1. Abbreviations and Definitions

Definitions for the Environmental Risk Assessment	
Activity / Event	The specific operation being undertaken relating to the proposed hazard and risk.
Hazard	The hazards category i.e. type of emission.
Source	The pollutants from the activity taking place such as flaring.
Pathway	The pathway the pollutant is taking such as air or unsaturated zones.
Receptor	Those who it may have an adverse effect on i.e. surrounding residents, wildlife and habitats, designated sites.
Exposure Probability	The chance of the hazard occurring without taking into account mitigation measures.
Impact Severity	The impact of the hazard should it occur without taking into account mitigation measures.
Risk Magnitude	A hazard that has been assessed and has been given a risk rating level pre-mitigation measures.
Risk Management	Mitigation measures that will be put in place to control the risks so far as reasonably practicable.
Residual Risk	A hazard that has been assessed and has been given a risk rating level post mitigation measures.
Not Significant	The severity, together with the likelihood of the risk is not expected to cause any harm to the environment.
Low	The severity, together with the likelihood of the risk has low potential to cause harm to the environment.
Medium	The severity, together with the likelihood of the risk has moderate potential to cause harm to the environment.
High	The severity, together with the likelihood of the risk has a high potential to cause harm to the environment.

Table 1: Definitions

2. Methodology

The structure of the Environmental Risk Assessment follows the Environment Agency online guidance and uses a model known as the 'Source-Pathway-Receptor' model. The Environmental Risk Assessment shall:

- Identify the risk from the site;
- Assess risks and checking they are acceptable;
- Justify appropriate measures to control the risk (if needed); and
- Present the findings of the risk assessment.

The Environmental Risk Assessment has included the following categories which have been reviewed for applicability within the proposed operations.

- 02 - Accidents.
- 03 - Air Emissions.
- 04 - Noise and Vibration.
- 05 - Odour Emissions.
- 06 - Releases to Surface Water.
- 07 - Releases to Groundwater.
- 08 - Visible Emissions.
- 09 - Fugitive Emissions.
- 10 - Climate Change
- 11 - Global Warming Potential.

3. Scoring Criteria

In order to establish a risk rating for each Source-Pathway-Receptor (S-P-R) linkage both the Likelihood (Exposure Probability) and Consequence (Impact Severity) have been issued with a score using Table 2 and Table 3 respectively. The score is used in conjunction with Table 4 to provide an overall risk rating of the activity. All scores and risk ratings are provided on the basis that the mitigation measure are not in place.

The Residual Risk uses the same scoring system but does consider the proposed mitigation measures.

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 2: Scoring System Likelihood

Consequence	Descriptor
Very Low	Slight environmental effect that does not exceed a regulatory standard.
Low	Minor environmental effect, may breach a regulatory standard, localised to the point of release with no significant impact.
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 3: Scoring System Consequence

The risk matrix presented in Table 4 provides a risk rating for each S-P-R linkage identified within this Environmental 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 4: Risk Matrix

Environmental 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 5 below.

Consequence	Acceptable	Descriptor
Not Significant	Acceptable	Near-certain that an incident will not occur, or the consequences would not be significant.
Low	Acceptable	Unlikely an incident will occur, or the consequences would be minor confined to the immediate area.
Medium	Tolerable	Activity can only take place provided that impacts are localised and risk remediation is readily
High	Unacceptable	The risk must be further reduced before the activity can commence.

Table 5: Risk Rating Definition

Statutory and Designated Receptors	Search Radius	Name	Distance from Site	Direction from Site	Grid Reference	Area (Ha)
Special Areas of Conservation (SAC)	**10 Km**	Beast Cliff-Whitby (Robin Hoods Bay)	6.04 Km	North	TA 00520 98710	265.38
		North York Moors	7.58 Km	Northwest	TA 97485 98904	44,094.41
			9.03 Km	Northwest	TA 94765 98147	
Special Protection Areas (SPA)	**10 Km**	North York Moors	7.58 Km	Northwest	TA 97485 98904	44,094.41
			9.03 Km	Northwest	TA 94765 98147	
		Flamborough and Filey Coast	9.36 Km	Southeast	TA 09017 86446	7,857.99
Special Protection Areas (Marine)	**10 Km**	Flamborough and Filey Coast	9.36 Km	Southeast	TA 09017 86446	7,857.99
RAMSAR	**10 Km**	No Receptors Found	-	-	-	-
Special Areas of Conservation (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	116.87
			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	144,100
			0.82 Km	Northwest	TA 01480 93448	
Scheduled Ancient Monuments (SAM)	**2 Km**	Post-medieval dovecote 40mk south of Cloughton Hall	1.77 Km	Northwest	TA 00881 94190	0.005
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	-	-	-	-

Statutory and Designated Receptors	Search Radius	Name	Distance from Site	Direction from Site	Grid Reference	Area (Ha)
Wood Pastures and Parkland BAP Priority Habitat	**2 Km**	No Receptors Found	-	-	-	-
		No Receptors Found	-	-	-	-
Local Nature Reserves (LNR)	**2 Km**	No Receptors Found	-	-	-	-

Sensitive Receptors	Search Radius	Name	Distance from Site	Direction from Site	Grid Reference	Area (Ha)
Sensitive Receptors: Households / Businesses	**2 Km**	Blue Star Welding & Maintenance	0.15 Km	West	TA 01884 92670	-
		Building housing: • Alonzecustom • Craft Beer Direct • Secondary Developments Custom Speed Shop	0.19 Km	West	TA 01875 92627	-
		Scarborough and Burniston CRE	0.23 Km	West	TA 01813 92625	-
		Wayside Farm	0.28 Km	West	TA 01793 92571	-
		Burniston	0.31 Km	West	TA 01639 92760	-
		Water Treatment Works	0.66 Km	Southeast	TA 02560 92289	-
		Ians Field Farm	0.77 Km	South	TA 01981 91975	-
		Cliff Top House	0.94 Km	Northeast	TA 02465 93766	-
		Westfield Farm	1.02 Km	Northwest	TA 01486 93716	-
		Swarthlands Farm	1.06 Km	Southwest	TA 01063 92214	-
		Cloughton Fields Cottage	1.14 Km	North	TA 02012 94035	-
		Scalby Lodge	1.26 Km	South	TA 02597 91593	-
		Fields Farm	1.30 Km	North	TA 01900 94184	-
		Scarborough RUFC	1.42 Km	Southwest	TA 01393 91469	-
		Cloughton	1.54 Km	Northwest	TA 01044 94029	-
		Scarborough	1.67 Km	South	TA 02244 91078	-
		Highlands Farm	1.97 Km	Northwest	TA 00138 93551	-

Surface Water Features	Search Radius	Name	Distance from Site	Direction from Site	Grid Reference	Area (Ha)
Surface Water Features	2 Km	Body of Water	0.09 Km	Southwest	TA 01968 92687	-
		Field Drain	0.12 Km	West	TA 01892 92662	-
		Field Drain	0.22 Km	North	TA 02115 93110	-
		Body of Water	0.24 Km	West	TA 01728 92701	-
		Body of Water	0.29 Km	South	TA 02011 92448	-
		Burniston Beck	0.38 Km	West	TA 01570 92760	-
		Body of Water	0.59 Km	Northwest	TA 01458 93091	-
		Body of Water	0.66 Km	Southeast	TA 02726 92530	-
		Body of Water	0.74 Km	South	TA 01876 92030	-
		Body of Water	0.82 Km	Northwest	TA 01483 93446	-
		North Sea	0.86 Km	East	TA 03002 92753	-
		Body of Water	0.95 Km	West	TA 01003 92748	-
		Body of Water	0.98 Km	North	TA 02359 93839	-
		Body of Water	0.99 Km	North	TA 01671 93770	-
		Body of Water	1.08 Km	Southwest	TA 01734 91700	-
		Body of Water	1.12 Km	Southwest	TA 01224 91925	-
		Body of Water	1.20 Km	Southwest	TA 01163 91866	-
		Body of Water	1.25 Km	West	TA 00730 92545	-
		Body of Water	1.32 Km	South	TA 02374 91453	-
		Body of Water	1.37 Km	North	TA 02112 94260	-
		Body of Water	1.43 Km	Southeast	TA 02713 91469	-
		Washy Cote Beck	1.44 Km	Southwest	TA 01103 91601	-
		Body of Water	1.55 Km	Northwest	TA 00767 93782	-
		Body of Water	1.68 Km	West	TA 00273 92738	-
		Body of Water	1.73 Km	Northwest	TA 00483 93686	-
		Body of Water	1.76 Km	Northwest	TA 00305 93404	-

