

19 RISK OF MAJOR ACCIDENTS AND DISASTERS

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19.1 Introduction

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

The Directive 2011/92/EU, as amended by Directive 2014/52/EU (the "EIA Directive") has updated the list of topics to be addressed in an EIAR and has included 'Risk Management' as a new topic to be addressed. Article 3 of the 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) indicates that additional information, relevant to the specific characteristics of the development or type of development concerned and to the environmental features likely to be affected, on the following matters to be included–

(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.

19.2 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.

19.3 Site Specific Risk Assessment Methodology

This section identifies the potential of unplanned but potential events that could occur during construction and operation of the proposed development.

Risks are set out according to the classification of risk, taken from the Guide to Risk Assessment in Major Emergency Management (Department of the Environment, Heritage & Local Government, 2010), as follows:

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 19-1 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)

Hazard Identification

The site is not in an area prone to natural disasters. Risks were reviewed through the identification. Therefore the risks set out below are considered the most relevant potential risks, with the likelihood identified from extremely unlikely (1) to very likely (5).

A risk matrix can be prepared against which the proposed development can be tested.

Likelihood	5 – V. Likely					
	4 – Likely					
	3 – Unlikely					
	2 – V. Unlikely					
	Ext. Unlikely					
		1 Minor	2 – Limited	3 Serious	4 – V. Serious	5 – Catastrophic
Consequence of Impact						

Table 19-2 Risk Matrix

Significant effects resulting are adverse effects that are described as 'Significant', 'Very Significant' or 'Profound' under the Draft EPA Guidelines (2017). Consequently, any evaluated risks that fall within Amber or Red Zones ('Medium' or 'High' Risk Scenarios) are brought forward for further consideration and assessment for further mitigation.

Category	Risk Factor Type	Likelihood
Weather	Storms/Snow	3
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	General housebuilding construction products	2
Pollution	Construction	3

Table 19-3 Identification of Key Risks and Categorisation

19.4 The Proposed Development

Likely Significant Effects

The likely significant effects are set out below.

Do Nothing Scenario

Where the development does not proceed, it is likely that the permitted development of 139 no. residential units (D17A/0337) would be implemented with the permission expiring in 2024. This would change the townscape character of the Tipperstown triangle of lands in keeping with the evolution of the wider Sandyford/Leopardstown urban district. The seven large-detached houses on large plots fronting Leopardstown Road would remain in use as individual dwellings.

This would (a) not fully realise the potential of the subject sites for sustainable residential use, and (b) not the change the character (for the better) or improve the quality of the Leopardstown Road streetscape to the extent that the proposed development would.

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 AWN Consulting. 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 residential development consisting of 463 units, a residential tenant amenity space and creche facility.

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
Tidal	Irish Sea Coastal Zone	Proposed Development	Low	High. Flooding of buildings in basements	Very Low	None	Very Low
Fluvial	Carysfort Maretimo	Proposed Development	Low	Moderate. water ingress into the building and basements	Very Low	None	Very Low
Pluvial	Private and Public Drainage Network	Proposed Development	High	High. Flooding of the buildings and basements	High risk of damage to the building and basements	Appropriate drainage design, over land flood routing and setting of appropriate floor levels	Low

Ground Water	Ground Water Present in the ground seeping through basement walls and floors	Proposed Development	High	Moderate. Ground water Ingress into Basement	Low	Adequately Waterproofing of basement structure if found necessary.	Low
Human/Mechanical Error	Drainage Network	Proposed Development	High	Moderate. Water ingress Into the Building and basements.	Moderate Risk of Damage to the building	Maintenance Strategy	Low

Table 19-4 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.

19.5 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
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Table 19-5 Main Risks

19.6 Potential Cumulative Impacts

Cumulative Impacts looks at the increased overall implications the proposed development may have on the environment in cumulation with existing and permitted development in the area. There is a granted planning permission (Planning Ref. D17A/0337 & ABP PLo6D.249248) for the demolition of 3 no. existing residential dwellings and material change of use of St. Joseph's House from residential care facility to residential use to provide for an overall development of 139 no. residential units. These buildings lie within the proposed development site.

