15.0 MITIGATION MEASURES AND MONITORING

15.1 INTRODUCTION

One of the main purposes of EIA is to identify potentially significant adverse impacts at the pre-consent stage and to propose measures to mitigate or ameliorate such impacts. This chapter of the EIAR document has been prepared by *John Spain Associates,* Blaine Cregan M.Sc. B.Sc (hons) and BEng., Executive Director with John Spain Associates. This chapter sets out a summary of the range of methods described within the individual chapters of this EIAR document which are proposed as mitigation and for monitoring during the construction and operational phases of the proposed development. It is intended that this chapter of the EIAR document will provide a useful and convenient summary for the competent/consent authority of the range of mitigation and monitoring measures proposed.

EIA related conditions are normally imposed by the competent/consent authority as part of conditions of planning consent and form a key part of the Impact Anticipation and Avoidance strategy. Conditions are principally used to ensure that undertakings to mitigate are secured by explicitly stating the location, quality, character, duration and timing of the measures to be implemented.

Monitoring of the effectiveness of mitigation measures put forward in the EIAR document, both by the competent authorities and the developer, is also an integral part of the process. Monitoring of environmental media and indicators arise either from undertakings or from conditions.

In the case of mitigation and monitoring measures it is important for all parties to be aware of the administrative, technical, legal and financial burdens that can accompany the measures proposed. It is also important to ensure that, where monitoring is provided for, it is clearly related to thresholds, which if exceeded cause a clearly defined set of actions to be implemented.

The 2018 EIA Guidelines published by the Department of Housing, Planning and Local Government state:

"While not a mandatory requirement an EIAR can very usefully include a summary table of features and/or measures envisaged to avoid, prevent or reduce and, if possible, offset likely significant adverse effects of the proposed development, and a timescale for the implementation of proposed mitigation measures."

Given the complexity of the scheme in question, and the detail provided within this EIAR, this chapter seeks to provide a complete overview of mitigation and monitoring measures proposed, in the spirit of the above statement within the EIA Guidelines albeit not formatted as a table.

15.2 MITIGATION STRATEGIES

15.2.1 Introduction

There are three established strategies for impact mitigation - avoidance, reduction and remedy. The efficacy of each is directly dependent on the stage in the design process at which environmental considerations are taken into account (i.e. impact avoidance can only be considered at the earliest stage, while remedy may be the only option available to fully designed projects).

15.2.2 Mitigation by Avoidance

Avoidance is generally the fastest, most cost effective and efficient form of impact mitigation. Environmental effects and consideration of alternatives have been taken into account at the earliest stage in the project design processes. The consideration of alternatives with respect to the development of the subject lands has been described in Chapter 3.

15.2.3 Mitigation by Reduction

This is a common strategy for dealing with effects which cannot be avoided. It concentrates on the emissions and effects and seeks to limit the exposure of the receptor. It is generally regarded as the "end of pipe" approach because it does not seek to affect the source of the problems (as do avoidance strategies above). As such this is regarded as a less sustainable, though still effective, approach.

15.2.4 Reducing the Effect

This strategy seeks to intercept emissions, effects and wastes before they enter the environment. It monitors and controls them so that acceptable standards are not exceeded. Examples include wastewater treatment, filtration of air emissions and noise attenuation measures.

15.2.5 Reducing Exposure to the Impact

This strategy is used for impacts which occur over an extensive and undefined area. Such impacts may include noise, visual impacts or exposure to hazard. The mitigation is effected by installing barriers between the location(s) of likely receptors and source of the impact (e.g. sound barriers, tree screens or security fences).

15.2.6 Mitigation by Remedy

This is a strategy used for dealing with residual impacts which cannot be prevented from entering the environment and causing adverse effects. Remedy serves to improve adverse conditions which exist by carrying out further works which seek to restore the environment to an approximation of its previous condition or a new equilibrium.

15.3 MITIGATION AND MONITORING MEASURES

15.3.1 Human Health and Population

Construction Phase

A comprehensive range of construction-related mitigation and remedial measures are proposed throughout this EIAR to address potential environmental impacts across various topics and their inter-relationships. These measures are designed to avoid any significant adverse environmental effects on population and human health during the construction phase. For a summary of all proposed mitigation and remedial measures, readers are directed to Chapter 15 of this EIAR.

To protect the amenities enjoyed by nearby residents, businesses, and employees, the appointed contractor will submit and implement a Construction Environmental Management Plan (CEMP) prior to commencement. The CEMP will be based on the mitigation measures outlined in this EIAR and will address all relevant environmental controls and emergency procedures for the duration of the construction phase.

A Resource Waste Management Plan, prepared by Byrne Environmental Consulting Ltd., is included with this planning application. The plan's objective is to ensure that waste generated during both the construction and operational phases is managed and disposed of in compliance with the Waste Management Acts 1996-2023 and all associated Waste Management Regulations.

Prior to beginning demolition, the contractor must obtain formal agreement from the Local Authority regarding pollution prevention measures, as well as emergency procedures for all stages of construction. All demolition works will adhere to 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'

Additional site controls and measures include:

- Road Cleanliness: Roadways will be kept clean of dirt and debris, with a road-sweeping truck on standby if required.
- Site Security and Safety: The contractor will secure the site perimeter with appropriate hoarding and ensure all staff complete a site induction process. Safe pass cards will be required for all workers, and separate pedestrian access will be provided at main site entrances. Controlled access points, equipped with gates or turnstiles, will remain locked outside of monitored hours.

