

CHAPTER SEVENTEEN INTERACTIONS BETWEEN ENVIRONMENTAL FACTORS

17.1 INTRODUCTION

All environmental factors are inter-related and this chapter cross references the individual environmental assessment reports undertaken, including the proposed mitigation measures, having regard to current knowledge and methods of assessment. An indication is also given of the cumulative effects of the proposed development when considered with other permitted development in the area, not yet constructed.

In practice many impacts have slight or subtle interactions with other disciplines. This chapter highlights those interactions which are considered to potentially be of a significant nature. Discussions of the nature and effect of the impact is primarily undertaken within each of the relevant chapters, while this chapter identifies the most important potential interactions.

17.2 METHODOLOGY

The preparation and coordination of this EIAR ensured that each of the specialist consultants liaised with each other on an ongoing basis and dealt with the likely interactions between effects predicted as a result of the proposed development. This process ensured that appropriate mitigation measures are incorporated into the design process.

At the screening stage in the preparation of the EIAR for the proposed development, the potential for significant cumulative and indirect impacts and interactions were examined and identified. Where identified such impacts and interaction of impacts were included in the scope and addressed in the baseline and impact assessment studies for each of the relevant environmental issues and aspects of the project. The cumulative and indirect impacts and interaction of impacts are presented in each of the EIAR chapters.

The primary interactions can be summarised as follows:

- Architectural design, landscape design, and road and services design and archaeology;
- Landscape design and engineering services with biodiversity and archaeology;
- Stormwater attenuation design with biodiversity and soil & geology;
- Visual impact with biodiversity and archaeology;
- Biodiversity with water and soils;
- Architectural and landscape design with noise;
- Noise and vibration and population and human health;
- Air quality and climate and population and human health; and
- Material Assets with population and human health, water, noise and vibration, air quality and climate

The matrix and expert opinion approaches, as outlined in the EU Guidelines, were used in the identification of the potential for significant cumulative and indirect impacts and interactions. Refer to Table 17.1 for the matrix of potential interactions.

Limerick City & County Council

Planning and Environmental Services

	Population & Human Health	Biodiversity	Archaeology & Cultural Heritage	The Landscape	Land Soils	Water Hydrology & Flood Risk	Air Quality & Climate	Noise & Vibration	Water Services	Material Assets Traffic & Transport	Material Assets Built Services
Population & Human Health		-	-	O	CO	-	CO	CO	-	CO	O
Biodiversity	-		-	CO	C	C	-	C	-	-	-
Archaeology & Cultural Heritage	-	-		CO	-	-	-	-	-	-	-
The Landscape	O	CO	CO		C	-	-	-	-	-	-
Land & Soils	-	C	-	-		C	C	-	-	-	-
Water, Hydrology & Flood Risk	CO	C	-	-	C		-	-	-	-	-
Air Quality & Climate	CO	-	-	-	C	-		-	-	CO	-
Noise & Vibration	CO	C	-	-	-	-	-		-	CO	-
Water Services	CO	C	-	-	-	-	-	-		-	CO
Material Assets: Traffic & Transport	CO	-	-	-	-	-	CO	CO	-		-
Material Assets: Built Services	CO	-	-	-	-	CO	CO	-	-	-	

C- Construction **O** – Operation **CO** – Construction & Operation

Table 17.1 Potential Interaction of Effects Matrix

17.3 DESCRIPTION OF THE INTERACTIONS

Each chapter of the EIAR details baseline information and identifies the significant potential and residual construction and operational effects/impacts of the proposed development. However, this Chapter details the significant interactive and inter-related effects/impacts. Table 17.2 indicates the key elements and activities of the proposed development during both the site preparation and operational phases and how they inter-act and inter-relate with the various environmental aspects considered in detail in Chapter 6.0 through to Chapter 16.0 of this EIAR.

The following Table 17.2 is indicative only and does not purport to contain or replace all or any of the issues raised in the main assessment sections of this EIAR. Their purpose is to demonstrate the main likely and significant inter-relationships and inter-actions between different environmental aspects considered. While many inter-relationships and inter-actions have been identified, it is anticipated that the mitigation measures included in the proposed development (and outlined in the other relevant sections of the EIAR) will also minimise or off-set potential for significant effects. With mitigation measures in place, no significant residual negative impacts are predicted

	Interaction With	Interaction
Population & Human Health	Landscape	The proposal has the potential to impact on the landscape and visual resources perceived by human beings. However, landscape proposals including provision of open space, trees and hedgerows shall mitigate and ensure that no significant impact arises.
	Land & Soils	There is potential for significant impact on human health from dust associated with the construction activities. A
	Material Assets - Traffic & Transport	Traffic flow for construction vehicles in the locality has potential to impact upon road safety; Traffic flow during operation within the site has the potential to create safety risks for pedestrians and cyclists, if the design does not provide for safe pedestrian / cycling environments;
	Material Assets – Resources & Waste Services	At operational stage increased population will create a greater demand on built services, placing greater demand on water requirements and the public sewer, which will need to be treated and delivered.
	Air & Climate	There is potential for impact on human health arising from dust during construction and from climate change associated with greenhouse gas emissions at operational stage. Subject to the implementation of a comprehensive dust minimisation plan and mitigation measures proposed, no significant impacts occur.
	Noise & Vibration	Noise and vibration generated from the construction and operational phases of the development have the potential to impact upon local population centres. With the proposed mitigation measures in place the noise impacts will be similar to the existing situation.
Biodiversity	Land & Soils	Excavation and soil works (i.e. through site clearance, re-profiling etc.) during the construction stage has the potential to cause impact on the biodiversity of the site, for example through disturbance of the available habitats. No potential operational interactions were identified.
	Water, Hydrology & Flood Risk	Surface water contamination has a potential to effect biodiversity in the area of the site. No potential operational interactions were identified.

