Proposed Derrygreenagh Power Project
Environmental Impact Assessment Report

Chapter 17: Major Accidents and Disasters

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17.0 MAJOR ACCIDENTS AND DISASTERS

17.1 Introduction

17.1.1 This chapter of the Environmental Impact Assessment Report (EIAR) presents a description of the likely significant adverse effects of the Proposed Development and Overall Project on the environment deriving from the vulnerability of the Proposed Development and Overall Project to risks from Major Accidents and Disasters (MA&Ds).

17.1.2 A full description of the existing Site is presented in Chapter 4 of this EIAR, while details of the Proposed Development and Overall Project are presented in Chapter 5 of this EIAR.

17.1.3 MA&Ds are defined in **Section 17.2**. In brief, Major Accidents are events that threaten serious environmental effects to human health, welfare and / or the environment and require the use of resources beyond those of the operator to manage, and disasters are external hazards, either natural or anthropogenic, with the potential to cause a Major Accident.

17.1.4 Activities associated with the construction, operation, and decommissioning of the Proposed Development and Overall Project have the potential to increase the risk of MA&Ds. The assessment of MA&Ds considers the full lifecycle of the Proposed Development and Overall Project, from construction, through operation, maintenance, and the eventual decommissioning and demolition of the facilities.

17.1.5 The assessment approach is described in **Section 17.2**. The assessment will provide an overview of the regulatory requirements to identify and assess MA&Ds. It will take into consideration the materials, operations and location of the Proposed Development and Overall Project. MA&Ds Risk Events relevant to the Proposed Development and Overall Project will be identified and, where Risk Events are determined to be credible, the potential impacts on environmental receptors (as identified in Section 4.8 of **Chapter 4** of this EIAR) will be qualitatively assessed, and mitigation measures to prevent or reduce these risks or their consequences are considered. These measures include engineering design and operational controls and the anticipated emergency management arrangements which would be initiated if the Risk Event occurred.

17.1.6 For each credible Risk Event, the qualitative assessment contained in this chapter will conclude if sufficient measures are in place to reduce risks associated with reasonably foreseeable worst-case impacts to acceptable limits ('as low as reasonably practicable' (ALARP)). Where risks can be reduced to ALARP it is concluded that the Risk Event does not constitute a likely significant adverse effect.

17.1.7 It is noted that a separate EIAR and MA&Ds assessment will be required for the Gas Connection Corridor (as part of separate future consenting processes by GNI), although where information is available this has been included in the assessment.

17.1.8 A Technical Land Use Planning (TLUP) and Major Accidents to the Environment (MATTE) assessment has been undertaken for the Proposed Development and Overall Project and is included in **Appendix 17A**, Volume II of the EIAR.

Statement of Authority

17.1.9 The Technical Team Lead for this Chapter is Dr Alex Freeman PhD and details of his professional experience are presented in EIAR **Appendix 1B** (refer to EIAR Volume II). Dr Freeman has been supported in the production of this assessment by Eoin O'Connor MEng and Nichola Egan MChem.

17.2 Methodology

Definitions

17.2.1 For the purpose of this assessment, the definition of a 'Major Accident' is taken from the guidelines on MA&Ds within EIA published by Institute of Environmental Management and Assessment (IEMA, 2020).

> *"A major accident is an event (for instance, train derailment or major road traffic accident) that threatens immediate or delayed serious environmental effects to human health, welfare and / or the environment and requires the use of resources beyond those of the client or its appointed representatives (i.e., contractors) to manage".*
>
> *Major accidents can be caused by disasters resulting from both man-made and natural hazards.*
>
> *A disaster is a man-made / external hazard (such as an act of terrorism) or a natural hazard (such as an earthquake) with the potential to cause an event or situation that meets the definition of a major accident.*
>
> *In general, major accidents and / or disasters should be considered as part of an assessment where the development has the potential to cause the loss of life, permanent injury and/or temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration".*

17.2.2 The COMAH Regulations 2015 (see **Section 17.3**) apply to the Proposed Development and Overall Project, specifically the Power Plant Area because it is expected to store significant quantities of hazardous materials including Secondary Fuel (HVO and/or distillate), which will be present on site for emergency use if there is an interruption to the supply of natural gas. It is proposed that 12,750 tonnes of Secondary Fuel will be stored on site, which is above the threshold of 2,500 tonnes for a lower tier COMAH site.

17.2.3 As the COMAH Regulations 2015 apply, the criteria for a major accident listed in Schedule 6 (Regulation 19(2)) are appropriate for consideration in this assessment. A major accident meets the COMAH criteria for a major accident if at least one of the consequences to persons and/or damage to property and/or the environment occurs, which is described below:

- An injury to a person which is fatal.
- Up to six persons injured within the establishment and hospitalised for at least 24 hours (hrs).
- One person outside the establishment hospitalised for at least 24hrs.
- A dwelling outside the establishment which is damaged and unusable as a result of the accident.
- The evacuation or confinement of persons for more than 2hrs where the value (persons × hours) is at least 500.
- The interruption of drinking water, electricity, gas or telephone services for more than 2hrs where the value (persons × hours) is at least 1,000.
- Damage to property in the establishment, to the value of at least EUR 2 million.
- Damage to property outside the establishment, to the value of at least EUR 500,000.
- Permanent or long-term damage to terrestrial habitats:

−0.5 hectares (ha) or more of a habitat of environmental or conservation importance protected by legislation; or

−10 or more hectares of more widespread habitat, including agricultural land.

- Significant or long-term damage to freshwater and marine habitats:

−10km or more of river or canal.

−1.0ha or more of a lake or pond.

−2.0ha or more of delta; or

−2.0ha or more of a coastline or open sea; or

−Significant damage to an aquifer or underground water: 1.0ha or more.

Assessment Approach

17.2.4 The MA&Ds assessment has been undertaken with reference to the Environmental Protection Agency's (EPA) 'Guidelines on the information to be contained in environmental impact assessment reports' (EPA, 2022).

17.2.5 The EPA guidance gives a high-level framework for what needs to be included in a MA&Ds assessment but does not provide specific topic guidance. There is no specific Irish guidance for the assessment of MA&Ds in the context of EIA. Therefore the EPA 'Guidance on assessing and costing environmental liabilities' (EPA, 2014) and the UK primer published by IEMA on MA&Ds in EIA (IEMA, 2020) and have been considered in the course of this assessment as described in **Section 17.17.3**. The assessment of MA&Ds has been based on the application of standard hazard identification and risk assessment methodology which is typically applied at COMAH Installations.

17.2.6 This methodology aims to identify credible MA&Ds Risk Events which are pertinent to the Proposed Development and Overall Project by virtue of the substances present, operations carried out and the geographic location. For each credible Risk Event identified, the likelihood and consequence of a reasonable worst-case scenario Risk Event is identified, taking into account mitigation measures already in place - embedded within the design, or best practice operating procedures, and emergency response policies of the Proposed Development and Overall Project. Following implementation of mitigation measures, the residual risk should be commensurate with a level considered by the Regulatory Authorities to be 'as low as reasonably practicable' (ALARP).

17.2.7 It is noted that this approach to the consideration of mitigation, which has been derived from the IEMA Primer, diverges from the approach within the EPA 2022 Guidelines. The EPA approach describes separate assessment of both pre-mitigation and post-mitigation, which is not appropriate in the case of MA&Ds, as the Proposed Development is required by other legislative regimes, including the Chemicals Act 2015 (COMAH) and the Safety, Health and Welfare at Work Act 2005 to take all necessary measures to prevent major accidents and to ensure the safety, health, and welfare of employees. Therefore a 'pre-mitigation' assessment is not possible, as the mitigation measures embedded in design cannot be considered separately. The principle of the EPA 2022 Guidelines is applied to the consideration of whether any further (secondary) mitigation, over and above those already in place, is deemed necessary to reduce residual risks to ALARP. Where residual risks can be reduced to ALARP it is concluded that the residual effect of the Risk Event does not constitute a likely significant adverse effect.

17.2.8 Furthermore, the findings of this MA&Ds assessment of whether a Risk Event constitutes a likely significant adverse effect or not is considered to be a yes/no question, and the seven-point scale in Table 3.4 of the EPA 2022 Guidelines ('describing the Significance

of Effects') is not applicable. It should be noted that Table 3.4 allows for a topic-specific approach to significance, and this approach has been adopted in this chapter.

17.2.9 In line with the IEMA Primer (2020), a proportionate approach has been used in this assessment, based on the relative likelihood of the Risk Events identified. A greater level of detail will be applied to the assessment of Risk Events which are considered more likely to occur, or to Risk Events with potentially greater consequences, whereas low-consequence events are scoped out of assessment as these are inherently not MA&Ds.

17.2.10 The approach used in this assessment is summarised as follows and has been derived from relevant guidance as described above:

- Identification of hazardous substances which could be present over the lifecycle of the Proposed Development, including flammable substances, materials harmful to the environment and materials harmful to human health.
- Consideration of the quantities and storage arrangements associated with these substances and the prospective operations at the Proposed Development involving these materials.
- Identification of potential MA&D Risk Events associated with these materials and operations. Assessment of the vulnerability of the Proposed Development to disasters as a result of, for example, location, infrastructure, climatic conditions and geological events, which constitutes a 'hazard identification record' as described in the IEMA Primer, or 'Long List'.
- The Long List of potential MA&Ds Risk Events identified is reduced following selection of only those credible Risk Events which are considered relevant to the site and the Proposed Development (the "Short List"). Between the Long List and the Short List Risk Events that are extremely unlikely to have consequences of a scale that constitutes a MA&D are screened out based on the IEMA Primer criteria. The "Short List" Risk Events are taken forward for further assessment.
- Where credible MA&Ds Risk Events and Disasters are identified, the reasonable worst-case consequence of a of each Risk Event is assessed in qualitative terms, based on factors including receptors which could be affected, and mitigation measures already in place. The reasonable worst-case consequence is rated as described in Section 3.3.2 "Risk Analysis" of the EPA 2014 Guidance and replicated in Table 17.1 and 17.2 below.

Table 17-1: Risk Classification Table - Consequence (EPA, 2014)

Rating	Consequence	
	Category	Description
1	Trivial	No impact or negligible change to the environment
2	Minor	Minor impact / localised or nuisance
3	Moderate	Moderate impact to environment
4	Major	Severe impact to environment
5	Massive	Massive impact to a large area, irreversible in medium term

Table 17-2: Risk Classification Table - Likelihood (EPA, 2014)

Rating	Likelihood	
	Category	Description
1	Very low	Very low chance of hazard occurring
2	Low	Low chance of hazard occurring
3	Medium	Medium chance of hazard occurring
4	High	High chance of hazard occurring

5	Very High	Very high chance of hazard occurring

- The likelihood and consequence ratings are combined to produce an overall risk ranking as described in Section 3.3.2 “Risk Analysis” of the EPA 2014 Guidance and replicated in Table 17.3 below. In addition to the risk ranking for each credible Risk Event, an assessment of whether the identified risk ranking is commensurate with ALARP (which would typically be if the risk ranking is ‘green’ but in certain cases even a ‘green’ score may not be commensurate with ALARP).

Table 17-3: Risk Matrix Template (EPA, 2014)

Likelihood	Very high	5	Green	Amber	Red	Red	Red
	High	4	Green	Amber	Amber	Red	Red
	Medium	3	Green	Green	Amber	Amber	Red
	Low	2	Green	Green	Green	Amber	Amber
	Very low	1	Green	Green	Green	Green	Green
			1	2	3	4	5
			Trivial	Minor	Moderate	Major	Massive
			Consequence				

- For each Risk Event where the assessed risk ranking is not commensurate with ALARP, this shall be considered a likely adverse significant impact. Consideration will be given to the further (secondary) mitigation, over and above those already in place, which would be required to reduce residual risks to ALARP. Where the assessed risk ranking is considered commensurate with ALARP the residual effect of the Risk Event is not considered to constitute a likely significant adverse effect.

17.2.11 Further detailed hazard and risk analyses will be carried out throughout the Proposed Development lifecycle. The engineering design of the Proposed Development will be subject to formal process safety risk assessments which typically comprise of Hazard Identification (HAZID), Hazard and Operability (HAZOP) and Layers of Protection Analysis (LOPA) at the appropriate project / design stage(s).

Consideration of the Proposed Development and the Overall Project

17.2.12 The Proposed Development comprises two main components, the Power Plant Area (PPA), and the Electricity Grid Connection (EGC). Further, the Overall Project also includes the Gas Connection Corridor (GCC). In order to fully understand the likely significant effects of the Proposed Development it has been considered in the context of the ‘Overall Project’, as the GCC is integral to the development as a whole even though it is not the direct subject of this consent.

17.2.13 MA&Ds assessments for each of the three components, the PPA, the EGC and the GCC have been conducted according to the assessment approach described above and are presented separately in this chapter.

