

	Site 1	Site 2AB	Site 2C	Site 3	Site 4	Site 5	Total
Use	sq. m	sq. m	sq. m	sq. m	sq. m	sq. m	sq. m
Office	3,610	17,484	17,029	-	295	5,799	44,217
Hotel	8,094	-	-	7,175	-	-	15,270
Residential	-	-	-	6,452	1,454	-	7,906
Retail	-	1,876	1,255	1,954	617	-	5,672
Café / Restaurant	-	625	150	138	864	679	2,456
Cultural / Gallery / Cafe	-	-	-	123	-	-	123
Extension to National Monument for ancillary use to National Monument – a cultural facility	-	-	-	-	60	-	60
Metro Enabling Works	-	555	831	-	-	-	1,386
Total	11,704	20,541	19,235	15,842	3,290	6,478	77,090

Table 17.1: Schedule of Accommodation by Site.

The blocks which form the six sites of the Dublin Central Masterplan are highly interconnected, and as such a holistic approach has been taken in preparing this EIAR.

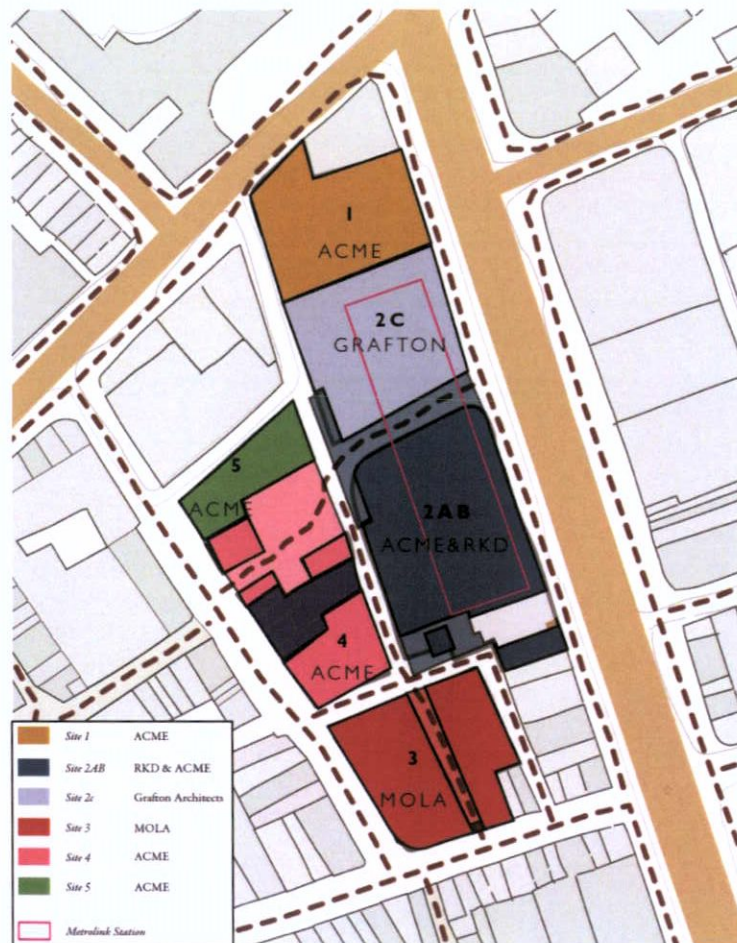


Figure 17.1: Dublin Central Masterplan with each Site identified.

17.4.2 Proposed Development – Site 3, 4 & 5

17.4.2.1 Site 3

The Proposed Development comprises a mixed-use scheme accommodating a hotel, residential units and associated amenities, cultural, retail and café / restaurant uses (c. 15,842 sq. m gross floor area) in 2no. blocks ranging in height from 1 – 9 storeys over 2no. new independent single storey basements. Provision of a new street/laneway linking Henry Street with Henry Place/Moore Lane.

17.4.2.2 Site 4

The Proposed Development comprises a mixed-use scheme accommodating residential units and associated amenities, retail and café / restaurant uses (c. 3,290 sq. m gross floor area) in 2no. parts located north and south of the Nos. 14 – 17 Moore Street (a National Monument/Protected Structures) ranging in height from 1 – 3 storeys including retained independent single storey basements. Provision of a part of the new public plaza and archway onto new public square.

17.4.2.3 Site 5

The Proposed Development comprises a mixed-use scheme accommodating office and café / restaurant uses (c. 6,478 sq. m gross floor area) in a single building ranging in height from 2 – 6 storeys (top floor set back) over new single storey localised basement. Provision of a part of the new public plaza.

17.5 Potential Impact of the Proposed Development

17.5.1 Dublin Central Masterplan

As discussed above, the scope and methodology of this assessment is centred on the understanding that the Dublin Central Masterplan would be designed, built and operated in line with best international current practice and, as such, the vulnerability of the Proposed Development to risks of major accidents and / or disasters is considered **low**.

Current EIA practice already includes an assessment of some potential accidents and disaster scenarios such as pollution incidents to ground and watercourses as well as assessment of flooding events. These are described in detail in the relevant EIAR assessment Chapters (refer to Chapter 7: Land, Soils & Geology and Chapter 8: Water for further detail).

17.5.1.1 Site Specific Risk Assessment

A site-specific risk assessment identifies and quantifies risks focusing on: unplanned, but possible and plausible events occurring during the construction and operation of the Proposed Development. The approach to identifying and quantifying risks associated with the Proposed Development by means of a site-specific risk assessment is derived from the Environmental Protection Agency (EPA) guidance.

The criteria for categorising impact is derived from the Department of Environment, Heritage & Local Government (DoEHLG) guidance (Refer to below tables).

The following steps were undertaken as part of the site-specific risk assessment: -

- Risk identification.
- Risk classification, likelihood and consequence.
- Risk evaluation.

Risk Identification

The identification of plausible risks has been carried out in consultation with relevant specialists. A Risk Register which was prepared during the design of the Proposed Development was also reviewed in order to inform the identification of risks for this assessment. The identification of risks has focused on non-standard but plausible incidents that could occur at the Proposed Development during construction and operation.

In accordance with the European Commission Guidance risks are identified in respect of the developments: -

- 1) Potential vulnerability to disaster risks.
- 2) Potential to cause accidents and / or disasters.

Risk Classification

Having identified the potential risks, the likelihood of occurrence of each risk has been assessed. An analysis of safety procedures and proposed environmental controls was considered when estimating likelihood of identified potential risks occurring. Table 17.1 defines 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, i.e. any risk to the Proposed Development less than extremely unlikely to occur has been excluded from the assessment. The likelihood rating assigned to each risk has assumed that all proposed mitigation measures and / or safety procedures are in place and have succeeded in reducing or preventing the major accident and / or disaster occurring.

Rating	Classification	Effect Description
1	Extremely Unlikely	May occur only 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 17.2: Risk Classification Table – Likelihood.

Classification of Consequence

The consequence rating assigned to each risk has assumed that all proposed mitigation measures and / or safety procedures have failed to prevent the major accident and / or disaster occurring. The consequence of the impact if the event occurs has been assigned as described in Table 17.2.

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

Ranking	Consequence	Impact	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 <€0.5M. 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.
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.

Table 17.3: Risk Classification Table – Likelihood.

Risk Evaluation

In accordance with the DoEHLG Guidelines (2010), the evaluated major accidents and natural disasters (MANDs) will be subject to a risk matrix to determine the level of significance of each risk for each scenario. These have been grouped according to 3 categories: -

- High Risk**
 Scenarios that have an evaluation score of 12 – 25, as indicated by the Red Zones in Table 17.3.
- Medium Risk**
 Scenarios that have an evaluation score of 8 – 11 as indicated by the Amber Zone in Table 17.3.
- Low Risk**
 Scenarios that have an evaluation score 1 – 7, of as indicated by the Green Zones in Table 17.3.

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

Table 17.4: Risk Matrix – Levels of Significance.

Significant effects resulting from MANDs are adverse effects that are described as ‘Significant’, ‘Very Significant’ or ‘Profound’ under the Draft EPA Guidelines (2017) and Volume 2, Section 2: The EIA Process of this report. Consequently, MANDs that fall within Amber or Red Zones (‘Medium’ or ‘High’ Risk Scenarios) are brought forward for further consideration and assessment for further mitigation.

17.5.1.2 Construction Stage

Risk ID	Potential Risk	Possible Cause	Requirement for further assessment?
Potential Vulnerability to Accidents and / or Disasters			
A	Flooding of site, from the River Liffey.	Proximity to River Liffey. Extreme weather – periods of heavy rainfall, taking into account climate change, strong winds and tidal events	No. The Dublin Central Masterplan area is not at risk of flooding. The Proposed Development will have no impact on floodplain storage and conveyance and will also not increase flood risk off site during construction. Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding. Refer to findings of the Flood Risk Assessment, prepared by Waterman Moylan Consulting Engineers.

Risk ID	Potential Risk	Possible Cause	Requirement for further assessment?
Potential to cause major accidents and / or disasters			
B	Fire / Explosion	<ul style="list-style-type: none"> • Damage to unmapped services / utilities during earth works. • Vehicle and vehicle collision. 	<p>No.</p> <p>The construction phase will be carried out in accordance with all relevant health and safety guidance and legislation, as well as the provisions of the Construction and Demolition Management Plan, prepared by Waterman Moylan Consulting Engineers.</p>
C	Unplanned outages / disruption to services	Damage to unmapped services / utilities during earth works.	<p>No.</p> <p>Disruption to services not considered to constitute a 'major accident or disaster' for the purposes of this assessment.</p>
D	Road traffic accidents resulting from construction phase traffic or temporary construction traffic management measures.	<ul style="list-style-type: none"> • Driver error. • Object on road. • Failure of vehicle control systems. • Public confusion. 	<p>No.</p> <p>The construction phase be carried out in accordance with all relevant health and safety guidance and legislation, as well as the provisions of the Construction & Demolition Management Plan, prepared by Waterman Moylan Consulting Engineers.</p>
E	Contamination of the groundwater / surface water.	Construction phase spills or leakages.	<p>No.</p> <p>The construction phase of the Proposed Development will be carried out in accordance with construction best-practise and provisions of the Construction & Demolition Management Plan, prepared by Waterman Moylan Consulting Engineers.</p>
F	Falling debris from construction vehicles / cranes or cranes striking rail overhead cables or poles	<ul style="list-style-type: none"> • Inadequate securing. • Overloading of vehicles. 	<p>No.</p> <p>The construction phase will be carried out in accordance with construction best-practise and provisions of the Construction & Demolition Management Plan, prepared by Waterman Moylan Consulting Engineers.</p>
Risk ID	Potential Risk	Possible Cause	Requirement for further assessment?
G	Release of asbestos fibres to atmosphere or surface water	<ul style="list-style-type: none"> • Inadequate handling and removal of Asbestos Containing Materials (ACMs). • Removal of un-surveyed ACM. 	<p>No.</p> <p>A number of buildings within the Dublin Central Masterplan area which will be demolished contain asbestos.</p> <p>The construction phase will be carried out in accordance with construction best-practise and provisions of the Construction & Demolition Management Plan, prepared by Waterman Moylan Consulting Engineers.</p>

Table 17.5: Risk Register – Construction Stage.

