

## 20 Summary of Mitigation Measures

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## 20.1 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.

## 20.2 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.

## 20.3 Population and Human Health

### Construction Stage

A bespoke and detailed Construction Management Plan (CMP) has been prepared by Waterman Moylan Engineering Consultants. The main purpose of a CMP is to provide a mechanism for implementation of the various mitigation measures which are described in chapter 20 of the EIAR. The purpose of this report is to summarise the possible impacts and measures to be implemented and to guide the Contractor who will be required to develop and implement the CMP on site.

All personnel will be required to understand and 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 Stage

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

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

### Monitoring

Measures to avoid negative impacts on Population and Human Health are largely integrated in to the design and layout of the proposed development. Compliance with the design and layout will be a condition of any permitted development.

1. Monitoring will be undertaken by the Building Regulations certification process and by the requirements of specific conditions of a planning permission.
2. Monitoring of compliance with Health & Safety requirements will be undertaken by the Project Supervisor for the Construction Process.

## 20.4 Biodiversity

### Construction Stage

#### Mitigation Measures to Prevent Water Pollution

The following measures are considered to be best practice with regards to construction and are considered appropriate in the context of general protection of biodiversity in local watercourses such as the Brewery Stream. They are not required for the protection of downstream designated sites.

Although the risk of any significant impact on water quality in any receiving waterbodies is considered to be extremely low, best practice will be implemented at all times in relation to all construction activities to avoid any accidental pollution events. This will include the following actions:

1. Hydrocarbons or any hazardous chemicals will be stored in specified bunded areas. Refuelling of plant machinery will also be carried out in bunded areas, to minimise the risk of any potential pollutants being discharged from the site.
2. Pollution control measures will be implemented to control any runoff from the site and prevent any runoff potentially contaminated with sediments or hazardous chemicals entering the drainage network.
3. Pouring of cement-based materials for works will only be carried out in dry conditions. Pumped concrete will be monitored to ensure there is no accidental discharge. Mixer washings and excess concrete will not be discharged directly into the existing drainage network. Concrete washout areas will be created to avoid any accidental discharge from the proposed development site.
4. Foul drainage from site offices and compounds, where not directed to the existing wastewater network, will be contained and disposed of off-site in an appropriate manner and in accordance with the relevant statutory regulations, to prevent any pollution to watercourses.
5. A response procedure will be put in place to deal with any accidental pollution events and spillage kits will be available and construction staff will be familiar with the emergency response procedure and use of the equipment.

#### Mitigation Measures for Bats

The following mitigation measures are proposed to ensure compliance with legislation within the Wildlife Acts 1976-2012, which protects bats and their roosts, during construction:

1. Prior to felling, trees which have been deemed suitable to support roosting bats (see PBRs on Figure 6.4) will be examined at height for the presence of bats and features which could support roosting bats. If bats are encountered, then they will be removed by hand by a suitably qualified bat ecologist under licence from NPWS and placed in a bat box for release at dusk. Trees containing potential roost features should be felled in a manner, such that features which could support roosting bats can remain intact and later be mounted onto other suitably sized trees along the perimeter to create a more natural environment for roosting bats.
2. Any trees to be felled on site should be rigged and felled in a way that is sensitive to the potential presence of bats. Trees should be section-felled, and the felled parts left in situ on the ground for a period of 24 hours. This should allow any bats present to escape or bats extracted by a licensed bat worker and placed in bat boxes to be erected on site. In addition, any trees which are to have works on their limbs carried out should be checked for the presence of bats by a suitably qualified bat ecologist prior to any works commencing.
3. If vegetation such as Ivy is to be removed from the cottages along the N11, the vegetation should be inspected by a suitably qualified bat ecologist with the aid of an endoscope, prior to removal, to check for the presence of roosting bats. If roosting bats are encountered, then works will cease and a derogation licence will need to be obtained from NPWS before vegetation removal can proceed.
4. During construction, any external lighting to be installed, including facilitating night-time working or security lighting, on the site should be sensitive to the presence of bats in the area. Lighting of the site during construction will be designed in accordance with the following guidance:
  - Guidance Notes for the Reduction of Obtrusive Light GN01 (Institute of Lighting Professionals, 2011)
  - 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).

