



Chapter 19

Risk of Major Accidents and / or Disasters

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19. Risk of Major Accidents and / or Disasters

19.1 Introduction

This chapter describes the likely significant negative effects on the environment arising from the vulnerability of the Proposed Development to risks of major accidents and / or disasters.

The assessment of the vulnerability of the Proposed Development to major accidents and / or disasters is carried out in accordance with the EIA Directive that entered into force on 16th May 2017 which 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 disasters which are relevant to the project concerned”

The underlying objective of this assessment is to ensure that appropriate precautionary actions are taken for any development projects which *“because of their vulnerability to major accidents and / or natural disasters, are likely to have significant adverse effects on the environment”*.

Based on the requirements of the EIA Directive, this chapter seeks to determine:

- The relevant major accidents and / or disasters, if any, that the Proposed Development could be vulnerable to;
- The potential for these major accidents and / or disasters to result in likely significant adverse environmental effect(s); and
- The measures that are in place, or need to be in place, to prevent or mitigate the potential significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.

A detailed description of the Proposed Development is provided in **Chapter 4, Description of the Proposed Development**.

19.2 Assessment Methodology

19.2.1 General

Major accidents and / or disasters are hazards that have the potential to affect and be affected by the Proposed Development. These include accidents during Construction, Operation and Decommissioning caused by operational failure and / or natural hazards.

The scope and methodology of this assessment is centred on the understanding that the Proposed Development will be designed, built and maintained in line with best current practice and in compliance with the relevant health and safety standards. As such, major accidents resulting from the Proposed Development will be very unlikely.

Notwithstanding the above, a risk analysis-based methodology that covers the identification, likelihood and consequence of major accidents and / or disasters has been used for this assessment. The scope and methodology presented in the following sections is based on the provisions of the EIA Directive, the EPA Guidelines (EPA, 2022) and guidance documents and other published risk assessment methodologies as described in Section 19.2.2.2, as well as professional judgement.

19.2.2 Guidance and legislation

19.2.2.1 Legislation

The following paragraphs are set out in the EIA Directive in relation to major accidents and / or disasters.

Recital 15 of the EIA Directive states that:

“In order to ensure a high level of protection of the environment, precautionary actions need to be taken for certain projects which, because of their vulnerability to major accidents, and / or natural disasters (such as flooding, sea level rise, or earthquakes) are likely to have significant adverse effects on the environment. For such projects, it is important to consider their vulnerability (exposure and resilience) to major accidents and / or disasters, the risk of those accidents and / or disasters occurring and the implications for the likelihood of significant adverse effects on the environment. 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 and Council Directive 2009/71/Euratom, or through relevant assessments carried out pursuant to national legislation provided that the requirements of this Directive are met.”

Note: Directive 2012/18/EU is the directive on the control of major-accident hazards involving dangerous substances, referred to as the COMAH or Seveso III Directive.

Article 3 of the EIA Directive provides that the EIAR shall identify, describe and assess in the appropriate manner, the direct and indirect significant effects on population and human health, biodiversity, land, soil, water, air and climate, material assets, cultural heritage and landscape deriving from (amongst other things) the *“vulnerability of the project to risks of major accidents and / or disasters that are relevant to the project concerned”*.

Specifically, the information relevant to major accidents and / or disasters to be included in the EIAR is set out in Section 8 of Annex IV of the EIA Directive as follows:

“(8) A description of 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 disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies”.

19.2.2.2 Guidance documents

Several guidance documents and published plans have been reviewed and considered in order to inform this assessment, as described in the following sections.

Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)

The European Commission Guidance outlines the legislative and key considerations that should be taken into account in the preparation of EIARs with respect to major accidents and / or disasters.

The Guidance lists the following issues which EIARs should address:

- What can go wrong with a Project?
- What adverse consequences might occur to human health and to the environment?
- How likely are these consequences?
- What is the Project’s state of preparedness in case of an accident/disaster?
- Is there a plan for an emergency situation?

EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR) (EPA, 2022)

The EPA guidelines refer to major accidents and / or disasters in several sections including:

- Characteristics of the Project – Under Section 3.5.2, it is stated that the project characteristics should include “*a description of the Risk of Accidents – having regard to substances or technologies used.*”
- Impact assessment - Under Section 3.7.1 it is stated that the impact assessment should, in accordance with Annex IV (5) of the EIA Directive, include “*the risks to human health, cultural heritage or the environment (for example due to accidents or disasters).*”
- Likelihood of Impacts - Under Section 3.7.3 it is stated that “*To address unforeseen or unplanned effects the Directive further requires that the EIAR takes account of the vulnerability of the project to risk of major accidents and /or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk).*”
- *This may be supported by general risk assessment methods or by systematic risk assessments required under other regulations e.g., a COMAH (Control of Major Accident Hazards involving Dangerous Substances) assessment.*”

Guidance on Assessing and Costing Environmental Liabilities (EPA, 2014)

The EPA has developed guidance that presents a systematic approach for assessing and costing environmental liabilities associated with the closure, restoration/aftercare and incidents associated with licensed facilities. This guidance is targeted at activities governed by EPA authorisations including Industrial Emissions Directive (IED), Integrated Pollution Prevention and Control (IPPC), wastewater discharge authorisations (WWDA) and dumping at sea (DaS) regimes.

Specifically, this document provides guidance on the identification and quantification of risks, focusing on unplanned, but possible and plausible events that may occur during the construction and Operational Phases of projects. Guidance is also provided on a range of risk assessment and evaluation techniques that could be employed.

A Framework for Major Emergency Management Guidance Document 1 – A Guide to Risk Assessment in Major Emergency Management (Government of Ireland, 2010)

The Department of the Environment, Heritage and Local Government, as it then was, published a guidance note in January 2010 on best practice in the area of risk assessment for major emergency management.

This Guidance sets out a risk assessment procedure that should be applied and documented by the principal response agencies as a basis for major emergency management. The risk assessment procedure underpins work in the later stages of the emergency management cycle. A significant benefit of the risk assessment process is that it can help establish confidence in the Major Emergency Management system, by showing it to be both realistic and logical.

This document describes the various stages of the risk assessment process and how it should be employed to inform mitigation and detailed planning during major emergency situations. Part 1 of the guidance sets out the risk assessment process and defines criteria for classifying impact and likelihood scenarios, as well as a process for recording the risk assessment.

National Risk Assessment for Ireland 2019 (Government of Ireland, 2019)

The most recent National Risk Assessment forms a critical subset of the strategic process (‘National Risk Assessment: Overview of Strategic Risks’) undertaken by the Government on an annual basis to assess national risks. The purpose of the assessment is to identify national hazards across a broad range of emergencies, to assess the likelihood and effect of these risks and to inform actions at national level aimed at mitigating such risks, including the allocation of resources.

19.2.3 Categorisation of the baseline environment

A desk-based study has been undertaken to establish the baseline environment relevant to the risk assessment, as this will influence both the likelihood and the effect of a major accident and / or disaster.

