

18 Risk of Major Accidents and Disasters

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18.1 Introduction

This chapter has been prepared by Brock McClure Planning and Development Consultants and DBFL Consulting Engineers.

The 2014 EIA Directive (2014/52/EU) has updated the list of topics to be addressed in an EIAR and has included ‘Risk Management’ as a new chapter to be addressed. Article 3 of the new EIA Directive requires that the EIA 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*”.

The Planning and Development Regulations 2001, as amended, Schedule 6 paragraph 2(h) indicate that it may be appropriate to furnish additional information in relation to the following –

(h) a description of the expected significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out pursuant to national legislation may be used for this purpose, provided that the requirements of the Environmental Impact Assessment 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, emergencies arising from such events.

The chapter identifies and assesses the likelihood and potential significant adverse impacts on the environment arising from the vulnerability of the proposed development to risks of major accidents and / or natural disasters. It considers whether the proposed development is likely to cause accidents and / or disasters and its vulnerability to them.

The purpose of the chapter is to ensure that the safety and precautionary measures necessary to protect the proposed development in the event of a major accident and / or natural disaster are identified and that appropriate mitigation measures are provided that would protect the environment in the event of such occurrences.

This chapter will identify the types of major accidents / natural disasters that the project is vulnerable to; whether major accidents or natural disasters and the responses to these give rise to significant adverse environmental impacts; the nature of these impacts and the measures needed to prevent or mitigate the likely adverse impact of such events on the environment.

18.2 Study Methodology

The proposed development has been designed and will be constructed in line with best practice. Major accidents and / or natural disasters are therefore very unlikely. The identification, control and management of risk is an integral part of the design. The following section set outs a risk analysis, which addressed the identification, likelihood and consequence of major accidents and / or natural disasters.

18.3 Site Specific Risk Assessment Methodology

The classification of likelihood is set out below:

Ranking	Classification	Likelihood
1.	Extremely Unlikely	May occur in exceptional circumstances. Once every 500 or more years.
2.	Very Unlikely	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 organisations worldwide; some opportunity; reason or means to occur; may occur once per 10-100 years.
4.	Likely	Likely 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.

Table 18.1 - Classification of Likelihood (Extracted from DoELG – A framework for major emergency management guidance document 1: A guide to Risk Assessment in Major Emergency Management 2010

The site is not an area prone to natural disasters. Risks were reviewed through the identification of plausible risks in consultation with relevant specialists. The risks below are considered the most relevant potential risks.

Category	Risk Factor Type	Likelihood
Weather	Storms/Snow	5
Hydrological	Risk from Flooding	1
Geological	Made ground	3
Road	Traffic Accident	3
Industrial Accident	Seveso Site	1
Explosion	Natural Gas	1
Fire	Construction and Operation	3
Building Collapse	Structural Failure	1
Hazardous Substance Escape	Construction	3
Pollution	Construction	3

Table 18.2 - Identification of Key Risks and Categorisation

18.4 The Proposed Development

Likely Significant Effects

The likely significant effects are set out below.

Do Nothing Scenario

The potential risk would be low due to vacant nature of the site.

Construction Phase

The proposal will involve the management of invasive species on site; the excavation of a basement level; traffic management; use of equipment and machinery on site; and scaffolding.

Hazardous materials used during construction will be appropriately stored so as not to give rise to a risk of pollution.

In the event of storms or snow, construction activity shall be halted and the site secured in accordance with any site risk assessments prepared for adverse weather conditions.

Construction activity will involve a number of potential risks as set out in the construction management plan enclosed herewith from DBLF Consulting Engineers. A review of the document confirms the potential for Noise and Vibration Sources from mechanical plant; Hazardous Spillages; and Contamination from Dust and Dirt.

Operational Phase

The proposal provides for a build to rent development consisting of 468 units, a residential tenant amenity space and a café/restaurant.

The main risk associated with operational stage is fire. The proposed uses are considered normal hazard fire risks. The uses do not include any hazards, which would be regarded as presenting an increased fire risk. The risk for fire will be that all fire safety measures shall comply with the requirements of Part B (Fire) Of the Second Schedule of the Building Regulations 1997-2017.