- No floodlighting of the buildings on site will be permitted during construction.

#### Mitigation Measures for Breeding Birds

The following mitigation measures are proposed to comply with legislation protecting birds and their nests:

1. In order to avoid disturbance or harm to breeding birds, their nests, eggs and/or their unflown young, all works involving the removal of vegetation including, but not limited to, trees or hedgerows, will be undertaken outside of the nesting season (1st March to 31st August inclusive).

Or where this seasonal restriction cannot be observed then:

2. A breeding bird survey will be undertaken during the appropriate survey season (between early March and late June) by an ecologist with experience undertaking breeding bird surveys in order to assess whether birds are nesting within suitable habitat affected by or immediately adjacent to the subject lands. Should nesting birds be encountered during surveys, the removal of trees or hedgerows may be required to be delayed until after the nesting season (1st March to 31st August inclusive).

#### Mitigation Measures for Habitats (Treelines)

In order to minimise the risk of accidental damage to treelines and individual trees, during construction, the following measures will be implemented:

1. All treelines and individual trees marked for retention as identified in the landscaping proposals will be fenced off at the outset of works and for the duration of construction to avoid damage to the trunk, branches or root systems of the trees and structures.
2. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree (NRA, 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).
3. Where fencing is not feasible due to insufficient space, protection for the tree/treeline 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).
4. Weekly checks of the fences will take place by the Project Ecologist and/or Contractor.
5. Soil will not be placed within the Root Protection Area of trees or within 5m of any retained treelines.

#### Mitigation Measures for Habitats (Invasive Species)

It is imperative that appropriate eradication of Japanese Knotweed on site follows guidance from the NRA and Invasive Species Ireland (ISI). Invasive species which may be impacted by the works should not be spread further afield. Under Article 49 of the Birds and Natural Habitats Regulations (2011) it is illegal to “*plant, disperse, allow or cause to disperse, spread or otherwise cause to grow*” any plant listed in the Third Schedule. Any person who does so will be guilty of an offence.

The mitigation strategy in relation to Japanese Knotweed is based on current published best practice guidelines, with the objectives of permanently removing all invasive plant species from the working area and preventing the spread of any established populations present with the boundary of the proposed development (a legal requirement for Japanese knotweed) –

- *Guidelines on the Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads* (National Roads Authority, 2010);
- *Managing Japanese Knotweed on Development Sites: The Knotweed Code of Practice* (Environment Agency, 2006);

- *Best Practice Management Guidelines, Japanese knotweed Fallopia japonica* (Kelly et al., 2008).

Removal of Japanese Knotweed plants will be required prior to any other element of site clearance. Mapping of new growth in late spring 2020 may be required as identification in winter months can be problematic.

An Invasive Species Management Plan, targeting the removal of Japanese Knotweed, has been prepared and this will need to be implemented sufficiently far in advance of the proposed construction works commencing, so as to allow time to adequately control all Japanese Knotweed populations within the boundary of the proposed development, having regard to the specific timing/seasonal constraints that apply. The Invasive Species Management Plan will assist the construction contractor in implementing the specific mitigation measures required in relation to Japanese Knotweed.

In general, there are three means by which invasive plant species may be eradicated from infested sites: long term herbicide treatment; excavation and disposal of contaminated material to licenced landfill; or, excavation and deep burial on site in combination with herbicide treatment (to a depth of at least 5m for Japanese knotweed). Disposal of invasive species should be carefully considered and appropriately conducted according to current guidance.

As species may have spread, or their distribution changed, between the habitat survey being carried out for this report and the commencement of construction works, the implementation of the Invasive Species Management Plan will include a pre-construction re-survey within the proposed development boundary to include accurate 1:5,000 scale mapping for the precise location of invasive species. The pre-construction surveys will be undertaken by suitable experts with competence in identifying Japanese Knotweed.