None of the potential construction phase risks considered have been identified as requiring further assessment.

17.5.1.3 Operational Stage

Risk ID	Potential Risk	Possible cause	Requirement for further assessment?
Potential Vulnerability to Disaster Risks			
H	Flooding of site	Extreme weather – periods of heavy rainfall, taking into account climate change, strong winds and tidal events.	No. The site is not at risk of flooding. The Dublin Central Masterplan have no impact on floodplain storage and conveyance. The likelihood of flooding is further minimised with adequate sizing of the on-site surface network and SuDS measures. Refer to findings of the Flood Risk Assessment prepared by Waterman Moylan Consulting Engineers.
I	Incident at nearby SEVESO site resulting in off-site environmental impact	<ul style="list-style-type: none"> • Fire / Explosion. • Equipment / Infrastructure failure. 	<p>No.</p> <p>A “consultation distance” is very broadly defined under Regulation 2 of the COMAH Regulations as “a distance or area relating to an establishment, within which there are potentially significant consequences for human health or the environment from a major accident at the establishment. The consultation distance for some types of COMAH facility ranges from 300m for establishments where the risk is from flammable non-pressurised materials, to 1 km for establishments where chemical processing involving flammable or toxic substances takes place, to 2km for establishments with bulk storage of pressurised or toxic substances, triggering an obligation on the Planning Authority to notify the Health & Safety Authority (HSA). The consultation distance is included in <i>italics</i> after each listed SEVESO site below.</p> <p>Upper Tier Sites in proximity: -</p> <ul style="list-style-type: none"> • Indaver Ireland Ltd., Tolka Quay Road, Dublin Port, Dublin 1 (<i>700m from perimeter</i>) – c. 2.5 km from the Dublin Central Masterplan area. • Dublin Waste to Energy Ltd., Pigeon House Road, Ringsend, Dublin 4 (<i>300m from bund wall</i>) – c. 3 km from the Dublin Central Masterplan area. • National Oil Reserves Agency Ltd., Shellybanks Road, Ringsend, Dublin 4 (<i>300m from perimeter</i>) – c. 4 km from the Dublin Central Masterplan area. • Tedcastles Oil Products Yard 2, Tolka Quay Road, Dublin Port, Dublin 1 (<i>400m from perimeter</i>) – c. 3.5 km from the Dublin Central Masterplan area. • Valero Energy (Ireland) Ltd., Dublin Joint Fuels Terminal, Alexandra Road, Dublin Port, Dublin 1 (<i>400m from perimeter</i>) – c. 4 km from the Dublin Central Masterplan area. • Fareplay Energy Ireland, Tankfarm 1, Alexandra Road and Tankfarm 2, Tolka Quay Road, Dublin Port, Dublin 1 (<i>400m from perimeter</i>) – c. 3.5 km from the Dublin Central Masterplan area.

Risk ID	Potential Risk	Possible cause	Requirement for further assessment?
			<ul style="list-style-type: none"> Calor Teoranta, Tolka Quay, Dublin 1 (600 m from perimeter) – c. 4 km from the Dublin Central Masterplan area. <p>Lower Tier Site in proximity: -</p> <ul style="list-style-type: none"> Circle K Terminal 1, Alexandra Road, Dublin Port, Dublin 1 (400m from perimeter) – c. 4 km from the Dublin Central Masterplan area. Circle K Yard 3, Alexandra Road, Dublin Port, Dublin 1 (300m from perimeter) – c. 4 km from the Dublin Central Masterplan area. Electricity Supply Board, North Wall Generating Station, Alexandra Road, Dublin (300m from bund wall) – c. 4 km from the Dublin Central Masterplan area. Electricity Supply Board, Poolbeg Generating Station, Ringsend, Dublin 4 (300 m from bund wall) – c. 4.8km from the Dublin Central Masterplan area. Iarnrod Eireann, Alexandra Rd, North Wall, Dublin 1 (300m from bund wall) – c. 3 km from the Dublin Central Masterplan area. Iarnrod Eireann Maintenance Works, Inchicore, Dublin 8 (300m from bund wall) – c. 4.5 km from the Dublin Central Masterplan area. Tedcastles Oil Products Yard 1, Promenade Road, Dublin 1 (400m from perimeter) – c. 3.5 km from the Dublin Central Masterplan area. Synergen Power Ltd t/a ESB Dublin Bay Power, Pigeon House Road, Ringsend, Dublin 4 (300m from bund wall) – c. 3 km from the Dublin Central Masterplan area. <p>As can be seen from the above list, the nearest COMAH site is 2.5 km from the Dublin Central Masterplan area.</p>
J	Incident at nearby LUAS	<ul style="list-style-type: none"> Fire Explosion. Act of terrorism. 	Yes.

Risk ID	Potential Risk	Possible cause	Requirement for further assessment?
Potential to Cause Accidents and / or Disasters			
K	Fire / Explosion	<ul style="list-style-type: none"> Equipment or infrastructure failure. Act of terrorism. Electrical problems. 	<p>No.</p> <p>The Proposed Development will be designed, built and operated in line with best international current practice, and will be compliant with all relevant Health and Safety and Fire regulation and guidance.</p>
L	Collision of Aircraft	<ul style="list-style-type: none"> Failure of air traffic control systems Act of terrorism 	<p>No.</p> <p>The Proposed Development does not include buildings in excess of 9 storeys. There are no active airfields or airports within 15km of the site.</p>

M	Public safety on O'Connell Street / general area.	<ul style="list-style-type: none"> • Crime • Public negligence 	No. Individual accidents / incidents are not considered to constitute a 'major accident / disaster' for the purposes of this assessment
N	Vehicle collisions on site.	<ul style="list-style-type: none"> • Public negligence. • Failure of vehicular operations. 	No. The existing street network will be retained and 2no. new streets will be introduced as part of the Dublin Central Masterplan. Individual accidents / incidents are not considered to constitute a 'major accident / disaster' for the purposes of this assessment.
O	Incident on future MetroLink.	<ul style="list-style-type: none"> • Act of terrorism • Explosion/fire 	Yes.

Table 17.6: Risk Register – Operational Stage.

The potential operation phase risks identified for further assessment include: J 'Incident at nearby LUAS' and O 'Incident on future MetroLink'.

17.5.1.4 Risk Assessment

Risk ID	Potential Risk	Possible cause	Environmental Effect	Likelihood Rating	Consequence Rating	Risk Score (Consequence x Likelihood)
J	Incident at nearby LUAS	<ul style="list-style-type: none"> • Fire explosion / • Act of terrorism 	<ul style="list-style-type: none"> • Illness, injury or death • Air quality effects 	2	4	8
<p>Basis of Likelihood</p> <p>Whilst the <i>National Risk Assessment 2019</i> has identified the risk to Ireland from both domestic and international terrorism, such an incident is considered 'very unlikely' in that there are no similar 'recorded incidents or anecdotal evidence' of an attack of this magnitude in Ireland. The city centre location makes the LUAS stops on O'Connell Street a potential target notwithstanding the highly unlikely potential for occurrence.</p> <p>Basis of Consequence</p> <p>Such an attack in Ireland could have significant impact in terms of public safety and security in the short term. Likewise, a breakdown in international peace and security arising from inter-state wars or other armed conflicts could have significant repercussions for Ireland and the EU, including potential impacts on energy supplies, transport routes or the environment. Thus, a 'very serious' consequence is identified in that such an event would result in numerous injuries and possibly fatalities, and there would be 'localised effects for an extended duration.'</p>						
O	Incident on future MetroLink	<ul style="list-style-type: none"> • Fire explosion / • Act of terrorism 	<ul style="list-style-type: none"> • Illness, injury or death • Air quality effects 	2	4	8
<p>Basis of Likelihood</p> <p>Whilst the <i>National Risk Assessment 2019</i> has identified the risk to Ireland from both domestic and international terrorism, such an incident is considered 'very unlikely' in that there are no similar 'recorded incidents or anecdotal evidence' of an attack of this magnitude in Ireland. The city centre location makes the future MetroLink stops on O'Connell Street a potential target notwithstanding the highly unlikely potential for occurrence.</p>						

Basis of Consequence

Such an attack in Ireland could have significant impact in terms of public safety and security in the short term. Likewise, a breakdown in international peace and security arising from inter-state wars or other armed conflicts could have significant repercussions for Ireland and the EU, including potential impacts on energy supplies, transport routes or the environment. Thus, a 'very serious' consequence is identified in that such an even would result in numerous injuries and possibly fatalities, and there would be 'localised effects for an extended duration.'

Table 17.7: Risk Assessment – Operational Stage.

This risk assessment in Table 17.6 categorises each of the potential risks by their 'risk score'. A corresponding risk matrix is provided in Table 17.7 which is colour coded in order to provide an indication of the critical nature of each risk. As outlined in Section 17.5.1.1, the red zone represents 'high risk scenarios', the amber zone represents 'medium risk scenarios' and the green zone represents 'low risk scenarios'.

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

Table 17.8: Risk Matrix – Levels of Significance.

17.5.1.5 Do-Nothing Impact

In the event that the Dublin Central Masterplan does not proceed, the site would remain in its current underutilised, brownfield state. In absence of an increased number of people residing, working or visiting the site, there would be **no increase** in the risk of major accidents occurring due to human interaction, should a disaster take place.

17.5.1.6 Construction Stage

None of the potential risks to be noted during the construction phase were identified as requiring further assessment.