Establishing the local and regional context, prior to completion of the risk assessment, enables a better understanding of the vulnerability and resilience of the area to emergency situations, and of the potential for

the surrounding environment to pose a risk of a major accident or disaster, which could affect the Proposed Development. Section 19.3 provides an overview of the baseline environment that has been considered for this assessment.

19.2.4 Impact assessment methodology

19.2.4.1 General

As discussed above, the scope and methodology of this assessment is based on the intention that the Proposed Development will be designed, built and maintained in line with best current practice and, as such, the vulnerability of the Proposed Development to risks of major accidents and / or disasters is considered to be low.

Certain potential unplanned events, such as pollution incidents to ground and watercourses and flooding events, are addressed in detail in the relevant environmental assessment chapters. These include **Chapter 16, Water** and **Chapter 17, Land, Soils, Geology and Hydrogeology**.

19.2.4.2 Risk assessment methodology

Overview

The site-specific risk assessment identifies and quantifies risks focusing on unplanned, plausible incidents occurring during the construction, operation and decommissioning of the Proposed Development. The following steps were undertaken as part of the site-specific risk assessment:

- Identification of potential risks;
- Risk classification - likelihood and consequence assessment; and
- Risk evaluation.

Identification of potential risk

In accordance with the EC Guidance, potential risks are identified in respect of:

1. Potential vulnerability to major accident or disaster; and
2. Potential to cause major accidents and / or disasters.

The identification of potential risks has focused on non-standard but plausible incidents, which could occur at the Proposed Development during construction, operation and decommissioning, and which could cause a non-trivial impact on the environment. Similarly, if an off-site event could cause the Proposed Development to have a non-trivial impact on the environment, this was also classified as a plausible risk.

Risk classification

Classification of likelihood

Once the potential risks were identified, the likelihood of the occurrence of each was assessed. The rating criteria adopted for the assessment follows that used in A Guide to Risk Assessment in Major Emergency Management (Government of Ireland, 2010). The EPA Guidelines (EPA, 2022) state that the risk assessment must be based on a ‘worst-case’ approach. Therefore, the consequence rating assumes that all proposed mitigation measures and safety procedures have failed to prevent the occurrence of a major accident and / or disaster. **Table 19.1** indicates the likelihood ratings that have been applied.

The approach adopted has assumed a ‘risk likelihood’ where one or more aspects of the likelihood description are met.

Table 19.1: Risk classification – likelihood

Ranking	Likelihood	Description
1	Extremely unlikely	May occur only in exceptional circumstances; once every 500 or more years
2	Very unlikely	It is not expected to occur; and / or no recorded incidents or anecdotal evidence; and / or very few incidents in associated organisations, facilities or communities; and / or little opportunity, reason or means to occur; may occur once every 100-500 years.
3	Unlikely	May occur at some time; and / or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisation’s worldwide; some opportunity, reason or means to occur; may occur once per 10-100 years.
4	Likely	Like to or may occur; regular recorded incidents and strong anecdotal evidence and will probably occur once per 1-10 years
5	Very likely	Very likely to occur; high level of recorded incidents and / or strong anecdotal evidence. Will probably occur more than once a year.

Classification of Consequence

The consequence rating assigned to each potential risk has assumed that mitigation measures and / or safety procedures have failed to prevent an effect on the environment. The consequence rating of the effect, if the incident occurs, is indicated in **Table 19.2**.

The consequence of a potential risk to the Proposed Development has been determined where one or more aspects of the consequence description are met i.e., potential risks that have no consequence have been excluded from the assessment.

Table 19.2: Risk classification – consequence

Ranking	Consequence	Effect	Description
1	Minor	Life, Health, Welfare Environment Infrastructure Social	Small number of people affected; no fatalities and small number of minor injuries with first aid treatment. No contamination, localised effects Minor localised disruption to community services or infrastructure (<6 hours).
2	Limited	Life, Health, Welfare Environment Infrastructure Social	Single fatality; limited number of people affected; a few serious injuries with hospitalisation and medical treatment required. Localised displacement of a small number of people for 6-24 hours. Personal support satisfied through local arrangements. Simple contamination, localised effects of short duration €0.5-3M Normal community functioning with some inconvenience
3	Serious	Life, Health, Welfare Environment Infrastructure Social	Significant number of people in affected area impacted with multiple fatalities (<5), multiple serious or extensive injuries (20), significant hospitalisation. Large number of people displaced for 6 – 24 hours or possibly beyond; up to 500 evacuated. External resources required for personal support. Simple contamination, widespread effects or extended duration. €3-10M Community only partially functioning, some services available

Ranking	Consequence	Effect	Description
4	Very serious	Life, Health, Welfare Environment Infrastructure Social	5 to 50 fatalities, up to 100 serious injuries, up to 2000 evacuated Heavy contamination, localised effects or extended duration €10-25M Community functioning poorly, minimal services available
5	Catastrophic	Life, Health, Welfare Environment Infrastructure Social	Large numbers of people impacted with significant numbers of fatalities (>50), injuries in the hundreds, more than 2000 evacuated. Very heavy contamination, widespread effects of extended duration. >€25M Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.

Risk evaluation

In accordance with A Guide to Risk Assessment in Major Emergency Management (Government of Ireland, 2010), once classified, the likelihood and consequence ratings have been multiplied to establish a ‘risk score’ to support the evaluation of risks by means of a risk matrix.

The risk matrix (as outlined in **Table 19.3**) indicates the critical nature of each risk. The risk matrix has been applied to evaluate each of the risks associated with the Proposed Development. The risk matrix is colour coded to provide a broad indication of the critical nature of each risk:

- The red zone represents ‘high risks’;
- The amber zone represents ‘medium risks’; and
- The green zone represents ‘low risks’.

Table 19.3: Risk matrix

Likelihood	Very likely	5					
	Likely	4					
	Unlikely	3					
	Very unlikely	2					
	Extremely unlikely	1					
			Minor	Limited	Serious	Very serious	Catastrophic
			1	2	3	4	5
Consequence Rating							

Significant impacts resulting from major accidents and / or disasters are adverse impacts that are described as ‘Significant’, ‘Very Significant’ or ‘Profound’ under the EPA Guidelines (EPA, 2022). Consequently, major accidents and / or disasters risk events that fall within the Amber or Red Zones (‘Medium’ or ‘High’ risk events) are considered to present risk of significant impacts and are brought forward for further consideration and assessment for mitigation.