Limitations and Assumptions

17.2.14 Assessment of the Gas Connection Corridor (GCC) has been based upon a well-informed route, but this may change during the course of detailed design to be carried out by Gas Networks Ireland (GNI) at a later date. Fresh MA&Ds assessments of the GCC will be undertaken as part of this future consenting process for the GCC.

Consultation

17.2.15An EIAR scoping letter was issued to a comprehensive list of Statutory and Non-Statutory bodies. Details of consultations are contained in **Chapter 6** of this EIAR and associated appendices. The Health and Safety Authority (HSA), which is the central competent authority for regulatory control of COMAH sites to which the Seveso Directive applies did not provide a response to the scoping letter. No other consultees reference MA&Ds in their responses.

17.3 Regulatory, Policy and Guidance Framework

17.3.1 This section identifies the relevant policy and legislation informing the scope of the assessment and sets out the requirements stipulated within EIA Directive 2014/52/EU.

Legislative Background

International

17.3.2 The assessment of the vulnerability of the Proposed Development and Overall Project to MA&Ds is included within the EIAR following changes to EU legislation per the revised EIA Directive 2014/52/EU and as transposed into Irish law. The Directive states the need to assess:

> *"the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and / or natural disasters which are relevant to the project concerned".*

17.3.3 The EIA Directive 2014/52/EC requires:

> *'A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and / or disasters… …in order to avoid duplications, it should be possible to use any relevant information available and obtained through risk assessments carried out pursuant to Union legislation, such as Directive 2012/18/EU of the European Parliament and the Council (13) and Council Directive 2009/71/Euratom (14), or through relevant assessments carried out pursuant to national legislation provided that the requirements of this Directive are met'*

17.3.4 In accordance with the requirements of the Regulations, an assessment of the potential risks of MA&Ds relevant to the Proposed Development and Overall Project is required. This assessment shall consider the measures envisaged to prevent or mitigate significant adverse effects on the environment associated with these incidents and provide details of the preparedness for a proposed emergency response should they occur.

17.3.5 The development of the risk assessment methodology has also been informed by the following EU legislation:

- Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC (Seveso III Directive) This is implemented in Ireland through the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015, (the "COMAH Regulations 2015").
- EU Regulation 402/2013 on the Common Safety Method on Risk Evaluation and Assessment (CSMRA) (as amended by Regulation EU 2015/1136).

National

17.3.6 The development of the risk assessment methodology has also been informed by the following Irish legislation:

- The SEVESO III Directive is implemented in Ireland through SI. No. 209/2015 the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015, (the "COMAH Regulations 2015").Act No. 10/2005 Safety, Health and Welfare at Work Act 2005.
- S.I. No. 566/2012 - European Union (Large Combustion Plants) Regulations

Policy

National

17.3.7 The Government of Ireland published a Framework for Major Emergency Management Framework (Department of Environment, Heritage and Local Government (DoEHLG), 2005) in order to set out common arrangements and structures for front line public sector emergency management in Ireland. The Framework covers hazard identification/risk assessment, mitigation/risk management, major emergency preparedness, delivering a coordinated response, and recovery. The document introduces a system to immediately determine a lead agency in all emergency situations and to facilitate effective coordination of response agencies.

Regional

17.3.8 The Eastern and Midland Regional Assembly (EMRA) Draft Regional Spatial and Economic Strategy does not provide guidance regarding the assessment of MA&Ds. It does refer to the need to ensure the resilience of critical infrastructure "*as both natural, including extreme weather events, and man-made disaster and crises situations become more common place*."

Local

17.3.9 The Offaly County Development Plan 2021-2027 (OCC, 2021), does not provide guidance regarding the assessment of MA&Ds but does refer to the implementation and control of Major Accident Hazard Sites, as defined by the SEVESO III Directive (2012/18/EU), within objective ENVP-16:

> *It is Council policy, for the purposes of preventing / reducing the risk or limiting the consequences of a major accident involving dangerous substances, to have regard to the provisions of the Major Accidents Directive, and any regulations under any enactment giving effect to that Directive, and the recommendations of the Health and Safety Authority, in the control of:*
>
> - *The siting of new establishments;*
> - *The modification of existing establishments; and*
> - *Development within the consultation distance of such establishments.*

17.3.10 The Westmeath County Development Plan 2021-2027 (WCC, 2021), does not provide guidance regarding the assessment of MA&Ds but does refer to the implementation and control of Major Accident Hazard Sites, as defined by the SEVESO III Directive (2012/18/EU), within policy objectives CPO 10.137 and 10.138:

> *CPO 10.137 Have regard to the provisions of the Major Accidents Directive, relating to the control of major accident hazards involving dangerous substances, and the recommendations of the Health and Safety Authority in the assessment of all planning applications located within the consultation distance of such sites.*
>
> *CPO 10.138 Require developers to submit a detailed consequence and risk assessment with all Environmental Impact Statements and/or legislative licence applications for all Seveso sites.*

Guidance

17.3.11 The MA&Ds assessment has been undertaken with reference to the Environmental Protection Agency's (EPA) 'Guidelines on the information to be contained in environmental impact assessment reports' (EPA, 2022), which provides a high-level framework for what needs to be included in a MA&Ds assessment but does not provide specific topic guidance.

17.3.12 There is no specific Irish guidance for the assessment of MA&Ds in the context of EIA. Therefore the following guidance has been considered in the course of this assessment.

- EPA 'Guidance on assessing and costing environmental liabilities' (EPA, 2014);
- IEMA 'Major Accidents and Disasters in EIA, A Primer' (IEMA, 2020);
- HSA 'Guidance on Technical Land-Use Planning Advice' (HSA, 2023);
- Chemical and Downstream Oil Industries Forum (CDOIF) 'Guideline Environmental Risk Tolerability for COMAH establishments) (CDOIF, 2016)
- Department of Housing, Local Government, and Heritage, 'A Guide to Risk Assessment in Major Emergency Management' (DHLGH, 2010)

Health and Safety Authority (HSA)

17.3.13 The Health and Safety Authority (HSA) is the central competent authority for regulatory control of sites to which the Seveso Directive applies.

17.3.14 The quantity of Secondary Fuel (HVO and/or distillate) to be stored at the Power Plant Area qualifies as Lower Tier COMAH Site as designated under the COMAH Regulations 2015. The HSA will be notified prior to commencing construction of the facility and a Major Accident Prevention Policy (MAPP) will be prepared prior to commencement of operation of the facility.

17.3.15 The COMAH Regulations 2015 require operators of establishments where dangerous substances are present, in quantities equal to or in excess of defined thresholds listed in Schedule I, Parts 1 and 2, to take all measures necessary to prevent and mitigate the effects of major accidents to human beings and the environment.

17.3.16 The Proposed Development (i.e., Power Plant Area) will include an inventory of 12,750 tonnes of Secondary Fuel (HVO and/or distillate), therefore is within the Lower Tier COMAH threshold (i.e., >2,500 tonnes).

17.3.17 The COMAH Regulations will not apply to the Electricity Grid Connection or the Gas Connection Corridor.

17.4 Baseline Environmental Conditions and Constraints

17.4.1 This section provides an overview of the Proposed Development and Overall Project, summarising the key features pertinent to the assessment of MA&Ds. Full details on the Site are provided in **Chapter 4** of this EIAR and full details of the Proposed Development are provided in **Chapter 5** of this EIAR.

Study Area

17.4.2 This section provides a summary of the location of the Proposed Development and Overall Project and proximity to health, safety and environmental receptors. A study area based on a radius of 5km from each of the areas constituting the Overall Project (the Power Plant Area, the Electricity Grid Connection, and the Gas Connection Corridor) has been considered.

17.4.3 There is no definitive guidance on the required study area for MA&Ds, therefore this has been based on experience and judgement, ensuring that sensitive locations are included. The 5km study area includes all areas within the outer cumulative risk-based planning zone contours for the Power Plant Area as modelled within the Land Use Planning Assessment, provided in **Appendix 17.A** Further buffer area is built in to the 5km study area to ensure that the nearest residential receptors are considered, and ensure that all potential MA&Ds Risk Events are captured. Impacts further than 5km from the Proposed Development are extremely unlikely.

17.4.4 The selected study area extends to the villages of Rochfortbridge, Co. Westmeath to the north-west of the power plant area, Rhode, Co. Offaly to the east of the electricity grid connection and the rural settlement of Croghan, Co. Offaly to the west of the electricity grid connection.

17.4.5 The characteristics of the surrounding area is mostly low density agricultural and residential development. A substantial extent of lands in close proximity to the Proposed Development and Overall Project boundary are peat bogs owned by Bord na Móna which have been historically harvested. All peat extraction activities across all of the Bord na Móna land-base have ceased since January 2021.

17.4.6 Current activities onsite post peat extraction includes site management and environmental monitoring, regulated under an Integrated Pollution Control (IPC) Licence, Reg No. P0501-01.

Receptors

17.4.7 Receptors are features of the environment that are subject to assessment under Article 3 of the EIA Directive, namely population and human health, biodiversity, land, soil, water, air and climate, material assets, cultural heritage and landscape.

17.4.8 The IEMA Primer states that an environmental receptor that could be vulnerable to a MA&D risk, but is outside the scope of the wider EIA, is very unlikely. Therefore, the determination of receptors has been completed primarily with reference to the work of other disciplines and the data sources that they used. These receptors are summarised in Section 4.8 of **Chapter 4** of this EIAR. In addition, industrial facilities with the capacity to impact on MA&D risks have been identified using the EPA Unified GIS Application (EPA, 2023).

17.4.9 Receptors that could be vulnerable to a MA&D risk are summarised below and illustrated in **Figure 17.1**.

Power Plant Area

17.4.10 The nearest residential properties to the Power Plant Area (PPA) are two sets of three properties, each c. 1.1 km to the south-east (one set over R400 road and the other on

L1009 road at Knockdrin). The nearest settlement to the PPA is Rochfortbridge, Co. Westmeath, c. 4km to the north-west. In the 2016 Census (WCC, 2021) Rochfortbridge recorded a population of 1,473 persons. There are also other scattered residences within the study area.

17.4.11 There are three IE Licenced facilities within the 5km Study Area of the PPA boundary.

- Carrick Farms: IE Licence P0649-01 (Intensive Agriculture Sector), is located c. 4km north-east of the PPA.
- Skeagh Farms: IE Licence P0938-02 (Intensive Agriculture Sector), is located c. 1.5km south-west of the PPA.
- SSE Generation Ireland Limited (Rhode): IE Licence P0694-01 (Energy Sector), is located c. 4.3km south of the PPA.

17.4.12 There are no current COMAH sites within 5km of the PPA. Castlelost FlexGen Ltd (Kiltotan & Collinstown, Rochfortbridge, Co. Westmeath) is a proposed Energy Sector development which is 3.7km north-west of the PPA and is included in the list of lower tier COMAH sites.

17.4.13 As described in **Chapter 13** of this EIAR, there are also three active quarries in the area. Two of the quarries are operated in a joint venture by Bord na Móna and are located c. 1.0km to the west and 1.2 km to the north-west of the PPA. The third, located c. 1.3km to the south west south-west of the PPA, is privately owned.

17.4.14 Soil geology and groundwater conditions have been identified using Geological Survey Ireland (GSI) datasets. The soil geology beneath the PPA is mainly Made Ground and surrounded by cut peat, with some areas of till chiefly derived from limestone also within the Study Area. The PPA is not located in a groundwater source protection area and the groundwater vulnerability around the PPA is classified as Low. The bedrock aquifer is classified as locally important. Soil geology and groundwater baseline conditions are fully described in **Chapter 13** and **Chapter 12** of this EIAR respectively.

17.4.15 The PPA is located in the Boyne Water Framework Directive (WFD) catchment. The following watercourses are located within the Study Area. Baseline water environment conditions are fully described in **Chapter 12** of this EIAR.

- The Mongagh River, a tributary of the Yellow River, is located immediately north of the PPA.
- The Yellow River, is located c. 1.6km south-east of the PPA.

17.4.16 There are no protected environmental sites within the Study Area. Baseline biodiversity conditions are fully described in **Chapter 9** of this EIAR.

17.4.17 The datasets of the National Monuments Service (NMS) and the National Inventory of Architectural Heritage (NIAH) contain 117 National Monuments and 29 Protected Sites within the Study Area. Baseline cultural heritage conditions within a 1km study area are fully described in **Chapter 8** and **Appendix 8A** of this EIAR.

Electricity Grid Connection

17.4.18 There are a number of residential properties adjacent to the Electricity Grid Connection (EGC) where it dissects (via undercrossing) the L1010 road at Togher, the nearest being c. 50m from the red line boundary. The nearest residential settlements to the EGC is the village of Rhode, Co. Offaly, c. 2.0km to the east and the village of Croghan, Co. Offaly, c. 2.0km to the west. In the 2016 Census (OCC, 2021), Rhode recorded a population of 811 persons and Croghan recorded a population of 601 persons. There are also other scattered residences within the study area.