The cleaning of windows in the buildings will be undertaken by a specialist contractor and risks of accidents will be minimised as a result.

There is a potential risk associated with the provision of the roof garden for the crèche facility with a risk for falls. The treatment of this garden has been designed to ensure that all users of the space are safely secured. Appropriate boundary treatment is proposed in this regard.

There are no exceptional risks associated with technology.

The Flood Risk Assessment enclosed herewith sets out the following flood risk analysis for operational stage:

Source	Pathway	Receptor	Likelihood	Consequence	Risk	Mitigation Measure	Residual Risk
Fluvial	Overbank from Deansgrange Stream 650m north-east of the site	People and Property (the proposed development)	Remote	Medium	Low	The lowest proposed FFL is 15.94m above the predicted 0.1%AEP fluvial event associated with Deansgrange Stream	Low
Surface Water (Pluvial)	Blockage and / or surcharging of the surface water drainage network	People and Property (the proposed development)	Possible	Medium	Medium	Proposed drainage system to be maintained on a regular basis to reduce the risk of blockage	Low
Human Mechanical Error (Pluvial)	Failure of SuDS measures (e.g. Hydrobrake failure)	People and Property (the proposed development)	Possible	Medium	Medium	Proposed drainage system to be maintained on a regular basis to reduce the risk of blockage	Low
Ground Water	Rising groundwater levels within the site	People and Property (the proposed development)	Remote	Low	Low	In general, the designed basement level, ground floor levels and external pavement levels have been designed to follow the natural topography of the site. Observed ground water levels during site investigations are all lower than designed site levels.	Low

Table 18.3 - Flood Risk Analysis

As the flood risk from all sources can be mitigated, reducing the flood risk to low or very low, the proposed development is considered acceptable in terms of flood risk.

18.5 Predicted Impacts - Risk of Major Accidents and/or Disasters

The following risk register has been prepared to identify the main risks identified within the construction and operational phases of the development.

Risk No.	Risk Event	Possible Cause
Construction Stage		
1.	Accidents during construction	Traffic Working at Height Fire Ground Water Pollution
2.	Adverse Weather	Snow/Storms/Poor Weather System
Operational Stage		
3.	Fire Following Occupation	Inappropriate Use of Electrical Appliances
4.	Falls	Falling from Roof Gardens Window Cleaning
5.	Flooding	Tidal Fluvial Pluvial Ground Water Human/Mechanical Error

Table 18.3 - Main Risks

18.6 Potential Cumulative Impacts

There are no permitted projects in the immediate area that require consideration.

18.7 Risks to Human Health

The potential for increased accidents is also considered low as a result of the relatively minor traffic increases. The worst-case scenario where mitigation measures failed for a development of the type proposed is considered to be the risk of an accident during the construction phase. This is considered highly unlikely and indeterminable.

In addition, the following risks to human health have been identified in individual chapters of this EIAR and these are set out herein for transparency in relation to overall risks to human health.

- **Lands and Soils:** Risks to Human Health associated with works during the construction phase in relation to land and soils include:
 - Work which puts persons at risk of burial under earthfall e.g. during basement excavation.
 - Works that could undermine existing foundations
 - Works in relation to subsoils impacted by hydrocarbons
 - Contact with existing underground services e.g. gas leaks or electrocution.

- Access and egress from the site and interface with site staff and / or the public e.g. Risk of slips, trips and falls
- Dust generation
- Use of machinery and plant e.g. risk of injury to personnel and damage to plant and machinery due to improper use.
- **Water:** During construction, cross contamination of potable water supply to construction compound could occur. With the implementation of the aforementioned mitigation measures, the likelihood of such events occurring would be local and not significant.