Surface Water Features	Search Radius	Name	Distance from Site	Direction from Site	Grid Reference	Area (Ha)
Surface Water Features (cont.)	**2 Km**	Body of Water	1.77 Km	Northwest	TA 01134 94371	-
		Body of Water	1.83 Km	Northwest	TA 01171 94462	-
		Body of Water	1.86 Km	Northwest	TA 00316 93669	-
		Body of Water	1.88 Km	West	TA 00073 92812	-
		Body of Water	1.91 Km	Northwest	TA 00062 93058	-
Aquifers (Bedrock)	**2 Km**	Secondary A	Site located within designation			-
Aquifers (Superficial Drift)	**2 Km**	Secondary (undifferentiated)	Site located within designation			-
		Secondary A	0.32 Km	West	TA 01743 92437	-

Statutory and Designated Water Receptors	Search Radius	Safeguard Zone ID	Waterbody ID	Safeguard Zone Name	Source Protection Zone ID	Source Protection Zone Name	Source Protection Zone Number	Distance From site	Direction From site	Grid Reference
Drinking Water Safeguard Zones (Surface Water)	**2 km**	SWSGZ6008		Humber_SWSGZ6008_Elvington & Loftsome Bridge				Site located within designation		
Drinking Water Protected Areas (Surface Water)	**2 km**	No Receptors Found						-	-	-
Drinking Water Safeguard Zones (Groundwater)	**2 km**	No Receptors Found						-	-	-
Bathing Waters	**2 km**	No Receptors Found						-	-	-
Source Protection Zones	**2 km**	No Receptors Found						-	-	-

ID	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
	Source	Pathway	Receptor					
AC1	Transferring Substances: • Spillages. • Overfilling. • Incorrect Connections.	Vapours Carried on Wind. Flow by Gravity.	See Receptor Table.	Medium	Medium	Medium	COSHH Assessments and SDS sheets in place for hazardous substances. COSHH Items stored appropriately in accordance with SDS and regulations. Drip trays used for the transfer or decanting of fuel/small volume liquids such as engine oil. Emergency Response Plan for the site. Groundwater monitoring (to be) in place with results reported in accordance with EA permit. HDPE membrane is in place and the subject of visual inspection where possible. Hydrogeological Impact Assessment concludes no significant impact. Operations planned / designed to minimise transport and handling operations. Plant, tanks and pipework tested for leaks prior to first use to confirm integrity. Qualified and competent site supervisor appointed. Primary containment systems monitored / tested where required. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Secondary containment installed to prevent spill onto tertiary containment system (HDPE). Spillage response procedure for the site established. Suitable spillage kits available on site / transport vehicles. Where HDPE failure is suspected, non-intrusive testing shall be undertaken.	Not Significant
AC2	Poor Storage Arrangements of Hazardous Substances: • Poor management of chemicals resulting in leaks / evaporation / loss of product.	Vapours Carried on Wind. Flow by Gravity.	See Receptor Table.	Low	Medium	Medium	Chemicals segregated, stored correctly and sealed when not in use. Competent personnel only to store / use chemicals. COSHH Assessments and SDS sheets in place for hazardous substances. COSHH Items stored appropriately in accordance with SDS and regulations. Drip trays used for the transfer or decanting of fuel/small volume liquids such as engine oil. Emergency Response Plan for the site. Groundwater monitoring (to be) in place with results reported in accordance with EA permit. HDPE membrane is in place and the subject of visual inspection where possible. Hydrogeological Impact Assessment concludes no significant impact. Operations planned / designed to minimise transport and handling operations. Plant, tanks and pipework tested for leaks prior to first use to confirm integrity. Qualified and competent site supervisor appointed. Primary containment systems monitored / tested where required. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Secondary containment installed to prevent spill onto tertiary containment system (HDPE). Spillage response procedure for the site established. Suitable spillage kits available on site / transport vehicles. Where HDPE failure is suspected, non-intrusive testing shall be undertaken.	Not Significant
AC3	Incompatible Substances coming into contact. (Unwanted Reactions / Runaway Reactions).	Vapours Carried on Wind. Flow by Gravity.	See Receptor Table.	Very Low	Medium	Low	Chemicals segregated, stored correctly and sealed when not in use. Competent personnel only to store / use chemicals. COSHH Assessments and SDS sheets in place for hazardous substances. COSHH Items stored appropriately in accordance with SDS and regulations. Emergency Response Plan for the site. Fire awareness training / site induction for personnel. Fire points, extinguishers and a fire water tank located around the site. Groundwater monitoring (to be) in place with results reported in accordance with EA permit. HDPE membrane is in place and the subject of visual inspection where possible. Leak Detection and Repair Plan for the site. Local Fire & Rescue Service notified of operations. Operations planned / designed to minimise transport and handling operations. Plant, tanks and pipework tested for leaks prior to first use to confirm integrity. Plant, tanks and pipework capped / plugged after breaking containment. Primary containment systems monitored / tested where required. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Secondary containment installed to prevent spill onto tertiary containment system (HDPE). Where HDPE failure is suspected, non-intrusive testing shall be undertaken.	Not Significant

ID	S-P-R Linkage			Exposure	Impact	Risk	Risk Management	Residual
	Source	Pathway	Receptor	Probability	Severity	Magnitude		Risk
AC4	Fire Breakout: • Fire and Associated Fumes. • Use of Fire Water.	Vapours Carried on Wind. Flow by Gravity.	See Receptor Table.	Very Low	Medium	Low	Breaking containment of tanks and pipework systems shall minimised. Chemicals segregated, stored correctly and sealed when not in use. Competent personnel only to store / use chemicals. COSHH Assessments and SDS sheets in place for hazardous substances. COSHH Items stored appropriately in accordance with SDS and regulations. Emergency Response Plan for the site. Fire awareness training / site induction for personnel. Fire points, extinguishers and a fire water tank located around the site. Fire Risk Assessment shall be in place and will outline the control measure and procedures used to reduce the likelihood of a fire igniting. Gas detectors deployed with an alarm trigger of 5ppm / 7mg.m3 (EH40 WELs). Groundwater monitoring (to be) in place with results reported in accordance with EA permit. HDPE membrane is in place and the subject of visual inspection where possible. Leak Detection and Repair Plan for the site. Local Fire & Rescue Service notified of operations. Permit to work system implemented to authorise specific works i.e. hot/cold works. Plant, tanks and pipework tested for leaks prior to first use to confirm integrity. Plant, tanks and pipework cleaned / purged where possible prior to breaking containment. Primary containment systems monitored / tested where required. Qualified and competent site supervisor appointed. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Secondary containment installed to prevent spill onto tertiary containment system (HDPE). Security measures implemented at site. Spillage response procedure for the site established. Suitable spillage kits available on site / transport vehicles. Where HDPE failure is suspected, non-intrusive testing shall be undertaken.	Not Significant
AC5	Impact from Fire: • Fire and Associated Fumes. • Use of Fire Water.	Vapours Carried on Wind. Flow by Gravity.	See Receptor Table.	Very Low	Medium	Low	Breaking containment of tanks and pipework systems shall minimised. Chemicals segregated, stored correctly and sealed when not in use. Competent personnel only to store / use chemicals. COSHH Assessments and SDS sheets in place for hazardous substances. COSHH Items stored appropriately in accordance with SDS and regulations. Emergency Response Plan for the site. Fire awareness training / site induction for personnel. Fire points, extinguishers and a fire water tank located around the site. Fire Risk Assessment shall be in place and will outline the control measure and procedures used to reduce the likelihood of a fire igniting. Gas detectors deployed with an alarm trigger of 5ppm / 7mg.m3 (EH40 WELs). Groundwater monitoring (to be) in place with results reported in accordance with EA permit. HDPE membrane is in place and the subject of visual inspection where possible. Leak Detection and Repair Plan for the site. Local Fire & Rescue Service notified of operations. Permit to work system implemented to authorise specific works i.e. hot/cold works. Plant, tanks and pipework tested for leaks prior to first use to confirm integrity. Plant, tanks and pipework cleaned / purged where possible prior to breaking containment. Primary containment systems monitored / tested where required. Qualified and competent site supervisor appointed. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Secondary containment installed to prevent spill onto tertiary containment system (HDPE). Security measures implemented at site. Spillage response procedure for the site established. Suitable spillage kits available on site / transport vehicles. Where HDPE failure is suspected, non-intrusive testing shall be undertaken.	Not Significant

