

ENVIRONMENTAL STATEMENT (VOLUME III)

Appendix 13.2 ES Risk Record

HyNet Carbon Dioxide Pipeline DCO

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 –
Regulations 5(2)(a)

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TABLE OF CONTENTS

APPENDIX 13-2 – RISK RECORD FOR SCREENED IN MAJOR EVENTS	1
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TABLES

Table 1.1 - ES Risk Record	1
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APPENDIX 13-2 – RISK RECORD FOR SCREENED IN MAJOR EVENTS

1.1.1. The Long List in **Appendix 13-1 Major Accidents and Disasters Long List (Volume III)**, presents all of the MA&D Event categories and types which have been considered as part of the assessment. Those MA&D types which could not be scoped out have been further assessed, the output of which is presented in **Table 1.1** below. **Table 1.1** is a record of all potential MA&D events considered as part of the Environmental Statement (ES) assessment process.

Table 1.1 - ES Risk Record

Risk Record Entry Number	MA&D Event Category	MA&D Event Type	Section of DCO Proposed Development	Hazard Description	Applicable Stages (Construction, Operation, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Clarification
1	Malicious Attacks	Fire and/or explosion or release of harmful gas	Route wide	Unexploded ordnance	C	During ground investigation or construction encountering UXO.	Presence of unexploded ordnance	Ground Conditions Report. CDM Register. UXO Risk Assessment.	Fire and/or explosion affects neighbouring property and/or those people in the immediate area.			X	X	X							A desk based UXO assessment has been commissioned for the Newbuild Infrastructure Boundary and identified no significant sources of Unexploded Ordnance (UXO) hazard. Provide possible procedures, protocols and training required during the construction phase.	N	The reasonable worst consequence of this event does not meet the criteria of a major accident. The only potential receptors of harm are construction/maintenance workers.	N/A	Not identified as a potential major accident/disaster event.

Risk Record Entry Number	MA&D Event Category	MA&D Event Type	Section of DCO Proposed Development	Hazard Description	Applicable Stages (Construction, Operation, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Clarification
2	Utilities failure	Fire and/or explosion or release of harmful gas	Route wide	Presence of underground services/utilities - gas, electricity.	C	Striking of underground services/utilities	Presence of existing utilities within the DCO Proposed Development area which are nearby to residential receptors.	CDM register. Construction Phase H&S plan. Hazard studies carried out at detailed design stage. Method Statements.	Fire and/or explosion affects neighbouring property and/or members of the public.			X	X	X							Location of utilities is obtained from the statutory undertakers and how the DCO Proposed Development will affect the utilities is discussed and any diversions required are highlighted. This information is then used in the detailed design of the DCO Proposed Development. Positive identification of all the utilities prior to starting work on site. Further work required to identify and design utility diversions, prior to construction phase.	Y	Could cause loss of life or permanent injury to multiple members of the public; or significant structural property damage.	Y	Considered to be ALARP if all mitigation measures outlined are correctly implemented.

3	Risk Record Entry Number													
	MA&D Event Category													
	MA&D Event Type													
	Section of DCO Proposed Development													
	Hazard Description													
	Over-Head HV power lines cross the route of the DCO Proposed													
C	Applicable Stages (Construction, Operation, Maintenance)*													
	Risk Description													
	Hazard Sources and/or Pathways													
	Documentation in which the event is/will be addressed													
	Reasonable worst consequence if event did occur and receptor(s)													
	Air Quality													
	Climate													
X	People and Communities													
	Biodiversity													
	Cultural Heritage													
	Geology and Soils													
	Landscape and Visual													
	Noise and Vibration													
	Transport													
	Material Resources													
	Road Drainage and the Water													
	Mitigation													
	HV overhead power lines do not need to be diverted. However, there is a potential need to provide protection measures during construction phase.													
N	Could this constitute a major accident or disaster?													
	Justification													
	The reasonable worst consequence of this event does not meet the criteria of a major accident. The only potential receptors of harm are construction workers.													
N/A	Is this ALARP with existing mitigation?													
	Clarification													
	Not identified as a potential major accident/disaster event.													