19.3 Baseline Environment

19.3.1 Disasters

Ireland's geographic position means natural disasters such as earthquakes or tsunamis, which might pose a risk to developments of this nature and scale in other locations, are less likely to occur and less likely to be of significant magnitude. In recent times, there has been an increase in the number of severe weather events in Ireland, particularly those leading to flash flooding, snow, lower than usual temperatures and strong winds. Some of the more recent severe weather events include Storm Ciara, January 2020, Storm Denis, February 2020, Storm Jorge, March 2020, Storm Barra, December 2021 and Storm Eunice, February 2022. Cork County Council (CCC) has published a Flood Emergency Response Plan and a Severe Weather Plan as part of its overall Major Emergency Plan (CCC, 2021) to respond and manage to such events.

With regard to disasters, severe weather conditions pose a plausible potential risk to the Proposed Development.

19.3.2 Major accidents

The potential for major emergencies within the CCC administrative area and the steps to be taken to respond to and manage such events are addressed in the CCC Major Emergency Plan (CCC, 2021).

Following the completion of risk assessments by CCC, a number of risks within the functional area were identified which had various implications for the Local Authority. These risk assessments were prepared with regard to other existing emergency plans for other sites, e.g., Inter-agency Emergency Plan for the Jack Lynch Tunnel.

Examples of Major Emergencies for which the CCC Major Emergency Plan would be activated include:

- Water contamination / pollution incident;
- Fire / explosion / toxic cloud release at industrial site;
- Fire / major crowd safety incident;
- Major road / rail incident;
- Hazardous materials incident (transportation); and
- Loss of critical infrastructure.

19.3.3 Licenced facilities

19.3.3.1 Seveso sites

The European Communities (Control of Major Accident Hazards involving Dangerous Substances) Regulations, 2015 (SI 209 of 2015) implement the requirements of the Council Directive 2012/18/EU on the control of major accident hazards involving dangerous substances. These Regulations require operators of establishments where dangerous substances are used or stored in large quantities to take all measures necessary to prevent and mitigate the effects of major accidents to man and the environment.

Establishments which fall under the remit of the Seveso III Regulations are classified as either "lower tier" or "upper tier" sites.

There are several Seveso sites in and around Cork City, with many of these sites located within close proximity to the Proposed Development site. The closest Seveso site to the Proposed Development is Janssen Pharmaceuticals, located at Little Island Industrial Estate, Cork. This is an "upper tier" Seveso site and is situated approximately 750m south-west of the Proposed Development site. The activity on site includes medical research and production of a wide range of pharmaceutical products. There are three more Seveso sites categorised as lower tier and upper tier sites which are located within two kilometres of the Proposed Development site.

In accordance with the Regulations, operators of a lower and upper tier establishment are to develop a site-specific Major-Accident Prevention Policy (MAPP) which is implemented by site specific procedures and systems.

19.3.3.2 Industrial emissions and waste licensed facilities

The nearest site to the Proposed Development which has a waste licence issued by the EPA is Thornbush Holdings Limited Former Mitsui Denman Plant. This facility is located approximately 1.5km southwest of the Proposed Development (Licensing No. W0246-01). The closest Industrial Emissions Licenced facility is Janssen Pharmaceutical Sciences, which is reported to make medical products and pharmaceuticals, and is located approximately 750m southwest of the Proposed Development.

The only other licenced facilities within 2km of the proposed development are listed in **Table 19.4**.

Table 19.4: Licenced facilities nearby the Proposed Development

Name	Licence reference no.	Approximate distance from Proposed Development
Janssen Pharmaceutical Sciences UC	P0016-01	750m
Upjohn Manufacturing Ireland Unlimited Company	P0136-04	1km
Cara Partners	P0017-02	1.1km
Wexport Limited	P0091-03	1.2km
Little Island BioEnergy Limited	P1018-01	1.5km
BASF Ireland Limited	P0052-02	1.5km
Architectural & Metal Systems Limited	P1117-01	1.5km

19.4 Potential Impacts

19.4.1 Do-Nothing Scenario

If the Proposed Development does not proceed, there will be no increase in the likelihood of major accidents occurring, or indeed the consequences should a major accident occur. There will also be no change to the likelihood or consequences of a disaster occurring. Therefore, there would be a neutral impact on the risk of major accidents and / or disasters under the ‘Do Nothing’ scenario.

19.4.2 Construction Phase

12 potential risks specific to the Construction Phase of the Proposed Development have been identified. These are outlined in the Construction Phase risk register in **Table 19.5**.

Table 19.5: Risk register – Construction Phase

Risk ID	Potential risk	Possible cause
C1	Collapse / damage to structures during bridge assembly and / or erection	<ul style="list-style-type: none"> - Faulty equipment; - Vehicular collision; - Employee negligence.
C2	Fall from height	<ul style="list-style-type: none"> - Faulty equipment, workmanship, or procedures; - Employee negligence.
C3	Contamination of groundwater and nearby surface water	<ul style="list-style-type: none"> - Employee negligence; - Spill or leaks; - Extreme weather (rain, wind); - Electrical fault or faulty equipment.

Risk ID	Potential risk	Possible cause
C4	Flooding of working areas (causing contamination to nearby water courses)	- Extreme weather events (e.g., periods of heavy rainfall, strong winds or fluvial flooding)
C5	Fire / explosion with a secondary effect of fire suppressant water / foam / powder reaching nearby receptors	- Spill or leak of flammable or explosive substance; - Construction vehicle or machinery collision; - Electrical fault or faulty equipment.
C6	Incident at nearby Seveso site leading to fire / explosion or pollution of water courses and / or release of harmful substances into the atmosphere	- Equipment or power failure; - Vehicle / plant machinery collision; - Sabotage / arson leading to ignition of fuel and / or explosion.
C7	Vehicle collision (involving construction traffic)	- Driver error; - Failure of vehicle control systems; - Failure of temporary traffic safety measures.
C8	Electrical shock	- Faulty equipment; - Contractor error during diversion of ESB MV overhead power lines that traverse the northern amenity park.
C9	Gas explosion	- Interaction with unknown gas infrastructure
C10	Risk of striking foul sewer mains running across southern wooded area	- Contractor error during construction of foundations in southern wooded area
C11	Risk of striking watermains supply – watermain running across the northern amenity park	- Contractor error during protection of existing watermain that traverses the northern amenity park
C12	Collapse of the during bridge during assembly and / or erection leading to damage to railway line	- Faulty equipment; - Vehicular collision; - Employee negligence.

19.4.3 Operational Phase

Six potential risks specific to the Operational Phase of the Proposed Development have been identified. These are outlined in the Operational Phase risk register in **Table 19.6**.

Table 19.6: Risk register – Operational Phase

Risk ID	Potential risk	Possible cause
O1	Collapse of Proposed Development	- Severe weather, earthquake, unforeseen wind gusts
O2	Fall from height during maintenance works	- Faulty maintenance equipment, workmanship or procedures; - Employee negligence.
O3	Fall from height by member of the public	- Anti-social behaviour
O4	Flooding of site area (causing contamination to nearby water courses)	- Extreme weather events (e.g., periods of heavy rainfall, strong winds or fluvial flooding)
O5	Incident at nearby Seveso site leading to fire / explosion or pollution of water courses and / or release of harmful substances into the atmosphere	- Equipment or power failure; - Vehicle / plant machinery collision; - Sabotage / arson leading to ignition of fuel and / or explosion.
O6	Collapse of the during bridge leading to damage to a train / the railway line	- Faulty equipment; - Vehicular collision.

