Chapter 15:

Summary of EIAR Mitigation and Monitoring Measures

15.0 SUMMARY OF EIAR MITIGATION & MONITORING MEASURES

15.1 INTRODUCTION

The central purpose of EIA is to identify potentially significant adverse impacts at the pre-consent stage and to propose measures to mitigate or ameliorate such impacts. This chapter of the EIAR document has been prepared by ***John Spain Associates*** and sets out a summary, for ease of reference, of the range of methods described within the individual chapters of this EIAR document which are proposed as mitigation and for monitoring during the construction and operational phases of the proposed development. It is intended that this chapter of the EIAR document will provide a useful and convenient summary to the competent/consent authority of the range of mitigation and monitoring measures proposed.

EIA related conditions are normally imposed by the competent/consent authority as part of conditions of planning consent and form a key part of the Impact Anticipation and Avoidance strategy. Conditions are principally used to ensure that undertakings to mitigate are secured by explicitly stating the location, quality, character, duration and timing of the measures to be implemented. A secondary role of EIA related conditions is to ensure that resources e.g. bonds / insurances will be available and properly directed for mitigation, monitoring or remedial action, in the event that the impacts exceed the predicted levels.

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

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

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

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

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

15.2 MITIGATION STRATEGIES

15.2.1 Introduction

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

15.2.2 Mitigation by Avoidance

Avoidance is generally the fastest, 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. The consideration of alternatives with respect to the development of the subject lands has been described in Chapter 2.

15.2.3 Mitigation by Reduction

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

15.2.4 Reducing the Effect

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

15.2.5 Reducing Exposure to the Impact

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

15.2.6 Mitigation by Remedy

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

15.3 MITIGATION AND MONITORING MEASURES

The following provides a list, for ease of reference, of the mitigation and monitoring measures recommended in each chapter of the EIAR.

15.3.1 Project Description & Alternatives Examined

Construction Phase

Not applicable.

Operational Phase

Not applicable.

Monitoring

Not applicable.

13.3.2 Population and Human Health

Construction Phase

P&HH CONST 1: Construction and Environmental Management Plan

It will be necessary for the appointed contractor to prepare and implement a construction and environment management plan (including traffic management) to reduce the impacts of the construction phase on local residents and ensure the local road network is not adversely affected during the course of the construction project. The measures incorporated into the Construction and Environmental Management Plan submitted with the application should be carried out in full.

P&HH CONST 2: Resource and Waste Management Plan

The measures outlined within the Resource and Waste Management Plan submitted with the application will be carried out in full during the construction stage. The Waste Management Plan meets the requirements of the Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects.

Operational Phase

Not applicable.

Monitoring

This section addresses the effects that require monitoring, along with the methods and the agencies that are responsible for such monitoring.

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

15.3.3 Archaeology and Cultural Heritage

Construction Phase

ARCH CONST 1: Pre-Commencement Recording

The site was subject to a number of archaeological assessments carried out in relation to the site, both invasive and non-invasive. These include Geophysical Survey (19R0011; Murphy, Breen, 2019), Archaeological Assessment (Lyne, 2019) and test trenching (19E0034; Clarke, Lyne, 2020). These did not identify any subsurface archaeological remains within the site.

The proposed development will see the preservation of the watercourse, the Gaybrook Stream that forms the townland boundary between Fosterstown North and Cremona townlands. While the townland boundary value is considered low, should the townland boundary be altered in any way, a photographic and written record of it will be required in order to preserve it by record, and should be carried out at the pre-construction phase.

No further archaeological mitigation is required.

Operational Phase

Not applicable.

Monitoring

No monitoring is necessary.

15.3.4 Biodiversity

Construction Phase

Enhancement Measures

BIO CONST 1: Low Intervention Hedgerow Management

Existing and new hedgerows proposed for the outer margins of the Site will be managed in a way so as to mitigate the loss of existing hedgerows as much as is possible. In this way new hedgerows can be maximised in the ecological value they provide at the Site, with habitat connectivity ensured along the margins of the development; connecting it in with the wider field boundary network in the area. This connectivity is vital for wildlife such as birds, bats, mammals and insect pollinators in a human landscape such as that which will be provided by the Proposed Development. Additionally, by managing hedgerows and treelines in a more natural way, they will provide more in terms of biodiversity; through increased plant diversity, increase provision of food resources and higher quality shelter to wildlife inhabiting and commuting through the area.

The above low intervention approach may not be suitable for hedges included within the more landscaped areas of the Site, which may need to be maintained to a higher degree for health and safety or aesthetic reasons. However, at the very least **native species** will be used wherever possible in these locations; to maximise the biodiversity value of these internal landscaped parts of the Site.

For the hedgerows running along the outer margins of the Site, the following management approach is proposed to maximise their biodiversity value and offset the loss of existing hedgerows at the Site. Should planning be granted, a **Hedgerow Management Plan** will be prepared by a suitably qualified ecologist; for the hedgerows that are proposed for the Site's outer boundaries. This management plan will include the following, with a focus on maintaining these hedges in as natural a state as possible to maximise their ecological value:

- The hedgerows located along the outer boundaries of the Site in the north, west and south will, as much as is practicable, link up with each other and with the hedgerows in the adjacent lands to the north. The provision of an almost continuous vegetative margin around the Site; through planted native hedgerows and trees, will maintain habitat connectivity with the surrounding environment.
- Hedgerows will be maintained with a **natural meadow strip of 1-2m** at their base wherever possible. Hedges with plenty of naturally occurring flowers and grasses at the base support will provide higher quality habitat for local wildlife using the hedges.
- The 1-2m strip at the base of the hedgerow will be cut on a reduced mowing regime to encourage wildflower growth and maximise the value of the hedgerow for pollinators. A **two-cut management approach** is ideal for suppressing coarse grasses and encouraging wild flowers. Cut the hedgerow basal strip **once during February and March** (this is before most verge plants flower and it will not disturb ground-nesting birds). Cut the verge **once again during September and October** (this slightly later cutting date allows plants that were cut earlier in the year time to grow and set seed).N.B. Raising the cutter bar on the back cut will lower the risk to amphibians, reptiles and small mammals.
- Hedgerows, where possible, will be allowed to reach at least 2.5m in height, and should be **trimmed in an A-shape**; maintaining a wider base to compliment the natural meadow strip at their base.

- Where hedgerow trimming needs to occur trimming will be delayed as late as possible – until **January and February;** as the surviving berry crop will provide valuable food for wildlife. The earlier this is cut; the less food will be available to help birds and other wildlife survive through the winter. Any hedgerow cutting will be done outside of the nesting season and due consideration of the **Wildlife Act 1976** (as amended) needs to be taken.
- Where possible, these outer boundary hedgerows will be cut on a minimum **3-year cycle** (cutting annually stops the hedgerow flowering and fruiting), and cut in rotation rather than all at once - this will ensure some areas of hedgerow will always flower (Blackthorn in March, Hawthorn in May).
- Where they occur naturally, Bramble and Ivy will be allowed grow in hedgerows where possible, as they provide key nectar and pollen sources in summer and autumn.