	The Landscape	Vegetation is an important aspect with respect to providing wildlife corridors. However, where mature vegetation will be removed as part of the proposed redevelopment, it will be replaced and overall there will no significant impact. The proposed development contains landscaping proposals.
	Noise & Vibration	Noise from construction and operational phases of the development has potential to impact on the fauna in the vicinity of the proposed redevelopment. However, the ecology chapters of the EIAR have predicted that following suitable mitigation, no significant impacts will occur.
The Landscape	Population & Human Health	The proposal has the potential to impact on the landscape and visual resources perceived by human beings. However, landscape proposals including provision of open space, trees and hedgerows shall mitigate and ensure that no significant impact arises.
	Biodiversity	Vegetation is an important aspect with respect to providing wildlife corridors. The development does necessitate the removal of hedgerows. However, the proposed development contains landscaping including the provision of trees and shrubs which shall mitigate any significant impacts arising.
	Land & Soils	There is potential for impact on landscaping from the reuse of fill material and the appropriateness of available soils during construction phase; The landscape plan will impact on the quality of the private and public open spaces, which will impact on people's health and well-being.
	Archaeology & Cultural Heritage	Landscaping construction has the potential to impact upon unknown archaeological features on site. The landscaping plan has an impact upon awareness and preservation of cultural heritage within the development and impact on local monuments.
Water, Hydrology & Flood Risk	Population & Human Health	Control of surface water during construction has potential to impact human health due to emissions from site to the hydrosphere or potential flooding during ground works. During the operational stage surface water management has the potential to cause flooding which may impact human health and safety;
	Biodiversity	Surface water contamination has a potential to effect biodiversity where works are proposed in proximity to the existing drainage ditch within the site as there is potential for discharge of these contaminants to the Lower River Shannon Special Area of Conservation (SAC) and River Shannon and River Fergus Estuaries Special Protection Area (SPA). However, it is proposed to construct a berm on the western boundary of the site to mitigate against such impacts.

	Land & Soils	Excavation and soil works (i.e. through site clearance, re-profiling etc.) during the construction stage has the potential to cause significant impact on the hydrology and hydrogeology of the site by increasing aquifer vulnerability, deposition of silt in streams, leakage of hydrocarbons, altering the surface water characteristics. Mitigation is proposed to offset such concerns.
Land & Soils	Landscape	Imported soils and materials necessary to undertake landscaping have the potential to impact the landscape. Any necessary imported soils will be chemically analysed and screened against generic screening values for a commercial end use to ensure that it does not pose a risk to human health.
	Biodiversity	Excavation and soil works (i.e. through site clearance, re-profiling etc.) during the construction stage have the potential to cause impact on the biodiversity of the site, for example through disturbance of the available habitats. Clearance works on site are restricted to certain months to protect breeding habitats.
	Water, Hydrology & Flood Risk	Excavation and soil works (i.e. through site clearance, re-profiling etc.) during the construction stage have the potential to cause significant impact on the hydrology and hydrogeology of the site by increasing aquifer vulnerability, deposition of silt in streams, leakage of hydrocarbons, altering the surface water characteristics
	Air & Climate	Excavation works and exposure of soil during the construction phase can influence the microclimate in an area. The movement of soils during the construction phase may result in the spread of dust and mud onto surrounding land uses and public roads. The air quality assessment indicates that there is no significant impact associated with these matters.
Air Quality & Climate	Population & Human Health	The construction and operational phases of the development have the potential to generate impacts in terms of air quality upon local population centres. Chapter 10.0 Air Quality & Climate does identify dust as a potential issue but puts forward mitigation and appropriate Dust Minimisation Plans to address the issue.
	Land & Soils	Excavation works and exposure of soil during the construction phase can influence the microclimate in an area. The movement of soils during the construction phase may result in the spread of dust and mud onto surrounding land uses and public roads. The air quality puts forward adequate mitigation and indicates that there is no significant impact associated with these matters.

	Traffic & Transport	Traffic generation has potential to result in impacts on Air Quality. Chapter 10 Air Quality & Climate has been prepared in close co-operation with the Traffic Consultant and has determined that no significant air quality impacts will occur due to traffic generation.
Noise & Vibration	Population & Human Health	Noise and vibration generated from the construction and operational phases of the development have the potential to impact upon local population centres. With the proposed mitigation measures in place the noise impacts will be similar to the existing situation.
	Biodiversity	Noise from construction and operational phases of the development has potential to impact on the fauna in the vicinity of the proposed redevelopment. However, Chapter 7.0 Biodiversity have predicted that following suitable mitigation, no significant impacts will occur.
	Traffic & Transport	Traffic generation has potential to result in noise related impacts. Chapter 11.0 Noise & Vibration has been prepared in close co-operation with the Traffic Consultant and has determined that no significant noise impacts will occur due to traffic generation.
Archaeology & Cultural Heritage	The Landscape	Landscaping construction has the potential to impact upon unknown archaeological features on site. The landscaping plan has an impact upon awareness and preservation of cultural heritage within the development and impact on local monuments.
Material Assets: Built Services	Population & Human Health	At operational stage increased population will create a greater demand on built services, placing greater demand on water requirements and the public sewer, which will need to be treated and delivered. Irish Water has confirmed capacity in the existing systems.
	Water, Hydrology & Flood Risk	The water and sewage connections at construction and operational stages have a potential interaction with available water supply and potential emissions to hydrological cycle. Best practice construction methods shall be used to avoid potential impacts.
	Air Quality & Climate	Construction of the site services have an potential interaction with air quality through impact of construction activities. The built services have an interaction with climate in the availability and use of non-greenhouse gas reliant power and heat sources.