19.4.4 Decommissioning Phase

Seven potential risks specific to the Decommissioning Phase of the Proposed Development have been identified. These are outlined in the Decommissioning Phase risk register in **Table 19.7**.

Table 19.7: Risk register – Decommissioning Phase

Risk ID	Potential risk	Possible cause
D1	Collapse / damage to structures during bridge decommissioning	<ul style="list-style-type: none"> - Faulty equipment; - Vehicular collision; - Employee negligence.
D2	Fall from height	<ul style="list-style-type: none"> - Faulty equipment, workmanship, or procedures; - Employee negligence.
D3	Contamination of groundwater and nearby surface water	<ul style="list-style-type: none"> - Spill or leaks from decommissioning vehicle or machinery; - Electrical fault or faulty decommissioning equipment; - Extreme weather (rain, wind).
D4	Flooding of site area (causing contamination to nearby water courses)	<ul style="list-style-type: none"> - Extreme weather events (e.g., periods of heavy rainfall, strong winds or fluvial flooding)
D5	Fire / explosion with a secondary effect of fire suppressant water / foam / powder reaching nearby receptors	<ul style="list-style-type: none"> - Decommissioning vehicle or machinery collision; - Electrical fault or faulty maintenance equipment.
D6	Incident at Seveso site leading to fire / explosion or pollution of water courses and / or release of harmful substances into the atmosphere	<ul style="list-style-type: none"> - Equipment or power failure; - Vehicle / plant machinery collision; - Sabotage / arson leading to ignition of fuel and / or explosion.
D7	Collapse of the bridge during decommissioning leading to damage to railway line	<ul style="list-style-type: none"> - Faulty equipment; - Vehicular collision; - Employee negligence.

19.4.5 Risk assessment

The potential risks identified in Sections 19.4.2, 19.4.3 and 19.4.4 have been assessed and the resulting risk analysis is presented in **Table 19.8**.

The risk register is based upon possible risks associated with the Proposed Development.

The consequence rating assigned to each potential risk assumes that the proposed mitigation measures and safety procedures have failed to prevent the effect on the environment.

Table 19.8: Risk assessment

Risk ID	Potential risk	Possible cause	Environmental effect	Likelihood rating (1 – 5)	Basis of likelihood	Consequence rating (1 – 5)	Basis of consequence	Risk score (consequence x likelihood)
Construction Phase								
C1	Collapse / damage to structures during bridge assembly and / or erection	<ul style="list-style-type: none"> Faulty equipment / products; Vehicular collision; Employee negligence. 	<ul style="list-style-type: none"> Damage to, or depletion of habitats and species; Effects on ambient air quality; Injury / illness / loss of life; Generation of waste, as damaged structure would have to be disposed of; Possible damage to fabric of heritage features. 	2	<p>Method statements will be prepared for all construction activities and best practice construction measures will be implemented by the contractor during construction. Assembly and erection of the proposed bridge will be carried out by suitably qualified and trained personnel.</p> <p>Construction Traffic will be managed in line with the procedures outline in the Construction and Environmental Management Plan (CEMP) in Appendix 5.1 in Volume 4 of this EIAR. As stated in the CEMP, a Construction Traffic Management Plan (CTMP) will be developed by the contractor and presented to CCC for approval prior to commencement of the construction works. The CTMP will contain detailed temporary traffic management drawings for each construction stage.</p> <p>Taking into consideration the robust mitigation measures to be implemented prior to assembly and erection of the proposed bridge the likelihood of such an event occurring was determined to be ‘very unlikely’.</p>	3	In the event of a structural collapse during the erection of the proposed new pedestrian and cyclist bridge, the consequence would be ‘serious’ in that a <i>significant number of people in the area would be affected and the community only partially functioning, some services available.</i>	6
C2	Fall from height	<ul style="list-style-type: none"> Faulty equipment, workmanship, or procedures; Employee negligence. 	<ul style="list-style-type: none"> Injury / loss of life. 	2	<p>The risk of fall from height during the Construction Phase is considered ‘very unlikely’.</p> <p>As outlined in Chapter 5, Construction Strategy, in accordance with the Regulations, a ‘Project Supervisor Design Process’ has been appointed for the Proposed Development and a ‘Project Supervisor Construction Stage’ will be appointed prior to commencement of works.</p> <p>The contractor will prepare a Health and Safety Plan and ensure that all staff have been trained in safe working procedures, that safe installation and environmental procedures are implemented and that all health and safety legislation and good working practices are followed.</p>	2	Should a fall from height occur a ‘limited’ effect is predicted, potentially resulting in a single fatality.	4
C3	Contamination of groundwater and nearby surface water	<ul style="list-style-type: none"> Employee negligence; Spill or leaks; Extreme weather (rain, wind); Electrical fault or faulty equipment. 	<ul style="list-style-type: none"> Contamination of nearby watercourses/ groundwater resource Damage to, or depletion of 	2	<p>Considering the environmental controls and monitoring measures which the PSCS will implement, as set out in the CEMP in Appendix 5.1 in Volume 4 of this EIAR, the likelihood of a spill or leak resulting in contamination of waterbodies or soil is ‘very unlikely’.</p>	2	Taking into consideration the distance between the Proposed Development and the Cork Harbour SPA and Great Island Channel SAC, in the very unlikely event of pollutants	4