Methods to Avoid

Hedgerows will not be over-managed. Tightly cut hedges mean there are fewer flowers and berries, thus reducing available habitats, feeding sources and suitable nesting sites.
Hedgerows will not be cut between March 1st and August 31st inclusive. It is both prohibited (except under certain exemptions) and very damaging for birds as this is the period they will have vulnerable nests containing eggs and young birds. Red-listed bird species Yellowhammer in particular nest up until the end of August.
Pesticide/ herbicide sprays or fertilisers will NOT BE USED near hedgerows as they can have an extremely negative effect on the variety of plants and animals that live there.

BIO CONST 2: Bat Box Provision
Three (3no.) bat boxes will be erected at suitable locations within the Site to provide new habitat for local bat species during the Operational phase of the Proposed Development. A qualified Ecologist will be consulted with regards the appropriate type and placement/location of these bat boxes. Mature trees located within the northern boundary hedgerow/treeline that is being retained as part of the Proposed Development may provide suitable locations, as the area along this boundary is being retained in a semi-natural state as a wildlife corridor.

Bird Mitigation

BIO CONST 3: Controlled Vegetation Removal
To ensure compliance with the Wildlife Act 2000 as amended, the removal of areas of vegetation should not take place within the nesting bird season (March 1st to August 31st inclusive) to ensure that no significant impacts (i.e., nest/egg destruction, harm to juvenile birds) occur as a result of the Proposed Development. Where any removal of vegetation within this period is deemed unavoidable, a qualified Ecologist will be instructed to survey the vegetation prior to any removal taking place. Should nesting birds be found, then the area of habitat in question will be noted and suitably protected until the Ecologist confirms the young have fledged, or a derogation licence is obtained from the NPWS.

Timing of vegetation clearance and instream works
The following table provides guidance for when vegetation clearance is permissible. Information sources include the British Hedgehog Preservation Society's *Hedgehogs and Development* and *The Wildlife (Amendment) Act, 2000*.

Table Error! No text of specified style in document.**.1 Seasonal restrictions on vegetation removal. Red boxes indicate periods when clearance should not be carried out.**

Ecological Feature	January	February	March	April	May	June	July	August	September	October	November	December

Breeding Birds	Vegetation clearance permissible	Nesting bird season No clearance of vegetation or works to relevant structures permitted unless confirmed to be devoid of nesting birds by an ecologist.		Vegetation clearance permissible	
Hibernating mammals (namely Hedgehog, excluding bats)	Mammal hibernation season No clearance of vegetation or works to relevant structures permitted unless confirmed to be devoid of hibernating mammals by an ecologist.		Vegetation clearance permissible		Mammal hibernation season No clearance of vegetation or works to relevant structures permitted unless confirmed to be devoid of hibernating mammals by an ecologist.
Bats	Tree felling to be avoided			Preferred period for tree-felling	Tree felling to be avoided

The preferred period for vegetation clearance is within the months of **September and October** as per the above table. Vegetation should be removed in sections working in a consistent direction to prevent entrapment of protected fauna potentially present (e.g., Hedgehog). Where this seasonal restriction cannot be observed, a check for active roosts and nests will be carried out immediately prior to any Site clearance by an appropriately qualified ecologist /ornithologist and repeated as required to ensure compliance with legislative requirements.

BIO CONST 4: Yellowhammer Habitat Provision

Red-listed species Yellowhammer were recorded along the hedgerows of the Site, both during the winter and breeding season. The maintenance of low-intervention native hedgerows along the outer boundaries of the Site will contribute maintaining nesting/foraging habitat at the Site for this species. Yellowhammer nests on or near the ground and so hedgerows and the unmanaged meadow verge habitat at their bases are important habitats for them. In addition, the long grasses and wildflower species that grow at the base of hedgerows e.g., nettle and dock, along with the insects they support, provide a valuable feeding resource for this species.

The maintenance of the outer hedgerows at the Site in a semi-natural form with a reduced cutting regime, along with the provision of a 1-2m **unmanaged** meadow margin along their bases; will ensure that suitable Yellowhammer habitats is provided at the Site into the future.

BIO CONST 5: Noise Control

A number of measures will be included in the contractor's CEMP as set out in *BS 5228-1: A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise,* that will be put in place during the Construction Phase of the Proposed Development. These will ensure that the level of noise caused by the proposed works will be controlled/reduced where possible so as to minimise the potential disturbance impact on local bird species.

These measures will include but are not limited to:

- Selection of plant with low inherent potential for generating noise.
- Avoid unnecessary revving of engines and switch off plant items when not required.
- Keep plant machinery and vehicles adequately maintained and serviced.
- Proper balancing of plant items with rotating parts.
- Keep internal routes well maintained and avoid steep gradients.

- Minimise drop heights for materials or ensure a resilient material underlies.
- Use of alternative reversing alarm systems on plant machinery.
- Where noise becomes a source of resonating body panels and cover plates, additional stiffening ribs or materials should be safely applied where appropriate.
- Limiting the hours during which site activities likely to create high levels of noise are permitted.
- Appointing a site representative responsible for matters relating to noise.
- Monitoring typical levels of noise during critical periods and at sensitive locations.

These measures will ensure that any noise disturbance to local birds or any other fauna species in the vicinity of the Site of the Proposed Development will be reduced to a minimum.

Gaybrook Stream Protection

A Construction Environmental Management Plan (CEMP) has been produced by Waterman-Moylan Engineering Consultants and will be implemented by the contractor during the Construction Phase of the Proposed Development. The CEMP details the suitable precautions to be followed to ensure the prevention of any potential pollution of watercourses as a result of construction activities, and will include the following:

BIO CONST 6: General Surface Water Mitigation

- The contractor will appoint a suitably qualified person to act as Ecological Clerk of Works (ECoW) to oversee the implementation of measures for the prevention of pollution to the receiving surface water environment.
- Measures such as silt fencing, straw bales and trenches will be inspected regularly by the ECoW to ensure they are effective and in good repair. Should any measures be damaged or ineffective, they will be repaired or replaced as per the instruction of the ECoW.
- Temporary cut off trenches will be excavated along the north of the Site in advance of stripping topsoil; to intercept sediment laden surface water flows prior to their reaching the Gaybrook Stream.
- These cut off trenches will be connected to a temporary settlement pond. Straw bales will be placed within the cut off trenches at strategic locations and at the outfall from the settlement pond.
- Stilling ponds to be installed where necessary with a diffuse outflow to mitigate any increase in run-off, along with any other erosion control and retention facilities (e.g., a three stage treatment train: swale – stilling pond – diffuse outflow); to reduce risk of downstream flooding.
- Location of stilling ponds will take into account groundwater vulnerability at the Site and will be located in suitable areas.
- As detailed in the CEMP, regular testing of surface water discharges will be undertaken at the outfall from the subject lands. The location will be agreed between the project ecologist and the Site foreman at the commencement of works. Trigger levels for halting works and re-examining protection measures will be pH >9.0 or pH <6.0; and/or suspended solids >25 mg/l. These trigger levels are based on those outlined within 'Guidelines on Protection of Fisheries During Works in and Adjacent to Waters (IFI, 2016)'.
- Where silt control measures are noted to be failing or not working adequately, works will cease in the relevant area. The project ecologist/ ECoW will review and agree alternative pollution control measures, such as deepening or redirecting trenches as appropriate, before works may recommence.
- Any imported materials will, as much as possible, be placed on Site in their proposed location and double handling will be avoided. Where this is not possible designated temporary material storage areas will be used.
- These temporary storage areas will be located at least 10m away from any surface water features/drainage ditches etc.; and will be surrounded with silt fencing to filter out any suspended solids from surface water arising from these materials.
- Pouring of cementitious materials will be carried out in the dry. A designated wash down area within the Contractor's compound will be used for cleaning of any equipment or plant, with the safe containment and

disposal of any cementitious water. No such waters will be allowed to reach the drainage ditches and streams at the Site.