Please refer to the Invasive Species Management Plan (ISMP) which has been prepared by Scott Cawley Ltd. for detailed eradication methods for Japanese Knotweed on site.

In addition, proposed landscaping planting on site will avoid using non-native, invasive species listed on: <http://invasivespeciesireland.com/background/legislation/ireland/third-schedule-part-1-plants/>

as well as plants contained on the Amber List of the Risk Assessment species on the Invasive Species Ireland website, whose threat is yet unknown: <http://invasivespeciesireland.com/toolkit/risk-assessment/amber-list-recorded-species/>.

## **Operational Phase**

### Mitigation Measures for Bats

The following mitigation measures are proposed with regards the operation of the proposed development:

1. The proposed development will include 5 no. Schwegler 1FF bat boxes to be erected on suitable retained trees in suitable locations across the site. The location and aspect of these bat boxes will be determined, in consultation with the project ecologist.

### Mitigation Measures for Breeding Birds

The following mitigation measure is proposed to provide additional nesting opportunities to local populations of breeding birds, to compensate for the removal of substantial amounts of vegetation from the proposed development site:

1. 6 no. bird boxes, of different shapes, will be erected on retained trees, in suitable locations, to compensate for the removal of nesting habitat as part of the proposed development.

### Mitigation Measures for Habitats (Invasive Species)

The proposed planting mixes have been reviewed by a competent ecologist to ensure that no species listed on the above references are included in the planting proposals. No mitigation measures are required for the operation of the proposed development

### **Operational Stage**

Not applicable.

### **Monitoring**

The following monitoring is proposed for the proposed development site, post construction:

1. Monitoring of use of the prescribed bird boxes will take place in autumn, to check for nesting activity, for 3 years post-completion of the development, to determine if they need to be relocated within the site; and;
2. Monitoring of use of proposed bat boxes will be undertaken annually for 5 years, by a suitably qualified and experienced bat ecologist, to check for roosting activity. Monitoring will take place twice a year- once in April/ May and once in September/ October. Results of the monitoring surveys will be provided to the competent authority.

## **20.5 Land and Soils**

### **Construction Stage**

1. The provision of wheel wash facilities at the construction entrance to the development will minimise the amount of soils deposited on the surrounding road network. The adjoining road network will be cleaned on a regular basis, if required, to prevent the build-up of soils from the development site on the existing blacktop roads.
2. Measures will be implemented throughout the construction stage to prevent contamination of the soil and adjacent watercourses from oil and petrol leakages and significant siltation. Suitable bunded areas will be installed for oil and petrol storage tanks. Designated fuel filling points will be put in place with appropriate oil and petrol interceptors to provide protection from accidental spills. Spill kits will be provided by the Contractor to cater for any other spills.
3. Dampening down measures with water sprays will be implemented during periods of dry weather to reduce dust levels arising from the development works.
4. Noise attenuation will be used on rock breakers to reduce noise levels.
5. After implementation of the above measures the proposed development will not give rise to any significant long-term adverse impact. Negative impacts during the construction phase will be short term only induration

### **Operational Stage**

1. Within the development, landscape areas will be top soiled and planted in accordance with the proposed landscaping plan. Following completion of these reinstatement works, no significant adverse impacts on the soils and geology of the subject lands are envisaged.
2. A comprehensive drainage network will be constructed to ensure that the lands drain effectively following their reshaping / re-profiling. The drainage system shall incorporate sustainable urban drainage methods to clean flows prior to discharge.

### **Monitoring**

Monitoring during the construction phase will be undertaken particularly in relation to the following:

1. Adequate protection of the topsoil stockpiled for reuse.
2. Monitoring of surface water discharged to existing sewers.
3. Monitoring cleanliness of the adjoining road network.

4. Monitoring measures for prevention of oil and petrol spillages.
5. Dampening down measures close to the boundaries of the site in dry weather

No operational stage/ post development monitoring will be required.