Risk ID	Potential risk	Possible cause	Environmental effect	Likelihood rating (1 – 5)	Basis of likelihood	Consequence rating (1 – 5)	Basis of consequence	Risk score (consequence x likelihood)
			<ul style="list-style-type: none"> aquatic habitats and species Contamination of soils, which would have to be remediated or removed as waste 		In addition, measures will be in place, as outlined in the CEMP in Appendix 5.1 in Volume 4 of this EIAR, in the event of hazardous material and or hazardous build-up of water which will be the responsibility of the PSCS.		<p>entering nearby watercourses, groundwater or soil, the consequence would be considered 'limited'.</p> <p>Should contamination occur, the contamination would be localised and the effects of short duration, which could be remediated.</p>	
C4	Flooding of working areas (causing contamination to nearby water courses)	<ul style="list-style-type: none"> Extreme weather events (e.g., periods of heavy rainfall, strong winds or fluvial flooding) 	<ul style="list-style-type: none"> Sedimentation of nearby watercourses; Destruction or damage to site services / infrastructure; Damage to, or depletion of aquatic habitats and species. 	2	The Proposed Development is partially located within Flood Zone A. Measures will be in place, as outlined in the CEMP in Appendix 5.1 in Volume 4 of this EIAR (e.g., the contractor will be required to monitor the weather forecasts to inform the programming of earthworks and stockpiling of material), to ensure no flooding of the working areas and to protect watercourses from pollution.	2	Taking into consideration the distance between the Proposed Development and the Cork Harbour SPA and Great Island Channel SAC, flooding of the working areas resulting in silt run-off would have a 'limited' consequence, causing simple contamination with localised effects of short duration, which could be remediated.	4
C5	Fire / explosion with a secondary effect of fire suppressant water / foam / powder reaching nearby receptors	<ul style="list-style-type: none"> Spill or leak of flammable or explosive substance; Construction vehicle or machinery collision; Electrical fault or faulty equipment. 	<ul style="list-style-type: none"> Damage to, or depletion of habitats and species (incl. aquatic habitats and species); Contamination of groundwater resource; Effects on ambient air quality; Contamination of soils, which would have to be remediated or removed as waste. Injury/illness/loss of life; Possible fire damage to heritage features and equipment as well as visual 	1	<p>A fire and / or explosion during the Construction Phase is considered 'extremely unlikely' as the quantities of flammable or explosive materials on site, which could ignite or spill, during the Construction Phase will be limited and will be confined to the Construction Compounds. In any areas with electrical equipment, or hydrocarbons, water will not be used for firefighting.</p> <p>In addition, appropriate site personnel will be trained as first aiders and fire marshals. The contractor will be required to maintain an emergency response plan which will cover all foreseeable risks including fire. In preparing this plan the contractor will be required to liaise with the emergency response services.</p>	3	<p>Should a fire and / or explosion occur, a significant number of people in close proximity to the area could be affected, therefore the consequence would be 'serious'.</p> <p>Contamination of groundwater and / or a watercourse could occur.</p> <p>Should contamination of soil occur, the contamination would be localised and the effects of short duration, which could be remediated.</p>	3

Risk ID	Potential risk	Possible cause	Environmental effect	Likelihood rating (1 – 5)	Basis of likelihood	Consequence rating (1 – 5)	Basis of consequence	Risk score (consequence x likelihood)
			impacts of fire damage					
C6	Incident at nearby Seveso site leading to fire / explosion or pollution of water courses and / or release of harmful substances into the atmosphere	<ul style="list-style-type: none"> Equipment or power failure; Vehicle / plant machinery collision; Sabotage / arson leading to ignition of fuel and / or explosion. 	<ul style="list-style-type: none"> Injury or loss of life; Destruction of property and / or infrastructure; Damage to terrestrial / aquatic life; Impact on air quality associated with emissions. 	2	<p>Seveso sites are regularly inspected with operators required to prepare and submit site-specific Major Accident Prevention Policy (MAPP) and Annual Environmental Reports to the relevant regulatory/ enforcement agencies (i.e., the Health and Safety Authority and Environmental Protection Agency).</p> <p>Given the stringent environmental and safety measures associated with such licenced sites the likelihood of such an incident occurring during construction is considered 'very unlikely'.</p>	3	<p>According to the HSA website, "major industrial accidents involving dangerous substances pose a significant threat to humans and the environment; such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident".</p> <p>On the basis that the closest Seveso site is approximately 750m away, the consequence is deemed to be 'serious'</p>	6
C7	Vehicle collision (involving construction traffic)	<ul style="list-style-type: none"> Driver error; Failure of temporary traffic safety measures. 	<ul style="list-style-type: none"> Injury / loss of life. 	2	<p>A major road traffic accident during the Construction Phase is considered 'very unlikely'.</p> <p>As stated in the CEMP in Appendix 5.1 in Volume 4 of this EIAR, a CTMP will be developed by the contractor and presented to CCC for approval prior to commencement of the construction works. The CTMP will contain detailed temporary traffic management drawings for each construction stage.</p>	2	<p>Should a major road traffic accident occur, a 'limited' effect is predicted in that a limited number of people would be affected.</p> <p>Further, should this event occur, there would be normal community functioning in the surrounding areas with just some inconvenience.</p>	4
C8	Electrical shock	<ul style="list-style-type: none"> Faulty equipment; Contractor error during diversion of ESB MV overhead power lines that traverse the northern amenity park. 	<ul style="list-style-type: none"> Injury / loss of life 	1	<p>The risk of electrical shock during the construction of the Proposed Development is considered 'extremely unlikely'.</p> <p>The potential risk relates primarily to the diversion of overhead power lines.</p> <p>Prior to commissioning, the contractor will be required to ensure that all the equipment and systems have been designed and installed to good industry practice.</p> <p>The location of site utilities and infrastructure are well known and best practice construction procedures as well as mitigation measures will be implemented.</p>	2	<p>Very limited workforce exposed to the hazard.</p> <p>The consequence is considered 'limited' due to the small number of people likely to be affected along with the potential for a few serious injuries with hospitalisation and medical treatment required.</p>	2
C9	Gas explosion	<ul style="list-style-type: none"> Interaction with unknown gas infrastructure 	<ul style="list-style-type: none"> Injury / loss of life 	2	<p>There is an existing 600mm diameter gas transmission pipeline and 180mm nearby the Proposed Development.</p>	3	<p>The consequence would be 'serious' as there is the</p>	6

Risk ID	Potential risk	Possible cause	Environmental effect	Likelihood rating (1 – 5)	Basis of likelihood	Consequence rating (1 – 5)	Basis of consequence	Risk score (consequence x likelihood)
					<p>However, there will be no effect on these gas services during the Construction Phase. The location of site utilities and infrastructure are well known.</p> <p>Prior to the commencement of works, the contractor will consult with the services and utilities mapping of the site and will consult with service providers, where required.</p>		potential for 'multiple fatalities' with 'multiple serious or extensive injuries'.	
C10	Risk of striking foul sewer mains running across southern wooded area	<ul style="list-style-type: none"> Contractor error during construction of foundations in southern wooded area 	<ul style="list-style-type: none"> Injury; Hazards associated with exposure to untreated wastewater (diseases etc.); Displacement of local residences and businesses in the event of flooding. 	2	<p>There is an existing foul sewer main running across the southern wooded area of the Proposed Development. This will remain unaffected by the works. The location of site utilities and infrastructure are well known.</p> <p>Prior to the commencement of works, the PSCS will consult with the services and utilities mapping of the site and will consult with service providers, where required.</p>	2	The consequence is considered 'limited' due to the small number of people likely to be affected.	4
C11	Risk of striking watermain supply – watermain running across the northern amenity park	<ul style="list-style-type: none"> Contractor error during protection of existing watermain that traverses the northern amenity park 	<ul style="list-style-type: none"> Injury; Disruption to water supply; Displacement of local residences and businesses in the event of flooding. 	2	<p>There is an existing Uisce Eireann watermain running across the northern amenity park area of the Proposed Development which will be protected as part of the works. The location of site utilities and infrastructure are well known.</p> <p>Prior to the commencement of works, the PSCS will consult with the services and utilities mapping of the site and will consult with service providers, where required.</p>	2	The consequence is considered 'limited' due to the small number of people likely to be affected.	4
C12	Collapse of the during bridge during assembly and / or erection leading to damage to railway line	<ul style="list-style-type: none"> Faulty equipment / products; Vehicular collision; Employee negligence. 	<ul style="list-style-type: none"> Injury / loss of life; Damage to infrastructure. 	2	<p>Method statements will be prepared for all construction activities and best practice construction measures will be implemented by the contractor during construction. Assembly and erection of the proposed bridge will be carried out by suitably qualified and trained personnel.</p> <p>The train line service will remain unaffected by the works, with safe working areas and appropriate protection, in line with Irish Rail requirements, being set up along the track zone.</p> <p>Access for the construction of the span crossing the railway line will take place during a temporary track closure. This is anticipated to be a weekend closure during the Christmas or Easter downtime periods and may take place overnight, in agreement with Irish Rail and Cork County Council.</p>	3	The consequence is considered 'serious' due to the small number of people likely to be affected.	6

