to be undertaken at intervals agreed with the Environment Agency in accordance with the requirements set out within the environmental permit.

11.3 Surface Run-off Water

Surface run-off water contained within the perimeter ditch will be tested prior to being transported offsite by a licensed road haulier to an Environment Agency licensed waste water treatment / waste water disposal facility.

If the results of the test identify that the surface run-off water is contaminated from any site spillages, arrangements will be made for the surface run-off water to be transported offsite by a licensed road haulier to a relevant Environment Agency permitted waste treatment facility.

11.4 Soil Analysis

The Operator is proposing to undertake soil sampling analysis to establish a good reference point as to the condition of the land underneath the Wellsite, which should be the target condition upon eventual site restoration.

The soil sampling and analysis will form the basis of a Ground Investigation Report which will be utilised as a baseline prior to the commencement of the development.

REFERENCES

1. The Environmental Permitting (England and Wales) Regulations 2016

   Available at: https://www.legislation.gov.uk/uksi/2016/1154/contents/made

2. Environment Agency (Environmental Permitting and Abstraction Licensing) (England) Charging Scheme

   Available at: https://www.gov.uk/government/publications/environmental-permits-and-abstraction-licences-tables-of-charges

3. Environment Agency, 2013, Guidance for Applicants H5: Site Condition Report – Guidance and Templates [Version: 3.0]

   Available at: https://www.gov.uk/government/publications/environmental-permitting-h5-site-condition-report

4. Multi-Agency Geographic Information for the Countryside

   Available at: https://magic.defra.gov.uk/MagicMap.aspx

5. British Geological Survey (BGS) Maps and Resources

   Available at: https://www.bgs.ac.uk/discovering-geology/maps-and-resources/maps/

6. CIRIA (2014). Containment Systems for the Prevention of Pollution [C736].

   Available at: https://www.ciria.org/