## 20.6 Water

### Construction Stage

A Construction Management Plan has been prepared for this application and is included under a separate cover. It is considered that the Construction Management Plan (CMP) will be updated by the appointed contractor. In order to minimise the potential impact of the construction phase of the proposed development on the surrounding surface water and groundwater environs, the following construction stage mitigation measures are to be included in the plan and be implemented in full.

1. The contractor will appoint a suitably qualified person to oversee the implementation of measures for the prevention of pollution to the receiving surface water environment.
2. To minimise the adverse effects, the prevailing weather conditions and time of year is to be taken into account when the site development manager is planning the stripping back of the site
3. Site stripping will be minimised as far as practicable.
4. Settlement ponds / silt traps will be provided to prevent silt runoff into the existing sewers/watercourses during the drainage works.
5. Regular testing of surface water discharges will be undertaken at the outfall from the subject lands. The location for testing and trigger levels for halting works will be agreed between the project ecologist and the site foreman at the commencement of works.
6. Where silt control measures are noted to be failing or not working adequately, works will cease in the relevant area. The project ecologist will review and agree alternative pollution control measures, such as deepening or redirecting trenches as appropriate, before works may recommence.
7. All fuels and chemicals will be bunded, and where applicable, stored within double skinned tanks /containers with the capacity to hold 110% of the volume of chemicals and fuels contents. Bunds will be located on flat ground a suitable distance from any watercourse or other water conducting features, including the cut off trenches.
8. Foul and surface water pipes will be carefully laid so as to minimise the potential for cross connections which results in contamination of receiving watercourses.
9. Site personal inductions are to be conducted such that all site personnel are made aware of the procedures the best practice in relation to the management of surface water runoff and ground water protection.
10. Where possible, precast concrete units are to be used to avoid on-site "wet" mix concrete usage. In situ concrete pours are to be managed in accordance with best practice to avoid overfills.
11. Concrete truck and wheel wash down facilities are to be provided in designated areas. Discharge from these areas is to be directed into the settlement ponds / silt traps.
12. Top soil for landscaping will be located in such a manner as to reduce the risk of washing away into local drainage or water courses.

### Operational Stage

1. The implementation of the following operation stage mitigation measures will minimise the impact on the hydrology and hydrogeology aspects of the development lands.



2. The surface water drainage network has been designed in accordance with the CIRIA SUDS Manual and the Greater Dublin Strategic Drainage Scheme. The appropriate interception mechanisms and treatment train process has been incorporated into the design.
3. Surface water outflow will be restricted to the equivalent greenfield runoff rate.
4. Flow restrictors with attenuation storage will be used to slowdown and store surface water runoff from discharging above green field rates to the sewer.
5. Attenuation systems will be constructed on-line to intercept the first flush during rainfall events after periods of dry weather.
6. Sustainable urban drainage measures such as green roofs, permeable paving and filter strips/swales will be provided to improve water quality

## **Monitoring**

### **Construction Stage**

Implementation of the Construction Management Plan is required to protect the hydrology and ground water elements of the subject lands during construction stage. Maintenance of the mitigation measures and monitoring of the management processed is required to ensure best practice. The monitoring measures to be implemented include:

1. Monitoring of the management and storage of dangerous chemicals and fuel.
2. Monitoring and maintenance of the wheel wash facilities.
3. Regular maintenance and monitoring of the sediment control measures.

### **Operational Stage**

1. Monitoring and maintenance of the SUDS features, road gullies, attenuation and flow control devices are imperative during the operation phase of the development.

## **20.7 Noise & Vibration**

### **Construction Phase**

Best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid significant impacts at the nearest sensitive buildings. The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- selection of quiet plant;
- noise control at source;
- screening, and;
- liaison with the public.

Further comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise monitoring, where required.