Risk ID	Potential risk	Possible cause	Environmental effect	Likelihood rating (1 – 5)	Basis of likelihood	Consequence rating (1 – 5)	Basis of consequence	Risk score (consequence x likelihood)
					As such, the chances of a collapse leading to damage to the railway line is considered 'very unlikely'.			
Operational Phase								
O1	Collapse of Proposed Development	<ul style="list-style-type: none"> Severe weather, earthquake, unforeseen wind gusts 	<ul style="list-style-type: none"> Injury / loss of life. 	1	<p>According to the Irish National Seismic Network (INSN), earthquakes measuring ~2 on the Richter Scale are 'normal' in terms of seismicity in Ireland. These are known as microearthquakes; they are not commonly felt by people and are generally recorded only on local seismographs. With events of this magnitude buildings in Ireland are extremely unlikely to be damaged or collapse due to seismic activity.</p> <p>It is considered 'extremely unlikely' that severe weather would cause significant damage or collapse of the bridge, even allowing for climate change scenario. The design and build of the Proposed Development have taken into consideration such extreme weather events.</p>	4	In the event the proposed bridge collapses during the Operational Phase, the consequence could be considered 'very serious' with 5 to 50 fatalities and up to 100 serious injuries.	4
O2	Fall from height during maintenance works	<ul style="list-style-type: none"> Faulty equipment, workmanship or procedures; Employee negligence. 	<ul style="list-style-type: none"> Injury / loss of life. 	1	<p>The risk of a fall from height while carrying out maintenance works during the operation of the Proposed Development is considered 'extremely unlikely' as all maintenance works can be carried out either from the decking of the proposed bridge which will have harness points in place or from safe mobile elevated work platforms (MEWPs). Additionally, parapets / handrailing of appropriate height will be in place for both pedestrians and cyclists.</p> <p>In addition, the design of the Proposed Development and the protective coating on the steel structures ensures that limited maintenance works will be required. Where works are necessary, only fully trained and qualified staff will carry out such maintenance works.</p>	2	A limited workforce will be involved in carrying out maintenance works which will be carried out from the deck of the proposed new pedestrian and cyclist bridge. Should a fall from height occur a 'limited' effect is predicted resulting in single fatality.	2
O3	Fall from height by member of the public	<ul style="list-style-type: none"> Anti-social behaviour 	<ul style="list-style-type: none"> Injury / loss of life. 	1	<p>The risk of a fall from height by a member of the public when using the proposed bridge is considered 'extremely unlikely' as the Proposed Development have been designed in accordance best practice. The design has also been reviewed by the project PSDP in line with Safety, Health and Welfare at Work (Construction) Regulations 2013. As mentioned in Chapter 4, Description of Proposed Development, parapets and handrailing of appropriate height will be in place for both pedestrians and cyclists,</p>	2	Should a fall from height occur a 'limited' effect is predicted resulting in single fatality.	2

Risk ID	Potential risk	Possible cause	Environmental effect	Likelihood rating (1 – 5)	Basis of likelihood	Consequence rating (1 – 5)	Basis of consequence	Risk score (consequence x likelihood)
					low level LED safety lighting will be fitted into the handrailing and along the decking, and the walkways will have an anti-slip surface to ensure safety of the users.			
O4	Flooding of site area (causing contamination to nearby water courses)	<ul style="list-style-type: none"> • Extreme weather events (e.g., periods of heavy rainfall, strong winds or fluvial flooding) 	<ul style="list-style-type: none"> • Sedimentation of nearby watercourses; • Destruction or damage to site services / infrastructure; • Damage to, or depletion of aquatic habitats and species. 	2	<p>The Proposed Development is partially located within Flood Zone A. Taking a conservative approach, the maximum flood level on site will be 3.66m OD. The lowest point on the northern side of the access ramp is at 3.40m OD and hence a short section of it will be flooded. This was considered acceptable as the bridge structure is 'less vulnerable' development considering the embankment at the access ramp will be vegetated to make it flood resilient.</p> <p>Therefore, the likelihood of flooding of the Proposed Development area is deemed 'very unlikely'.</p>	2	Taking into consideration the distance between the Proposed Development and the Cork Harbour SPA and Great Island Channel SAC, flooding of the working areas resulting in silt run-off would have a 'limited' consequence, causing simple contamination with localised effects of short duration, which could be remediated.	4
O5	Incident at nearby Seveso site leading to fire / explosion or pollution of water courses and / or release of harmful substances into the atmosphere	<ul style="list-style-type: none"> • Equipment or power failure; • Vehicle / plant machinery collision; • Sabotage / arson leading to ignition of fuel and / or explosion. 	<ul style="list-style-type: none"> • Injury or loss of life; • Destruction of property and / or infrastructure; • Damage to terrestrial / aquatic life; • Impact on air quality associated with emissions. 	2	<p>Seveso sites are regularly inspected with operators required to prepare and submit site-specific Major Accident Prevention Policy (MAPP) and Annual Environmental Reports to the relevant regulatory/ enforcement agencies (i.e., the Health and Safety Authority and Environmental Protection Agency).</p> <p>Given the stringent environmental and safety measures associated with such sites the likelihood of such an incident occurring during the Operational Phase is considered 'very unlikely'.</p>	3	<p>According to the HSA website, "<i>major industrial accidents involving dangerous substances pose a significant threat to humans and the environment; such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident</i></p> <p>On the basis that the closest Seveso site is approximately 750m away, the consequence is deemed to be 'serious'</p>	6
O6	Collapse of the Proposed Development resulting in damage to a train / the railway line	<ul style="list-style-type: none"> • Faulty equipment / products; • Vehicular collision. 	<ul style="list-style-type: none"> • Injury / loss of life; • Damage to infrastructure. 	2	The design and manufacture of the equipment follows industry best practice to and complies with relevant standards. The products used will also meet relevant industry standards, with their use demonstrating a long, safe history. As such, it is considered 'very unlikely' that the bridge would collapse due to faulty equipment or a vehicular collision.	3	The consequence is considered 'serious' due to the small number of people likely to be affected.	6

