19 Summary of Mitigation Measures

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19.1 Introduction

This chapter was prepared Brock McClure Planning Consultants. This chapter provides a summary of mitigation measures proposed in Chapters 5 to 18. The appointed contractor will be required to adhere to the mitigation contained in the EIAR for the protection of the environment and to ensure sustainable development.

19.2 Mitigation Strategies

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).

Avoidance

Avoidance is generally the fastest, cheapest and most effective form of impact mitigation. Environmental effects and consideration of alternatives have been taken into account at the earliest stage in the project design processes.

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.

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.

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).

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.

19.3 Population and Human Health

Construction Phase

A bespoke and detailed Construction Management Plan (CMP) to provide a mechanism for implementation of the construction phase mitigation measures which are described in the EIAR. The purpose of this report is to summarise the measures to be implemented during the construction phase.

All personnel will be required to implement the requirements of the CMP and shall be required to comply with all legal requirements and best practice guidance for construction sites.

Project supervisors for the construction phase will be appointed in accordance with the Health, Safety and Welfare at Work (Construction Regulations) 2013 and a Preliminary Health and Safety Plan will be formulated during the detailed design stage which will address health and safety issues from the design stages, through to the completion of the construction phases.

Adherence to the construction phase mitigation measures presented in this EIAR will ensure that the construction of the proposed development will have an imperceptible and neutral impact in terms of health and safety.

Operational Phase

The proposed development has been designed to avoid negative impacts on population and human health through;

- The inclusion of a childcare facility within the proposed development;
- Landscaping to mitigate against issues arising from microclimate conditions;
- The inclusion of a comprehensive foul and surface water management system;
- Energy efficient measures; and,
- High quality finishes and materials.

19.4 Biodiversity

Construction Phase

Non-native invasive plant species

The following mitigation measures will ensure that there will be no impacts from non-native invasive species within habitats in the local area:

•The invasive species *Hyacinthoides hispanica* and *Allium triquetrum* will be re-surveyed and marked on the ground by the site ecologist prior to the commencement of all other construction works within the lands. This will be undertaken in late spring, when the plants are in their flowering and vegetative phase and clearly identifiable above ground;

•The areas of *Hyacinthoides hispanica* and *Allium triquetrum* will be removed from all habitats within the lands. The material will be removed from site by an appropriately qualified and licenced professional with experience in treatment of invasive species. Treatment of *Hyacinthoides hispanica* and *Allium triquetrum* may be by a combination of mechanical means (i.e. removal by trowel or shovel and transport to a licensed facility for treatment) and chemical means (i.e. application of herbicide to growing material). Both species are listed on the Third Schedule of the Birds and Habitats Regulations and are considered to be high-risk species. The requirement for further treatment of both species will be determined based on ongoing monitoring of the lands following completion of initial clearance.

Water quality

The following mitigation measures will ensure there are no impacts on water quality in the immediate vicinity of the proposed development from release of hydrocarbons, polluting chemicals, sediment/silt and contaminated waters control during the construction stage of the proposed development and therefore no potential impacts on the downstream receiving water courses, *i.e.* the Carysfort-Maretimo Stream:

- Specific measures to prevent the release of sediment over baseline conditions to the existing surface water drainage network, during the construction work, which will be implemented as the need arises. These measures include, but are not limited to, the use of silt fences, silt curtains, settlement lagoons and filter materials.
- Provision of exclusion zones and barriers (e.g., silt fences) between earthworks, stockpiles and temporary surfaces to prevent sediment washing into the existing drainage systems and hence the downstream receiving water environment.
- Provision of temporary construction surface drainage and sediment control measures to be in place before earthworks commence.
- Weather conditions will be taken into account when planning construction activities to minimise risk of run-off from the site.
- Prevailing weather and environmental conditions will be taken into account prior to the pouring
 of cementitious materials for the works adjacent to any surface water drainage features, or
 drainage features connected to same. Pumped concrete will be monitored to ensure no
 accidental discharge. Mixer washings and excess concrete will not be discharged to existing
 surface water drainage systems. Concrete washout areas will be located remote any surface
 water drainage features, where feasible, to avoid accidental discharge to watercourses.
 Washing out of any concrete trucks on site will be avoided (dry brush shoots will be used
 instead).
- Any fuels of chemicals (including hydrocarbons or any polluting chemicals) will be stored in a
 designated, secure bunded area(s) to prevent any seepage of potential pollutants into the local
 surface water network. These designated areas will be clearly sign-posted and all personnel on
 site will be made aware of their locations and associated risks.

- All mobile fuel bowsers shall carry a spill kit and operatives must have spill response training. All fuel containing equipment such as portable generators shall be placed on drip trays. All fuels and chemicals required to be stored on-site will be clearly marked. Care and attention should be taken during refueling and maintenance operations. Particular attention should be paid to gradient and ground conditions, which could increase risk of discharge to waters.
- A register of all hazardous substances, which will either be used on site or expected to be present (in the form of soil and/or groundwater contamination) will be established and maintained. This register will be available at all times and shall include as a minimum:
 - Valid Safety Data Sheets;
 - Health & Safety, Environmental controls to be implemented when storing, handling,
 - using and in the event of spillage of materials;
 - Emergency response procedures/precautions for each material; and,
 - The Personal Protective Equipment (PPE) required when using the material.
 - Implementation of response measures to potential pollution incidents.
- Robust and appropriate Spill Response Plan and Environmental Emergency Plan will be prepared prior to works commencing and they will be communicated, resourced and implemented for the duration of the works. Emergency procedures/precautions and spillage kits will be available and construction staff will be trained and experienced in emergency procedures in the event of accidental fuel spillages.
- All trucks will have a built-on tarpaulin that will cover excavated material as it is being hauled offsite and wheel wash facilities will be provided at all site egress points.
- Water supplies shall be recycled for use in the wheel wash. All waters shall be drained through appropriate filter material prior to discharge from the construction sites.
- The removal of any made ground material, which may be contaminated, from the construction site and transportation to an appropriate licensed facility shall be carried out in accordance with the Waste Management Act, best practice and guidelines for same.
- A discovery procedure for contaminated material will be prepared and adopted by the appointed contractor prior to excavation works commencing on site. These documents will detail how potentially contaminated material will be dealt with during the excavation phase.
- Implementation of measures to minimise waste and ensure correct handling, storage and disposal of waste (most notably wet concrete, pile arisings and asphalt).
- All of the above measures implemented on site will be monitored throughout the duration of construction to ensure that they are working effectively, to implement maintenance measures if required and applicable, and to address any potential issues that may arise.

The aforementioned mitigation measures will also protect against potential accidental pollution events in downstream nationally designated sites, particularly South Dublin Bay pNHA.

Terrestrial Habitats

The following measures will be implemented to minimise the risk of accidental damage to hedgerows, treelines, woodland and parkland habitat (and individual trees) during the construction phase of the proposed development:

- A site ecologist will be appointed by the employer's representative to undertake an ecological clerk of works role over the construction phase of the proposed development. The site ecologist will be responsible for monitoring compliance with the proposed ecological mitigation measures. They will liaise with the site foreman and report to the local authority on a regular basis;
- All hedgerows, tree lines and areas of woodland/parkland that are scheduled for retention will be fenced-off from construction traffic using Heras fencing or similar at the outset of works and for the duration of construction to avoid damage to the trunk, branches or root systems of the trees. Temporary fencing will be erected at a sufficient distance from trees so as to enclose the Root Protection Area (RPA) of the tree (National Roads Authority, 2005-2011). In general, the RPA covers an area equivalent to a circle with a radius 12 times the stem diameter (measured at 1.5m above ground level for single stemmed trees);
- Where fencing is not feasible due to insufficient space, protection for the tree/hedgerow will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it. It will still be necessary to ensure that the area within

the RPA is not used for vehicle parking or the storage of materials (including oils and chemicals). This measure is considered secondary to fencing of retained habitats, and should only be undertaken as a last resort; and,

• Spoil materials such as rubble, topsoil, building goods and equipment, will not be placed within the RPA of trees or within 5m of hedgerows.