Water Services	Population & Human Health	At operational stage increased population will create a greater demand on water services, placing greater demand on water requirements and the public sewer, which will need to be treated and delivered. Irish Water has confirmed capacity in the existing systems.
	Biodiversity	The construction of water services on site has the potential to impact on the flora & fauna in the vicinity of the proposed redevelopment.
	Material Assets – Resources & Waste Services	At operational stage increased population will create a greater demand on built services, placing greater demand on water requirements and the public sewer, which will need to be treated and delivered.
Material Assets: Traffic & Transport	Population & Human Health	Traffic flow for construction vehicles in the locality has potential to impact upon road safety; Traffic flow during operation within the site has the potential to create safety risks for pedestrians and cyclists, if the design does not provide for safe pedestrian / cycling environments;
	Air & Climate	Construction traffic has the potential to have a significant impact in terms of air quality. The Air Quality & Climate chapter has been prepared in close consultation with the traffic consultant. Operational traffic has the potential to have a significant impact in terms of air quality. The Air Quality chapter has been prepared in close consultation with the traffic consultant.
	Noise & Vibration	Construction traffic has the potential to have a significant impact in terms of noise and vibration. The Noise and Vibration chapter has been prepared in close consultation with the traffic consultant. Operational traffic has the potential to have a significant impact in terms of noise and vibration. The Noise and Vibration chapter has been prepared in close consultation with the traffic consultant;

Table 17.2 Summary of Key Proposed Activities and Scheme Elements that Inter-Act and Cause Inter-Related Effects

17.4 CUMULATIVE EFFECTS

Cumulative effects address the long-term changes that may result from the construction and operation of the proposed development and the combined effect of this development with other developments in the area. This review is undertaken to ensure that the combined effects of the proposed development and other influences are assessed in total, and not as individual aspects of the environmental assessment.

A planning history review was undertaken to identify any recently approved or pending developments which may have a cumulative impact with the proposed development. There are no significant developments permitted in the area, which have not yet been constructed, save for the Masterplan site itself, details of which have been provided in Chapter 1.0 Introduction and Chapter 6.0 in Table 6.2.

The proposed development does need to be considered in conjunction with the works currently underway, delivering the proposed Coonagh to Knockalisheen Distributor Project. This infrastructure project secured consent from An Bord Pleanála in 2021 and was subject to the preparation of an EIAR and Environmental Impact Assessment. The cumulative impacts associated with noise and dust during construction have been considered in Chapters 10.0 and 11.0 of the EIAR, whilst potential effects arising from increased traffic have also been considered in Chapter 12.0.

The overall cumulative impact of the proposed development and the adjoining road currently under construction, will result in:

- An increase in economic activity in the local area region;
- A slight increase in traffic on the local road network which can be adequately managed;
- No significant environmental nuisance from an air quality perspective subject to implementation of the mitigation measures and adherence to good working practices; and
- No significant landscape visual effects due to the nature of the existing, surrounding built environment and the planting of trees.

17.5 REFERENCES

Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), EPA 2003

Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, EPA, 2022.

EU Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions.



CHAPTER EIGHTEEN SUMMARY OF MITIGATION MEASURES

18.1 INTRODUCTION

This chapter provides a summary of mitigation measures proposed in Chapters 6.0 to 15.0. 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.

18.2 INCORPORATED DESIGN MITIGATION

A number of mitigation measures have been incorporated into the design proposal, following an iterative assessment during the design stage. In some instances, these mitigatory measures have shaped the design of the scheme, the juxtaposition of the buildings and the mix of uses proposed.

The design rationale and detail employed seeks to mitigate potential negative effects on a series of environmental factors and considerations.

18.2.1 Landscape & Visual

- Establishing an integrated relationship between the proposed development and surrounding buildings and the broader urban landscape, incorporating aspects of prevalent built forms, scale, texturing, colour and materials and in particular the established building line fronting onto THE Old Cratloe Road and the Pass (Meelick) Road;
- The insertion, positioning and detailed modelling of the buildings in order to assist in the visual assimilation of their mass;
- Appropriate architectural detailing to assist in the integration of the external building facades – including the modulation of openings and fenestration in a manner that reflects building function and harmonises with current local proportions and rhythms;
- Facilitating an active streetscape fronting onto the Pass Road;
- Rationalisation of all services elements and any other potential visual clutter and its incorporation internally within building envelopes;
- Simplification and rationalisation of the proposed roof lines;
- Development of a biodiversity area south of the Old Cratloe Rod adjoining proposed Phase 5; and
- The use of appropriate materials to reflect the existing context and ensure a harmonious balance is achieved.

18.2.2 Material Assets – Traffic & Transport

- Development of an internal road network in compliance with DMURS;
- Focused provision on connections to future transport links including Bus Connects; and
- Provision of bicycle, car and motorcycle spaces in accordance with the requirements of the Limerick Development Plan 2022 – 2028 and in proximity to the houses and commercial buildings they are intended to serve.

18.2.3 Population & Human Health

- Development of land and provision of houses in an area that is located outside of identified flood risk areas;
- Provision of a creche and neighbourhood centre facilities to support the creation of a new neighbourhood and ensure adequate capacity in the area for childcare services;
- Modifications to site layout plan to accommodate future bus infrastructure including provision of a bus stop adjoining the masterplan site

18.2.4 Material Assets – Resources & Waste Management

- Reuse of excavated material on site insofar as possible;
- Design depths of proposed infrastructure are to be optimised to existing excavated levels so that excessive excavations are avoided where possible;
- Products and materials are supplied locally where possible; and
- Provision of Waste Storage Areas (WSA's) to facilitate segregation of waste types generated during construction.

18.2.5 Water & Hydrology

- Incorporating Sustainable Drainage Systems where practicable including the provision of permeable paving within dedicated parking areas and bioretention pods at key strategic locations; and
- Optimising design depths of proposed infrastructure so that excessive excavations are avoided.

18.2.6 Biodiversity

- Proposing natural hedgerow planting to compensate for loss of woody hedgerow habitat on site and to facilitate an appropriate environment for potential nesting; and
- Development of a biodiversity area as part of Phase to the south of the Old Cratloe Road thereby enhancing biodiversity within the development proposal.

18.3 CONSTRUCTION PHASE MITIGATION

18.3.1 Population & Human Health

POP & HH CONST 1: In order to protect the amenities enjoyed by nearby residents and the adjoining school, a Construction and Environmental Management Plan (including traffic management) shall be prepared by the contractor and implemented during the construction phase.

POP & HH CONST 2: A berm shall be constructed at the western boundary of the site to prevent any flow of surface water into the drainage ditch during construction.

18.3.2 Biodiversity

BIO CONST 1: In order to prevent flow into the drainage ditches, silt fencing with geotextile membrane shall be erected around the site to prevent any discharge to water courses. To further protect the drainage ditches identified in Figure 7.1, berms shall be constructed. This is particularly important as

the overall MS is at a higher elevation than both of the ditches and the likelihood of discharge from the construction site during periods of rainfall are high.