Risk ID	Potential risk	Possible cause	Environmental effect	Likelihood rating (1 – 5)	Basis of likelihood	Consequence rating (1 – 5)	Basis of consequence	Risk score (consequence x likelihood)
Decommissioning Phase								
D1	Collapse / damage to structures during bridge decommissioning	<ul style="list-style-type: none"> Faulty equipment / products; Vehicular collision. Employee negligence. 	<ul style="list-style-type: none"> Damage to, or depletion of habitats and species; Effects on ambient air quality; Injury / loss of life; Generation of waste, as damaged structure would have to be disposed of; Possible damage to fabric of heritage features. 	2	<p>Prior to the decommissioning of the pedestrian and cyclist bridge, detailed method statements and risk assessments will be prepared by the decommissioning contractor. The concrete decking and steel spans will be cut into a number of large sections. This will be done either <i>in situ</i> or at ground level, with the decking and spans being lifted out by a mobile crane and moveable gantry. Cutting and subsequent removal of the decking and spans will be carried out by suitably qualified and trained personnel.</p> <p>Prior to the commencement of decommissioning works the contractor will prepare a Traffic Management Plan which will designate traffic routes and timings of works to ensure separation of the works area from members of the public and protected structures.</p> <p>Taking into consideration the robust mitigation measures to be implemented the likelihood of such an event occurring was determined to be ‘very unlikely’.</p>	3	In the event of a structural collapse during the decommissioning of the proposed new pedestrian and cyclist bridge, the consequence would be ‘serious’ in that a <i>significant number of people in the area would be affected and the community only partially functioning, some services available.</i>	6
D2	Fall from height	<ul style="list-style-type: none"> Faulty equipment, workmanship or procedures; Employee negligence. 	<ul style="list-style-type: none"> Injury / loss of life. 	2	<p>The risk of fall from height during Decommissioning Phase is considered ‘very unlikely’.</p> <p>The decommissioning contractor will be required to ensure that all staff have been trained in safe working procedures, that safe environmental procedures are implemented and that all health and safety legislation and good working practices are followed. Appropriate site personnel will be trained as first aiders.</p>	2	Should a fall from height occur a ‘limited’ effect is predicted resulting in single fatality.	4
D3	Contamination of groundwater and nearby surface water	<ul style="list-style-type: none"> Spill or leaks from decommissioning vehicle or machinery; Electrical fault or faulty decommissioning equipment; Extreme weather (rain, wind). 	<ul style="list-style-type: none"> Contamination of nearby watercourses / groundwater resource; Damage to, or depletion of aquatic habitats and species; Contamination of soils, which would have to be remediated or removed as waste. 	2	<p>Environmental controls will be implemented by the decommissioning contractor to ensure that the likelihood of a spill or leak resulting in contamination of waterbodies or soil is ‘very unlikely’.</p> <p>In addition, measures will be in place in the event of hazardous material and or hazardous build-up of water which will be the responsibility of the decommissioning contractor.</p>	2	<p>Taking into consideration the distance between the Proposed Development and the Cork Harbour SPA and Great Island Channel SAC, in the very unlikely event of pollutants entering nearby watercourses, groundwater or soil, the consequence would be considered ‘limited’.</p> <p>Should contamination occur, the contamination would be localised and the effects of</p>	4

Risk ID	Potential risk	Possible cause	Environmental effect	Likelihood rating (1 – 5)	Basis of likelihood	Consequence rating (1 – 5)	Basis of consequence	Risk score (consequence x likelihood)
							short duration, which could be remediated.	
D4	Flooding of site area (causing contamination to nearby water courses)	<ul style="list-style-type: none"> Extreme weather events (e.g., periods of heavy rainfall, strong winds or fluvial flooding) 	<ul style="list-style-type: none"> Sedimentation of nearby watercourses; Destruction or damage to site services / infrastructure; Damage to, or depletion of aquatic habitats and species. 	2	The Proposed Development is partially located within Flood Zone A. Measures will be in place during the decommissioning phase to ensure no flooding of the working areas and to protect watercourses from pollution.	2	Taking into consideration the distance between the Proposed Development and the Cork Harbour SPA and Great Island Channel SAC, flooding of the working areas resulting in silt run-off would have a 'limited' consequence, causing simple contamination with localised effects of short duration, which could be remediated.	4
D5	Fire / explosion with a secondary effect of fire suppressant water / foam / powder reaching nearby receptors	<ul style="list-style-type: none"> Decommissioning vehicle or machinery collision; Electrical fault or faulty maintenance equipment. 	<ul style="list-style-type: none"> Damage to, or depletion of habitats and species (incl. aquatic habitats and species); Contamination of groundwater resource; Effects on ambient air quality; Contamination of soils, which would have to be remediated or removed as waste. Injury/illness/loss of life; Possible fire damage to heritage features and equipment as well as visual impacts of fire damage 	1	<p>A fire and / or explosion during the Decommissioning Phase is considered 'extremely unlikely' as the quantities of flammable or explosive materials on site, which could ignite or spill, during the Decommissioning Phase will be limited. In any areas with electrical equipment, or hydrocarbons, water will not be used for firefighting.</p> <p>In addition, appropriate site personnel will be trained as first aiders and fire marshals. The contractor will be required to maintain an emergency response plan which will cover all foreseeable risks including fire. In preparing this plan the contractor will be required to liaise with the emergency response services.</p>	3	<p>Should a fire and / or explosion occur, a significant number of people in close proximity to the area could be affected, therefore the consequence would be 'serious'.</p> <p>Contamination of groundwater and / or a watercourse could occur.</p> <p>Should contamination of soil occur, the contamination would be localised and the effects of short duration, which could be remediated.</p>	3
D6	Incident at Seveso site leading to fire / explosion or pollution of	<ul style="list-style-type: none"> Equipment or power failure; Vehicle / plant machinery collision; 	<ul style="list-style-type: none"> Injury or loss of life; Destruction of property and / or infrastructure; 	2	Seveso sites are regularly inspected with operators required to prepare and submit site-specific Major Accident Prevention Policy (MAPP) and Annual Environmental Reports to the relevant regulatory/ enforcement agencies	3	According to the HSA website, " <i>major industrial accidents involving dangerous substances pose a significant threat to humans and the</i>	6