#### *1. 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.

#### *2. 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.

The following best practice migration measures shall be implemented:

- a. Site compounds will be located away from noise sensitive boundaries within the site constraints. The use lifting bulky items, dropping and loading of materials within these areas should be restricted to normal working hours.
- b. For mobile plant items such as cranes, dump trucks, excavators and loaders, maintaining enclosure panels closed during operation can reduce noise levels over normal operation. Mobile plant will be switched off when not in use and not left idling.
- c. For steady continuous noise, such as that generated by diesel engines, noise reduction will be effected where practicable by fitting a more effective exhaust silencer system.
- d. For percussive tools such as pneumatic breakers, a number of noise control measures include fitting muffler or sound reducing equipment to the breaker ‘tool’ and ensure any leaks in the air lines are sealed. Erect localised screens around breaker or drill bit when in operation in close proximity to noise sensitive boundaries.
- e. For concrete mixers, control measures should be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- f. For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- g. For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- h. All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

### 3. 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. Standard construction site hoarding (2.4m in height) with a mass per unit of surface area greater than 7 kg/m<sup>2</sup> can provide adequate sound insulation.

### 4. Liaison with the Public

A designated noise 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, prior to particularly noisy construction activity, e.g. piling, the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

### 5. 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. If piling 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 ensure noise limits are not exceeded due to cumulative activities. This will be reviewed in relation to other potential cumulative works occurring on adjacent construction site in close proximity to noise sensitive properties which have the potential to lead to significant construction noise impacts.

### **Operational Stage**

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

#### 1. *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.

#### 2. *Building Services Plant*

Taking into account that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria included in Section 10.5 (i.e. 35dB  $L_{Aeq,15min}$  at noise sensitive locations within the proposed development itself) 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.

### **Monitoring**

#### Construction Phase

1. The contractor will be required to ensure construction activities operate within the noise limits set out within this assessment. The contractor will be required to undertake regular noise monitoring at locations representative of the closest sensitive locations to ensure the relevant criteria are not exceeded.
2. Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise*.

#### Operational Phase

Noise or vibration monitoring is not required once the development is operational.

## **20.8 Air Quality and Climate**

### **Construction Stage**

A dust minimisation plan will be formulated for the construction phase of the project, as construction activities are likely to generate some dust emissions. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. The majority of any dust produced will be deposited close to the potential source and any impacts from dust deposition will typically be within 200m of the construction area. A detailed dust minimisation plan associated with a high level risk of dust impacts is outlined in Appendix 10.2. This plan draws on best practice mitigation measures from Ireland, the UK and the USA in order to ensure the highest level of mitigation possible.

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

1. 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.
2. Furthermore, any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions.
3. Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads.

4. Vehicles using site roads will have their speed restricted, and this speed restriction will be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.
5. Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.
6. 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.
7. During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
8. In order to reduce the impact to visitors of the park during works, hoarding or screens shall be erected around works areas to reduce visual impact. This will also have an added benefit of preventing larger particles of dust from travelling off-site and impacting receptors.

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

### **Operational Phase**

Impacts to air quality and climate are predicted to be imperceptible for the operational phase therefore, no mitigation is required.

### **Monitoring**

#### **Construction Phase**

Due to the close proximity of the site to a number of high sensitivity receptors, monitoring of construction dust deposition at these nearby sensitive receptors during the construction phase of the proposed development is recommended. This is to ensure the proposed mitigation measures are working satisfactorily. Monitoring can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The TA Luft limit value is 350 mg/(m<sup>2</sup>\*day) during the monitoring period between 28 - 32 days.

#### **Operational Phase**

There are no predicted impacts to air quality or climate during the operational phase therefore, no monitoring is proposed.

## **20.9 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**

The mitigation measures utilized used for this development project is landscaping using trees, which creating a reduced vorticity, makes it possible to reduce the velocities, thus the wind impact on the building. Small particles randomly distributed within an area are normally used in numerical modelling to model trees. These introduce a pressure drop in the model and therefore causes the wind to reduce its speed when passing through the trees, as expected in reality.

### **Monitoring**

There is not particular requirement to monitor the wind impact during construction phase as the designated amenity areas will not be in use during this phase of the project.

The development has been designed to conform with the Lawson Criteria for Comfort and Distress in accordance with the Wind Beaufort Scale.