- Traffic Management: A Traffic Management Plan, to be agreed with Dublin City Council's Transportation Department and An Garda Síochána, will be implemented to mitigate potential impacts on surrounding road networks.
- Surface Water Management: In alignment with Sustainable Drainage Systems (SuDS) Best Management Practices, surface water proposals aim to reduce site runoff to 2 l/s. Measures include green roofs, stormwater attenuation, hydrobrake systems, and a Class 1 interceptor. The stormwater drainage system is designed for a 100-year storm event. Further details on surface water and flood risk are provided in Chapter 6 (Water and Hydrology).
- Dust Control: To mitigate dust-related health impacts, a dust minimisation plan will be implemented based on best practices from Ireland, the UK, and the USA. Additional details are provided in Chapter 8 of this EIAR
- Noise and Vibration Control: Specific noise and vibration control measures are outlined in Chapter 9. The contractor will adhere to noise abatement guidelines per BS 5228–1 (BSI 2014a) and S.I. No. 241/2006 for outdoor equipment. Noise monitoring will follow ISO 1996–1 (ISO 2016) and ISO 1996–2 (ISO 2017), and operational plant items will comply with BS 4142 guidance for noise control.

These combined measures reflect a structured approach to managing environmental, safety, and operational impacts, ensuring compliance with best practices and relevant regulatory standards throughout the construction phase.

Operational Phase

Since the impacts of the proposed development on Human Health and Population are either non-significant, positive, or cannot be further mitigated, no additional mitigation measures are required.

Monitoring

In relation to the impact of the development on population and human health it is considered that the monitoring measures outlined in this EIAR in regard to the other environmental topics such as water, air quality and climate and noise and vibration sufficiently address monitoring requirements.

15.3.2 Land, Soil, Geology and Hydrogeology

Construction Phase

A project-specific Outline Construction and Environmental Management Plan (CEMP) has been prepared by CS Consulting and is submitted as part of this planning application. Prior to commencement of construction this CEMP will be updated and will be maintained by the contractors during the construction and operational phases. The CEMP will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the procedures.

Soil handling, Removal and Compaction

Three soil samples were collected from the site, and the soil was classified as hazardous due to elevated levels of lead and zinc. Additional soil sampling and testing (including WAC testing) will be necessary if any soil is to be removed from the site for reuse or disposal. Any soil designated for removal will be handled and disposed of by a licensed contractor at a licenced facility

Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment and the material will be stored away from any surface water drains. Made ground shall be stockpiled separately to natural soils and stones in order to prevent cross-contamination of excavated materials on site. Movement of material will be minimised in order to reduce dust and degradation of soil structure.

Basement Assessment

The following mitigation measures will be included in the design to protect water quality:

Any minor ingress of groundwater and collected rainfall in the excavation will be pumped out during construction. It is proposed that the water be discharged via the existing stormwater sewer network. The use of silt traps, settlement tanks and an oil interceptor (if required) will be adopted if monitoring indicates the requirements for the same with no silt or contaminated water permitted to discharge to the sewer.

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

An Outline Construction and Environmental Management Plan (CEMP) has been prepared by CS Consulting Engineers as part of the planning application. Prior to commencement of construction the appropriate contractor will produce a detailed CEMP which will include management of any collected water.

Appropriate instrumentation will be installed to monitor wall and ground movements during construction. The predictions of ground movement based on the ground movement analysis should be checked by monitoring the basement wall. The monitoring will include the installation of inclinometers in the basement wall elements so the pattern of wall behaviour can be reviewed with predicted values and due to the presence of residential dwellings and protected structures close to the site boundary. Contingency measures will be implemented if movements of the adjacent structures exceed predefined trigger levels.

In cases where vibration from construction methods could potentially damage sensitive neighbouring buildings and structures vibration monitors are to be installed. Contingency measures will be implemented if monitored vibrations exceed predefined trigger levels.

It is considered that there is a low risk of inflow during construction works due to the installation of piles into bedrock prior to excavation works on the basement.

The proposed basement will have no long-term impact on water levels in the overburden or underlying aquifer and no impact on the current water body status. The bedrock water table will not be affected by the excavation works. Temporary dewatering of the perched water table within the clayey deposits to facilitate excavation works is expected to be minor and it will have a temporary local impact only.

The basement will need to be fully waterproofed to ensure no groundwater enters the finished basement.

Management of any collected rainwater and any groundwater seepage during basement excavations will be pumped to existing sewers (following appropriate treatment) in agreement with the regulatory authority.

Fuel and Chemical Handling

All oils, solvents and paints used during construction will be stored within temporary bunded areas; these areas shall be bunded to a volume of 110% of the capacity of the largest tank/container.

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents, and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas. Oil storage tanks should have secondary containment provided by means of an above ground bund to capture any oil leakage irrespective of whether it rises from leakage of the tank itself or from associated equipment such as filling and off-take points, sighting gauges etc., all of which should be located within the bund. Bund specification should conform to the current best practice for oil storage (Enterprise Ireland BPGC5005).

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area (or where possible off the site) which will be away from surface water gulleys or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

All ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. The pouring of concrete will take place within a designated area using a geosynthetic material to prevent concrete runoff into the soil/groundwater media. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

Pouring of concrete should be carried out in the dry and allowed to cure. Mixer washings and excess concrete should not be discharged to surface water. Implementation of comprehensive and strict site housekeeping measures to isolate concrete from local surface waters is essential.