ID	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
	Source	Pathway	Receptor					
AC6	Containment Failure of Exploration and Well Test Equipment. • Storage Tanks. • Pipework. • Wellhead. • Separator. • Any Other Equipment.	Vapours Carried on Wind. Flow by Gravity.	See Receptor Table.	Medium	High	High	COSHH Assessments and SDS sheets in place for hazardous substances. COSHH Items stored appropriately in accordance with SDS and regulations. Emergency Response Plan for the site. Fire awareness training / site induction for personnel. Fire points, extinguishers and a fire water tank located around the site. Fire Risk Assessment shall be in place and will outline the control measure and procedures used to reduce the likelihood of a fire igniting. Gas detectors deployed with an alarm trigger of 5ppm / 7mg.m3 (EH40 WELs). Groundwater monitoring (to be) in place with results reported in accordance with EA permit. HDPE membrane is in place and the subject of visual inspection where possible. Leak Detection and Repair Plan for the site. Local Fire & Rescue Service notified of operations. Plant, tanks and pipework tested for leaks prior to first use to confirm integrity. Plant, tanks and pipework cleaned / purged where possible prior to breaking containment. Primary containment systems monitored / tested where required. Qualified and competent site supervisor appointed. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Secondary containment installed to prevent spill onto tertiary containment system (HDPE). Spillage response procedure for the site established. Suitable spillage kits available on site / transport vehicles. Where HDPE failure is suspected, non-intrusive testing shall be undertaken.	Not Significant
AC7	Surface Run-off Water: • Overfill of Site Containment Ditch resulting in unauthorised offsite discharge of non-contaminated water.	Flow by Gravity.	See Receptor Table.	Low	Medium	Medium	Drip trays used for the transfer or decanting of fuel/small volume liquids such as engine oil. Emergency Response Plan for the site. Groundwater monitoring (to be) in place with results reported in accordance with EA permit. HDPE membrane is in place and the subject of visual inspection where possible. No discharge activities are being proposed. Primary containment systems monitored / tested where required. Qualified and competent site supervisor appointed. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Routine visual check on the containment ditch by operatives. Secondary containment installed to prevent spill onto tertiary containment system (HDPE). Site designed to flood in the first instance before over spilling. Site located within Flood Zone 1 (<1 in 1,000 annual probability of flooding). Spillage response procedure for the site established. Suitable spillage kits available on site / transport vehicles. Where HDPE failure is suspected, non-intrusive testing shall be undertaken.	Not Significant
AC8	Surface Run-off Water: • Overfill of Site Containment Ditch resulting in unauthorised offsite discharge of contaminated water.	Flow by Gravity.	See Receptor Table.	Low	Medium	Medium	Drip trays used for the transfer or decanting of fuel/small volume liquids such as engine oil. Emergency Response Plan for the site. Groundwater monitoring (to be) in place with results reported in accordance with EA permit. HDPE membrane is in place and the subject of visual inspection where possible. No discharge activities are being proposed. Primary containment systems monitored / tested where required. Qualified and competent site supervisor appointed. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Routine visual check on the containment ditch by operatives. Secondary containment installed to prevent spill onto tertiary containment system (HDPE). Site designed to flood in the first instance before over spilling. Site located within Flood Zone 1 (<1 in 1,000 annual probability of flooding). Spillage response procedure for the site established. Suitable spillage kits available on site / transport vehicles. Where HDPE failure is suspected, non-intrusive testing shall be undertaken.	Not Significant

ID	S-P-R Linkage			Exposure	Impact	Risk	Risk Management	Residual
	Source	Pathway	Receptor	Probability	Severity	Magnitude		Risk
AC9	Onsite Spillages: • Percolation through near surface and deeper formation to groundwater bodies. • Percolation offsite through near surface and deeper formation to groundwater bodies.	Flow by Gravity.	See Receptor Table.	Medium	Medium	Medium	Drip trays used for the transfer or decanting of fuel/small volume liquids such as engine oil. Emergency Response Plan for the site. Groundwater monitoring (to be) in place with results reported in accordance with EA permit. HDPE membrane is in place and the subject of visual inspection where possible. Primary containment systems monitored / tested where required. Qualified and competent site supervisor appointed. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Routine visual check on the containment ditch by operatives. Secondary containment installed to prevent spill onto tertiary containment system (HDPE). Site designed to flood in the first instance before over spilling. Site located within Flood Zone 1 (<1 in 1,000 annual probability of flooding). Spillage response procedure for the site established. Suitable spillage kits available on site / transport vehicles. Where HDPE failure is suspected, non-intrusive testing shall be undertaken.	Not Significant
AC10	Vandalism • Various – acts of vandalism may cause fires, loss of containment from containers, damage to site equipment, etc.	Various - acts of vandalism may cause fires, loss of containment from containers, damage to site equipment, etc.	See Receptor Table.	Very Low	High	Low	Chemicals segregated, stored correctly and sealed when not in use. COSHH Assessments and SDS sheets in place for hazardous substances. COSHH Items stored appropriately in accordance with SDS and regulations. Emergency Response Plan for the site. Fire awareness training / site induction for personnel. Fire points, extinguishers and a fire water tank located around the site. Fire Risk Assessment shall be in place and will outline the control measure and procedures used to reduce the likelihood of a fire igniting. HDPE membrane is in place and the subject of visual inspection where possible. Local Fire & Rescue Service notified of operations. Secondary containment installed to prevent spill onto tertiary containment system (HDPE). Security measures implemented at site. Spillage response procedure for the site established. Suitable spillage kits available on site / transport vehicles. Where HDPE failure is suspected, non-intrusive testing shall be undertaken.	Not Significant
AC11	Spillage and Leaks as a result of vehicle related accidents: • System spillages and Leaks as a Result from Vehicle Related Accidents	Vapours Carried on Wind. Flow by Gravity.	See Receptor Table.	Low	Medium	Medium	COSHH Assessments and SDS sheets in place for hazardous substances. COSHH Items stored appropriately in accordance with SDS and regulations. Drip trays used for the transfer or decanting of fuel/small volume liquids such as engine oil. Emergency Response Plan for the site. Fire awareness training / site induction for personnel. Fire points, extinguishers and a fire water tank located around the site. Fire Risk Assessment shall be in place and will outline the control measure and procedures used to reduce the likelihood of a fire igniting. Groundwater monitoring (to be) in place with results reported in accordance with EA permit. HDPE membrane is in place and the subject of visual inspection where possible. Local Fire & Rescue Service notified of operations. Operations planned / designed to minimise transport and handling operations. Regular maintenance and inspections conducted as directed by written procedures. Secondary containment installed to prevent spill onto tertiary containment system (HDPE). Spillage response procedure for the site established. Suitable spillage kits available on site / transport vehicles. Trained persons to operate vehicles and site plant. Vehicles and plant serviced and maintained in line with manufacturer requirements. Vehicles shall drive on approved roads and follow site traffic management system. Where HDPE failure is suspected, non-intrusive testing shall be undertaken.	Not Significant
AC12	Flooding: • Overfill of Site Containment Ditch resulting in unauthorised offsite discharge of non-contaminated water. • Overfill of Site Containment Ditch	Vapours Carried on Wind. Flow by Gravity.	See Receptor Table.	Very Low	Medium	Low	Emergency Response Plan for the site. Qualified and competent site supervisor appointed. Routine visual check on the containment ditch by operatives. Site designed to flood in the first instance before over spilling. Site located within Flood Zone 1 (<1 in 1,000 annual probability of flooding).	Not Significant