Risks to Human Health associated with works during the construction phase associated with Water and Hydrology include:

- Work which puts persons at risk of burial under earthfall e.g. risk of injury to personnel from trench collapse.
- Contact with existing underground services e.g. gas leaks or electrocution.
- Works adjacent to live traffic and pedestrian cycle movements e.g. risk to public in terms of working on public road and footpath associated with provision of a water connection.
- Access and egress from the site and interface with site staff and / or the public e.g. Risk of slips, trips and falls.
- Work in confined spaces e.g. asphyxiation.
- Use of machinery and plant e.g. risk of injury to personnel and damage to plant and machinery due to improper use.
- **Noise and Vibration:** In terms of the noise exposure of construction workers and potential hearing damage that may be caused due to exposure to high levels of noise, the Safety, Health and Welfare at Work (General Application) Regulations 2007 (Statutory Instrument No. 299 of 2007) provides guidance in terms of allowable workplace noise exposure levels for employees. The Regulations specify two noise Action Levels at which the employer is legally obliged to reduce the risk of exposure to noise. The appointed contractor will be required to comply with the Regulations and provide appropriate noise exposure mitigation measures where necessary. The noise exposure level to off-site receptors during the construction phase will be below the lower Action Level and therefore the risk of noise exposure resulting in potential hearing damage to off-site receptors is minimal.
- **Air & Climate:** Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the air quality impact of construction of the proposed development will be short-term and imperceptible with respect to human health.

Air dispersion modelling of operational traffic emissions was undertaken to assess the impact of the development with reference to EU ambient air quality standards which are based on the protection of human health. As demonstrated by the modelling results (see section 10.10) emissions as a result of the proposed development are compliant with all National and EU ambient air quality limit values and, therefore, the impact on human health will be long-term and imperceptible.

- **Wind and Microclimate:** No risks identified
- **Material Assets - Traffic and Transport:** During the construction stage of the proposed development, health and safety procedures as per the Construction Management Plan (CMP) will be adhered to. The Construction Management Plan will be prepared in accordance with the Dún Laoghaire – Rathdown County Development Plan regulations.

- **Material Assets - Utilities:** Risks to Human Health associated with works during the construction phase in the vicinity of existing utilities include:
 - Work which puts persons at risk of burial under earthfall e.g. risk of injury to personnel from trench collapse.
 - Contact with existing underground services e.g. gas leaks or electrocution.
 - Works adjacent to live traffic and pedestrian cycle movements e.g. risk to public in terms of working on public road and footpath.
 - Access and egress from the site and interface with site staff and / or the public e.g. Risk of slips, trips and falls.
 - Work in confined spaces e.g. asphyxiation.
 - Use of machinery and plant e.g. risk of injury to personnel and damage to plant and machinery due to improper use.
- **Material Assets - Waste Management:** Best practice waste management measures are proposed for the management of construction phase wastes which will ensure that materials are segregated and stored appropriately. Waste materials generated during the construction phase will not pose a risk to local human health as a result of their inert nature. Domestic waste generated by construction staff shall be stored in wheelie bins to minimise the presence of vermin on site. Wastes shall be collected on at least a weekly basis.

The management of domestic wastes generated during the operational phase which ensure that wastes are segregated at source in each residential unit to facilitate the diversion of mixed waste away from landfill/incinerator and to maximise the potential for re-use and recycling. Communal waste storage areas shall be designed to provide a clean, safe and mobility impaired accessible area in which residents can place their wastes in one of three bulk waste bins, namely recyclable, organic, mixed non-recyclable. The waste storage areas will be regularly cleaned and disinfected and shall be naturally ventilated to prevent odours occurring. Therefore, the impact of construction waste and operational waste arising associated with the proposed development is likely to be negative, short-term and imperceptible with respect to human health.

18.8 Mitigation Measures

Construction Stage

The following mitigation measures are proposed within the Construction Management Plan, which reduce the risks of major accidents and disasters and risks to human health.

Measures to Minimise Nuisance Dust Emissions

The following dust suppression practices are to be implemented during the construction phase:

- The Contractor shall prepare a dust minimisation plan which shall be communicated to all site staff
- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic
- Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly (on any un-surfaced site road, this will be 20 kph and on hard surfaced roads as site management dictates)
- Vehicles delivering material with dust potential (soil, aggregates etc.) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust

- Public roads outside the site will be inspected on a daily basis for cleanliness and cleaned as necessary
- Debris, sediment, grit etc. captured by road sweeping vehicles is to be disposed off-site at a licensed facility
- Vehicles exiting the site shall make use of a wheel wash facility where appropriate prior to entering onto public roads
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions

Monitoring of dust deposition levels (via the Bergerhoff method) shall take place at a number of locations at the site boundary of the proposed development to ensure that dust nuisance is not occurring at nearby sensitive receptors. This monitoring aims to ensure that the dust mitigation measures outlined above remain effective.