- Where possible the permanent connection to the public foul sewer will be used temporarily for construction vehicle wash down. Such waters will discharge directly, via suitable pollution control and attenuation, to the foul sewer system.
- Refuelling of plant during Construction Phase will only be carried out at designated refuelling station locations on site. Each station will be fully equipped for spill response and a specially trained and dedicated Environmental and Emergency Spill Response team will be appointed before the commencement of works on site.
- Only emergency breakdown maintenance will be carried out on site. Drip trays and spill kits will be available on site to ensure that any spills from the vehicle are contained and removed off site.
- All personnel working on site will be trained in pollution incident control response. Emergency silt control & spillage response procedures contained within the CEMP will ensure that appropriate information will be available on site outlining the spillage response procedures and a contingency plan to contain silt during an incident.
- Any other diesel, fuel or hydraulic oils stored on site will be stored in bunded storage tanks- the bunded area will have a volume of at least 110% of the volume of the stored materials as per best practise guidelines (Enterprise Ireland, BPGCS005).
- Adequate security will be provided during the Construction Phase to prevent any incidents as a result of vandalism.
- Portaloos and/or containerised toilets and welfare units will be used to provide facilities for site personnel. All associated waste will be removed from site by a licenced waste disposal contractor.

BIO CONST 7: Stream Re-profiling Works

- A suitably qualified ECoW will be present during the stream reprofiling works to ensure measures to minimise sedimentation of the Gaybrook Stream are followed.
- Re-profiling to take part in dry weather as far as is possible, using suitable materials, to minimise any disturbances to any waters that may flow through this ditch.
- A 10m buffer zone will be enforced around the stretch of the waterway located along the northern boundary of the Site of the Proposed Development; wherein no works will take place other than those associated with the re-profiling of the stream itself.
- No heavy plant machinery will be allowed enter this buffer zone, nor will materials be stored in this area.
- Operation of machinery in-stream will be kept to a minimum, and all machinery must be mechanically sound to avoid oil/fuel leakage to stream waters.
- Oil/fuel storage and refilling area will be located at least 10m from the stream and minimum 50m from any boreholes/wells, in an area surrounded by a raised bund as per best practise guidelines (Enterprise Ireland, BPGCS005).
- Any flows present in the existing stream during re-profiling works to be diverted via overland temporary pipes around areas where active works are taking place.
- Stream re-profiling to be carried out in small stages starting upstream and working downstream.
- The re-profiled stream channel bed will be constructed using suitable stone material to protected imported material from erosion.
- Erosion control matting (e.g., Jute matting) and other measures will be used to protect banks from erosion while planted vegetation establishes.

Bat Mitigation

BIO CONST 8: Pre-felling Bat survey and Tree removal

Should any tree felling be required, a pre-felling bat survey will be conducted by a suitably qualified bat ecologist of any trees noted to have some bat roost potential at the Site (highlighted in **Error! Reference source not found.**). This will be carried out the night/morning before felling is proposed to commence and will determine

whether a derogation is needed from the NPWS. When felling bat roost potential trees, the following measures will be followed:

- Tree-felling will be undertaken in the months of September and October. During this period bats are capable of flight and are more likely to avoid risks associated with tree-felling, while this approach will also avoid the nesting bird season.
- Felling during the winter months should be avoided as this creates the additional risk that bats may be in hibernation and thus unable to escape from a tree that is being felled. Additionally, disturbance during winter may reduce the likelihood of survival as bat body temperature is too low and they may have to consume too much body fat to survive.
- Tree-felling should be undertaken using heavy plant and chainsaw. There is a wide range of machinery available with the weight and stability to safely fell a tree. Normally trees are pushed over, with a need to excavate and sever roots in some cases. In order to ensure the optimum warning for any roosting bats that may still be present, an affected 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. Any affected trees should then be pushed to the ground slowly and **should remain in place for a period of at least 24 hours**, and preferably 48 hours to allow bats to escape.
- Should any bats be found to be roosting in trees marked for felling, a derogation licence from the National Parks and Wildlife Services (NPWS) will be required.

Small Mammals Mitigation

BIO CONST 9: Construction Waste Hygiene

As best-practise all construction-related rubbish at the Site e.g., plastic sheeting, netting etc. should be kept in a designated area and kept off ground level so as to prevent small mammals such as hedgehogs from entrapment and death.

BIO CONST 10: Hedgehog Habitat during Construction Phase

During the Construction Phase of the development hedgehogs in particular have the potential to be significantly impacted through the loss of suitable hibernation and nest sites in the form of piles of dead wood, vegetation and leaves on site.

This can be mitigated through the careful removal of dead wood/leaves to another part/corner of the Site where they will not be affected. Woody debris from the proposed management of hedgerow/treeline areas on site can also be left in this out-of-the way area as compensatory hedgehog habitat during the Construction Phase. Hedgehogs also frequent long grass for foraging and daytime nesting sites so caution when strimming/ mowing these areas of the Site is advised. Work likely to cause disturbance during hibernation – for example removal of hibernation habitats such as log piles and dense scrub – **shouldn't take place during November to March** (See Table Error! No text of specified style in document.**.1**).

Operational Phase

BIO OPER 1: Bat-friendly Night-time lighting

The impact of increased night-time lighting as a result of the Proposed Development will be mitigated through the incorporation of bat-friendly lighting measures into the project design and associated lighting plan.

In order to minimise disturbance to bats commuting/foraging in the vicinity of the Site, lighting has been designed to minimise light-spill onto the Gaybrook Stream and boundary vegetation at the Site.

This is achieved by ensuring that the design of lighting adheres to the guidelines presented in the Bat Conservation Trust & Institute of Lighting Engineers *'Bats and Lighting in the UK - Bats and Built Environment Series',* (ILP, 2018) the Bat Conservation Trust *'Artificial Lighting and Wildlife Interim Guidance'* and the Bat Conservation Trust *'Statement on the impact and design of artificial light on bats'*.

Dark buffer zones can be effectively used to separate important habitats or features from lighting by forming a dark perimeter around them (ILP, 2018). Buffer zones rely on ensuring light levels within a certain distance of a feature do not exceed certain defined limits. The buffer zone can be further subdivided in to zones of increasing illuminance limit radiating away from the feature. Examples of this application can be seen in Figure Error! No text of specified style in document..**1**. The riparian zone of the Gaybrook Stream is being maintained as a dark corridor for local wildlife including commuting and foraging bats.