ID	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
	Source	Pathway	Receptor					
AE1	Emission to Air from Engine Exhausts including: • Vehicles. • Ancillary Plant (Generators). • Main Plant (Drilling Rig / Workover Rig / Well Test Spread).	Emitted to air and carried on wind.	See Receptor Table.	High	Low	Medium	Air Quality Impact Assessment concludes increases in road traffic, are assessed to have a neutral impact on air quality Equipment installed, serviced and maintained by competent and qualified contractors. Generators assessed for compliance with Emission Limit Values. Odour Management Plan implemented for the site, if required. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Trained persons to operate vehicles and site plant. Vehicles and plant serviced and maintained in line with manufacturer requirements. Vehicles and plant switched off when not in use. Working personnel subject to a site induction covering odour management.	Not Significant
AE2	Emission to Air from the Incineration of Natural Gas: • Flare Tip / Stack.	Emitted to air and carried on wind.	See Receptor Table.	Medium	Low	Medium	Air Quality Impact Assessment concludes no significant impact. Combustion temperature managed to ensure efficient (>98%) combustion efficiency. Combustion unit subject to approval by the EA. Dedicated scrubbers in place to remove H_2S from natural gas, if necessary. Equipment installed, serviced and maintained by competent and qualified contractors. Flare monitoring (to be) in place with results reported in accordance with EA permit. H_2S is not anticipated. Odour Management Plan implemented for the site, if required. Propane shall be used to increase the calorific value of the gas whilst heavy with Nitrogen(N_2) / Carbon Dioxide (CO_2) to encourage combustion. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Trained persons to operate flare unit. Vehicles and plant serviced and maintained in line with manufacturer requirements. Working personnel subject to a site induction covering odour management.	Not Significant
AE3	Emission to Air from Well Clean Up / Cold Venting Operations: • Flare Tip / Stack.	Emitted to air and carried on wind.	See Receptor Table.	Medium	High	High	Combustion temperature managed to ensure efficient (>98%) combustion efficiency. Combustion unit subject to approval by the EA. Dedicated scrubbers in place to remove H_2S from natural gas, if necessary. Equipment installed, serviced and maintained by competent and qualified contractors. Flare monitoring (to be) in place with results reported in accordance with EA permit. H_2S is not anticipated. Odour Management Plan implemented for the site, if required. Potential for small volumes of gas upon completion of acidisation. Propane shall be used to increase the calorific value of the gas whilst heavy with Nitrogen(N_2) / Carbon Dioxide (CO_2) to encourage combustion. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Trained persons to operate flare unit. Vehicles and plant serviced and maintained in line with manufacturer requirements. Well clean up anticipated to last no longer than 45 minutes per occurrence. Working personnel subject to a site induction covering odour management.	Not Significant

ID	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
	Source	Pathway	Receptor					
AE4	Emission to Air from All Phases of Development: • Vehicles. • Stationary Plant. ▪ Drilling. ▪ Well Testing. ▪ Well Treatments. ▪ Workovers. ▪ Abandonment.	Emitted to air and carried on wind.	See Receptor Table.	Medium	Low	Medium	Air Quality Impact Assessment concludes no significant impact. Equipment installed, serviced and maintained by competent and qualified contractors. Generators assessed for compliance with Emission Limit Values. Odour Management Plan implemented for the site, if required. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Trained persons to operate vehicles and site plant. Vehicles and plant serviced and maintained in line with manufacturer requirements. Vehicles and plant switched off when not in use. Well clean up anticipated to last no longer than 45 minutes per occurrence. Working personnel subject to a site induction covering odour management.	Not Significant
AE5	Emnission to Air from Breaking of Containment: • Storage Tanks. • Pipework. • Wellhead. • Separator. • Any Other Equipment.	Emitted to air and carried on wind.	See Receptor Table.	Medium	Low	Medium	Air Quality Impact Assessment concludes no significant impact. Breaking containment of tanks and pipework systems shall minimised. Equipment cleaned / purged where possible prior to breaking containment. Plant, tanks and pipework capped / plugged after breaking containment. Plant, tanks and pipework cleaned / purged where possible prior to breaking containment. Odour Management Plan implemented for the site, if required. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Trained persons to operate vehicles and site plant. Working personnel subject to a site induction covering odour management.	Not Significant
AE6	Emission to Air from Produced Fluids on the Surface of Wellbore Equipment: • Drilling Rig. • Workover Rig. • Drill Pipe. • Wellhead. • Any Other Equipment.	Emitted to air and carried on wind.	See Receptor Table.	Medium	Low	Medium	Cleaning and purging where possible prior to pulling out of hole. Odour Management Plan implemented for the site, if required. Records kept of complaints and subsequent mitigation imposed if necessary. Volume of produced fluids on wellbore equipment is expected to be minimal. Working personnel subject to a site induction covering odour management.	Not Significant
AE7	Emission to Air from the Storage of Sewage: • Sewage Tanks.	Emitted to air and carried on wind.	See Receptor Table.	Medium	Low	Medium	Breaking containment of tanks and pipework systems shall minimised. Equipment cleaned / purged where possible prior to breaking containment. Plant, tanks and pipework capped / plugged after breaking containment. Plant, tanks and pipework cleaned / purged where possible prior to breaking containment. Odour Management Plan implemented for the site, if required. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Tanks monitored and emptied as required. Tanks self-contained / enclosed where necessary to limit emissions to air. Working personnel subject to a site induction covering odour management.	Not Significant
AE8	Emission to Air from the Storage of General Waste: Waste Skips.	Emitted to air and carried on wind.	See Receptor Table.	Medium	Low	Medium	Odour Management Plan implemented for the site, if required. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Skips clearly marked to ensure waste segregation and avoid cross contamination. Skips monitored daily and emptied as required. Skips self-contained / enclosed to prevent emissions. Working personnel subject to a site induction covering odour management.	Not Significant

ID	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
	Source	Pathway	Receptor					
NE1	Noise Releases from Engines including: • Vehicles. • Ancillary Plant (Generators). • Main Plant (Rig/Well Test Spread).	Atmosphere and Ground Vibrations.	See Receptor Table.	Medium	Medium	Medium	Compliance with planning authority noise limits. Installation of acoustic barrier where required. Loading/unloading operations planned for day light hours where possible. Noise limits set by the planning authority shall be complied with. Noise monitoring imposed if required. Periodic noise monitoring will take place during the development. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Trained operators to load / unload vehicles using MHE plant equipment. Transport restrictions and hours of operation set by the planning authority shall not be breached. Vehicles and plant serviced and maintained in line with manufacturer requirements. Vehicles and plant switched off when not in use. White noise reversing alarms fitted to site vehicles if required.	Not Significant
NE2	Noise Releases from the Incineration of Natural Gas: • Flare Tip / Stack.	Atmosphere and Ground Vibrations.	See Receptor Table.	Medium	Medium	Medium	Compliance with planning authority noise limits. Installation of acoustic barrier where required. Noise limits set by the planning authority shall be complied with. Noise monitoring imposed if required. Periodic noise monitoring will take place during the development. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures.	Not Significant
NE3	Noise and Vibration from Drilling Operations including: • Vehicles. • Ancillary Plant (Generators). • Main Plant (Drilling Rig and Equipment).	Atmosphere and Ground Vibrations.	See Receptor Table.	Low	Medium	Medium	Compliance with planning authority noise limits. Installation of acoustic barrier where required. Loading/unloading operations planned for day light hours where possible. Noise limits set by the planning authority shall be complied with. Noise monitoring imposed if required. Operation will be short duration. Periodic noise monitoring will take place during the development. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Trained operators to load / unload vehicles using MHE plant equipment. Transport restrictions and hours of operation set by the planning authority shall not be breached. Vehicles and plant serviced and maintained in line with manufacturer requirements. Vehicles and plant switched off when not in use. White noise reversing alarms fitted to site vehicles if required.	Not Significant
NE4	Noise Releases from Ancillary Operations.	Atmosphere and Ground Vibrations.	See Receptor Table.	Low	Medium	Medium	Compliance with planning authority noise limits. Installation of acoustic barrier where required. Loading/unloading operations planned for day light hours where possible. Noise limits set by the planning authority shall be complied with. Noise monitoring imposed if required. Periodic noise monitoring will take place during the development. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Trained operators to load / unload vehicles using MHE plant equipment. Transport restrictions and hours of operation set by the planning authority shall not be breached. Vehicles and plant serviced and maintained in line with manufacturer requirements. Vehicles and plant switched off when not in use. White noise reversing alarms fitted to site vehicles if required.	Not Significant