Risk Record Entry Number	MA&D Event Category	MA&D Event Type	Section of DCO Proposed Development	Hazard Description	Applicable Stages (Construction, Operation, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Clarification
4	Utilities failure	Harm to people	Route Wide	Historical Wayleave records are inconsistent in the position of actual presence of utilities crossing the DCO Proposed Development	C	Striking of underground services/utilities	Presence of existing utilities within the DCO Proposed Development area which are nearby to residential receptors.	CDM register. Hazard studies carried out at detailed design stage. Construction Phase H&S Plan. Method Statements.	Death and/or injury to construction workers.			X	X	X							1. Seek clarification from utility owners of the presence and location of all utilities. 2. Review of existing records/condition surveys. 3. Additional surveys being undertaken by specialist contractor. 4. CAT scan and GPR surveys. 5. Trial pits.	N	The reasonable worst consequence of this event does not meet the criteria of a major accident. The only potential receptors of harm are construction workers.	N/A	Not identified as a potential major accident/disaster event.

Risk Record Entry Number	MA&D Event Category	MA&D Event Type	Section of DCO Proposed Development	Hazard Description	Applicable Stages (Construction, Operation, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Clarification
5	Utilities failure	Loss of power	Route wide	Presence of underground services/utilities -sewers, gas, electricity, potable water, telecoms/data and	C	Striking of underground services/utilities	Presence of electricity cables along route (route crossings)	CDM register. Hazard studies carried out at detailed design stage. Construction Phase H&S Plan. Method statements.	Loss of power affects neighbouring property and/or members of the public.			X									Location of utilities is obtained from the statutory undertakers and how the DCO Proposed Development will affect the utilities is discussed and any diversions required are highlighted. This information is then used in the detailed design of the DCO Proposed Development. Positive identification of all the utilities prior to starting work on site. Further work required to identify and design utility diversions, prior to construction phase.	N	Unlikely to cause community wide power outage or damage to infrastructure which could cause a MA&D.	N/A	Not identified as a potential major accident/disaster event.

Risk Record Entry Number	MA&D Event Category	MA&D Event Type	Section of DCO Proposed Development	Hazard Description	Applicable Stages (Construction, Operation, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Clarification
6	Pollution accident	Fire and/or explosion or release of harmful gas	Route wide	Loss of containment event involving an AGI and/or pipeline and/or block valve.	O, M	Large scale release of CO ₂ resulting from a loss of containment event involving an AGI and/or pipeline and/or block valve. Pipeline/AGI/ BVS containing CO ₂ , air dispersion of CO ₂ gas cloud.	Dedicated studies undertaken to assess the likelihood and consequences of a large CO ₂ release. HAZID studies during FEED and detailed design.	CO ₂ toxicity and fogging hazard affects neighbouring properties and/or those people in the immediate area.	X	X	X										Continuous monitoring of pressure and flow. On detection of a potential leak, the Carbon Dioxide Pipeline will be automatically shut down and isolated to minimise the volume of CO ₂ released. The Newbuild Carbon Dioxide Pipeline will be constructed to appropriate design standards. Management systems will be in place for preventative maintenance including pipeline inspection and integrity checks.	Y	Could cause loss of life or permanent injury which requires ongoing disability support.	Y	Considered to be ALARP if all mitigation measures outlined are correctly implemented.