BIO CONST 2: A lined attenuation pit shall be constructed at the lowest point to capture any surface water during the construction phase.

BIO CONST 3: The phased ground clearance works for the proposed development that involve the removal/disturbance of any hedgerow, treeline or occasional mature trees, will be undertaken outside of peak bird breeding season (March 1st to August 31st inclusive); if hedgerow clearance cannot be limited to outside this period, a qualified ecologist will be required to oversee clearance operations, with works being halted in the event that nesting birds are observed.

BIO CONST 4: Construction operations shall take place during the hours of daylight to minimise disturbances to roosting birds and to minimise disturbances to faunal species at night. No badger or other activity was observed during the walk over surveys.

BIO CONST 5: If site lighting is required during construction works it will be placed with consideration of and away from the potential foraging/roosting areas of protected species associated with the wider area such as hedgerows/treelines

BIO CONST 6: A pre-construction mammal survey will be undertaken within the footprint of the development in order to confirm that none of these species have colonised the site following the walkover surveys. In the event that a badger sett or other spraint or holts should be encountered at any point, the NPWS will be informed and in the case of badger, NRA Guidelines for the Treatment of Badgers Prior To the Construction of National Road Schemes will be followed. Should evidence of Otters be found then a derogation licence will be required.

BIO CONST 7: As part of best practice construction measures a preconstruction bat survey shall be carried out within the site prior to construction to reconfirm the findings of preplanning surveys (no roosts were detected during the walkover surveys). If any roosts are found during these surveys a relevant bat derogation licence shall be sought prior to construction works commencing and works will be carried out under the terms of the relevant derogation licence this shall include any felling works being undertaken, and works will be timed and conducted in a manner to ensure that no bats are harmed as a result of felling.

BIO CONST 8: Lighting shall not be left switched on overnight within the site during the construction phase. The use of lighting within the site can discourage some bat species from using the site, and attract other species due to higher insect activity, increasing their vulnerability to predators.

BIO CONST 9: The proposed surface water drainage infrastructure as proposed which includes the use of SuDs measures as well as an attenuation system fed by soakaways shall be implemented on site, therefore preventing impact on the adjacent drainage ditches and the wider aquatic environment, including the European Sites evaluated in the NIS.

BIO CONST 9: Construction will follow guidance from Inland Fisheries Ireland (IFI, 2016) for the protection of aquatic habitats. This will include the erection of a geotextile silt fence (or similar barrier)

along the western boundary to prevent the ingress of silt to the drainage ditch. Water leaving the site will pass through an appropriately-sized silt trap or settlement pond so that only silt-free run-off will leave the site.

BIO CONST 10: Dangerous substances, such as oils, fuels etc., will be stored in a bunded zone. Emergency contact numbers for the Local Authority Environment Section, Inland Fisheries Ireland, the Environmental Protection Agency and the National Parks and Wildlife Service will be displayed in a prominent position within the site compound. These agencies will be notified immediately in the event of a pollution incident.

BIO CONST 11: Site personnel will be trained in the importance of preventing pollution and the mitigation measures described here to ensure same.

BIO CONST 12: The site manager will be responsible for the implementation of these measures. They will be inspected on at least a daily basis for the duration of works, and a record of these inspections will be maintained.

BIO CONST 13: The area of the proposed works will be kept to the minimum necessary, including all site clearance works, to minimise disturbance to habitats and flora. In this case, particular care to minimise impact to retained hedgerows is required, with no felling, removal or trimming undertaken other than where required to facilitate essential access and to ensure health and safety of operatives. Where individual trees are to be retained within the development, protected fencing must be erected.

18.3.3 Land & Soils, Geology & Hydrogeology

L & S CONST 1: Where feasible, the extent of excavation works and depths for dwellings and roads shall be limited through design to minimise disturbance of the original soil, subsoil formations and bedrock and to retain soil structure.

L & S CONST 2: Asbestos and other contaminants within any filled material must be considered a possibility. This should be investigated prior to the commencement of development works and suitable mitigation measures (including special environmental and human health contingency plans and procedures, following best-practice guidance) for the unexpected discovery of contaminated land or illegally deposited waste materials shall be developed and implemented as part of a detailed risk assessment under the direction of a contaminated land consultant / hydrogeologist.

L & S CONST 3: A Construction Environmental Management Plan (CEMP) to be prepared and approved in advance of the commencement of development works by Limerick City and County Council. In the event that contamination is encountered, the approved plans shall be adhered to at all times by relevant contractors and subcontractors.

L & S CONST 4: Monitoring prior to, during and post construction works of groundwater quality shall be undertaken to ensure minimum disturbance of water quality in the general vicinity of the site. During the construction phase, the monitoring programme shall include daily checks, weekly inspections and monthly audits to ensure compliance with the Construction and Demolition Waste Management Plan (CDWMP) and the CEMP. This shall be undertaken in consultation with Limerick City and County Council

L & S CONST 5: All waste containers (including all ancillary equipment such as vent pipes and refueling hoses) shall be stored within a secondary containment system (e.g. a bund for static tanks or a drip tray for mobile stores and drums). The bunds shall be capable of storing 110% of the tank capacity. Where more than one tank is stored, the bund shall be capable of holding 110% of the largest tank or 25% of the aggregate capacity (whichever is greater). Drip trays used for drum storage shall be capable of holding at least 25% of the drum capacity. Where more than one drum is stored the drip tray shall be capable of holding 25% of the aggregate capacity of the drums stored. Spill kits shall be kept in these areas in the event of spillages.

L & S CONST 6: All imported soils and stones shall be sourced from a licenced / permitted facility with suitable documentation to confirm the material is inert and fit for purpose.

L & S CONST 7: Suitable runoff and sediment control measures shall be designed and implemented prior to and during construction activities. These control measures depend upon weather conditions, site characteristics and construction activities and will ensure protection to the underlying subsoils and groundwater aquifer.