ID	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
	Source	Pathway	Receptor					
NE5	Noise and Vibration from Proppant Squeeze Operations including: • Vehicles. • Ancillary Plant (Generators). • Main Plant (Workover Rig / Proppant Plant and Equipment).	Atmosphere and Ground Vibrations.	See Receptor Table.	Low	Medium	Medium	Compliance with planning authority noise limits. Installation of acoustic barrier where required. Loading/unloading operations planned for day light hours where possible. Noise limits set by the planning authority shall be complied with. Noise monitoring imposed if required. Operation will be short duration. Periodic noise monitoring will take place during the development. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Seismic monitoring implemented. Trained operators to load / unload vehicles using MHE plant equipment. Transport restrictions and hours of operation set by the planning authority shall not be breached. Vehicles and plant serviced and maintained in line with manufacturer requirements. Vehicles and plant switched off when not in use. White noise reversing alarms fitted to site vehicles if required.	Not Significant
NE6	Noise and Vibration from Well Treatment Operations including: • Vehicles. • Ancillary Plant (Generators). • Main Plant (Workover Rig and Equipment).	Atmosphere and Ground Vibrations.	See Receptor Table.	Low	Medium	Medium	Compliance with planning authority noise limits. Installation of acoustic barrier where required. Loading/unloading operations planned for day light hours where possible. Noise limits set by the planning authority shall be complied with. Noise monitoring imposed if required. Operation will be short duration. Periodic noise monitoring will take place during the development. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Trained operators to load / unload vehicles using MHE plant equipment. Transport restrictions and hours of operation set by the planning authority shall not be breached. Vehicles and plant serviced and maintained in line with manufacturer requirements. Vehicles and plant switched off when not in use. White noise reversing alarms fitted to site vehicles if required.	Not Significant
NE7	Noise and Vibration Emissions from: • Mechanical Failures. • Mechanical Defects.	Atmosphere and Ground Vibrations.	See Receptor Table.	Low	Medium	Medium	Plant, tanks and pipework tested for leaks prior to first use to confirm integrity. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Sensitive Receptors in excess of 500 metres away from the development. Trained persons to operate vehicles and site plant. Vehicles and plant serviced and maintained in line with manufacturer requirements.	Not Significant

ID	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
	Source	Pathway	Receptor					
OE1	Odour Emissions from the Incineration of Natural Gas: • Flare Tip / Stack.	Emitted to air and carried on wind.	See Receptor Table.	Medium	Medium	Medium	Air Quality Impact Assessment concludes no significant impact. Combustion unit subject to approval by the EA. Dedicated scrubbers in place to remove H_2S from natural gas, if necessary. Equipment installed, serviced and maintained by competent and qualified contractors. Flare monitoring (to be) in place with results reported in accordance with EA permit. H_2S is not anticipated. Odour Management Plan implemented for the site, if required. Plant, tanks and pipework tested for leaks prior to first use to confirm integrity. Potential for small volumes of gas upon completion of acidisation. Propane shall be used to increase the calorific value of the gas whilst heavy with Nitrogen(N_2) / Carbon Dioxide (CO_2) to encourage combustion. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Trained persons to operate flare unit. Well clean up anticipated to last no longer than 45 minutes per occurrence. Working personnel subject to a site induction covering odour management.	Not Significant
OE2	Odour Emissions from Engine Exhausts including: • Vehicles. • Ancillary Plant (Generators). • Main Plant (Drilling Rig / Workover Rig / Well Test Spread).	Emitted to air and carried on wind.	See Receptor Table.	High	Low	Medium	Air Quality Impact Assessment concludes no significant impact. Equipment installed, serviced and maintained by competent and qualified contractors. Odour Management Plan implemented for the site, if required. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Vehicles and plant switched off when not in use. Working personnel subject to a site induction covering odour management.	Not Significant
OE3	Odour Emissions from Well Clean Up / Cold Venting Operations including: • Flare Tip / Stack.	Emitted to air and carried on wind.	See Receptor Table.	Low	High	Medium	Combustion temperature managed to ensure efficient (>98%) combustion efficiency. Combustion unit subject to approval by the EA. Dedicated scrubbers in place to remove H_2S from natural gas, if necessary. Equipment installed, serviced and maintained by competent and qualified contractors. Flare monitoring (to be) in place with results reported in accordance with EA permit. H_2S is not anticipated. Odour Management Plan implemented for the site, if required. Potential for small volumes of gas upon completion of acidisation. Propane shall be used to increase the calorific value of the gas whilst heavy with Nitrogen(N_2) / Carbon Dioxide (CO_2) to encourage combustion. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Trained persons to operate flare unit. Vehicles and plant serviced and maintained in line with manufacturer requirements. Well clean up anticipated to last no longer than 45 minutes per occurrence. Working personnel subject to a site induction covering odour management.	Not Significant

ID	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
	Source	Pathway	Receptor					
OE4	Odour Emissions from Breaking of Containment: • Storage Tanks. • Pipework. • Wellhead. • Separator. • Any Other Equipment.	Emitted to air and carried on wind.	See Receptor Table.	Medium	Low	Medium	Air Quality Impact Assessment concludes no significant impact. Breaking containment of tanks and pipework systems shall minimised. Equipment cleaned / purged where possible prior to breaking containment. Plant, tanks and pipework capped / plugged after breaking containment. Plant, tanks and pipework cleaned / purged where possible prior to breaking containment. Odour Management Plan implemented for the site, if required. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Trained persons to operate vehicles and site plant. Working personnel subject to a site induction covering odour management.	Not Significant
OE5	Odour Emissions from the Storage of Low Volume Odorous Products.	Emitted to air and carried on wind.	See Receptor Table.	Low	Low	Low	Air Quality Impact Assessment concludes no significant impact. Chemicals segregated, stored correctly and sealed when not in use. Competent personnel only to store / use chemicals. Containers checked on delivery, pre-use and periodically for signs of damage/leaks. Odour Management Plan implemented for the site, if required. Odourless products used ahead of those which give rise to odour where practicable. Products kept within their dedicated storage area when not in use. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Tanks monitored and emptied as required. Tanks self-contained / enclosed where necessary to limit emissions to air. Working personnel subject to a site induction covering odour management.	Not Significant
OE6	Odour Emissions from Produced fluids on the surface of wellbore equipment: • Drilling Rig. • Drill Pipe. • Wellhead. • Any Other Equipment.	Emitted to air and carried on wind.	See Receptor Table.	Low	Low	Low	Cleaning and purging where possible prior to pulling out of hole. Odour Management Plan implemented for the site, if required. Records kept of complaints and subsequent mitigation imposed if necessary. Volume of produced fluids on wellbore equipment is expected to be minimal. Working personnel subject to a site induction covering odour management.	Not Significant
OE7	Odour Emissions from the Use of / Decanting of Low Volume Odorous Products.	Emitted to air and carried on wind.	See Receptor Table.	Low	Low	Low	Air Quality Impact Assessment concludes no significant impact. Chemicals segregated, stored correctly and sealed when not in use. Competent personnel only to store / use chemicals. Containers checked on delivery, pre-use and periodically for signs of damage/leaks. Odour Management Plan implemented for the site, if required. Odourless products used ahead of those which give rise to odour where practicable. Products kept within their dedicated storage area when not in use. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Working personnel subject to a site induction covering odour management.	Not Significant