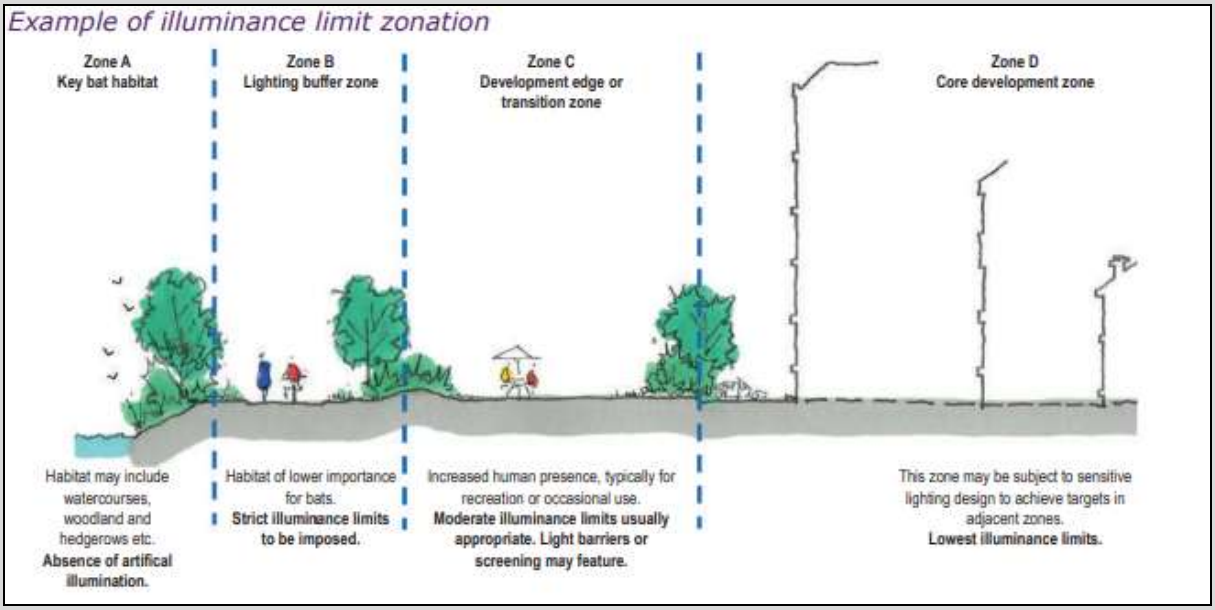

Figure Error! No text of specified style in document..**1 External Lighting Zonation Diagram adapted from ILP (2018)**

The following lighting measures will be agreed with the project Lighting consultant, and will be incorporated into the lighting plan for the Proposed Development, subject to agreement with Fingal CoCo:

- The minimisation of night-time lighting emitted during both the Construction and Operational Phases of the Proposed Development (once health and safety requirements are met).
- The avoidance of direct lighting of existing or proposed treelines and hedgerows at the Site, as well as areas of planting.
- LED luminaires will be used as they have low UV output, sharp cut-off, lower intensity, good colour rendition and dimming capability.
- Luminaires will be mounted horizontally, ensuring minimal/no up-light.
- Where possible luminaires will be mounted on poles less than 8m (preferably 6m and less).
- Where possible the LEDs used will be <2700K.
- Motion sensor lighting will be considered for the private pathways where possible and safe to do so. The usage and application of motion sensor lighting at the Site will be subject to Fingal CoCo public lighting approval and health and safety requirements.
- Glare shields will be utilized where required in order to minimise any unnecessary light spill onto potential bat routes along the boundaries of the Site.

Incorporation of the appropriate luminaire specifications as advised by a lighting professional can have a considerable input in mitigating the potential impact of night-time lighting on local bats.

Night-time lighting across the Site of the Proposed Development will be kept to a minimum during both the Construction and Operational Phases of the Proposed Development through the reduction of light spill from the

building interior via windows/entrances, and the reduction of spill/glare from outdoor lighting in place on the building exterior and throughout the Site (see Figure Error! No text of specified style in document.**.2**).

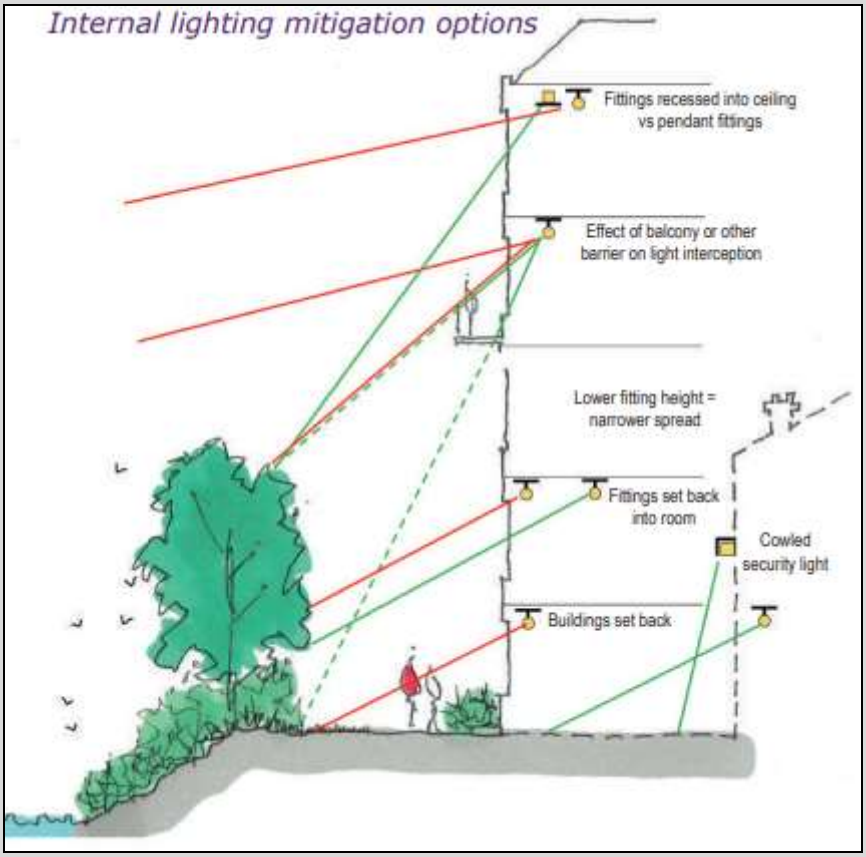

Figure Error! No text of specified style in document.**.2 Internal Lighting Guidance Diagram adapted from ILP (2018); red line indicates non-mitigated light spill; green line indicates mitigated light spill showing favourable outcomes.**

Monitoring

Vegetation Clearance

Should any removal of vegetation within the nesting season be unavoidable, a qualified Ecologist will be instructed to survey the vegetation in question prior to any removal taking place. Should nesting birds be found, then the area of habitat in question will be noted and suitably protected until the Ecologist confirms the young have fledged.