17.4.19There are four IE Licenced facilities within the 5km Study Area of the EGC boundary.

- Carrick Farms (as above), is located c. 4.2km north-east of the EGC.
- Skeagh Farms (as above), is located c. 140m, south-west of the EGC.
- SSE Generation Ireland Limited (Rhode): IE Licence P0694-01 (Energy Sector), is located c. 900m, east of the EGC.
- Mr Mattie Moore: IE Licence P0430-01 (Intensive Agriculture Sector), is located c. 3.4km west of the EGC.

17.4.20The proposed Castlelost FlexGen Ltd development is c. 3.4km north-west of the EGC and is included in the list of lower tier COMAH sites.

17.4.21The soil geology beneath the EGC is mainly peat and the Study Area includes some till derived chiefly from limestone. The EGC is not located in a groundwater source protection area and the groundwater vulnerability classification around the EGC ranges from Low to High according to the GSI. The 400kV Substation Site has a Moderate groundwater vulnerability. The GSI classifies the bedrock aquifer as locally important. Soil geology and groundwater baseline conditions are fully described in **Chapter 13** and **Chapter 12** respectively.

17.4.22The EGC is located in the Boyne WFD Catchment and the Barrow WFD Catchment. The following watercourses are located within the Study Area. Baseline water environment conditions are fully described in **Chapter 12** of this EIAR.

- The Mongagh River, a tributary of the Yellow River, is located c. 740m north of the EGC.
- The Yellow River, intersects the EGC.
- The Coolcor Stream, a tributary of the Yellow River, intersects the EGC.
- The Esker (Stream) [Offaly], a tributary of the Figile River, is located c. 1km west and c. 700m south of the EGC.
- The Grand Canal is c. 90m south of the EGC.
- The Philipstown River is c. 3.2km south of the EGC.

17.4.23Grand Canal pNHA is c. 90m south of the EGC. Baseline biodiversity conditions are fully described in **Chapter 9** of this EIAR.

17.4.24The datasets of the National Monuments Service (NMS) and the National Inventory of Architectural Heritage (NIAH) contain three National Monuments within the EGC, and a further 316 National Monuments and 89 Protected Sites within the Study Area. Baseline cultural heritage conditions within a 1km study area are fully described in **Chapter 8** and **Appendix 8A** of this EIAR.

Gas Connection Corridor

17.4.25There are a number of residential properties within the Gas Connection Corridor (GCC), including along the R446 and L1127. The nearest residential settlements to the GCC is the village of Rochfortbridge, the western part of which falls within the GCC. There are also other scattered residences within the study area.

17.4.26There are three IE Licenced facilities within the 5km Study Area of the GCC boundary.

- Carrick Farms (as above), is located c. 3.8km north-east of the GCC.
- Skeagh Farms (as above), is located c. 1.0m south-west of the GCC.

- SSE Generation Ireland Limited (Rhode): IE Licence P0694-01 (Energy Sector), is located c. 4.7m south-east of the GCC.

17.4.27 The proposed Castlelost FlexGen Ltd development is c. 320m south-west of the GCC and is included in the list of lower tier COMAH sites.

17.4.28 The soil geology beneath the GCC is mainly peat at the southern and northern extents, with other areas of till chiefly derived from limestone. The GCC is not located in a groundwater source protection area and the groundwater vulnerability classification around the GCC ranges from Low to High according to the GSI. The GSI classifies the bedrock aquifer as locally important. Soil geology and groundwater baseline conditions are fully described in **Chapter 13** and **Chapter 12** respectively.

17.4.29 The GCC is located in the Boyne WFD Catchment and the Lower Shannon WFD Catchment. The following watercourses are located within the Study Area. Baseline water environment conditions are fully described in **Chapter 12** of this EIAR.

- The Mongagh River, intersects the GCC.
- The Yellow River is located c. 1.5km south of the GCC.
- The Brosna River is located c. 3.0 km west of the GCC.

17.4.30 Lough Ennell SPA/SAC/NHA is located c. 2.6 km north-west the GCC. Nure Bog NHA is located c. 3.9 km north-west of the GCC. Cloncrow Bog (New Forest) NHA is located c. 4.5 km south-west of the GCC. Milltownpass Bog NHA is located c.4.9 km north-east of the GCC. Baseline biodiversity conditions are fully described in **Chapter 9** of this EIAR.

17.4.31 The datasets of the National Monuments Service (NMS) and the National Inventory of Architectural Heritage (NIAH) contain three National Monuments and nine Protected Sites within the EGC, and a further 319 National Monuments and 98 Protected Sites within the 5 km Study Area. Baseline cultural heritage conditions within a 1km study area are fully described in **Chapter 8** and **Appendix 8A** of this EIAR.

17.5 Predicted Impacts

Do Nothing

17.5.1 In the absence of the Proposed Development and Overall Project being progressed, the likelihood of a major accident and / or disaster occurring is very low. The PPA site is currently used for servicing equipment required for post peat extraction activities required for site management and environmental monitoring. The EGC land is mostly part of the Derrygreenagh bog complex. The GCC land is mostly in agricultural usage. Activities associated with this usage are likely to be low risk.

17.5.2 If the Proposed Development were not to proceed, environmental monitoring and site management would continue, as required under the conditions of the IPC Licence (P0501-01). The area of agricultural land for the 400kV substation would continue to be managed for agricultural purposes.

Power Plant Area

Construction Phase

17.5.3 The identification of potential MA&Ds Risk Events during construction of the PPA considers the geographical location, the substances which will be present, and the typical activities associated with the works, including electrical work and general construction work.

Hazardous Substances

17.5.4 Construction materials which may be harmful to human health or the environment will be present including the following:

- Liquid concrete can be harmful to human health and the environment and will be present in substantial quantities during construction where it is used to construct buildings, site surfacing, equipment supports, and other assets.
- Diesel fuel will be present on site to fuel vehicles, construction equipment and generators.
- Acetylene, contained in compressed gas cylinders, may be present on-site to carry out welding during construction activities.

17.5.5 In addition to the above, the construction phase also includes commissioning of the plant, with the additional introduction of natural gas and secondary fuel to the site. The risks associated with these substances haven't been considered separately as part of the construction phase as these risks will be the same (with the same mitigation measures) as those included in the operational phase below.

17.5.6 **Table 17.4** contains a review of the potential Risk Events which involve the substances described in this section. The hazard codes of each substance are listed in accordance with the Classification, Labelling and Packaging (CLP) Regulation (EC) No 1272/2008.

Electrical Hazards

17.5.7 Construction activities include works required to connect electrical power generated at high voltage (HV) at the PPA to the transmission system via equipment such as transformers and switchgear. There are hazards associated with HV electricity, particularly during construction when work is carried out at or near to overhead power lines and underground cables. Contact with HV electricity can cause fatal injuries therefore must be carefully managed to control risks.

General Construction Activities

17.5.8 General construction activities will include ground preparation, excavation, construction of buildings and process structures including bulk storage tanks and bunding. These activities will require the use of vehicles and tools. The hazards associated with activities include the potential for vehicle impact, particularly during reversing and vehicle overturning. The controls around this work will be carefully managed via risk assessment to control the risks to people, the environment and also to the existing operational areas.

Natural Hazards

17.5.9 Disasters such as major storms and strong seismic events have a low likelihood of occurrence, however the potential impacts can reach the highest level of consequence.

Identification of Potential Risk Events

17.5.10 The potential major accident Risk Events which have been identified for the construction phase of the PPA based upon the hazardous substances present are described in **Table 17.4**.

17.5.11 The other potential MA&Ds Risk Events which have been identified for the construction phase of the PPA are described in **Table 17.5.**

Assessment of Credible Risk Events

17.5.12 The conclusions of the assessment of substances contained in **Table 17.4** are that the materials which will be present at the PPA during construction do not have the potential to initiate a credible major accident Risk Event.

17.5.13 The conclusions of the assessment of other potential MA&Ds Risk Events contained in **Table 17.5** are that a wildfire triggered by construction activity or otherwise has the potential to initiate a credible major accident Risk Event.

17.5.14 Credible Risk Events have been assessed in detail within **Table 17.6**, where the measures which will be taken to prevent and mitigate these are considered.

17.5.15 Taking into consideration the likelihood and consequences of the Credible Risk Events, considering necessary embedded mitigation measures and best practices as described in **Section 17.2**, the overall risk of a MA&D Risk Event at the PPA during construction is considered to be low, but cannot be entirely eliminated. The assessed risk is considered to be commensurate with ALARP, and therefore **not a likely significant effect**.

Operational Phase

Hazardous Substances

17.5.16 The identification of potential MA&Ds Risk Events during the operational phase considers the substances present at the PPA, identifying those which are potentially dangerous, such as flammable materials and substances toxic to human health and / or the environment. The assessment also considers the equipment in which these substances will be stored and used and typical activities associated with the operation of the PPA.

17.5.17 The following materials will be present at the PPA during operation, which are considered in detail within the Land Use Planning Assessment (**Appendix 17A**):

- Natural Gas

  −This will be the primary source of fuel used to generate power to both the CCGT and OCGT and will be supplied via an underground pipeline to an onsite Above Ground Infrastructure (AGI). The AGI will be located north-west of the CCGT, adjacent to the R400 road. Natural gas will be forwarded from the Pressure Regulating Station (PRS) outlet in the AGI compound to the

south of the site (OCGT unit) via a buried gas pipework. Natural gas will also be forwarded via the prevailing pressure connection to the power plant gas receiving facility located adjacent to the AGI. The gas receiving facility contains a gas compressor and pressure control station. From the gas receiving facility the gas is supplied to the CCGT.

−The Derrygreenagh AGI provides pressure and temperature control for the supply to the OCGT. Pressure and temperature control for the CCGT is carried out within the Power Plant Area. Dew point heating takes place in the gas receiving facility and performance heating in the gas skid adjacent to the CCGT.

- Secondary Fuel (HVO and/or distillate)

  −This will be used as a secondary source of fuel to generate power in the event of an interruption in the gas supply to the Proposed Development. The secondary fuel is a requirement of the connection agreement for security of supply.

  −Secondary Fuel will be stored within permanent, above ground storage tanks which will be equivalent to approximately 5 days CCGT full load continuous operation and 3 days OCGT full load operation, as determined by the connection agreement for security of supply.

  −Smaller quantities of Secondary Fuel will also be present within systems such as a small emergency generator and within fire water pumps.

  −Temporary power generators operating on diesel fuel may also be used during construction / demolition activities.

- Liquefied Petroleum Gas e.g. Propane

  −There will be two 1000kg propane tanks on site, serving the CCGT and the OCGTs. Propane is commonly used in pilot ignition systems for combustion plant and as reference gases in the continuous emissions monitoring systems installed within the stack.

17.5.18 The following substances are also expected to be present in the PPA during operation. Current indicative quantities are provided - these will be confirmed during the detailed engineering design phase.

- 35% ammonia solution (25.4 tons) for NO_x control of flue gases and boiler water conditioning.
- Lubricating oil (100 tons) for rotating machinery and transformer oil (50 tons).
- Compressed gases including:
  - Hydrogen compressed gas (100 kg) stored in pressurised cylinders which is used as a coolant in the gas combustion turbine generator cooling system.
  - Carbon dioxide compressed gas (17.7 tons) for gas turbine enclosure fire protection & hydrogen cooled generator purging.
  - Nitrogen compressed gas (four bottles) for natural gas system purging.
  - Inert gas (35+ bottles, FM200 or equivalent) for automatic fire protection of electrical / electronic equipment enclosures.
  - Acetylene (one bottle) contained in compressed gas cylinders may be present on-site to carry out welding for maintenance activities.

- Water treatment chemicals including:
  - Trisodium phosphate powder (0.2 tons) and solution (1.0 tons) for boiler water conditioning.
  - Carbohydrazide solution (1.3 tons) for boiler drum water conditioning.
  - Sodium hypochlorite (15.0 tons) as a cooling water biocide.
  - Sodium hydroxide (14 tons) for water treatment plant resin regeneration.
  - Sulphuric acid (15.0 tons) for water treatment plant resin regeneration.
  - Sodium chloride (1.0 tons) for water softening.

17.5.19 Firewater runoff is also considered as a potentially dangerous substance in this assessment. In the event of a major fire on-site, foam concentrate will be applied to extinguish fires, particularly within the fuel storage area and potentially the offloading and forwarding areas. The firewater runoff would contain a mixture of materials that could be harmful to the environment if released to ground and groundwater. Firewater retention will be considered at final design using the EPA 'Firewater Runoff Tool'. The operation of the PPA where it concerns emissions to the environment, including firewater will be regulated by EPA through the Industrial Emissions Licence (IEL).

17.5.20 All materials stored within the PPA will be safely contained within dedicated storage tanks or appropriate containers, i.e., compressed gas cylinders. All materials will be stored in suitably bunded areas with weather protection, where appropriate, and will be subject to regular inspections and periodic integrity testing.