Risk ID	Potential risk	Possible cause	Environmental effect	Likelihood rating (1 – 5)	Basis of likelihood	Consequence rating (1 – 5)	Basis of consequence	Risk score (consequence x likelihood)
	water courses and / or release of harmful substances into the atmosphere	<ul style="list-style-type: none"> Sabotage / arson leading to ignition of fuel and / or explosion. 	<ul style="list-style-type: none"> Damage to terrestrial / aquatic life. Impact on air quality associated with emissions 		(i.e., the Health and Safety Authority and Environmental Protection Agency). Given the stringent environmental and safety measures associated with such licenced sites the likelihood of such an incident occurring during decommissioning is considered 'very unlikely'.		<i>environment; such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident".</i> On the basis that the closest Seveso site is approximately 750m away, the consequence is deemed to be 'serious'	
D7	Collapse of the during bridge during decommissioning leading to damage to the railway line	<ul style="list-style-type: none"> Faulty equipment / products; Vehicular collision; Employee negligence. 	<ul style="list-style-type: none"> Injury / loss of life; Damage to infrastructure. 	2	<p>The design and manufacture of the equipment follows industry best practice to and complies with relevant standards. The products used will also meet relevant industry standards, with their use demonstrating a long, safe history.</p> <p>Method statements will be prepared for all decommissioning activities and best practice measures will be implemented by the decommissioning contractor.</p> <p>Decommissioning of the proposed bridge will be carried out by suitably qualified and trained personnel.</p> <p>The train line service will remain unaffected by the works, with safe working areas and appropriate protection in line with Irish Rail requirements being set up along the track zone.</p> <p>Decommissioning will take place during a temporary track closure.</p> <p>As such, the chances of a collapse leading to damage to a train/railway line is considered 'very unlikely'.</p>	3	The consequence is considered 'serious' due to the small number of people likely to be affected.	6

19.4.6 Risk scores and risk matrix

The risk assessment in **Table 19.9** categorises each of the potential risks by their ‘risk score’.

Table 19.9: Risk scores

Risk ID	Potential risk	Likelihood rating (1 – 5)	Consequence rating (1 – 5)	Risk score (consequence x likelihood)
Construction Phase				
C1	Collapse / damage to structures during bridge assembly and / or erection	2	3	6
C2	Fall from height	2	2	4
C3	Contamination of groundwater and nearby surface water	2	2	4
C4	Flooding of working areas (causing contamination to nearby water courses)	2	2	4
C5	Fire / explosion with a secondary effect of fire suppressant water / foam / powder reaching nearby receptors	1	3	3
C6	Incident at nearby Seveso site leading to fire / explosion or pollution of water courses and / or release of harmful substances into the atmosphere	2	3	6
C7	Vehicle collision (involving construction traffic)	2	2	4
C8	Electrical shock	1	2	2
C9	Gas explosion	2	3	6
C10	Risk of striking foul sewer mains running across southern wooded area	2	2	4
C11	Risk of striking watermains supply – watermain running across the northern amenity park	2	2	4
C12	Collapse of the during bridge during assembly and / or erection leading to damage to railway line	2	3	6
Operational Phase				
O1	Collapse of Proposed Development	1	4	4
O2	Fall from height during maintenance works	1	2	2
O3	Fall from height by member of the public	1	2	2
O4	Flooding of site area (causing contamination to nearby water courses)	2	2	4
O5	Incident at nearby Seveso site leading to fire / explosion or pollution of water courses and / or release of harmful substances into the atmosphere	2	3	6
O6	Collapse of the Proposed Development resulting in damage to a train / the railway line	2	3	6
Decommissioning Phase				
D1	Collapse / damage to structures during bridge decommissioning	2	3	6

Risk ID	Potential risk	Likelihood rating (1 – 5)	Consequence rating (1 – 5)	Risk score (consequence x likelihood)
D2	Fall from height	2	2	4
D3	Contamination of groundwater and nearby surface water	2	2	4
D4	Flooding of site area (causing contamination to nearby water courses)	2	2	4
D5	Fire / explosion with a secondary effect of fire suppressant water / foam / powder reaching nearby receptors	1	3	3
D6	Incident at Seveso site leading to fire / explosion or pollution of water courses and / or release of harmful substances into the atmosphere	2	3	6
D7	Collapse of the during bridge during decommissioning leading to damage to the railway line	2	3	6

A corresponding risk matrix is provided in **Table 19.10** which is colour coded to provide an indication of the critical nature of each risk. The red zone represents high risks, the amber zone represents medium risks and the green zone represents low risks.

Table 19.10: Risk matrix

Likelihood	Very likely	5					
	Likely	4					
	Unlikely	3					
	Very unlikely	2		C2, C3, C4, C7, O4, C10, C11, D2, D3, D4	C1, C6, C9, C12, O5, O6, D1, D6, D7		
	Extremely unlikely	1		C8, O2, O3	C5, D5	O1	
			Minor	Limited	Serious	Very serious	Catastrophic
			1	2	3	4	5
			Consequence Rating				

As is evident in **Table 19.10**, each of the potential risks identified during the construction, operation and decommissioning of the Proposed Development can be classified as a low risk.

No plausible major accident or disaster hazards were identified to which the Proposed Development will be particularly vulnerable. No plausible potential risks were identified which would result in the Proposed Development causing a major accident or disaster on or outside of the Proposed Development.

19.5 Mitigation and Monitoring

19.5.1 Construction Phase

Aside from the mitigation and monitoring measures to be carried out by the contractor as outlined in the CEMP in **Appendix 5.1** in **Volume 4** of this EIAR (e.g., site inspections and audits), and the measures outlined throughout the remainder of the EIAR, no additional mitigation or monitoring is considered necessary during the Construction Phase of the Proposed Development.

19.5.2 Operational Phase

No additional mitigation or monitoring measures are considered necessary during the Operational Phase of the Proposed Development.

19.5.3 Decommissioning Phase

Should some or all of the proposed development be decommissioned, planning consent and environmental assessments would be required to ensure that adverse effects on the environment would be minimised.

19.6 Cumulative Impacts

A review of CCC, An Bord Pleanála (ABP) and Department of Housing, Local Government and Heritage (DHLGH) online planning records has indicated that other projects have been proposed within the surrounding area that may give rise to cumulative impacts (refer to **Chapter 20, Cumulative and Interactive Impacts**).

While unlikely, there is potential for overlap between the Construction Phases of the projects listed in **Chapter 20, Cumulative and Interactive Impacts** and the Proposed Development, which could result in a cumulative effect on water quality and / or traffic and transportation (in the form of a vehicle collision). However, with the implementation of the mitigation measures outlined in the CEMP (refer to **Appendix 5.1** in **Volume 4** of this EIAR) and the implementation of a CTMP for the Proposed Development, no significant negative cumulative effects are predicted.

No operational or decommissioning cumulative effects associated with the projects listed in **Chapter 20, Cumulative and Interactive Impacts** have been identified.

19.7 Residual Impacts

No plausible major accidents and / or disasters were identified, to which the Proposed Development will be particularly vulnerable during the Construction, Operational or Decommissioning Phase.

No plausible potential risks were identified which would result in the Proposed Development causing a major accident and / or disaster on or outside the site during the Construction, Operational or Decommissioning Phase.

19.8 References

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