

Environmental Impact Assessment Report

Rosshill Strategic Housing
Development, Co. Galway

Volume 1: Non-Technical Summary and Main
Report





DOCUMENT DETAILS

Client: **Alber Developments Ltd.**

Project Title: **Rosshill Strategic Housing Development, Co. Galway**

Project Number: **181058-b**

Document Title: **Environmental Impact Assessment Report (EIAR)**

Document File Name: **EIAR – F – 2021.07.02 – 181058-b**

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Rev	Status	Date	Author(s)	Approved By
01	Final	02/07/2021	TB	MW

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NON-TECHNICAL SUMMARY

Introduction

This Environmental Impact Assessment Report ('EIAR') has been prepared by McCarthy Keville O'Sullivan Ltd. (MKO) on behalf of Alber Developments Limited, which intends to apply to An Bord Pleanála (ABP) under the Planning and Development Act 2000 (as amended by the Residential Tenancies Act 2016) for a strategic housing scheme located in the townlands of Roscam and Merlin Park, Co. Galway. The application is being made under the Strategic Housing Provisions of the Planning and Development (Housing) and Residential Tenancies Act, 2016.

The site area comprises approximately 4.7 hectares of land. It is located on the Rosshill Road, which connects to the Old Dublin Road in the west and the Coast Road in the east. The general area is rural in character and is surrounded by a number of small residential developments and individual houses. A number of individual houses and the Rosshill Stud Farm lie to the south, with agricultural lands to the east. Galway bay and agricultural lands lie to the west of the site. The Galway to Dublin trainline runs along the northern border of the site. The site and surrounds are zoned Residential and so the character of the area is transitioning to that land use.

The applicant for the proposed development is Alber Developments Ltd. Alber Developments is a national house building company set up in 2017. The senior management team has over 30 years of construction experience and has developed major commercial and residential projects both in Ireland and the UK.

Alber Developments have employed an experienced Design Team to ensure that this development will be delivered to meet all the relevant planning, environmental and sustainability requirements.

Need for the Development

There is currently a significant shortage of housing units available to service the housing market (including the rental market) in Galway City and the surrounding areas. The proposed development will contribute significantly to alleviating the shortage of housing supply in Galway and brings into use lands zoned specifically for that purpose.

In addition, the construction industry, through projects such as the proposed development, makes a significant contribution to economic development in Ireland. Notwithstanding the Covid-19 related crisis (which prevails at the time of submission of this application), there remains strong demand for housing in the Galway MASP area, for which the proposed development will be able to provide. The proposed strategic housing development will provide a significant supply of mixed tenure residential units which will contribute towards the aim of growing the population of the Galway MASP in a sustainable manner in accordance with national, regional and local planning policy.

Purpose and Structure of this EIAR

The purpose of the EIAR is to document the current state of the environment in the vicinity of the proposed development site and to quantify the likely significant effects of the proposed development on the environment. The EIAR submitted by the applicant provides the relevant environmental information to enable the Environmental Impact Assessment (EIA) to be carried out by the competent authority.

The information to be contained in the EIAR is prescribed by statutory regulation and informed by various guidelines. The Environmental Protection Agency (EPA) recently published its ‘Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports’ (EPA, August 2017), which are intended to guide practitioners during the transition to new Regulations transposing the updated Directive. These draft guidelines have also been used in the compiling of this EIAR.

The EIAR project team comprises a multidisciplinary team of experts with extensive experience in the assessment of similar developments and in their relevant area of expertise. Each chapter of this EIAR has been prepared by a competent expert in the subject matter. The chapters of this EIAR are as follows:

- The chapters of this EIAR are as follows:
- Introduction
- Background to the Proposed Development
- Consideration of Reasonable Alternatives
- Description of the Proposed Development
- Population & Human Health
- Biodiversity,
- Land, Soils and Geology
- Hydrology and Hydrogeology
- Air and Climate
- Noise and Vibration
- Landscape and Visual
- Cultural Heritage
- Material Assets – including Traffic
- Interaction of the Foregoing
- Schedule of Mitigation

The EIAR submitted by the applicant provides the relevant environmental information to enable the EIA to be carried out by the competent authority. A Natura Impact Statement has also been prepared in line with the requirements of the Habitats Directive, and will be submitted to the Planning Authority as part of the planning application documentation.

Background to the Proposed Development

The Background to the Proposed Development chapter presents information on the strategic planning context for the proposed development, the site selection and design process, a description of the proposed development site and its planning history, the assessment of alternatives, scoping and consultation, and the cumulative impact assessment process.

The site comprises agricultural land in rough grazing. It previously formed a par-3 golf course however the old greens and fairways are now fallow and overgrown. The subject site is zoned for Low Density Residential (LDR) and Agriculture and Amenity (G) development under the Galway City Development Plan 2017-2023.

A review of the Galway City Council online map-based planning search indicates that there have been a number of planning applications on the subject lands, with the most notable developments being outlined.

A scoping letter providing details of the application site and the proposed development, was prepared by McCarthy Keville O’Sullivan Ltd. and circulated on 15th February 2021 to statutory agencies, NGOs and other relevant parties.

This EIAR also considers the potential for cumulative effects from the proposed development with other key existing, permitted or proposed projects.

Reasonable Alternatives

This chapter of the EIAR contains a description of the reasonable alternatives that were considered in respect of the development of the site, in terms other land-use options, unit numbers, unit types, design, construction methods and site layout.

A number of alternative development options for the site were analysed, including a ‘do nothing’ option. The chapter provides an overview as to the manner in which the proposed development design has evolved and provides evaluation of the comparable potential for environmental effects. The design process was an iterative process, where findings at each stage of the design’s evolution were used to further refine the design, always with the intention of minimising the potential for environmental impacts.

The current proposed development layout is the culmination of an extensive design process. Overall, the proposed development is a better design from an environmental perspective than the alternatives previously considered. The proposed development provides for an appropriate number of residential units at a density that is consistent with the provisions of the *Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (2009)*. Following a Section 247 meeting with Galway City Council a number of additional amendments were made to the design of the project which included taking in feedback surrounding open space, parking provisions and design details. These amendments included:

- Additional revisions to the landscaping design, including elements surrounding connectivity, play equipment, retention/reinforcement of tress, larger open, revisions to smaller areas of open space to make them more attractive and the introduction of public art elements.
- Amendments to the positioning of the apartment block, car parking, further development of the character of the site, amendments to road materials to promote traffic calming and the creation of further permeability.

Alternative land uses, processes and mitigation measures are also considered in this chapter.

Description of the Proposed Development

The proposed development site comprises approximately 4.704 ha of land located within the townlands of Roscam and Merlin Park to the south east of Galway City. It is located south of Rosshill Road, which connects to the Old Dublin in the west and the Coast Road in the east. The general area is rural in character and is surrounded by a number of small residential developments and individual houses. A number of individual houses and the Rosshill Stud Farm lie to the south, with agricultural lands to the east. The Merlin Park Hospital lies to the north. Galway bay and agricultural lands lie to the west. The Galway to Dublin trainline runs along the northern border of the site.

The proposed development will consist of the following:

1. *Construction of 102no. residential units comprising of 35 apartments and 67 houses:*
2. *Demolition of the existing silage concrete apron (40sqm)*
3. *Childcare facility (399sqm over 2-storeys) associated outdoor play areas and parking*
4. *Retail/Commercial space (188.5sqm) including loading bay*
5. *Provision of shared communal and private open space, including play and fitness equipment*
6. *Car and cycle parking, including electric vehicle charging points*
7. *Provision of all associated surface water and foul drainage services and connections including pumping station*
8. *Landscaping, access routes and public art*
9. *Lighting and associated works*
10. *Access and junction improvements at Rosshill Road and Rosshill Stud Farm Road*

11. *Provision of a footpath connectivity link along Rosshill Road and Rosshill Stud Farm Road*
12. *All associated works and services*

There are no protected structures or archaeological monuments located within the application site; however, there is a National Monument Record (Record number GAA094-070) which is described as a ‘folly’ located circa 98 m south of the proposed site and a National Monument Record (Record number GA094-122) described as an ‘enclosure’ is located circa 60 m north of the proposed site. The site is also located to the south of a Protected Structure, Rosshill Railway Bridge (RPS 8806, NIAH 30409423)

The lands are not located in any Natura 2000 designated sites (European Ecologically designated sites). However, the site is located approximately 200 metres east of the Galway Bay Complex (SAC) and Special Protection Area (SPA), approximately 4.3 kilometres to the southeast of the Lough Corrib Special Area of Conservation. In this regard, an Appropriate Assessment Screening has been undertaken and a Natura Impact Assessment prepared.

Access to the proposed development is to be facilitated via the Rosshill Road as detailed in Figure 4.2.

A network of footpaths throughout the proposed development will provide a high rate of accessibility to the landscaped amenity areas including a playground, outdoor exercise equipment and kickabout areas. The inclusion of these attractive, well designed walking routes will encourage pedestrians to access the local facilities on foot as opposed to taking their personal vehicles.

Construction methodologies that will be used for the proposed housing development are described in this chapter. Further details are also provided in the Construction and Environmental Management Plan (CEMP) included as Appendix 4-2 of this EIAR. All construction methodologies proposed conform to industry best practice.

In general, the hours in which vehicles will arrive and depart will coincide with the expected site working hours of 7.00am to 7.00pm in the evening from Monday to Friday, and 7:00am to 2:00pm on Saturday.

Before completion of the construction phase of the proposed development, landscaping works will be carried out to improve the visual amenity of the site. These landscaping works will follow the layout of the landscape plan provided in the Landscape Master Plan.

Population & Human Health

One of the principal concerns in the development process is that people, as individuals or communities, should experience no diminution in their quality of life from the direct or indirect impacts arising from the construction and operation of a development.

Information regarding human beings and general socio-economic data were sourced from the Central Statistics Office (CSO), the Galway City Development Plan 2017 – 2023, Fáilte Ireland and any other literature pertinent to the area. The study included an examination of the population and employment characteristics of the area. This information was sourced from the Census of Ireland 2016, which is the most recent census for which a complete dataset is available, also the Census of Ireland 2011, the Census of Agriculture 2000 and 2010 and from the CSO website, www.cso.ie.

Galway City, where the proposed development is located has a host of amenities and community facilities, including GAA, Rugby and other sports clubs, youth clubs and recreational areas. The closest church to the proposed development site is 2 kilometres to the west in Renmore.

There are a wide range of services available in the area. Retail and personal services are centred in Galway city centre, and there are further shops and businesses located in the surrounding area such as Roscam and Doughiska. Galway City Council has a public library located nearby in Ballybane.

Within the proposed development site, the provision and maintenance of pedestrian and cycle infrastructure is intended, ensuring connectivity with adjoining routes and off-site networks. High quality secure bicycle parking facilities for both short term and long term bicycle parking requirements will also be provided.

The primary school located closest to the proposed development site is the Merlin Woods Primary School, located in Doughiska, approximately 1.2 kilometres northeast of the proposed development site. The secondary school located closest to the proposed development site is Colaiste Mhuirlinne, which lies adjacent to the Merlin Woods Primary school and is also approximately 1.2 kilometres northeast of the site.

The third-level institution of Galway-Mayo Institute of Technology (Cluain Mhuire Campus) is located approximately 1.5 kilometres northwest of the proposed development site. The National University of Ireland (NUI) Galway main campus is located 4.8 kilometres to the west of the site. It is estimated that approximately 20% of the population of Galway city are students.

There are no tourist attractions pertaining specifically to the site of the proposed development. Key tourist attractions within the wider area of Galway City include NUI Galway, a number of theatres, Sports facilities (Eamon Deacy Park, The Sportsground, Galway Racecourse, Pierce Stadium, etc.).

Overall the proposed development will have no significant negative impacts on Population and Human Health. There will be a slight positive cumulative operational impact on tourism between the proposed site and other projects in the area, where an increase in residents and tourists within the area will allow for a positive influence on local tourism.

Biodiversity

Between April 2019 and May 2021, a range of ecological survey work has been undertaken to provide comprehensive information on all ecological aspects of the location of the Proposed Development and the surrounding area. These surveys included detailed assessment of the site in terms of protected habitats and species. The studies and survey work undertaken provide a comprehensive inventory of the flora and fauna of the study area.

The proposed development site is a former golf course. The majority of the site comprises a network of semi-improved, species poor Dry neutral grassland (GS1), with a small area of poorly-drained grassland at the north-west of the site was classified as *Wet grassland (GS4)*. The north-eastern corner of the site consists of a relatively disturbed area with imported rock and rubble. Scattered native and non-native trees are present throughout the site. A number of relatively immature trees are located to the southeast of the site. Treelines (WL2), comprised predominantly of mature and immature ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*) and beech (*Fagus sylvatica*) demarcate the southern, eastern and part of the northern boundaries of the development site. None of the habitats within the works areas correspond to those listed on Annex I of the EU Habitats Directive. No watercourses were recorded within or adjacent to the development site.

The development has been designed to minimise the loss of treelines delineating the site boundaries. While it is proposed to maintain the majority of these treelines, including the mature beech treeline delineating the site's western boundaries. In addition, A landscaping plan has been prepared for the proposed development and provides for the retention of existing treelines and woodland within and around the site periphery, or for the recreation of similar features through tree, hedge and native woodland planting in the new development in order to ameliorate any tree loss. Therefore connectivity with the woodland to the west of the development site and the wider landscape will be maintained.

There will be no significant impacts on biodiversity given the nature, scale and design of the proposal. No significant residual effects on surface water quality, groundwater quality or the local hydrological/hydrogeological regime were identified.

The potential residual impacts on ecological receptors will not be significant and no potential for the proposed development to contribute to any cumulative impacts on biodiversity when considered in combination with other plans and projects was identified

Potential impacts on European Designated Sites (SACs and SPAs) are assessed within a separate Screening for Appropriate Assessment report and Natura Impact Statement. The NIS states that: “it can be objectively concluded that the Proposed Development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site”.

Land, Soils and Geology

The elevation of the site ranges between approximately 8 and 20m OD (metres above Ordnance Datum) The overall local topography generally slopes from east to west, towards the shoreline located ~ 500m southeast of the proposed site.

The topography of the site was further investigated during a site visit on 10th September/2019. Within the site itself, a topographically high area is located toward the centre of the site, the ground slopes steeply to the west of this section, before becoming relatively flat. The ground generally slopes steadily east and northeast of this section, towards a topographical low point at the northeast of the site. The dominant land use on the bordering land is agricultural, with Rosshill Farm Stud located ~ 200m south of the site.

The Proposed Development site is underlain by the Burren Formation which is described as pale grey clean skeletal limestone. The limestones are classified by the GSI as a Regionally Important Aquifer – Karstified (conduit) (Rkc).

The site is dominated by deep, well drained, mainly basic mineral soils (BminDW) with areas of shallow, well drained, mainly basic soils (BminSW) located towards the northwest of the site. The areas surrounding the site are all mapped as having similar soils, with the exception of smaller areas at the shoreline to the south and southwest, which are mapped as peaty gleys.

There are no known areas of soil contamination on the site. During the site walkovers, no areas of particular contamination concern were identified. Any material on the site appears to be excavated subsoil/rock type material. There are no recorded Geological Heritage sites within the proposed development area.

An assessment of the construction and operational phases of the development have been completed, along with a cumulative assessment for the development. An assessment of the potential health effects in relation to soils and geology has also been undertaken. Based on the above, and with implementation of the outlined mitigation measures, No significant impacts on the land, soil and geology of the site will occur.

Hydrology and Hydrogeology

Hydro-Environmental Services (HES) was engaged by MKO, to carry out an assessment of the potential impacts of a proposed housing development at Rosshill, Galway City, Co. Galway on water aspects (hydrology and hydrogeology) of the receiving environment.

The Proposed Development site does not contain field drains or natural watercourses and it is likely that much of the rainfall that falls on the site drains through the soils i.e. percolates to ground.

A Flood Risk Assessment was completed by Tobin Engineers in 2021 and it is estimated that the risk of flooding at the proposed residential development will be minimal, and it is predicted that the development will not increase the risk of flooding elsewhere.

The Burren Formation limestones, which are mapped to underlie the Proposed Development site are classified by the GSI (www.gsi.ie) as a Regionally Important Aquifer – Karstified (conduit). This bedrock type has typically high transmissivity and low storativity with lower gradients closer to the coast. The vulnerability rating of the aquifer within the overall site is classified as “Extreme (X –rock at/near surface)”.

There are no groundwater protection zones mapped within the proposed development site or study area. There is 1 no. mapped private well (GSI database to accuracy of <50m) located ~0.5km at Murrrough House, which was obtained from the GSI well database (www.gsi.ie). This is a shallow dug well and likely intercepts shallow water draining from the surrounding soils, rather than the bedrock aquifer.

The Proposed Development site is naturally separated from any local watercourses, and this setback distance means that there is limited potential for impact on water quality or the downstream designated sites.

Notwithstanding this, during each phase of the proposed housing development at Rosshill (construction and operation) a number of activities will take place on the proposed development site, some of which will have the potential to affect the hydrological regime or water quality at the site or its vicinity. These potential impacts generally arise from sediment input from runoff and other pollutants such as hydrocarbons and cement-based compounds, with the former having the most potential for impact during the construction phase.