Risk Record Entry Number	MA&D Event Category	MA&D Event Type	Section of DCO Proposed Development	Hazard Description	Applicable Stages (Construction, Operation, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Clarification
7	Industrial and urban accidents	Fire and/or explosion or release of harmful gas	Stanlow AGI	Fire and/or explosion at the Stanlow Refinery Plant.	O, M	Damage to AGI equipment which could potentially lead to a loss of containment of CO ₂ for a limited period of time. AGI containing CO ₂ , air dispersion of CO ₂ gas cloud.		Dedicated studies undertaken to assess the likelihood and consequences of a large CO ₂ release. HAZID studies during FEED and detailed design. AGI Emergency Plan.	CO ₂ toxicity and fogging hazard affects neighbouring property and/or those people in the immediate area.	X	X	X									Stanlow Refinery Plant site emergency plan to control/contain the initiating event to prevent/reduce the risk of spread to the AGI. Interface management procedures between the undertaker and Stanlow Refinery Plant. Leak detection and emergency shutdown system installed on the CO ₂ transmission system.	Y	Could cause loss of life or permanent injury which requires ongoing disability support.	Y	Considered to be ALARP if all mitigation measures outlined are correctly implemented.

8	Risk Record Entry Number	
Industrial and urban accidents	MA&D Event Category	
Fire and/or explosion or release of harmful gas	MA&D Event Type	
Stanlow AGI	Section of DCO Proposed Development	
Fire and/or explosion at the Stanlow Refinery Plant.	Hazard Description	
C	Applicable Stages (Construction, Operation, Maintenance)*	
Exposure of construction staff to a release from Stanlow Refinery Plant.	Risk Description	
Release from Stanlow Refinery Plant dispersing through the air.	Hazard Sources and/or Pathways	
Stanlow Refinery Plant Off-site emergency plan. Construction phase Emergency Plan.	Documentation in which the event is/will be addressed	
Harm to small number of construction workers.	Reasonable worst consequence if event did occur and receptor(s)	
	Air Quality	
	Climate	
X	People and Communities	
	Biodiversity	
	Cultural Heritage	
	Geology and Soils	
	Landscape and Visual	
	Noise and Vibration	
	Transport	
	Material Resources	
	Road Drainage and the Water	
Stanlow Refinery Plant site emergency plan to control/contain the event to prevent/reduce the risk to construction personnel.	Mitigation	
N	Could this constitute a major accident or disaster?	
The reasonable worst consequence of this event does not meet the criteria of a major accident. The only potential receptors of harm are construction/maintenance workers.	Justification	
N/A	Is this ALARP with existing mitigation?	
Not identified as a potential major accident/disaster event.	Clarification	

Risk Record Entry Number	MA&D Event Category	MA&D Event Type	Section of DCO Proposed Development	Hazard Description	Applicable Stages (Construction, Operation, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Clarification
9	Industrial and urban accidents	Fire and/or explosion or release of harmful gas	Ince AGI	Loss of containment of ammonia from CF Fertiliser Plant.	C, O, M	Exposure to a toxic gas cloud dispersing from CF Fertiliser Plant.	Toxic gas cloud from CF Fertiliser Plant dispersing through the air.	CF Fertiliser Plant Off-site emergency plan. AGI Emergency Plan.	Harm to small number of construction/maintenance workers.			X									CF Fertiliser Plant site/off-site emergency plan to control/contain the initiating event to prevent/reduce the risk of spread to the AGI. AGI site emergency plan. Interface management procedures between the undertaker and CF Fertilisers.	N	The reasonable worst consequence of this event does not meet the criteria of a major accident. The only potential receptors of harm are construction/maintenance workers.	N/A	Not identified as a potential major accident/disaster event.

Risk Record Entry Number	MA&D Event Category	MA&D Event Type	Section of DCO Proposed Development	Hazard Description	Applicable Stages (Construction, Operation, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Clarification
10	Industrial and urban accidents	Fire and/or explosion or release of harmful gas	Ince AGI	Explosion at CF Fertiliser Plant.	O, M	Damage to AGI equipment which could potentially lead to a loss of containment of CO ₂ for a limited	AGI containing CO ₂ , air dispersion of CO ₂ gas cloud.	Dedicated studies undertaken to assess the likelihood and consequences of a large CO ₂ release. HAZID studies during FEED and detailed design. AGI Emergency Plan.	CO ₂ toxicity and fogging hazard affects neighbouring property and/or those people in the immediate area.	X	X	X									CF Fertiliser Plant site/off-site emergency plan to control/contain the initiating event to prevent/reduce the risk of spread to the AGI. Interface management procedures between the undertaker and CF Fertilisers. Leak detection and emergency shutdown system installed on the CO ₂ transmission system.	Y	Could cause loss of life or permanent injury which requires ongoing disability support.	Y	Considered to be ALARP if all mitigation measures outlined are correctly implemented.