17.5.1.7 Operational stage

From examining the plausible risks presented in Table 17.7, the scenario with the highest risk score in terms of a major accident and / or disaster was identified as being 'Incident at nearby LUAS' and 'Incident on Future MetroLink'.

This risk was given a score of 8 indicating a scenario that is '**very unlikely**' to occur, but which would have '**very serious**' consequences should it do so. According to the risk matrix in Table 17.7, this indicates a '**medium risk scenario**'.

The Global Terrorism Index (GTI) is a comprehensive study analysing the impact of terrorism for 163no. countries and which covers 99.7 per cent of the world's population. In 2018, Ireland ranked as the 65th country most impacted by terrorism of the 163no. countries. Whilst the National Risk Assessment 2019 has identified the risk to Ireland from both domestic and international terrorism, there are no similar 'recorded incidents or anecdotal evidence' of attacks of this magnitude in Ireland.

17.5.2 Cumulative

As outlined in sections 17.5.1.6 and 17.5.1.7 above, **no likely risks** of a major accident / disaster occurring are identified during construction stage. A **medium risk** of major accident / disaster is identified during the operational phase. No cumulative effects are identified.

17.5.3 Proposed Development

17.5.3.1 Construction Stage

The potential risk during the construction phase of the Proposed Development is the same as described under 17.5.1.6.

17.5.3.2 Operational Stage

The potential risk during the operational phase of the Proposed Development is the same as described under 17.5.1.6.

17.5.3.3 Do-Nothing Impact

The 'do-nothing' impact of the Proposed Development will be the same as described under 17.5.1.5.

17.6 Mitigation Measures (Ameliorative, Remedial or Reductive Measures)

17.6.1 Rating of Major Accidents and Disasters without Mitigation

17.6.1.1 Construction Phase

The mitigation measures relevant to each environmental factor outlined in chapters 5 – 16 of the EIAR, as well as in the Construction Management Plan, will be implemented during the construction phase and will collectively mitigate the risk of major accidents and disasters during this time.

The construction phase will be carried out in accordance with best practice site management measures relating to health and safety and emergency response. These measures are described in the Outline Construction Management Plan, prepared by Waterman Moylan Consulting Engineers.

17.6.1.2 Operational Stage

No mitigation or monitoring measures are proposed specific to reducing the risk of major accident / disaster during operation.

17.7 Residual Impact of the Proposed Development

The risk of a major accident and / or disaster during the construction phase of the Dublin Central Masterplan and the Proposed Development is considered **low**.

The risk of a major accident and / or disaster during the operational phase of the Dublin Central Masterplan and the Proposed Development is considered **medium**.

17.8 Monitoring

No monitoring associated with risks of major accidents and / or disaster is proposed during construction or operational phases.

17.9 Reinstatement

No reinstatement measures are necessary during the construction or operational phases of this development.

17.10 Difficulties Encountered

No difficulties were encountered during the assessment process.

18 SUMMARY OF MITIGATION MEASURES

18.1 Introduction

This Chapter of the EIAR collates and summarise the mitigation measures recommended for each of the environmental topics examined in Chapters 5 – 17 of this EIAR.

These mitigation measures and any associated monitoring comprise what would be implemented during the Demolition, Construction and Operational Phase to reduce the potential for significant adverse impact of the proposed development on the environment.

This Chapter does not expand on the reasoning or expected effectiveness of the proposed mitigation or monitoring measures. For such descriptions, we refer to each of the individual chapters of the EIAR.

A number of the recommended mitigation measures would be expected to be required as a condition of any grant of permission by Dublin City Council.

This chapter has been prepared by Stephen Little, Managing Director and Michael O'Sullivan, Senior Planner, of Stephen Little & Associates. Stephen has 29 years' professional experience of town planning in Ireland, is a Corporate Member of both the Irish Planning Institute and the Royal Town Planning Institute and holds a Diploma in EIA Management (UCD). Michael has 7 years' professional experience in the planning in both the public sector and private consultancy in Ireland, has a MPlan – Master in Planning & Sustainable Development and is a Corporate Member of the Irish Planning Institute.

18.2 Proposed Mitigation Measures

18.2.1 Population and Human Health (Chapter 5)

18.2.1.1 Dublin Central Masterplan

Construction Stage

Prior to the commencement of construction, the appointed contractor will be required to obtain formal agreement from the Local Authority on pollution prevention measures as well the overall approach and emergency procedures for all construction stages. All demolition works are to be in accordance with the following guidelines: -

- BS 6187:2000 '*Code of Practice for Demolition*'.
- Health and Safety Executive Guidance Notes GS 29 / 1, 2, 3 & 4.
- S.I. 504 Safety, Health & Welfare at Work (Construction) regulations 2013.
- Air Pollution Act 1987.
- Environmental Protection Agency Act 1992.
- BS 5228:2009 Part 1 '*Noise Control on Construction & Open Sites*'.

Prior to the works commencing, detailed photograph surveys (condition schedules) of adjoining walls, roads, footpaths, grass verges etc. are to be prepared. Copies of the relevant parts are to be made available to adjoining owners and Dublin City Council. This record will form the basis of assessing repairs to adjoining areas in the future should a dispute arise as to their cause.

Roadways are to be kept clean of dirt and other debris. A road sweeping truck is to be provided if necessary, to ensure that this is so.

The Contractor will be responsible for the security of the site. The Contractor will be required to: -

- Operate a site induction process for all site staff.
- Ensure all site staff shall have current 'safe pass' cards.
- Install adequate site hoarding to the site boundary.

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- Maintain site security staff at all times.
- Separate pedestrian access from construction at the main site entrance off the Naas Road and provide a safe walkway for pedestrians along the main access road into the site.
- Ensure restricted access is maintained to the works.

The construction works will be hoarded off or fenced off from the public at all times. A 2.4 m minimum high plywood painted timber hoarding will be provided along the long-term boundaries at the entrance, and at other areas around the site where the perimeter fence/wall is not deemed sufficient for safety and security reasons. Heras type fencing will be used on short term site boundaries where appropriate to suit the works.

Controlled access points to the site, in the form of gates or doors / turnstiles, will be kept locked any time that these areas are not monitored (e.g., outside working hours). During working hours, a gates person will control traffic movements and deliveries at any active site access to ensure safe access and egress to and from site onto the public roads.

A Traffic Management Plan will be prepared by the contractor and agreed with Dublin City Council's Transportation Department and An Garda Siochana, to mitigate any impact of construction on the surrounding road network (Further details are provided in Chapter 13: Material Assets (Transportation) of this EIAR). A Preliminary Construction Traffic Management Plan prepared by Waterman Moylan accompanies each planning application.

As detailed in Chapter 7: Land, Soils & Geology of this EIAR, there is no evidence of a significant soil hazard on site or requirement for dewatering of groundwater.

Chapter 8: Water of this EIAR states that there is no potential for flooding and the proposed design incorporates attenuation measures to ensure development will not result in increased flooding off site. In order to mitigate the potential dust-related health impacts during the construction phase, a dust minimisation plan will be formulated. This plan will draw upon best practice mitigation measures from Ireland, the UK and the USA to ensure the highest level of mitigation possible. Further detail is provided in Chapter 9: Climate (Air Quality & Climate Change) of this EIAR.

Best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid significant impacts at the nearest sensitive buildings. The best practice measures set out in BS 5228 (2009) Parts 1 and 2 will be complied with. Further details are provided in Chapter 11: Air (Noise & Vibration).

Operational Stage

In light of the fact that any of the impacts associated with the operation of the Dublin Central Masterplan on Human Health and Population are either not significant or positive, no further mitigation measures are required. Notwithstanding the lack of need for mitigation measures, Section 11.6.2 of Chapter 11: Air (Noise & Vibration) of this EIAR outlines a number of noise mitigation measures which will further reduce the likely noise impacts arising from entertainment noise and internal building façade noise.

18.2.1.2 Proposed Development – Site 3, 4 & 5

Construction Stage

The mitigation measures of the Proposed Development (Sites 3, 4 and 5) are the same as the mitigation measures of the Proposed Masterplan Development described in Section 5.2.1.1.

Operational Stage

The mitigation measures of the Proposed Development (Sites 3, 4 and 5) are the same as the mitigation measures of the Proposed Masterplan Development described in Section 5.2.1.1.

18.2.2 Biodiversity (Chapter 6)

18.2.2.1 Dublin Central Masterplan

This section presents the mitigation measures that will be implemented during construction and operation to avoid the potential impacts of the proposed development on KERs. All of the mitigation measures will be implemented in full. They are in accordance with best practice, and tried and tested, effective control measures to protect the receiving environment.

Mitigation Measures for Designated Sites during Construction Stage

European Sites

As set out in the Appropriate Assessment Screening Report, in concluding that the proposed development is not likely to have a significant effect on any European sites, mitigation measures intended to avoid or reduce any harmful effects of the proposed development on European sites were not required or taken into account.

National Sites

As there is no risk of the proposed development to affect the integrity of any nationally designated site, mitigation measures intended to avoid or reduce any harmful effects of the proposed development on nationally designated sites were not required or taken into account.

Mitigation Measures for Birds during Construction Stage

Bird species are protected under the Wildlife Acts and it is an offence to disturb birds while on their nests, or to wilfully take, remove, destroy, injure or mutilate their eggs or nests. There is potential for direct impacts on nesting birds and/or mortality of birds (including birds of local importance (higher value)) arising from the proposed development. This scenario would be most likely if works were to occur during the time of year when birds are likely to be nesting (which is from 1 March to 31 August, inclusive).

Where feasible, vegetation (e.g. scrub) will not be removed, between the 1 March and the 31 August, to avoid direct impacts on nesting birds. Where the construction programme does not allow this seasonal restriction to be observed, then these areas will be inspected by a suitably qualified ecologist for the presence of breeding birds prior to clearance. Areas found not to contain nests will be cleared within 3 days of the nest survey, otherwise repeat surveys will be required.

Measures to prevent herring gulls nesting on the rooftops of the buildings may also be undertaken well in advance of breeding bird season. This includes measures such as:

- Kite hawks to discourage birds from the site.
- A specialist bird proof net to restrict access and prevent gulls from nesting.¹

These measures must be undertaken by a specialist, and before any birds begin to nest on the buildings.