L & S CONST 8: Waste fuels and materials shall be stored in designated areas that are isolated from surface water drains or open waters (e.g. excavations). Skips shall be closed or covered to prevent materials being blown or washed away and to reduce the likelihood of contaminated water leakage. Hazardous wastes such as waste oil, chemicals and preservatives, shall be stored in sealed containers and kept separate from other waste materials while awaiting collection by a registered waste carrier. Fueling, lubrication and storage areas and site offices shall not be located within 25m of drainage ditches, surface waters or open excavations. Fuel Interceptor tanks shall be installed on the site to treat any runoff.

L & S CONST 9: All construction vehicles, plant and machinery shall be maintained on a weekly basis and checked daily to ensure any damage or leakages are corrected. Precautions shall be taken to avoid spillages, including:

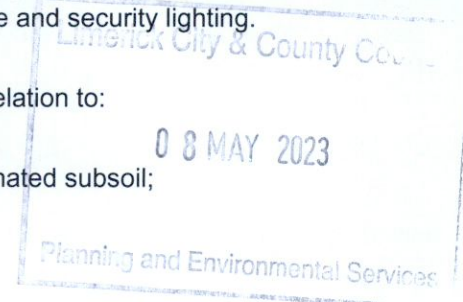
- Supervision of deliveries and refuelling activities;
- Use of secondary containment e.g. bunds around oil storage tanks;
- Use of drip trays around mobile plant; and
- Designating and using specific impermeable refuelling areas isolated from surface water drains.

L & S CONST 10: All potentially hazardous materials shall be securely stored on site.

L & S CONST 11: Adequate security measures shall be installed on the construction site. Early assessment of sensitivities and risks will assist in the design of the site layout and security measures required. Security measures shall include secure fencing, secure site access, securing plant and equipment, secure storage of materials, sufficient warning signage and security lighting.

L & S CONST 12: The construction phase shall be monitored in relation to:

- Prevention of oil and diesel spillages;
- Adequate runoff control of potential stockpiles of contaminated subsoil;
- Protection of topsoil stockpiled for re-use;
- cleanliness of the adjoining road network.



L & S CONST 13: Soils shall be reused on site where possible. Chemical analysis will be carried out to assess whether the backfill material is inert or presents a risk to human and / or environmental receptors. Suitable soil disposal routes and waste soil receiving facilities shall be determined and incorporated into the Construction & Demolition Waste Management Plan (C&DWMP) for the works.

L & S CONST 14: Excavated materials shall be visually assessed for signs of contamination. Should material appear to be contaminated or potentially contaminated, samples shall be analysed by an appropriate testing laboratory. Contaminated material shall be treated in accordance with the Waste Management Regulations. All excess fill and material considered unacceptable for reuse on site in terms of the residual risk posed to human health and to the environment shall be appropriately disposed of in accordance with the Waste Management Regulations.

L & S CONST 15: Surplus subsoil arisings caused by excavations for foundations, roads and drainage shall be minimised and where necessary, stockpiled and taken off-site to a licensed landfill facility. Any topsoil that is removed shall be used for re-grading at a later stage.

L & S CONST 16: Top-soiling and landscaping of the works shall be undertaken as soon as finished levels are achieved, in order to reduce weathering and erosion and to retain soil properties. Existing topsoil shall be retained on site to be used for the proposed development

L & S CONST 17: Reusable excavated gravels, sands or rock shall be retained on-site for backfilling or drainage purposes to reduce the total volume of imported material.

L & S CONST 18: Wheel wash facilities shall be provided close to the site entrance to reduce the deposition of mud, soils and other substances on the surrounding road network.

18.3.4 Hydrology – Surface Water & Flooding

HYDROLOGY CONST 1: Back-up plans to deal with the possibility of contamination or fuel spills, e.g. pumping of wells or sumps to collect contaminated groundwater for treatment shall be undertaken and included in an overall Construction & Demolition Waste Management Plan (C&DWMP) and Emergency Operation Plan (EOP).

HYDROLOGY CONST 2: Special environmental and human health contingency plans and procedures, following best-practice guidance, shall be developed for the unexpected discovery of contaminated or illegally deposited waste materials. These may include a detailed environmental site investigation, contamination delineation, risk assessment and appropriate remediation under the design and supervision of an experienced contaminated land engineer/hydrogeologist.

HYDROLOGY CONST 3: Chemical analysis will be carried out to assess whether any fill material presents a risk to human and/ or environmental receptors and to determine a suitable on-site or off-site disposal routes.

HYDROLOGY CONST 4: All imported fill material will be sourced from approved and licenced/permitted facilities. All fill material will be confirmed to be inert prior to importation to the site including confirmation of the chemical testing and a visual assessment.

HYDROLOGY CONST 5: All waste containers (including all ancillary equipment such as vent pipes and refuelling hoses) shall be stored within a secondary containment system (e.g. a bund for static tanks or a drip tray for mobile stores and drums). The bunds shall be capable of storing 110% of the tank capacity. Where more than one tank is stored, the bund shall be capable of holding 110% of the largest tank or 25% of the aggregate capacity (whichever is greater). Drip trays used for drum storage shall be capable of holding at least 25% of the drum capacity. Where more than one drum is stored the drip tray shall be capable of holding 25% of the aggregate capacity of the drums stored.

HYDROLOGY CONST 6: Silt fencing and berms will be installed strategically around and through the site. The location of the silt fencing and berms will be determined in the construction stage C&DWMP and will be subject to a detailed assessment of the planned works methodology and works area. The purpose of the silt fencing and berms are to prevent silt laden water leaving the site and entering adjoining lands and surface waters.

HYDROLOGY CONST 7: Drainage ditches will be installed to intercept surface water where there is a risk of significant water flow into excavations, adjoining lands or watercourses. A lined attenuation pit shall be constructed at the lowest point to capture any surface water at this point. There will also be a requirement to periodically pump water from excavations. All collected and pumped water will have to be treated prior to discharge. The run-off will be directed through appropriately sized settlement ponds or tanks to remove suspended solids.

HYDROLOGY CONST 8: Monitoring prior to, during and post construction works of surface water and groundwater quality shall be undertaken to ensure minimum disturbance of water quality in the general vicinity of the site. During the construction phase, the monitoring programme will include daily checks, weekly inspections and monthly audits to ensure compliance with the Construction Environmental Management Plan. This will be undertaken in consultation with the wishes of Limerick City & County Council.