17.5.21 Emissions to the atmosphere at the PPA will include nitrogen dioxide and carbon monoxide. The impacts of these pollutants at sensitive receptors are fully assessed in **Chapter 7**. The operation of the PPA where it concerns emissions to the environment will be regulated by EPA through the Industrial Emissions Licence (IEL)

17.5.22 **Table 17.4** contains a review of the potential accident Risk Events which involve the substances described in this section. The hazard codes of each substance are listed in accordance the CLP Regulation (EC) No 1272/2008.

Operational Activities

17.5.23 OCGT and CCGT systems use well established technology and are in operation within many facilities worldwide as they provide an efficient means of generating electricity very quickly. There are however recognised hazards associated with their use as they comprise complex, high speed components and operate at high temperatures and pressures with a flammable mixture of fuel in air. These systems must be carefully managed and controlled via safety systems.

Natural Hazards

17.5.24 Disasters such as major storms and strong seismic events have a low likelihood of occurrence, however the potential impacts can reach the highest level of consequence.

17.5.25 The design life of the PPA is 25 years; therefore, adverse impacts associated with climate change such as increased ambient temperatures and wind speeds are pertinent and are also considered in this section. The potential disaster Risk Events which have been assessed for the PPA are described in **Table 17.5**.

17.5.26 The potential impacts of natural disasters are well understood by engineers involved with the design, and operation of the PPA. These impacts are mitigated during the engineering design phase, for example, by the use of industry standard mechanical and structural design codes used for pipework, process equipment, supports and structural assets.

Identification of Potential Risk Events (Long List)

17.5.27 The potential major accident Risk Events which have been identified for the operation of the PPA based upon the hazardous substances present are described in **Table 17.4**.

17.5.28 The other potential MA&Ds Risk Events which have been identified for the operation of the PPA are described in **Table 17.5**.

Assessment of Credible Scenarios (Short List)

17.5.29 The conclusions of the assessment of substances contained in **Table 17.4** are that the substances with the potential to initiate a major accident hazard Risk Events are natural gas, Secondary Fuel, and LPG.

17.5.30 The conclusions of the assessment of other potential MA&Ds Risk Events contained in **Table 17.5** are that a wildfire in the vicinity of the PPA during operation has the potential to constitute a credible major accident Risk Event.

17.5.31 Credible Risk Events have been assessed in detail within **Table 17.6**, where the measures which will be taken to prevent and mitigate these are considered.

17.5.32 Taking into consideration the likelihood and consequences of the Credible Risk Events, considering necessary embedded mitigation measures and best practices as described in **Section 17.2**, the overall risk of a MA&D Risk Event at the PPA during operation is considered to be low, but cannot be entirely eliminated. The assessed risk is considered to be commensurate with ALARP, and therefore **not a likely significant effect**.

Decommissioning Phase

17.5.33 At the end of its operating life, all above-ground equipment associated with the PPA will be decommissioned and removed from the Site. Prior to removing the plant and equipment, all residues and operating chemicals will be cleaned out from the plant and disposed of at a suitably licenced facility.

17.5.34 Site closure planning and liability risk assessment will be documented within the IEL for the PPA. Required safety controls and remedial actions will be incorporated into a Decommissioning Environmental Management Plan, as part of a Closure Remediation Aftercare Management Plan (CRAMP)) which will be produced and agreed with the EPA as part of the permit surrender process.

17.5.35 No potential Risk Events have been identified relating to the decommissioning phase based on current information available.

Electricity Grid Connection

Construction Phase

17.5.36 The identification of potential MA&Ds Risk Events during construction of the EGC considers the same factors described under the previous PPA section (i.e., geographical location, substances present, the typical activities associated with the works, and natural hazards).

Hazardous Substances

17.5.37 Construction materials which may be harmful to human health or the environment will be present including the following:

- Liquid concrete can be harmful to human health and the environment and will be present in substantial quantities during construction where it is used to construct buildings, site surfacing, equipment supports, and other assets.
- Diesel fuel will be present on site to fuel vehicles, construction equipment and generators.

- Acetylene, contained in compressed gas cylinders, may be present on-site to carry out welding during construction activities.

17.5.38 **Table 17.4** contains a review of the potential major accident Risk Events which involve the substances described in this section. The hazard codes of each substance are listed in accordance the Classification, Labelling and Packaging (CLP) Regulation (EC) No 1272/2008.

Electrical Hazards

17.5.39 Construction activities primarily include works concerning equipment intended to carry electrical power generated at high voltage (HV). There are hazards associated with HV electricity, particularly during construction when work is carried out at or near to overhead power lines and underground cables. Contact with HV electricity can cause fatal injuries therefore must be carefully managed to control risks.

General Construction Activities

17.5.40 General construction activities will include ground preparation, excavation, construction of structures including substations, and overhead line construction. These activities will require the use of vehicles and tools. The hazards associated with activities include the potential for vehicle impact, particularly during reversing and vehicle overturning. The controls around this work will be carefully managed via risk assessment to control the risks to people, the environment and also to the existing operational areas.

Natural Hazards

17.5.41 Disasters such as major storms and strong seismic events have a low likelihood of occurrence, however the potential impacts can reach the highest level of consequence.

Identification of Potential Risk Events (Long List)

17.5.42 The potential major accident Risk Events which have been identified for the construction phase of the EGC based upon the hazardous substances present are described in **Table 17.4**.

17.5.43 The other potential MA&Ds Risk Events which have been identified for the construction phase of the EGC are described in **Table 17.5.**

Assessment of Credible Risk Events (Short List)

17.5.44 The conclusions of the assessment of substances contained in **Table 17.4** are that the materials which will be present at the EGC during construction do not have the potential to initiate a credible major accident Risk Event.

17.5.45 The conclusions of the assessment of potential disaster Risk Events contained in **Table 17.5** are that a wildfire in the vicinity of the EGC during construction has the potential to initiate a credible major accident Risk Event.

17.5.46 Credible Risk Events have been assessed in detail within **Table 17.6**, where the measures which will be taken to prevent and mitigate these are considered.

17.5.47 Taking into consideration the likelihood and consequences of the Credible Risk Events, considering necessary embedded mitigation measures and best practices as described in **Section 17.2**, the overall risk of a MA&D Risk Event at the EGC during construction is considered to be low, but cannot be entirely eliminated. The assessed risk is considered to be commensurate with ALARP, and therefore **not a likely significant effect**.

Operational Phase

17.5.48 The identification of potential MA&Ds during the operational phase of the EGC considers the same factors described under the previous Power Plant Area section (i.e.,

geographical location, substances present, the typical activities associated with the works, and natural hazards.

Hazardous Substances

17.5.49 There are oil filled reactors at the 220 kV substation and oil filled step-up transformers at the 400 kV substation.

Operational Activities

17.5.50 Operational activities primarily include maintenance works concerning equipment intended to carry electrical power generated at high voltage (HV). There are hazards associated with HV electricity, particularly during construction when work is carried out at or near to overhead power lines and underground cables. Contact with HV electricity can cause fatal injuries therefore must be carefully managed to control risks.

Natural Hazards

17.5.51 Disasters such as lightning strikes and strong seismic events have a low likelihood of occurrence, however the potential impacts can reach the highest level of consequence.

17.5.52 Adverse impacts associated with climate change such as increased ambient temperatures and wind speeds are pertinent considering the expected design life of the EGC and are also considered in this section. The potential disaster Risk Events which have been assessed for the EGC are described in **Table 17.5**.

17.5.53 The potential impacts of natural disasters are well understood by engineers involved with the design, and operation of the EGC. These impacts are mitigated during the engineering design phase, for example, by the use of industry standard electrical and structural design codes.

Identification of Potential Risk Events (Long List)

17.5.54 The potential MA&Ds Risk Events which have been identified for the operation of the EGC are described in **Table 17.5**.

Assessment of Credible Risk Events (Short List)

17.5.55 The conclusions of the assessment of potential MA&Ds Risk Events contained in **Table 17.5** are that a wildfire in the vicinity of the EGC during operation has the potential to initiate a credible major accident Risk Event.

17.5.56 Credible Risk Events have been assessed in detail within **Table 17.6**, where the measures which will be taken to prevent and mitigate these are considered.

17.5.57 Taking into consideration the likelihood and consequences of the Credible Risk Events, considering necessary embedded mitigation measures and best practices as described in **Section 17.2**, the overall risk of a MA&D Risk Event at the EGC during operation is considered to be low, but cannot be entirely eliminated. The assessed risk is considered to be commensurate with ALARP, and therefore **not a likely significant effect**.

Decommissioning Phase

17.5.58 The Electricity Grid Connection will be managed by the transmission asset operators (TAO) and transmission service operators (TSO) (ESBN and EirGrid for electricity) as part of the national grid network. When the Electricity Grid Connection will be decommissioned depends on the asset owner's operational requirement and asset management policy. Therefore, potential accident Risk Events associated with the decommissioning phase of the Electricity Grid Connection have been scoped out.

Gas Connection Corridor

Construction Phase

17.5.59 The identification of potential MA&Ds Risk Events during construction of the GCC considers the same factors described under the previous PPA section (i.e., geographical location, substances present, the typical activities associated with the works, and natural hazards).

Hazardous Substances

17.5.60 Construction materials which may be harmful to human health or the environment will be present at the GCC including the following:

- Liquid concrete can be harmful to human health and the environment and will be present in substantial quantities during construction where it is used to construct buildings, site surfacing, equipment supports, and other assets.
- Diesel fuel will be present on site to fuel vehicles, construction equipment and generators.
- Acetylene, contained in compressed gas cylinders, may be present on-site to carry out welding during construction activities.

17.5.61 **Table 17.4** contains a review of the potential major accident Risk Events which involve the substances described in this section. The hazard codes of each substance are listed in accordance the Classification, Labelling and Packaging (CLP) Regulation (EC) No 1272/2008.

General Construction Activities

17.5.62 General construction activities will include ground preparation, trenching, horizontal direction drilling, and pipeline installation. These activities will require the use of vehicles and tools. The hazards associated with activities include the potential for vehicle impact, particularly during reversing and vehicle overturning. The controls around this work will be carefully managed via risk assessment to control the risks to people, the environment and also to the existing operational areas.

Natural Hazards

17.5.63 Disasters such as major storms and strong seismic events have a low likelihood of occurrence, however the potential impacts can reach the highest level of consequence.

Overview of Potential Risk Events (Long List)

17.5.64 The potential major accident Risk Events which have been identified for the construction phase of the GCC based upon the hazardous substances present are described in **Table 17.4**.

17.5.65 The other potential MA&Ds Risk Events which have been identified for the construction phase of the GCC are described in **Table 17.5.**

Assessment of Credible Risk Events (Short List)

17.5.66 The conclusions of the assessment of substances contained in **Table 17.4** are that the materials which will be present at the GCC during construction do not have the potential to initiate a credible major accident Risk Event.

17.5.67 The conclusions of the assessment of other potential MA&Ds Risk Events contained in **Table 17.5** are that a wildfire in the vicinity of the GCC during construction has the potential to initiate a credible major accident Risk Event.

17.5.68 Credible Risk Events have been assessed in detail within **Table 17.6**, where the measures which will be taken to prevent and mitigate these are considered.

17.5.69 Taking into consideration the likelihood and consequences of the Credible Risk Events, considering necessary embedded mitigation measures and best practices as described in **Section 17.2**, the overall risk of a MA&D Risk Event at the GCC during construction is considered to be low, but cannot be entirely eliminated. The assessed risk is considered to be commensurate with ALARP, and therefore **not a likely significant effect**.

Operational Phase

17.5.70 The identification of potential MA&Ds during the operational phase of the GCC considers the same factors described under the previous Power Plant Area section (i.e., geographical location, substances present, the typical activities associated with the works, and natural hazards.

Hazardous Substances

17.5.71 The following materials will be present at the GCC during operation which are considered in detail within **Table 17.4**:

- Natural Gas
  - This will be present within the buried Gas Pipeline.

Operational Activities

17.5.72 Operational activities primarily include regular monitoring surveys to inspect the route condition and marker posts.

Natural Hazards

17.5.73 Disasters such as strong seismic events have a low likelihood of occurrence, however the potential impacts can reach the highest level of consequence.

17.5.74 Adverse impacts associated with climate change such as increased ambient temperatures and wind speeds are pertinent considering the expected design life of the GCC and are also considered in this section. The potential disaster Risk Events which have been assessed for the GCC are described in **Table 17.5**.

17.5.75 The potential impacts of natural disasters are well understood by engineers involved with the design, and operation of the GCC. These impacts are mitigated during the engineering design phase, for example, by the use of industry standard mechanical and structural design codes used for pipework.

Overview of Potential Risk Events (Long List)

17.5.76 The potential major accident Risk Events which have been identified for the operation of the GCC based upon the hazardous substances present are described in **Table 17.4**.

17.5.77 The other potential MA&Ds Risk Events which have been identified for the operation of the GCC have been identified in **Table 17.5**.