Operational Stage

Mitigation Measures for Birds during Operational Stage

Mitigation measures are not required as operational phase impacts predicted on bird species as a result of the proposed development will be short-term and not significant.

¹ Sullivan, I. & Lusby, J. (2021). Wildlife in Buildings: Linking our built and natural heritage. BirdWatch Ireland.

18.2.2.2 Proposed Development – Site 3, 4 & 5

This section presents the mitigation measures that will be implemented during construction and operation to avoid the potential impacts of the proposed development on KERs. All of the mitigation measures will be implemented in full. They are in accordance with best practice, and tried and tested, effective control measures to protect the receiving environment.

Mitigation Measures for Designated sites during Construction Stage

European Sites

As set out in the Appropriate Assessment Screening Report, in concluding that the proposed development is not likely to have a significant effect on any European sites, mitigation measures intended to avoid or reduce any harmful effects of the proposed development on European sites were not required or taken into account.

National Sites

As there is no risk of the proposed development to affect the integrity of any nationally designated site, mitigation measures intended to avoid or reduce any harmful effects of the proposed development on nationally designated sites were not required or taken into account.

Mitigation measures for Birds during Construction Stage

Bird species are protected under the Wildlife Acts and it is an offence to disturb birds while on their nests, or to wilfully take, remove, destroy, injure or mutilate their eggs or nests. There is potential for direct impacts on nesting birds and/or mortality of birds (including birds of local importance (higher value) arising from the proposed development. This scenario would be most likely if works were to occur during the time of year when birds are likely to be nesting (which is from 1 March to 31 August, inclusive).

Where feasible, vegetation (e.g. scrub) will not be removed, between the 1 March and the 31 August, to avoid direct impacts on nesting birds. Where the construction programme does not allow this seasonal restriction to be observed, then these areas will be inspected by a suitably qualified ecologist for the presence of breeding birds prior to clearance. Areas found not to contain nests will be cleared within 3 days of the nest survey, otherwise repeat surveys will be required.

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- Kite hawks to discourage birds from the site.
- A specialist bird proof net to restrict access and prevent gulls from nesting.²

These measures must be undertaken by a specialist, and before any birds begin to nest on the buildings.

Mitigation measures for birds Operational Stage

Mitigation measures are not required as operational phase impacts predicted on bird species as a result of the proposed development will be short-term and not significant.

² Sullivan, I. & Lusby, J. (2021). Wildlife in Buildings: Linking our built and natural heritage. BirdWatch Ireland

18.2.3 Land, Soils and Geology (Chapter 7)

18.2.3.1 Dublin Central Masterplan

Construction Stage

To reduce the quantity of soil to be removed from or imported into the site, the floor levels of the proposed buildings and roads are designed to match existing levels and minimise the cut and fill balance. The number of vehicle movements offsite will be minimised by this optimisation. However, given that there are significant basement areas proposed, including the proposed underground Metrolink station, it is anticipated that there will be a significant surplus of soil to be removed from the site.

Surplus subsoil and rock that may be required to be removed from site will be deposited in approved fill areas or to an approved waste disposal facility. Surplus subsoil will be stockpiled on site, in such a manner as to avoid contamination with builders' waste materials, etc., and so as to preserve the materials for future use as clean fill. A Construction Management Plan will need to include protocols for soil removal and should be implemented by the development's main contractor during the construction stage.

Where contaminated soils are encountered during the works, they will be excavated and disposed of off-site in accordance with the Waste Management Acts, 1998-2006, and associated regulations and guidance provided in Guidelines for the Management of Waste from National Road Construction Projects published by the National Roads Authority in 2008.

The provision of wheel wash facilities at the construction entrances to the development will minimise the amount of soils deposited on the surrounding road network. The adjoining road network will be cleaned on a regular basis, as required, to prevent the build-up of soils from the development site on the existing public roads.

Measures will be implemented throughout the construction stage to prevent contamination of the soil and adjacent watercourses from oil and petrol leakages. Suitable bunded areas will be installed for oil and petrol storage tanks. Designated fuel filling points will be put in place with appropriate oil and petrol interceptors to provide protection from accidental spills. Refuelling will be restricted to these allocated re-fuelling areas. This area is to be an impermeable bunded area designed to contain 110% of the volume of fuel stored.

During excavation works, temporary sumps will be used to collect any surface water run-off thereby avoiding of standing water within the basement and other excavations.

Silt traps, silt fences and tailing ponds will need to be provided by the contractor where necessary to prevent silts and soils being washed away by heavy rains during the course of the construction stage. Surface water runoff and water pumped from the excavation works will be discharged via a silt trap / settlement pond to the existing combined drainage system which discharges to the Dublin Wastewater Treatment Plant at Ringsend. Straw bales will be used at the outfall to filter surface water to remove contaminants.

Dampening down measures with water sprays will be implemented during periods of dry weather to reduce dust levels arising from the development works.

After implementation of the above measures, the Proposed Development will not give rise to any significant long term adverse impact. Moderate negative impacts during the construction stage will be short term only in duration.

A Construction Management Plan, Traffic Management Plan and Waste Management Plan will be implemented by the contractor during the construction stage to control the above remedial measures.

Operational Stage

No mitigation measures for soils or geology will required during the operational stage.

18.2.3.2 Proposed Development – Site 3, 4 & 5

Construction Stage

The mitigation measures for the Proposed Development (Sites 3, 4 and 5) are the same as the mitigation measures set out for the Dublin Central Masterplan described in Section 7.2.3.1.

Operational Stage

No mitigation measures for soils or geology will required during the operational stage.

18.2.4 Water (Chapter 8)

18.2.4.1 Dublin Central Masterplan

Mitigation measure will be implemented on a site by site basis in line with best practice standards. The relevant mitigation measures for Site 3, 4 & 5 are set out in Section 8.2.4.2 below. The same standards will be implemented as part of the development of the remaining sites within the Dublin Central Masterplan area.

18.2.4.2 Proposed Development – Site 3, 4 & 5

Water Supply

Construction Stage

A method statement setting out in detail the procedures to be used when working in the vicinity of existing watermains will be produced by the contractor for any construction works within the vicinity of watermains and for roads or services crossing watermains.

All watermains will be cleaned and tested in accordance with Irish Water guidelines prior to connection to the public watermain.

All connections to the public watermain will be carried out by, or under the supervision of, Irish Water.

Potential negative impacts during construction stage will be short term only.

Operational Stage

Water meters will be installed at connection points, with locations to be agreed and approved by Irish Water, and these meters will be linked to Irish Water's monitoring system by telemetry. These meters will facilitate the early detection of unusual water usage in the network and identify potential leaks in the system.

All plumbing fixtures and fittings and sanitary wear to be installed within the development should be to the current best practice for water consumption to minimise future water usage.

It is not envisaged that any further remedial or reductive measures will be necessary on completion.

Foul Water Drainage

Construction Stage

In order to reduce the risk of defective or leaking foul sewers, the following remedial measures will be implemented: -

- All new foul sewers will be tested by means of an approved air test during the construction stage in accordance with Irish Waters Code of Practice and Standard Details.
- All private drainage will be inspected and signed off by the design Engineer in accordance with the Building Regulations Part H and BCAR requirements.

- Foul sewers will be surveyed by CCTV to identify possible physical defects.
- The connection of the new foul sewers to the public sewer will be carried out under the supervision of Irish Water and will be checked prior to commissioning.
- Prior to commencement of excavations in public areas, all utilities and public services will be identified and checked, to ensure that adequate protection measures are implemented during the construction stage.

Operational Stage

All foul drains will be tested and surveyed prior to connection to the public sewers to minimise the risk of uncontrolled ground water penetration or leakage of the foul water to ground water on the site.

Otherwise, no remedial or reductive measures are deemed to be necessary after completion of the development of the Dublin Central Masterplan, other than normal maintenance of the foul sewer system.

Surface Water Drainage

Construction Stage

The contractor will prepare and implement a Construction Management Plan which will outline the requirements for the storage and handling of fuel, including the refuelling of vehicles in designated refuelling zones to minimise the risk of spillages, and the impact of spillages should they occur.

The Construction Management Plan will also utilise sedimentation controls, including silt traps, tailings ponds and silt fences during the construction period.

All private drainage will be inspected and signed off by the design Engineer in accordance with the Building Regulations Part H and Building Control (Amendment) Regulations (BCAR) requirements. This will reduce the possibility of any cross connections being constructed.

Operational Stage

Surface water will be attenuated privately within each site of the Dublin Central Masterplan, and will discharge to the public network at a controlled rate limited to 2l/s from each site.

In addition, the SuDS devices outlined in Section 8.4.1.3 in chapter 8 of the EIAR, will reduce and slow down the rate of surface water runoff from each site within the Dublin Central Masterplan. This will minimise peak flows in the downstream system during major storm events. Gullies and the flow control devices shall be regularly maintained to avoid blockages.

The SuDS treatment train will also treat the surface water discharging to the public network, removing pollutants from the surface water runoff. Maintenance of these SuDS devices will be required to ensure that they continue to treat the surface water as designed.

18.2.5 Climate (Air Quality and Climate Change) (Chapter 9)

18.2.5.1 Dublin Central Masterplan

Construction Stage

A detailed dust minimisation plan associated with a high level risk of dust impacts is outlined in Appendix 9.2. This plan draws on best practice mitigation measures from Ireland, the UK and the USA in order to ensure the highest level of mitigation possible. Care has specifically been paid to the requirements and recommendations within the Dublin City Council's guidance entitled "*Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition*".

In summary some of the measures which will be implemented will include: -

- Prior to demolition blocks should be soft striped inside buildings (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- During the demolition process, water suppression should be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays/local extraction should be used.
- Drop heights from conveyors, loading shovels, hoppers and other loading equipment should be minimised, if necessary fine water sprays should be employed.
- 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 will be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction will be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.
- Public roads and footpaths outside the site will be regularly inspected for cleanliness and cleaned as necessary. If sweeping using a road sweeper is not possible due to the nature of the surrounding area then a suitable smaller scale street cleaning vacuum will be used.
- 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.
- Hoarding or screens shall be erected around works areas to reduce visual impact. This will also have an added benefit of preventing larger particles of dust from travelling off-site and impacting receptors.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

Operational Stage

The impact of the proposed development on air quality and climate is predicted to be imperceptible with respect to the operational phase in the long term. Therefore, no additional site-specific mitigation measures are required beyond the incorporated design mitigation as described in Section 9.5.1.2.2 and 9.5.2.2.2 in chapter 9 of this EIAR.