Surface Water protection

The contractor will appoint a suitably qualified person to act as Ecological Clerk of Works (ECoW) to oversee the implementation and effective maintenance of measures for the prevention of pollution to the receiving surface water environment. Measures such as silt fencing, straw bales and trenches will be inspected regularly by the ECoW to ensure they are effective and in good repair. Should any measures be damaged or ineffective, they will be repaired or replaced as per the instruction of the ECoW.

As detailed in the CEMP, regular testing of surface water discharges will be undertaken at the outfall from the subject lands. The location will be agreed between the project ecologist and the Site foreman at the commencement of works. Trigger levels for halting works and re-examining protection measures will be pH >9.0 or pH <6.0; and/or suspended solids >25 mg/l. These trigger levels are based on those outlined within 'Guidelines on Protection of Fisheries During Works in and Adjacent to Waters (IFI, 2016)'.

Where silt control measures are noted to be failing or not working adequately, works will cease in the relevant area. The project ecologist / ECoW will review and agree alternative pollution control measures, such as deepening or redirecting trenches as appropriate, before works may recommence.

15.3.5 Landscape and Visual Impact

Construction Phase

LVIA CONST 1: Construction and Environmental Management Plan

The building site including a site compound with site offices, site security fencing, scaffolding and temporary works will be visible during the construction phase. This is generally viewed as a temporary and unavoidable feature of construction in any setting.

Other mitigation measures proposed during this delivery stage of the development, revolve primarily around the implementation of appropriate site management procedures during the construction works – such as the control of lighting, storage of materials, placement of compounds, control of vehicular access, and effective dust and dirt control measures, etc. Such mitigation is set out in the Construction and Environmental Management Plan prepared for the scheme by Waterman Moylan Consulting Engineers. This is a working document which will be continually reviewed and amended to ensure effective mitigation throughout the construction period. The Construction and Environmental Management Plan specifically references the following construction phase mitigation measures as relevant to the assessment of Landscape and Visual impact:

- Site hoarding will be erected to restrict views of the construction activity e.g., standard 2.4m high construction hoarding;
- Though limited on this site, the establishment of tree protection measures as required and as set out in the Arboricultural Method Statements contained in the Arboricultural Report, as prepared by Charles McCorkell and accompanying this submission (tree protection; access facilitation pruning; temporary surfaces etc within zones of protection);
- A post-construction re-assessment of retained trees/hedgerows shall be carried out.

Operational

The design rationale and details employed seek to mitigate negative effects on the landscape character and upon visual amenity of the area by:

- Incorporating the smaller scaled blocks closer to the existing adjacent residential developments to the south and west, whilst introducing density, height and landmark qualities in appropriate locations, closer to the town centre;
- Employing variation of tone, colour and texture across the facades, particularly where the buildings can be seen from a greater distance and the use of use of appropriate and harmonising colour, tones and materials throughout the development;
- Retaining existing vegetation where possible and introducing appropriate planting to further screen and absorb the buildings over time;
- Rationalisation of all services elements and any other potential visual clutter and its incorporation internally within building envelopes (as far as practically possible);

- The provision, maintenance and management of a sensitively considered soft landscape design for the development, which assists in the integration and screening of the buildings within the existing landscape, particularly at the lower levels;
- Including public open spaces within the design which link with and relate appropriately to existing adjacent open spaces.

As the above are incorporated into the scheme design, further mitigation measures during the operation phase are not required.

Monitoring

The retention of the existing boundary hedgerows and planting, where possible and proposed, coupled with the effective use of new planting to screen and integrate the built elements of the proposal into the existing landscape, are important aspects of the proposed scheme design. The success of the proposed scheme is dependent on both operations being properly executed. Effective hedgerow protection measures must be established in advance of construction work commencing and an approved system of monitoring the on-going health and vigour of both existing and proposed planting will be necessary. The timely planting and the maintenance and management required to successfully establish new planting with the projected rates of growth and general performance required, needs a significant and effective input from professionals with the necessary expertise to ensure it is effectively delivered. The monitoring of the planting performance and suitably appropriate responses to ensure same will be essential to the success of the development as proposed.

15.3.6 Land and Soils

Construction Phase

In order to reduce impacts on the soils and geology environment, a number of mitigation measures will be adopted as part of the construction works on site. The measures will address the main activities of potential impact which include:

- Control of soil excavation/ infill and export from site;
- Fuel and chemical handling, transport and storage; and
- Control of water during construction.

L&S CONST 1: Construction Environmental Management Plan (CEMP)

A Construction Environmental Management Plan (CEMP) has been prepared by Waterman Moylan (2022) for the proposed development and is included with the planning documentation. In advance of work starting on site, the works Contractor will prepare a detailed CEMP. The detailed CEMP will set out the overarching vision of how the construction of the proposed development will be managed in a safe and organised manner by the Contractor. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent planning conditions relevant to the proposed development.

As a minimum, the CEMP will be formulated in accordance with best international practice including but not limited to:

- CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532) Construction Industry Research and Information Association;
- CIRIA (2002) Control of water pollution from construction sites: guidance for consultants and contractors (SPI56) Construction Industry Research and Information Association

- CIRIA (2005), Environmental Good Practice on Site (C650); Construction Industry Research and Information Association
- BPGCS005, Oil Storage Guidelines;
- Eastern Regional Fisheries Board, (2006), Fisheries Protection Guidelines: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites;
- CIRIA 697, The SUDS Manual, 2007; and
- UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004.

In order to reduce impacts on the hydrological environment, a number of mitigation measures will be adopted as part of the construction works on site.

L&S CONST 2: Control of Soil Excavation

Site preparation, excavations and levelling works required to facilitate construction of foundations, access roads and the installation of services will require to excavate c. 66,000 m3. Suitable soils could be reused on site as backfill, where possible. Contractors shall be required to submit and adhere to a method statement indicating the extent of areas likely to be affected and demonstrating that this is the minimum disturbance necessary to achieve the required works.

According to onsite investigations, the bedrock vulnerability is 'Low' throughout the site. Removal and reinstatement of subsoil cover will not alter the vulnerability category of the underlying bedrock. The deposition of infill soil would increase the overburden thickness and thus may even decrease the groundwater vulnerability.

Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment and the material will be stored away from any open surface water drains. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust.

Although there is no evidence of historical contamination in the proposed development area, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be disposed of by a licensed waste disposal contractor.

Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated against through the implementation of appropriate earthworks handling protocol during construction. It is anticipated that any stockpiles will be formed within the boundary of the site and there will be no direct link or pathway from this area to any surface water body. Overburden material will be protected from exposure to wind by storing the material in sheltered parts of the site, where possible.

Dust suppression measures (e.g., damping down during dry periods), vehicle wheel washes, road sweeping, and general housekeeping will ensure that the surrounding environment are free of nuisance dust and dirt on roads.

L&S CONST 3: Source of Fill and Aggregated

All fill and aggregate for the proposed development will be sourced from reputable suppliers. All suppliers will be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the proposed development;
- Environmental Management status; and

- Regulatory and Legal Compliance status of the Company.

There will be no impact to mineral resources in the area as a result of the Proposed Development.