Assessment of Credible Risk Events (Short List)

17.5.78 The conclusions of the assessment of substances contained in **Table 17.4** are that the substances with the potential to initiate a major accident hazard Risk Events are natural gas.

17.5.79 The conclusions of the assessment of potential disaster Risk Events contained in **Table 17.4** are that a wildfire in the vicinity of the GCC during operation has the potential to initiate a credible major accident Risk Event.

17.5.80 Risk Events have been assessed in detail within **Table 17.6**, where the measures which will be taken to prevent and mitigate these are considered.

17.5.81 Taking into consideration the likelihood and consequences of the Credible Risk Events, considering necessary embedded mitigation measures and best practices as described in **Section 17.2**, the overall risk of a MA&D Risk Event at the GCC during operation is considered to be low, but cannot be entirely eliminated. The assessed risk is considered to be commensurate with ALARP, and therefore **not a likely significant effect**.

Decommissioning Phase

17.5.82 The Gas Connection Corridor will be managed by the transmission asset operators (TAO) and transmission service operators (TSO) (GNI for gas) as part of the national gas networks. When the gas pipeline will be decommissioned depends on the asset owner's operational requirement and asset management policy. Therefore, potential accident Risk Events associated with the decommissioning phase of the GCC have been scoped out.

Impact Assessment Tables

17.5.83 The tables described in the Sections above are provided below, constituting **Table 17.4**, identifying potential major accident Risk Events relating to hazardous substances, **Table 17.5** identifying other potential major accident and disaster Risk Events, and **Table 17.6** assessing credible MA&D Risk Events. These tables include Risk Events related to the PPA, EGC and GCC.

Table 17-4: Identification of Potential Major Accident Risk Events ("Long List") Relating to Hazardous Substances

SUBST-ANCE	DESCRIPTION OF USE	CLP[1] HAZARD CLASSIFI-CATION	SCREENING AND IDENTIFICATION OF POTENTIAL MAJOR ACCIDENT RISK EVENTS	IS RISK EVENT CREDIBLE (Y / N)	APPLIC-ABLE TO
Construction					
Concrete	Liquid concrete will be used in the construction of new facilities at the PPA, EGC, and GCC including buildings, surfacing and containment systems. Temporary storage systems will be present during construction of the Proposed Development and Overall Project and standard techniques will be used to pour cement onto prepared areas, for example, during the creation of tank bunds.	Typically, non-classified in accordance with CLP.	There is the potential for an accidental release of concrete into the soil, or surface water during the construction of the PPA, EGC, or GCC. Concrete is not classified hazardous in accordance with CLP; however, concrete paste is alkaline (pH 10-14) and therefore the potential impacts if concrete enters the environment via a release to water, include: • Raising the pH causing harm to aquatic ecosystems • Cause sedimentation on aquatic beds, which could harm flora and fauna. Containment systems to intercept any material released will be developed within a Construction Phase Environmental Management Plan (CEMP). Therefore, it is not considered credible that this Risk Event could lead to a consequence that meets the criteria of a Major Accident and is not considered further in this assessment.	**No**	**PPA** **EGC** **GCC**
Diesel	Diesel fuel will be present during construction of the PPA, EGC, and GCC to fuel vehicles, construction	H226 – Flammable liquid and vapour. H304 – May be fatal if	There is the potential for an accidental release of diesel into the soil, groundwater, or surface water during the construction of the PPA, EGC, or GCC where it could cause major disturbances including harm to aquatic ecosystems. Due to the small quantities of diesel involved, it is not considered credible that this Risk Event could lead to a	**No**	**PPA** **EGC** **GCC**

[1] Classification, Labelling and Packaging

SUBST-ANCE	DESCRIPTION OF USE	CLP[1] HAZARD CLASSIFI-CATION	SCREENING AND IDENTIFICATION OF POTENTIAL MAJOR ACCIDENT RISK EVENTS	IS RISK EVENT CREDIBLE (Y / N)	APPLIC-ABLE TO
	equipment and generators. Temporary storage systems will be present during construction of the Proposed Development and Overall Project and volumes will be kept to a minimum.	swallowed and enters airways. H315 – Causes skin irritation. H332 – Harmful if inhaled. H350 – May cause cancer. H373 – May cause damage to organs. H410 – Very toxic to aquatic life with long lasting effects.	consequence that meets the criteria of a Major Accident and is not considered further in this assessment.		
			There is the potential for an accidental release of diesel to be ignited, resulting in a pool fire. The potential impacts of a pool fire include harm to persons due to thermal radiation or smoke inhalation or damage to property. Due to the small quantities of diesel involved and its high flashpoint it is not considered credible that this Risk Event could lead to a consequence that meets the criteria of a Major Accident and is not considered further in this assessment.	**No**	**PPA** **EGC** **GCC**
Compressed Gas Cylinders including: Acetylene	During construction activities within the PPA, EGC, and GCC, welding may be carried out using compressed gases such as acetylene.	H220 – Extremely flammable gas. H280 – Contains gas under pressure; may explode if heated. H230 – May react explosively even in the absence of air.	There is the potential for a release of gas, including an explosive depressurisation event, for example due to accidental damage to a gas cylinder, pressure regulator, or associated pipework. The released gas could be ignited, resulting in a fire or explosion, the potential impacts of which could include harm to persons due to thermal radiation or smoke inhalation or damage to property. The number of cylinders containing extremely flammable gas used on-site will be low and industry standard procedures will be used for the use of gas cylinders and their storage when not in use. Therefore, it is not considered credible that this Risk Event could lead to a consequence that meets the criteria of a Major Accident and is not considered further in this assessment.	**No**	**PPA** **EGC** **GCC**
			There is the potential for a fire onsite (unrelated to the compressed gas cylinders) which escalates to areas where	**No**	**PPA**

SUBST-ANCE	DESCRIPTION OF USE	CLP[1] HAZARD CLASSIFI-CATION	SCREENING AND IDENTIFICATION OF POTENTIAL MAJOR ACCIDENT RISK EVENTS	IS RISK EVENT CREDIBLE (Y / N)	APPLIC-ABLE TO
			gas cylinders are being stored. The potential impact would be as above. The number of cylinders containing extremely flammable gas used on-site will be kept to a minimum and industry standard procedures will be used. Therefore, it is not considered credible that this Risk Event meets the criteria of a Major Accident and is not considered further in this assessment.		**EGC** **GCC**
Operation					
Natural Gas	Natural gas is the primary source of fuel used within the power generation systems at the CCGT and OCGT Units within the PPA. Natural gas will be supplied from the Pressure Regulating Station (PRS) outlet in the AGI compound to the gas turbines in the turbine hall (CCGT unit) and prevailing pressure outlet to the south of the site (OCGT unit) via a buried gas pipework. Natural gas to the PPA will be delivered via an underground high-pressure pipeline within the GCC.	H220 – Extremely flammable gas.	There is the potential for a loss of containment of natural gas from process equipment or pipework within the PPA and GCC, for example due to mechanical failure of pipework, connections or fittings, such as corrosion or fatigue, or as a consequence of accidental damage to equipment and pipework such as a dropped object, an impact with vehicles or machinery. If released and ignited, the potential consequences of a release of natural gas include a jet fire or fireball (if ignited immediately), flash fire (if delayed ignition) or a vapour cloud explosion (VCE) (if gas accumulates within an enclosed or congested area before ignition). The potential impacts of a fire and / or explosion as a result of a release of natural gas include: • A major fire which could escalate to other areas. • Thermal radiation generated by a major fire and / or explosion overpressures could cause significant harm to persons including up to the potential for fatal injuries. • Harm to persons due to smoke inhalation. • Damage to property within the establishment. A Technical Land Use Planning Assessment (TLUP) has considered this Risk Event (refer to **Appendix 17A**).	**Yes** **Risk Event 1**	**PPA** **GCC**

SUBST-ANCE	DESCRIPTION OF USE	CLP[1] HAZARD CLASSIFI-CATION	SCREENING AND IDENTIFICATION OF POTENTIAL MAJOR ACCIDENT RISK EVENTS	IS RISK EVENT CREDIBLE (Y / N)	APPLIC-ABLE TO
			The potential for a major accident Risk Event(s) associated with a substantial loss of containment of natural gas from pipework or process equipment is considered credible, therefore this Risk Event is considered further in this assessment.		
			There is the potential for a leak of natural gas within the turbine enclosures which allows natural gas to build up to explosive concentrations, resulting in a VCE. The potential impacts of an explosion as a result of a release of natural gas include: • A major fire which could escalate to other areas. • Thermal radiation generated by explosion overpressures could cause significant harm to persons including up to the potential for fatal injuries. • Damage to property within the establishment. A Technical Land Use Planning Assessment (TLUP) has considered this Risk Event (refer to **Appendix 17A**). The potential for a major accident Risk Event(s) associated with a natural gas leak within the turbine is considered credible, therefore this Risk Event is considered further in this assessment.	**Yes** **Risk Event 2**	**PPA**
Secondary Fuel (HVO and/or distillate)	Secondary Fuel will be supplied to the PPA for storage within tanks prior to use on demand in the CCGT and OCGT units. This will be supplied via road tanker to the offloading area and	H226 – Flammable liquid and vapour. H304 – May be fatal if swallowed and enters airways.	There is the potential for an accidental release of Secondary Fuel, for example due to the failure of or accidental damage to pipework, flexible hoses, storage tanks, transfer pumps, or the containment systems within delivery vehicles. The potential impacts of a release in which substantial quantities of Secondary Fuel are released include: • Contamination of soil, groundwater, or local watercourses. • Harm to aquatic ecosystems	**Yes** **Risk Event 3**	**PPA**

SUBST-ANCE	DESCRIPTION OF USE	CLP[1] HAZARD CLASSIFI-CATION	SCREENING AND IDENTIFICATION OF POTENTIAL MAJOR ACCIDENT RISK EVENTS	IS RISK EVENT CREDIBLE (Y / N)	APPLIC-ABLE TO
	transferred to storage tanks located within a bunded area. The Secondary Fuel capacity for the Proposed Development is 16,700m^3. During construction, there may be small quantities of fuel present in temporary equipment such as mobile cranes, mobile power generators, etc.	H315 – Causes skin irritation. H332 – Harmful if inhaled. H351 – Suspected of causing cancer. H373 – May cause damage to organs through prolonged or repeated exposure. H411 – Toxic to the aquatic environment with long lasting effects	A Major Accident To The Environment (MATTE) Assessment has considered this Risk Event (refer to **Appendix 17A**). The potential for a major accident Risk Event(s) associated with a substantial loss of containment of Secondary Fuel is considered credible, therefore this Risk Event is considered further in this assessment.		
			There is the potential for an accidental release of Secondary Fuel to be ignited, resulting in a pool fire. The potential impacts of a pool fire: • Harm to people via thermal radiation effects. • Harm to people via the inhalation of smoke containing harmful substances. • Damage to property within the establishment. Application of firewater containing foam would typically be used in a Secondary Fuel pool fire Risk Event, which is separately considered. The procedure for a Secondary Fuel spill would include an immediate clean up. Secondary Fuel has a high flashpoint (above ambient). Therefore, it is not considered credible that this Risk Event could lead to a consequence that meets the criteria of a Major Accident and is not considered further in this assessment.	**No**	**PPA**
Liquefied Petroleum Gas/Propane In Compressed Gas Cylinders	Propane cylinders may be used in pilot ignition systems and as reference gas in emissions monitoring systems. Two 1000kg propane tanks will be present within the PPA.	H220 – Extremely flammable gas. H280 – Contains gas under pressure; may explode if heated.	In the event of accidental damage to a gas cylinder, pressure regulator or associated pipework, there is the potential for a release of gas. If the gas released is ignited, this could result in a fire / explosion. In the event of a fire onsite which escalates to areas where gas cylinders are stored, there is the potential for an explosion if the cylinders are exposed to thermal radiation.	**Yes** **Risk Event 4**	**PPA**