HYDROLOGY CONST 9: Waste fuels and materials shall be stored in designated areas that are isolated from surface water drains or open waters (e.g. excavations). Skips will be closed or covered to prevent materials being blown or washed away and to reduce the likelihood of contaminated water leakage. Hazardous wastes such as waste oil, chemicals and preservatives, will be stored in sealed containers and kept separate from other waste materials while awaiting collection by a registered waste carrier. Fuelling, lubrication and storage areas and site offices will not be located within 50m of drainage ditches, surface waters or open excavations. Fuel interceptor tanks will be installed on the site to treat any runoff.

HYDROLOGY CONST 10: Wash-out areas on site will be located greater than 50m from any natural watercourse and properly designed with an impermeable liner to contain all cement laden water. No wash-out of ready-mix concrete vehicles shall be located within 10 metres of any temporary or permanent drainage features. Signage shall be erected to clearly identify the wash-out areas. Sufficient wash-out areas shall be provided to cater for all vehicles at peak delivery times.

HYDROLOGY CONST 11: All waste material (both soils and other) generated will be temporarily stored in secure bunded areas thereby preventing the migration of leachate or contaminating substances from impacting on the surrounding environment.

HYDROLOGY CONST 12: Adequate security measures shall be installed on the construction site the design of the construction site layout and security measures required will take account of the sensitivity of the project and potential locations at risk. Security measures will include secure fencing, secure site access, securing site plant and equipment, secure storage of materials, sufficient warning signage, and security lighting.

HYDROLOGY CONST 13: All construction vehicles, plant and machinery shall be maintained on a weekly basis and checked daily to ensure any damage or leakages are corrected. Precautions shall be taken to avoid spillages, including:

- Supervision of deliveries and refuelling activities;
- Use of secondary containment e.g. bunds around oil storage tanks;
- Use of drip trays around mobile plant; and
- Designating and using specific impermeable refuelling areas isolated from surface water drains.

18.3.5 Air Quality & Climate

AIR QLTY & C CONST 1 - Dust mitigation measures appropriate for sites with a medium risk of dust impacts shall be implemented during the construction phase of the proposed development. The dust mitigation measures have been developed in the form of a Dust Management Plan which is detailed within Appendix 10.1. The Dust Management Plan as detailed in Appendix 10.1 shall be agreed with the planning authority prior to construction and the measures implemented throughout the construction phase of the proposed development.

AIR QLTY & C CONST 2 - The following best practice measures shall be implemented on site to prevent significant GHG emissions and reduce impacts to climate:

- 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.
- Sourcing materials locally where possible to reduce transport related CO2 emissions.

18.3.6 Noise & Vibration

N & V CONST 1: Construction site hoarding will be constructed around the site boundaries as standard. The hoarding will be constructed of a suitable material in order to provide a good level of sound insulation. The placement of site buildings such as offices and stores will be used, where feasible, to provide noise screening when placed between the source and the receiver.

N & V CONST 2 : Static plant such as compressors and generators shall 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. 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.

N & V CONST 3: 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.

N & V CONST 4: The contract documents will clearly specify the construction noise criteria included in Chapter 11.0 which the construction works must operate within. The Contractor undertaking the construction of the works will be obliged to take specific noise abatement measures and comply with the recommendations of *BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Noise* and the European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001.

N & V CONST 5: If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control “at source”. Referring to the potential noise generating sources for the works under consideration, the following best practice migration measures should be considered:

- For mobile plant items such as dump trucks, excavators and loaders, the installation of an acoustic exhaust and or maintaining enclosure panels closed during operation can reduce noise levels by up to 10dB. Mobile plant should be switched off when not in use and not left idling. For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- Demountable enclosures can also be used to screen operatives using hand tools and will be moved around site as necessary.
- All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

N & V CONST 6: A designated environmental liaison officer will be appointed to site during construction works. Any noise complaints should be logged and followed up in a prompt fashion by the liaison officer.

18.3.7 Material Assets – Traffic & Transport

T & T CONST 1: A Construction Traffic Management Plan (CTMP) is to be prepared in consultation with Limerick City and County Council. The CTMP will mitigate traffic impact through:

- programming deliveries outside of peak periods
- ensuring construction vehicles route to site via agreed routes and junctions
- ensuring the construction compound accommodate all construction staff, parking, deliveries and safe vehicle turning
- ensuring construction vehicles will be covered during dry weather to prevent dust emissions
- ensuring wheel washers provided to ensure debris and mud are not taken onto the local road
- ensuring trained banksmen will marshal delivery vehicles within the site & access/exit.

18.3.8 Material Assets – Built Services

BUILT SERV CONST 1 - Provision of Utilities shall be carried out and monitored in accordance with the recommendations and requirements of the relevant statutory bodies (ESB, Gas Networks Ireland, Irish Water, EIR, Limerick City and County Council etc.) and to ensure compliance with health & safety legislation.

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BUILT SERV CONST 2 - Prior to the commencement of excavations in public areas, all utilities and public services are to be identified and checked; to ensure that adequate protection measures are implemented to minimise the risk of service disruption.

BUILT SERV CONST 3 - All proposed connections to existing services shall be constructed at off-peak times to minimise disruption to neighbouring properties.

BUILT SERV CONST 4 - Water metering shall be included to record consumption to ensure there are no leaks as a result of the project.

18.3.9 Material Assets – Waste Management

WM CONST 1 - Cut and fill on the site has been minimised through the design process. . The quantum of fill required on site shall be reduced by reusing bedrock as Class 1 material any other existing site won materials as appropriate.

WM CONST 2 - Prior to commencement, the appointed Contractor(s) will be required to prepare a Resource Waste Management Plan (RWMP) in agreement with LCCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream. The Contractor will be required to fully implement the RWMP throughout the duration of the proposed construction phase.

WM CONST 3 - A Resource Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the demolition, excavation and construction works. All construction staff will be provided with training regarding the waste management procedures.

WM CONST 4 - 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. The following waste types, at a minimum, will be segregated:

- Concrete rubble (including ceramics, tiles and bricks);
- Plasterboard;
- Metals;
- Glass; and
- Timber.