Risk Record Entry Number	MA&D Event Category	MA&D Event Type	Section of DCO Proposed Development	Hazard Description	Applicable Stages (Construction, Operation, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Clarification
11	Hydrology	Harm to people	Route wide	Impact from construction activities alongside watercourses and flood zone 3.	C	The DCO Proposed Development crosses Flood Zone 3 and a very limited extent of Flood Zone 2. The three BVSs along the Stanlow AGI to Flint AGI Pipeline are	Flooding Excavations	CDM register. Construction Phase H&S Plan. Method statements. CEMP.	Harm to small number of construction workers.			X								X	Where possible, storage of materials or Construction Compounds would not be located within the active fluvial and tidal floodplain. Construction material would be controlled near watercourses. At trenched crossings of watercourses, there would be a control of flows to avoid an increase of flood risk. There would be temporary drainage solutions to control runoff and protect surface water drainage patterns. Potential groundwater flooding in excavations would be controlled. Emergency planning procedures for construction workers would be implemented in case of risk of flooding, as appropriate.	N	The reasonable worst consequence of this event does not meet the criteria of a major accident. The only potential receptors of harm are construction workers.	N/A	Not identified as a potential major accident/disaster event.

Risk Record Entry Number	MA&D Event Category	MA&D Event Type	Section of DCO Proposed Development	Hazard Description	Applicable Stages (Construction, Operation, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Clarification
12	Hydrology	Fire and/or explosion or release of harmful gas	Route wide	Flooding	O, M	Erosion of support below pipeline leading to pipeline failure.	Flooding	Flood Risk Assessment. Emergency plan.	CO ₂ toxicity and fogging hazard affects neighbouring property and/or those people in the immediate area.			X								X	Geotechnical ground investigation informing the design of the Newbuild Carbon Dioxide Pipeline and the underlying support structure beneath the Newbuild Carbon Dioxide Pipeline. Continuous monitoring of pressure and flow. On detection of a potential leak, the Carbon Dioxide. Pipeline will be automatically shut down and isolated to minimise the volume of CO₂ released. The Newbuild Carbon Dioxide Pipeline will be constructed to appropriate design standards. Management systems will be in place for preventative maintenance including pipeline inspection and integrity checks.	Y	Could cause loss of life or permanent injury which requires ongoing disability support.	Y	Considered to be ALARP if all mitigation measures outlined are correctly implemented.

13	Risk Record Entry Number		
	Hydrology	MA&D Event Category	
	Extreme weather (flood)	MA&D Event Type	
	Ince AGI, Stanlow AGI, Northop Hall AGI, Flint AGI and BVS: Rock Bank, Mollington and Aston Hill.	Section of DCO Proposed Development	
	Flooding of AGI or BVS.	Hazard Description	
	O, M	Applicable Stages (Construction, Operation, Maintenance)*	
	Risk to personnel	Risk Description	
	Flooding	Hazard Sources and/or Pathways	
	Flood Risk Assessment. Emergency plan.	Documentation in which the event is/will be addressed	
	Minor flood damage to equipment.	Reasonable worst consequence if event did occur and receptor(s)	
		Air Quality	
		Climate	
		People and Communities	
		Biodiversity	
		Cultural Heritage	
		Geology and Soils	
		Landscape and Visual	
		Noise and Vibration	
		Transport	
		Material Resources	
		Road Drainage and the Water	
	X	Mitigation	
	An Outline Surface Water Drainage Strategy has been produced for the DCO Proposed Development which includes drainage design for the AGIs and BVSS. Flood risk at AGIs and BVSS would be managed for operation and maintenance, through design such as raising finished floor levels, and appropriate procedures e.g., development of suitable emergency procedure.		
	N	Could this constitute a major accident or disaster?	
	The reasonable worst consequence of this event does not meet the criteria of a major accident. Nuisance only.	Justification	
	N/A	Is this ALARP with existing mitigation?	
	Not identified as a potential major accident/disaster event.	Clarification	