The aforementioned measures are included within a Woodland Management Plan that accompanies this report.

Furthermore, compensation for the loss of *c*. 173m of hedgerow and *c*. 300m of treeline is proposed via the planting of a new hedgerow on site, as outlined in section 6.9 below.

Vegetation clearance/demolition of a structure

The following mitigation measures are proposed to comply with the legal protection afforded to breeding birds and their nests under the Wildlife Acts:

• In order to avoid disturbance or harm to breeding birds, their nests, eggs and/or their unflown young, all works involving the removal of trees, hedgerows, grasslands or the demolition of the structure will be undertaken outside of the nesting season (i.e., 1 March to 31 August inclusive)

Or where this seasonal restriction cannot be observed then:

• A breeding bird survey will be undertaken by a suitably experienced ecologist in order to assess whether birds are nesting within suitable habitat affected by or immediately adjacent to the proposed works. Should nesting birds be encountered during surveys, it may be necessary to delay the removal of trees or hedgerows or the demolition of the buildings until after the nesting season (i.e., 1 March to 31 August inclusive), or until the chicks have fully fledged.

Bats: Lighting

During construction, any external lighting to be installed, including facilitating night-time working or security lighting, on the site shall be sensitive to the presence of bats in the area, downlighting, and time limited where possible. Lighting of sensitive wildlife areas and primary ecological corridors (*e.g.* Grand Canal) and light pollution in general should be avoided.

Lighting of the site during construction is designed in accordance with the following guidance:

- Guidance Notes for the Reduction of Obtrusive Light GN01 (Institute of Lighting Professionals, 2020)
- Bats & Lighting Guidance Notes for Planners, Engineers, Architects and Developers (Bat Conservation Ireland, December 2010)
- Bats and Lighting in the UK Bats and the Built Environment Series (Bat Conservation Trust UK, January 2008).

Vegetation Clearance

The following mitigation measures are proposed in relation to those trees identified as having potential to support roosting bats, and particularly those which will be removed during the construction stage. Bats could occupy suitable roosting features at any time prior to the commencement of works. Therefore, there is an inherent risk that bats could be affected by felling works. The following mitigation procedures will be followed:

- Felling of potential tree roosts will be undertaken during the periods April to May or September to October as during this period bats are capable of flight and may avoid the risks from tree felling if proper measures are undertaken, but also are neither breeding nor in hibernation
- Use of detectors alone may not be sufficient to record bat emergence and re-entry in darkness. Therefore, prior to felling of confirmed and potential tree roosts, an emergence survey using infra-red illumination and video camera(s) and bat detectors will be carried out on the night immediately preceding the felling operation to determine if bats are present
- Where it is safe and appropriate to do so for both bats and humans, such trees may be felled using heavy plant to push over the tree. In order to ensure the optimum warning for any roosting bats that may still be present, the tree will be pushed lightly two to three times, with a pause of approximately 30 seconds between each nudge to allow bats to become active. The tree should

then be pushed to the ground slowly and should remain in place until it is inspected by a bat specialist

- Trees should only be felled "in section" where the sections can be rigged to avoid sudden movements or jarring of the sections
- Where remedial works (e.g., pruning of limbs) is to be undertaken to trees deemed to be suitable for bats, the affected sections of the tree will be checked by a bat specialist (using endoscope under a separate derogation license held by that individual) for potential roost features before removal. For limbs containing potential roost features high in the tree canopy, this will necessitate the rigging and lowering of the limb to the ground (with the potential roost feature intact) for inspection by the bat specialist before it is cut up or mulched. If bats are found to be present, they will be removed by a bat specialist licensed to handle bats and released in the area in the evening following capture
- If any bat tree roots are confirmed, and will be removed by the proposed felling works, then a derogation license will be required from the NPWS, and appropriate alternative roosting sites will be provided in the form of bat boxes.

Badgers

Before works to clear any of the habitat features suitable to supporting badgers commence, checks will be undertaken of all mammal holes within the subject lands, in advance (approximately one month) of commencement of construction works. This will involve monitoring of holes by remote infra-red cameras for a period of 14 days each at minimum. This measure is proposed in order to account for potential changes to badger activity within the lands between granting of planning and commencement of construction activities. Monitoring will involve checks for signs of breeding activity at setts. This will require a licence from the NPWS permitting their filming to assess locations of activity.

Guidelines for the treatment of badgers prior to the construction of national road schemes (National Roads Authority, 2009) recommends against the use of heavy machinery within 30m of badger sett entrances, and the exclusion of light machinery (generally wheeled vehicles) from within 20m of a badger sett entrance. This is not feasible in this instance in light of the location of blocks E1 and E2, which are within 20m of the badger sett entrance. It is proposed that the northernmost of the six sett entrances, which is inactive, will be closed permanently, and that the remaining sett entrances in the lands will be closed temporarily for the duration of the construction phase of the proposed development.

The closure of sett entrances will be undertaken between July and November inclusive, in order to avoid the peak breeding season for badger (December to June), and therefore avoid the risk of disturbance or mortality of cubs. Works may proceed during the breeding season for badger following the successful closure of the sett entrances.

In order to close each set entrance, a one-way badger gate (or a similar device) will be installed at each set entrance. The gates will be soft blocked with stones after their installation and will be monitored for a 21-day period for signs of activity. Where no activity takes place, further stones or similar materials will be used to reinforce the closure of the sett entrance. The sett entrance will be monitored for activity throughout construction. The sett entrances may need to be closed several times over the duration of the project if badgers reopen the sett entrances. All sett entrances, with the exception of the northernmost sett entrance will be reopened following the completion of works by removal of badger gates.

At the landscaping stage of the proposed development, a dense planting of evergreen ground cover species such as *Luzula sylvatica* and native evergreen woodland shrubs/trees such as *llex aquifolium, Euonymus europaeus, Crataegus monogyna* and *Viburnum opulus* will be established around the badger sett entrances. The intention of this planting is to minimise the requirement maintenance machinery (*i.e.* lawnmowers) within the vicinity of sett entrances, and to provide a level of screening of them from residential dwellings. These measures are intended to reduce the levels of disturbance to badgers and their setts at the operational phase of the proposed development.

In addition, to protect individual badgers from direct harm, all open excavations on site will be covered when not in use and backfilled as soon as possible. Excavations will also be covered at night and any deep excavations left open will have appropriate egress ramps in place to allow mammals to safely exit excavations should they fall in.

Operational Stage

<u>Habitats</u>

The landscape plans (see Chapter 11) of the proposed development site will implement appropriate measures such as using plants of native origin in planting/meadows and by leaving unmanaged and/or enhanced areas for biodiversity. To offset the loss of habitats, the proposed landscape plans include the planting of a dense ground flora in the area of woodland in the vicinity of the badger setts (i.e. south of proposed blocks E1 and E2). This will involve planting of a mix of ornamental varieties of *Luzula sylvatica* and occasional specimen shrubs of *Ilex aquifolium* and other evergreen shrubs suitable for shady environments.

A one metre wide grass verge will be maintained between the edge of amenity space and treelines, hedgerows and woodland habitats. This will allow the development of edge habitat for wildlife of tall grasses and forbs. The verge will be managed through a single annual cut in August/September. No fertilisers or herbicides will be applied to the verge or in the vicinity of the verge, in order to ensure maximum species diversity. The verge will be allowed to develop naturally from the soil seedbank as opposed to being sown from imported seed.