ID	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
	Source	Pathway	Receptor					
OE8	Odour Emissions from the Storage of Sewage: • Sewage Tanks.	Emitted to air and carried on wind.	See Receptor Table.	Medium	Low	Medium	Breaking containment of tanks and pipework systems shall minimised. Equipment cleaned / purged where possible prior to breaking containment. Plant, tanks and pipework capped / plugged after breaking containment. Plant, tanks and pipework cleaned / purged where possible prior to breaking containment. Odour Management Plan implemented for the site, if required. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Tanks monitored and emptied as required. Tanks self-contained / enclosed where necessary to limit emissions to air. Working personnel subject to a site induction covering odour management.	Not Significant
OE9	Odour Emissions from the Storage of General Waste: • Waste Skips.	Emitted to air and carried on wind.	See Receptor Table.	Medium	Low	Medium	Odour Management Plan implemented for the site, if required. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Skips clearly marked to ensure waste segregation and avoid cross contamination. Skips monitored daily and emptied as required. Skips self-contained / enclosed to prevent emissions. Working personnel subject to a site induction covering odour management.	Not Significant
OE10	Odour Emissions from the Storage of Odorous Waste Products: • Waste Containers. • Waste Storage Tanks. • Waste Skips.	Emitted to air and carried on wind.	See Receptor Table.	Medium	Low	Medium	Odour Management Plan implemented for the site, if required. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Skips clearly marked to ensure waste segregation and avoid cross contamination. Skips monitored daily and emptied as required. Skips self-contained / enclosed to prevent emissions. Working personnel subject to a site induction covering odour management.	Not Significant

ID	S-P-R Linkage			Exposure	Impact	Risk	Risk Management	Residual
	Source	Pathway	Receptor	Probability	Severity	Magnitude		Risk
SE1	Discharge of Surface Run-off Water: • Surface water run-off to soils and subsurface.	Flow by Gravity.	See Receptor Table.	Low	Medium	Medium	No discharge activities are being proposed. Routine visual check on the containment ditch by operatives.	Not Applicable

ID	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
	Source	Pathway	Receptor					
GE1	Indirect input to groundwater from the well including: • Drilling Fluids. • Proppant Carrier Fluid. • Proppant. • Well Treatment Fluids.	Flow by Gravity / Formation Pressures.	See Receptor Table.	Medium	High	High	Borehole(s) design approved by the Environment Agency under the WR11 Process. Borehole(s) design reviewed by an Independent Well Examiner and the HSE. Borehole(s) designed and constructed to industry standards. Cementation best practice to be utilised. Groundwater monitoring (to be) in place with results reported in accordance with Environmental Permit. Hydrogeological Impact Assessment concludes no significant impact. Loss circulation material available within drilling fluid for drilling activities. No direct input to groundwater is being proposed. Qualified and competent Site Supervisor appointed. Substances shall be approved for use by the Environment Agency and assessed using JAGDAG methodology. The proppant squeeze activity shall be the subject of a Hydraulic Fracture Plan and subject to regulatory approval. Water based drilling fluid used whilst drilling through near surface (<400m) aquifers.	Not Significant
SE2	Groundwater Emission (Percolation to soils and subsurface): • Surface water run-off to soils and subsurface.	Flow by Gravity.	See Receptor Table.	Low	Medium	Medium	Breaking containment of tanks and pipework systems shall minimised. Chemicals segregated, stored correctly and sealed when not in use. Competent personnel only to store / use chemicals. COSHH Assessments and SDS sheets in place for hazardous substances. COSHH Items stored appropriately in accordance with SDS and regulations. Drip trays used for the transfer or decanting of fuel/small volume liquids such as engine oil. Emergency Response Plan for the site. HDPE membrane is in place and the subject of visual inspection where possible. Hydrogeological Impact Assessment concludes no significant impact. Leak Detection and Repair Plan for the site. Plant, tanks and pipework tested for leaks prior to first use to confirm integrity. Plant, tanks and pipework capped / plugged after breaking containment. Plant, tanks and pipework cleaned / purged where possible prior to breaking containment. Primary containment systems monitored / tested where required. Qualified and competent site supervisor appointed. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Routine visual check on the containment ditch by operatives. Secondary containment installed to prevent spill onto tertiary containment system (HDPE). Site designed to flood in the first instance before over spilling. Site located within Flood Zone 1 (<1 in 1,000 annual probability of flooding). Spillage response procedure for the site established. Suitable spillage kits available on site / transport vehicles. Where HDPE failure is suspected, non-intrusive testing shall be undertaken.	Not Significant

ID	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
	Source	Pathway	Receptor					
VE1	Visible Emissions from Engine Exhausts including: • Vehicles. • Ancillary Plant (Generators). • Main Plant (Rig/Well Test Spread/Proppant Squeeze Plant and Equipment).	Gas and Particulate Matter Emissions Carried on Prevailing Winds.	See Receptor Table.	High	Low	Medium	Equipment installed, serviced and maintained by competent and qualified contractors. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Trained persons to operate vehicles and site plant. Vehicles and plant serviced and maintained in line with manufacturer requirements. Vehicles and plant switched off when not in use.	Not Significant
VE2	Visible Emissions from the Incineration of Natural Gas: • Flare Tip / Stack.	Gas and Particulate Matter Emissions Carried on Prevailing Winds.	See Receptor Table.	Medium	Low	Medium	Combustion temperature managed to ensure efficient (>98%) combustion efficiency. Combustion equipment shall be agreed by Environment Agency. Combustion unit subject to approval by the EA. Equipment installed, serviced and maintained by competent and qualified contractors. Flare monitoring (to be) in place with results reported in accordance with EA permit. Good phase separation upstream of incinerator to remove and prevent liquid carryover. Incinerator units designed and constructed to industry standards / best available techniques. Incinerator units shall be of a shrouded and enclosed nature ensuring efficient combustion. Monitoring of combustion temperature shall be undertaken during periods of incineration. Procedures established and communicated to operational personnel should the flow rate of gas exceed or fall below the incinerators flow range. Propane shall be used to increase the calorific value of the gas whilst heavy with Nitrogen(N2) / Carbon Dioxide (CO2) to encourage combustion. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Trained persons to operate flare unit.	Not Significant
VE3	Visible Emissions from Site Lighting: • Light overspill from the site fixed lighting systems / mobile floodlights.	Light emissions extending beyond the site boundary.	See Receptor Table.	High	Low	Medium	Lighting Assessment has been undertaken. Lighting overspill shall be checked during regular external patrols. Lighting systems shall be designed and installed to ensure light overspill is minimised. Where light overspill is identified, site management will adjust lighting systems to minimise light overspills. Where practicable, limit use of floodlights in areas where light overspill will impact on residentiual properties / local habitats. Where practicable, use lighting systems with motion detection systems so lighting comes on when activated.	Not Significant