Surface water drainage measures, pollution control and other preventative measures have been incorporated into the project design to minimise significant adverse impacts on water quality and downstream designated sites.

The surface water drainage plan will focus on silt management using silt fences, and silt bags, and to control runoff rates. The key surface water control measure is that there will be no direct discharge of development runoff into local watercourses. This will be achieved by avoidance methods and design methods (i.e. surface water drainage to soakaways).

Preventative measures during construction include fuel and concrete management and a waste management plan which will all be incorporated into the Construction and Environmental Management Plan.

Overall, the Proposed Development presents no significant impacts to surface water and groundwater quality provided the proposed mitigation measures are implemented.

There will be no net impact on the local hydrological regime, groundwater levels, or groundwater flowpaths during the construction and operational phase of the proposed development. There will be no direct or indirect hydrological impacts on the Galway Bay SAC.

Overall the proposal presents no significant impacts to surface water and groundwater quality provided the proposed mitigation measures are implemented. No significant cumulative impacts on groundwater or designated sites are anticipated.

Air and Climate

Due to the nature of the development, the general character of the surrounding environment and publicly available information on air quality, air quality sampling, was deemed to be unnecessary for the EIAR.

The Environmental Protection Agency (EPA) has designated four Air Quality Zones for Ireland:

- Zone A: Dublin City and environs
- Zone B: Cork City and environs
- Zone C: 16 urban areas with population greater than 15,000
- Zone D: Remainder of the country.

These zones were defined to meet the criteria for air quality monitoring, assessment and management described in the Framework Directive and Daughter Directives. The site of the proposed development lies within Zone C, which represents urban areas with a population of greater than 15,000.

The ambient air quality monitoring carried out closest to the subject site is at Bohermore in Galway City. This monitoring location also lies within Zone C which comprises urban areas with populations greater than 15,000. The air quality in the vicinity of the proposed development site is likely to be quite similar in nature and composition.

The construction of the proposed development will require the use of machinery and plant, thereby giving rise to exhaust emissions. Dust is also common emission from construction sites and there is potential for the generation of dust from during the construction phase of the proposed development. Mitigation measures have been developed and will be employed to minimise the impact of dust and vehicle emissions on air quality and climate. The overall impact on air and climate will be short term, imperceptible and negative in effect.

Noise and Vibration

Potential noise and vibration impacts may be divided into the following categories:

- Construction phase noise impacts on surrounding receptors.
- Construction phase vibration impacts on surrounding receptors.
- Post-completion noise impacts on surrounding receptors.
- Post-completion vibration impacts on surrounding receptors.
- Noise impacts within the completed development from external sources ('inward impacts').

Following a preliminary scoping exercise, it was concluded that the proposed development will not give rise to any vibration impacts following commissioning, and this category has therefore been scoped out. The remaining four categories are assessed in the noise chapter.

Typical ambient noise levels across the local area were measured, and these used to identify appropriate construction phase noise criteria. Likely construction plant were identified, and their noise emissions data used to predict likely noise levels at surrounding receptors. Predicted levels were assessed in the context of identified criteria, and mitigation measures identified where required. Potential sources of vibration during the construction phase were identified, and impacts assessed by reference to commonly applied criteria.

Noise sources associated with the commissioned development were reviewed, and potential impacts assessed. Such impacts relate chiefly to traffic, and a proposed commercial block at the northeast corner of the site. In line with emerging best practice, an assessment of inward noise impacts was undertaken, and the requirement for enhanced façade treatments was assessed.

The construction phase is expected to last 2 years. Construction will be undertaken in stages, and is unlikely to extend beyond 18 months in any particular zone. Several mitigation measures are proposed. Noise impacts will be short term and slight adverse at worst. No vibration impacts are expected.

Noise impacts associated with onsite sources at the proposed commercial units will be neutral. With respect to traffic, the proposed development will result in a slight increase in local noise levels. Impacts will be permanent and slight adverse at the nearest receptors close to the Rosshill Road – Rosshill Stud Farm Road junction.

Inward noise levels will be satisfactory in the context of WHO and ProPG criteria, subject to certain mitigation measures.

No indirect impacts or interactive effects have been identified.

There are no large scale developments previously permitted or proposed in the local area. Thus potential cumulative impacts are unlikely to arise.

Noise emissions from train movements on the adjacent railway line have been assessed, and have been used to inform the site design process. Train noise emissions are not significant when assessed using PropPG. Cumulative noise impacts with the railway line will not be significant.

Landscape and Visual

This chapter of the Environmental Impact Assessment Report (EIAR) addresses the potential landscape and visual impacts of a proposed Strategic Housing Development at Rosshill, Galway City. The emphasis in this chapter is on the likely significant effects of the proposal. It covers the assessment methodology, a description of the proposed development and the existing landscape as well as landscape policy and relevant guidance. It includes a description of Galway City Council's landscape policy and the area in which the proposed development site is located.

The Landscape & Visual assessment is based on desk study of the study area, field surveys of the site and surrounds and the use of photographs and photomontages from representative viewpoints of the site. The landscape of the area is described in terms of its existing character, which includes a description of the physical and visual character, landscape values and the landscape's sensitivity to change. The potential impacts in both landscape and visual terms are then assessed, including cumulative impact.

Desk studies and site visits determined that there would be very limited visibility of the proposed Rosshill Housing Development beyond 300 metres from the site and likely no effects on sensitive visual and landscape receptors or landscape designations in the LVIA Study Area. Photomontage assessments determined that there would be partial visibility of the proposed development from localised areas on the local road network surrounding the site.

Perceptual and aesthetic changes to the wider landscape character surrounding the site are likely to be insignificant as a result of the very limited and localised visibility. The greatest changes will occur on the footprint of the development site where the landscape will be materially altered from an unkept green field site of grassland and woodland to a suburban housing development. Considering the proposed retention of existing woodland, proposed landscaping plan and the zoning of these lands for residential purposes, landscape effects are not deemed to be significant.

Due to very effective screening of the proposed development by landform and existing vegetation there will be in minimal visual changes in the landscape of the LVIA Study Area. There are no sensitive visual receptors surrounding the site that will be impacted by the proposed development and the proposed development is unlikely to obscure or intrude upon any existing valuable scenic views. In this regard, likely visual effects are not deemed to be significant.

To conclude, likely landscape and visual effects anticipated from the proposed development are not deemed to be significant. Considering the mitigation plans in place and the zoning of these lands as residential, residual effects upon the landscape and visual amenity can be deemed to be neutral.

Archaeological & Cultural Heritage

This chapter comprises an assessment of the potential impact of the Proposed Development on the Cultural Heritage resource. Cultural heritage includes archaeology, architectural heritage and any other tangible assets. The assessment was based on GIS based mapping, desktop analysis of all baseline data and a comprehensive programme of field inspection of the Proposed Development.

The proposed SHD boundary does not contain any recorded monuments, or protected structures. The SHD boundary does extend along the public road under protected structure 8806, a 19th century railway bridge. No direct impacts to the structure as a result of the proposed development are identified. A second protected structure (Folly 8803) is situated just under 100m to the south of the proposed boundary. No direct impacts to the folly or the walled garden within which the latter is located are identified. Some features associated with the protected structure as listed by Galway City council in RPS entry 8803 are located in a range of outbuildings situated to the north-west of the folly. The features include a dove cote and a cart house. The northern portion of the outbuildings, currently occupied by a concrete apron and utilised as a silage pit, will be removed as part of the development. No direct impact to the dove cote which is located at the south-east end of the range of outbuildings will occur as part of this phase of the proposed development and is located outside the proposed development boundary.

Appropriate mitigation measures have been recommended to ameliorate any potential impacts to the archaeological and cultural heritage resource as a result of the proposed development, including any potential sub-surface archaeology which may exist within the site. The mitigation measures include geophysical survey and targeted archaeological testing under licence which should be undertaken prior to construction. Monitoring at the construction stage will also be undertaken.

Impacts on setting on National Monuments are considered to be Not Significant as the monument (Roscam Ecclesiastical Complex) and its immediate setting are well preserved. This effect could increase to Slight (cumulative) when considering all projects combined.

Visual impacts to the immediate setting of the Recorded Monuments as a result of the development are not anticipated, however, a change to its wider setting is acknowledged. The potential impact on setting of the monument as a result of the development is regarded as Not Significant given the intervening distance between same and the changes which have already taken place in the surrounding landscape.

Material Assets

The proposed development site is an existing greenfield site located immediately to the south of the Galway-Dublin Rail Line at Rosshill, Co. Galway. The site is situated approximately 4km from Galway City. The land surrounding the immediate site is mixed low-density residential, consisting primarily of one-off housing. Rosshill Farm Stud is located to the south of the proposed development site, with the Galway-Dublin Rail line bounding the north of the site. The proposed development is bounded to the north by the Rosshill Road and the Galway Dublin Rail Line, and to the East by the Rosshill Farm Stud Road.

Traffic

An assessment of the traffic impact of the proposed development in Rosshill was undertaken. The site is forecast to generate 69 vehicle movements during the AM peak and 55 movements during the PM peak times.

The Road Safety Audit carried out for the proposed development during the planning stage considered various aspects such as, junction design, provision for pedestrians, provisions for cyclists and road signage, marking and lighting. Recommendations noted from the independent company undertaking the road safety audit, CST Group Chartered Consulting Engineers, have been taken into account and the concerns raised have either been designed out or will be considered and suitable measures put in place during the detailed design stage.

The proposed development has integrated a number of measures in line with the relevant standards and guidelines, such as DMURS 2019 and the National cycle Manual, which promotes the use of sustainable travel to and from the site.

Based on this assessment it is considered that in general, the traffic generated by the proposed development in Rosshill, Co. Galway will be adequately accommodated on the local highway network in the vicinity. The Dublin Road junctions are predicted to be above capacity without the development traffic in the future design years. The analysis shows that the inclusion of the development traffic will result in a slight increase in the degree of saturation for the junctions.

The proposed Galway Bypass will ultimately reduce traffic flow at these junctions. Also, with the implementation of the Operational Phase mitigation measures, such as the pedestrian, public transport and cycling measures, a shift in the modal split can be accomplished resulting in a reduction in the impact on the junction capacities.

Other Material Assets

There are a number of services located in the area surrounding the site including electricity, gas, water, sewage and telecommunications networks. Best practices will be implemented to ensure that there are no significant impacts on these, and to ensure safety of the site workers. Site specific Waste Management Plans will be in operation through the construction and operational phases. There will be no significant impacts on material assets as a result of the proposed development.

Interaction of the Foregoing

The preceding sections of this Environmental Impact Assessment Report (EIAR) identify the potential environmental impacts that may occur in terms of Population and Human Health, Biodiversity, Land Soils and Geology, Hydrology and Hydrogeology, Air and Climate, Noise & Vibration, Landscape & Visual, Cultural Heritage and Material Assets (including Traffic), as a result of the proposed development. All of the potential impacts of the proposed development and the measures proposed to mitigate them have been outlined in the preceding sections of this report. However, for any development with the potential for significant environmental impact there is also the potential for interaction amongst these impacts. The result of interactive impacts may either exacerbate the magnitude of an impact or ameliorate it.

A matrix is presented in Table 14-1 to identify interactions between the various aspects of the environment already discussed in this report. The matrix highlights the occurrence of potential positive or negative impacts during both the construction (C) and operational (O) phases. The matrix is symmetric, with each environmental component addressed in the previous sections of this report being placed on both axes of a matrix, and therefore, each potential interaction is identified twice. Interaction in the matrix does not imply a cumulative impact.

Interactions have been identified between effects on Population and Human Health and effects on Noise and Vibration, Air and Climate, Hydrology and Hydrogeology. Interactions have been identified between effects on Biodiversity, Flora and Fauna with effects on Soils and Geology, Hydrology and Hydrogeology, Noise and Vibration. Interactions have been identified between effects on Soils and Geology with effects on Hydrology and Hydrogeology. Interactions have been identified between effects on Air and Climate with effects on Material Assets.

Where any potential interactive effects have been identified, appropriate mitigation is included in the relevant sections (Sections 5-13) of the EIAR.

In general, there are no significant negative effects associated with the proposed development or potential interactions. The development has been designed to ensure it is in keeping with its surrounds, has limited potential for environmental emissions and will have a generally positive effect for the local community and Galway City.

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1. INTRODUCTION

1.1 Introduction

This Environmental Impact Assessment Report ('EIAR') has been prepared by McCarthy Keville O'Sullivan Ltd. (MKO) on behalf of Alber Developments Ltd, which intends to apply to An Bord Pleanála (ABP) under the *Planning and Development Act 2000* (as amended by the *Residential Tenancies Act 2016*) for a strategic housing scheme located in Galway City in the townlands of Roscam, Merlin Park and Murrough. The application is being made under the Strategic Housing Provisions of the *Planning and Development (Housing) and Residential Tenancies Act, 2016*.

The site area comprises 4.7 hectares of land. It is located on the Rosshill Road, which connects to the Old Dublin Road in the west and the Coast Road in the east. The general area is rural in character and is surrounded by a number of small residential developments and individual houses. A number of individual houses and the Rosshill Stud Farm lie to the south, with agricultural lands to the east. Galway bay and agricultural lands lie to the west of the site. The Galway to Dublin trainline runs along the northern border of the site. The site and surrounds are zoned Residential and so the character of the area is transitioning to that land use.

1.2 The Applicant

The applicant for the proposed development is Alber Developments Ltd. Alber Developments is a national house building company set up in 2017. The senior management team has over 30 years of construction experience and has developed major commercial and residential projects both in Ireland and the UK.

Alber Developments have employed an experienced Design Team to ensure that this development will be delivered to meet all the relevant planning, environmental and sustainability requirements.

1.3 Planning Background

There is a considerable planning history associated with housing development proposed on the lands which form the subject-matter of this application, and which is summarised in Chapter 2 of this EIAR.

By way of introduction, it is sufficient to state that, in May 2020, An Bord Pleanála refused permission (under ref. no. ABP-306413-20) for development consisting of, *inter alia*, construction of 342 no. residential units (185 no. houses and 157 no. apartments) at the development site. Permission was refused based on three reasons. The three reasons related thematically to ecology, services, and design. The decision of An Bord Pleanála has been fully considered as part of the current proposed application.

1.4 Approach to Rectifying Reason for Refusal

Since the decision of the Board to refuse the 2020 Planning Application (Ref: ABP-306413) for the original development the applicant has taken a number of steps to rectify and address the reasons set out (where feasible). It is important to stress that the Irish Water planned upgrade works to the Merlin Park no 1 pumping station was a key reason for refusal; a matter not in the control of the developer. Steps undertaken in direct response to the reasons for refusal include:

- Carrying out a wintering bird survey for the period October 2020 to March 2021. The objective of the winter surveys is to assess the suitability of the proposed

development site to support a variety of wintering wildfowl and waders, including the bird species listed as Special Conservation Interests (SCIs) for the Inner Galway Bay SPA.; Details of the results of the wintering bird survey are provided in Chapter

- Liaising with Irish Water with respect to the upgrade of the Merlin Park pumping station. Irish Water have confirmed that the Merlin Park pumping station has the capacity to handle wastewater flows from the proposed development
- Redesigning the proposed development to improve the overall road layout, variety and distinctiveness, and enhancing the integration of existing trees and woodland into the development.

The bird surveys outlined above and the data collected has been presented in this EIAR and the accompanying NIS for the proposed development. This will allow the Board to carry out a robust assessment of the potential impacts on bird species and to consider the potential impacts on the qualifying interests on Natura 2000 sites in the vicinity of the proposed development.

1.5 Legislative Context

1.5.1 Introduction

The consolidated European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the ‘EIA Directive’), has been transposed into Irish planning legislation by the Planning and Development Acts 2000 to 2019 and the Planning and Development Regulations 2001 to 2019. The EIA Directive was amended by Directive 2014/52/EU which has been transposed into Irish law pursuant to the provisions of amendments made to Part X of the Planning and Development Act 2000 and European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018), as amended.

Accordingly, this EIAR has been prepared in compliance with the EIA Directive as amended by Directive 2014/52/EU and Irish implementing legislation, including Part X of the Planning and Development Act 2000, as amended and Planning and Development Regulations 2001 (S.I. No. 600 of 2001), as amended in particular as amended by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018).

The European Union Directive 2011/92/EU, amended by EU Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment (the ‘EIA Directive’), requires Member States to ensure that a competent authority carries out an assessment of the likely significant effects of certain types of project, as listed in the Directive, prior to development consent being given for the project. The Environmental Impact Assessment (EIA) of the proposed development will be undertaken by An Bord Pleanála as the competent authority, in compliance with the provisions of EU and Irish law and guidance.

1.5.2 EIA Screening

The relevant classes/scales of development that normally require Environmental Impact Assessment (EIA) are set out in Schedule 5 (Part 2) of the Planning and Development Regulations 2001, as amended.