The aforementioned measures are included within a Woodland Management Plan that accompanies this report.

<u>Bats</u>

Lighting

The lighting plans take into consideration sensitive wildlife areas (*e.g.* Rockfield Park), and are downlighting, and time limited where possible.

The following recommendations have been considered in relation to the detailed operational lighting design, and have been reviewed by a suitably qualified and experienced ecologist:

- Lighting levels should be the minimum required for health and safety requirements.
- Vertical light spill shall be minimized by the use of suitable cut off luminaires.
- No floodlighting should be used, this causes a large amount of light spillage into the sky. The spread of light should be kept below the horizontal.
- Lights should be of low intensity. It is better to use several low intensity lights than one strong light spilling light across the entire area.
- Narrow spectrum lighting should be used with a low UV component (UV filters can be used to reduce the UV component emitted by lights). Glass also helps reduce the UV component emitted by lights.
- The use of LED directional lighting (through the use of hoods, louvres, shields, or cowls) to restrict light to those areas where it is needed.
- Consideration the use of automatic sensor or dimming systems to minimise the duration and intensity of lighting on the site.

The technical details of the lighting plans for the proposed development include the following:

- Lighting will be restricted to the building perimeter, plant areas, roadways and car parking;
- All pathways will be illuminated using bollards;
- All columns will be a maximum of 5 meters high with sharp cut off luminaires, located to minimise light back spill; and,
- LED-based lighting.

These are in adherence with the guidance presented in relation to bats and lighting in Section 6.8.1.4.

19.5 Land, Soils, Geology, Hydrogeology, Utilities

Construction Stage

In order to minimise the impact of construction on the site's soils, geology and hydrogeology the following mitigation measures will be implemented:

- Contractor to implement best practice construction methods and practices complying with Building Control Act 1990 2017, building regulations 1997 2017, Safety Health and Welfare at Work Regulations 2019.
- Existing topsoil and sub-soil shall be retained on site to be used for the future development to reduce the volumes removed, to reduce the construction phase trip generation, to retain the existing natural type of topsoil from the site for the future development.
- Topsoil shall be stored in an appropriate manner on site for the duration of the constructions works and protected for re-use on completion of the main site works.
- Top-soiling and landscaping shall take place as soon as finished levels are achieved in order to reduce weathering and erosion and to retain soil properties;
- Wheel wash facilities shall be provided close to the site entrance to reduce the deposition of mud, soils and other substances on the surrounding road network;
- The construction phase shall be monitored, in particular in relation to the following:
 - Protection of topsoil stockpiled for re-use and to prevent degradation;
 - Adequate protection from contamination of soils for removal;
 - Cleanliness of adjoining road network
 - Prevention of oil and petrol spillages; and
 - Dust control
- Extent of excavation works and depths for basement and roads shall be limited through design to minimise disturbance of the original soil and subsoil formations and to retain soil structure also to reduce bulk volume excavation which is just above the rock;
- Construction traffic shall be excluded from areas of soil to be retained to reduce its degradation;
- Extent of excavation works and depths for basement and roads shall be limited through design to minimize disturbance of the original soil and subsoil formations and to retain soil structure also to reduce bulk volume excavation. This will also help to reduce the volumes of material off-site and backfill material;
- Reusable excavated gravels, sands or rock shall be retained on-site for backfilling or use in landscaped areas or drainage purposes to reduce the total volume of imported material;
- Any soil/subsoil that is deemed to be contaminated will be stored separately to the clean and inert soil/subsoil. The material will be appropriately tested and classified as either nonhazardous or hazardous in accordance with the EPA publication 'Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous' using the HazWasteOnline application (or similar approved classification method). The material will then need to be classified as clean, inert, non-hazardous or hazardous in accordance with the EC Council Decision 2003/33/EC.
- The appointed waste contractor will collect and transfer the unsuitable material and waste material as receptacles are filled. Any waste removed off-site will be carried by contractors licensed under the Waste Management Acts 1996 2008, the Waste Management (Collection Permit) Regulations 2007(as amended) and Amendments and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended).
- Oil and fuel stored on site for construction shall be stored in designated areas within the site compound which shall be located in the open space immediately to the south west of St Catherine's House. The oil and fuel storage tanks shall be proprietary self-bunded tanks.
- Refuelling of construction machinery shall be undertaken in designated areas located away from surface water drainage in order to minimise potential contamination impacts on remaining soils, geology and hydrogeology. Spill kits shall be kept in these areas in the event of spillages;

- Pouring of concrete including wash down and washout of concrete from delivery vehicles to shall be controlled in an appropriate facility located within the site compound which will be located in the open space immediately south west of St Catherine's House.
- Surface water runoff during the construction works that may become contaminated with silt or other materials shall be treated/separated in a silt trap before disposal: and
- Surplus subsoil from excavations shall be properly stockpiled when being re-used or else taken off-site.
- Water Supply

Appropriate construction methodology as outlined in Irish Water – Code of Practice for Water Infrastructure (IW-CDS-5020-03) which is available to download at www.water.ie/iw-documents/connections/Water-Code-of-Practice.pdf will be employed to ensure against contamination risk of the local water supply and all watermain connection works shall be carried out by the Irish Water accredited regional contractor.

To avoid contamination of the local water supply and leaks in the system, all watermains shall be tested in accordance with Irish Water Code of Practice for Water Infrastructure.

Wastewater Drainage

To prevent the potential ingress of ground water, all new sewers shall be tested and surveyed and, where necessary, repaired in accordance with Irish Water Code of Practice for Wastewater prior to connection to the public system.

Any leakage from foul sewers shall be cordoned off and contaminated effluent and soil collect and disposed of by a licenced contractor.

The connection of the new foul sewer to the public combined sewer network shall be carried out by the Irish Water Regional Contractor.

Surface Water Drainage

Temporary dewatering measures shall only be employed where necessary and shall discharge to the surface sewer network only, to prevent untreated ground water discharge to the surface sewer system during construction of the basement, an on-site treatment system / silt trap shall be used to treat ground water as necessary to meet Irish Water or Dublin City Council temporary discharge licence

To prevent the potential ingress of ground water, all new sewers shall be tested and surveyed and, where necessary, repaired in accordance with the Greater Dublin Area Regional Code of Practice for Drainage Works prior to connection to the public surface water system

Road sweeping facilities shall be provided during the construction phase on a daily basis or more frequently if required.

All oils/diesel stored on site for construction equipment shall be located within the site compound which will be located in the green area immediately south west of St Catherine's House. The oil and fuel storage tanks shall be proprietary self bunded tanks.

<u>Gas Supply</u>

The locations of the gas network infrastructure is shown on JJ Campbell and Associates Existing Site Plan Drawing C1, location for the Gas infrastructure within the site was taken from Gas Networks records and a GPR survey by Murphy Surveys, to help mitigate the risk of a gas main hit before construction starts. Prior to excavation, additional site investigations, including slit trenches, shall be carried out as a mitigation, in order to determine the exact location of the gas network in close proximity to the works area. This will ensure that the underground gas network will not be damaged during the construction phase.

The following measures will be put in place to ensure that there are no interruptions to existing services and all services and utilities are maintained, unless agreed in advance with Gas Networks Ireland (GNI).

All works in the vicinity of GNI infrastructure will be carried out in ongoing consultation with GNI and will be in compliance with all requirements GNI has, including procedures to ensure safe working practices are implemented when working near live gas mains.