14	Risk Record Entry Number	
Industrial and urban accidents	MA&D Event Category	
Harm to people	MA&D Event Type	
Ince AGI, Stanlow AGI, Northop Hall AGI, Flint AGI and BVS: Rock Bank, Mollington and Aston Hill.	Section of DCO Proposed Development	
Installing electrical connections (e.g. between the AGIs/BVS and incoming power supplies).	Hazard Description	
C	Applicable Stages (Construction, Operation, Maintenance)*	
Electrocution risk to personnel	Risk Description	
Electricity	Hazard Sources and/or Pathways	
CDM register. Construction Phase H&S Plan.	Documentation in which the event is/will be addressed	
Death and/or injury to construction workers and/or National Grid personnel	Reasonable worst consequence if event did occur and receptor(s)	
	Air Quality	
	Climate	
X	People and Communities	
	Biodiversity	
	Cultural Heritage	
	Geology and Soils	
	Landscape and Visual	
	Noise and Vibration	
	Transport	
	Material Resources	
	Road Drainage and the Water	
Guidance provided by National Grid to be adhered to.	Mitigation	
N	Could this constitute a major accident or disaster?	
The reasonable worst consequence of this event does not meet the criteria of a major accident. The only potential receptors of harm are construction workers and National Grid staff.	Justification	
N/A	Is this ALARP with existing mitigation?	
Not identified as a potential major accident/disaster event.	Clarification	

15	Risk Record Entry Number	
Industrial and urban accidents	MA&D Event Category	
Harm to people	MA&D Event Type	
Rock Bank BVS	Section of DCO Proposed Development	
CLH Pipeline System (CLH-PS) Limited with fuel storage and distribution	Hazard Description	
O, M	Applicable Stages (Construction, Operation, Maintenance)*	
Fire and/or explosion at fuel storage facility impacts the Rock Bank BVS resulting in a loss of containment event at the BVS and subsequent release of CO ₂ .	Risk Description	
BVS containing CO ₂ , air dispersion of CO ₂ gas cloud.	Hazard Sources and/or Pathways	
Dedicated studies undertaken to assess the likelihood and consequences of a large CO ₂ release. HAZID studies during FEED and detailed design. BVS Emergency Plan.	Documentation in which the event is/will be addressed	
CO ₂ toxicity and fogging hazard affects neighbouring property and/or those people in the immediate area.	Reasonable worst consequence if event did occur and receptor(s)	
×	Air Quality	
×	Climate	
×	People and Communities	
	Biodiversity	
	Cultural Heritage	
	Geology and Soils	
	Landscape and Visual	
	Noise and Vibration	
	Transport	
	Material Resources	
	Road Drainage and the Water	
CLH Pipeline System site/off-site emergency plan to control/contain the initiating event to prevent/reduce the risk of spread to the BVS. Leak detection and emergency shutdown system installed on the CO ₂ transmission system.	Mitigation	
Y	Could this constitute a major accident or disaster?	
Could cause loss of life or permanent injury which requires ongoing disability support.	Justification	
Y	Is this ALARP with existing mitigation?	
Considered to be ALARP if all mitigation measures outlined are correctly implemented.	Clarification	