## **20.10 Landscape and Visual Impact Assessment**

### **Construction Phase**

The subject application does not propose any relevant mitigation measures at construction stage.

### **Operational Phase**

The subject application proposes the development of lands on and immediately adjoining a substantial and strategically located infill site, which was the subject of major re-development in order to accommodate medium and high-density residential development in recent years. In these circumstances, during the construction or operational phases scope for mitigation measures, scope for mitigation measures, which would preserve a sustainable level of density, is limited.

### **Monitoring**

Construction Stage

Monitoring of avoidance, remedial and mitigation measures is not relevant to the assessment of visual impacts on the built environment in the case of the subject application.

Operational Stage

Monitoring of avoidance, remedial and mitigation measures is not relevant to the assessment of visual impacts on the built environment in the case of the subject application.

## **20.11 Material Assets - Traffic and Transport**

### **Construction Stage**

1. Adequate signposting will be located on site to ensure safety of all road users and construction workers.
2. Due to the proximity if the proposed site along well serviced bus routes and being well served by cycle lanes, it is intended to limit construction staff parking and to encourage the use of public transport. A limited number of car parking spaces may be provided for senior construction managers within the development site. Suitable locations in the surrounding area may be identified where staff can park and link to public transportation.

3. The main contractor as part of their site set up arrangements, shall appoint a Coordinator responsible for the implementation of a Construction Stage Mobility Management Plan and shall carry out the following tasks as part of their role:
  - a. Provide an extensive information service for public transport options and routes at a public location(s) within the development for construction workers
  - b. Update the public transport information adjacent to the development on on-going basis; and
  - c. Advise company staff of tax incentives for public transport and bicycles.
4. For those wishing to cycle to and from the development, dedicated cycle parking will be provided for the duration of the works within the site. Shower facilities and lockers will also be provided.
5. A dedicated “construction site” access/egress system will be implemented during the construction phases.
6. Hoarding will be set up around the perimeter to prevent pedestrian access.
7. Dedicated construction haul routes will be identified and agreed with the local authority prior to the commencement of constructions activities onsite.
8. A material storage zone will also be provided in the Construction Compound area. This storage zone will include material recycling areas and facilities.
9. A detailed Construction and Traffic Management Plan will be prepared by the contractor and agreed with the Local Authority prior to commencing works on site.

#### Operational Phase

1. To reduce traffic impact and to promote more sustainable modes of transport a Mobility Management Plan will be prepared for the development
2. A management company will be appointed by the developer to manage the development. A senior member of staff from the management company who supports the philosophy of the Plan will be appointed as the Co-ordinator. There Co-ordinator will be responsible for:
  - a. Implementation and maintenance of the Plan;
  - b. Monitoring progress of the Plan
  - c. Liaison with public transport operators and officers of the Planning and Highway Authorities;
  - d. Production of information reports for the Developer, the occupier(s) and the Planning and Highway Authorities; and
  - e. Ongoing assessment of the objectives of the Plan.
3. Up to date local bus timetables will be maintained within the tenant amenity area and other fixed points within the buildings on the site. Residents will be advised of their location. In addition, internet access to travel information will be provided. The developer will provide all new residents with a travel pack showing alternative modes of travel to the development. Where possible, the developer will advise visitors to the site of alternative modes of travel to that of the car.
4. Secure parking facilities will be provided within the basement level -1 for residents and at surface level for visitors and Creche users. Local cycle route information will be provided in the tenant amenity area and at other fixed points within the development and residents will be advised of their location. Details of cycle parking provided is included in the Traffic and Transport assessment provided with the planning submission.
5. 5 No go Car spaces will be initially provided and details of how to join the scheme will be provided to all residents when they move into their apartment. Information will also be displayed within the resident amenity area and updated when required.

6. The Co-ordinator will be responsible for the management of inappropriate parking within the development. This parking management will ensure that spaces are reserved for those who have rented the space and will be accessible only to those users.

### **Monitoring**

#### Construction Stage

Traffic management and deliveries will be carefully monitored during the construction stage as part of the Construction Management Plan. The appointed contractor will monitor their mobility management plan to ensure that is operating effectively. Local residents will be kept fully informed of construction activities through mail shots, email and site notices.