SUBST-ANCE	DESCRIPTION OF USE	CLP[1] HAZARD CLASSIFI-CATION	SCREENING AND IDENTIFICATION OF POTENTIAL MAJOR ACCIDENT RISK EVENTS	IS RISK EVENT CREDIBLE (Y / N)	APPLIC-ABLE TO
		H332 – Harmful if inhaled.	The consequences of a fire / explosion could include harm to people if present in the vicinity of the cylinder(s) and damage to assets, potentially interrupting operation of the Proposed Development. Industry standard procedures will be used for the storage and use of gas cylinders which reduce the risk associated with these systems to a low level. When not in use, cylinders will be stored in external, well-ventilated areas and when in use, appropriately certified equipment will reduce the potential for ignition if a flammable gas is accidentally released. A Technical Land Use Planning Assessment (TLUP) has considered this Risk Event (refer to **Appendix 17A**). There is the potential for a major accident Risk Event(s) associated with a loss of containment of LPG, therefore this Risk Event is considered further in this assessment.		
Compressed Gas Cylinders Other, including: Hydrogen Acetylene	A small number of compressed gas cylinders containing hydrogen may be present on-site during operation as part of the power generator cooling systems. During maintenance activities, welding may be carried out using compressed gases such as acetylene.	H220 – Extremely flammable gas. H280 – Contains gas under pressure; may explode if heated. H230 – May react explosively even in the absence of air.	There is the potential for a release of gas, including an explosive depressurisation event, for example due to accidental damage to a gas cylinder, pressure regulator, or associated pipework. The released gas could be ignited, resulting in a fire or explosion, the potential impacts of which could include harm to persons due to thermal radiation or smoke inhalation or damage to property. The number of cylinders containing hydrogen and acetylene used on-site will be low and industry standard procedures will be used for the storage and use of gas cylinders. Therefore, it is not considered credible that this Risk Event could lead to a consequence that meets the criteria of a Major Accident and is not considered further in this assessment.	**No**	**PPA**
			There is the potential for a fire onsite (unrelated to the compressed gas cylinders) which escalates to areas where	**No**	**PPA**

SUBST-ANCE	DESCRIPTION OF USE	CLP[1] HAZARD CLASSIFI-CATION	SCREENING AND IDENTIFICATION OF POTENTIAL MAJOR ACCIDENT RISK EVENTS	IS RISK EVENT CREDIBLE (Y / N)	APPLIC-ABLE TO
			gas cylinders are being stored. The potential impact would be as above. The number of cylinders containing extremely flammable gas used on-site will be low and industry standard procedures will be used. Therefore, it is not considered credible that this Risk Event could lead to a consequence that meets the criteria of a Major Accident and is not considered further in this assessment.		
Compressed Gas Cylinders (other non-flammable) Including fire suppressant, CO_2.	A small number of compressed gas cylinders or bulk storage tank containing CO_2 will be installed to provide fire protection in enclosed areas of the turbine and generator. Nitrogen would typically be used during maintenance activities to purge pipework and other uses.	H280 – contains gas under pressure	There is the potential for a release of gas, including an explosive depressurisation event, for example due to accidental damage to a gas cylinder, pressure regulator, or associated pipework. The released gas could cause harm to people present, potentially causing asphyxiation. The number of cylinders containing compressed gas used on-site will be low and industry standard procedures will be used for the storage and use of gas cylinders and their storage when not in use. Therefore, it is not considered credible that this Risk Event could lead to a consequence that meets the criteria of a Major Accident and is not considered further in this assessment.	**No**	**PPA**
Firewater – effluent generated during firefighting	In the event of a major fire at the PPA, EGC, or GCC, application of firewater would be used to extinguish a fire and potentially to provide cooling to adjacent structures	Non-classified in accordance with CLP.	There is the potential for an accidental release of firewater runoff into the soil, groundwater, and surface water during the operation of the PPA, GCC, or EGC. Firewater runoff would contain foam and other substances used for fire suppression. Modern foam concentrates do not contain substances classed as harmful to the environment; however products of combustion and un-combusted hydrocarbons would also be present which have the potential to cause harm if released to the environment.	**No**	**PPA** **EGC** **GCC**

SUBST-ANCE	DESCRIPTION OF USE	CLP[1] HAZARD CLASSIFI-CATION	SCREENING AND IDENTIFICATION OF POTENTIAL MAJOR ACCIDENT RISK EVENTS	IS RISK EVENT CREDIBLE (Y / N)	APPLIC-ABLE TO
	preventing escalation of the incident. A foam concentrate additive would typically be used in a fuel pool fire Risk Event which involved Secondary Fuel.		During the detailed design of the Proposed Development, a detailed firewater containment assessment will be carried out, as required for a COMAH Installation and an EPA licenced facility. This will be conducted using the EPA's Firewater Run-Off Tool. This assessment will involve the calculation of the total quantity of firewater which could be produced in a range of Risk Events and will inform the design of containment facilities. Containment of firewater would therefore prevent material from being released offsite. This material would be collected for testing, treatment and disposal offsite at a suitable facility. Due to the containment systems that would be in place according to the terms of the operating licence, it is not considered credible that this Risk Event could lead to a consequence that meets the criteria of a Major Accident and is not considered further in this assessment.		
35% Ammonia Solution	35% ammonia will be used for NO_x control of flue gases and boiler water conditioning. For the purposes of NO_x control, ammonia will be delivered by bulk tanker and stored in tanks. For the purposes of boiler water conditioning, ammonia will be delivered and stored within an intermediate bulk container.	H314 – Causes severe skin burns and eye damage. H335 – May cause respiratory irritation. H410 – Very toxic to aquatic life with long lasting effects.	There is the potential for an accidental release of ammonia solution into the soil and groundwater during the operation of the PPA, for example due to accidental damage to the storage tank, HGV tankers or associated pipework. Ammonia solution will be present on site in relatively small quantities and stored in suitable containment systems i.e. dedicated storage vessels in suitably bunded areas with weather protection to collect all stored material should a failure of the storage vessel occur. Storage facilities will be inspected regularly to prevent accidental damage. Due to the quantities of ammonia solution involved and the containment systems in place it is not considered credible that this Risk Event could lead to a consequence that meets the criteria of a Major Accident and is not considered further in this assessment.	**No**	**PPA**

SUBST-ANCE	DESCRIPTION OF USE	CLP[1] HAZARD CLASSIFI-CATION	SCREENING AND IDENTIFICATION OF POTENTIAL MAJOR ACCIDENT RISK EVENTS	IS RISK EVENT CREDIBLE (Y / N)	APPLIC-ABLE TO
			There is the potential for ammonia to evaporate from an accidental release of ammonia solution and form a toxic cloud which could be harmful to human health, causing damage to skin and eyes as well as causing respiratory issues especially within an enclosed area. Ammonia solution will be present on site in relatively small quantities and stored in suitable containment systems i.e. dedicated storage vessels in suitably bunded areas with weather protection to collect all stored material should a failure of the storage vessel occur. Storage facilities will be inspected regularly to prevent accidental damage. Due to the quantities of ammonia solution involved and the containment systems in place it is not considered credible that this Risk Event could lead to a consequence that meets the criteria of a Major Accident and is not considered further in this assessment.	**No**	**PPA**
Water Treatment Chemicals	Biocides, scale control agents, water conditioning agents, water softeners and other water treatment chemicals as detailed Paragraph 17.5.16 will be required to treat water and effluent. Water treatment chemicals will be delivered by bulk tanker and stored in tanks	H290 – May be corrosive to metals. H302 – Harmful if swallowed. H314 – Causes severe skin burns and eye damage. H315 – Causes skin irritation. H318 – Causes serious eye damage.	There is the potential for an accidental release of water treatment chemicals into the soil and groundwater during the operation of the PPA, for example due to accidental damage to the storage tank, HGV tankers or associated pipework. Water treatment chemicals will be present on site in relatively small quantities and stored in suitable containment systems i.e. dedicated storage vessels in suitably bunded areas with weather protection to collect all stored material should a failure of the storage vessel occur. Storage facilities will be inspected regularly to prevent accidental damage. Due to the quantities of water treatment chemicals involved and the containment systems in place it is not considered credible that this Risk Event could lead to a consequence that meets the criteria of a Major Accident and is not considered further in this assessment.	**No**	**PPA**

SUBST-ANCE	DESCRIPTION OF USE	CLP[1] HAZARD CLASSIFI-CATION	SCREENING AND IDENTIFICATION OF POTENTIAL MAJOR ACCIDENT RISK EVENTS	IS RISK EVENT CREDIBLE (Y / N)	APPLIC-ABLE TO
		H319 – Causes serious eye irritation. H335 – May cause respiratory irritation. H400 – Very toxic to aquatic life. H411 – Toxic to aquatic life with long lasting effects.			
Lubrication Oils	Mineral and synthetic oils are typically used for topping up purposes within equipment such as gearboxes and compressors to generate power and to provide lubrication for moving parts. These materials will be typically delivered and stored in small containers such as drums with a 200-litre capacity.	Typically, non-classified in accordance with CLP.	There is the potential for an accidental release of lubrication oils into the soil and groundwater during the operation of the PPA or EGC. Lubrication and hydraulic fluids will be present on site in relatively small quantities and stored in suitable containment systems i.e. dedicated storage vessels in suitably bunded areas with weather protection to collect all stored material should a failure of the storage vessel occur. Storage facilities will be inspected regularly to prevent accidental damage. Due to the small quantities of material involved it is not considered credible that this Risk Event could lead to a consequence that meets the criteria of a Major Accident and is not considered further in this assessment.	**No**	**PPA** **EGC**

SUBST-ANCE	DESCRIPTION OF USE	CLP[1] HAZARD CLASSIFI-CATION	SCREENING AND IDENTIFICATION OF POTENTIAL MAJOR ACCIDENT RISK EVENTS	IS RISK EVENT CREDIBLE (Y / N)	APPLIC-ABLE TO
Transformer and Turbine System Oils	Mineral and synthetic oils are typically used within transformers for heat transfer purposes and in the turbine system for lubrication and control. There will be an inventory of c. 20 tonnes at the 220 kV substation, c. 100 tonnes at the 400 kV substation, and c. 150 tonnes at the PPA. These materials will be typically delivered and stored in small containers such as drums with a 200-litre capacity.	H304 – may be fatal if swallowed and enters airways	There is the potential for an accidental release of lubrication and transformer oils into the soil and groundwater during the operation of the PPA or EGC. The transformers are located within bunded areas which will contain any oil leakage from them. The oil tank for the turbine lubrication oil system is bunded and flanged joints in the distribution system are minimised. The drainage system around the turbine is considered oil contaminated and drains from the area are routed through a class 1 full retention oil separator prior to entering the overall site process drainage system.	**No**	**PPA** **EGC**

Table 17-5: Identification of Other Potential Major Accident and Disaster Risk Events ("Long List")

CATEGORY	DESCRIPTION	SCREENING AND IDENTIFICATION OF POTENTIAL DISASTER RISK EVENTS	IS RISK EVENT CREDIBLE (Y/N)	APPLIC-ABLE AREAS
'Domino Event' Accident	An incident such as a fire occurring at a neighbouring industrial site could potentially impact the PPA, EGC, or GCC during construction or operation and conversely, a Risk Event at the PPA, EGC, or GCC could escalate and reach a neighbouring facility.	There are several industrial sites located in the vicinity of the Proposed Development and Overall Project, however there are no Upper Tier COMAH sites or similar high risk sites and the distances involved make it highly unlikely that knock-on impacts will occur. Therefore, this Risk Event is not considered credible and is not considered further.	**No**	**PPA EGC GCC**
Accident – Peat Fire	A fire at the PPA, EGC, or GCC could spread to peat in the local environment causing a wildfire, or a wildfire due to other causes could escalate to the PPA, EGC, or GCC. Peat wildfires can include smouldering combustion, which can spread beneath the surface, persist for months or even years, and be very difficult to extinguish.	Severe wildfires are infrequent in Ireland but may increase as a result of climate change. The PPA, EGC, and GCC are located in an environment that contains peat bog areas particularly vulnerable to wildfire. It is unlikely that the PPA, EGC, or GCC will initiate a peat fire due to the extensive mitigations against fire and explosion. However, if a fire did catch in the peat, it may be very difficult to extinguish quickly. This has the potential to cause harm to people, and damage property and assets. Therefore, this Risk Event is considered credible.	**Yes Risk Event 5**	**PPA EGC GCC**
Structural Failure / Building Collapse	An incident such as a building collapsing during construction or operation of the PPA, EGC, or GCC.	Structures will be designed to industry codes and standards. Construction activities will be subject to a CEMP which will consider the potential for collapses to occur and identify appropriate mitigation measures and safe systems of work to be adopted. Therefore, this Risk Event is not considered credible and is not considered further.	**No**	**PPA EGC GCC**
Accident - High Voltage (HV) Electrical equipment	Electrical power will be generated at high voltage levels at the PPA and transported along the EGC. Accidental contact with high voltage systems can be immediately fatal to people and accidents involving electricity have occurred	There is the potential for a disaster to occur at the PPA or EGC during construction or operation, for example due to accidental damage or malfunction of high voltage electrical equipment. During construction, activities will be carried out to install new electrical connections. This work will be very	**No**	**PPA EGC**