Section 172 of the Planning & Development Act 2000, as amended, provides the legislative basis for mandatory EIA. It states the following:

“An environmental impact assessment shall be carried out by a planning authority or the Board, as the case may be, in respect of an application for consent for proposed development where either:

- (a) *the proposed development would be of a class specified in –*

(i) *Part 1 of Schedule 5 of the Planning and Development Regulations 2001, and either –*

- I. such development would exceed any relevant quantity, area or other limit specified in that Part, or*
- II. no quantity, area or other limit is specified in that Part in respect of the development concerned,*

or

(ii) *Part 2 of Schedule 5 of the Planning and Development Regulations 2001 and either*

- I. such development would exceed any relevant quantity, area or other limit specified in that Part, or*
- II. no quantity, area or other limit is specified in that Part in respect of the development concerned,*

Accordingly, Schedule 5 of the Planning & Development Regulations 2001, as amended sets out a number of classes and scales of development that require EIA.

With regards to the proposed strategic housing development, the provisions of Part 2 of Schedule 5 require an EIA to be undertaken where it is proposed to carry out the following - “*Construction of more than 500 dwelling units*”, as per paragraph 10 (b)(i) of Part 2 of the Schedule and urban development which would involve an area greater than either 2ha (*business district*), 10 ha (built up area) or 20ha (elsewhere) as per paragraph 10(b)(iv).

The proposed residential development does not exceed the 500 unit threshold in paragraph 10(b)(i). In respect of paragraph 10(b)(iv), the site is not located in a business district and does not propose urban development of an area greater than 10 hectares. Therefore the proposed development does not equal or exceed the relevant quantity, area or other limit specified in Part 2 of Schedule 5 and is not subject to mandatory EIA.

However, section 172 of the Planning & Development Act 2000, as amended, also sets out the basis for EIA for developments which do not equal or exceed, the relevant quantity, area or other limit specified in Part 2 of Schedule 5, i.e., “sub-threshold development”. Thus, an EIA is required where sub-threshold development is likely to have significant effects on the environment and therefore should be subject to EIA. In this context, the consideration of ‘significant effect’ is not determined by reference to relevant quantity, area or other limit thresholds but also considering factors such as the nature and location of a project must also be taken into account. On this basis, it was decided to compile an EIAR in respect of the proposed strategic housing development.

Article 299A of the Planning and Development Regulations 2001, as amended, provides that, where a planning application for a “sub-threshold” strategic housing development is accompanied by an EIAR and a request for a EIA screening determination under section 7(1)(a)(i)(I) of the 2016 Act was not made – as is the position in relation to this application – then the application shall be dealt with as if the EIAR had been submitted in accordance with subsection 172(1).

The EIAR provides information on the receiving environment and assesses the likely significant effects of the project and proposes mitigation measures to avoid or reduce these effects. The function of the EIAR is to provide information to allow the competent authority to conduct the Environmental Impact Assessment (EIA) of the proposed development.

1.5.3 Content of an EIAR

Article 5 of the EIA Directive provides that, where an EIA is required, the developer shall prepare and submit an environmental impact assessment report (EIAR) previously referred to as an Environmental Impact Statement ('EIS'). The information to be provided by the developer shall include at least:

- a) a description of the project comprising information on the site, design, size and other relevant features of the project;
- b) a description of the likely significant effects of the project on the environment;
- c) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
- d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;
- e) a non-technical summary of the information referred to in points (a) to (d); and (f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

In addition, article 94 of Schedule 6 to, the Planning and Development Act 2000 to 2019 sets out the information to be contained in an EIAR, with which this EIAR complies.

MKO was appointed as environmental consultant on the proposed project and commissioned to prepare this EIAR in accordance with the requirements of the EIA Directive as amended by Directive 2014/52/EU.

1.5.4 EIA Guidance

The Environmental Protection Agency (EPA) published its *'Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'* (EPA, August 2017), and these draft guidelines have been used in the compiling of this EIAR.

In preparing this EIAR regard has also been taken of the provisions of the *'Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment'*, published by the Department of Housing, Planning and Local Government (DHPLG) in August 2018 to the extent these guidelines are relevant having regard to the enactment of the revised EIA Directive.

The European Commission also published a number of guidance documents in December 2017 in relation to Environmental Impact Assessment of Projects (Directive 2011/92/EU as amended by 2014/52/EU) including *'Guidance on the preparation of the Environmental Impact Assessment Report'*. MKO has prepared the EIAR with regard to these guidelines also.

1.6 Brief Description of the Development

The proposed development will consist of the following across a site extending to 4.704 hectares.

1. Construction of 102no. residential units comprising of 35 apartments and 67 houses:
 - 4no. Apartment Type '1A' - 1 bed 2 person
 - 4no. Apartment Type '1B' - 1 bed 2 person
 - 3no. Apartment Type '1C' - 1 bed 2 person
 - 11no. Apartment Type '2A' - 2 bed 4 person
 - 4no. Apartment Type '2B' - 2 bed 4 person
 - 3no. Apartment Type '2C' - 2 bed 4 person
 - 3no. Apartment Type '2D' - 2 bed 4 person
 - 3no. Apartment Type '2E' - 2 bed 3 person

- 2no. House Type 'A/A1' - 4 Bed Semi Detached
- 8no. House Type 'B/B1' - 3 Bed Semi Detached
- 4no. House Type 'C/C1' - 3 Bed End of Terrace
- 2no. House Type 'C2' - 3 Bed Mid Terrace
- 2no. House Type 'D' - 2 storey town house - end of terrace - 3 bed
- 4no. House Type 'D1' - 2 storey town house - mid terrace - 3 bed
- 2no. House Type 'D2' - 3 storey town house - end of terrace - 4 bed
- 2no. House Type 'E' - 3 bed Long Semi-Detached
- 2no. House Type 'F' - 4 bed Long Semi-Detached
- 3no. House Type 'G' - 2 storey town house - end of terrace - 3 bed
- 6no. House Type 'G1' - 2 storey town house - mid terrace - 3 bed
- 3no. House Type 'G2' - 3 storey town house- end of terrace- 4 bed
- 1no. House Type 'H' - 3 Bed Semi Detached
- 1no. House Type 'H1' - 3 Bed Semi Detached - Double front
- 8no. House Type 'J/J1' - 3 Bed semi detached
- 4no. House Type 'K' - 3 bed Long Semi-Detached
- 4no. House Type 'L' - 4 bed Long Semi-Detached
- 3no. House Type 'M' - 3 Bed End of Terrace
- 3no. House Type 'M1' - 3 Bed End of Terrace
- 3no. House Type 'M2' - 3 Bed Mid Terrace

2. Demolition of the existing silage concrete apron (40sqm)
3. Childcare facility (399sqm over 2-storeys) associated outdoor play areas and parking
4. Retail/Commercial space (188.5sqm) including loading bay
5. Provision of shared communal and private open space, including play and fitness equipment
6. Car and cycle parking, including electric vehicle charging points
7. Provision of all associated surface water and foul drainage services and connections including pumping station
8. Landscaping, access routes and public art
9. Lighting and associated works
10. Access and junction improvements at Rosshill Road and Rosshill Stud Farm Road
11. Provision of a footpath connectivity link along Rosshill Road and Rosshill Stud Farm Road
12. All associated works and services

All elements of the proposed development, including parking and any works required to footpaths and roads to accommodate the project, have been assessed as part of this EIAR.


1.6.1 References to Proposed Development

For the purposes of this EIAR, where the 'proposed development' is referred to, this relates to all the project components described in detail in Chapter 4 of this EIAR. Where the 'the site' or 'proposed development site' is referred to, this relates to the primary study area for the development, as delineated by the EIAR Study Area in green as shown on Figure 1-1. Individual topics for assessment purposes, i.e. each chapter, indicate the study area used for that topic. The actual site boundary for the purposes of the planning permission application occupies a smaller area within the primary EIAR study area.

The EIAR Study Area, 'the site', encompasses an area of approximately 5.33 hectares. The planning permission site boundary for the proposed development measures approximately 4.704 hectares. The proposed development is described in detail in Chapter 4 of this EIAR.



Map Legend

 EIAR Study Area



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Drawing Title

Site Location Map

Project Title
Rosshill Strategic Housing Development

Drawn By TB	Checked By MW
Project No. 181058-b	Drawing No. Figure 1.1
Scale 1:15000	Date 29.06.21



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1.7

Need for the Development

There is currently a significant shortage of housing units available for sale and occupancy in Galway City and the surrounding areas. The rapidly increasing price of housing is a result of the shortage in supply, and many people will soon find themselves unable to afford a home. This problem is also aggravated by a lack of housing units available for the rental market also. The proposed development will contribute significantly to alleviating the shortage of housing supply in Galway and brings into use lands zoned specifically for that purpose.

In addition, the construction industry, through projects such as the proposed development, makes a significant contribution to economic development in Ireland. Notwithstanding the Covid-19 related crisis (which prevails at the time of submission of this application), there remains strong demand for housing in the Galway MASP area, for which the proposed development will be able to provide. The proposed strategic housing development will provide a significant supply of mixed tenure residential units which will contribute towards the aim of growing the population of the Galway MASP in a sustainable manner in accordance with national, regional and local planning policy.

1.8

Purpose and Scope of the EIAR

As part of the Environmental Impact Assessment process, the developer of the project must prepare and submit an Environmental Impact Assessment Report (hereafter referred to as the EIAR). This is the first step of the EIA process, as mentioned in Article 1(2)(g) of European Union Directive 2011/92/EU, as amended by Directive 2014/52/EU on assessment of the effects of certain public and private Projects on the environment (“the EIA Directive”). The EIAR is the document prepared by the developer that presents the output of the assessment. It contains information regarding the project, the likely significant effect of the project, the baseline scenario, the reasonable alternatives considered by the developer, the features and measures to mitigate adverse significant effects as well as a Non-Technical Summary and any additional information specified in Annex IV of the EIA Directive. Article 5 of the EIA Directive sets out what must be included in the EIA Report, and how to ensure that it is both of a sufficient high quality and complete. This EIAR provides a statement of the likely significant effects associated with the proposed strategic housing development.

It is important to distinguish the Environmental Impact Assessment (EIA) to be carried out by An Bord Pleanála, from the Environmental Impact Assessment Report (EIAR) accompanying the planning application. The EIA is the assessment carried out by the competent authority, which includes an examination that identifies, describes and assesses in an appropriate manner, in the light of each individual case and in accordance with Articles 4 to 11 of the Environmental Impact Assessment Directive, the direct and indirect effects of the proposed development on the following:

- a) *population and human health*
- b) *biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC*
- c) *land, soil, water, air and climate*
- d) *material assets, cultural heritage and the landscape*
- e) *the interaction between the factors referred to in points (a) to (d)*

1.9

Structure and Content of the EIAR

1.9.1

General Structure

This EIAR uses the grouped structure method to describe the existing environment, the potential impacts of the proposed development thereon and the proposed mitigation measures. Background information relating to the proposed development, consultation undertaken and a description of the

proposed development are presented in separate sections. The grouped format sections describe the impacts of the proposed development in terms of human beings and population, flora and fauna, soils and geology, water, air and climate, noise, landscape, cultural heritage and material assets such as traffic and transportation, together with the interaction of the foregoing.

The chapters of this EIAR are as follows:

- Introduction
- Background to the Proposed Development
- Consideration of Reasonable Alternatives by the developer
- Description of the Proposed Development
- Population & Human Health
- Biodiversity,
- Land, Soils and Geology
- Hydrology and Hydrogeology
- Air and Climate
- Noise and Vibration
- Cultural Heritage
- Landscape and Visual
- Material Assets – including Traffic
- Interaction of the Foregoing
- Schedule of Mitigation

The EIAR also includes a non-technical summary, which is a condensed and easily comprehensible version of the EIAR document. The non-technical summary is laid out in a similar format to the main EIAR document and comprises a description of the proposed development followed by the existing environment, impacts and mitigation measures presented in the grouped format.

1.9.2 Description of Likely Significant Effects and Impacts

As stated in the Draft ‘*Guidelines on the Information to be contained in Environmental Impact Assessment Reports*’ (EPA, 2017), an assessment of the likely impacts of a proposed development is a requirement of the EIA process. The statutory criteria for the presentation of the characteristics of potential impacts requires that potential significant impacts are described with reference to the extent, magnitude, complexity, probability, duration, frequency, reversibility and trans-frontier nature (if applicable) of the impact.

The classification of impacts in this EIAR follows the definitions provided in the Glossary of Impacts contained in the following guidance documents produced by the by the European Commission (EC) Environmental Protection Agency (EPA):

- ‘*Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report*’ (EC, 2017)
- ‘*Guidelines on the Information to be contained in Environmental Impact Assessment Reports – Draft August 2017*’ (EPA, 2017).
- ‘*Revised Guidelines on the Information to be contained in Environmental Impact Statements – Draft September 2015*’ (EPA, 2015)
- ‘*Advice Notes for Preparing Environmental Impact Statements – Draft September 2015*’ (EPA, 2015).
- ‘*Advice Notes on Current Practice in the Preparation of Environmental Impact Statements*’ (EPA, 2003)
- ‘*Guidelines on the Information to be contained in Environmental Impact Statements*’ (EPA, 2002)

Table 1-1 presents the glossary of impacts as published in the EPA guidance documents. Standard definitions are provided in this glossary, which permit the evaluation and classification of the quality,

Table 1-1 Impact Classification Terminology (EPA, 2017)

Impact Characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment
	Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative	A change which reduces the quality of the environment
Significance	Imperceptible	An effect capable of measurement but without significant consequences
	Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Very significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
	Profound	An effect which obliterates sensitive characteristics

Impact Characteristic	Term	Description
Extent & Context	Extent	Describe the size of the area, number of sites and the proportion of a population affected by an effect
	Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions
Probability	Likely	Effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented
	Unlikely	Effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented
Duration and Frequency	Momentary	Effects lasting from seconds to minutes
	Brief	Effects lasting less than a day
	Temporary	Effects lasting less than a year
	Short-term	Effects lasting one to seven years
	Medium-term	Effects lasting seven to fifteen years
	Long-term	Effects lasting fifteen to sixty years
	Permanent	Effect lasting over sixty years
	Reversible	Effects that can be undone, for example through remediation or restoration
	Frequency	Describe how often the effect will occur. (once, rarely,

Impact Characteristic	Term	Description
		occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)
Type	Indirect	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway
	Cumulative	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	‘Do Nothing’	The environment as it would be in the future should the subject project not be carried out
	Worst Case’	The effects arising from a project in the case where mitigation measures substantially fail
	Indeterminable	When the full consequences of a change in the environment cannot be described
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect
	Synergistic	Where the resultant effect is of greater significance than the sum of its constituents

Each impact is described in terms of its quality, significance, extent, duration and frequency, and type, where possible. A ‘Do-Nothing’ impact is also predicted in respect of each environmental theme in the EIAR. Residual impacts are also presented following any impact for which mitigation measures are prescribed. The remaining impact types are presented as required or applicable throughout the EIAR.

Any potential interactions between the various aspects of the environment assessed throughout this EIAR are presented in Chapter 14: Interaction of the Foregoing.

1.10

Project Team

The companies and staff listed in Table 1-2 were responsible for completion of the EIAR in respect of the proposed development. Further details regarding project team members are provided below.

The EIAR project team comprises a multidisciplinary team of experts with extensive experience in the assessment of projects and in their relevant area of expertise. The qualifications and experience of the principal staff from each company involved in the preparation of this EIAR are summarised in Section 1.9.1 below. Each chapter of this EIAR has been prepared by a competent expert in the subject matter. Further details on project team expertise are provided in the Statement of Authority at the beginning of each impact assessment chapter.

Table 1-2 below details the companies and staff that were responsible for completion of the EIAR:

Table 1-2 Companies and Staff Responsible for EIAR Completion

Consultants	Principal Staff Involved in Project	EIAR Input
MKO Tuam Road, Galway, H91 VW84	Michael Watson Thomas Blackwell Meabhann Crowe Owen Cahill Pat Roberts John Hynes Sarah Mullen Jack Workman Audrey Williams Joseph O'Brien	Project Managers, Scoping and Consultation, Preparation of Natura Impact Statement, EIAR Report Sections: 1. Introduction 2. Background to the Proposed Development 3. Reasonable Alternatives 4. Description of the Proposed Development 5. Population & Human Health 6. Biodiversity, Flora & Fauna. 9. Air & Climate 12. Landscape & Visual 14. Interaction of the Foregoing 15. Schedule of Mitigation
Hydro Environmental Services 22 Lower Main Street Dungarvan Co. Waterford	Michael Gill Adam Keegan	Preparation of EIAR Sections: 7. Land, Soils & Geology 8. Hydrology & Hydrogeology
Tobins Consulting Engineers Fairgreen House, Fairgreen Road, Co. Galway	Micheál Geraghty, Richard Daly	Flood Risk Assessment Engineering Report and Drainage Design Preparation of EIAR Section 13. Material Assets - Traffic and Transport
Damian Brosnan Acoustics	Damian Brosnan	Baseline Noise Survey and preparation of Report Section 10: Noise and Vibration
Tobar Archaeological Services	Miriam Carrol	Preparation of Section 11: Cultural Heritage

1.10.1 Project Team Members

1.10.1.1 MKO

Michael Watson, MA; MIEMA, CEng, PGeo

Michael Watson has over 19 years' experience in the environmental sector. Following the completion of his Master's Degree in Environmental Resource Management, Geog from National University of Ireland, Maynooth he worked for the Geological Survey of Ireland and then a prominent private environmental & hydrogeological consultancy. Michael's professional experience includes managing Environmental Impact Assessments on behalf of clients in the renewable energy, waste management, commercial and industrial sectors nationally. These projects have required liaising with the relevant local authorities, Environmental Protection Agency (EPA) and statutory consultees as well as coordinating the project teams and sub-contractors. Michael has significant experience in the EPA Industrial Emissions, IPPC and Waste licensing regimes managing licence applications and subsequent regulatory compliance on behalf of clients in the waste and industrial sectors. Michael also has a Bachelor of Arts Degree in Geography and Economics from NUI Maynooth, is a Member of IEMA, a Chartered Environmentalist and Professional Geologist.