#### Operational Stage

During the operational stage the Mobility Management Plan will be monitored by the Co-ordinator. The travel survey will establish the initial modal split of travel by residents.

The Co-ordinator, in consultation with the Developer, the Occupiers, and the Local Authority or its agents, will agree annual targets, following completion and analysis of the travel survey, for increasing the percentage of non-car modes.

The Co-ordinator will:

1. Meet with officers of the Local Authorities or its agents within a period of 6 months following occupation of the building(s) and thereafter every 12 months to assess and review progress of the Plan and agree objectives for the next 12 months, and
2. Prepare and submit to senior management of the Developer, the Occupier(s) and the Local Authorities or its agents, an annual Monitoring Report.

## **20.12 Material Assets - Utilities**

### Construction Stage

#### Surface Water

1. The contractor will appoint a suitably qualified person to oversee the implementation of measures for the prevention of pollution to the receiving surface water environment.
2. Regular testing of surface water discharges will be undertaken at the outfall from the subject site.
3. Where silt control measures are noted to be failing or not working adequately, works will cease in the relevant area. The system is cleaned and starts working again.
4. All fuels and chemicals will be bunded, and where applicable, stored within double skinned tanks / containers with the capacity to hold 110% of the volume of chemicals and fuels contents. Bunds will be located on flat ground a minimum distance of 50 m from any watercourse or other water conducting features, including the cut off trenches.
5. All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position accurately identified before excavation works commence.
6. Temporary traffic management will be implemented as appropriate during the construction of the connections to Brewery.
7. Surface Water pipes will be carefully laid so as to minimise the potential for cross connections.

#### Foul Water

1. All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position accurately identified before excavation works commence.
2. Foul water pipes to be laid with sufficient falls to ensure self-cleansing velocity

3. Foul pipes will be carefully laid so as to minimise the potential for cross connections.

#### Water Supply

1. All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position accurately identified before excavation works commence.
2. All water mains will be cleaned, sterilised and tested to the satisfaction of the Irish Water/Local Authority prior to connection to the public water main.
3. All connections to the public water main will be carried out under the supervision of the Irish Water/Local Authority.

#### ESB Network

1. Where possible backup network supply to any services will be provided should the need for relocation or diversion of existing services be required otherwise, relocation or diversion works will be planned with the service provider to incur minimal impact, with users notified in advance of any works.

#### Gas

1. Where possible backup network supply to any services will be provided should the need for relocation or diversion of existing services be required, otherwise relocation or diversion works will be planned with the service provider to incur minimal impact, with users notified in advance of any works.
2. Connections to the existing gas networks will be coordinated with the relevant utility provider and carried out by approved contractors.

#### Telecommunications - Eir

1. Where possible backup network supply to any services will be provided should the need for relocation or diversion of existing services be required, otherwise relocation or diversion works will be planned with the service provider to incur minimal impact, with users notified in advance of any works.
2. Connections to the existing telecommunications networks will be coordinated with the relevant utility provider and carried out by approved contractors.

### **Operational Phase**

#### Surface Water

1. Flow restrictors with attenuation storage will be used to slowdown and store surface water runoff from discharging above green field rates to the sewer.
2. Attenuation systems will be constructed on-line to intercept the first flush during rainfall events after periods of dry weather.
3. Sustainable urban drainage measures such as permeable paving and swales will be provided.
4. A petrol interceptor will be installed to prevent hydrocarbons entering the local drainage system.
5. The attenuation storage systems will be constructed at a fall to maintain movement of water and thus prevent stagnation. Silt would be collected at a sump and removed periodically.
6. Regular maintenance of the drainage network, including petrol interceptor.
7. The drainage network will be inspected annually and maintained.



#### Foul Water

1. The foul network will be inspected annually and maintained.

#### Water Supply

1. It is not envisaged that any other remedial or reductive measures will be necessary upon the completion of the development.