Appendix 2.1, submitted as part of this application, has highlighted 14no. applications in the local area. Per the map, there are 2no. planning applications proposed further east of our site along the Leopardstown Road, (D19A/0972 – ABP 300757/20 and D21A/0294).

19.7 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:** A potential risk to human health due to the associated works during construction is the direct contact, ingestion or inhalation of receptors (i.e. construction workers) with any soils which may potentially contain low level hydrocarbon concentrations from Site activities (potential minor leaks, oils and paint).

No human health risks associated with long term exposure to contaminants (via. direct contact, ingestion or inhalation) resulting from the proposed development are anticipated.

- **Water:** There is a risk to Human Health should the ground water or the existing water supply become contaminated during the construction or operational stages, and the water is consumed. In order to mitigate these risks the measures outlined below will be adopted.
- **Noise and Vibration:** Construction phase noise and vibration emissions will be temporary and transient and will be managed so as to minimise impact to population and human health by complying with all relevant guidance, as such the impact will be short-term and have a slight impact overall.

Operational phase noise will also be managed to achieve relevant noise limit values and is predicted to meet all such requirements. No operational phase vibration impacts are predicted. Therefore, the operational phase noise impacts will be neutral for the life of the development.

- **Air & Climate:** Emissions from construction phase is likely to be negative, short term and imperceptible with respect to human health. At operational stage, traffic emissions will not result in a significant impact on human health.
- **Landscape & Visual:** The character of the impact of changes to the visual environment on human health (positive, negative or neutral) will depend on how well a development is received by the public, and on the general contribution of the development to the built environment. The character of a visual impact, and even the duration of a visual impact, is very dependent on the attitude of the viewer. If a viewer is opposed to a new building for

reasons other than visual, that viewer is likely to see the building in a negative light, no matter how beautiful the building might be.

- **Material Assets - Traffic and Transport:** A number of temporary risks to human health may occur during construction phase related to noise, dust, air quality and visual impacts which are addressed in other sections of this EIAR. There will be a slight increase in traffic on the local road network.
- **Material Assets - Utilities:** There are potential implications for the local populations if there are disruptions to utility services during the connection of the new services to the proposed development.
- **Material Assets - Waste Management:** The potential impacts on human beings in relation to the generation of waste during the construction and operational phases are that incorrect management of waste could result in littering which could cause a nuisance to the public and attract vermin. A carefully planned approach to waste management and adherence to the project specific C&DWMP and OWMP, will ensure appropriate management of waste and avoid any negative impacts on the local population. The predicted effect of the generation of waste during the construction and operational phases on human health will be long-term, imperceptible and neutral.
- **Daylight and Sunlight:** As is always the case where a development will result in a change to the sunlight and daylight environment of an area, the impacts of the development on sunlight access will result in interactions with climate, population and human health and the landscape.

19.8 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

The measures to be operational at this site will include:

- The proposed construction vehicle routes for the site will require a traffic management plan to be agreed upon with DLRCC and TII prior to site workings beginning.
- Two-way traffic will be maintained throughout the project with construction access only via Leopardstown Road. Advanced warning signs will be placed at sufficient distances to taper off the entry and exit points. Pedestrian marshals will be used as and when required.
- Construction traffic operation would only be limited 0800 to 1900 from Monday to Friday and 0800 to 1400 on Saturday for the off-road construction. These times may vary to facilitate specific site requirements and/or construction activities associated with the site. Any variation will be discussed and agreed in advance with DLRCC.
- Use of properly designed access and egress points to minimise impact on both external traffic and amenity of residents;
- All vehicle movements both on and around the site will be controlled by a competent and certified banksman.
- Material deliveries and collections from site will be planned, scheduled and staggered to avoid any unnecessary build-up of construction works related traffic.
- Deliveries to site shall be booked in advance using a delivery schedule, to prevent lorry congestion on the road networks surrounding the site.
- Alternative safe routeways shall be established for traffic and pedestrians where existing routeways have to be altered, removed or worked on during the project.