In the case of drummed fuel or other chemical which may be used during construction containers will be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

Operational Phase

During operation measures there is no requirement for bulk fuels. There is also no requirement for discharge to ground and no requirement for abstraction of groundwater. An environmental management plan will apply to the development during the operational phase incorporating mitigation measures and emergency response measures.

Monitoring

Construction Phase

Regular inspection of surface water run-off and sediments controls e.g. silt traps and settlement tanks will be employed during the construction phase. Soil sampling to confirm disposal options for excavated soils. Regular inspection of construction/mitigation measures will be undertaken e.g. concrete pouring, refuelling etc.

Operational Phase

There is no monitoring required during the operational phase.

15.3.3 Water and Hydrology

Construction Phase

A project-specific Outline Construction and Environmental Management Plan (CEMP) has been developed by CS Consulting and is included as part of this planning application. Before construction begins, the CEMP will be updated and managed by the contractors throughout both the construction and operational phases. The CEMP will address all potentially polluting activities and include an emergency response procedure. All site personnel will receive training on how to implement these procedures effectively.

Soil Handling, Removal, and Compaction

Soil sampling (three samples) conducted on-site revealed that the soil is hazardous due to elevated levels of lead and zinc. Additional soil sampling and testing will be required if any soil needs to be removed from the site. Any soil removed will be disposed of by a licensed contractor at a licensed facility.

Temporary storage of soil will be carefully managed to prevent any adverse impact on the surrounding environment, with materials being stored away from surface water drains. The movement of materials will be minimized to reduce soil degradation and dust generation.

Basement Assessment – Mitigation Measures

The design includes the following mitigation measures to protect water quality during the construction and operation of the basement:

Groundwater and Rainwater Management During Excavation:

- Any minor ingress of groundwater and collected rainfall during excavation will be pumped out.

- The water will be discharged via the existing stormwater sewer network, with the use of silt traps and an oil interceptor, if necessary. This ensures that no silt or contaminated water is discharged into the sewer.

Site Investigation and Water Bearing Gravels:

- Site investigation has not identified significant water-bearing gravels within the basement footprint. If such gravels are encountered, the design will facilitate water discharge around the basement structure to prevent flooding.

Spill Control and Material Storage:

- All oils, solvents, and paints used during construction will be stored within temporary bunded areas. These bunds will have a volume capacity of 110% of the largest tank/container to prevent spillage into the surrounding environment.

Concrete Management:

- Ready-mixed concrete will be delivered to the site by truck, and a risk assessment will be carried out for wet concreting operations to ensure no discharge of alkaline wastewater or contaminated stormwater to the underlying subsoil.

- Concrete washing and washout of concrete vehicles will take place off-site at an appropriate facility.

Outline Construction and Environmental Management Plan (OCEMP):

- An OCEMP, prepared by CS Consulting Engineers, will guide the management of water and other environmental impacts during construction. A detailed CEMP will be produced by the appointed contractor before the start of construction and will include management of any collected water.

Ground Movement and Monitoring:

- Ground movements will be closely monitored, particularly in areas where movements are critical. Instruments such as inclinometers will be installed in the basement wall to monitor ground behavior and ensure predicted values align with actual movements.

- Monitoring will include weekly readings of surveying points set up before the start of works. Vibration monitors will be installed to protect adjacent structures, and contingency measures will be put in place if movements exceed predetermined levels.

Water Inflow Risk:

- Based on groundwater monitoring of the adjacent site, it is considered that the risk of inflow during construction is low. Installation of piles prior to excavation is expected to mitigate groundwater inflow risks.

Impact on Water Levels and Aquifers:

- The basement excavation is not expected to affect the water levels in the overburden or the underlying aquifer. The bedrock water table will not be impacted by the excavation works.

- Temporary dewatering of the perched water table during excavation will have a minor, local impact, and no long-term effect is anticipated.

Waterproofing of Basement:

- The basement will be fully waterproofed to prevent groundwater ingress into the finished structure.

Management of Collected Rainwater and Groundwater:

- Any collected rainwater and groundwater seepage during the basement excavation will be pumped to the existing sewers after appropriate treatment, with approval from the regulatory authority.

These measures ensure that the basement construction will not adversely impact the surrounding water environment, and all potential risks are mitigated through careful planning, monitoring, and adherence to best practices.

Fuel and Chemical Handling Mitigation Measures

To minimize the impact on the underlying subsurface strata and surrounding environment from material spillages, the following mitigation measures will be employed during the construction phase of the development:

Storage of Oils, Solvents, and Paints:

- Oils, solvents, paints, and other chemicals will be stored in temporary bunded areas.
- Oil and fuel storage tanks will be placed in designated bunded areas, with the bunds designed to contain 110% of the volume of the largest tank/container plus an allowance of 30 mm for rainwater ingress.
- Drainage from the bunded areas will be diverted for safe collection and disposal, ensuring that no spillage contaminates surrounding soil or water systems.

Refuelling and Maintenance of Vehicles:

- Refuelling of construction vehicles and equipment will take place in a designated refuelling area on-site (or, where possible, off-site) located away from surface water drains or gullies.
- In the event that a machine needs to be refuelled outside of the designated area, fuel will be transported using mobile double-skinned fuel tanks to minimize the risk of leakage or spillage.
- An adequate supply of spill kits and hydrocarbon adsorbent packs will be maintained in the designated refuelling area. All personnel involved in refuelling operations will be fully trained in the use of these equipment and emergency procedures.
- The project will adhere to guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) to ensure best practices are followed.