#### ESB Network

1. On completion of the construction phase no further mitigation measures are proposed in relation to the electrical infrastructure.

#### Gas

1. On completion of the construction phase no further mitigation measures are proposed in relation to the gas infrastructure.

#### Telecommunications - Eir

1. On completion of the construction phase no further mitigation measures are proposed in relation to the telecommunications infrastructure.

#### **Monitoring**

The proposed monitoring of the various built services during the operation stage will include:

1. Surface water drainage and SUDS features will be monitored and maintained by the Developer.
2. The water usage within the proposed development will be monitored via the bulk water meters. Records will be maintained by Irish Water to ensure any excess usage is identified and investigated as necessary.
3. Irish Water will monitor the operation of the foul drainage network including the receiving environment.
4. The construction and waste management plans will be adhered to.
5. The provision of utility services including electricity, gas and broadband will be monitored by the relevant utility provider.

### **20.13 Material Assets - Waste Management**

#### **Construction Stage**

As previously stated, a project specific C&D WMP has been prepared in line with the requirements of the requirements of the guidance document issued by the DoEHLG and is included as Appendix 15.1. 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 contractor(s) will be required to refine/update the C&D WMP or submit an addendum to C&D WMP to DLRCC to provide further detail of specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

Project Engineers have estimated that c. 19,700 tonnes of soil and stones will be generated from the excavations required to facilitate basement completion and construction of new foundations, the installation of underground services. It is anticipated that all of this material will require removal from

the site for offsite reuse, recovery, recycling and/or disposal. The contractor(s) will endeavour to ensure that material is reused or recovered off-site insofar as is reasonably practicable or disposed of at authorised facility.

In addition, the following mitigation measures will be implemented:

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

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

### **Operational Stage**

As previously stated, a project specific OWMP has been prepared and is included as Appendix 15.2. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the EMR Waste Management Plan 2015 – 2021 and the DLR Refuse and Recycling Storage Guidelines.

In addition, the following mitigation measures will be implemented:

- On-site segregation of all waste materials into appropriate categories including (but not limited to):
  - Organic waste;
  - Dry Mixed Recyclables;
  - Mixed Non-Recyclable Waste;
  - Glass;
  - Waste electrical and electronic equipment (WEEE);
  - Batteries (non-hazardous and hazardous);
  - Cooking oil;
  - Light bulbs;
  - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.);
  - Furniture (and from time to time other bulky waste); and
  - Abandoned bicycles.
- All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;
- All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities; and

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

### **Monitoring**

The management of waste during the construction phase should be monitored to ensure compliance with relevant local authority requirements, and effective implementation of the C&D WMP including maintenance of waste documentation.

The management of waste during the operational phase should be monitored to ensure effective implementation of the OWMP by the building management company and the nominated waste contractor(s).

## **20.14 Archaeological, Architectural and Cultural Heritage**

### **Construction Stage**

#### **1. Archaeology**

No mitigation measures are deemed necessary in relation to the archaeological resource.

#### **2. Architecture**

All vegetation will be removed from the three Grange Cottage to be demolished and a written and photographic record made of the structures prior to their demolition. This will be carried out by a suitably qualified heritage specialist.

3. Cultural Heritage

All vegetation will be removed from any sections of the surviving demesne walls to be demolished and a written and photographic record made of the structures prior to their demolition. This will be carried out by a suitably qualified heritage specialist.

**Operational Stage**

1. Archaeology

No mitigation required.

2. Architecture

No mitigation required.

3. Cultural Heritage

No mitigation required.

**Monitoring**

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

## 20.15 Daylight & Sunlight

**Construction/Operational Phases**

The subject application proposes the development of lands on and immediately adjoining a substantial and strategically located infill site, which was the subject of major re-development in order to accommodate medium and high density residential development in recent years. In these circumstances, during the construction or operational phases scope for mitigation measures, which would preserve a sustainable level of density, is limited.

**Monitoring**

Monitoring of avoidance, remedial and mitigation measures is not relevant to the assessment of impacts on sunlight access in the case of the subject application.