18.2.5.2 Proposed Development – Site 3, 4 & 5

Construction Stage

The mitigation measures outlined in Section 9.2.5.1 and Appendix 9.2 will be applied across the site for each phase of the development.

Operational Stage

No mitigation is required for the operational phase of the development as no significant impacts to air quality or climate are predicted.

18.2.6 Climate (Sunlight & Daylight) (Chapter 10)

No mitigation measures are proposed as the impact of Sunlight and Daylight is relatively insignificant and considered consistent with development within a city centre environment.

18.2.7 Air, Noise and Vibration (Chapter 11)

18.2.7.1 Dublin Central Masterplan

Construction Stage

Mitigation measures for the construction phase are set out below in order to reduce potential impacts as far as practicable to within the adopted design goals for noise and vibration. These mitigation measures should be read in tandem with the specific noise mitigation measures in line with the DCC GPG for high risk sites, as presented in Appendix 11.2.

Noise Mitigation Measures

The contract documents will clearly specify the construction noise criteria included in this chapter which the construction works must operate within. The Contractor undertaking the construction of the works will be obliged to take specific noise abatement measures and comply with the recommendations of *BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise* and the European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001. These measures will ensure that: -

- No plant used on site will be permitted to cause an ongoing public nuisance due to noise.
- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.
- Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use;
- Any plant, such as generators or pumps that is required to operate outside of normal permitted working hours will be surrounded by an acoustic enclosure or portable screen.

BS 5228 -1:2009+A1 2014 includes guidance on several aspects of construction site practices, which include, but are not limited to: -

- Selection of quiet plant.
- Control of noise sources.
- Screening.
- Hours of work.
- Liaison with the public.

Further comment is offered on these items in the following paragraphs.

Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise monitoring. The contractor will be required to conduct construction noise predictions prior to works taking place and put in place the most appropriate noise control measures depending on the level of noise reduction required at any one location.

Selection of Quiet Plant

The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item of plant will be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action will be to identify whether or not said item can be replaced with a quieter alternative.

For static plant such as compressors and generators used at work areas such as construction compounds etc., the units will be supplied with manufacturers' proprietary acoustic enclosures where possible.

General Comments on Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant, or the application of improved sound reduction methods in consultation with the supplier or the best practice use of equipment and materials handling to reduce noise.

In practice, a balance may need to be struck between the use of all available techniques and the resulting costs of doing so. It is therefore proposed to adopt the concept of "Best Available Techniques" as defined in EC Directive 96/61. In this context "best" means "the most effective in achieving a high general level of protection of the environment as a whole".

Proposed techniques will also be evaluated in light of their potential effect on occupational health and safety. The following outline guidance relates to practical noise control at source techniques which relate to specific site considerations: -

- For mobile plant items such as cranes, dump trucks, excavators and loaders, the installation of an acoustic exhaust and/or maintaining enclosure panels closed during operation can reduce noise levels by up to 10dB. Mobile plant will be switched off when not in use and not left idling.
- For piling plant, noise reduction can be achieved by enclosing the driving system in an acoustic shroud. For steady continuous noise, such as that generated by diesel engines, it is possible to reduce the noise emitted by fitting a more effective exhaust silencer system or utilising an acoustic canopy to replace the normal engine cover.
- For all materials handling, the contractor will ensure that best practice site noise control measures are implemented including ensuring that materials are not dropped from excessive heights and drop chutes/dump trucks are lined with resilient materials, where relevant.
- Where compressors, generators and pumps are located in areas in close proximity to noise sensitive properties/ areas and have potential to exceed noise criterion, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- Resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can be controlled by fixing resilient materials in between the surfaces in contact.
- Demountable enclosures can also be used to screen operatives using hand tools and may be moved around site as necessary.
- All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

Screening

Typically screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to other forms of noise control. The effectiveness of a noise screen will depend on the height and length of the screen, its mass, and its position relative to both the source and receiver.

The length of the screen should in practice be at least five times the height, however, if shorter sections are necessary then the ends of the screen will be wrapped around the source. BS 5228 - 1:2009+A1 states that on level sites the screen should be placed as close as possible to either the source or the receiver. The construction of the barrier will be such that there are no gaps or openings at joints in the screen material. In most practical situations the effectiveness of the screen is limited by the sound transmission over the top of the barrier rather than the transmission through the barrier itself. In practice, screens constructed of materials with a mass per unit of surface area greater than 10kg/m² will give adequate sound insulation performance.

Construction noise calculations have assumed a partial line of sight (-5dB) is achieved using a solid 2.4m high standard construction site hoarding. It will be a requirement for works occurring immediately in proximity to the closest noise sensitive locations along the site boundary, that the line of sight is further blocked such that a reduction of at least 10dB is achieved between the noise sensitive façade and construction activities. A reduction of this order can be achieved using a higher perimeter screen or using localised screening around specific items of plant.

Annex B of BS 5228-1:2009+A1:2014 (Figures B1, B2 and B3) provide typical details for temporary and mobile acoustic screens, sheds and enclosures that can be constructed on site from standard materials.

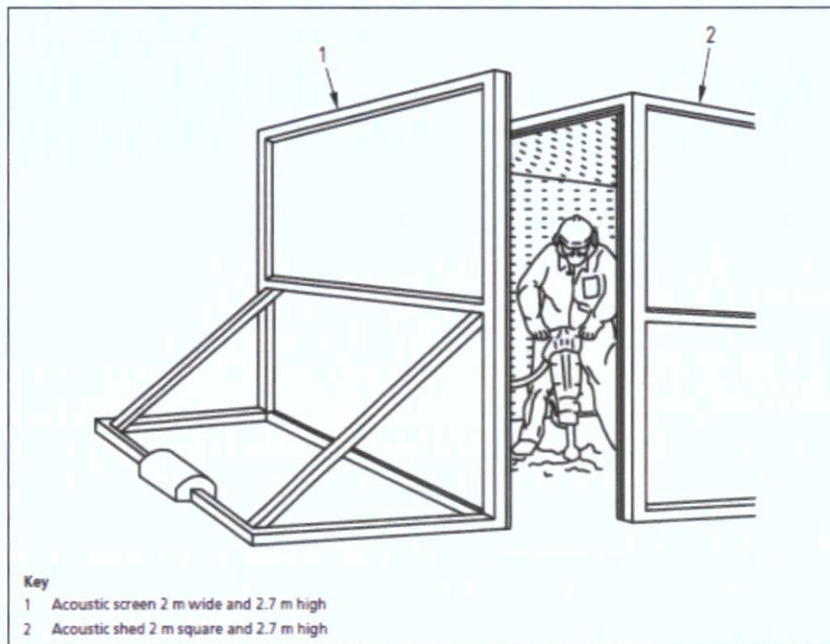


Table B.4 Measured sound reduction given by types of partial enclosure

Type of enclosure (see Figure B.3)	Reduction dB(A)		
	Facing the opening(s)	Sideways	Facing rear of shed
Open-sided shed lined with absorbent material; no screen	1	9	14
Open-sided shed lined with absorbent material; with reflecting screen in front	10	6	8
Open-sided shed lined with absorbent material; with absorbent screen in front	10	10	10

Figure 18.1: Typical Acoustic Screen / Shed Detail.

In addition, careful planning of the site layout will also be considered. The placement of temporary site buildings such as offices and stores between the site and sensitive locations can provide a good level of noise screening during the phasing of works.

Hours of Work

Construction activity will mostly take place during daytime hours Monday to Friday and a half day on Saturdays. In the event of it being deemed necessary to undertake works outside these, it will be necessary to obtain prior written approval from Dublin City Council. Such approval would typically only be granted on submission of details of the activity accompanied by an assessment of potential noise impact.

Consideration should be given to the scheduling of activities in a manner that reflects the location of the site and the nature of neighbouring properties. Each potentially noisy event/activity should be considered on its individual merits and scheduled according to its noise level, proximity to sensitive locations and possible options for noise control.

Depending on the noise emission levels experienced and associated noise impact, the contractor should be flexible and able to conduct certain works at hours which reflect periods when the neighbouring properties have lower sensitivities to noise.

Liaison with the Public

Clear forms of communication will be established between the contractor and noise sensitive areas in proximity so that residents or building occupants are aware of the likely duration of activities likely to generate higher noise or vibration.

The duration of piling, excavation and other high noise or vibration activities works is usually short in relation to the length of construction work as a whole, and the amount of time spent working near to sensitive areas can represent only a part of the overall period. Subjective impacts during these phases can be significantly reduced if timelines and potential impacts are known in advance.

Noise Control Audits

It is recommended that noise control audits be conducted at regular intervals throughout the demolition/construction programme. In the first instance, it is recommended that such audits take place on a monthly basis. This is subject to review, however, and the frequency of audits may be increased if deemed necessary.

The purpose of the audits will be to ensure that all appropriate steps are being taken to control construction noise emissions. To this end, consideration should be given to issues such as the following (note that this list is not intended to be exhaustive): -

- Hours of operation being correctly observed.
- Opportunities for noise control “at source”.
- Optimum siting of plant items.
- Plant items being left to run unnecessarily.
- Correct use of proprietary noise control measures.
- Materials handling.
- Poor maintenance.
- Correct use of screening provided and opportunities for provision of additional screening.

Piling

Piling is the construction activity which is most likely to cause disturbance. General guidance in relation to piling is outlined in the following paragraphs.

Piling programmes should be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. If piling works are in progress on a site at the same time as other works of construction or demolition that themselves may generate significant noise and vibration, the working programme should be phased so as to prevent unacceptable disturbance at any time.

During consultation the planner, developer, architect and engineer, as well as the local authority, should be made aware of the proposed method of working of the piling contractor. The piling contractor should in turn have evaluated any practicable and more acceptable alternatives that would economically achieve, in the given ground conditions, equivalent structural results.

It should be remembered that a decision regarding the type of pile to be used on a site will normally be governed by such criteria as loads to be carried, strata to be penetrated and the economics of the system, for example the time it will take to complete the installation and other associated operations such as soil removal. It may not be possible for technical reasons to replace a noisy process by one of the 'quieter piling' alternatives. Even if it is possible, the adoption of a quieter method may prolong the piling operation; the net result being that the overall disturbance to the community will not necessarily be reduced.