Meabhann Crowe BA (Hons), M.Sc.

Meabhann Crowe is a Project Planner with McCarthy O'Sullivan Ltd with over 10 years private sector experience. She is a fully chartered member of the Royal Town Planning Institute (MRTPI). Meabhann holds a BA (Hons) in Geography, Sociological and Political Science and a Masters in Urban and Regional Planning. Prior to taking up her position with McCarthy Keville O'Sullivan in October 2018, Meabhann was employed as an Associate Director with Colliers International in their Edinburgh office, prior to which she was employed for several years with Halliday Fraser Munro. In her time in the industry Meabhann has been active on a number of instructions across a broad spectrum of mixed-use, residential, commercial, renewable energy and retail projects.

Meabhann brings particular expertise in initial development feasibility appraisals and development strategies. Her experience in managing large multi-disciplinary teams in the preparation of local and major planning applications across residential and mixed-use and retail developments means she has a wealth of knowledge to draw on in the early stages of development. She has particular experience in preparing and managing site strategies which include both responding to emerging planning policy whilst also preparing and progressing planning applications and appeals.

Thomas Blackwell B.A., M.Sc., PWS

Thomas is a Senior Environmentalist with MKO with over 15 years of progressive experience in environmental consulting. Thomas holds a BA (Hons) in Geography from Trinity College Dublin and a M.Sc. in Environmental Resource Management from University College Dublin. Prior to taking up his position with MKO in August 2019, Thomas worked as a Senior Environmental Scientist with HDR, Inc. in the United States and held previous posts with private consulting firms in both the USA and Ireland. Thomas is a registered Professional Wetland Scientist with the Society of Wetland Scientists with specialist knowledge in wetland assessment and delineation, mitigation planning and design, stream geomorphic assessment, and stream and wetland restoration design. Thomas' professional experience includes managing Environmental Impact Assessments, environmental permitting, environmental due diligence and compliance, and general environmental assessment on behalf of clients in the solar farm, mining, solid waste management, residential and commercial development, and public sectors. Thomas' key strengths and areas of expertise are in project management and strategy development, environmental permitting and assessment for renewable energy projects, fluvial

geomorphology and stream restoration design. Since joining MKO, Thomas has been involved as an Environmental Consultant on a range of energy infrastructure, and residential projects.

Owen Cahill B.Sc., M.Sc.

Owen is an Environmental Engineer with McCarthy O’Sullivan Ltd. with over 10 years of experience in the environmental management and construction industries. Owen holds BSc. (Hons) and MSc. in Construction Management and a master’s in environmental engineering. Prior to taking up his position with MKO in October 2013, Owen worked as an Environmental Officer with Kepak and prior to which he held a post with Pentland Macdonald Contaminated Land & Water Specialist in Northern Ireland. Prior to working in planning and environmental consultancy, Owen was employed within the construction industry where he gained significant experience on a variety of civil, residential and commercial projects. Owen’s wide ranging multi sector experience has provided him with specialist knowledge and understanding of the challenges in the planning and delivery of developments with the minimum environmental impact and with practicality and constructability in mind. Owen’s key strengths and areas of expertise are in project management, environmental impact assessment, wind energy & solar energy construction & environmental management planning and waste permit management. Since joining MKO Owen has been involved as a Project Manager on a range of energy infrastructure, commercial, residential, waste facility and quarry projects as well as managing the licensing requirements of a number of EPA licensed facilities. Within MKO Owen plays a large role in the management and confidence building of junior members of staff and works as part of a large multi-disciplinary team to produce EIS Reports. Owen has project managed the Environmental Impact Assessment of a range of development projects across the Ireland and holds Affiliate Membership with the Institute of Environmental Management & Assessment and is currently awaiting interview and assessment to become a Full Member and Chartered Environmentalist.

Pat Roberts B.Sc. (Env.)

Pat Roberts is a Senior Ecologist and director of the Ecology team with McCarthy O’Sullivan Ltd. with over 12 years post graduate experience of providing ecological services in relation to a wide range of developments at the planning, construction and monitoring stages. Pat holds B.Sc.(Hons) in Environmental Science. Pat has extensive experience of providing ecological consultancy on large scale industrial and civil engineering projects. He is highly experienced in the completion of ecological baseline surveys and impact assessment at the planning stage. He has worked closely with construction personnel at the set-up stage of numerous construction sites to implement and monitor any prescribed best practice measures. He has designed numerous Environmental Operating Plans and prepared many environmental method statements in close conjunction with project teams and contractors. He has worked extensively on the identification, control and management of invasive species on numerous construction sites. Prior to taking up his position with MKO in June 2005, Pat worked in Ireland, USA and UK as a Tree Surgeon and as a nature conservation warden with the National Trust (UK) and the US National Park Service. Pat’s key strengths include his depth of knowledge and experience of a wide range of ecological and biodiversity topics and also in his ability to understand the requirements of the client in a wide range of situations. He currently manages the ecological team within MKO and ensures that the outputs from that team are of a very high standard and meet the requirements of the clients and relevant legislation and guidelines. He is a full member of the Chartered Institute of Ecologists and Environmental Managers (CIEEM),

John Hynes M.Sc. (Ecology), B.Sc.

John Hynes is a Senior Ecologist with McCarthy O’Sullivan Ltd. with over 5 years of experience in both private practice and local authorities. John holds a B.Sc. in Environmental Science and a M.Sc. in Applied Ecology. Prior to taking up his position with MKO in March 2014, John worked as an Ecologist with Ryan Hanley Consulting Ltd. and Galway County Council. John has specialist knowledge in Flora and Fauna field surveys, Geographic Information Systems, data analysis, Appropriate Assessment, Ecological Impact Assessment and Environmental Impact Assessment. John’s key strengths and areas of expertise are in project management, GIS and impact assessment. Since joining MKO John has been involved as a Senior Ecologist on a significant range of energy infrastructure, commercial, national roads and private/public development projects. Within MKO John

plays a large role in the management and confidence building of junior members of staff and works as part of a large multi-disciplinary team to produce EIS Reports. John has project managed a range of strategy and development projects across the Ireland and holds CIEEM membership.

Eoin Gilson B.Sc., M.Sc.

Eoin is a Graduate Environmental Scientist with MKO who took up his position in October 2018. Eoin holds a BSc (Hons) in Microbiology and a MSc (Hons) in Applied Environmental Science. Eoin has specialist knowledge in environmental field surveys, data analysis and renewable energy systems. Eoin's key strengths and areas of expertise are in data management, report writing and environmental monitoring and management. On joining MKO Eoin has been involved on a range of renewable energy infrastructure projects, working as part of a large multi-disciplinary team to produce EIA Reports.

Jack Workman, M.Sc.

Jack Workman is an Environmental Scientist and Landscape and Visual Impact Assessment (LVIA) specialist with MKO. Jack joined the company in February 2020 and his primary role at MKO is within the landscape team where he produces the Landscape Visual Impact Assessment chapter of Environmental Impact Assessment reports. Jack holds an MSc. in Coastal and Marine Environments (Physical Processes, Policy & Practice) from NUIG, where he was awarded the Prof. Máirín De Valéra distinction in science research award. Prior to taking up his position with MKO, Jack worked as a Geospatial Analyst and Research Assistant with NUIG and also held previous posts in the coastal engineering sector with Royal Haskoning DHV and Saltwater Technologies. Jack has specialist knowledge in Landscape Visual Impact Assessment, GIS, UAV remote sensing and coastal and marine environmental science. Jack's key strengths and areas of expertise are in geospatial analysis, planning, and Environmental Impact Assessment reporting. Since joining MKO Jack has been involved as an environmental consultant on Landscape Visual Impact Assessments. Jack holds a graduate membership with the Chartered Institute of Water and Environmental Management.

Joseph O'Brien

Joseph O'Brien holds the position of CAD Technician. Joseph holds a BA Honours Level 8 Modelmaking, Design and Digital Effect, Institute of Art Design and Technology (IADT), Dun Laoghaire & City & Guilds Level 3 2D & 3D AutoCAD certificates. Joseph's role entails various wind and solar farm projects which require various skills such as mapping, aerial registration and detailed design drawings for projects. Prior to joining us, Joseph worked as a free-lance Modelmaker and CAD Technician. His previous experience included designing various models and props through CAD and then making them for various conventions such as Dublin Comic Con and Arcade Con.

1.10.1.2 Hydro Environmental Services Ltd

Michael Gill

Michael Gill is an Environmental Engineer with over ten years' environmental consultancy experience in Ireland. Michael has completed numerous hydrological and hydrogeological impact assessments of wind farms in Ireland. He has also managed EIA/EIS assessments for infrastructure projects and private residential and commercial developments. In addition, he has substantial experience in wastewater engineering and site suitability assessments, contaminated land investigation and assessment, wetland hydrology/hydrogeology, water resource assessments, surface water drainage design and SUDs design, and surface water/groundwater interactions.

Adam Keegan

Adam Keegan (BSc, MSc) is a hydrogeologist with three years of experience in the environmental sector in Ireland. Adam has been involved in numerous hydrological and hydrogeological impact assessments, flood risk assessments and hydrogeological monitoring as part of the team at HES.

1.10.1.3 **Damian Brosnan Acoustics**

Damian Brosnan

Damian Brosnan has been working in acoustics since 1996. He holds a Postgraduate Diploma in Acoustics & Noise Control from the Institute of Acoustics, and an MSc in Applied Acoustics from the University of Derby. Damian is a member of the Institute of Acoustics (MIOA), and is secretary of their Irish branch. He is also a member of Engineers Ireland, and a member of ACASITI, a recently formed association of Irish professional acoustic consultants. Damian has worked on several hundred noise projects to date, including a number of large scale residential and commercial developments.

1.10.1.4 **Tobin Consulting Engineers**

Richard Daly

Richard joined TOBIN Consulting Engineers in Feb 2016 having returned to Ireland from London where he had been employed as a Civil Engineer between 2011 and 2016 with Barhale PLC. Richard has worked on a wide variety of projects throughout the UK and Ireland from large scale utility works to Sports Campus developments and Strategic Housing Developments. He has worked on projects at numerous stages from initial concept stage right through to Contract completion. Tasks undertaken by Richard include: preparation and submission of planning applications, preparation of tender documents, coordination of site works, design and development of civil design for developments including services, roads etc.

Micheál Geraghty

Micheál has a BSc in Construction Project Management and has over 15 years' experience in Traffic Engineering within a variety of projects including the preparation of Traffic and Transportation Assessments, Mobility Management Plans, Parking Reviews, School Travel Plans, Junction Analysis and Road/Junction designs. Micheál has completed many Traffic and Transport Assessments and Mobility Management Plans for various commercial, residential, leisure, industrial and school projects. He has completed CPD training courses in Junction Design and Junction Analysis and has experience in liaising with Local Authorities, Clients, and other stakeholders in relation to the projects.

1.10.1.5 **Tobar Archaeological Services**

Tobar Archaeological Services is a Cork-based company in its 16th year in business. They offer professional nationwide services ranging from pre-planning assessments to archaeological excavation, and cater for clients in state agencies, private and public sectors.

Tobar's Directors, Annette Quinn and Miriam Carroll, are licensed by the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs to carry out excavations in Ireland and have carried out work directly for the National Monuments Services of the Department of the Environment, Heritage and Local Government. Tobar Archaeological Services has a proven track record and extensive experience in the wind farm industry from EIS/EIAR stage through to construction stage when archaeological monitoring is frequently required.

1.11 **Preparation**

MKO is responsible for the preparation of this EIAR. No difficulties, such as technical deficiencies, lack of information or knowledge, were encountered in compiling any specific information contained in the EIAR.

2. BACKGROUND TO THE PROPOSED DEVELOPMENT

2.1 Site of the Proposed Development

2.1.1 Site Location

The site of the proposed development comprises of 4.704ha of land located at Rosshill, to the east of Galway City. The site is located immediately south of the Galway to Dublin railway line and Rosshill Road, west of Rosshill Stud Farm Road. The site is 5km from Eyre Square, the perceived centre of Galway City and 4.1km from Main Street, Oranmore.

In terms of neighbouring housing in the immediate area surrounding the site comprise several scattered one-off residential dwellings. The dwellings vary in type, form, design and size with the majority being single dwellings located on large plots.

The proposed development site is greenfield in nature however was previously in use as a par 3 golf course, which ceased operation in the early 2000’s. There are now a number of tree lines and hedgerows present within the site. A mixture of hedgerows and stone walls enclose to the eastern and northern boundary. There are no watercourses on site. There are no ecological or environmental designations on site.

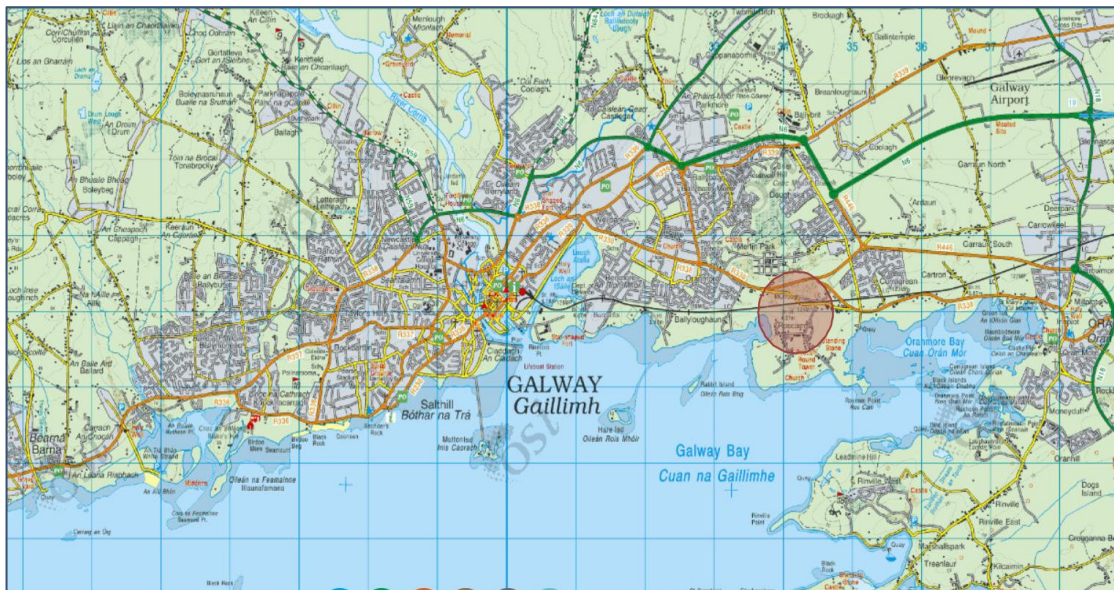


Plate 2-1 Location Context (Source – MyPlan).

2.1.2 Physical Characteristics of Site and Surrounding Lands

The site comprises agricultural land in rough grazing. It previously formed a par-3 golf course however the old greens and fairways are now fallow and overgrown. Hedgerows are present on site along with several mature and semi-mature trees and tree groupings. There are no watercourses on site. The site is undulating, falling to the west, the topology is generally flat except for where the site falls in level forming a ridge generally running north to south, located to the west of the ruined farmstead. A single point of access currently exists into the site from Rosshill Road to the east.

The site boundaries (Refer to Plates 2-2 to 2-3 below) comprise in the main agricultural hedgerows and stone walls. To the north, the site is bound by the Old Dublin Road and the railway line. To the east, Rosshill Road runs in a north-south fashion. The eastern site boundary has extensive broadleaf trees as does some of the south boundary and part of the eastern boundary. A triangular copse of trees are located to the northeast but are of a lower quality. To the south and west lies agricultural land which also formed part of the former par-3 golf course.



Plate 2-2 Northern Boundary



Plate 2-3 Eastern Boundary

2.1.3 Site Access

The development site is accessed from the Rosshill Road (located to the east of the development site) just south of the existing railway bridge. The Rosshill Road itself is accessed from the Old Dublin Road (R338) to the north. A single point of access currently exists into the site from Rosshill Road to the east.

2.2 Planning History

This section sets out the relevant planning history of the site and its immediate surrounds.

2.2.1 Planning Applications within the Application Boundary

There is an extensive planning history associated with the site as summarised below. An overview of these applications is provided below.