Concrete Management:

- Ready-mixed concrete will be delivered to the site by truck, and a suitable risk assessment for wet concreting will be completed prior to commencement. The risk assessment will include measures to prevent the discharge of alkaline wastewater or contaminated stormwater into the underlying subsoil.
- The concrete pouring will occur within a designated area on-site, and a geosynthetic material will be used to prevent concrete runoff into the soil or groundwater.
- Wash down and washout of concrete trucks will take place off-site at an appropriate facility, reducing the risk of contamination from concrete residues.

Chemical Storage and Handling:

- Drummed fuels or other chemicals used during construction will be stored in a dedicated, internally bunded chemical storage cabinet. These cabinets will be clearly labelled to facilitate appropriate remedial action in case of a spill.
- The storage area will be managed to ensure that any potential spills can be contained and dealt with promptly, following best practices for hazardous material management.

By adhering to these robust mitigation measures, the project aims to prevent contamination of soil, groundwater, and surface water during the construction phase, ensuring compliance with environmental regulations and minimizing any potential negative impacts.

Operational Phase

During the operational phase of the development, there will be no need for bulk fuel storage, reducing the risk of fuel spills. There will also be no discharge of water to the ground, as surface water will be managed through the drainage system. Additionally, the development will not extract groundwater, ensuring no impact on local water supplies. An Environmental Management Plan (EMP) will be implemented during operation to oversee environmental protection. The plan will include measures to prevent environmental harm and emergency response procedures in case of incidents, ensuring quick and effective action if needed.

Surface Water Drainage

The proposed development will significantly enhance the local drainage system by providing full attenuation for the increased hardstanding area, in line with the requirements of the Greater Dublin Strategic Drainage Study. Several measures will be implemented to reduce the risk of spills affecting the water environment, including the design of the car park and on-site speed restrictions.

A flood risk assessment was carried out in accordance with the OPW's "The Planning System and Flood Risk Management Guidelines for Planning Authorities" (November 2009). For further details, please refer to Section 6.3.7, Flooding, above. The full Flood Risk Assessment for the proposed development can be found in Appendix 6.1 at the end of this report.

Foul Water

The proposed development will operate within the requirements of the connection agreement with Uisce Éireann.

Water Supply

Flow monitoring will be installed at the point where the public and private water mains meet, serving the purposes of billing and leakage detection. The specific details of the required meter and its enclosure will be discussed and agreed upon with the water authority prior to the start of construction.

Monitoring

Construction Phase

During the construction phase, the site drainage systems will be monitored to ensure that construction activities do not negatively impact surface water. This monitoring will help confirm that all implemented mitigation measures are effective in protecting the hydrological environment.

Operational Phase

Maintenance of the stormwater and foul sewer systems for the entire landholding will adhere to the standards and requirements specified by the relevant utility providers. This ensures the systems function effectively and remain in compliance with all applicable regulations.

15.3.4 Biodiversity

Construction Phase

A project ecologist will be appointed and consulted in relation to all onsite drainage during works. Consultation with the project ecologist will not involve the formulation of new mitigation measures for the purposes of protecting any European Site and relate only to the implementation of those mitigation measures already stated in the submission or the formulation of mitigation for other purposes.

All demolition and site clearance works methodologies will have prior approval of a project ecologist.

Staging of project will be carried out to reduce risks of onsite drainage to the River Liffey and subject to the approval of a project ecologist.

Upon lifting of the concrete slab/hard standing and removal the building on site, the soils will be assessed for contamination prior to any site discharge.

Local drainage connections, gullies and watercourses will be protected from dust, silt and surface water throughout the works.

All onsite drainage network connections will be blanked off and sealed at the first phase of the demolition works.

There will be no entry of solids or petrochemicals to the drainage network during the works

The Site Manager will be responsible for the pollution prevention programme and will ensure that at least daily checks are carried out to ensure compliance. A record of these checks will be maintained.

Spill containment equipment shall be available for use in the event of an emergency. The spill containment equipment shall be replenished if used and shall be checked on a scheduled basis.

Demolition works should be carried outside of bird nesting season (March 1st-31st August). Should this not be possible, a pre-works check by a qualified ecologist should be undertaken to ensure nesting birds are absent. This would include nesting gulls on buildings if present.

Pre-Construction survey for bats. If bats are found roosting on site a derogation licence will be required from the NPWS prior to demolition.

Operational Phase

Standard operational mitigation measures as outlined in the engineering report will be in place to protect surface water networks from pollution.

Mitigation measures to address potential risk of bird strikes will involve the installation of ceramic fritted glass on the corner windows of the twelfth and thirteenth floors at the quay-side of the building.

Monitoring

Construction Phase

A project ecologist will be appointed to oversee demolition and construction works on site.

Operational Phase

No operational monitoring/reinstatement is required.

15.3.5 Air Quality and Climate

Construction Phase

Air Quality

Implementation of the best practice air quality mitigation measures specified in DCC's *Air Quality Monitoring & Noise Control Units Good Practice Guide for Construction and Demolition.*

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before works commence on site. Community engagement includes explaining the nature and duration of the works to local residents and businesses.
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board will also include head/regional office contact details.
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out.

Site Monitoring

- A programme of dust monitoring at site boundaries shall be implemented for the duration of the construction phase.