CATEGORY	DESCRIPTION	SCREENING AND IDENTIFICATION OF POTENTIAL DISASTER RISK EVENTS	IS RISK EVENT CREDIBLE (Y/N)	APPLIC-ABLE AREAS
	particularly during construction activities, for example, where cranes have come into contact with overhead power lines. Malfunction of high voltage electrical systems can result in events such as arc flash incidents which create high levels of thermal radiation and explosion overpressures. People exposed to arc flash events can suffer fatal or life changing injuries. Damage to high voltage electrical infrastructure could restrict the ability of the facility to operate and compromise electrical supply to the local area.	carefully controlled via the CEMP and specific work plans supported by risk assessments. Only suitably qualified and experienced electrical engineers will be allowed to work on high voltage systems, and industry standard safety procedures will be used. Therefore, this Risk Event is not considered credible and is not considered further.		
Accident - Vandalism / Arson / Terrorism / Cyber Attack	There is the potential for hostile acts against the PPA, EGC, or GCC for example by people opposed to power generation using hydrocarbon fuels. Cyber security where electronic process control systems are remotely accessed by bad actors for a variety of purposes is an increasing threat to which the power generation industry is aware of and takes very seriously.	Vandalism, arson and terrorist activities could cause harm to people on site, damage to assets and interruption to power generation operations at the Proposed Development. In most instances, any acts would be limited to the potential interruption to operation, minor damage or vandalism. The Proposed Development and Overall Project is not considered a high-risk target. This will be mitigated by implementing security measures including appropriate fencing, CCTV, access control and guards etc. Cyber security systems are designed by expert engineers to prevent unauthorised access to computers on site which provide essential functions for safe operation. Therefore, this Risk Event is not considered credible and is not considered further.	**No**	**PPA** **EGC** **GCC**
Flooding	Flooding due to rainfall, pluvial flooding from surface water and fluvial flooding from rivers.	A Site-Specific Flood Risk Assessment (FRA) Report has been prepared, refer to **Appendix 12A**.	**Yes**	**PPA**

CATEGORY	DESCRIPTION	SCREENING AND IDENTIFICATION OF POTENTIAL DISASTER RISK EVENTS	IS RISK EVENT CREDIBLE (Y/N)	APPLIC-ABLE AREAS
	Flooding could cause damage and disruption during the construction of the PPA, EGC, and GCC. Flooding during the operation of the PPA, EGC, and GCC could result in damage to site assets such as storage tanks and pipework, with the potential for subsequent loss of containment of diesel, natural gas or other substances.	The purpose of the FRA is to demonstrate that the proposed development will: - Not increase flood risk elsewhere and, if practical, will reduce overall flood risk - Include measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible. - Include measures to ensure that residual risk to the area and/or development can be managed to an acceptable level. This FRA has identified a minimum finish level which will inform the engineering design of the Proposed Development. Flooding may present a credible risk to the Proposed Development; however, this is not considered further within this Chapter, as it is fully addressed in **Appendix 12A**.		**EGC** **GCC**
Climate Change – Increased Ambient Temperatures	The ambient temperatures experienced in the location of the Proposed Development and Overall Project could increase during the lifecycle of the facility as a result of climate change.	Increasing atmospheric temperatures could potentially result in the operational instability of equipment such as cooling systems and electrical apparatus such as switchgear, which is sensitive to temperature and humidity. Failure of these systems due to high temperatures could result in operational interruptions at the Proposed Development but would be unlikely to cause an incident which has the potential to result in a major accident or disaster. The engineering design of the facilities will take operation at future climatic conditions into account; therefore, this Risk Event is not considered credible and is not considered further within this chapter.	**No**	**PPA** **EGC** **GCC**

CATEGORY	DESCRIPTION	SCREENING AND IDENTIFICATION OF POTENTIAL DISASTER RISK EVENTS	IS RISK EVENT CREDIBLE (Y/N)	APPLIC-ABLE AREAS
Climate Change– Increased Wind Speeds	The wind speeds experienced during storms could potentially increase during the lifecycle of the facility as a result of climate change.	Increasing atmospheric wind speeds could cause tall structures such as chimneys and exhaust vent stacks to become unstable. In a worst-case event, these structures could collapse resulting in harm to people on site, damage to assets and an interruption to operation. The structural engineering design of the facilities will calculate wind loading and other requirements based on industry standard guidance and methods. Structural design standards incorporate factors to account for uncertainty, therefore operation at future conditions which include higher wind speeds will be considered. Consequently, a potential disaster involving high winds is not considered credible is not considered further within this chapter.	**No**	**PPA** **EGC** **GCC**
Earthquakes and seismic events	Low magnitude seismic events which are not perceptible to humans occur quite regularly throughout the island of Ireland. The likelihood for a major seismic event however is very low.	If a major seismic event were to occur at the Proposed Development, there is the potential to cause harm to people, damage to assets and infrastructure and interrupt power generation operations. The Irish National Seismic Network (INSN) records earthquakes on the island of Ireland, however these are predominantly low magnitude events. A review of the INSN records do not show any recent or historic earthquake events in the midlands of Ireland. Ireland is recognised as having a low level of seismic activity, with most earthquakes being recorded in the south-east or north-west of Ireland. There is an INSN station located in North Co. Tipperary.	**No**	**PPA** **EGC** **GCC**

CATEGORY	DESCRIPTION	SCREENING AND IDENTIFICATION OF POTENTIAL DISASTER RISK EVENTS	IS RISK EVENT CREDIBLE (Y/N)	APPLIC-ABLE AREAS
		The structural engineering design of the facilities will calculate the appropriate loading requirements for seismic factors. Consequently, a potential disaster involving seismic activity is not considered credible is not considered further within this chapter.		
Lightning strike	A direct lightning strike to the Proposed Development could cause damage to assets and equipment and has the potential to cause harm to people struck by falling objects. There is also the potential that lightning may ignite flammable substances, for example, if a strike occurred during venting of gas to atmosphere. This could result in a fire causing damage to assets and potentially harm to people on site.	The engineering design of the Proposed Development will incorporate lightning mitigation. This will be assessed in accordance with recognised industry standards such as EN/IEC 62305. It is expected that an appropriate lightning arrestor will be fitted at the highest point on buildings such the turbine building and substations. The exhaust stacks would also be expected to be fitted with lightning protection to safely conduct the electrical current to earth in the event of a storm. Consequently, Consequently, a potential disaster involving a lightning strike is not considered credible is not considered further within this chapter	**No**	**PPA** **EGC** **GCC**

Table 17-6: Assessment of Credible Major Accident and Disaster Risk Events ("Short List")

REFERENCE	RISK EVENT DESCRIP-TION	POTENTIAL CAUSES AND IMPACTS	SUMMARY OF PRE-EXISTING MITIGATION MEASURES	DESCRIPTION OF EFFECTS	LIKELIHOOD	CONSEQUENCE	RISK RANKING	APPLICABLE AREAS	ALARP?	LIKELY SIGNIFICANT
1	Major Fire and / or Explosion due to natural gas pipeline release	A release of natural gas from equipment or pipework could be caused by mechanical failure, impact damage or an operator error resulting in a loss of containment. A major fire initiated in one area of the Proposed Development could have the potential to escalate to other areas such as the fuel storage. Immediate ignition of the gas release could result in a jet fire or fireball. Delayed ignition could lead to a flash fire or vapour cloud explosion (VCE). The impact of a natural gas fire and / or explosion could cause significant harm to	The Proposed Development will include the following mitigation measures which would prevent and minimise the consequences of a major fire and / or explosion caused by the accidental release of natural gas. Major pipework sections will be routed below ground where practical to reduce the potential for accidental damage. The design equipment and pipework will be to industry codes and standards to reduce the potential for a loss of containment, including the use of welded connections to avoid potential leak sources. The design will be subject to numerous formal process safety studies to identify and mitigate hazards, such Hazard and Operability (HAZOP) studies. Gas pipework safety systems including pressure regulation will be	A quantitative risk assessment (QRA) has been carried out to assess this Risk Event (refer to **Appendix 18A**). This study has concluded the level of risk onsite and offsite is acceptable. The residual low risk will be managed by standard operating procedures, safety and environmental management measures to level commensurate with ALARP.	1 (Very Low)	4 (Major)	4 (Green)	PPA, GCC	Y	N

REFERENCE	RISK EVENT DESCRIP -TION	POTENTIAL CAUSES AND IMPACTS	SUMMARY OF PRE-EXISTING MITIGATION MEASURES	DESCRIPTION OF EFFECTS	LIKELIHOOD	CONSEQUENCE	RISK RANKING	APPLICABLE AREAS	ALARP?	LIKELY SIGNIFICANT
		personnel on site, up to the potential for fatal injuries caused by thermal radiation and / or projected debris generated during an explosion. The distance to the nearest residential receptors is such that an incident would be unlikely to have an impact offsite, other than potentially a recommendation by the emergency services to close windows and remain indoors temporarily. Firewater would be unlikely to be used to extinguish a gas fire, however, may be used to cool adjacent structures to prevent escalation. Firewater runoff would therefore be unlikely to be substantially contaminated therefore the potential to cause	installed along with operational controls and monitoring. Instrumentation and control systems will continuously monitor the process and leaks causing a loss of pressure would be rapidly detected. Alarms, both audible and visual, would be raised in the event of a deviation from set points such as pressure levels, alerting site operators. The potential for a release of gas to be ignited via contact with electrical or mechanical equipment will be reduced by the installation of compliant equipment. This will be installed as required by Explosives Atmosphere Risk Assessment, to be carried out during the detailed engineering design of the Proposed Development. During commissioning, when gas will be introduced to the site, detailed method statements, plans and assessments will be produced to carry out these activities safely. Regulatory Authorities including the HSA and EPA will be closely								

REFERENCE	RISK EVENT DESCRIP-TION	POTENTIAL CAUSES AND IMPACTS	SUMMARY OF PRE-EXISTING MITIGATION MEASURES	DESCRIPTION OF EFFECTS	LIKELIHOOD	CONSEQUENCE	RISK RANKING	APPLICABLE AREAS	ALARP?	LIKELY SIGNIFICANT
		harm to the environment if released would be low. In the event of a major fire there is the potential for emissions to air such as particulates and un-combusted hydrocarbons.	involved throughout the design, construction, and operation of the facilities to ensure compliance with all legislative requirements and to ensure compliance with design specifications and codes. The Proposed Development will be operated and managed by experienced, highly trained personnel in accordance with all Regulatory requirements, including COMAH. A Site Emergency Response Plan will be developed prior to the commencement of operations and will include detailed procedures in the event of a major accident.							
2	Major VCE Explosion due to natural gas leak within the turbine enclosure	A build-up of natural gas to explosive concentrations could be caused by mechanical failure, or an operator error resulting in VCE. The impacts would be similar as for Risk Event 1.	Pre-existing mitigation measure for Risk Event 1 apply. The gas turbine enclosures are force ventilated for temperature and gas level control purposes. The system ensures that small leaks do not reach the LEL. The turbine enclosures will have a leak detection system that will trip the incoming gas supply when the concentration within the enclosure reaches set values which are below	A QRA has been carried out to assess the risk of this Scenario (refer to **Appendix 18A**). This study has concluded the level of risk onsite and offsite is acceptable.	1 (Very Low)	4 (Major)	4 (Green)	PPA	Y	N

REFERENCE	RISK EVENT DESCRIP-TION	POTENTIAL CAUSES AND IMPACTS	SUMMARY OF PRE-EXISTING MITIGATION MEASURES	DESCRIPTION OF EFFECTS	LIKELIHOOD	CONSEQUENCE	RISK RANKING	APPLICABLE AREAS	ALARP?	LIKELY SIGNIFICANT
			the LEL (below explosive concentrations).	The residual low risk will be managed by standard operating procedures, safety and environmental management measures to level commensurate with ALARP.						
3	Major Release to the Environment - Secondary Fuel (HVO and/or distillate)	The potential causes of a loss of containment of Secondary Fuel are via mechanisms such as accidental damage to pipework or equipment or an operator error. In the event of a release of Secondary Fuel, the most likely impacts resulting from a major loss of containment are on the environment, should a catastrophic failure of primary, secondary and tertiary	The mitigation measures which would prevent the accidental release of Secondary Fuel are similar to those described above for natural gas, however the following specific measures will also be installed on site. Secondary Fuel will be stored in fixed steel tanks (primary containment) which are located within impermeable concrete bunds (secondary containment). These bunds will be sized to store 110% of the capacity of the largest tank or 25% of the total volume of fuel that could be stored within the bunded area, whichever is the greater.	A QRA has been carried out to assess the risk of this Scenario (refer to **Appendix 18A**). This study has concluded the level of risk onsite and offsite is acceptable. The residual low risk will be managed by standard operating procedures,	1 (Very Low)	4 (Major)	4 (Green)	PPA	Y	N

REFERENCE	RISK EVENT DESCRIP-TION	POTENTIAL CAUSES AND IMPACTS	SUMMARY OF PRE-EXISTING MITIGATION MEASURES	DESCRIPTION OF EFFECTS	LIKELIHOOD	CONSEQUENCE	RISK RANKING	APPLICABLE AREAS	ALARP?	LIKELY SIGNIFICANT
		containment occur simultaneously. In such an event, Secondary Fuel could enter soil, groundwater and potentially local watercourses.	Secondary Fuel tanks will be designed in accordance with internationally recognised design codes such as API 620 and API 650 and fitted with level control, monitoring and alarms. These assets will be subject to regular inspection and maintenance. The Proposed Development will have a process drains system (tertiary containment) which will contain Secondary Fuel in the event of a failure of primary and secondary containment. During fuel offloading operations, protective systems will be in place to prevent a loss of containment such as dry-break hose couplings and vehicle chocks to prevent 'drive-away' incidents. The design equipment and pipework will be to industry codes and standards to reduce the potential for a loss of containment, including the use of welded connections to avoid potential leak sources. Fuel pipework safety systems will be installed along with operational controls and monitoring.	safety and environmental management measures to level commensurate with ALARP.						