<u>Telecommunication</u>

The locations of the telecommunication network infrastructure is shown on JJ Campbell and Associates Existing Services Drawing C1, location of the telecommunication infrastructure within the site was taken from the by Murphy Surveys Utility Survey drawings which will help mitigate the risk of a telecommunications cable hit before construction starts. Prior to excavation additional site investigations, including slit trenches, shall be carried out in order to determine the exact location of the telecommunications network in close proximity to the works area. This will ensure that the underground telecommunications network will not be damaged during the construction phase.

The following measures will be put in place to ensure that there are no interruptions to existing services and all services and utilities are maintained unless agreed in advance with the relevant telecommunication provider.

All works in the vicinity of the telecommunications providers' infrastructure will be carried out in ongoing consultation with the relevant provider and will be in compliance with all relevant requirements or guidelines.

Where new services are required, application shall be made to the relevant provider for a connection permit where appropriate and will adhere to their requirements to ensure safety of installation.

It is considered that any likely impacts to overhead cables in the vicinity will be mitigated by.

• <u>Electricity</u>

The locations of the high and low voltage ESB infrastructure is shown on JJ Campbell and Associates Existing Services Drawing C1, location of the telecommunication infrastructure within the site was taken from the by Murphy Surveys Utility Survey drawings which will mitigate the risk of damage to the electricity infrastructure before construction starts. Prior to excavation the Contractor will carry out additional site investigation, including slit trenches, in order to determine the exact location of the electricity network in close proximity to the works area. This will ensure that the underground electricity network will not be damaged during the construction phase

The Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and all services and utilities are maintained unless this has been agreed in advance with ESB Networks.

All works in the vicinity of ESB Networks infrastructure will be carried out in ongoing consultation with ESB Networks and will be in compliance with any requirements or guidelines they may have including procedures to ensure safe working practices are implemented when working near live overhead/underground electrical lines.

Operational Stage

In order to minimise the impact of the development's operational phase on the site's soils, geology and hydrogeology, the following mitigation measures should be implemented:

All waste generated by the everyday operation of the development should be securely stored within designated collection areas with positive drainage collection systems to collect potential run off. Operational waste should be removed from site using licensed waste management contractors; A project specific OWMP has been prepared and is included in Chapter 13, Waste Management.

The Operator / Buildings Manager of the Site during the operational phase will be responsible for ensuring – allocating personnel and resources, as needed – the ongoing implementation of the OWMP, ensuring a high level of recycling, reuse, and recovery at the Site of the proposed Development.

In addition, the following mitigation measures will be implemented:

The Operator / Buildings Manager will ensure 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); and

Abandoned bicycles.

The Operator / Buildings Manager will ensure that 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;

The Operator / Buildings Manager will ensure that all waste collected from the Site of the proposed Development will be reused, recycled, or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available; and

The Operator / Buildings Manager will ensure that all waste leaving the Site will be transported by suitable permitted contractors and taken to suitably registered, permitted, or licensed facilities.

The effective implementation of these mitigation measures will ensure the waste arising from the proposed development during the operational phase is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, and Regulations made thereunder, the Litter Pollution Act 1997, the EMR Waste Management Plan 2015 – 2021 and the DLRCC waste bye-laws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

- Fuel storage areas, if required, should be within secured, self bunded designated areas.
- Water Supply

A water audit will be carried out by Irish Water to ensure the construction is fully in compliance with Irish Water Code of Practice and standard details prior to taking in charge. The site watermain system will be metered as directed by Irish Water to facilitate detection of leakage and prevent ongoing water loss.

Wastewater Drainage

A wastewater audit will be carried out by Irish Water to ensure the construction is fully in compliance with Irish Water Code of Practice and standard details prior to taking in charge. Areas to remain in the charge of the applicant (private side drainage) will be maintained on a scheduled basis as part of the building management plan.

• <u>Surface Water Drainage</u>

The development has been designed in accordance with Dublin City Council Drainage Department's guidelines for planning applications, the recommendations of the Greater Dublin Regional Drainage Study (GDSDS) and Ciria Guide C753 – The SUDS Manual, to incorporate best practice Sustainable Drainage Systems. Sustainable Drainage Systems are a collection of water management practices that aim to align modern drainage systems with natural water processes. Integration of SuDS make urban drainage systems more

compatible with components of the natural water cycle such as storm surge overflows, soil percolation, and bio-filtration, mitigating the effect human development may have on the natural water cycle, particularly surface runoff and water pollution trends.

In the context of this site, the provision of the sustainable drainage systems including, green and blue roofs to intercept, filter and attenuate surface water at roof level, tree pits to intercept, filter and attenuate surface water at grade and attenuation storage devices to limit peak discharge rates to the public surface water sewer to pre-development flows, as well as eliminate surface water discharge to the combined sewer network, will result in a significant improvement on the public drainage system, from existing conditions. This will constitute a positive, imperceptible and permanent impact.

All sustainable drainage systems will be either maintained by the applicant or, where taken in charge, by the local authority. Regular maintenance of the SuDS systems will maintain their function of treating surface water prior to discharge. This will prevent silt build-up and other contaminant discharge to the surface water network. Regular maintenance of the attenuation storage and flow control device will maintain controlled discharge of stormwater in rainfall events and prevent inundation of the surface water system.

Gas Supply

The gas demands during the operational phase on the existing gas network are considered to be low due to the NZEB energy efficient design, thermal performance of the buildings and the use of renewable technology to reduce the heating demand. The apartment heating system is proposed to be exhaust air heat pump which does not require gas. The gas demand will be in the form of the ground floor retail units and it is predicted that this gas demand will be small.

<u>Telecommunication</u>

The design and construction of the required Telecommunication services infrastructure in accordance with the relevant guidelines and codes of practice will mitigate any potential service outage impacts during the operational phase of the development, with the exception of any routine maintenance of the site services.

<u>Electricity</u>

The power demands during the operational phase on the existing electricity network are considered to be imperceptible due to the energy efficient design including LED lighting, high performance heating equipment.

The design and construction of the required electrical services infrastructure in accordance with the relevant guidelines and codes of practice will mitigate any potential impacts during the operational phase of the development, with the exception of any routine maintenance of the site services.

The likely impact from the operational phase on the electricity supply network is likely, of long term and positive effect as key infrastructure is provided to the neighbourhood.

The indirect impact will allow ESB Networks to provide additional resilience in their network through the provision of new Sub-Stations (Assuming agreement with ESB Networks) which in turn should have a slight permanent impact of positive effect on the wider area's electrical infrastructure.

19.6 Hydrology

Construction Phase Mitigation Measures

To minimise the impact of the construction phase on the water environment mitigation measures should be implemented. These include the following:

- Implement best practice construction methods and practices complying with the relevant legislation
- The construction phase should be monitored, in particular in relation to the following:
 - Management of run-off from the site including pumping/dewatering
 - Adequate protection measures implemented to prevent contamination of run-off prior to discharge
 - Prevention of oil and petrol spillages
- Oil and fuel stored on site for construction should be stored in designated areas. These areas shall be bunded and should be located away from surface water drainage
- Refuelling of construction machinery shall be undertaken in designated areas located away from surface water drainage in order to minimise potential contamination impacts on the water environment. Spill kits shall be kept in these areas in the event of spillages
- Pouring of concrete including wash down and washout of concrete from delivery vehicles to be controlled in an appropriate facility to prevent contaminating run-off and groundwater
- Surface water runoff during the construction works that may become contaminated with slit or other materials to be treated/separated before disposal
- Dewatering measures should only be employed where necessary
- Basement excavations should be kept to a minimum to reduce impacts to the groundwater
- In the event of groundwater being encountered during the construction phase, mitigation measures will include dewatering by pumping to an appropriate treatment facility prior to discharge. Other measures would include excluding contaminating materials such as fuels and hydrocarbons from sensitive parts of the site i.e. highly vulnerable groundwater areas
- Surface water collecting in excavations should be directed to on-site settlement ponds, where silt removal will be facilitated prior to discharge to further reduce the possibility of contaminants entering the local water system. Periodic testing of the surface water of contaminants entering the local water system. Periodic testing of the surface water discharge may also be undertaken where required
- Any hazardous construction materials shall be stored appropriately to prevent contaminating run-off or groundwater
- The extent of sub-soil and top-soil stripping to be minimised to reduce the rate and volume of the run-off during construction until the topsoil and vegetation are replaced
- Removal of existing long-term flood storage above ground and part replacement with managed storage in tanks and tank sewers to provide the same quantum of flood storage volume at 30 year and 100 year return events