L&S CONST 4: Fuel and Chemical Handling

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas at locations at least 50m from any body of water, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal. Spill kits will be kept on site at all times and all staff trained in their appropriate use. Spill kits will contain 10 hr terrestrial oil booms (80mm diameter x 1000mm) and a plastic sheet, upon which contaminated soil can be placed to prevent leaching to ground water

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area (or where possible off the site) which will be away from surface water gulleys, the existing open ditch or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with. Any refuelling and maintenance of equipment will be done at designated bunded areas with full attendance of plant operative(s) within contained areas at least 50m from any watercourse.

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

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

Emergency response procedures will be outlined in the detailed CEMP. All personnel working on the site will be suitably trained in the implementation of the procedures. Method statements for dealing with accidental spillages will be provided the Contractor for review by the Employer's Representative.

L&S CONST 5: Control of Water during Construction

Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.

There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the trenches are kept relatively dry. Any minor ingress of groundwater and collected rainfall in the excavation will be pumped out during construction. It is estimated that the inflow rate of groundwater will be low and limited to localised perched water. Due to the very low permeability of the Dublin Boulder Clay and the relative shallow nature for excavations, infiltration to the underlying aquifer is not anticipated.

Any run-off will be intercepted on site, where the ground falls towards adjoining properties or public roads/footpaths. This will be achieved with open drains or French drains and collected for treatment based on the conditions of a FCC and/or Irish Water licence, prior to pumping to the surface sewer network. During any

discharge of surface water from the basement/excavations, the quality of the water will be improved through the provision of settlement tanks and will be regularly monitored visually for hydrocarbon sheen and suspended solids. Periodic laboratory testing of discharge water samples will be carried out in accordance with the requirements of Fingal County Council before discharge to the surrounding drainage network.
Should any discharge of construction water be required during the construction phase, discharge will be to foul sewer. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, 50 m buffer zone between machinery and watercourses/ stormwater sewer/ drainage ditch, refuelling of machinery off site) and hydrocarbon interceptors. Designated parking at least 50m from any watercourse. The site compound will be located at least 50m from any watercourse. Contractor to prepare a site plan showing the location of all surface water drainage lines and proposed discharge points to the sewer. The plan will include the location of all surface water protection measures, including monitoring points and treatment facilities

Any minor ingress of groundwater and collected rainfall in the excavation will be pumped out during construction. It is estimated that the inflow rate of groundwater will be low and limited to localised perched water. It is therefore proposed that the water be discharged via the existing stormwater sewer network. Extensive monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the sewer. The use of slit traps and an oil interceptor (if required) will be adopted if the monitoring indicates the requirements for the same with no silt or contaminated water permitted to discharge to the sewer. There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavations are kept relatively dry. Due to the very low permeability of the Dublin Boulder Clay and the relative shallow nature for excavations, infiltration to the underlying aquifer is not anticipated. Based on GSI information and historical site investigations, it is not anticipated that there will be rock removal required for the proposed single storey basements in the development, for building foundations, for service trenches or for any other works.

The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection. This will prevent any potential negative impact on the stormwater drainage and the material will be stored away from any surface water drains. Movement of material will be minimised to reduce the degradation of soil structure and generation of dust. Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations. Soil from works will be stored away from existing drainage features to remove any potential impact.

Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site and the suitable distance of topsoil piles from surface water drains will be maintained.

Given the current greenfield condition of the subject site, no contamination is expected to be encountered during excavation works on site. Nonetheless, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

The contractor will appoint a suitably qualified person to act as Ecological Clerk of Works (ECoW) to oversee the implementation of measures for the prevention of pollution to the receiving surface water environment. Measures such as silt fencing, straw bales and trenches will be inspected regularly by the ECoW to ensure they are effective and in good repair. Should any measures be damaged or ineffective, they will be repaired or replaced as per the instruction of the ECoW.

Temporary cut off trenches will be excavated along the north of the Site in advance of stripping topsoil; to intercept sediment laden surface water flows prior to their reaching the Gaybrook Stream. These cut off trenches

will be connected to a temporary settlement pond. Straw bales will be placed within the cut off trenches at strategic locations and at the outfall from the settlement pond.

Operational

L&S OPER 1: Sustainable Urban Drainage

There are no discharges to ground included in the design and no abstractions from the aquifer. In the event of an accidental leakage of oil from the parking areas, this will be intercepted by the drainage infrastructure proposed and any releases to drainage will be mitigated through hydrocarbon interceptors.

Monitoring

Construction Phase

Routine inspections of construction activities will be carried out on a daily basis by the contractor staff to ensure all controls to prevent environmental impact, relevant to the construction activities taking place at the time, are in place. Environmental inspections will ensure that the works are undertaken in compliance with the Project CEMP and that the requirements of the Conditions of Planning, the NIS and associated documentation are being adhered to during construction.

The Contractor will develop their own site inspection programme, which will include an inspection procedure and relevant forms to record any issues. Only suitably-trained staff will undertake environmental site inspections. The Project Ecologist will keep records of works undertaken. Regular inspection of surface water run-off and sediments controls e.g. silt traps will be carried during the construction phase.

In addition, soil sampling will be carried out to confirm disposal options for excavated soils in order to avoid contaminated run-off. Regular inspection of construction/mitigation measures will be undertaken e.g. concrete pouring, refuelling, etc.

Operational Phase

No future soil or groundwater monitoring is proposed as part of the proposed project as no bulk chemical storage on site. Petrol interceptors will be maintained and cleaned out in accordance with the manufacturer's instructions. Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground..

15.3.7 Water

Construction Phase

WAT CONST 1: Construction Environmental Management Plan (CEMP)

A Construction Environmental Management Plan (CEMP) has been prepared by Waterman Moylan (2022) for the proposed development and is included with the planning documentation. In advance of work starting on site, the works Contractor will prepare a detailed CEMP. The detailed CEMP will set out the overarching vision of how the construction of the proposed development will be managed in a safe and organised manner by the Contractor. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent planning conditions relevant to the proposed development.

As a minimum, the CEMP will be formulated in accordance with best international practice including but not limited to:

- CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532) Construction Industry Research and Information Association;
- CIRIA (2002) Control of water pollution from construction sites: guidance for consultants and contractors (SPI56) Construction Industry Research and Information Association
- CIRIA (2005), Environmental Good Practice on Site (C650); Construction Industry Research and Information Association
- BPGCS005, Oil Storage Guidelines;
- Eastern Regional Fisheries Board, (2006), Fisheries Protection Guidelines: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites;
- CIRIA 697, The SUDS Manual, 2007; and
- UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004.

In order to reduce impacts on the hydrological environment, a number of mitigation measures will be adopted as part of the construction works on site.

WAT CONST 2: Surface Water Run-off

As there is potential for run-off to enter current stormwater systems and indirectly discharge to a watercourse, mitigations will be put in place to manage run-off during the construction phase.

The contractor will appoint a suitably qualified person to act as Ecological Clerk of Works (ECoW) to oversee the implementation of measures for the prevention of pollution to the receiving surface water environment. Measures such as silt fencing, straw bales and trenches will be inspected regularly by the ECoW to ensure they are effective and in good repair. Should any measures be damaged or ineffective, they will be repaired or replaced as per the instruction of the ECoW.