Construction & Demolition Works Mitigation

- Avoid unnecessary vehicle movements and manoeuvring, and limit speeds on site so as to minimise the generation of airborne dust.
- Use of rubble chutes and receptor skips during construction activities.
- During dry periods, dust emissions from heavily trafficked locations (on and off site) will be controlled by spraying surfaces with water and wetting agents.
- 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 only.
- Re-suspension in the air of spillages material from trucks entering or leaving the site will be prevented by limiting the speed of vehicles within the site to 10kmh and by use of a mechanical road sweeper.
- The overloading of tipper trucks exiting the site shall not be permitted.
- Aggregates will be transported to and from the site in covered trucks.
- Where the likelihood of windblown fugitive dust emissions is high and during dry weather conditions, dusty site surfaces will be sprayed by a mobile tanker bowser.
- Wetting agents shall be utilised to provide a more effective surface wetting procedure.
- Exhaust emissions from vehicles operating within the construction site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised by routine servicing of vehicles and plant, rather than just following breakdowns; the positioning of exhausts at a height to ensure adequate local dispersal of emissions, the avoidance of engines running unnecessarily and the use of low emission fuels.
- All plant not in operation shall be turned off and idling engines shall not be permitted for excessive periods.
- 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.
- Material stockpiles containing fine or dusty elements including top soils shall be covered with tarpaulins.
- Where drilling or pavement cutting, grinding or similar types of stone finishing operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers. All concrete cutting equipment shall be fitted with a water dampening system.

Climate

- Implementation of the site-specific Resource and Construction Waste Management Plan which defines how the reuse and recycling of materials shall be maximised.
- Prevention of site plant and machinery engines idling.
- Ensure all plant and machinery are well maintained.
- Minimising damage to site construction materials by correct storage and management thus preventing waste being generated.

Operational Phase

Air Quality

There is no mitigation measures required for the operational phase of the development.

Climate

The sustainable design elements of the proposed development contribute to a building design that meets and exceeds the Building Regulations in terms of primary energy consumption and carbon dioxide emissions.

The passive measures included in the design, such as maximizing the use of daylight and minimizing solar gain (glazing selection and solar shading), reducing fabric heat loss through the building envelope and improving the air tightness significantly contribute towards reducing the loads on the active systems within the building.

The active measures mentioned above have been designed to reduce the primary energy consumption through intelligent control and highly efficient plant and equipment.

The sustainable design of the proposed development offers a building that will consume less primary energy than the reference building used to assess Part L compliance.

- Energy efficient LED lighting will be utilised;
- Exhaust air source heat pump technology will be installed; and PV solar panels will be installed to supplement renewable energy
- Use of natural ventilation;
- Use of natural light to reduce the need for artificial lighting;
- Long-lasting and durable materials will be chosen, where feasible, to reduce ongoing maintenance and replacement requirements;
- Proximity to public transport to reduce private car journeys and promote more sustainable travel options;
- Electric Vehicle (EV) charging points will be provided In line with both the building regulations (TGD Part L, since 2021) as well as the Dublin City Development Plan
- The provision of 330 bicycle parking spaces

Monitoring

Construction Phase

A programme of continuous dust deposition monitoring will be conducted for the duration of the demolition and construction phase at locations along the site boundary adjacent local receptors.

Operational Phase

There is no monitoring proposed for the operational stage.

15.3.6 Noise and Vibration

Construction Phase

Construction & Demolition Phases Noise & Vibration Mitigation

Implementation of the best practice noise and vibration mitigation measures specified in DCC's *Air Quality Monitoring & Noise Control Units Good Practice Guide for Construction and Demolition*

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before works commence on site. Community engagement includes explaining the nature and duration of the works to local residents and businesses.
- The name and contact details of a person to contact regarding noise and vibration issues shall be displayed on the site boundary, this notice board will also include head/regional office contact details.
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with noise and vibration concerns, together with details of any remedial actions carried out.

Site Monitoring

- A programme of continuous live noise and vibration monitoring shall be implemented for the duration of the construction phase.

Construction & Demolition Works Mitigation

Site-Specific mitigation measures will include:

- A strictly enforced noise management programme shall be implemented at the site from the outset of construction activities.
- Noisy stationary equipment shall be sited away from sensitive site boundaries as far as practicable.
- Where reasonable, practicable, noisy plant or activities shall be replaced by less noisy alternatives if noise breaches and/or complaints occur.
- Proper use of plant with respect to minimising noise emissions and regular maintenance will be required.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and will be maintained in good efficient order
- Where noisy plant is required to operate in works areas next to residential houses low noise plant options will be used wherever practicable.
- Dumpers and any plant used for moving materials around the site will have high performance exhaust silencers.
- Selected use of rubber-tyred equipment over steel track equipment where practicable.
- The use of inherently quiet plant is required where appropriate – all compressors and generators will be “sound reduced” or “super silent” models fitted with properly lined and sealed acoustic covers, which will be kept closed whenever the machines are in use, and all ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers.
- All compressors, generators and pumps shall be silenced models fitted with properly lined and sealed acoustic covers or enclosures, which will be kept closed whenever the machines are in use.
- All pneumatic percussive tools such as pneumatic hammers shall be fitted with dampers, mufflers or silencers of the type recommended by the manufacturer.
- Fixed items of plant shall be electrically powered in preference to being diesel or petrol driven.
- Vehicles and mechanical plant utilised on site for any activity associated with the works shall be fitted with effective exhaust silencers and shall be maintained in good working order and operated in a manner such that noise emissions are controlled and limited as far as reasonably practicable.
- Any plant, equipment or items fitted with noise control equipment found to be defective in shall not be operated until repaired / replaced.
- Machines in intermittent use shall be shut down in the intervening periods between works or throttled down to a minimum during periods when not in use.
- Static noise emitting equipment operating continuously shall be housed within suitable acoustic enclosure, where appropriate.
- All excavator mounted pneumatic breakers used for demolition and ground breaking activities shall be fitted with effective dampeners and /or enclosed within a noise adsorbing blanket structure to minimise noise emissions.