Operational Phase Mitigation Measures

To minimise the impact of the development's operational phase on the water environment, the following mitigation measures should be implemented:

- Surface water system shall incorporate SuDS and designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS) to reduce impact of the development on the existing environment
- Surface water discharge rates should be limited to existing Green-field run-off rates to prevent increased flood risk
- Water conservation methods such as the use of low flush toilets and grey water reuse should be incorporated into the development to reduce water resource volumes and related treatment
- A regular maintenance and inspection programme of the flow control devices, attenuation storage facilities, gullies and petrol interceptor will be required during the Operational Phase ensure the proper working of the development's networks and discharges

- All waste generated by the everyday operation of the development should be securely stored within designated collection areas with positive drainage collection systems to collect potential run off. Operational waste should be removed from site using licensed waste management contractors
- Foul effluent to be collected and discharged from the site via properly constructed sewers to the public foul sewer system
- Surface water run-off from the development to be collected by an appropriately designed system with contaminants removed prior to discharge e.g. via a light liquids separator
- Collection networks should be regularly monitored, maintained and services within the context of an overall development and environmental management plan
- Fuel storage areas, if required, should be within secured, bunded designated areas

19.7 Noise & vibration

Mitigation measures for the construction phase are set out below in order to reduce potential impacts as far as practicable to within the adopted criteria for noise and vibration.

Construction Phase - Noise

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;
- noise control at source;
- screening;
- liaison with the public, and;
- monitoring.

Detailed 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 and vibration monitoring, where required.

Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. 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 should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

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. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

Referring to the potential noise generating sources for the works under consideration, the following best practice migration measures should be considered:

- Where practical, site compounds will be located in excess of 30m from noise sensitive receptors within the site constraints. The use lifting bulky items, dropping and loading of materials within these areas should be restricted to normal working hours.
- For mobile plant items such as 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 should be switched off when not in use and not left idling.
- For concrete mixers, control measures should be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- Demountable enclosures can also be used to screen operatives using hand tools and will be moved around site as necessary.
- All items of plant should 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

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Construction site hoarding will be constructed around the site boundaries as standard. The hoarding will be constructed of a material with a mass per unit of surface area greater than 7 kg/m^2 to provide adequate sound insulation.

In addition, careful planning of the site layout will also be considered. The placement of site buildings such as offices and stores will be used, where feasible, to provide noise screening when placed between the source and the receiver.

Liaison with the Public

A designated environmental liaison officer will be appointed to site during construction works. Any noise complaints should be logged and followed up in a prompt fashion by the liaison officer. In addition, where a particularly noisy construction activity is planned or other works with the potential to generate high levels of noise, or where noisy works are expected to operate outside of normal working hours etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

Monitoring

Where required, construction noise monitoring will be undertaken at periodic sample periods at the nearest noise sensitive locations to the development works to check compliance with the construction noise criterion.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

Project Programme

The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. During excavation/ demolition or other high noise generating works are in progress on a site at the same time as other works of construction that themselves may generate significant noise and vibration, the working programme will be phased so as to prevent unacceptable disturbance at any time.

Construction Phase – Vibration

The vibration from construction activities will be limited to the values set out in Section 9.2. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Limit values have been provided for soundly constructed residential and commercial properties.

Operational Phase – Noise

Additional Traffic on Adjacent Roads

During the operational phase of the development, noise mitigation measures with respect to the outward impact of traffic from the development are not deemed necessary.

Mechanical Services Plant

Taking into account that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria is achieved within the development it is expected that there will be no negative impact at sensitive receivers off site, and therefore no further mitigation required.

Inward Noise

In this instance, the facades highlighted in Chapter 8, Figure 8.7 will be provided with glazing and ventilation that achieves the minimum sound insulation performances as set out in Table 0-1 and Table 0-2. Other facades in the development have no minimum requirement for sound insulation.

Markun	Octave Band Centre Frequency (Hz)						
iviark-up	125	250	500	1000	2000	4000	ĸw
RED	20	19	29	38	36	45	33

Table 0-1: Sound Insulation Performance Requirements for Glazing, SRI (dB)

The overall R_w and $D_{ne,w}$ outlined in this section are provided for information purposes only. The over-riding 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 Chapter 9, Table 0-1 and Table 0-2 or greater.

The following performance requirements apply to all ventilation paths from outside the building. This can be achieved by passive acoustic wall or window vents or via mechanical ventilation systems.

Ventilators in the facades of dual aspect living/dining spaces in areas designated 'red' should provide increased performance as outlined below.

Mark-up Octave Band Centre Frequency (Hz)							
	125	250	500	1000	2000	4000	D _{n,e,w}
RED	22	24	30	36	33	38	33

Table 0-2: Sound Insulation Performance Requirements for Ventilation, D_{n,e,w} (dB)

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing and ventilation systems. In the context of the

acoustic performance specification the 'glazing system' is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

The assessment has demonstrated that the recommended internal noise criteria can be achieved through consideration of the proposed façade elements at the design stage. The calculated glazing and ventilation specifications are preliminary and are intended to form the basis for noise mitigation at the detailed design stage. Consequently, these may be subject to change as the project progresses.

Vibration

No vibration mitigation measures are required applicable the operational phase.

19.8 Air Quality and Climate

Construction Phase

Air Quality

The proactive control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. The measures for controlling fugitive dust, and the manner in which they are to be implemented, have been set out in the Dust Management Plan which can be found in Appendix 9.2. These measures will be incorporated into the Construction Environmental Management Plan (CEMP) prepared for the site.

In summary the measures which will be implemented include:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.
- 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 especially soil, 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.

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.

Climate

Construction stage traffic and embodied energy of construction materials are expected to be the dominant source of greenhouse gas emissions as a result of the construction phase of the development. Construction vehicles, generators etc., may give rise to some CO₂ and N₂O emissions. However, due to short-term nature of these works, the impact on climate will not be significant.

Nevertheless, some site-specific mitigation measures will be implemented during the construction phase of the proposed development to ensure emissions are reduced further. In particular the prevention of on-site or delivery vehicles from leaving engines idling, even over short periods. Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site

19.9 Wind and Microclimate

Construction Phase

The effects on wind microclimate at the Site during the construction phase have been assessed using professional judgement.

As construction of the Proposed Development progresses the wind conditions at the site would gradually adjust to those of the completed development, and mitigation measures would need to be implemented before completion and operation.

Operational Phase

As stated above, if the wind conditions exceed the threshold, these conditions become unacceptable for favourable pedestrian activities and mitigation measure should be accounted for.

Mitigation measures include:

- Landscaping: the use of vegetation to protect buildings from wind
- Sculptural screening (solid or porous): to either deflect the wind or bleed the wind by removing its energy.
- Canopies and Wind gutters: horizontal canopies are used to deflect the wind and redirect the wind around the building and above the canopy.