Temporary cut off trenches will be excavated along the north of the Site in advance of stripping topsoil; to intercept sediment laden surface water flows prior to their reaching the Gaybrook Stream. These cut off trenches will be connected to a temporary settlement pond. Straw bales will be placed within the cut off trenches at strategic locations and at the outfall from the settlement pond.

Any run-off will be intercepted on site, where the ground falls towards adjoining properties or public roads/footpaths. This will be achieved with open drains or French drains and collected for treatment based on the conditions of a FCC and/or Irish Water licence, prior to pumping to the surface sewer network. During any discharge of surface water from the basement/excavations, the quality of the water will be improved through the provision of settlement tanks and will be regularly monitored visually for hydrocarbon sheen and suspended solids. Periodic laboratory testing of discharge water samples will be carried out in accordance with the requirements of Fingal County Council before discharge to the surrounding drainage network.

Direct uncontrolled run-off into the drainage ditch running through the site will not be allowed. Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.

Should any discharge of construction water be required during the construction phase, discharge will be to foul sewer. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, 50 m buffer zone between machinery and watercourses/ stormwater sewer/ drainage ditch, refuelling of machinery off site) and hydrocarbon interceptors. Designated parking at least 50m from any watercourse. The site compound will be located at least 50m from any watercourse. Contractor to prepare a site

plan showing the location of all surface water drainage lines and proposed discharge points to the sewer. The plan will include the location of all surface water protection measures, including monitoring points and treatment facilities

Any minor ingress of groundwater and collected rainfall in the excavation will be pumped out during construction. It is estimated that the inflow rate of groundwater will be low and limited to localised perched water. It is therefore proposed that the water be discharged via the existing stormwater sewer network. Extensive monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the sewer. The use of slit traps and an oil interceptor (if required) will be adopted if the monitoring indicates the requirements for the same with no silt or contaminated water permitted to discharge to the sewer. There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavations are kept relatively dry. Due to the very low permeability of the Dublin Boulder Clay and the relative shallow nature for excavations, infiltration to the underlying aquifer is not anticipated. Based on GSI information (refer to Chapter 7), it is not anticipated that there will be rock removal required for the proposed single storey basements in the development, for building foundations, for service trenches or for any other works.

Run-off water containing silt will be contained on site via settlement tanks and treated to ensure adequate silt removal. Silt reduction measures on site will include a combination of silt fencing and settlement measures (silt traps, silt sacks and settlement tanks/ponds).

The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection. This will prevent any potential negative impact on the stormwater drainage and the material will be stored away from any surface water drains. Movement of material will be minimised to reduce the degradation of soil structure and generation of dust. Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations. Soil from works will be stored away from existing drainage features to remove any potential impact.

Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site and the suitable distance of topsoil piles from surface water drains will be maintained.

As detailed in the CEMP, regular testing of surface water discharges will be undertaken at the outfall from the subject lands. The location will be agreed between the project ecologist and the site foreman at the commencement of works. Trigger levels for halting works and re-examining protection measures will be: pH >9.0 or pH <6.0; and/or suspended solids >25 mg/l. These trigger levels are based on those outlined within ‘Guidelines on Protection of Fisheries During Works in and Adjacent to Waters (IFI, 2016)’.

WAT CONST 3: Fuel and Chemical Handling

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas at locations at least 50m from any body of water, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal. Spill kits will be kept on site at all times and all staff trained in their appropriate use. Spill kits will contain 10 hr terrestrial oil booms (80mm diameter x 1000mm) and a plastic sheet, upon which contaminated soil can be placed to prevent leaching to ground water

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area (or where possible off the site) which will be away from surface water gulleys, the existing open ditch or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in

this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with. Any refuelling and maintenance of equipment will be done at designated bunded areas with full attendance of plant operative(s) within contained areas at least 50m from any watercourse.
Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

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

Emergency response procedures will be outlined in the detailed CEMP. All personnel working on the site will be suitably trained in the implementation of the procedures. Method statements for dealing with accidental spillages will be provided the Contractor for review by the Employer's Representative.

WAT CONST 4: Soil Removal and Compaction

Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment. The material will be stored away from any surface water drains (see Surface Water Run-off section above). Movement of material will be minimised to reduce degradation of soil structure and generation of dust.

All excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

Given the current greenfield condition of the subject site, no contamination is expected to be encountered during excavation works on site. Nonetheless, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

Operational Phase

WAT OPER 1: Sustainable Urban Drainage Systems

The proposed development will provide a significant improvement to the local drainage catchment as it is proposed to provide full attenuation in compliance with the requirements of the Greater Dublin Strategic Drainage Study. A number of design measures (SuDS measures detailed in Section 8.4 above and in the Engineering Assessment Report) will be put in place to minimise the likelihood of any spills entering the water environment to include the design of the car park with hydrocarbon interceptors. In the event of an accidental leakage of oil from the parking areas, this will be intercepted by the drainage infrastructure proposed.

It is proposed to ultimately discharge surface water from the proposed development, post attenuation and outflow restrictions into the existing local drainage.

Monitoring

Construction Phase

The Project Ecologist will supervise the sampling of suspended solids downstream prior to commencement of works, and weekly during remediation works. Samples will be analysed on site. Should results show a 10% increase in suspended solids downstream of the site this will be brought to the attention of the contractor by the Project Ecologist and any suitable contingency measures will be instigated.

Routine inspections of construction activities will be carried out on a daily basis by the contractor staff to ensure all controls to prevent environmental impact, relevant to the construction activities taking place at the time, are in place. Environmental inspections will ensure that the works are undertaken in compliance with the Project CEMP and that the requirements of the Conditions of Planning, the NIS and associated documentation are being adhered to during construction.

As detailed in the CEMP, regular testing of surface water discharges will be undertaken at the outfall from the subject lands. The location will be agreed between the project ecologist and the site foreman at the commencement of works. Trigger levels for halting works and re-examining protection measures will be: pH >9.0 or pH <6.0; and/or suspended solids >25 mg/l. These trigger levels are based on those outlined within 'Guidelines on Protection of Fisheries During Works in and Adjacent to Waters (IFI, 2016)'.

The Contractor will develop their own site inspection programme, which will include an inspection procedure and relevant forms to record any issues. Only suitably-trained staff will undertake environmental site inspections. The Project Ecologist will keep records of works undertaken. Regular inspection of surface water run-off and sediments controls e.g. silt traps will be carried during the construction phase.

In addition, soil sampling will be carried out to confirm disposal options for excavated soils in order to avoid contaminated run-off. Regular inspection of construction/mitigation measures will be undertaken e.g. concrete pouring, refuelling, etc.

Operational Phase

Maintenance of the surface water drainage system, including hydrocarbon interceptors, and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to surface water.

For the SUDS strategy to work as designed it is important that the entire drainage system is well maintained. It will be the responsibility of the site management team to ensure the drainage system is maintained during construction and until handover of the development to the Management Company. The Management Company will then assume responsibility for the maintenance and upkeep of the surface water drainage network including all SuDS. Maintenance and cleaning of gullies, manholes (including catch pits) and attenuation tanks will ensure adequate performance.