2.2.1.1 Previous Strategic Housing Development (SHD) Applications

Planning Reference: ABP306413-20

There has been a previous SHD application lodged with respect to the subject site. The application was lodged with An Bord Pleanála on the 17th of January 2020 and was assigned the reference 306413-20. The development proposal at that time included the subject site along with lands located to the south and west of the current site. The full description of the noted development is as follows:

- a) *“Residential development consisting of 342 number units, comprising 185 number houses and 157 number apartments including a ground-floor community space, office, café, retail unit*
- b) *A two-storey childcare facility*
- c) *The provision of public realm landscaping including shared public open space and play areas, public art, public lighting, resident and visitor parking including car rental bays, electric vehicle charging points and bike rental spaces;*
- d) *Pedestrian, cyclist and vehicular links throughout the development;*
- e) *Access road and junction improvements at Rosshill road/Old Dublin Road;*
- f) *Provision of all associated surface water and foul drainage services and connections including pumping station and*
- g) *All associated site works and ancillary services.”*

An Bord Pleanála issued their decision on the 7th of May 2020 in which permission was refused based on three reasons. The three reasons related thematically to ecology, services and design. The decision of An Bord Pleanála has been considered as part of the current proposed application.

2.2.1.2 Other Planning Applications within the Vicinity of the Application Site

The site of the proposed development was previously in use as an 18 hole par 3 golf course which has since ceased all operations on the site in the early 2000’s. The club house was located to the south east of the development site with the old greens and fairways now overgrown and unidentifiable. A number of applications of a residential nature have also been submitted for the site. A review of the Galway City Council online planning application mapping system indicates the following planning applications have also been made in respect of the subject site.

Table 2-1 Planning Applications within the Application Boundary

Application Reference	Description	Decision
05/352	Permission for the construction of a 137 unit residential development consisting of 16 no. 4-bed detached houses, 15 no. 5-bed detached houses, 26 no. 2-bed townhouses, 73 no. 3-bed townhouses, 7 no. 4-bed townhouses, a creche (215 sq. m.) a shop (215 sq. m.), a new access to Old Dublin Road and all associated external and site development works.	Refused by GCC 14/07/2005
06/816	Permission for the construction of (i) a 99 unit residential development (18,871 sqm) consisting of 43 no. 5-bed detached houses, 16 no. 4-bed detached houses, 25 no. 2-bed apartments, 2 no. 3-bed apartments, 12 no. 2-bed duplexes, 1 no. 3-bed end terrace house, (ii) a creche (350 sqm), (iii) a new access to the Rosshill Road, (iv) an upgraded junction onto the Old Dublin Road, (v) ESB Substation, (vi) Pumping house, (vii) Car parking (225 no. spaces at surface level and 60 no. spaces underground) and (viii) all associated external and site development works.	Granted by GCC 06/06/2007

2.2.2 Planning Applications within the Vicinity of the Application Site

A planning search was carried out to identify planning applications which were made in the vicinity of the subject site. The planning search captures an area of approximately 300m surrounding the Proposed Development site. The majority of applications identified sought permission for the construction, alteration or servicing of dwellings within the area

Table 2-2 Planning Applications within the Vicinity of the Application Boundary

Application Reference	Description	Decision
89/148	Erection of dwellinghouse & septic tank.	Granted by GCC 30/05/1989
92/24	Permission for provision of access from site of dwellinghouse to the public road.	Granted by GCC 15/04/1992
92/119	Permission for erection of dwellinghouse and septic tank.	Granted by GCC 27/05/1992
93/622	Permission for alterations to conservatory roof & addition of porch.	Granted by GCC 09/02/1994
94/70	Permission for alterations to previously approved house plan.	Granted by GCC 17/04/1994
96/201	Permission for extension to dwellinghouse (kitchen, utility and 2 bedrooms).	Granted by GCC 05/06/1996
96/851	Permission for a front extension comprising a bay window and retention of garage-shed at rear.	Granted by GCC 27/03/1997
97/66	Permission to erect dwellinghouse and septic tank.	Granted by GCC 04/06/1997
97/276	Permission for serviced dwellinghouse	Granted by GCC 06/08/1997
97/326	Permission for dwellinghouse and septic tank.	Granted by GCC 14/08/1997
98/224	Outline Permission to erect dwellinghouse with septic tank on lands.	Refused by GCC Granted by An Bord Pleanála (107054)

Application Reference	Description	Decision
		08/01/1999
98/469	Permission for Garden Sheds.	Granted by GCC 27/01/1999
98/471	Permission for granny flat extension.	Granted by GCC 28/09/1998
99/120	Outline permission to construct dwellinghouse and a septic tank.	Granted by GCC 20/09/1999
99/834	Approval for construction of dwellinghouse and associated garage and septic tank (Outline Ref. 224/98).	Granted by GCC 05/04/2000
00/361	Permission for extension to house.	Granted by GCC 09/08/2000
00/606	Permission for new dwellinghouse and septic tank.	Granted by GCC 18/01/2001
00/768	Permission to construct a dwellinghouse with garage, septic tank, percolation area and associated site works.	Granted by GCC 18/05/2001
00/872	Permission for dormer dwelling and septic tank with percolation area	Granted by GCC 07/03/2001
01/120	Permission for approval for 6m wide entrance roadway for 4 number sites	Granted by GCC 18/05/2001
01/162	Permission to carry out extensions to house consisting of utility room, dining / living room at ground floor level and with a study at first floor level overhead.	Granted by GCC 20/09/2001
01/318	Permission to construct a dwelling house, septic tank and percolation area.	Granted by GCC 07/10/2001
02/233	Permission for retention of development, for amendment to previous grant of planning permission (Pl. Ref. No. 816/00) by the provision of a dedicated septic tank and percolation area to a single dwellinghouse under construction.	Granted by GCC 31/07/2002
02/407	Permission to demolish the existing shed to the front of the site and for the construction of a dwellinghouse, garage, septic tank and percolation area.	Refused by GCC 07/08/2002
02/943	Permission to construct a dwellinghouse, garage, septic tank, percolation area and puraflo unit.	Granted by GCC 04/03/2003
03/624	Permission for a multipurpose amenity development to include for 8 five a side synthetic soccer pitches, 8 tennis courts, putting greens/bowls associated lighting and dressing rooms / club house.	Granted by GCC 16/03/2004
03/982	Permission to construct a private garage at the rear of house.	Refused by GCC 18/12/2003
04/338	Permission to construct a storage shed for an agricultural tractor and its ancillary equipment at the rear of house.	Granted by GCC 05/08/2004
04/546	for the proposed demolition of the existing rear structure, provision of new two storey extension to rear of dwelling, provision of covered vehicular structure, revisions to layout of ground floor and first floor layouts and all ancillary works in relation to the development.	Granted by GCC 31/03/2005
04/868	Permission for 1) the change of use from the basement garage to a proposed playroom area of the existing dwelling house 2) the erection of a proposed garage, exercise room and first floor gymnasium 3) alterations to the rear elevations at the above address.	Granted by GCC 21/02/2005
06/293	Permission for the restoration and change of use of existing out houses and stables to use as a single residential unit, the construction of a single storey extension to same, and the	Granted by GCC 06/07/2006

Application Reference	Description	Decision
	provision of an effluent treatment plant and all associated site works and services.	
06/293	Retention permission to (1) Retain kitchen dining area to east side of dwelling house (2) Retain garage conversion to play area/bedroom (3) Build new conservatory to west site of dwellinghouse. (4) Extend existing cloaks/lobby area to provide new dining room (5) Replace kitchen window and build in new patio doors in kitchen dining area on south elevation	Granted by GCC 06/07/2006
07/27	Permission for retention and completion of all works in conjunction with existing dwelling house and all ancillary works in relation to the development (As per previous Planning approval file Ref. No. 04/546).	Granted by GCC 17/04/2007
08/144	Permission for the demolition of an existing detached single-storey dwelling house and garden shed, and the construction of a detached two-storey dwelling house, septic tank and Bord na Mona Puraflo treatment system, with new relocated site entrance from the public road and associated site works.	Granted by GCC 03/06/2008
10/116	Permission for the construction of a farm shed and internal farm roadway.	Granted by GCC 09/08/2010
10/212	Permission for the construction of 4 no. dwellinghouses (in dormer and two storey typology), 4 no. garden sheds and 4 no. individual effluent treatment plants and percolation areas on lands zoned 'L.D.R.' in the Galway City Development Plan. Permission also for all associated roads, footpaths, services, public lighting, open spaces and new site boundaries.	Granted by GCC 25/05/2011
11/6	Permission to construct a domestic garage, also to extend and renovate existing dwelling.	Granted by GCC 03/05/2011
14/74	Permission to (1) demolish existing shed and rear porch of existing dwellinghouse (2) to construct new extension to side and rear of dwellinghouse (3) to make alterations to existing dwelling house and (4) install new treatment system and percolation with all associated services	Granted by GCC 09/06/2014
16/109	E.O.D on Pl. Reg. Ref. No. 10/212 - Permission for the construction of 4 no. dwellinghouses (in dormer and two storey typology), 4 no. garden sheds and 4 no. individual effluent treatment plants and percolation areas on lands zoned 'L.D.R.' in the Galway City Development Plan. Permission also for all associated roads, footpaths, services, public lighting, open spaces and new site boundaries	Granted by GCC 22/06/2016
16/187	Permission to construct a garage with all associated services	Granted by GCC 28/09/2016
16/354	Permission for a new residential development which contains 3 no. 2 storey 4 bedroom detached houses with individual vehicular entrances and sewage treatment systems together with all ancillary site works, landscaping and service connections	Granted by GCC 05/09/2017
17/295	Permission for development which will consist of the construction of a dwelling house, waste water treatment system and all associated site development and external works	Granted by GCC Refused by An Bord Pleanála (301019) 03/12/2018
18/44	Permission for development which will consist of the construction of a dwelling house, external store, waste water treatment system and all associated site development and external works	Granted by GCC

Application Reference	Description	Decision
		Refused by An Bord Pleanála (301417) 03/12/2018
18/232	Permission and Retention permission for a development consisting of a change of House type to the residential dwelling on Site No. 1 which was granted planning permission under Reg. Ref 10/212 (extended under Reg. Ref 16/109) to now provide for a new house type A which comprises a 2 storey, 4 bed detached dwelling with shed/garage and associated car parking, landscaping, boundary treatments and all ancillary site works necessary to facilitate the proposed development. Retention permission is also sought for minor changes to the granted vehicle and pedestrian entrance layout to accommodate the proposed development.	Granted by GCC Granted by An Bord Pleanála (302635) 31/01/2019
19/89	Permission for development which consists of the construction of a dwelling house, external store, waste water treatment system and all associated site development and external works	Granted by GCC Refused by An Bord Pleanála (304592) 02/07/2019
19/186	Permission is sought for the change of house type to the residential dwelling on site No. 1, previously granted planning permission under Pl. Ref. 10/212 & 16/109 & associated garden shed / garage store and all associated site works & services.	Granted by GCC 15/08/2019
19/291	Permission is sought for the change of house type B at site 2 previously granted planning permission under P.L. ref 10/212 & 16/109 & associated garage store and all associated site works and services.	Granted by GCC Granted by An Bord Pleanála (306460) 07/05/2020
20/100	Permission is sought for the development which will consist of 1) Demolish Existing Derelict Dwelling House, 2) Construct a new two storey Dwelling House with carport and external store (370m ²), 3) Retain existing site entrance, 4) Provision for new proprietary Effluent Treatment System and Percolation Area, and 5) All associated site works in the townland	Granted by GCC 14/12/2020
20/174	Permission for the construction of a single storey extension and all associated services onto an existing domestic garage. The extension will incorporate a studio and a home office	Granted by GCC 29/09/2020
21/34	Permission for development which will consist of a new two storey side extension, alterations to front entrance porch, internal alterations and all ancillary site works.	Current Application

2.3

Cumulative Projects

An additional planning search was carried out to identify projects/applications which were made within approximately 2km of the subject site which sought permission for developments of a similar nature. The projects identified are listed under Table 2-3 below:

Table 2-3 Planning Applications of a Similar Nature in the Vicinity of the Site

Application Reference	Description	Decision
99/687	Permission for 59 houses and associated site development works.	Granted by GCC 22/03/2000

Application Reference	Description	Decision
00/841	Permission for 304 two storey houses,18 apts, in a 3 storey residential block,&15 apts. in a mixed use block of 3/4 storeys, incorporating commercial neighbourhood facilities, incl. a creche, doctors surgery & retail space, with associated carparking; site development works incl., temporary sewerage treatment plant & providing new vehicular access points to the Cheshire House grounds&3 neighbourhood dwellings on the site.	Granted by GCC 14/06/2001
04/724	Permission to construct ninety two semi-detached houses (92 no.) and fifteen detached houses (15 no.) to provide a new entrance from Coast Road (R338) and to provide new entrance from Doughiska Road to the development site together with all site services.	Granted by GCC 16/12/2004
15/194	Permission for development at this site at Roscam with access from the Oranmore Road (R338), Galway and measuring c. 2.24 hectares in area. The development will consist of 49 no. two-storey detached and semi-detached four bedroom houses, 2 no. two-storey semi-detached 3 bedroom houses and a three/four storey apartment block containing 12 no. 2 bedroom apartments and a crèche (166sq.m) at ground floor. Permission is also sought for all associated car-parking, landscaping, boundary treatments and ancillary site development works including amendments to car-parking, boundary treatment and Site no. 67 forming part of permitted development under Reg. Ref. 05/940 (subsequently amended by permission Reg. Ref. 13/347).	Granted by GCC 18/05/2016
16/187	Permission to construct a garage with all associated services	Granted by GCC 28/09/2016
16/228	Permission for a new residential development. The development consists of 16 no. 2-storey, five-bedroom, detached houses, together with individual garages, as applicable, new vehicular site accesses and roads with all ancillary site works, landscaping and service connections	Granted by GCC 21/03/2017
17/283	Permission to construct 23 two storey Dwellinghouses consisting of Detached, Semi-dectached and terrace including access/egress off the old coast road to Oranmore with sewer connection to adjacent sewer pumping station adjacent the Dublin Road and all associated services.	Granted by GCC 12/01/2018
18/187	Permission for a change of house type to previously granted planning permission (reference 16/228). These amendments consist of a change of house type C (on site 6 only) which is a 5-bedroom two storey detached house	Granted by GCC 05/09/2018
19/54	Permission for development which consists of the demolition of existing sun room and to replace it with a single storey extension to the front of dwelling house and a back porch to the side	Granted by GCC 28/05/2019
19/95	Permission for development which consists of the constructing 51 No. one, two and three bedroom apartments and two one bedroom Town Houses in 6 no. Blocks ranging in height from one storey up to four storey, with sewer connection to adjacent pumping station adjacent Dublin road, together with access/egress off the old coast road to Oranmore and all associated services at Doughiska and Merlin Park Townlands. (Previous Planning Ref No. 17/283)	Granted by GCC 26/06/2019
21/28	Permission for development which will consist of; variations to domestic garage design from that previously granted under	Granted by GCC 29/03/2021

Application Reference	Description	Decision
	16/228 to include proposed domestic garage and gym and associated works.	
21/73	Permission for development which will consist of amendments to previously granted planning permission (ref 16/228). The amendments consist of the following changes : 1. Minor changes to boundaries of sites 8,9,10,11 to accommodate revised house types. 2. Minor changes to alignment of proposed access road and junction between sites 8 and 12. 3 Change of house types on sites 8,9,10,11 which are to remain 5 bedroom two storey detached houses. 4. Minor amendments to side and rear elevation of house type A1 currently granted on site 15. 5. Minor amendments to side and rear elevation of house type B2 currently granted on sites 12 and 13. 6. Proposed garages for sites 8,12,13,15.	Current Application

2.4 Planning Policy

This section of the report sets out the relevant national, regional and local planning policies of relevance to the planning application. Relevant material considerations are also set out, as appropriate.

2.4.1 National Planning Policy Context

2.4.2 National Planning Framework

The National Planning Framework (2018) (“NPF”), entitled ‘Ireland 2040’ comprises the Government’s proposed long term strategic planning framework to guide national, regional and local planning and investment decisions over the next 25 years. The NPF is a strategic document providing the framework for future development and investment in Ireland, and aiming to coordinate sectoral areas such as housing, jobs, transport, education, health, environment, energy and communications, into an overall coherent strategy. The National Planning Framework includes ten National Strategic Outcomes implemented through the Strategic Investment Priorities, and includes:

- Compact growth
- Enhanced regional accessibility
- Strengthened rural economics and communities
- Sustainable mobility
- A strong economy supported by enterprise, innovation and skills
- Sustainable management of water and other environmental resources

In terms of Ireland’s future population, circa one million additional people are expected to be living in Ireland by 2040, and National Objective 1b seeks to ensure this growth is felt across all the regions. Under table 4.1 of the NPF Targeted Pattern of City Population Growth a population growth range of 50-60% is noted leading to a minimal target population of 120,000 people for Galway City and Suburbs by 2040. This leads to an estimated growth of between 40,000 to 48,000 additional people when measured against the 2016 levels. The following pertinent objectives are noted:

- **National Policy Objective 1b**
Northern and Western Region: 160,000 - 180,000 additional people i.e. a population of just over 1 million.
- **National Policy Objective 3a**
Deliver at least 40% of all new homes nationally, within the built-up footprint of existing settlements.

➤ **National Policy Objective 32**

To target the delivery of 550,000 additional households to 2040.