In particular, it is possible to summarise the different flow features and the corresponding mitigation option as follows (Figures 19.1 and 19.2):

- **Downwash Effects:** when wind hits the windward face of a tall building, the building tends to deflect the wind downwards, causing accelerated wind speeds at pedestrian level and around the windward corners of the building. This can occur when Tall and wide building facades face the prevailing winds.
- **Downdraft Effects:** When the leeward face of a low building faces the windward face of a tall building, it causes an increase in the downward flow of wind on the windward face of the tall building. This results in accelerated winds at pedestrian level in the space between the two buildings and around the windward corners of the tall building.

Mitigation Options:

- To mitigate unwanted wind effects, it is recommended to introduce a base building or podium with a step back and setting back a tower relative to the base building, the downward wind flow can be deflected, resulting in reduced wind speed at pedestrian level.
- Landscaping the base building roof and tower step back, wind speeds at grade can be further reduced, and wind conditions on the base building roof can improve.



Figure 19.1 Mitigation Measures for Downwash and Downdraft Effects

• **Funnelling Effects:** Wind speed is accelerated when wind is funnelled between two buildings. This is referred to as the "wind canyon effect". The intensity of the acceleration is influenced by the building heights, size of the facades, building separation distance and building orientation. Similar effect can be noticed when a bridge is connecting two buildings, the wind passing below the bridge is accelerated, therefore pedestrians can experience high uncomfortable velocities of wind.

Mitigation Options:

- A horizontal canopy on the windward face of a base building can improve pedestrian level wind conditions. Parapet walls around a canopy can make the canopy more effective.
- Sloped canopies only provide partial deflection of downward wind flow.
- A colonnade on the windward face of the base building provides the pedestrian with a calm area where to walk while being protected or a breeze walking space outside the colonnade zone.



Figure 19.2 Mitigation Measures for Funnelling Effects

19.10 Landscape and Visual Impact Assessment

Construction Stage

See Construction Management Plan

Operational Stage

No mitigation measures are proposed. However, it should be noted that, while the landscaping proposed as part of this application will, of itself, result in changes in the visual environment, many would consider boundary and other hard and soft landscaping works to result in positive changes and to have a mitigating effect on the visual impact of new development.

19.11 Material Assets – Traffic and Transport

Construction Phase

The CTMP appended to this EIAR includes a description of the proposed works and how these works will be managed for the duration of the demolition and construction works on site. The CTMP includes proposed details for access arrangements for labour, plant and materials and indicates the locations of construction parking/plant and machine compounds. A final CTMP shall be prepared, together with detailed method statements, having regard to any relevant planning conditions.

The proposed works on the public road (e.g. for services connections) will require an application for a Road Opening Licence to the Local Authority.

Construction vehicle movements will be minimised through:

- Consolidation of delivery loads to/from the site and managing larger deliveries to occur outside peak traffic periods,
- Use of precast/prefabricated materials, where possible,
- Adequate storage space on site will be provided with no impact on public streets or areas,
- Adherence to best practice mobility management measures for the site staff to encourage access to the site by means other than the private car.

Operational Phase

No mitigation is proposed for the operational phase of the proposed development as it is predicted to have a not significant impact on the operation of the local roads.

19.12 Material Assets – Waste Management

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

Construction Stage

The following mitigation measures will be implemented during the construction phase of the proposed Development:

As previously stated, a project specific C&D WMP has been prepared in line with the requirements of the Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects (DoEHLG, 2006), and is included as Appendix 13.1. 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 phases of the proposed Development.

- Prior to commencement, the appointed Contractor(s) will be required to refine / update the C&D WMP (Appendix 13.1) in agreement with DLRCC or submit an addendum to the C&D WMP to DLRCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream.
- The Contractor will be required to fully implement the C&D WMP throughout the duration of the proposed construction and demolition phases.

A quantity of topsoil, sub soil, clay and made ground will need to be excavated to facilitate the proposed Development. The Project Engineers have estimated that all or most of the c. 45,000 m³ of excavated material will need to be removed off-site, with only 1,500m³ of topsoil remaining onsite for reuse in landscaping. 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 offsite reuse, recycling, and recovery. The following waste types, at a minimum, will be segregated:
 - Concrete rubble (including ceramics, tiles, and bricks);
 - Plasterboard;
 - Metals;
 - Glass; and
 - \circ 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, excavation 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 suitably permitted contractors and taken to suitably registered, permitted, or licenced facilities; and
- 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 construction phase of the proposed 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, and the *EMR Waste Management Plan 2015 – 2021*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

Operational Stage

As previously stated, a project specific OWMP has been prepared and is included as Appendix 13.2.

 The Operator / Buildings Manager of the Site during the operational phase will be responsible for ensuring – allocating personnel and resources, as needed – the ongoing implementation of this OWMP, ensuring a high level of recycling, reuse, and recovery at the Site of the proposed Development.

In addition, the following mitigation measures will be implemented:

- The Operator / Buildings Manager will ensure 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); and
 - Abandoned bicycles.
- The Operator / Buildings Manager will ensure that 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;
- The Operator / Buildings Manager will ensure that all waste collected from the Site of the proposed Development will be reused, recycled, or recovered, where possible, with the

exception of those waste streams where appropriate facilities are currently not available; and

• The Operator / Buildings Manager will ensure that 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 proposed Development during the operational phase 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 DLRCC waste byelaws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

19.13 Archaeological and Cultural Heritage

Construction Phase

Archaeological strata or deposits may become evident over the ground-reduction phase of development and it is considered best practice to undertake pre-construction investigations. These can take the form of geophysical investigations or archaeological test excavation, both undertaken under licence from the National Monuments Service. In this particular instance the presence of underlying granite bedrock would render geophysical exploration ineffectual; test trenching would therefore be the most obvious measure to be taken to investigate the extent and nature of any surviving archaeological substrates.

Should there survive archaeological material that will be directly impacted upon by the proposed development, there is usually further negotiation with the planning authority and the National Monuments Service regarding its preservation, either *in situ* or by record. Should there be significant archaeological material present which requires hand excavation, a full report should issue as part of the licencing conditions and form part of the compliance documentation.

Where there is no archaeological material evident over the test trenching phase, it may be prudent to undertake a programme of licenced monitoring over the ground reduction programme until the level of undisturbed deposits is reached. This will serve to ensure that no archaeological strata or structures are impacted on by the proposed development.

Should significant archaeological deposits or structures be disturbed over the initial groundworks, all work will stop and the opposite authorities informed. With the agreement of the NMS all archaeological features will be fully recorded in accordance with the former DoEHLG's *Policy and Guidelines on Archaeological Excavation*. All finds identified shall be fully documented and all appropriate material retrieved for off-site analysis, storage, curation and conservation in accordance with NMI guidelines. The finds and any environmental samples taken will be stored in the offices of ABH.

On completion of the archaeological monitoring, a report will be prepared for submission to the opposite authorities for further consultation. A summary account of the excavation will be published in the *Excavations* bulletin.

The site archive will be compiled in accordance with the procedures outlined by the NMS and deposited in the Dublin City Archaeological Archive as soon as practicable after the final report has been submitted.

Operational Phase

There are no mitigation measures required.

19.14 Architectural and Built Heritage

Construction Stage

The conservation methodology for the describes in detail the measures to be taken to minimise the loss of or damage to historic fabric which contributes to the special interest of the Structures. The methodology in relation to the Gatelodge is as follows **Detailed Method Statement**

Conservation Method Statement for the Dismantling and Reconstruction of the

Gate-lodge at St Teresa's House, Temple Hill, Monkstown, Blackrock, Co Dublin.