15.3.8 Air Quality & Climate

Construction Stage

Air Quality

AIR CONST 1: Fugitive Dust Prevention

The proactive control of fugitive dust will ensure the prevention of significant emissions. The key aspects of controlling dust are listed below. Full details of the dust management plan can be found in Appendix 9.2. These measures have been incorporated into the overall Construction Environmental Management Plan (CEMP) prepared in respect of the proposed development.

In summary the measures which will be implemented will 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 will 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.
- 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 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 CONST 1: Climate Mitigation

Impacts to climate during the construction stage are predicted to be imperceptible however, good practice measures can be incorporated to ensure potential impacts are lessened. These include:

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.
- Ensure all plant and machinery are well maintained and inspected regularly.
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.

Operational Stage

The impact of the operational traffic associated with proposed development on air quality and climate is predicted to be imperceptible with respect to the operational phase in the long term. Therefore, no site specific mitigation measures are required other than those set out in Section 9.5.2 in relation to operational phase energy usage.

Monitoring

Construction Stage

Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the proposed development is recommended to ensure mitigation measures are working satisfactorily. This 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^2*day) during the monitoring period between 28 - 32 days.

Operational Stage

There is no monitoring recommended for the operational phase of the development as impacts to air quality and climate are predicted to be imperceptible.

13.3.9 Noise & Vibration

Construction Phase

N&V CONST 1: Noise and Vibration Control Measures

With regard to construction activities, best practice control measures from construction sites within BS 5228 (2009 +A1 2014) Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2 will be used to control noise and vibration impacts. The implementation of all best practice noise and vibration control methods will ensure impacts to nearby residential noise sensitive locations are not significant. This will be particularly important during excavation and foundation construction which are likely to be the activities to have the highest potential noise and vibration impact.

Noise-related mitigation methods are described below and will be implemented for the project in accordance with best practice. These methods include:

- 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;
- During construction, the contractor will manage the works to comply with noise limits outlined in BS 5228-1:2009+A1 2014. Part 1 – Noise;

- 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;
- Limiting the hours during which site activities which are likely to create high levels of noise or vibration are permitted;
- Monitoring levels of noise and vibration during critical periods and at sensitive locations.

Furthermore, it is envisaged that a variety of practicable noise and vibration control measures will be employed. These will include:

- Selection of plant with low inherent potential for generation of noise and/ or vibration;
- Erection of good quality site hoarding to the site perimeters which will act as a noise barrier to general construction activity at ground level;
- Erection of barriers as necessary around items such as generators or high duty compressors, and;
- Situate any noisy plant as far away from sensitive properties as permitted by site constraints.
- Where practicable, localised screening should be used during breaking activities to obscure line of site to the closest sensitive receptors.

Operational Phase

N&V OPER 1: Mechanical and Electrical Plant

As part of the detailed design of the development, plant items with appropriate noise ratings and, where necessary, appropriately selected remedial measures (e.g. enclosures, silencers etc.) will be specified in order that the adopted plant noise criteria is achieved at the façades of noise sensitive properties, including those within the development itself.

N&V OPER 2: Inward Noise

As is the case in most buildings, the glazed elements and ventilation paths of the building envelope are typically the weakest element from a sound insulation perspective. In general, all wall constructions (i.e. blockwork or concrete and spandrel elements) offer a high degree of sound insulation, much greater than that offered by the glazing systems. Therefore, noise intrusion via the wall construction will be minimal. It's also noted that the ventilation strategy will be for Mechanical Ventilation Heat Recovery units which are expected to provide strong sound insulation to external noise, hence ingress of noise through the ventilation systems is considered to be negligible for this assessment.

In this instance the facades will be provided with glazing that achieves the minimum sound insulation performance as set out in Table 10.17.

Location	Octave Band Centre Frequency (Hz)						dB R_w
	125	250	500	1k	2k	4k	
RED	26	28	36	42	43	43	40
All Other Facades	26	26	33	39	39	47	37

Table 10.17: Sound Insulation Performance Requirements for Glazing, SRI (dB)

The overall R_w outlined above are provided for information purposes only. The over-riding requirements are the octave band sound insulation performance values which may also be achieved using alternative glazing configurations. Any selected system will be required to provide the same or greater level of sound insulation performance as that set out in Tables 10.17.

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.

Monitoring

The contractor will be required to ensure construction activities operate within the noise and vibration limits set out within this assessment. The contractor will be required to undertake regular noise and vibration monitoring at locations representative of the closest sensitive locations to ensure the relevant criteria are not exceeded.

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

Vibration monitoring should be conducted in accordance with BS 6472 for human disturbance and BS ISO 4866:2010 for building damage.

15.3.10 Microclimate / Wind

Design related mitigation measures have been incorporated into the scheme design and are reflected in the application drawings / proposals submitted for approval. No additional construction or operational related mitigation measures are recommended.

Construction Phase

No mitigation measures required.

Operational Phase

No mitigation measures are required.

Monitoring

No monitoring is required.

15.3.11 Material Assets

Construction Phase

MA CONST 1: Resource & Waste Management Plan

The proposed development will comply with the provisions of the Resource and Waste Management Plan with respect to construction waste.

MA CONST 2: Construction and Environmental Management Plan

A construction and environmental management plan, including measures for construction traffic management, has been submitted with the EIAR and will be implemented in order to protect local amenities and the integrity and operation of the local road network during the construction phase.

MA CONST 3: Provision of Utilities

Provision of utilities will be carried out in accordance with the recommendations of the relevant statutory bodies and providers (ESB, Gas Networks Ireland, Irish Water, EIR, Fingal County Council etc.)

MA CONST 4: Water Metering

Water Metering will be included in each unit to record consumption.

Operational Phase

No mitigation measures are considered necessary during the operational phase.

Monitoring

Monitoring measures will be in accordance with provisions outlined elsewhere in this EIAR document.

15.3.12 Transportation

Construction Phase

MA T&T CONST 1: Construction Traffic Management

- Adequate signposting will be located on site to ensure safety of all road users and construction workers.

- 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.

- 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:
  - Provide an extensive information service for public transport options and routes at a public location(s) within the development for construction workers;
  - Update the public transport information adjacent to the development on on-going basis; and
  - Advise company staff of tax incentives for public transport and bicycles.

- 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.

- A dedicated “construction site”’ access/egress system will be implemented during the construction phases.

- Hoarding will be set up around the perimeter to prevent pedestrian access.
- Dedicated construction haul routes will be identified and agreed with the local authority prior to the commencement of construction activities onsite.
- A material storage zone will also be provided in the Construction Compound area. This storage zone will include material recycling areas and facilities.
- 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

MA T&T OPER 1: Mobility Management

It is proposed to provide a mobility management plan which will be implemented during the operational phase of the development. This plan will encourage more sustainable modes of transport over the traditional journey by car and will assist in reducing car trips to/from the development. The implementation of a mobility management plan will assist in reducing the traffic and transportation impact of the proposed development on the surrounding road network.

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 it is operating effectively.

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 residents traveling by non-car modes.

The Co-ordinator will:

- 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
- Prepare and submit to senior management of the Developer, the Occupier(s) and the Local Authorities or its agents, an annual Monitoring Report.