On typical piling sites the major sources of noise are essentially mobile and the noise received at any control points will therefore vary from day to day as work proceeds. The duration of piling works is usually short in relation to the length of construction work as a whole, and the amount of time spent working near to noise sensitive areas can represent only a part of the piling period.

Noise reduction can be achieved by enclosing the driving system in an acoustic shroud. For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system or utilising an acoustic canopy to replace the normal engine cover.

Screening by barriers and hoardings is less effective than total enclosure but can be a useful adjunct to other noise control measures. For maximum benefit, screens should be close either to the source of noise (as with stationary plant) or to the listener. Removal of a direct line of sight between source and listener can be advantageous both physically and psychologically. In certain types of piling works there will be ancillary mechanical plant and equipment that may be stationary, in which case, care should be taken in location, having due regard also for access routes. When appropriate, screens or enclosures should be provided for such equipment.

Contributions to the total site noise can also be anticipated from mobile ancillary equipment, such as handling cranes, dumpers, front end loaders etc. These machines may only have to work intermittently, and when safety permits, their engines should be switched off (or during short breaks from duty reduced to idling speed) when not in use.

All mechanical plant should be well maintained throughout the duration of the piling works. When a site is in a residential environment, lorries should not arrive at or depart from the site at times incontinent to residents.

Vibration

On review of the likely vibration levels associated with construction activities, it may be concluded that the construction of the Proposed Development is not expected to give rise to vibration that is either significantly intrusive or capable of giving rise to structural or cosmetic damage to adjacent buildings.

In the case of vibration levels giving rise to human discomfort, in order to minimise such impacts, the following measures shall be implemented during the construction period: -

- A clear communication programme will be established to inform adjacent building occupants in advance of any potential intrusive works which may give rise to vibration levels likely to exceed perceptible levels. The nature and duration of the works will be clearly set out in all communication circulars.
- Appropriate vibration isolation shall be applied to plant, where feasible.
- Monitoring will be undertaken at identified sensitive buildings, where proposed works have the potential to be at or exceed the vibration limit values.

Operational Stage

Mitigation measures for the operational phase are set out to ensure that operational noise sources associated with the Dublin Central Masterplan will operate within the relevant noise criteria so that there is no resultant negative impact on nearby noise sensitive receivers.

Noise Mitigation Measures

Mechanical Plant Noise

During the detailed design of the development, the selection and location of mechanical and electrical plant will be undertaken in order to ensure the noise emission limits set out above are not exceeded. In addition to selecting plant with suitable noise levels, the following best practice measures are recommended for all plant items in order to minimise potential noise disturbance for adjacent buildings: -

- Where ventilation is required for plant rooms, consideration will be given to acoustic louvers or attenuated acoustic vents, where required to reduce noise breakout.
- Ventilation plant serving plant rooms and car parks will be fitted with effective acoustic attenuators to reduce noise emissions to the external environment.
- The use of perimeter plant screens will be used, where required, for roof top plant areas to screen noise sources.
- The use of attenuators or silencers will be installed on external air handling plant.
- All mechanical plant items e.g. fans, pumps etc. shall be regularly maintained to ensure that excessive noise generated any worn or rattling components is minimised.
- Any new or replacement mechanical plant items, including plant located inside new or existing buildings, shall be designed so that all noise emissions from site do not exceed the noise limits outlined in this document.

Installed plant will have no tonal or impulsive characteristics when in operation

Inward Noise Impact

Inward noise impacts across the development are assessed and appropriate mitigation specified across the Dublin Central Masterplan to ensure that, when window are closed that the internal noise level targets are achieved.

Assessment of Site 1 and Site 2AB and Site 2C will follow the methodology set out in this document once the design is finalised. Measured noise levels across the development will be used to assess the levels of noise intrusion and to ascertain the need for appropriate mitigation.

18.2.7.2 Proposed Development – Site 3, 4 & 5

Construction Stage

The mitigation measures outlined in Section 11.6.1.1 for the construction stage are also applicable for the Proposed Development. These mitigation measures should be read in tandem with the specific noise mitigation measures in line with the DCC GPG for high risk sites, as presented in Appendix 11.2.

Operational StageMechanical Plant Noise

The mitigation measures outlined in Section 11.6.1.2 are also applicable to the Proposed Development.

Inward Noise Impact

In the context of the Proposed Development, the facades highlighted in Figure 18.2 will be provided with glazing and ventilators that achieves the minimum sound insulation performance as set out in Table 18.1 below.

The specification applies only to residential units, hotel rooms and office space on the facades indicated. Retail and food & beverage units along these facades do not have a sound insulation requirement. Other facades in the development have no minimum requirement for sound insulation.

The overall R_w and $D_{n,e,w}$ outlined in this section are provided for information purposes only. The overriding requirement is the Octave Band sound insulation performance values which may also be achieved using alternative glazing and ventilation configurations. Any selected system will be required to provide the same level of sound insulation performance set out in Table 18.1.

Site	Façade	Glazing Octave Band Centre Frequency (Hz)						Ventilator	
		125	250	500	1000	2000	4000	R_w	$D_{n,e,w}$
Site 3	Henry St (RED)	26	27	34	40	38	46	37	39
	Moore St. / Henry Pl (ORANGE)	19	27	34	39	35	40	35	36
Site 4	Moore St (RED)	26	27	34	40	38	46	37	39
	Moore Lane / Henry Place (ORANGE)	19	27	34	39	35	40	35	36
Site 5	Moore St. (RED) Residential	26	27	34	40	38	46	37	39
	All Facades (ORANGE) Office	20	22	27	32	32	37	30	N/A

Table 18.1: Calculated Construction Traffic Noise Levels at Edge of Road.

Façade specification are marked up in Figure 18.2 below. Ventilator requirements are 39 dB $D_{n,e,w}$ and 36 dB $D_{n,e,w}$ for facades marked up in red and orange respectively.

With respect to the hotel, façade recommendations have been presented here so that the internal noise level requirements set out in BS 8233 are met. It may be the case that the future operator of the hotel will have their own brand standard with associated acoustic considerations that must be achieved. This will be assessed at detailed design stage.

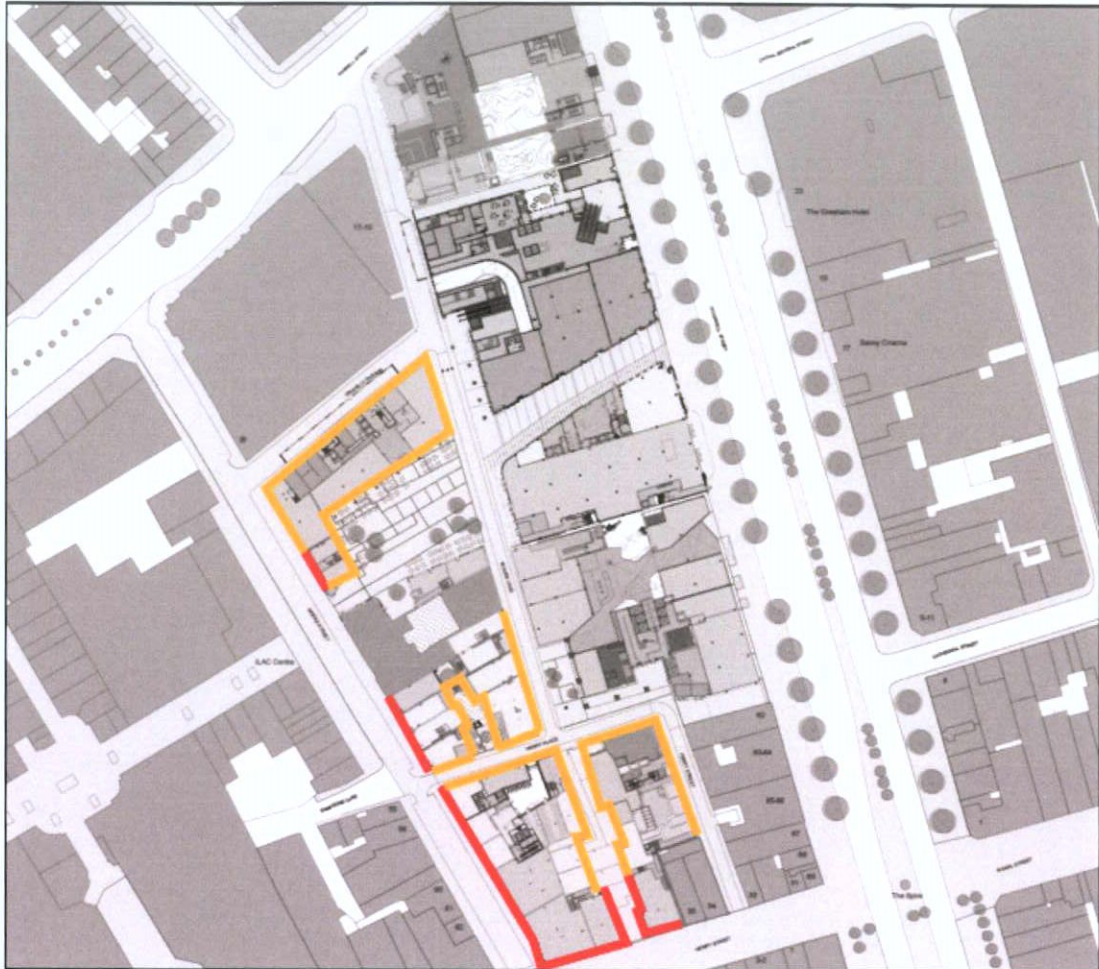


Figure 18.2: Glazing and Ventilator Requirement.

18.2.8 Landscape and Visual Impact (Chapter 12)

18.2.8.1 Dublin Central Masterplan

Not applicable as the Masterplan is still being refined and discussions with the Planning Authority are on-going. Notwithstanding this, as the Masterplan presents an integrated design for a new city quarter, no remedial or reductive measures are likely to be applicable.

18.2.8.2 Proposed Development – Site 3, 4 & 5

Construction Stage

No mitigation measures have been proposed with respect to effects from the construction of the Proposed Development.