Site Control Measures

The designated and operational on-site control measures, which will be established and maintained at this site, will include:

- Designated hard routes through site;
- Each departing vehicle to be checked by banksman;
- Wheel wash facility at egress point;
- Provision and facilities to cover lorry contents as necessary;
- Controlled loading of excavated material to minimise risk of spillage of contents;
- Spraying/damping down of excavated material on site by dedicated crews;
- Use of known routes for lorries to monitor impact on local area; and
- Facility to clean local roads if mud or spillage occurs.
- Hazardous materials to be stored in a designated area on site with appropriate drip trays/bunding and fire extinguishers to contain any spillages.

Control of Dust and Dirt

The main problems, which may arise during the early part of construction, will be controlled by the measures described above and by the following measures:

- The use of hardcore access route to work front;
- A regime of 'wet' road sweeping can be set up to ensure the roads around the immediate site are as clean and free from dirt / dust arising from the site, as is reasonably practicable. This cleaning will be carried out by approved mechanical sweepers.
- Footpaths immediately around the site can be cleaned by hand regularly, with damping as necessary.
- High level walkways and surfaces such as scaffolding can be cleaned regularly using safe 'wet' methods, as opposed to dry methods.
- Vehicle waiting areas or hard standings can be regularly inspected and kept clean by brushing or vacuum sweeping and will be regularly sprayed to keep moist, if necessary.
- Vehicle and wheel washing facilities can be provided at site exit(s) where practicable. If necessary vehicles can be washed down before exiting the site.
- Netting can be provided to enclose scaffolding in order to mitigate escape of air borne dust from the demolition.
- Vehicles and equipment shall not emit black smoke from exhaust system, except during ignition at start up.
- Engines and exhaust systems should be maintained so that exhaust emissions do not breach stationary emission limits set for the vehicle / equipment type and mode of operation.
- Servicing of vehicles and plant should be carried out regularly, rather than just following breakdowns.
- Internal combustion plant should not be left running unnecessarily.
- Exhaust direction and heights should be such as not to disturb dust on the ground and to ensure adequate local dispersal of emissions.
- Where possible fixed plant such as generators should be located away from residential areas.
- The number of handling operations for materials will be kept to a minimum in order to ensure that dusty material is not moved or handled unnecessarily.

- The transport of dusty materials and aggregates should be carried out using covered / sheeted lorries.
- Material handling areas should be clean, tidy and free from dust.
- Vehicle loading should be dampened down and drop heights for material to be kept to a minimum.
- Drop heights for chutes / skips should be kept to a minimum.
- Dust dispersal over the site boundary should be minimised using static sprinklers or other watering methods as necessary.
- Stockpiles of materials should be kept to a minimum and if necessary, they should be kept away from sensitive receptors such as residential areas etc. Where necessary, should be sheeted or watered down.
- Methods and equipment should be in place for immediate clean-up of spillages of dusty material.
- No burning of materials will be permitted on site.
- Earthworks excavations should be kept damp where necessary and where reasonably practicable.
- Cutting on site should be avoided where possible by using pre-fabrication methods to facilitate any temporary works that may be required to enable the demolition.
- Equipment and techniques for cutting / grinding / drilling / sawing etc, which minimise dust emissions and which have the best available dust suppression measures, should be employed.
- Prior to commencement, the main contractor should identify the demolition operations which are likely to generate dust and to draw up action plans to minimise emissions, utilising the methods highlighted above. Furthermore, the main contractor should prepare environmental risk assessments for all dust generating processes, which are envisaged.
- The main contractor should allocate suitably qualified personnel to be responsible for ensuring the generation of dust is minimised and effectively controlled.
- Demolition works to incorporate water spray to reduce dust.

Operational Stage

- The management company will be responsible for the management of all common areas. The operational management plan enclosed herewith should be applied at operational stage.
- Specialised Contractors will be appointed for window cleaning.
- Appropriate Boundary Treatment should be maintained for roof gardens.

19.9 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.

19.10 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.

19.11 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