REFERENCE	RISK EVENT DESCRIP-TION	POTENTIAL CAUSES AND IMPACTS	SUMMARY OF PRE-EXISTING MITIGATION MEASURES	DESCRIPTION OF EFFECTS	LIKELIHOOD	CONSEQUENCE	RISK RANKING	APPLICABLE AREAS	ALARP?	LIKELY SIGNIFICANT
			Instrumentation and control systems will continuously monitor the process and leaks causing a loss of pressure would be rapidly detected. A Site Emergency Response Plan (ERP) will be developed prior to the commencement of operations.							
4	Major Fire and / or Explosion due to catastrophic rupture of LPG cylinder	A cylinder rupture could be caused by mechanical failure, or an operator error (for example during delivery) resulting in VCE, jet fire / fireball or flash fire. The impacts would be similar as for Risk Events 1 and 2.	Embedded mitigation measure for Risk Events 1 and 2 apply. LPG will be delivered by road tanker. Standard operating procedures will be in place to mitigate the risk of cylinder rupture or leak during delivery.	A QRA has been carried out to assess the risk of this Scenario (refer to **Appendix 18A**). This study has concluded the level of risk onsite and offsite is acceptable. The residual low risk will be managed by standard operating procedures, safety and environmental management measures to level	1 (Very Low)	4 (Major)	4 (Green)	PPA	Y	N

REFERENCE	RISK EVENT DESCRIP-TION	POTENTIAL CAUSES AND IMPACTS	SUMMARY OF PRE-EXISTING MITIGATION MEASURES	DESCRIPTION OF EFFECTS	LIKELIHOOD	CONSEQUENCE	RISK RANKING	APPLICABLE AREAS	ALARP?	LIKELY SIGNIFICANT
				commensurate with ALARP.						
5	Peat Wildfire	A fire caused by Risk Events 1, 2, or 4 could initiate a peat wildfire. This could smoulder, spread underground and affect a large area for a long time and be difficult to extinguish.	Embedded mitigation measure for Risk Events 1, 2 and 4 apply.	There is a very low risk of an off-site fire caused by Risk Events 1, 2, and 4.	1 (Very Low)	5 (Mas-sive)	5 (Green)	PPA, EGC, GCC	Y	N

17.6 Mitigation Measures

17.6.1 As no likely significant effects were identified, no additional mitigation measures are proposed.

17.6.2 A summary of the key best practices mitigation measures, and how these will be regulated which were taken into account in **Section 17.5** in order to prevent major accidents and disasters at the Proposed Development are provided below.

Best Practice Mitigation Measures

Construction Phase

17.6.3 The construction of the Proposed Development will be in accordance with international, national and established industry codes, standards and practice, such as the specification of pipework materials, design of structures *etc*.

17.6.4 An outline CEMP has been prepared (refer to Appendix 5A), which is to be updated by the appointed contractor. Similar plans are anticipated to be developed for eventual demolition activities.

17.6.5 A site-specific Health and Safety Plan produced by the Engineering and Construction Contractor covering the construction and commissioning of the Proposed Development will be prepared to ensure compliance with relevant health and safety legislation including the Safety, Health and Welfare at Work Act.

Operational Phase

17.6.6 The design of the Proposed Development will allow it to be operated and maintained in accordance with international, national and established industry codes, standards and practice.

17.6.7 The Proposed Development and Overall Project will comply with the requirements of all relevant health, safety and environmental legislation including COMAH, which requires operators to take all measures necessary to prevent major accidents.

17.6.8 A site-specific Health and Safety Plan produced by the Operator(s) covering the operation and maintenance of the Proposed Development will be prepared to ensure compliance with relevant health and safety legislation including the Safety, Health and Welfare at Work Act.

17.6.9 A detailed chemical inventory and risk assessments for all materials handled on-site will be produced in accordance with the requirements of the Chemical Agents legislation. All fuels and chemicals stored on-site will be used in compliance with their Safety Data Sheets according to the requirements of REACH.

17.6.10 Regular maintenance and inspection of all facilities will be carried out to reduce the potential for equipment failures which could lead to a loss of containment. In particular, systems containing pressurised natural gas will be subject to the requirements of The Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2012.

17.6.11 An Environmental Management System (EMS) will be implemented in the operational phase (regulated by the EPA under IE Licence) for a systematic approach to managing risk and achieving continual improvement of environmental performance based on a process of plan-do-check-act (PDCA)

Emergency Management

17.6.12 A Site Emergency Response Plan (ERP) will be developed for the EMS to include the Proposed Development and Overall Project in accordance with legislative requirements

including COMAH and IE Licence, which will include a fire strategy and appropriate training procedures.

17.6.13 Procedures will be in place for the EMS to clearly detail the responsibilities, actions and communication channels for operational staff and personnel on how to deal with emergencies should they occur. Staff will also receive the level of training required for their role and position. This will include dealing with events such as fires, explosions, spillages, flooding etc.

17.6.14 This plan will contain detailed plans for the response to emergencies such as loss of containment of natural gas and Secondary Fuel, fires and severe weather events. A stock of emergency equipment such as spill kits will be maintained on site in particular around the fuel storage areas.

17.6.15 The local Fire and Rescue Service and other key stakeholders would be expected to provide an input to the development of emergency plans and potentially engage with desktop and live emergency training exercises.

17.6.16 All personnel on Site will receive appropriate training in the contents of the Site ERP and be fully aware of their responsibilities during emergency events and participate in regular training exercises. Emergency critical roles will involve personnel trained to use foam pourers and other fire suppression systems.

17.6.17 In the event of gas detection in the gas turbine enclosures above a threshold the gas turbine fuel supply system will be tripped and an alarm will alert the operators. In the event that a fire is detected the gas turbine fuel system and ventilation system will be automatically tripped and a fire extinguishing agent will be automatically injected into the gas turbine enclosure. An alarm will alert the operators.

17.7 **Residual Effects**

17.7.1 As no likely significant effects were identified, no additional mitigation measures are proposed. Residual effects are therefore not relevant for this assessment as the Predicted Impacts (Section 17.5), accounting for the design of the Proposed Development, will not result in any significant effects. Additional mitigation measures are therefore not required and there is no difference between the residual effects and those outlined in Section 17.5 above.

17.8 Cumulative Effects

Cumulative Effects between the Various Elements of the Proposed Development and Overall Project

17.8.1 The potential cumulative impacts from interactions between various elements of the Proposed Development and Overall Project, as described in Chapter 5, have been considered in terms of impacts on MA&Ds. Due to the proximity, scale, and timelines associated with each element, there is potential for cumulative effects with the Proposed Development and Overall Project.

17.8.2 This impact assessment has considered all elements of the Proposed Development and Overall Project, including elements which are not subject to this planning permission, during the construction, operation, and decommissioning phases and where these could have knock-on effects.

Cumulative In-Combination Effects

17.8.3 Cumulative effects relate to the potential effects of the Proposed Development and Overall Project in combination of the potential effects of other developments (referred to as 'cumulative developments') within the surrounding area, as listed in Chapter 19. A summary of cumulative effects pertinent to MA&Ds is contained in the following section.

Cumulative Effects during Construction

17.8.4 Assuming that the mitigation measures detailed in Section 17.5 for the PPA, EGC and GCC are implemented, no additional effects due to cumulative developments during construction are anticipated.

Cumulative Effects During Operation

17.8.5 Assuming that the mitigation measures detailed in Section 17.5 for the PPA, EGC and GCC are implemented, no additional effects due to cumulative developments during operation are anticipated.

Cumulative Effects During Decommissioning

17.8.6 Assuming that the mitigation measures detailed in Section 17.5 for the PPA are implemented, (on the basis that decommissioning of the GCC and EGC are scoped out) no additional effects due to cumulative developments during decommissioning are anticipated.

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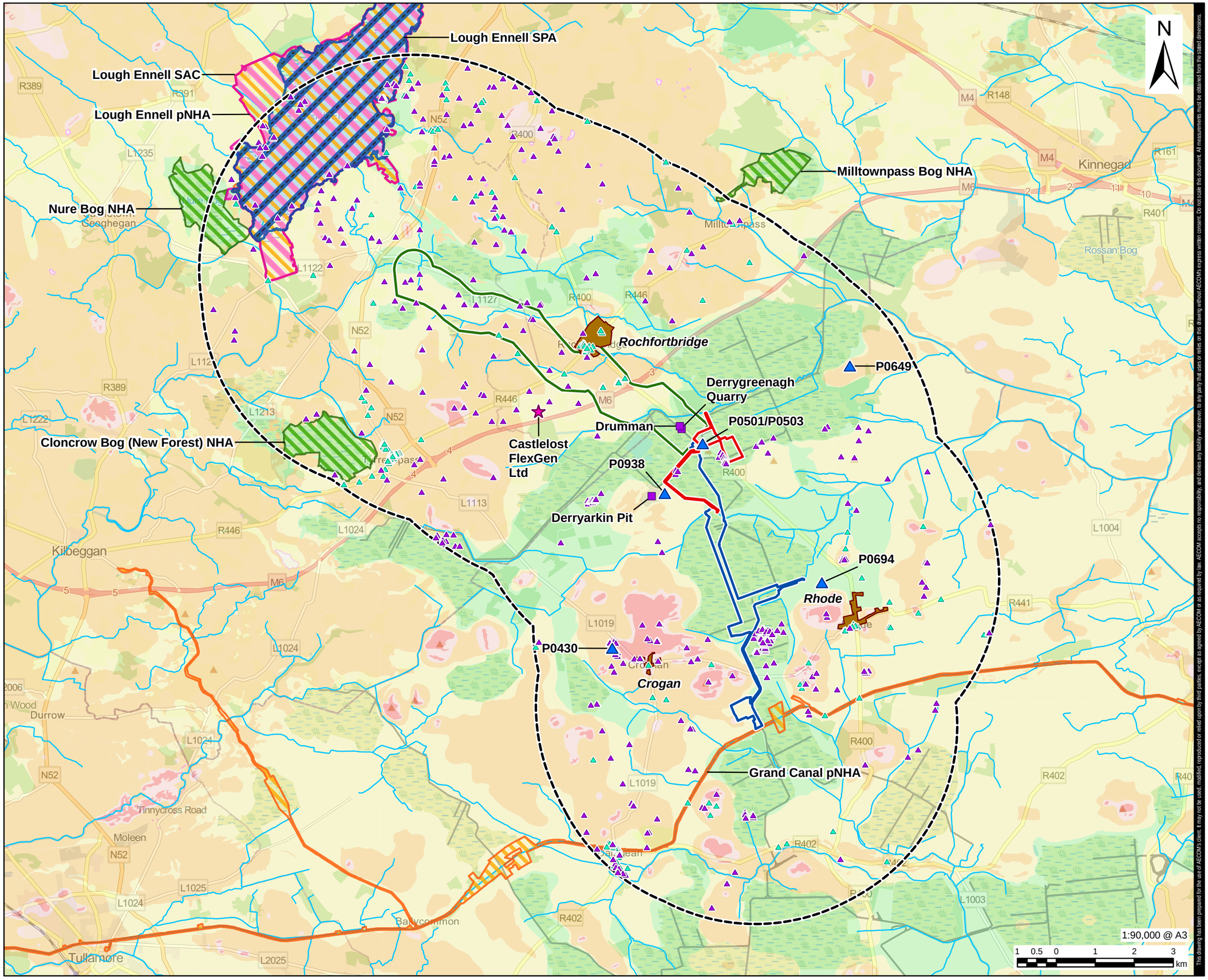

AECOM

PROJECT

Proposed Derrygreenagh Power Project

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Bord na Móna

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LEGEND

- Power Plant Area Boundary
- Electricity Grid Connection Boundary
- Gas Connection Corridor Boundary
- 5km Study Area
- Residential Area
- Watercourse
- Licenced IPPC Industrial Facilities
- Control of Major Accident Hazards (COMAH) Site
- Active Quarry

Cultural Heritage

- National Monuments (SMR)
- National Inventory of Architectural Heritage (NIAH)

Designated Sites

- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Natural Heritage Area (NHA)
- Proposed Natural Heritage Area (pNHA)

Groundwater Vulnerability

- Rock at or near Surface or Karst
- Extreme
- High
- Moderate
- Low
- Water

NOTES

ISSUE PURPOSE

FOR ISSUE

PROJECT NUMBER

60699676

FIGURE TITLE

Key Major Accidents and Disasters Receptors

FIGURE NUMBER

Figure 17.1