Operational Stage

Since the Proposed Development is an integrated design for a new city quarter, no remedial or reductive measures are applicable. In these circumstances, during the construction or operational phases scope for mitigation measures, which would preserve a sustainable level of density, is limited. However, developments already planned, approved or under construction near the site or elsewhere in the city will reduce the potential visibility of the Proposed Development, and thereby mitigate the extent of its visual impact.

18.2.9 Material Assets (Transportation) (Chapter 13)

18.2.9.1 Dublin Central Masterplan

Construction Stage

The primary mitigation measure during the Construction Stage will be the implementation of the *Construction Traffic Management Plan* and the *Construction Management & Waste Management Plan*.

This will require all deliveries to and collection from the subject site to comply with the DCC requirements for HGV movements including the use of the Designated HGV Routes illustrated in Figure 13.2.

Two construction routes to the site have been identified both to Parnell Street. One will be from Dorset Street via Dominick Street and one from Summerhill via Parnell Street.

Proposal for local traffic management during the various stages of construction have also been prepared and will be incorporated in the detailed *Construction Traffic Management Plan* to be prepared by the appointed Contractor in conjunction with Dublin City Council for approval.

Traffic and other movements on the road network during the Construction Stage will be managed by carrying out the works in a number of stages to a sequence to be prepared in conjunction with Dublin City Council and implemented by the main Contractor.

During the Construction Stage, the appointed Contractor will be required to maintain access along Moore Lane and Henry Place to existing properties at the times currently permitted by Dublin City Council or as may otherwise be agreed with the property owners and DCC.

Operational Stage

The primary mitigation measure during the Operational Stage will be the implementation of the Travel Plan for Dublin Central and in particular the Action Plan section of the Travel Plan which will implement the management of travel demand.

Mitigation measures to limit the impact of the future intensification of public transport services through Bus Connects and Metrolink, are outside the control of the Dublin Central project.

18.2.9.2 Cumulative Development

Construction Stage

The Mitigation Measures for the Cumulative Development arising from the Construction Stage will be the same as the Mitigation Measures for the Proposed Development described in Section 13.6.1.1.1.

Operational Stage

The Mitigation Measures for the Cumulative Development arising from the Operational Stage will be the same as the Mitigation Measures for the Proposed Development described in Section 13.6.1.1.2.

18.2.9.3 Proposed Development – Site 3, 4 & 5

Construction Stage

The Mitigation Measures for the Proposed Development arising from the Construction Stage of the Proposed Development (Sites 3, 4 and 5) will be the same as the Mitigation Measures for the Proposed Development (Dublin Central Masterplan) described in Section 13.6.1.1.1.

Operational Stage

The Mitigation Measures for the Cumulative Development arising from the Operational Stage of the Proposed Development (Sites 3, 4 and 5) will be the same as the Mitigation Measures for the Proposed Development (Dublin Central Masterplan) described in Section 13.6.1.1.2.

18.2.9.4 Cumulative Development

Construction Stage

The Mitigation Measures for the Cumulative Development arising from the Construction Stage of the Proposed Development (Sites 3, 4 and 5) will be the same as the Mitigation Measures for the Cumulative Development (Dublin Central Masterplan) described in Section 13.6.1.2.1.

Operational Stage

The Mitigation Measures for the Cumulative Development arising from the Operational Stage of the Proposed Development (Sites 3, 4 and 5) will be the same as the Mitigation Measures for the Proposed Development (Dublin Central Masterplan) described in Section 13.6.1.2.2.

18.2.10 Material Assets (Waste) (Chapter 14)

18.2.10.1 Dublin Central Masterplan

Construction Stage

As previously stated, a project specific C&D WMP has been prepared in line with the requirements of the requirements of the guidance document issued by the DoEHLG and is included as Appendix 14.1. Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phase of the Proposed Development. Prior to commencement, the contractor(s) will be required to refine / update the C&D WMP or submit an addendum to C&D WMP to DCC to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

A quantity of soil, stone, silt, sand and clay which will need to be excavated to facilitate the Proposed Development. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented: -

- Building materials will be chosen with an aim to 'design out waste'.
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated: -
 - Concrete rubble (including ceramics, tiles and bricks).
 - Plasterboard.

- Metals.
- Glass.
- Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible.
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site.
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required).
- A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the demolition and construction works.
- All construction staff will be provided with training regarding the waste management procedures.
- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal.
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities.
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the EC (Waste Directive) Regulations (2011). EPA approval will be obtained prior to moving material as a by-product. However, it is not currently anticipated that Article 27 will be used.

These mitigation measures will ensure that the waste arising from the demolition and construction phase of the development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, the EMR Waste Management Plan (2015 – 2021). It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

Operational Stage

As previously stated, a project specific OWMP has been prepared and is included as Appendix 14.2. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the EMR Waste Management Plan 2015 – 2021 and abiding by the DCC waste bye-laws.

In addition, the following mitigation measures will be implemented: -

- On-site segregation of all waste materials into appropriate categories including (but not limited to): -
 - Organic waste.
 - Dry Mixed Recyclables.
 - Mixed Non-Recyclable Waste.
 - Glass.
 - Waste electrical and electronic equipment (WEEE).
 - Batteries (non-hazardous and hazardous).

- Cooking oil.
- Light bulbs.
- Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.).
- Furniture (and from time to time other bulky waste).
- Abandoned bicycles.
- All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials.
- All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available.
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997*, the *EMR Waste Management Plan (2015 – 2021)* and the DCC waste bye-laws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

18.2.10.2 Proposed Development – Site 3, 4 & 5

Construction Stage

As previously stated, a project specific C&D WMP has been prepared in line with the requirements of the requirements of the guidance document issued by the DoEHLG and is included as Appendix 14.1. Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phase of the Proposed Development. Prior to commencement, the contractor(s) will be required to refine / update the C&D WMP or submit an addendum to C&D WMP to DCC to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

A quantity of soil, stone, silt, sand and clay which will need to be excavated to facilitate the Proposed Development. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented: -

- Building materials will be chosen with an aim to ‘design out waste’.
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated: -
 - Concrete rubble (including ceramics, tiles and bricks).
 - Plasterboard.
 - Metals.
 - Glass.
 - Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible.

- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site.
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required).
- A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the demolition and construction works.
- All construction staff will be provided with training regarding the waste management procedures.
- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal.
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities.
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the EC (Waste Directive) Regulations (2011). EPA approval will be obtained prior to moving material as a by-product. However, it is not currently anticipated that Article 27 will be used.

These mitigation measures will ensure that the waste arising from the demolition and construction phase of the development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, the EMR Waste Management Plan (2015 – 2021). It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

Operational Stage

As previously stated, a project specific OWMP has been prepared and is included as Appendix 14.2. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the EMR Waste Management Plan 2015 – 2021 and abiding by the DCC waste bye-laws.

In addition, the following mitigation measures will be implemented: -

- On-site segregation of all waste materials into appropriate categories including (but not limited to): -
 - Organic waste.
 - Dry Mixed Recyclables.
 - Mixed Non-Recyclable Waste.
 - Glass.
 - Waste electrical and electronic equipment (WEEE).
 - Batteries (non-hazardous and hazardous).
 - Cooking oil.
 - Light bulbs.
 - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.).
 - Furniture (and from time to time other bulky waste).
 - Abandoned bicycles.

- All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials.
- All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available.
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997*, the *EMR Waste Management Plan (2015 – 2021)* and the DCC waste bye-laws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

18.2.11 Cultural Heritage (Architectural) (Chapter 15)

18.2.11.1 Masterplan

Construction Stage

Potential cumulative impacts are envisaged as arising at demolition, excavation and construction stages where the development sequence for multiple Masterplan plan sites occur in tandem. It is envisaged over a prolonged period, that construction will be active to one or more development sites, with common road networks and site compound areas outside designated 'Sites' in correspondingly active use. As all works occur within or in the vicinity of the ACA and neighbouring protected and historic fabric, the cumulative impact of the proposed development is likely to be experienced by this architectural heritage.

Operational Stage

Cumulative construction stage impacts are envisaged as being short term, and whilst disruptive, will, on completion provide an enhanced urban environment in which all structures and spaces of architectural and cultural heritage interest can collectively thrive.

18.2.11.2 Mitigation Measures for the Development of Site 3

Construction Stage

Qualification of the Composition of the Existing Building Range

Construction strategies for Site 3 were designed to accommodate a range of unknown conditions within the extent of retained building fabric, with numerous scenarios factored into the development of the structural design.

It is proposed to distil construction strategies prior to commencement of works, under the direction of Waterman Moylan's and the architectural and structural heritage teams.

The intended outcome of future investigations will be to frame a precise structural analysis of the buildings, which in turn will directly and accurately inform demolition and protection strategies.

Qualification of Protection Strategies

The preparation of a detailed construction plan for the demolition of building fabric will inform a correspondingly detailed protection plan for retained fabric, which in turn, will safeguard the architectural heritage characteristics of retained fabric, and also reduce physical impacts for the enclosing ACA.

Operational StageContinued Protection of Retained Fabric

All of the retained fabric within Site 3 is included in the designated boundary of the ACA. A significant factor in maintaining the integrity of the ACA at operational stage is the continued maintenance and good presentation of retained fabric. It is envisaged the estate will be under a single Management Company, rather than a fragmented ownership meaning that a higher level of integrity can be maintained.

18.2.11.3 Mitigation Measures for the Development of Site 4

Construction Stage

Primary risks in developing Site 4 are associated with construction impacts in proximity to the National Monument. It is intended, following submission of planning applications and easing of Covid restrictions, to embark on a range of agreed conservation-led investigative works. In conjunction with statutory stakeholders, a detailed design strategy for all stages of the construction process will be developed to ensure that all risks are identified and mitigated. Ministerial Consent will be sought for the expanded construction strategies.

As a principle, it is intended to observe a similar level of detailing to mitigate construction risks for retained fabric within Site 4, on the basis that similar conditions are likely to exist elsewhere requiring a similar level of ameliorative protection and conservation.

Operational Stage

Substantial sections of Site 4 shares boundaries with either protected or retained fabric of heritage significance. Monitoring of boundary conditions into the future will be required to ensure the long term protection of these boundary conditions.

Similarly, building fabric scheduled for retention and conservation within Site 4 merits ongoing monitoring to ensure its long term protection. These buildings are not protected structures, but, in accordance with the Conservation Plan, are treated as if they were, as an integral component of a future maintenance strategy.