- Site activities shall be staggered when working in proximity to any receptor, that is concrete cutting and rock breaking should where possible. This proposed method of working will provide effective noise management of site activities to ensure that any receptor is not exposed to unacceptably high levels of noise over extended periods.
- Excessive reviving of all vehicles shall be avoided.
- Unnecessary dropping of heavy items onto ground surfaces shall be banned.
- The use of an excavator bucket to break up slabs of concrete or tarmacadam shall not be permitted.
- The dragging of materials such as steel covers, plant or excavated materials along ground surfaces shall not be permitted.
- Plant Reversing Alarms: Where reasonably practicable and deemed safe by risk assessment, taking into account onsite hazards and working environment, the tonal reversing alarms of mobile plant shall be replaced with broadband alarms.

Operational Phase

All building services plant associated with the building shall be assessed during its commissioning in accordance with *British Standard BS 4142, "Rating Industrial Noise Affecting Mixed Residential and Industrial Areas",* which sets out a methodology which can be used to establish acceptable levels of services noise once the development is operational.

Monitoring

Construction Phase

Noise Monitoring

On commencement of the site construction activities, live noise monitoring systems shall be installed at site boundary locations to measures and assess the impact that site activities may have on ambient noise levels at local receptors and to assess compliance with the proposed noise limit value of 75dB(A) $L_{Aeq, 11hr.}$ The noise monitoring systems will have the functionality to issue text and email alerts to site construction staff in the event the noise limit is exceeded. This will allow for works to be reviewed and the specific high noise activity to be identified.

The environmental noise measurements will be completed in accordance with the requirements of *ISO 1996-1: 2017: Acoustics – Description, measurement and assessment of environmental noise*. The measurement parameters to be recorded include wind speed, temperature, LAeq, LA90, LA10 and LAmax, 1/3 Octave Frequency analysis and impact noise analysis.

The results of noise monitoring surveys will be made available to Dublin City Council on request.

Vibration Monitoring

On commencement of the site construction activities, live vibration monitoring systems shall be installed on neighbouring properties (pending permission) or at site boundary locations to measures and assess vibration levels generated by site activities and to assess compliance with the proposed vibration limit values of 1mm/sec PPV at the adjacent pre-school and National school and 7.5mm/sec PPV at any other building.

The vibration monitoring systems will have the functionality to issue text and email alerts to site construction staff in the event the vibration limits are exceeded. This will allow for works to be reviewed and the specific vibration generating activities to be identified.

The vibration measurements will be completed in accordance with *BS 7385-2:1993 – Evaluation and Measurement for Vibration in Buildings: Part 2 – Guide to Damage Levels from Groundborne Vibration.*

The results of vibration monitoring surveys will be made available to Dublin City Council on request.

Operational Phase

Following the completion of the proposed development a noise assessment will be conducted in accordance with *BS 4142 Methods for rating and assessing industrial and commercial sound (2014).* Should it be determined that operational noise has an adverse impact, the specific noise sources will be identified, and appropriate noise mitigation measures will be implemented to reduce the operational noise level.

15.3.7 Archaeological, Architectural and Cultural Heritage

Construction Phase

A programme of archaeological test trenching will be carried out across the site to investigate the potential for earlier structural remains to survive beneath the current ground level. This may occur in two phases, within the open yard to the south, and following demolition in the north. The results of this investigation will inform the pre-development archaeological mitigation strategy for the site, which may include preservation by record (excavation), preservation in-situ and/or archaeological monitoring. Any further mitigation will require approval from the National Monuments Service of the DoHLGH and in consultation with the Dublin City Archaeologists.

A full photographic and detailed built heritage survey will be carried out of the existing buildings and walls that are of historical interest prior to the commencement of demolition works. This will be carried out by a suitably qualified historic buildings expert.

Operational Phase

No mitigation is proposed for the operational phase of the proposed development

Monitoring

The mitigation measures detailed above would also function as a monitoring system to allow the further assessment of the scale of the predicted impacts and the effectiveness of the mitigation measures.

15.3.8 Traffic and Transportation

Construction Phase and Operational Phase

Based on the traffic study conducted in this chapter, it can be concluded that the impact of the development on the local road network during both the demolition/construction and operational phases will be minimal. However, a Construction Management Plan will be developed in consultation with Dublin City Council to ensure effective traffic management during construction. Additionally, key stakeholder engagement will be carried out to communicate site activities and programme expectations

Monitoring

The Construction Management Plan is a dynamic document that will be updated and maintained throughout the Demolition/Construction phase. It will include the monitoring of site activities and ensure regular engagement with stakeholders.

15.3.9 Material Assets - Waste

Construction Phase

The following construction phase mitigation measures will be implemented.

- From the outset of construction activities, a dedicated and secure compound containing bins, and/or skips, and storage areas, into which all waste materials generated by construction site activities, will be established within the active construction phase of the development site.
- Spill kits shall be located within the site compound with clearly labelled instructions on how they shall be used to clean up fuel/oil spills to minimise the potential for ground contamination.