ID	S-P-R Linkage			Exposure	Impact	Risk	Risk Management	Residual
	Source	Pathway	Receptor	Probability	Severity	Magnitude		Risk
FE1	Emissions of H_2S from: • Natural Gas released from the Wellbore. • Natural Gas released from Pipework / Storage Tanks / Three Phase Separator.	Vapours / Fumes Carried on Wind.	See Receptor Table.	Low	Low	Low	Borehole(s) design approved by the EA under the WR11 Process. Borehole(s) design reviewed by an independent well examiner and the HSE. Borehole(s) designed and constructed to industry standards. Dedicated scrubbers in place to remove H_2S from natural gas, if necessary. Drilling mud provides over balanced weight to prevent gas to surface. Emergency Response Plan for the site. Fire awareness training / site induction for personnel. Flare unit to have a permanent source of ignition i.e. pilot light. Gas detectors deployed with an alarm trigger of 5ppm / 7mg.m3 (EH40 WELs). H_2S is not anticipated. Leak Detection and Repair Plan for the site. Local Fire & Rescue Service notified of operations. Loss circulation material available within drilling fluid for drilling activities. Plant, tanks and pipework tested for leaks prior to first use to confirm integrity. Plant, tanks and pipework capped / plugged after breaking containment. Plant, tanks and pipework cleaned / purged where possible prior to breaking containment. Primary containment systems monitored / tested where required. Regular maintenance and inspections conducted as directed by written procedures. Site based fire risk assessment in place and detailing the mitigation measures.	Not Significant
FE2	Emissions of Natural Gas released from: • Wellbore. • Flare Unit (Flame-out). • Pipework. • Storage Tanks. • Three Phase Separator.	Vapours / Fumes Carried on Wind.	See Receptor Table.	Low	Low	Low	Borehole(s) design approved by the EA under the WR11 Process. Borehole(s) design reviewed by an independent well examiner and the HSE. Borehole(s) designed and constructed to industry standards. Dedicated scrubbers in place to remove H_2S from natural gas, if necessary. Drilling mud provides over balanced weight to prevent gas to surface. Emergency Response Plan for the site. Fire awareness training / site induction for personnel. Flare unit to have a permanent source of ignition i.e. pilot light. Gas detectors deployed with an alarm trigger of 5ppm / 7mg.m3 (EH40 WELs). H_2S is not anticipated. Leak Detection and Repair Plan for the site. Local Fire & Rescue Service notified of operations. Loss circulation material available within drilling fluid for drilling activities. Plant, tanks and pipework tested for leaks prior to first use to confirm integrity. Plant, tanks and pipework capped / plugged after breaking containment. Plant, tanks and pipework cleaned / purged where possible prior to breaking containment. Primary containment systems monitored / tested where required. Regular maintenance and inspections conducted as directed by written procedures. Site based fire risk assessment in place and detailing the mitigation measures.	Not Significant

ID	S-P-R Linkage			Exposure	Impact	Risk	Risk Management	Residual
	Source	Pathway	Receptor	Probability	Severity	Magnitude		Risk
FE3	Emissions from Well Test Equipment including: • Storage Tanks. • Pipework and connecting joints. • Wellhead. • Separator. • Any Other Equipment.	Vapours / Fumes Carried on Wind.	See Receptor Table.	Low	High	Medium	Emergency Response Plan for the site. Fire awareness training / site induction for personnel. H_2S is not anticipated. Leak Detection and Repair Plan for the site. Local Fire & Rescue Service notified of operations. Plant, tanks and pipework tested for leaks prior to first use to confirm integrity. Primary containment systems monitored / tested where required. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Site based fire risk assessment in place and detailing the mitigation measures. Spillage response procedure for the site established. Suitable spillage kits available on site / transport vehicles.	Not Significant
FE4	Emissions from Unexpected Chemical Reactions / Runaway Reactions.	Vapours / Fumes Carried on Wind.	See Receptor Table.	Very Low	Medium	Low	Chemicals segregated, stored correctly and sealed when not in use. Competent personnel only to store / use chemicals. COSHH Assessments and SDS sheets in place for hazardous substances. COSHH Items stored appropriately in accordance with SDS and regulations. Drip trays used for the transfer or decanting of fuel/small volume liquids such as engine oil. Emergency Response Plan for the site. Fire awareness training / site induction for personnel. Fire points, extinguishers and a fire water tank located around the site. HDPE membrane is in place and the subject of visual inspection where possible. Leak Detection and Repair Plan for the site. Local Fire & Rescue Service notified of operations. Plant, tanks and pipework tested for leaks prior to first use to confirm integrity. Plant, tanks and pipework capped / plugged after breaking containment. Plant, tanks and pipework cleaned / purged where possible prior to breaking containment. Qualified and competent site supervisor appointed. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Site based fire risk assessment in place and detailing the mitigation measures. Spillage response procedure for the site established. Suitable spillage kits available on site / transport vehicles.	Not Significant
FE5	Dust and Mud Generated from: • Vehicles. • Site Operations.	Carried on Wind	See Receptor Table.	High	Low	Medium	Avoid certain activities that may present dust if high winds occur. High winds are defined as a strong breeze >25mph. (http: Operations planned / designed to minimise transport and handling operations. Qualified and competent site supervisor appointed. Records kept of complaints and subsequent mitigation imposed if necessary. Roads to / from the site are monitored for mud deposits. A road sweeping contractor will be arranged for road cleaning if required. Vehicles shall drive on approved roads and follow site traffic management system.	Not Significant

ID	S-P-R Linkage			Exposure	Impact	Risk	Risk Management	Residual
	Source	Pathway	Receptor	Probability	Severity	Magnitude		Risk
FE6	Litter Generated from: • Vehicles. • Site Operations.	Carried on Wind	See Receptor Table.	High	Very Low	Low	Litter cleared routinely as part of working day. Provision of adequate refuse receptacles for both inside and outside working areas. Records kept of complaints and subsequent mitigation imposed if necessary. Skips monitored daily and emptied as required. Skips self-contained / enclosed to prevent emissions.	Not Significant
FE7	Emissions to Surface Water from: • Leaks from process pipework. • Leaks from storage vessels. • Leaks from site plant. • Leaks from welfare pipework. • Leaks from foul sewage pipework. • Site Flooding.	Flow by Gravity.	See Receptor Table.	Low	Medium	Medium	Breaking containment of tanks and pipework systems shall minimised. Chemicals segregated, stored correctly and sealed when not in use. Competent personnel only to store / use chemicals. COSHH Assessments and SDS sheets in place for hazardous substances. COSHH Items stored appropriately in accordance with SDS and regulations. Emergency Response Plan for the site. HDPE membrane is in place and the subject of visual inspection where possible. Leak Detection and Repair Plan for the site. Plant, tanks and pipework tested for leaks prior to first use to confirm integrity. Plant, tanks and pipework capped / plugged after breaking containment. Plant, tanks and pipework cleaned / purged where possible prior to breaking containment. Primary containment systems monitored / tested where required. Qualified and competent site supervisor appointed. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Routine visual check on the containment ditch by operatives. Secondary containment installed to prevent spill onto tertiary containment system (HDPE). Site designed to flood in the first instance before over spilling. Site located within Flood Zone 1 (<1 in 1,000 annual probability of flooding). Spillage response procedure for the site established. Suitable spillage kits available on site / transport vehicles. Where HDPE failure is suspected, non-intrusive testing shall be undertaken. Working personnel subject to a site induction covering odour management.	Not Significant

ID	S-P-R Linkage			Exposure	Impact	Risk	Risk Management	Residual
	Source	Pathway	Receptor	Probability	Severity	Magnitude		Risk
FE8	Emissions to Groundwater from: • Leaks from process pipework. • Leaks from storage vessels. • Leaks from plant. • Leaks from welfare pipework. • Leaks from foul sewage pipework.	Percolate to underlying Groundwaters.	Groundwater Bearing Formations.	Low	Medium	Medium	Breaking containment of tanks and pipework systems shall minimised. Chemicals segregated, stored correctly and sealed when not in use. Competent personnel only to store / use chemicals. COSHH Assessments and SDS sheets in place for hazardous substances. COSHH Items stored appropriately in accordance with SDS and regulations. Emergency Response Plan for the site. HDPE membrane is in place and the subject of visual inspection where possible. Leak Detection and Repair Plan for the site. Plant, tanks and pipework tested for leaks prior to first use to confirm integrity. Plant, tanks and pipework capped / plugged after breaking containment. Plant, tanks and pipework cleaned / purged where possible prior to breaking containment. Primary containment systems monitored / tested where required. Qualified and competent site supervisor appointed. Records kept of complaints and subsequent mitigation imposed if necessary. Regular maintenance and inspections conducted as directed by written procedures. Routine visual check on the containment ditch by operatives. Secondary containment installed to prevent spill onto tertiary containment system (HDPE). Site designed to flood in the first instance before over spilling. Site located within Flood Zone 1 (<1 in 1,000 annual probability of flooding). Spillage response procedure for the site established. Suitable spillage kits available on site / transport vehicles. Where HDPE failure is suspected, non-intrusive testing shall be undertaken. Working personnel subject to a site induction covering odour management.	Not Significant
FE9	Emissions to Groundwater / Formations from the well: • Drilling Fluid. • Well Treatment Fluid (Non-Returns). • Circulation / Suspension Fluid.	Flow by Gravity / Formation Pressures.	See Receptor Table.	High	Very Low	Medium	Borehole(s) design approved by the EA under the WR11 Process. Borehole(s) design reviewed by an independent well examiner and the HSE. Borehole(s) designed and constructed to industry standards. COSHH Assessments and SDS sheets in place for hazardous substances. Groundwater monitoring (to be) in place with results reported in accordance with EA permit. Loss circulation material available within drilling fluid for drilling activities. Qualified and competent site supervisor appointed. Records kept of complaints and subsequent mitigation imposed if necessary. Water based drilling fluid used whilst drilling through near surface (<400m) aquifers.	Not Significant