Description of building

The building is a single storey double-fronted lodge, open pedimented breakfront, one over one windows with granite cills and lugged architraves, granite plinth and rendered quoins. It has a hipped roof with central chimney with granite capping and plinth and double console eaves brackets. A room by room description is attached. J.A.K. Dean¹ describes it as being Italianate in style and of a pattern common in south Dublin, referring to similar examples in Newtownpark, Homestead and Tirbradden.



Lodge at St Teresa's House

Proposed works

It is proposed to deconstruct the building and reconstruct it in a different location within the original curtilage of St Teresa's House, as indicated on the planning drawings, salvaging and re-using as much of the historic fabric as possible, while substituting later non-original fabric of inferior specification with new materials matching the likely original specification. The later lean-to extension to the rear (north-west) side of the building would be omitted. As the opportunity arises to bring the building into line with modern design standards, notably those relating to disabled access, resistance to moisture and thermal insulation it is proposed that slight alterations would be made to the construction methods, as detailed below. The deconstruction and reconstruction would take place under the supervision of an architect experienced in architectural conservation.

The works will be carried out with due regard to the Architectural Heritage Protection: Guidelines for Planning Authorities², and the Conservation Charters of ICOMOS³. Account will be taken of the Royal Institute of the Architects of Ireland Guidelines, and international and national best practice.

¹ J.A.K. Dean, *The Gate Lodges of Leinster, a gazetteer* (Wordwell, Dublin 2016) Rec 200.

² Architectural Heritage Protection: Guidelines for Planning Authorities

³ International Council on Monuments and Sites

In addition to the existing detailed survey and record photographs, the contractor will be required to make a full set of survey drawings and photographs, showing the details of each window and door and its constituent elements. The contractor shall be required to number all the elements of the stone walls as described below and to make a full photographic survey of the stripped masonry walls.

All dismantling and removals are to be carried out with the greatest care and with the over-riding objective of preserving in good condition as much the original fabric of the building as possible. The contractor(s) shall be responsible for ensuring that no element of the historic structure which contributes to its special interest or significance, is damaged. Work will be carried out under the constant presence of a Clerk of Works experienced in the repair of historic buildings. Where any material is found to be defective beyond re-use or repair, this shall be brought to the immediate attention of the Conservation Architect before any such material is disposed of, for which the Conservation Architects written approval is required.

A specialist building conservation contractor and specialist sub-contractors will be selected on the basis of experience and competence.

Schedule of Works

Dismantlement

Remove all mechanical and electrical services, fixtures, fitting, pipes, conduits, junction boxes, aerials or dishes.

Demolish and remove off site lean-to extension.

Carefully dismantle and remove four no. sliding sash windows, frames, shutters and shutter boxes, architraves and skirting.

Strip internal and external plaster/render and analyse composition.

Remove ceilings (note – there is no decorative plasterwork).

Remove fire surrounds and inserts.

Remove ridge and hip-tiles, clean, and store carefully.

Strip and remove off-site fibre cement slates

Undertake detailed survey of roof timbers, numbering each element.

recording extent of decay, if any and prepare roof timber drawing. Remover roof timbers, cutting out any sections affected by rot,

clean and store carefully.

Undertake detailed survey of stripped walls, including photographs, recording those areas constructed of stonework and brickwork. Take down external and internal walls, separating the material into brick, stone rubble and cut stone and carefully retaining the stone "pinnings". Clean off all mortar bedding and infill and store brick and stones carefully. Excavate floor and remove. If stone slabs found, clean and remove to storage. All material to be stored in secure dry ventilated containers on site. Revise reconstruction drawings to include any new information discovered and consult with Conservation Architect.

Reconstruction

The same main and specialist contractors would be engaged in the reconstruction as part of the same contract.

Set out in position shown on planning drawings. Excavate for foundations/drainage. Pour strip foundations Construct rising walls of concrete block Install below-ground drainage Install hardcore, insulation and radon/barrier/d.p.m./d.p.c. Construct external and internal walls and chimney breast of brick and stone as shown on finalised construction drawings. including brick arches/ hardwood lintols where appropriate Install wall plates. Construct chimney stack with prefabricated metal d.p.c. tray re-using granite plinth and capping Reconstruct timber roof of rafters, hips-rafters ridge board collar ties and ceiling joists reusing the original material. Where any rafter is decayed in less than 50% of its length it is to be retained and spliced with new timber of the same dimensions. Lay breathable roofing felt to entire roof, using UV resistant material where exposed at eaves. Set out battens and slate roof using Bangor Blue slates with copper nails Re-fix console brackets, and fascia and soffit, splicing in new material as appropriate. Lay external below ground drainage and backfill. Fit cast iron gutters and temporary rwps. Re-install granite cills and architraves, plinth and quoins. First fix mechanical and electrical services. Render external walls using lime-based render formulated to match the original, creating raised quoins and re-instating keystone above entrance door. Fit cast iron rwps. Re-fit window frames. Plaster internal walls using lime render to match original. Refit internal joinery and sashes.

Decorate.

Second fix mechanical and electrical services.

Regrade immediate site and complete hard and soft landscaping.

Specifications and standards

The specifications for the various trades area are as set out in the Detailed Method Statements for the main house and include detailed specifications for:

- 1 The re-construction of stone walls
- 2 Lime render and plaster
- 3 Repairs of windows
- 4 Natural Slating
- 5 Rainwater goods
- 6 Lead roofing

Contractor(s)' Method Statement

A dimensional and photographic survey has been carried out under the direction of the Conservation Architect.

The Contractor(s) shall prepare written statements demonstrating to the Conservation Architect how all elements of the structure shall be protected, including details of their temporary storage and transport. Materials must be protected from precipitation, extremes of temperature, sunlight and loading and must be secured against vandalism and theft. The statement shall specify how materials will be protected against accidental damage by site operatives, such as by boarding up, roping off, sheeting over, etc.

Deconstruction

A heritage contractor of proven experience will be engaged on the overall project to act as main contractor. Specialist heritage sub-contractors in the areas of lime render, brickwork, stonemasonry (dressed and rubble) and joinery would be nominated.

Inspection

Before any work commences the Contractor must carried out a detailed inspection of every element and confirm that the Method Statement is appropriate to the works. Where necessary and where required by the sequencing of opening up or dismantlement, the Method Statement must be adjusted to take account of new information. Where this occurs, the revised statement must be submitted to the Conservation Architect for his approval prior to the continuation of the works

Investigation

In order to facilitate the detailed and accurate recording of the building and its components, limited opening and up and removal of samples off site, may be permitted. This may only take place with the prior written approval of the Conservation Architect. Permission will only be forthcoming where the Conservation architect is satisfied that non-destructive or limited testing is to be carried out.

Drawings and Records

A detailed dimensional survey and photographic record has been undertaken and is available to the contractor. Supplementary drawings and record will be made as the works are opened up. The record documents must be delivered to the Conservation Architect and approved in writing before any removals take place.

Drawings

Before commencement, the Contractor is required to provide a full set of survey drawings, including detailing of every element showing its components, joints and profiles.

Schedules

Before commencement, the Contractor is required to prepare a full schedule of all elements to be removed, with each item to be provided with a reference number.

Records

Each element is to be clearly labelled before removal and cross-referenced to the record drawings. Labelling is to be carried out in such a way that the labels can be removed without damage but cannot be removed accidentally.

Photography

Each element must be photographed clearly in such a way that identifies the item and differentiates it from other, similar items, clearly shown the reference number and any distinguishing wear, damage or markings. If necessary, each item must have a number of photographs.

Protection, Damage and Repairs

Protection

The building is a Protected Structure as described in the Planning and Development Act 2000 (as amended) which states, inter alia,

58.—(1) Each owner and each occupier shall, to the extent consistent with the rights and obligations arising out of their respective interests in a protected structure or a proposed protected structure, ensure that the structure, or any element of it which contributes to its special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest, is not endangered.....