- All vehicle and plant oils and liquid construction materials shall be stored in secure impermeable storage units.
- All diesel-powered generators shall be inspected on at least a weekly basis by a delegate of the project manager to ensure it is not leaking diesel or oils.
- All empty containers containing residual quantities of oils, greases and hydrocarbon-based liquids shall be stored in a dedicated, clearly labelled impermeable container.
- In order to ensure that the construction contractor correctly segregate waste materials, it is the responsibility of the site construction manager to ensure all staff are informed by means of clear signage and verbal instruction and made responsible for ensuring site housekeeping and the proper segregation of construction waste materials.
- It will be the responsibility of the Resource and Waste Manager (RWM) to ensure that a written record of all quantities and natures of wastes exported off-site are maintained on-site in a Waste File at the Project office.
- It is the responsibility of the RWM that all contracted waste haulage drivers hold an appropriate Waste Collection Permit for the transport of waste loads and that all waste materials are delivered to an appropriately licenced or permitted waste facility in compliance with the following relevant Regulations:
    - Waste Management (Collection Permit) Regulations 2007 – 2023 (as amended) (SI No.820 of 2007)
    - Waste Management (Collection Permit) Amendment Regulations 2016 (SI No.247 of 2016)
    - Waste Management (Collection Permit) Amendment No. 2 Regulations 2023 (SI No.104 of 2023)
    - Waste Management (Facility Permit and Registration) Regulations S.I.821 of 2007 and the Waste Facility Permit under the Waste Management (Facility Permit and Registration) (Amendment) Regulations S.I.250 of 2019.2007 to 2023 (as amended).
    - Waste Management Acts 1996 (Revised 1st July 2023).- 2011.
- Prior to the commencement of the Project, the Resource and Waste Manager (RWM) shall identify a permitted Waste Contractor(s) who shall be engaged to collect and dispose of all inert and hazardous wastes arising from the project works.
- The RWM shall maintain copies of all Waste Collection Permits and copies of the Waste Facility Permit or Waste Licence to which waste materials are exported to. The RWM shall ensure that all Permits/Licences are within date.
- All waste soils prior to being exported off-site, shall be classified as inert, non-hazardous or hazardous in accordance with the EPA (2018) Waste Classification Guidance – List of Waste & Determining if Waste is Hazardous or Non-Hazardous document to ensure that the waste material is transferred by an appropriately

Resource Management

Resources shall be managed to reduce the volume of waste material generated and to increase opportunities to re-use and recycle materials at the site as follows:

- Demolition waste shall be segregated to allow the recovery, recycling and re-use of waste streams to be conducted.
- Bricks that are suitable for re-use may be re-used on-site for the construction of decorative features.
- Materials shall be ordered on an “as needed” basis to prevent over supply and preventing damage to bulk orders stored on-site.
- Materials shall be stored and handled in a manner that minimises the generation of damaged materials
- Materials shall be ordered in appropriate sequence to minimise materials stored on site
- All staff and Sub contractors shall be advised through inductions and tool box talks on how to dispose of their waste correctly on-site.

- Broken concrete blocks and excess aggregate materials shall be segregated and stored off-site for use as hard standing material on future projects. This will result in the following positive impacts:
  - Reduction in the requirement for virgin aggregate materials from quarries
  - Reduction in energy required to extract, process and transport virgin aggregates
  - Reduced HGV movements associated with the delivery of imported aggregates to the site
  - Reduction in the amount of landfill space required to accept C&D waste
- Excess wood will be segregated in separate skips and sent for recycling.
- Plastic arising from general waste or packaging will be segregated and stored in separate skips.
- Metals waste shall be stored in dedicated skips
- Any hazardous material (e.g., unknown hotspot, underground tanks) discovered during the course of the construction phase shall be isolated and the removal of contaminated materials shall be managed by the sites Resource and Waste Manager.

Operational Phase

In order to ensure that the office development is designed and operated to maximise the opportunities for maximising recycling waste streams and minimising the generation of unrecyclable mixed waste streams, the following key design aspects shall be implemented.

- All Tenants of the development shall be provided with training by the Facility Management Company on how the wastes that they produce shall be managed in accordance with the OWMP.
- All Tenants of the development shall be provided with information by the Facility Management Company on the segregation of waste at source and how to reduce the generation of un- segregated wastes.
- All Canteens / Kitchenettes shall include 4-bin waste system to facilitate the segregation of waste at source for

  Organic compostable waste
  Dry recyclable waste
  Non-recyclable mixed waste
  Glass

- Each floor will contain an interim Waste Storage Area in which Tenants of that floor will deposit their waste types into the 7-bin system.

  Organic compostable waste
  Dry recyclable waste
  Non-recyclable mixed waste
  Glass
  WEEE

- The Facility Management Company shall transfer the contents of the intermediate waste bins to the buildings Waste Management Area.

Monitoring

Construction Phase

The Resource and Waste Manager (RWM) will maintain a written record of all quantities and types of construction wastes generated, reused / recycled and exported off-site during the construction phase.
The following information shall be recorded for each load of waste exported off-site:

- Waste Type EWC Code and description.
- Volume of waste collected.

- Waste collection contractor's Waste Collection Permit Number and collection receipt including vehicle registration number.
- Destination of waste load including Waste Permit / Licence number of facility.
- Description of how waste at facility shall be treated i.e. disposal / recovery / export

Construction Phase Waste Auditing

In order to ensure that construction wastes generated during the course of the development are being effectively managed and recorded, a waste management audit shall be conducted on a routine basis to determine compliance with the RWMP.