18.2.11.4 Mitigation measures for the Development of Site 5

Construction Stage

Key risks for the development of Site 5 are confined to demolition and excavation stages, where risks of vibrations are predicted as occurring for the National Monument.

Mitigations against foreseen potential impacts arising from the demolition, excavation and enabling works of constructing Site 5 are detailed in structural engineering studies carried out by Waterman Moylan Consulting Engineers Limited and Waterman Structures Limited, with inputs by Ms. Lisa Edden, specialist conservation engineer of CORA, attached to the planning application for Site 5.

Operational Stage

No mitigations are envisaged as being required for operational stage of Site 5 buildings.

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18.2.12 Cultural Heritage (Archaeology) (Chapter 16)

18.2.12.1 Dublin Central Masterplan

Construction Stage

Works in the Vicinity of the National Monument – Nos. 14 – 17 Moore Street

Appropriate conservation methodologies will be employed on all works carried out adjacent to the National Monument (see Chapter 15: Cultural Heritage (Architectural)).

The preservation order for Nos. 14 – 17 Moore Street provides the site with the highest level of statutory protection. The investigation, demolition, earthmoving and construction works within the previously defined assessment area for works in proximity to the National Monument (**Error! Reference source not found.**) for the development of Site 4 in the Dublin Central Masterplan area will require Ministerial Consent under Section 14 of the National Monuments Act (as amended). The consent application will be supported by detailed method statements compiled by the integrated conservation team for the Dublin Central project (comprising a conservation architect, structural conservation engineer, architect and archaeologist). This will include an archaeological strategy.

It is anticipated that the National Monument will be developed as a commemorative centre under Ministerial Consent C495. Consultation with the OPW and their conservation team has and will continue to be carried out to ensure that there is an integrated and collaborative approach for the protection and conservation of the monument and their shared/adjoining boundaries.

The archaeological mitigation in the vicinity of the National Monument will as a minimum include: -

- Archaeological monitoring of site investigation, site preparation and temporary works as required.
- Archaeological monitoring of site clearance (including the clearance of cellars/basements) and of demolition works to identify and record as appropriate, any objects, fixtures or features that can be related to the 1916 Easter Rising.
- Archaeological testing will be carried out after demolition in the areas to the rear of Nos. 18 and 19 Moore Street and in the rear yard of No. 13 Moore Street to establish the depth and nature of the infill material associated with the backfilling of the brickfield quarry.
- Archaeological excavation of archaeological soils or features that are encountered and impacted by the Proposed Development.
- Archaeological monitoring of earthmoving works.

The archaeological works will be carried out under Ministerial Consent. The Minister may attach further conditions in the granting of consent, including conditions requiring archaeological excavation.

Where the Minister has granted a consent under Section 14 of the Act, no other consent or licence under any provision of the National Monuments Act, including an excavation licence, is required for any archaeological work or activity, (e.g., the other works in Site 4 not bounding the National Monument will require an archaeological licence).

General Mitigation

The following archaeological mitigation measures will be carried out within the Dublin Central Masterplan area under licence to the DHLGH: -

- **Monitoring**

A programme of archaeological monitoring will take place at the pre-construction, site preparation and enabling works / early stages of construction where any preparatory ground reduction works are required. This will be carried out in order to establish the presence or absence, as well as the nature and extent, of any archaeological deposits, features or sites that

may be present, where ground investigation and earth-moving works are taking place. This will include the survey and recording of any surviving 18th century structures that may be revealed.

- **Test Excavation**

Given that the development is within the ZAP for Dublin (DU018-020), archaeological test excavation will be required. The testing will be carried out during the post demolition phase in areas where it is possible and safe to do so. It will be strategic and focused in areas where there are no existing basements. The testing will establish the nature and the level of disturbance across the site.

Following the implementation of an approved programme of mitigation, any impact on archaeological soils, finds or features identified within the Dublin Central Masterplan area will be resolved in consultation with the relevant authorities during the course of the project.

- **Excavation**

In the event that archaeological features or deposits exist, the mitigation for development impact will involve an excavation which will be integrated into the early phases of the site's development programme.

Archaeological excavation will ensure that this removal is systematically and accurately recorded, drawn and photographed, to achieve a full descriptive paper and digital archive, thereby adding to the archaeological record and to the knowledge of a specified area.

The results will be compiled in detailed reports which will be submitted to DCC and to DHLGH and the NMI in compliance with the awarding of a licence.

- **Licensing**

Archaeological monitoring and excavation will be carried out under licence from the DHLGH and the NMI, and will ensure the full recognition of, and the proper excavation and recording of all archaeological soils, features, finds and deposits which may be disturbed below the ground surface.

All mitigation measures will be carried out in accordance with an approved method statement which will be agreed in advance with the DCC City Archaeologist.

- **General**

These proposed strategies do not prejudice any further recommendations made by the Department, who may seek additional information or consider alternative strategies.

National Monuments Legislation (as amended) states that in the event of the discovery of archaeological finds or remains, the NMI should be notified immediately. Provision must be made to allow for, and fund any, archaeological work that may be needed if any remains should be noted during ground preparation works or during construction. As described above, if features are revealed, the area will need to be investigated, allowing no further development to take place until the site is fully identified, recorded and excavated or, alternatively, avoided.

All archaeological issues shall be resolved to the satisfaction of the DHLGH and the NMI.

The Applicant is aware of the archaeological potential of the site and its implications for the development and the possibility of a significant design change. The Applicant will make provision to allow for and fund whatever archaeological work may be needed on the site in accordance with the National Monuments legislation (1930–2004).

Operational Stage

None required.

18.2.12.2 Proposed Development – Site 3, 4 & 5

Construction StageSite 3

Site 3 is a conglomeration of properties amassed over a period of time. A phased approach to the archaeological investigation and mitigation is suggested: -

- **Monitoring**

Archaeological monitoring will take place at the preconstruction, site preparation and enabling works / early stages of construction and where any preparatory ground reduction works are required. This will be carried out in order to establish the presence or absence, as well as the nature and extent, of any archaeological deposits, features or sites that may be present, where ground investigation and earth-moving works are taking place.

It is anticipated that the following works will be monitored as required: -

- *Pre-Demolition Investigation Works*

Including but not limited to the monitoring of: -

- Site investigation works.
- Opening up works at basement or ground levels.
- Site survey of existing basements in association with the conservation contractor (as required) to record any early 18th century fabric that might be identified.
- Recording of basement vaults beneath Henry Street prior to infilling (where it is safe to do so).

- *Demolition & Enabling Works*

Including but not limited to the monitoring of: -

- Temporary enabling works where they will require opening up works at ground level.
- Strip footings associated with retention of structures and adjacent basements.
- Excavation of pile guide.
- Post-demolition grubbing out of foundations and substructures.
- All earthmoving works.

- **Test Excavation**

Given that the development is within the ZAP for Dublin (DU018-020), archaeological test excavation will be required.

The testing will be carried out during the post demolition phase in areas where it is possible and safe to do so. It will be strategic and focused in areas where there are no existing basements. The testing will establish the nature and the level of disturbance across the site.

Following the implementation of an approved programme of mitigation, any impact on archaeological soils, finds or features identified within Site 3 will be resolved in consultation with the relevant authorities during the course of the project.

- **Excavation**

In the event that archaeological features or deposits exist, the mitigation for development impact will involve an excavation which will be integrated into the early phases of the site's development programme.

Archaeological excavation will ensure that this removal is systematically and accurately recorded, drawn and photographed, to achieve a full descriptive paper and digital archive, thereby adding to the archaeological record and to the knowledge of a specified area.

The results will be compiled in detailed reports which will be submitted to DCC and to DHLGH and the NMI in compliance with the awarding of a licence.

- **Licencing**

Archaeological monitoring and excavation will be carried out under licence from the DHLGH and the NMI, and will ensure the full recognition of, and the proper excavation and recording of all archaeological soils, features, finds and deposits which may be disturbed below the ground surface.

All mitigation measures will be carried out in accordance with an approved method statement which will be agreed in advance with the DCC City Archaeologist.

- **General**

These proposed strategies do not prejudice any further recommendations made by the Department, who may seek additional information or consider alternative strategies.

National Monuments Legislation (as amended) states that in the event of the discovery of archaeological finds or remains, the NMI should be notified immediately. Provision must be made to allow for, and fund any, archaeological work that may be needed if any remains should be noted during ground preparation works or during construction. As described above, if features are revealed, the area will need to be investigated, allowing no further development to take place until the site is fully identified, recorded and excavated or, alternatively, avoided.

All archaeological issues shall be resolved to the satisfaction of the DHLGH and the NMI.

Site 4

Works in the vicinity of the National Monument – Nos. 14 – 17 Moore Street

Appropriate conservation methodologies will be employed on all works carried out adjacent to the national monument (see Chapter 15: Cultural Heritage (Architectural)).

The preservation order for Nos. 14 – 17 Moore Street provides the site with the highest level of statutory protection. The investigation, demolition, earthmoving and construction works within the previously defined assessment area for works in proximity to the National Monument (**Error! Reference source not found.**) for the development of Site 4 in the Dublin Central Masterplan area will require Ministerial Consent under Section 14 of the National Monuments Act (as amended). The consent application will be supported by detailed method statements compiled by the integrated conservation team for the Dublin Central project (comprising a conservation architect, structural conservation engineer, architect and archaeologist). This will include an archaeological strategy.

The national monument will be developed as a commemorative centre (a cultural use) under ministerial consent C495. As part of the design process the Dublin Central Team has consulted with the DHLGH, the OPW and their conservation team. Consultation will be an ongoing process to ensure that there is an integrated and collaborative approach for the protection and conservation of the monument and the shared/adjoining boundaries with Site 4. The detailed methodologies for these works will be developed through the Ministerial Consent process. The archaeological mitigation in the vicinity of the National Monument will as a minimum include: -

- Archaeological monitoring of site investigation, site preparation and temporary works as required.
- Archaeological monitoring of site clearance (including the clearance of cellars / basements) and of demolition works to identify and record as appropriate, any objects, fixtures or features that can be related to the 1916 Easter Rising.
- Archaeological testing will be carried out after demolition in the areas to the rear of Nos. 18 and 19 Moore Street and in the rear yard of No. 13 Moore Street.
- Archaeological excavation of archaeological soils or features that are encountered and impacted by the Proposed Development.