Risk Record Entry Number	MA&D Event Category	MA&D Event Type	Section of DCO Proposed Development	Hazard Description	Applicable Stages (Construction, Operation, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Clarification
16	Industrial and urban accidents	Spillage or longer term seepage of pollutants into ground/watercourse	Route wide	Loss of containment from a MAH pipeline.	C	Damage to a third party MAH pipeline.	Construction work associated with the CO ₂ pipeline in close proximity to third party MAH pipelines.	CDM register. Construction Phase H&S Plan. Pipeline operators safety report.	Contamination of ground and/or water supply.						X						X 1. Seek clarification from pipeline owners of the presence and location of pipelines. 2. CAT scan and GPR surveys. 3. Trial pits. 4. The pipelines should have been designed and constructed in accordance with British Standard 8010 – Code of Practice for Pipelines (BS 8010) and the Pipelines Act 1962. 5. Close coordination and cooperation between all parties involved.	Y	Could cause permanent or long-lasting damage to environmental receptor(s) that cannot be restored through minor clean-up and restoration efforts.	Y	Considered to be ALARP if all mitigation measures outlined are correctly implemented.

Risk Record Entry Number	MA&D Event Category	MA&D Event Type	Section of DCO Proposed Development	Hazard Description	Applicable Stages (Construction, Operation, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Clarification
17	Industrial and urban accidents	Ground collapse	Route wide	Presence of unrecorded mine workings.	C, O, M	Collapse of mine workings.	Historical mine workings.	Ground Conditions Report. CDM Register. Mining Risk Assessment.	Death and/or injury to construction/maintenance workers.			X	X		X						Shallow coal mining related stability issues to be assessed and addressed in line with best practice guidance (CIRIA C758D Abandoned Mine Workings Manual) that is accepted by the Coal Authority.	N	The reasonable worst consequence of this event does not meet the criteria of a major accident. The only potential receptors of harm are construction/maintenance workers.	N/A	Not identified as a potential major accident/disaster event.

Risk Record Entry Number	MA&D Event Category	MA&D Event Type	Section of DCO Proposed Development	Hazard Description	Applicable Stages (Construction, Operation, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Clarification
18	Industrial and urban accidents	Fire and/or explosion or release of harmful gas	Route wide	Loss of containment from Carbon Dioxide Pipeline.	O, M	Large scale release of CO ₂ resulting from a loss of containment event involving the CO ₂ pipeline.	Intrusive work by 3rd parties e.g. farmers, construction works.	Dedicated studies undertaken to assess the likelihood and consequences of a large CO ₂ release. HAZID studies during FEED and detailed design. Carbon Dioxide Pipeline Emergency Plan.	CO ₂ toxicity and fogging hazard affects neighbouring property and/or those people in the immediate area.	X	X	X									The Carbon Dioxide Pipeline system will be: - Fitted with a leak detection and emergency shut down system. - Buried below ground. - Provided with enhanced wall thickness at identified risk areas. - Provided with corrosion / cathodic protection systems (coating damage). - Operated, Maintained and Inspected (Piggable) to ensure continued integrity and in compliance with relevant codes, standards and regulations. - Provided with additional protection at key crossings e.g. motorways. - Provided with pipeline tape markers and pipeline surface markers.	Y	Could cause loss of life or permanent injury which requires ongoing disability support.	Y	Considered to be ALARP if all mitigation measures outlined are correctly implemented.

Risk Record Entry Number	MA&D Event Category	MA&D Event Type	Section of DCO Proposed Development	Hazard Description	Applicable Stages (Construction, Operation, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Clarification
19	Industrial and urban accidents	Ground collapse	Route wide	Presence of unrecorded mine/quarry workings.	O, M	Collapse of mine/quarry workings damaging the CO ₂ pipeline or BVS resulting in a loss of containment event.	Historical mine/mineral extraction workings	Coal Mining Risk Assessment. Ground Conditions Report.	CO ₂ toxicity and fogging hazard affects neighbouring property and/or those people in the immediate area.	X	X	X									Shallow coal mining related stability issues to be assessed and addressed in line with best practice guidance (CIRIA C758D Abandoned Mine Workings Manual) that is accepted by the Coal Authority. Leak detection and emergency shutdown system installed on the CO ₂ transmission system.	Y	Could cause loss of life or permanent injury which requires ongoing disability support.	Y	Considered to be ALARP if all mitigation measures outlined are correctly implemented.

*Applicable Stages (C=Construction, O=Operational, M=Maintenance)