The effectiveness of a Resource and Waste Management Plan and its implementation, will be subject to quarterly audits by the RWM throughout the duration of the construction phase.

Audits will focus on materials inputs to the project and the waste outputs identifying:

Resources

- How resource management was integrated into the design of project buildings and areas
- Re-use, recycling of existing on-site materials prior to development including soils, buildings, structures.
- Re-using surplus materials from previous development projects e.g. office cabins, fencing, aggregates, concrete products.
- Additional opportunities for future resource management.

Waste

The audits will also investigate the operational factors and management policies that contribute to the generation of waste and identify appropriate corrective actions, where necessary.

- Performance targets will be developed, e.g. an 85% overall recycling target, successes and failures will be recorded and Action Plans will be developed to address any issue which arise.
- Inspections of the waste storage areas will be undertaken and recorded on a weekly basis, issues relating to housekeeping, inappropriate storage and segregation of wastes.
- The RWM will record the findings of the audits, including types and quantities of waste arising, final treatments and costs, in a quarterly audit report.
- The Final Waste Audit will examine the manner of how resources were managed and how and where the waste was produced and how waste generation can be reduced in future projects.

Operational Phase

The Facility Management Company shall prepare an annual report for the Local Authority and Tenants of the development on the quantities of waste generated within the development to demonstrate how waste reduction and recycling targets are being achieved with regard to the targets defined in the National Waste Management Plan for a Circular Economy 2024-2030.

15.3.10 Material Assets - Utilities

Construction Phase

No significant impacts are expected from the construction or operation of the proposed development. However, to minimize impacts as much as possible, the following mitigation measures will be implemented during the construction phase:

- The precise locations of all existing on-site services (both underground and overhead, where applicable) will be confirmed, such as through the use of slit trenches in key areas, before the commencement of on-site works.

- In planning and carrying out the proposed works, careful consideration will be given to the Gas Networks Ireland (GNI) Guidelines for Designers and Builders - Industrial and Commercial (Non-Domestic) Sites (2018), as well as the Health & Safety Authority (HSA) Code of Practice for Avoiding Danger from Underground Services (2016).

- All necessary precautions will be taken to prevent any unplanned disruptions to services or utilities during the proposed works.
- Consultation with all relevant service providers will be conducted prior to the commencement of works, ensuring that all activities are carried out in accordance with the applicable standards and safely.
- An interface will be established between the contractor and the relevant utility service providers/authorities during the construction phase of the proposed development. This interface will be carefully managed to ensure a smooth construction schedule with little to no disruption to the local residential and business community.
- All new infrastructure will be installed in compliance with the relevant standards, guidelines, and codes of practice.
- All mitigation measures related to site access/egress and construction traffic management, as outlined in Chapter 12 of this EIAR (Traffic & Transportation) and in the finalized Construction Traffic Management Plan, which will be developed by the contractor in agreement with DCC, as specified in the outline Construction Management Plan (submitted separately as part of the planning application), shall be fully implemented by the site contractors.
- Before the operational phase of the proposed development, utility infrastructure connections will be tested by a qualified professional using an approved methodology, as authorized by the relevant service provider and under the supervision of DCC. The water supply for the proposed development will be tested to the satisfaction of DCC and Irish Water before being connected to the public potable water system.
- The successful contractor will ensure that the drainage and water supply networks remain clear of materials that could reduce capacity or cause blockages. Regular visual inspections will be conducted to maintain this condition.

Operational Phase

No significant impacts are expected from the construction or operation of the proposed development. However, to minimize impacts as much as possible, any required maintenance or upgrades of on-site utilities infrastructure during the operational phase will be conducted in accordance with the specifications of the relevant service providers and will be facilitated by the estate manager.

The proposed development includes intrinsic design elements that will reduce its demand for potable water. These include low water usage sanitary appliances and the collection of rainwater for landscaping and maintenance purposes. Water meters shall be fitted to Uisce Éireann specifications, to permit monitoring of potable water consumption.

The use of low-water-usage sanitary appliances, as previously described, will reduce the volume of foul effluent generated during the operational phase of the development. To enhance the quality of the effluent discharged into the public foul drainage system, incidental runoff from underground basement car park areas, internal waste storage areas, and compactor units will be routed through grit/oil separators before being discharged from the development.

Monitoring

The proposed development does not require specific monitoring or reinstatement measures with respect to the material assets discussed in this chapter.

15.3.11 Landscape

Construction Phase

According to industry best practice, the applicant has developed a Construction Management Plan, setting out the standards and procedures to be adhered to during construction, in order to manage the associated short term environmental effects.

The mitigation of potential construction effects will follow industry best practice construction standards, such as the use of appropriate hoarding. The use of measures such as high-level screening to hide the visibility of equipment above rooflines or trees is not proposed, as this can be more visually obtrusive than the equipment itself.

Site lighting would be designed to minimise light pollution on the surroundings of the site, using light sources of the minimum intensity required and ensuring that light is only use where needed.

The mitigation measures set out here are likely to have the greatest effect on areas closer to the site, where hoarding would screen views of the construction activities related to the lower elements of the proposed development. In this case, the potential effects of construction could be reduced from 'moderate to substantial and adverse' to a slight to moderate significance and adverse nature. These effects are temporary.

Unlike visual receptors, the residual effects on townscape receptors are not affected by these mitigation measures.

Operational Phase

No mitigation is required.

Monitoring

No monitoring is required.