Central to meeting **Objective 32** is guiding the delivery of future housing. In that vein the NPF sets out a range of national core principles, including:

- *National core principles are set out to guide the delivery of future housing, at every level of governance:*
 - *Ensure a high standard quality of life to future residents as well as environmentally and socially sustainable housing and placemaking through integrated planning and consistently excellent design.*
 - *Allow for choice in housing location, type, tenure and accommodation in responding to need.*
 - *Prioritise the location of new housing provision in existing settlements as a means to maximising a better quality of life for people through accessing services, ensuring a more efficient use of land and allowing for greater integration with existing infrastructure.*
 - *Tailor the scale and nature of future housing provision to the size and type of settlement where it is planned to be located.*
- **National Policy Objective 33**
The provision of new homes at locations that can support sustainable development and at an appropriate scale of provision relative to location.
- **National Policy Objective 34**
Support the provision of lifetime adaptable homes that can accommodate the changing needs of a household over time.

The NPF calls for higher densities to avoid urban sprawl: “Historically, low-density housing development has been a feature of Ireland’s housing landscape in cities, towns, villages and the countryside. To avoid urban sprawl and the pressure that it puts on both the environment and infrastructure demands, increased residential densities are required in our urban areas.” The relevant National Policy Objective in relation to density states:

➤ **National Policy Objective 35**

Increase residential density in settlements, through a range of measures including reductions in vacancy, re-use of existing buildings, infill development schemes, area or site-based regeneration and increased building heights

In creating successful communities, National Policy Objective 4 states:

➤ **National Policy Objective 4**

Ensure the creation of attractive, liveable, well designed, high quality urban places that are home to diverse and integrated communities that enjoy a high quality of life and well-being.

The NPF gives significant weight to quality of life and in that vein states “*place is intrinsic to achieving good quality of life - the quality of our immediate environment, our ability to access services and amenities, such as education and healthcare, shops and parks, the leisure and social interactions available to us and the prospect of securing employment, all combine to make a real difference to people’s lives.*”

➤ **National Policy Objective 27**

Ensure the integration of safe and convenient alternatives to the car into the design of our communities, by prioritising walking and cycling accessibility to both existing and proposed developments and integrating physical activity facilities for all ages

2.4.3 Planning Policy Statement 2015

The Government prepared the non-statutory Planning Policy Statement (‘PPS’) to set out the key principles of what it expects of planning authorities, public bodies and those engaged with the planning process and high-level priorities for the continued enhancement of the planning system.

Key principles of the PPS include:

- *Planning must proactively drive and support sustainable development*
- *Planning is about creating communities and further development existing communities in a sustainable manner*
- *Planning will enhance a sense of place*
- *Planning will support the protection and enhancement of environmental quality*

To ensure these and other Key Principles are met, Key Priorities are set out, including:

- *Quality in Planning Outcomes*
 - *“The success of our planning process will be judged by the quality of places that result variously from, the development of new places, the regeneration of existing places and the protection or enhancement of places that are particularly sensitive because of the natural and/or cultural heritage or environment they contain.”*
 - *“Government wants to see planning authorities encourage high standards of development in their areas informed by an understanding of the qualities of their places and the underlying economics of development...”*
 - *“Quality of place is not just determined by buildings, but how the streets and spaces between buildings work...”*

The development proposed creates a new community at Rosshill which incorporates local service/facility provision. Distinct character areas create a sense of place, assisted by a detailed landscape approach which works with the existing landscape features of the site. Consideration has been given to how each area functions for residents, pedestrian and vehicular users and how strong connectivity and access across and through the site and its surrounds can be achieved. Enhancement of the landscape is provided for which in turn has benefits for the local biodiversity on site.

2.4.4 Section 28 Ministerial Guidelines

There are various Ministerial Guidelines in respect of residential development, with those most relevant to the proposed development included below.

2.4.4.1 Urban Development and Building Heights Guidelines for Planning Authorities December 2018

These Guidelines, published by the Minister under Section 28 of the Planning and Development Act 2000 (as amended), set out national planning policy guidelines on building heights in relation to urban areas, building from the strategic policy framework set out in Project Ireland 2040 and the National Planning Framework.

In regard to building heights in suburban/edge locations the Guidelines note that newer housing developments outside city and town centres and inner suburbs, (i.e. the suburban edges of towns and cities), typically now include town-houses (2-3 storeys), duplexes (3-4 storeys) and apartments (4 storeys upwards). It is judged that developments of this form have the ability to deliver medium densities within the range of 35-50 dwellings per hectare net. The Guidelines also conclude that that developments of this style aid in addressing the need for further development of 1 and 2 bedroom units while at the same time providing for 3 and 4 bedroom units. This allows for a wider variety and wider housing demographic giving a variety of building typology and tenure options allowing households to

‘meet changing accommodation requirements over longer periods of time without necessitating relocation’.

The Guidelines detail that developments should include an effective mix of 2,3 and 4 storey developments which integrate well into the existing historical neighbourhoods. It notes that 4 storeys or more can be accommodated alongside existing larger buildings, trees, parkland, river/sea frontage or along wider streets. Specific Planning Policy Requirements (“SPPR”) 2 details the following:

“In driving general increases in building heights, planning authorities shall also ensure appropriate mixtures of uses, such as housing and commercial or employment development, are provided for in statutory plan policy. Mechanisms such as block delivery sequencing in statutory plans² could be utilised to link the provision of new office and residential accommodation, thereby enabling urban redevelopment to proceed in a way that comprehensively meets contemporary economic and social needs, such as for housing, offices, social and community infrastructure, including leisure facilities.”

Specific Planning Policy Requirement 4 details the following:

“It is a specific planning policy requirement that in planning the future development of greenfield or edge of city/town locations for housing purposes, planning authorities must secure:

- *the minimum densities for such locations set out in the Guidelines issued by the Minister under Section 28 of the Planning and Development Act 2000 (as amended), titled “Sustainable Residential Development in Urban Areas (2007)” or any amending or replacement Guidelines;*
- *a greater mix of building heights and typologies in planning for the future development of suburban locations; and*
- *avoid mono-type building typologies (e.g. two storey or own-door houses only), particularly, but not exclusively so in any one development of 100 units or more.”*

2.4.4.2 Design Manual for Urban Roads and Streets (2019)

Design Manual for Urban Roads and Streets (DMURS) was published by the Department of Transport, Tourism and Sport and the Department of Environment, Community and Local Government in April 2013. DMURS provides guidance relating to the design of urban roads and streets. DMURS encourages designers to give due consideration to creating a ‘sense of place’ which is of core significance to the creation of safe and more integrated street designs. The guidance document notes that four interlinked characteristics influence the sense of place within a street, including:

- *Connectivity: The creation of vibrant and active places requires pedestrian activity. This in turn requires walkable street networks that can be easily navigated and are well connected.*
- *Enclosure: A sense of enclosure spatially defines streets and creates a more intimate and supervised environment. A sense of enclosure is achieved by orientating buildings toward the street and placing them along its edge. The use of street trees can also enhance the feeling of enclosure.*
- *Active Edge: An active frontage enlivens the edge of the street creating a more interesting and engaging environment. An active frontage is achieved with frequent entrances and openings that ensure the street is overlooked and generate pedestrian activity as people come and go from buildings.*
- *Pedestrian Activity/Facilities: The sense of intimacy, interest and overlooking that is created by a street that is enclosed and lined with active frontages enhances a pedestrian’s feeling of security and well-being. Good pedestrian facilities (such as wide footpaths and well-designed crossings) also make walking a more convenient and pleasurable experience that will further encourage pedestrian activity.*

The DMURS guidance emphasises that these four characteristics represent the basic measures that should be established in order to create people friendly streets that facilitate more sustainable neighbourhoods.

2.4.4.3 Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas 2009

The role of the Guidelines is to ensure the sustainable delivery of new development throughout the country.

The Guidelines seek to inform the core principles of urban design when designing places of high quality and distinct identity. The Guidelines recommend that planning authorities promote high quality design in their policy documents and in their development management process. In this regard, the Guidelines are accompanied by a Design Manual which demonstrates how design principles can be applied in the design and layout of new residential developments, at a variety of scales of development and in various settings. The Manual sets out 12no. design criteria which should be used to guide good design as detailed below in Table 2-4.

Table 2-4: Best Practice Design Manual Criteria

Design Criteria	Wording
1	Context: How does the development respond to its surroundings?
2	Connections: How well is the new neighbourhood/site connected?
3	Inclusivity: How easily can people use and access the development?
4	Variety: How does the development promote a good mix of activities?
5	Efficiency: How does the development make appropriate use of resources, including land?
6	Distinctiveness: How do the proposals create a sense of place?
7	Layout: How does the proposal create people-friendly streets and spaces?
8	Public realm: How safe, secure and enjoyable are the public areas?
9	Adaptability: How will the buildings cope with change?
10	Privacy/amenity: How do the buildings provide a high quality amenity?
11	Parking: How will the parking be secure and attractive?
12	Detailed design: How well thought through is the building and landscape design?

These Guidelines support a plan-led approach to development as provided for in the Planning and Development Act 2000. Section 2.1 of the Guidelines note that ‘*the scale, location and nature of major new residential development will be determined by the development plan, including both the settlement strategy and the housing strategy*’. The enclosed Design Statement (ONOM, 2021) provides a full detailed response to the design criteria set out above and illustrates how each is addressed and accorded with.

2.4.4.4 Department of Housing, Local Government and Heritage Circular 02/2021

On the 21st of April 2021 the Department of Housing, Local Government and Heritage issued a circular letter surrounding residential densities in towns and villages. The purpose of the Circular is to provide clarity in relation to the interpretation and application of current statutory guidelines, in advance of issuing updated Section 28 guidelines that will address sustainable residential development in urban areas, later in 2021. The Circular clarifies the application of the Sustainable Residential Development Guidelines to ensure that when carrying out their planning functions, An Bord Pleanála and Planning Authorities apply a graduated and responsive, tailored approach to the assessment of residential densities in Peripheral and/or Less Accessible Urban Locations, as defined in the Apartment Guidelines and as they apply to towns of all sizes, to ensure that such places are developed in a sustainable and proportionate manner. The Circular sets out direction surrounding appropriate density levels within different site areas including edge of larger towns and small towns and villages. The Circular notes that *“it is necessary for An Bord Pleanála and Planning Authorities to exercise discretion in the application and assessment of residential density”*.

2.4.4.5 Childcare Facilities Guidelines for Planning Authorities (2001)

The Childcare Facilities - Guidelines for Planning Authorities, published in June 2001 define childcare as:

“childcare” is taken to mean “full day-care and sessional facilities and services for pre-school children and school-going children out of school hours. It includes services involving care, education and socialisation opportunities for children, services such as pre-schools, naíonraí (Irish language playgroups), day-care services, crèches, playgroups, and after-school groups are encompassed by these Guidelines”.

The Childcare Facilities Guidelines for Planning Authorities state that for new residential schemes, one childcare facility will be required unless there are significant reasons to the contrary. A benchmark provision of one childcare facility per 75 dwellings is recommended (and a pro rata increase for developments in excess of 75 houses). Regard shall be given to the existing geographical distribution of childcare facilities and the emerging demographic profile of areas.

In relation to location, the Guidelines state *“The threshold for provision should be established having regard to the existing geographical distribution of childcare facilities and the emerging demographic profile of areas.”*

The Guidelines stipulate criteria for suitable sites for full day care facilities in new/existing residential areas:

- *“Detached houses/sites with space for off-street parking and/or suitable drop-off and collection points and also space for outdoor play*
- *Neighbourhood centres provided that the premises can accommodate open space*
- *Premises/sites on primary traffic routes close to public transport nodes and which can provide safe pull in/parking areas for customers and staff*

“Applications for full day-care facilities in premises other than those listed above (e.g terraced houses or houses located on a cul-de-sac) should be treated on their merits having regard to the principles outlined above in relation to parking/drop-off points, layout and design of the housing area and the effect on the amenities of adjoining properties.”

2.4.4.6 Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities 2018

The Guidelines provide for updated guidance on apartment developments in response to the ‘National Planning Framework’ and ‘Rebuilding Ireland’. These guidelines supersede the 2015 ‘Sustainable Urban Housing: Design Standards for New Apartments; Guidelines for Planning Authorities’.

As part of the Ministers forward it was noted that:

“Apartments are a key and growing part of the way in which we live in various parts of our country and particularly in our cities and towns. A move towards a much greater level of apartment living is essential in ensuring our major urban areas develop sustainably rather than sprawling inexorably outwards as has been highlighted in the Government’s National Planning Framework.”

The Guidelines (which have taken account the provisions of the NPF) acknowledge that in the short term to 2020, the Housing Agency has identified a need for at least 45,000 new homes in Ireland’s five cities; Dublin, Cork, Limerick, Galway and Waterford.

Further to this in the longer term to 2040, the National Planning Framework (NPF) projects a need for a minimum of 550,000 new homes, at least half of which are targeted for provision in Ireland’s five cities. The guidelines further go on to recognize that the NPF also signals a shift in Government policy towards securing more compact and sustainable urban development. In relation to the above the guidelines detail that:

“It is therefore critical to ensure that apartment living is an increasingly attractive and desirable housing option for a range of household types and tenures, building on and learning from experience to date, and that the economic and regulatory conditions are such that apartment development attracts both the investment and the seeking out of this crucial form of housing by households, that will then result in greater delivery of apartments in Ireland’s cities and towns and other appropriate locations.”

The focus of this guidance is on the apartment building itself and on the individual units within it. The 2018 Guidelines specify planning policy requirements for:

- Internal space standards for different types of apartments, including studio apartments;
- Dual aspect ratios;
- Floor to ceiling height;
- Apartments to stair/lift core ratios;
- Storage spaces;
- Amenity spaces including balconies/patios; and
- Room dimensions for certain rooms

Further to the above the Guidelines also list a number of Specific Planning Policy Requirements (‘SPPRs’); those of relevance are detailed in Table 2-5 below:

Table 2-5: Specific Planning Policy Requirements

Design Criteria	Wording
1	<i>Apartment developments may include up to 50% one-bedroom or studio type units (with no more than 20-25% of the total proposed development as studios) and there shall be no minimum requirement for apartments with three or more bedrooms. Statutory development plans may specify a mix for apartment and other housing developments, but only further to an evidence-based Housing Need and Demand Assessment (HNDA),</i>

Design Criteria	Wording
	<i>that has been agreed on an area, county, city or metropolitan area basis and incorporated into the relevant development plan(s).</i>
3	<p><i>Minimum Apartment Floor Areas:</i></p> <ul style="list-style-type: none"> > <i>Studio apartment (1 person) 37 sq.m</i> > <i>1-bedroom apartment (2 persons) 45 sq.m</i> > <i>2-bedroom apartment (4 persons) 73 sq.m</i> > <i>3-bedroom apartment (5 persons) 90 sq.m</i>
4	<p><i>In relation to the minimum number of dual aspect apartments that may be provided in any single apartment scheme, the following shall apply:</i></p> <ul style="list-style-type: none"> (i) <i>A minimum of 33% of dual aspect units will be required in more central and accessible urban locations, where it is necessary to achieve a quality design in response to the subject site characteristics and ensure good street frontage where appropriate.</i> (ii) <i>In suburban or intermediate locations it is an objective that there shall generally be a minimum of 50% dual aspect apartments in a single scheme.</i> (iii) <i>For building refurbishment schemes on sites of any size or urban infill schemes on sites of up to 0.25ha , planning authorities may exercise further discretion to consider dual aspect unit provision at a level lower than the 33% minimum outlined above on a case-by-case basis, but subject to the achievement of overall high design quality in other aspects.</i>
5	<i>Ground level apartment floor to ceiling heights shall be a minimum of 2.7m and shall be increased in certain circumstances, particularly where necessary to facilitate a future change of use to a commercial use. For building refurbishment schemes on sites of any size or urban infill schemes on sites of up to 0.25ha , planning authorities may exercise discretion on a case-by-case basis, subject to overall design quality.</i>
6	<i>A maximum of 12 apartments per floor per core may be provided in apartment schemes. This maximum provision may be increased for building refurbishment schemes on sites of any size or urban infill schemes on sites of up to 0.25ha , subject to overall design quality and compliance with building regulations.</i>

2.4.4.7 Guidelines for Planning Authorities on The Planning System and Flood Risk Management (November 2009)

The Planning System and Flood Risk Management Guidelines were published by the Minister for the Environment, Heritage & Local Government in November 2009 under Section 28 of the Planning & Development Act 2000 (as amended). The Guidelines require the planning system at all levels to avoid development in areas at risk of flooding, particularly floodplains, unless there are proven wider sustainability grounds that justify appropriate development and where the flood risk can be reduced or managed to an acceptable level without increasing flood risk elsewhere; adopt a sequential approach to flood risk management when assessing the location for new development based on avoidance, reduction and mitigation of flood risk; and incorporate flood risk assessment into the process of making decisions on planning applications and planning appeals.

The purpose of the Guidelines is to introduce “*comprehensive mechanisms for the incorporation of flood risk identification, assessment and management into the planning process*”. The document goes on to state that:

“Planning authorities will ensure that only developments consistent with the overall policy and technical approaches of these Guidelines will be approved and permission will be

refused where flood issues have not been, or cannot be, addressed successfully and where the presence of unacceptable residual flood risks to the development, its occupants or users and adjoining property remains.”