ID	S-P-R Linkage			Exposure	Impact	Risk	Risk Management	Residual
	Source	Pathway	Receptor	Probability	Severity	Magnitude		Risk
FE10	Emission from Breaking of Containment: • Storage Tanks. • Pipework. • Wellhead. • Separator. • Any Other Equipment.	Flow by Gravity. Vapours / Fumes Carried on Wind.	See Receptor Table.	Medium	Low	Medium	Breaking containment of tanks and pipework systems shall minimised. COSHH Assessments and SDS sheets in place for hazardous substances. COSHH Items stored appropriately in accordance with SDS and regulations. Emergency Response Plan for the site. HDPE membrane is in place and the subject of visual inspection where possible. Hydrogeological Impact Assessment concludes no significant impact. Plant, tanks and pipework capped / plugged after breaking containment. Plant, tanks and pipework cleaned / purged where possible prior to breaking containment. Records kept of complaints and subsequent mitigation imposed if necessary. Secondary containment installed to prevent spill onto tertiary containment system (HDPE). Where HDPE failure is suspected, non-intrusive testing shall be undertaken. Working personnel subject to a site induction covering odour management.	Not Significant
FE11	Emissions from Onsite Spillages from: • Oil. • Formation Water. • Drilling Fluids. • Well Treatment Fluids. • Ancillary Products.	Flow by Gravity. Vapours / Fumes Carried on Wind.	See Receptor Table.	Medium	Very Low	Low	COSHH Assessments and SDS sheets in place for hazardous substances. COSHH Items stored appropriately in accordance with SDS and regulations. Emergency Response Plan for the site. HDPE membrane is in place and the subject of visual inspection where possible. Hydrogeological Impact Assessment concludes no significant impact. Records kept of complaints and subsequent mitigation imposed if necessary. Secondary containment installed to prevent spill onto tertiary containment system (HDPE). Where HDPE failure is suspected, non-intrusive testing shall be undertaken. Working personnel subject to a site induction covering odour management.	Not Significant

ID	Event	Impact	Risk Management
CC1	Increase in summer temperature (~7°C) and dryer summers.	Dryer conditions may result in an increase of dust emissions from the site.	Use of dust suppressant sprays (water dampening) if dust is identified. Where site remediation works or construction activities take place consider the use of less dusty material.
		The surface temperature of plant and equipment may cause additional stress and expansion, particularly on pipework and fittings.	Ensure new equipment is designed to cope with foreseeable stress and expansion where possible. Undertake regular inspections followed by preventative maintenance on site plant and equipment.
		Odour may become more prevalent from the storage of hydrocarbons and other materials.	Implementation of an odour management plan in line with permit conditions should odour arise causing impact on the surrounding receptors.
		Potential for an increase in fires, particularly wildfires on neighbouring land.	Maintain relationship with local fire authority and keep them updated over site inventory. Continue to take note of the local news during hot conditions and sites vulnerable to wildfires.
		Increase in energy demands for plant cooling units or personnel cooling units.	Where possible ensure plant and equipment can facilitate higher temperatures in the first instance. Utilise onsite electricity production in the first instance where possible to facilitate cooling units.
		Increase in water demands for dust suppression or site operations.	Ensure mains water supply and/or imported supply is capable of meeting site demand. Utilise site surface water and spray over site for dust suppression. Calculate the volume of water needed for operations with significant consumption. Consider alternatives to water for well treatments where possible or plan works around seasons.
CC2	Extreme variability with regards to winter temperatures.	Colder temperatures could lead to the freezing of site systems such as pipework, plant and surface water management systems.	Where fluids have the potential to freeze within pipework, lagging shall be used.
		Damage to plant and equipment through repeated freezing and thawing of water.	Where fluids have the potential to freeze within pipework, lagging shall be used. Undertake regular inspections followed by preventative maintenance on site plant and equipment.
CC3	Extreme Rainfall intensity (20% increase on todays values) Winter rainfall increase (Anticipated to be 40%)	External flooding events leading to power loss or interruptions.	Utilise onsite electricity (gas) production in the first instance where possible and have a back up diesel system should mains power be unavailable.
		External flooding events leading to site access and egress restrictions for emergency services, staff and deliveries.	Adopt suitable measures for managing surface water onsite including the availability of pumps to clear flooded areas near the site and on the site.
		Internal flooding events leading to power loss or interruptions.	Utilise onsite electricity (gas) production in the first instance where possible and have a backup system should mains power be unavailable. Ensure that suitable drainage arrangements and storage and back up storage (tanks) are available. Ensure electrical components are elevated when flooding becomes apparent.
		Internal flooding events leading to infrastructure damage.	Ensure that suitable drainage arrangements and storage and back up storage (tanks) are available. Undertake regular inspections followed by preventative maintenance on site plant and equipment. Undertake a flood risk assessment and regularly review, taking note of historic events.
		Internal flooding event leading to floodwater and surface waters being contaminated.	Ensure that suitable drainage arrangements and storage and back up storage (tanks) are available. Undertake a flood risk assessment and regularly review, taking note of historic events.
		Internal flooding events leading to drain and interceptor (where installed) to be overwhelmed.	Ensure that suitable drainage arrangements and storage and back up storage (tanks) are available. Ensure interceptor is maintained, drainage channels are clear and seek alternative means of water disposal (tankered offsite)
CC4	Increase in sea level rises (~0.6m)	Permanent or frequent flooding at the site. (Wellsite is within 20 km of the Humber River.)	Undertake a flood risk assessment and regularly review, taking note of historic events. Ensure the availability of emergency pumps should flooding be anticipated more foreseeable. Protection of control and electrical systems. Identification of 'flat bottom' tanks / equipment that have the potential to floating.
		Localised impact on groundwater (<20km from the coastline) by increasing groundwater levels and artesian pressures.	Consideration of tidal reach. Consideration of artesian pressures whilst drilling through groundwater systems. Undertake a flood risk assessment and regularly review, taking note of historic events. Ensure the availability of emergency pumps should flooding be anticipated more foreseeable. Protection of control and electrical systems. Identification of 'flat bottom' tanks / equipment that have the potential to floating.
CC5	River flow variability. (50% flow increase) or (80% flow decrease)	Potential to inhibit drainage and lead to localised flooding.	Ensure that suitable drainage arrangements and storage and back up storage (tanks) are available. Discharge to surface water when permitted to do so, utilise additional storage where possible. Undertake a flood risk assessment and regularly review, taking note of historic events. Ensure the availability of emergency pumps should flooding be anticipated more foreseeable. Protection of control and electrical systems. Identification of 'flat bottom' tanks / equipment that have the potential to floating.

Substance	Release over proposed development (t)			Impact	
	CO_2	CH_4	N_2O	t CO_2 equivalent	% of total project releases
Global warming potential (relative to CO2, 100 years)	1	28	265		
Phase					
Phase 1 - Construction of the Cloughton 2 Wellsite.	668	1	0.02	711	7.2
Phase 2 - Drilling of Cloughton-2 Well.	2949	3	0.08	3058	30.9
Phase 3 - Workover and testing of Cloughton-2 Well.	5442	8	0.085	5687	57.4
Phase 4 - Decommissioning of the Cloughton-2 Well and the restoration of the Cloughton 2 Wellsite.	417	1	0.01	451	4.6
Total	9477	14	0.2	9907	100

For reference, the data within the table has been reproduced from Table 4.10 Calculation of greenhouse gas releases of the Cloughton 2 Air Quality Impact Assessment.