WM CONST 5 - A quantity of soil, stone, gravel and clay will need to be excavated to facilitate the proposed development. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

WM CONST 6 - 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; (alternatively, the waste will be sorted for recycling, recovery or disposal).

WM CONST 7 - 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).

WM CONST 8 - All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal and will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities.

WM CONST 9 - All waste leaving the site will be recorded and copies of relevant documentation maintained. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the EC (Waste Directive) Regulations (2011). EPA approval will be obtained prior to moving material as a by-product. However, it is not currently anticipated that Article 27 will be used.

18.3.10 Cultural Heritage

CH CONST 1: The children's burial ground (LI005-007---) located within the Masterplan area will be preserved *in situ* as an undeveloped greenspace and is outside the Phase 3 area. A 20m buffer from the outer edge of the monument will be established prior to any construction works commencing within the site.

CH CONST 2: The 20m buffer around the children's burial ground (LI005-007---) will be fenced-off with Harris fencing prior to the commencement of construction to protect the site during the course of works. This fence shall remain in place until all development works have been completed. The fencing will be erected under archaeological supervision and no construction related activities, such as machine movements, dumping of spoil or storage of materials will occur within the fenced-off area.

CH CONST 3: Previously unrecorded features of potential archaeological origin shall be preserved by record through a programme of archaeological excavation and recording under licence from the National Monuments Service (NMS) in the Department of Housing, Local Government and Heritage. The archaeological excavations will be undertaken in advance of the main construction works in the relevant areas in order to allocate adequate time to appropriately excavate and record the archaeological deposits/features.

CH CONST 4: A post-excavation phase of works, involving analysis, reporting and dissemination to the relevant authorities will be undertaken off site. The level of the post excavation analysis and reporting will be commensurate with the level of archaeology excavated on site.

18.3.11 The Landscape

LVA CONST 1 – A site planning design strategy to retain boundary hedgerows and tree protection measures was designed and is to be implemented on site as detailed in the Landscape and Mitigation Diagram in Chapter 16.

LVA CONST 2 – Site hoarding shall be erected to screen views of construction activities.

LVA CONST 3 - Tree protection measures shall be installed to ensure vegetation to be retained is fully protected during the construction process.

18.4 OPERATIONAL PHASE MITIGATION

18.4.1 Population & Human Health

No mitigation proposed.

18.4.2 Biodiversity

BIO OPER 1: The SUDS strategy as designed shall be implemented on site as it will reduce the impact of the flow of surface water and storm water on the adjacent aquatic environments (drainage ditches).

BIO OPER 2: The habitats to be retained outside of the development shall be fenced off from the public so that they remain undisturbed for wildlife. These habitats include the proposed new pond, new and existing wet grassland and drainage ditches (the latter will be separated from the development by a boundary wall).

18.4.3 Land & Soils, Geology & Hydrogeology

L & S OPER 1: An appropriately designed drainage system has been incorporated into the design of the proposed development. The system has been designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS), the CIRIA SUDS Manual 2015 and Recommendations for Site Development Works for Housing Areas published by the Department of the Environment and Local Government. It involves ensuring that suitable protection measures of runoff infiltration to ground including permeable paving, gullies and catch pits, lined attenuation structures and oil-water interceptors are provided. The design takes into consideration the groundwater vulnerability rating and all surface water SUDS features within 1m of the bedrock will be wrapped with impermeable geotextile to prevent potentially contaminated water entering the aquifer.

18.4.4 Hydrology – Surface Water & Flooding

HYDROLOGY OPER 1: An appropriately designed drainage system has been incorporated into the design of the proposed development. The system has been designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS), the CIRIA SUDS Manual 2015 and Recommendations for Site Development Works for Housing Areas published by the Department of the Environment and Local Government. It involves ensuring that suitable protection measures of runoff to surface water including permeable paving, gullies and catch pits, lined attenuation structures and oil-water interceptors are provided.

18.4.5 Air Quality & Climate

AIR QLTY & C OPER 1 - The development shall be Nearly Zero Energy Building (NZEB) compliant in accordance with the 2021 Part L requirements. Each building shall have a Building Energy Rating (BER) to comply with the NZEB requirements.

AIR QLTY & C OPER 2 - Renewable technologies in the form of air to water heat pumps shall be fitted to each unit. Passive design measures include the use of the building fabric to take advantage of the site constraints/orientation to maximise the daylight factors, natural ventilation and solar benefits. Natural daylight factors in accordance with BRE and CIBSE recommendations have been targeted.

18.4.6 Noise & Vibration

No mitigation proposed.

18.4.7 Material Assets – Traffic & Transport

No mitigation proposed.

18.4.8 Material Assets – Built Services

No mitigation proposed.

18.4.9 Material Assets – Waste Management

RES & WM OPER 1: 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.

RES & WM OPER 2: 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.

RES & WM OPER 3: All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

18.4.10 Cultural Heritage

CH OPER1: An Archaeological Management Plan for the Phase 1 area (Planning Ref. 21/1800) was submitted to Limerick City and County Council. This included mitigation measures to manage and protect the children's burial ground (LI005-007----) during the operational phase which will also apply for the operational phase of the proposed development.

- A policy of minimal change shall be adopted with regard to the existing features of the archaeological monument. The existing site is surrounded by bushes and thick bramble and these shall be retained to define the perimeter of the monument. Any non-woody shrubs around the perimeter of the monument shall be pruned/removed by hand during routine maintenance. Maintenance involving minimal change will help the site to retain its current character, ensure that the archaeological monument remains inviolate and that the plant and animal ecosystems that have developed naturally on the monument are not unnecessarily disturbed.
- The site will be framed by a buffer of wildflower meadow around its periphery, which will be subject to bi-annual maintenance, which will include strimming/cutting of vegetation using hand tools. Material will be removed from the site to a designated dumping site located outside the 20m buffer around the monument. Any wind-blown modern plastics or other debris identified within the site during routine maintenance shall be collected and removed to an appropriate facility. No burning of materials shall occur.
- Routine bi-annual maintenance shall include monitoring the condition of the monument and its surrounds and the identification of evidence of inappropriate usage or anti-social behaviour.
- Interpretive signage shall be erected approximately 20m from the exterior edge of the feature (outside the buffer surrounding the monument). The signage shall include a description of the

site as provided by the Archaeological Survey of Ireland and a generic explanation of the monument type.