(4) Any person who, without lawful authority, causes damage to a protected structure or a proposed protected structure shall be guilty of an offence.

The over-riding objective of the Conservation Works is to retain as much of the original fabric as is practicable in-situ and to protect all such fabric from damage or loss.

The Contractor's Method Statement must address all aspects of protection to the structure and all elements of it which contribute to its special interest.

Existing historical features to be retained in-situ to be protected by the construction of plywood sheeting. This will include boxing to shutters and architraves, the fixing of sheeting to retained door faces, boxing of mantlepieces and the sheeting of window panes to the lower half of windows.

The structure must be protected from water ingress arising from openings in the external envelope. Temporary covering must be kept in place. Where other openings are formed either temporarily or permanently, they must be adequately sealed.

Storage of temporarily removed historic fabric

Fabric which is removed for alteration or repair must be stored safely in secure dry dust-free storage areas, and stacked on pallets or laid flat, as appropriate. No fabric may be permitted to have loads imposed upon it.

Scaffolding and mobile towers

Scaffolding may not be fixed directly to the protected structure. Vertical supports must be appropriately placed on bearers which spread the load and protect historic surfaces. Towers must not be place directly on historic surfaces.

New Openings

Where new openings are to be formed in existing walls, this shall be done with the minimum of damage to the fabric to be retained. The stone of brick masonry shall be neatly re-bedded to form the opening in a pattern to match that of other similar openings in the structure. Under no circumstances may shuttered concrete be used to form new openings.

Damage

All damage must be identified and recorded by the above methods before any disassembly takes place. Any damage which is not so recorded will be deemed to have been caused by the contractor or his workers or sub-contractors. Such damage must be brought to the immediate attention of the Conservation architect who may instruct that appropriate repairs are carried out without charge, or that the cost of appropriate repairs will be deducted from payments due to the Contractor under the contract

Repairs

The exact methodology of any repairs necessary which are not covered by the specification below, shall be detailed in writing and approved in writing by the Conservation Architect before any such repairs commence.

Variations

No variations to the materials or their method of assembly will be permitted without the prior written approval of the Conservation Architect.

Operational Stage

There will be no additional impact on Architectural Heritage post-completion of the works.

19.15 Daylight Sunlight

Construction Phase

Remedial measures during the construction phase in relation to daylight and sunlight access are not considered to be required.

Operational Phase

Imperceptible impact is expected in relation to daylight and sunlight access experienced by the future inhabitants of the proposed development and to the existing inhabitants of the adjacent buildings. Therefore no remedial or mitigation measures are considered to be required.

19.16 Risk of Major Accidents & Disasters

Construction Stage

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

All works on site shall comply with BS 5228 2009+ A1 2014 (Parts 1 & 2) which gives detailed guidance on the control of noise and vibration from construction activities. In general, the following mitigation measures shall be implemented during the proposed construction works:

- Avoid unnecessary revving of engines and switch off equipment when not required.
- Keep internal haul roads well maintained and avoid steep gradients.
- Minimise drop height of materials.
- Start-up plant sequentially rather than all together
- In accordance with "Best Practicable Means", plant and activities to be employed on site are reviewed to ensure that they are the quietest available for the required purpose.
- Where required, improved sound reduction methods are used e.g. enclosures.
- Site equipment is located away from noise sensitive areas, as much as physically possible.
- Regular and effective maintenance by trained personnel is carried out to reduce noise and / or vibration from plant and machinery.
- Hours will be limited during which site activities likely to create high levels of noise and vibration are carried out.
- A site representative responsible for matters relating to noise and vibration will be appointed prior to construction on site.

Site Route Measures:

Site access routes (particularly unpaved areas) can be a significant source of fugitive dust from construction sites if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25% to 80% ⁵.

- A speed restriction of 20 km/h will be applied as an effective control measure for dust for onsite vehicles or delivery vehicles within the vicinity of the site;
- Bowsers will be available during periods of dry weather throughout the construction period. Research shown found that the effect of surface watering is to reduce dust emissions by 50%. The bowser will operate during dry periods to ensure that unpaved areas are kept moist. The required application frequency will vary according to soil type, weather conditions and vehicular use; and
- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced areas shall be restricted to essential site traffic only.

Site Traffic Control Measures:

Spillage and blow-off of debris, aggregates and fine material onto public roads will be reduced to a minimum by employing the following measures:

- Vehicles delivering material with potential for dust emissions to an off-site location shall be enclosed or covered at all times to restrict the escape of dust;
- Any hard surface site roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.
- A power washing facility or wheel cleaning facility will be installed near to the site compound for use by vehicles exiting the site when appropriate, and an example of the washing equipment can be seen in insert 7.1; and
- Road sweepers will be employed to clean the site access route as required.

Noise and Vibration Measures:

External noise and vibration monitoring will be undertaken at locations on the site boundary closest to sensitive locations. Monitors may be added, removed or relocated as necessary.

Site traffic vehicle movements would be minimised through:

- Consolidation of delivery loads to/from the site and managing large deliveries on site to occur outside of peak periods.
- Use of precast/prefabricated materials where possible
- Adequate storage space on site will be provided
- A strategy will be developed by the main contractor to minimise construction material quantities as much as possible
- Site staff vehicle movements will also be minimised by offering Travel to Work Scheme benefits to encourage car sharing.

Dust Control Measures:

The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design, planning and effective control strategies. The siting of construction activities and the limiting of stockpiling will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance. In addition, good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or using effective control measures quickly before the potential for nuisance occurs.

- During working hours, technical staff will be available to monitor dust levels as appropriate; and
- At all times, the dust management procedures put in place will be strictly monitored and assessed.

The dust minimisation measures should be reviewed at regular intervals during the construction phase to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust generation. In the event of dust nuisance occurring outside the site boundary, site activities should be reviewed, and procedures implemented to rectify the problem. Specific dust control measures to be employed are presented below

Mobility Management Measures:

The contractor will be required as part of the contract to introduce a mobility management plan for its workforce to encourage access to the site by means other than by private car. The following section identifies some of the measures the contractor will provide as part of the Mobility Management Plan.

The Mobility Management Plan will form part of the Construction Management Plan and will be agreed with Dun Laoghaire Rathdown County Council prior to works beginning on site.

Walking

The contractor will ensure construction staff have ease of access to Temple Hill Road thereby providing convenient access to the public transport routes that run along same and the nearby DART line.

Cycling

Cycle parking spaces will be provided on the site for construction staff. In addition, lockers will be provided to allow cyclists store their cycling clothes.

Car Sharing

Car sharing among the construction staff will be encouraged, especially from areas where construction staff may be clustered. The contractor will aim to organise shifts in accordance to staff origins, hence enabling higher levels of car sharing. Such a measure offers a significant opportunity to reduce the proportion of construction staff driving to -site and which will minimise the potential traffic impact on the road network surrounding the site.

Public Transport

The Contractor will issue an information leaflet to all staff as part of their induction on site, highlighting the location of the various public transport services in the vicinity of the construction site.

Management of the Mobility Management Plan

To oversee and implement the Mobility Management Plan for the construction works, the following mechanisms will be put in place by the Main Contractor:

- The appointment of a Mobility Manager to implement the Plan.
- The establishment of a group (which includes the Main Contractor) to oversee the ongoing implementation of the Plan.

Operational Stage

At the operational level, a Site Engineer from the main contractor and Foreman from each subcontractor on the site shall be assigned the direct responsibility to ensure that the discrete operations stated in the Waste Management Plan are performed on an on-going basis.