Site Control Measures

Stripping of Topsoil

- Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the development
- At any given time, the extent of topsoil strip (and consequent exposure of subsoil) will be limited to the immediate vicinity of active work areas
- Topsoil stockpiles will be protected for the duration of the works and not located in areas where sediment laden runoff may enter existing surface water drains
- Topsoil stockpiles will also be located so as not to necessitate double handling

Excavation of Subsoil Layers

- The duration that subsoil layers are exposed to the effects of weather will be minimized
- Disturbed subsoil layers will be stabilized as soon as practicable (e.g. backfill of drainage trench excavations)
- Stockpiles of excavated subsoil material will be protected for the duration of the works, stockpiles of subsoil material will be located separately from topsoil stockpiles

Weather Conditions

- Typical seasonal weather variations will also be taken account of when planning stripping of topsoil and excavations with an objective of minimizing soil erosion

Dust Control

- Dust suppression practices are to be implemented during stripping of topsoil layers and excavation of subsoil layers as outlined in Section 9 of this Preliminary Construction Management Plan

Area Impacted by Hydrocarbons Adjacent to Filling Station

An area of the site adjacent to the neighbouring filling station (adjacent to the western boundary) has been impacted by hydrocarbons. Investigation within the hydrocarbon impacted area confirms that the reduction in degree of impact moving downgradient and away from the filling station suggests that the impact is related to the filling station.

Two locations have been identified where these materials should be excavated and removed from site in the event of residential development (see Figure 4.1). These materials should be classified as

and disposed of as hazardous. All subsoil impacted by hydrocarbons which are affected by the proposed development is to be removed.

The natural subsoils outside the impacted area have been assessed and are suitable for removal to a suitably licenced inert facility.

Also refer to EIAR Chapter 7 Lands and Soils.

The Contractor is to provide a Method Statement (to be agreed prior to commencing any works on site) for works in the vicinity of areas impacted by hydrocarbons including but not limited to details of:

- Their proposed specialist sub-contractors
- Proposals for containment of contamination,
- Proposal for removal of hydrocarbons from dewatered groundwater prior to discharge
- Co-ordination of contamination removal with other site works
- Proposed licenced waste receiving facility
- Compliance with relevant legislation including HSA publications and the Waste Management Act.

Operational Stage

None required.

Flood Risk

Proposed mitigation measures to address residual flood risks are summarized below;

M1. Proposed drainage system to be maintained on a regular basis to reduce the risk of a blockage.

M2. In the event of storms exceeding the 1% AEP design capacity of the attenuation system, possible overland flow routing towards open space areas located to the north of Willow Grove should not be blocked. At this location the site's boundaries should be permeable to facilitate flood routing onto adjacent public spaces.

It is considered that the flood risk mitigation measures if implemented are sufficient to provide a suitable level of protection to the proposed development. A regularly maintained drainage system will ensure that it remains effective and in good working order should a large pluvial storm occur.

Should extreme pluvial flooding occur that is in excess of the development's attenuation capacity (i.e. greater than 1%AEP), then overland flow routes directed towards open space areas and adjacent public roads are provided in order to protect the residence which are proposed at lower floor levels.

18.9 Interactions

There are interactions with Population and Human Health, Land, Soils, Geology and Hydrogeology, Surface Water, Noise, Climate and Air, Material Assets, Traffic and Transport, Landscape and Visual, and Cultural Heritage.

18.10 Conclusions

Through the implementation of mitigation measures, there are no identified incidents or examples of major accidents and or natural disasters that present a sufficient combination of risk and consequence that are likely to lead to significant residual impacts or environmental effects or impacts on human health.

18.11 References

DHPLG: *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* 2018

DOELG: *A Framework For Major Emergency Management Guidance Document 1: A Guide To Risk Assessment In Major Emergency Management* 2010