18.4.11 The Landscape

LVA OPER 1 - The architectural design of the buildings as proposed shall be delivered as per the planning drawings as they aim to reduce the visual mass through its form and choice of materials.

LVA OPER 2 - The retention of existing native hedgerows as detailed in the Landscape and Visual Mitigation Diagram shall assist the visual integration of the building into the landscape and mitigate the visual impact.

LVA OPER 3 - The landscape proposals as detailed on the Landscaping Plan inclusive of green links, trees, hedgerows, wetlands, SUDS features, woodland blocks and wildflower meadow shall be implemented in full. These elements will assist the visual integration of the building into the landscape and mitigate the visual impact.

LVA OPER 4 - The visual screening provided by the proposed hedgerows and tree belts indicated on the KFLA Landscape and Visual Mitigation Diagram shall be implemented during the first planting season following construction of the houses.

LVA OPER 5 - Periodic tree surveys and implementation of a tree management plan for the mature trees on site to ensure their continued sustainability shall be undertaken.

LVA OPER 6 - The implementation and monitoring of the landscape management plan shall be undertaken for the full duration of the defects liability period to ensure successful establishment of the proposed planting scheme and trees.

18.5 MONITORING

18.5.1 Population and Human Health

- No monitoring proposed.

18.5.2 Biodiversity

- Prior to construction water testing should be conducted to provide baseline information on water quality for the two water courses (drainage ditches) adjacent to the overall site.
- Suitably qualified personnel will be appointed by the contractor to monitor the construction process and a daily environmental record will be kept of any accidents, leaks or spills and how they were addressed. The appointed personnel will also monitor the removal of any of the trees and hedgerows and should any nests or bat roosts be identified then work will cease and the ecologist contacted. Similarly if any of the Qualifying Interest species for the European Sites should occupy the site during construction (as detailed in the Stage 2 Appropriate Assessment for NIS Report), then works will cease immediately and the relevant authority (NPWS) will be contacted for advice on proceeding.

- On completion of the construction phase water monitoring of surface water must be completed to determine any changes to water quality as a result of the construction process.
- All onsite environmental record sheets will be collated and an environmental report compiled on completion of the construction phase. This report will be made available to LC&CC.
- A qualified ecologist will complete a walkover survey of the development site on completion to ensure that all SuDs measures and landscaping measures have been implemented. A report of this survey will be made available to LC&CC.

18.5.3 Land & Soils, Geology & Hydrogeology

- Soil removed during the construction phase is to be monitored to maximise potential for re-use on site. Monitoring of any hazardous material stored on-site will form part of the proposed Construction & Waste Management Plan. A dust management/monitoring programme should be implemented during the construction phase of the development. The quantities of topsoil and subsoil removed off site will be recorded.
- The ongoing monitoring and maintenance of surface water treatment features such as petrol interceptors, gullies, and catch pit manholes

18.5.4 Hydrology – Surface Water & Flooding

- Monitoring prior to, during and post construction works of surface water and groundwater quality shall be undertaken to ensure minimum disturbance of water quality in the general vicinity of the site. During the construction phase, the monitoring programme will include daily checks, weekly inspections and monthly audits to ensure compliance with the Construction Environmental Management Plan. This will be undertaken in consultation with the wishes of Limerick City & County Council.
- Monitoring of any hazardous material stored on-site will form part of the proposed Construction & Waste Management Plan.
- The ongoing monitoring and maintenance of surface water treatment features such as petrol interceptors, gullies, and catch pit manholes

18.5.5 Air Quality & Climate

- Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase, particularly during the ground works phases, 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/m²/day during the monitoring period of 30 days (+/- 2 days).

18.5.6 Noise & Vibration

- No monitoring proposed.

18.5.7 Material Assets – Traffic & Transport

- The appointed contractor will be obliged to appoint a traffic liaison officer/traffic manager who will be involved in preparing the CTMP and to monitor the performance of the CTMP. The traffic liaison officer will be available to receive complaints, comments and queries about the traffic generated by the construction site and traffic issues associated with the site.
- Regular meetings will be held on-site to which with all relevant stakeholders will be invited. The traffic liaison officer/traffic manager will liaise with:
 - Limerick City and County Council (LCCC) including Elected Members
 - An Garda Síochána
 - Other relevant statutory bodies
 - Members of the community.
 - Adjacent contractors

18.5.8 Material Assets – Built Services

- Water consumption will be monitored for the development during construction through the use of water meters. This will ensure that any potential leaks as a result of construction are addressed promptly.
- All water mains to be pressure tested and cleaned in accordance with the Irish Water code of practice prior to connecting to the existing potable water supply network. This will ensure that the watermain is leak free, clean and ready to receive water before the development is operational.
- All foul sewers to be pressure tested and cleaned in accordance with the Irish Water code of practice prior to connecting to the existing foul sewer network. This will ensure that the foul sewer is leak free, clean and ready to receive foul effluent before the development is operational.
- All new infrastructure, which is to serve the proposed development, is to be routinely inspected with any maintenance carried out, as required.
- Any monitoring of the built services required during the operational phase of the proposed project will be as advised by the relevant services providers.

18.5.9 Material Assets – Waste Management

- A Resource Manager shall be appointed, who will have responsibility for monitoring the actual waste volumes being generated and ensuring that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the Resource Manager will identify the reasons for this and work to resolve any issues. Recording of waste generation during the construction phase of the proposed development will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future developments.

18.5.10 Cultural Heritage

Following the completion of all required post-excavation analyses, including environmental, artefact studies and dating, a final report on the excavations will be submitted to the statutory and relevant bodies.

18.5.11 The Landscape

- All tree protection measures will be monitored by a qualified Arborist throughout the construction period.
- A landscape management plan will form part of the works contract and include for ongoing maintenance of the planting scheme. A qualified landscape architect will monitor the post installation management and maintenance of the scheme by a suitable qualified landscape contractor. The landscape works and maintenance contracts will include a requirement for replacement planting to ensure the full design intent is realised.

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