The Guidelines introduce comprehensive mechanisms for the incorporation of flood risk identification, assessment and management into the planning process. The guidelines require the planning system to:

- *“Avoid development in areas at risk of flooding unless proven wider sustainable*
- *development grounds and risk can be mitigated without increasing risk elsewhere.*
- *Adopt a sequential approach to flood risk management for new development*
- *location based on avoidance, reduction and mitigation of flood risk.*
- *Incorporate flood risk assessment into decision making on planning applications.”*

2.5 Regional Planning Policy Context

2.5.1 Regional Spatial and Economic Strategy (Northern & Western Regional Assembly) 2020-2032

The Regional Spatial & Economic Strategy (‘RSES’) for the Northern & Western Regional Assembly (RSES NWRA) was adopted on 24th January 2020. The principal purpose of the RSES is to support the implementation of the National Planning Framework and the economic policies and objectives of the Government by providing a long-term strategic planning and economic framework for the development of the regions. Section 3.6 of the RSES sets out the Galway Metropolitan Area Strategic Plan (MASP). The Vision of this MASP is that Galway will be a leading global city, renowned as a successful, sustainable, competitive, compact and accessible city of scale that supports a high quality of life, maintains its distinctive identity and supports its rich heritage, language and cultural experience.

The RSES outlines arrangements for a co-ordinated metropolitan area strategic plan (MASP) for the Galway Metropolitan Area. The MASP has been provided with statutory underpinning to act as 12 year strategic planning and investment framework. The MASP is an opportunity for Galway to address recent growth legacy issues and build on key strengths, including a vibrant arts and cultural scene, year round tourism and an attractive natural setting.

With regard to growth ambitions for the region, the RSES NWRA notes the importance of compact growth in order to create more compact settlements:

“Compact growth will be pursued to ensure sustainable growth of more compact urban and rural settlements, supported by jobs, houses, services and amenities, rather than continued sprawl and unplanned, uneconomic growth.”

- **Regional Policy Objective 3.1**
“Develop urban places of regional-scale through:
 - *Delivering on the population targets for the Metropolitan and Regional Growth Centres through compact growth:*
 - *Delivering significant compact growth in Key Towns; and*
 - *Developing derelict and underutilised sites, with an initial focus within town cores.”*

The proposed development will provide 102 no. residential units which will become a key growth settlement to support the Galway Metropolitan Area which will directly support RPO 3.2:.

- **Regional Policy Objective 3.2:**
 - a) *Deliver at least 50% of all new city homes targeted in the Galway MASP, within the existing built-up footprint of Galway City and suburbs*

- b) *Deliver at least 40% of all new housing targeted in the Regional Growth Centres, within the existing built-up footprint*
- c) *Deliver at least 30% of all new homes that are targeted in settlements with a population of at least 1,500 (other than the Galway MASP and the Regional Growth Centres), within the existing built-up footprints;*

The site of the proposed development is located in close proximity to Roscam which is a strategic location within the Galway MASP. Per the RSES the Galway MASP is noted as having considerable land capacity that can significantly contribute to meeting the housing demands, the proposed development in this line will be contributing to the recognised need for housing within an appropriate area.

With regard to the Roscam area the following is noted:

“A number of strategic locations have been identified that present the opportunity and capacity to deliver the necessary quantum of housing to facilitate targeted growth, subject to the adequate provision of services.

i. Consolidation of the existing neighbourhoods of Knocknacarra, Rahoon, Castlegar and Roscam.

ii. Development of Regeneration Lands at Ceannt Station Quarter, Inner Harbour and Headford Road

iii. Ardauniv. Murroughv. Baile Chláir, Bearna, Oranmore, Briarhill”

The proposed development will provide 102 no. residential units within the general Roscam area which has been identified as a ‘strategic location’ within the RSES. As per the above these areas have been identified as strategic locations that present the opportunity and capacity to deliver the necessary quantum of housing to facilitate targeted growth.

➤ ***Policy Objective 3.8:***

“Support the design of new/replacement/refurbished dwellings to high energy efficiency standards that fully avail of renewable technologies, maximise solar gain, utilising modern materials and design practices.”

The provisions of Policy Objective 3.8 have been considered and the design has been influenced by its provisions.

➤ ***Regional Policy Objective 6.30***

“Planning at the local level should promote walking, cycling and public transport by maximising the number of people living within walking and cycling distance of their neighbourhood or district centres, public transport services, and other services at the local level such as schools.”

The proposed development promotes the use of public transport and well as pedestrian moveability both within the site as well as the greater surrounding area. Public transport and connectivity is further discussed under Section 7.7.3 of this report.

➤ ***Regional Policy Objective 7.19***

“The proposed residential units have been designed to accommodate the changing needs of a household over time. The proposed units in this scheme have been designed to have generous living areas, ample storage and spacious private open spaces. This allows for a variety of methods that can be employed for their adaptation.”

The proposed development incorporates a mixed of dwellings in terms of form, size and type to specifically create a community which responds to the ongoing and changing needs of a community. Creation of developments where residents can remain throughout their lifetime is a positive and will add to the creation of strong sustainable communities.

➤ **Regional Policy Objective 7.20**

“Increase population living within settlements, through a range of measures including reductions in vacancy, re-use of existing buildings, in-fill development schemes, area or site-based regeneration, service site provision and increased building heights appropriate to the settlement, together with infrastructure provision.”

The proposed development will provide 102no. residential units which will become a key growth settlement to support the greater Galway City area.

As part of this RSES, a co-ordinated Metropolitan Area Strategic Plan (MASP) is prepared for Galway Metropolitan area. The RSES amplifies the provisions of the NPF and the MASP sets out the strategic direction the city will grow to achieve compact growth, as envisaged within the first national strategic outcome in the NPF.

As outlined in the MASP, in Section 3.6 of the RSES, the Galway Metropolitan Area has considerable land capacity that can significantly contribute to meeting the housing demands based on population targets set out in the NPF and RSES. The targets are as follows (per section 3.6.3.1 of the RSES):

- *“1. Population of Galway MASP to grow by 27,500 to 2026 and by a further 14,500 to 2031 with the population of the City and Suburbs accommodating 23,000 to 2026 and a further 12,000 to 2031.*
- *2. Deliver at least half (50%) of all new homes that are targeted within the MASP to be within the existing built-up footprint.”*

The Galway Metropolitan Area is the primary centre identified for growth in the north west region. Table 2-6 below outlines the MASP population targets as set out within Table 3 of the RSES:

Table 2-6: MASP Population Targets

Settlement	Population 2016 Census	% Increase to 2040 (min)	Uplift to 2040	Proposed 2026 uplift (min)	Proposed 2021 Uplift (min)	Transitional Target Population ²
Galway City	79,900	50-55%	52,000	23,000	12,000	115,000

The following Regional Policy Objectives also relates to the population targets:

“RPO 3.2

(a) Deliver at least 50% of all new city homes targeted in the Galway MASP, within the existing built-up footprint of Galway City and suburbs.

(b) Deliver at least 40% of all new housing targeted in the Regional Growth Centres, within the existing built-up footprint.

(c) Deliver at least 30% of all new homes that are targeted in settlements with a population of at least 1,500 (other than the Galway MASP and the Regional Growth Centres), within the existing built-up footprints”

2.6.1 Galway City Development Plan 2017-2023

The current statutory planning policy document for the subject site is the Galway City Development Plan 2017-2023 (GCDP), which was adopted by the City Council in December 2016 and came in to effect on the 7th January 2017. The GCDP includes a Core Strategy and Settlement Strategy that notes the need to accommodate continued population growth, in line with the City’s designation as a ‘Gateway’, in a sustainable manner. In this regard, the adopted Settlement Strategy is primarily based on consolidating the urban form of the City. The strategic goals of the GCDP include the following:

- *Promote balanced and sustainable economic development that will enable Galway City to fulfil its role as a National Gateway and a Regional Centre, providing sufficient employment opportunities and appropriate services.*
- *Use the role of the Gateway to harness the strengths and maximise the economic development of the region.*
- *Provide for a built and natural environment that is of high quality and that contributes to providing a good quality of life for residents and visitors and affords sustainable transportation opportunities.*

Within the extant Plan, the subject site is zoned for Low Density Residential (LDR) and Agriculture and Amenity (G) development. This is shown in the below extract from the Development Plan, with the approximate site boundary outlined in red.

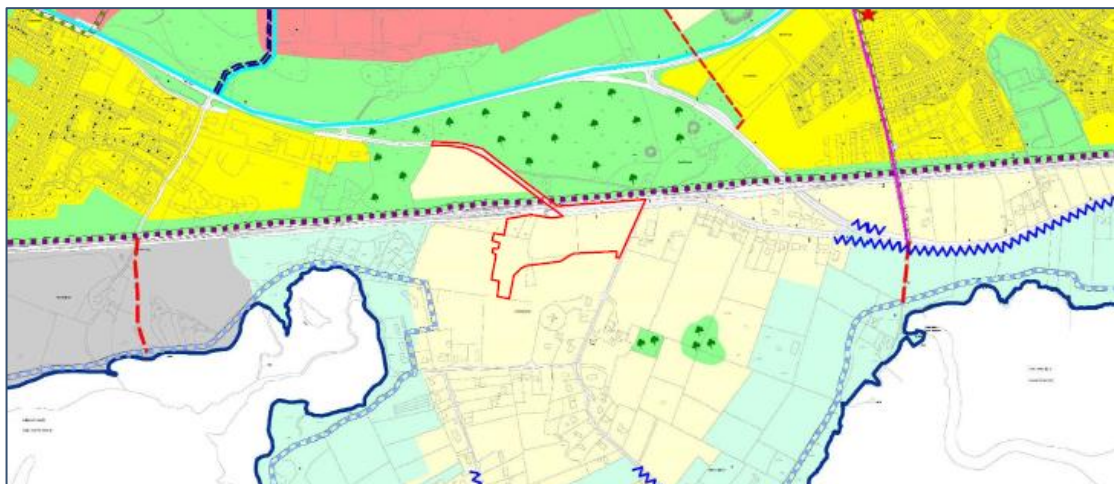


Plate 2-4: Development Plan Zoning and Indicative Site Boundary

Plate 2-5 replicates Figure 11.13 of the Development Plan which applies specific controls to the land as outlined in red, the former Roscam Pitch and Putt (and adjacent lands).



Plate 2-5: LDR Roscam Pitch and Putt and adjacent lands (Source: Galway City Development 2017-2023)

The following specific development objectives for the site are noted in the Plan:

- *The maximum plot ratio density of 0.2:1 shall only be considered following agreement on an overall layout of the area.*
- *This layout will have regard to the sylvan character of the site and where appropriate the protection of existing trees and the Roscam Folly.*
- *Development will only be considered where it accords with strategic main drainage proposals.*

Section 2.9 of the Plan details that the prescribed residential densities in these LDR areas are considered appropriate due to the established residential pattern, deficiency in service provision and significance of landscape. Associated **Policy 2.9** – Low Density Residential Areas states:

- *Protect the character of these areas by ensuring new development has regard to the prevailing pattern, form and density of these areas.*
- *Protect the characteristics of these areas through development standards and guidelines.*

Chapter 11 - Land Use Zoning Policies and Objectives sets out in detail uses considered compatible with zonings. This is copied below in Tables 2-7:

Table 2-7: Zoning Objective LDR

Zoning Objective LDR - To provide for low-density residential development which will ensure the protection of existing residential amenity.	
Uses which are compatible with and contribute to the zoning objective, for example:	<ul style="list-style-type: none"> ▪ <i>Residential</i> ▪ <i>Residential institution</i> ▪ <i>Outdoor recreational use</i> ▪ <i>Accommodation for Travellers</i> ▪ <i>Local shops, local offices, licensed premises, banks and other local services</i> ▪ <i>Buildings for education</i> ▪ <i>Childcare facilities</i>

Uses which may contribute to the zoning objective, dependent on the R and LDR location and scale of development for example:	<ul style="list-style-type: none"> ▪ <i>Buildings for the care of the health, safety or welfare of the public</i> ▪ <i>Buildings for the community, cultural or recreational use</i>
	<ul style="list-style-type: none"> ▪ <i>Hotel, Guesthouses and B&B's</i> ▪ <i>Part conversion or extension of private residence to studio, office, childcare facility or small enterprises by the occupier of the dwelling, at a scale as would not unduly interfere with the primary use of the dwelling</i> ▪ <i>Places of worship</i> ▪ <i>Public utilities</i>

As identified the site of the proposed development is zoned for residential development, this includes a sub-zoning of Low Density Residential. In this regard it needs to be highlighted that the principal zoning for the site (residential) is acceptable and wholly appropriate with regards to the proposed development.

It is a stated aim of the Council “*To provide for good quality housing for all sectors of the community in sustainable neighbourhoods that are attractive places to live and are within easy access to a range of local services, amenities, community facilities and public transport networks. To ensure that these neighbourhoods have a sense of identity and foster sustainable living and movement patterns.*”

The Council have set out in Chapter 2 of the Plan their housing strategy, which includes: (inter alia):

- *Implement the recommended settlement strategy for the city ensuring that sufficient land is zoned to meet future demand, in the interests of sustainability and to achieve the optimal integration of land use and transportation.*
- *Accommodate through land use zoning the requirements of the Housing Strategy.*
- *Encourage sustainable neighbourhoods of high-quality residential development, with a mix of house types and tenures with a strong identity and sense of place.*
- *Promote sustainable neighbourhoods where community facilities and services of an appropriate nature are easily accessible.*
- *Enable each household to have access to housing suitable to their needs and promote the provision of social housing, housing for persons with special needs and the provision of homeless and emergency accommodation.*
- *Promote climate adaptation measures as part of the development of sustainable neighbourhoods.*
- *Protect and enhance existing residential areas and explore opportunities for environmental improvements in particular in city centre residential areas.*

Policy 2.2 of the Plan sets out the Council’s **Housing Strategy** which includes:

- *Secure implementation of the Housing Strategy 2017-23, which has been informed by the Core Strategy, by ensuring that sufficient suitable lands are zoned to meet the extent of housing needs identified in the strategy in accordance with the NSS and RPGs targeted population for Galway City*
- *Require as provided for under Section 95 of the Planning and Development Act 2000 (as amended) that 10% of all housing developments in excess of 9 units, on lands zoned for residential use or for a mixture of residential and other use be reserved for the purposes of social housing.*
- *Have regard to all Government policies on housing and specifically include for consultation, support and assistance to all Approved Housing Bodies (AHB) in their role as social housing providers.*
- *Support a diverse range of housing types, size and tenures within housing developments in the interests of countering undue segregation and to allow for choice of community, for all persons irrespective of age, culture, social background or ability.*

- *Planning applications for multiple housing units will be required to submit a Statement of Housing Mix detailing the proposed mix and demonstrating that it provides a sufficient minimum in house sizes and types to satisfy the demands of the emerging reduction in household sizes. The needs of special groups such as the elderly and disabled will be required to be considered as part of this process.*
- *Support the development of sustainable communities and ensure that all new housing developments – private, public and voluntary are carried out in accordance with the DECLG guidelines Sustainable Residential Developments in Urban Areas (2008) and Section 28 Ministerial guidelines – Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities, (2015).*

The Plan emphasises that the successful integration of a new housing development within its surrounding context is an important element in the design process. It can include the natural environment, the form of settlement, buildings and spaces, landscape features, contours, historical/archaeological features and local biodiversity. The following factors are noted:

- Local facilities and community infrastructure;
- The public transport network and network of walking and cycling routes;
- The green network.

Policy 2.4 Neighbourhood Concept sets out to:

- *Encourage the development of sustainable residential neighbourhoods, which will provide for high quality, safe, accessible living environments which accommodates local community needs.*
- *Encourage sustainable neighbourhoods, through appropriate guidelines and standards and through the implementation of local area plans, framework plans/masterplans.*
- *Protect and enhance new/existing residential neighbourhoods through appropriate guidelines and standards, preparation of framework plans, development briefs and design statements.*
- *In the design of residential developments regard shall be had to the Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (2009) and the accompanying Urban Design Manual–A Best Practice Guide and the Design Manual for Urban Roads and Streets (2013).*

The Plan supports sustainable neighbourhoods which include a mix of uses (Section 2.5 Neighbourhoods: Outer Suburbs).

As per the *Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas Cities, Towns and Villages* the promotion of higher residential densities in appropriate locations is acceptable. In assessing high density developments regard shall be had to these guidelines and the accompanying design manual which sets out certain criteria including the following:

- *“Acceptable building heights;*
- *Avoidance of overlooking and overshadowing;*
- *Provision of adequate private and public open space;*
- *Landscaping where appropriate and provision of safe play spaces;*
- *Adequate internal space standards;*
- *Suitable parking provision;*
- *Provision of ancillary facilities such as community facilities and local services.”*

The Development Plan encourages development proposals to consider a range of design principles including:

- *Connectivity and Permeability:* provide convenient access to places, particularly to schools and places of work. Routes within the area should be accessible for everyone and as direct as possible.
- *Sustainability:* prioritise the needs of walking, cycling, public transport and the need for car-borne trips to be minimised.
- *Safety:* provide for safe access on streets, paths and cycle routes for users of all ages and degrees of personal mobility.
- *Legibility:* ensure residents and visitors can easily find their way around the area.
- *Sense of Place:* ensure streets contribute to the creation of attractive and lively mixed-use places. Streets should not just serve a movement function, their design should include consideration of appropriate opportunities for events and social interaction. The use of street names with a connection to the area can also reinforce a sense of place and evocation of the past in new buildings.

Policy 7.4.3 Childcare sets out to:

- *Facilitate the development of childcare facilities, including after school services, at a number of suitable locations, such as, within residential areas, places of employment, city centre, neighbourhood and district centres, schools, in the vicinity of educational and community establishments and adjacent to public transport nodes.*
- *Contribute to the provision of childcare facilities by requiring that such facilities be provided in conjunction with residential developments over 75 dwelling units.*
- *Consider alternative arrangements where it can be clearly established that adequate childcare facilities exist.*

2.6.1.1 Summery of Compliance with Local Policy

The development provides 102no. residential units on residentially zoned lands within the settlement envelope. It therefore accords with the general zoning contained within the Galway City Development Plan 2017-2023. The plot ratio provided for in the Plan for this specific site (0.2:1) is exceeded with respect to the proposed development, which stands at 0.41:1; however, this exceedance is a direct consequence of the national requirement to make efficient use of land and to increase overall residential densities on residentially zoned lands.

The design has evolved from an assessment of the site character, features, constraints and opportunities. It results the creation of a successful neighbourhood in this location close to the City of Galway and represents a density of 35.8 units per ha which is not wholly different from that previously accepted by the Board’s Inspector (36 units per ha) on a zoned and serviceable site (refer to the Inspectors report into SHD application ref: 306143).

Associated facilities are provided for in this new neighbourhood to enhance the sense of community within the layout. The Council through the zoning objectives of the site encourage the provision of community, commercial and local employment facilities to serve the local community of the neighbourhood. The range of facilities can include schools, childcare facilities, community centres, primary health care centres and local commercial services. As set out earlier in this section uses which can be considered compatible with the zoning in this instance include local shops, offices, childcare facilities and other local services. Such uses have been considered and where deemed appropriate integrated into the overall design to create a vibrant community in this location.

The provision of a mix of house types and tenures, as called for in the Development Plan, is evident in the development proposals. As per the development statistics (Section 4.2 of this report) a total of 102no. units which will be split across 67 housing units (65.7%) and 35 apartment units (34.3%). Under the overall 102 units there will be 30 different variants across the housing and apartment units. This, together with the application of universal design principles, aims to create a successful residential community with the opportunity for residents to move between accommodation types within the

community over a period of time. With regards to the dwelling mix under the original application (ABP ref:306413-20) the Inspector noted that:

“The dwelling mix caters for a range of 1, 2, 3 and 4 bed units in a range of unit types, from semi-detached/terraced houses, to duplex units and apartment blocks. I consider this mix to be reasonable and supportive of national policy.”

In creating sustainable housing, the development proposal has sought to optimise natural sunlight, daylight and solar gain through consideration of topography, building orientation and building layout.

It is acknowledged in the Development Plan that open space and amenity space is an asset in any development. The open spaces included in the development proposal have been carefully considered especially in light of the Council’s comments at pre-application stage (3rd of December 2020 and 14th of January 2021) and serve a range of functions/uses as detailed in the accompanying Landscape Statement (CSR, 2021). A total of 15.60% of public open space is achieved within the proposals, in line with the provisions of the Development Plan.

Car parking has been provided taking account of the provisions of the Galway City Development Plan 2017-2023 in relation to parking and the consideration of dual use parking where peak demand periods do not coincide, and a focus on innovative layout solutions to create areas of high quality and amenity. Table 2-8 below illustrates the parking proposed in the current proposals.

Table 2-8: Car Parking Provisions

Requirements	Proposed Development
Retail - 1 space per 15sqm (GCDP Section 11.10.1)	Proposed retail space: 188.56sqm Spaces Required: 13 Spaces Provided: 3* * Shortfall to commercial spaces to be covered by some apartment spaces which will typically be vacated during business hours.
Apartment Block- 1 space per apartment and 1 visitor space per every 4 apartments (DHPLG’s Sustainable Urban Housing: Design Standards for New Apartments)	Apartments: 35 Spaces Required: 44 Spaces Provided: 43 35 no. spaces are provided for each apartment. 8 number spaces are visitor spaces through the scheme. 07 no. Creche & 03 no. Retail spaces will normally be vacated outside office hours and can be used as visitor spaces.
Creche- 1 space per 20sqm operation space (GCDP Section 11.10.1)	Creche Operational Space: 288.37sqm (Overall 398.80sqm) Spaces Required: 14 Spaces Provided: 7 7 spaces are dedicated staff spaces. The remainder 7 of required spaces is made up of Apartment spaces which will typically be vacated during business hours.
Houses- 2 on curtilage spaces proposed per dwelling or 1.5 grouped spaces + 1 per 3 dwellings visitor (GCC Section 11.10.1)	Houses: 67 Spaces Required: 149.8 Spaces Provided: 130

Additionally, the provision of bicycle parking within the layout has been considered, per Table 2-9 below:

Table 2-9: Bike Parking Provisions

Requirements	Proposed Development
House- At least 2 spaces provided in rear gardens. All gardens are provided with direct access	Houses: 67 Spaces Required: 134 Spaces Provided: 134

Creche- No stated requirement in the Galway City Council Development plan 2017-2023	Creche: 1 Spaces Required: 0 Spaces Provided: 9
Commercial/Retail-1 cycle stand (5 spaces) per 20 carpark spaces (GCC Section 11.10.3)	Retail Unit: 1 Spaces Required: 12.5 Spaces Provided: 20
Apartment- 1 space per bedroom and 1 visitor space per every 2 apartments (DHPLG's Sustainable Urban Housing: Design Standards for New Apartments)	Apartments: 35 Spaces Required: 76.5 Spaces Provided: 77

2.6.2 Galway Transportation Strategy, 2016

The Galway Transport Strategy (GTS) 2016 represents a partnership approach between Galway City Council, Galway County Council and the National Transport Authority. It includes a series of measures which will address the transport problems experienced across the city particularly during peak hours, over a phased and co-ordinated basis over the next 20 years, based on priority needs. The GTS has established that the reduction in traffic congestion requires both improvements to public transport, cycling and walking networks and the provision of a new orbital route.

The proposed measures were arrived at following transport modelling which included defining the existing transport problems, predicting future travel demands, access mode share and assessing their mutual impacts and interdependencies. The strategy includes traffic management, giving priority to walking cycling and bus movements, modifications to the traffic network, management of parking activities and heavy goods vehicles, improvements to the public realm and use of 'smarter mobility'. These measures are designed to both address the current significant problems and inefficiencies in the movement of people and goods within and around the city and to establish a long-term transport plan that will underpin the future sustainable growth of the city as supported by the Core Strategy.

The development proposed seeks to make use of and enhance connections through and around the site. As demonstrated in the accompanying design drawings there is wide-ranging connectivity across and through the site. The applicant has sought to engage with CIE regarding public transport connections, while the provision of bike and car rental bays also promote sustainable transport.

2.7 Scoping and Consultation

2.7.1 Scoping Document

An informal EIAR scoping exercise was undertaken as part of the EIAR process. Scoping is the process of determining the content, depth and extent of topics to be covered in the environmental information to be submitted to a competent authority for projects that are subject to an Environmental Impact Assessment (EIA). This process is conducted by contacting the relevant authorities and Non-Governmental Organisations (NGOs) with interest in the specific aspects of the environment likely to be affected by the proposal. These organisations are invited to submit comments on the scope of the EIAR and the specific standards of information they require. Comprehensive and timely scoping helps ensure that the EIAR refers to all relevant aspects of the proposed development and its potential effects on the environment. In this way, scoping not only informs the content and scope of the EIAR, it also provides a feedback mechanism for the proposed design itself.

A scoping document providing details of the application site and the proposed development, was prepared by MKO and circulated on 15th February 2021 to the agencies, NGOs and other relevant parties listed in **Error! Reference source not found.**10 below.

MKO requested the comments of the relevant personnel/bodies in their respective capacities as consultees with regards to the EIAR process.

2.7.2 Scoping Responses

The scoping responses received to date are presented in Appendix 2-1.

Table 2-10 Scoping Consultees

No.	Consultee	Response
1.	An Taisce	No response received at the time of lodgement.
2	Department of Agriculture, Food and the Marine	Response received 26 th March 2021. The Department of Agriculture, Food and the Marine had no submission or observation.
3	Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media	Response received 8 th April 2021, observations/recommendations can be viewed in full under Appendix 2-1.
4	Galway City Council- Transportation and Infrastructure Department	No response received at the time of lodgement.
5	Galway City Council- Environment Section	No response received at the time of lodgement.
6	Galway City Council- Heritage Officer	No response received at the time of lodgement.
7	Faite Ireland	No response received at the time of lodgement.
8	Geological Survey of Ireland	The Geological Survey of Ireland (GSI) responded to the scoping request on the 24 th of February 2021. Observations/recommendations can be viewed in full under Appendix 2-1.
9	Health Service Executive	The HSE acknowledged receipt of the scoping document and requested a soft copy on the 5 th March 2021.
10	Inland Fisheries Ireland	No response received at the time of lodgement.
11	Irish Water	No response received at the time of lodgement.
12	Office of Public Works	The Office of Public Works acknowledged receipt of the scoping document on the 15 th of February 2021.
13	Transport Infrastructure Ireland (TII)	Transport Infrastructure Ireland acknowledged receipt of the scoping document on the 15 th of February 2021.
14	The Heritage Council	No response received at the time of lodgement.

No.	Consultee	Response
15	ESB Networks	The ESB acknowledged receipt of the scoping document on the 18 th of February 2021.
16.	National Transport Authority	The National Transport Authority acknowledged receipt of the scoping document on the 15 th February 2021.
17	Commission for Regulations of Utilities	No response received at the time of lodgement.
18	National Parks and Wildlife Service-DAU	The DAU acknowledged receipt of the scoping document on the 16 th of February 2021.

2.7.3 Section 247 Pre-Planning Meetings

2.7.4 Meeting No.1

The first section 247 (s247) meeting was held on the 10th of December 2020 and was attended by the applicant, their project architects, engineers, landscape architect and planning consultant. Representatives from the Council’s roads/transport, drainage, planning and parks section were also in attendance.

At the meeting the applicants design team introduced both the applicants and the proposed development to Galway City Council. Key elements of the project such as landscape, civils, transport and the overall design of the development were presented and discussed in detail with the Planning Authority.

The following information was lodged with the Authority ahead of the meeting:

- Site Location Map 20175-2501 (ONOM)
- Overall Site Survey 20175-2502 (ONOM)
- Site layout part 1 20175-2511 (ONOM)
- Site layout part 2 20175-2512 (ONOM)
- House type A/A1 Semi Detached 20175-2710 (ONOM)
- House Type C/C1 Semi-Detached 20175-2730 (ONOM)
- House Type E + F 20175-2740 (ONOM)
- Development statistics sheet
- Preliminary Landscape Report Phase 1 (CSR)
- Preliminary Report on Civil Works Phase 1(Tobin)
- Watermain layout drawing 10690-2101 Rev D01(Tobin)
- Drainage layout drawing 10690-2102 Rev D01(Tobin)
- Combined Services layout drawing 10690-2100 Rev D01 (Tobin)

In discussions and feedback the applicants team outlined a number of elements of the project including:

- *The applicants will continue to liaise with Irish Water with respect to the upgrade of the Merlin Park pumping station,*
- *The context of the proposed development following the refusal of Pl. 306413-20,*
- *Site zoning as per the Galway City Development Plan 2017-2023,*
- *The functionality of open space under Phase 1 with a recommendation made that the central green space of the overall scheme should be brought forward to Phase 1,*
- *The location of the creche was discussed in detailed with the design team invited to explore this further, and,*

- *The development in the context of the proposed and existing road networks.*

It was agreed that the team would review the Council’s feedback and seek a follow-up meeting.

It was proposed to carry out a site walk-over between the Council’s landscape officer and the project landscape architect.

2.7.5 Meeting No.2

A second section 247 meeting took place between the applicant, their project architects, engineers, landscape architect, planning consultant and the representatives of Galway City Council (attended by roads/transport, drainage, planning and the parks section). The meeting took place on the 14th of January 2021. The following information was provided to the Authority ahead of the meeting:

- Rosshill Narrative
- Masterplan Site Layout 20175-3001 (ONOM)
- Part 01 Site Layout 20715-3002 (ONOM)
- Part 02 Site Layout 20715-3003 (ONOM)
- Green Open Spaces Masterplan Spaces 20715-3010 (ONOM)
- Landscape Plan (CSR),
- Development Statistics (ONOM)
- Car Parking Requirements (ONOM)
- Technical Note re: SUDS (Tobin)

At the second meeting the applicants team outlined the various updates which were made to the proposed development following feedback from the initial meeting, which included:

- *Revisions to the landscape design of the development such as:*
 - *Additional consideration and redesign of the open space located at Cell No.1,*
 - *The addition of play equipment*
 - *The introduction of swales within the car park area at the apartment block*
 - *Further retention and reinforcement of a number of areas of trees on site*
- *Various updates to the layout and design had been undertaken such as:*
 - *Relocation of creche building following detailed discussions with GCC to the north-east corner of the site*
 - *Staggering of the apartment block to create more visual interest in this location*
 - *Further consideration to the car parking layout (both at the apartment block and along the main road fronting Cell No.1)*
 - *A further diversity in house design to add to variety and distinctiveness across the site*
 - *A review of pedestrian movement and access throughout the site.*

Galway City Council noted the positive changes which have come about following the initial meeting. Further positive feedback was also noted surrounding the context of the current application in the potential for the development of surrounding zoned lands in due course, the relocation of the creche, changes to the open spaces and the retention/reinforcement of existing trees. A number of additional elements of the proposed development including the overall design, roads and car parking were discussed further.

The applicants welcomed any additional feedback from Galway City Council with regards to the proposed development following the second meeting.

2.7.5.1 An Bord Pleanála

A tripartite meeting took place between An Bord Pleanála, Galway County Council and the Design team on the 1st of April 2021. The meeting detailed discussions were had with regards to the principle of the project including elements surrounding density, transport, urban design and layout, natural and cultural heritage, services (pump station), etc.

2.7.5.2 Consultations with Prescribed Bodies

Consultations were held with the following prescribed bodies with regards to the proposed development:

- Consultations were held between the Project Engineers and Irish Water;
- Consultations were held with the Planning Authority under the section 247 pre-application process;
- Additional consultations were held with the Council’s Senior Executive Parks Superintendent regarding proposed section 48 Development Contributions;
- Roads Section of Galway City Council;
- Consultations were held with The Galway County and City Childcare Committee to inform the application; and,
- NPWS.

2.8 Cumulative Impact Assessment

This EIAR, which includes a description of likely significant impacts of the project, includes an assessment of cumulative impacts that may arise. The factors considered in relation to cumulative effects include human beings, flora and fauna, soil, water, climatic factors, landscape, cultural heritage and material assets.

The potential for cumulative impacts arising from the proposed development in combination with other projects has therefore been fully considered throughout this EIAR. This section of the EIAR provides an overview of other projects located within the wider area that have been considered within the cumulative impact assessments.

2.8.1 Methodology for the Cumulative Assessment of Projects

The potential for cumulative effects to arise from the proposed development was considered in the subject areas of human beings, flora and fauna, soil, water, climatic factors, landscape, cultural heritage and material assets. To comprehensively consider potential cumulative impacts, the final section of each relevant section within this Environmental Report includes a cumulative impact assessment where appropriate.

The potential cumulative impact of the proposed development and other relevant developments has been carried out with the purpose of identifying what influence the proposed development will have on the surrounding environment when considered cumulatively and in combination with relevant permitted, proposed and constructed projects in the vicinity of the proposed site.

The Cumulative Impact Assessments (CIA) of projects has four principle aims:

1. *To establish the range and nature of existing projects within the cumulative impact study area of the proposed cable connection.*
2. *To summarise the relevant projects which have a potential to create cumulative impacts.*

3. *To establish anticipated cumulative impact findings from expert opinions within each relevant field. Detailed cumulative impact assessments are included in each relevant section of the Environmental Report.*
4. *To identify the projects that hold the potential for cumulative interaction within the context of the proposed development and discard projects that will neither directly or indirectly contribute to cumulative impacts.*

Assessment material for this cumulative impact assessment was compiled on the relevant developments within the vicinity of the proposed development. The material was gathered through a search of the Galway City Council online Planning Register, reviews of relevant Environmental Report, or Environmental Impact Assessment Report (EIAR) documents, planning application details and planning drawings, and served to identify past and future projects, their activities and their environmental impacts. These projects are summarised in Section 2.8.2 below.

2.8.2 Projects Considered in Cumulative Assessment

The projects considered in relation to the potential for cumulative impacts and for which all relevant data was reviewed (e.g. individual EIS/EIAR's, layouts, drawings etc) include those listed previously above at Section 2.3 and noted below:

Application Reference	Description	Decision
99/687	Permission for 59 houses and associated site development works.	Granted by GCC 22/03/2000
00/841	Permission for 304 two storey houses, 18 apts, in a 3 storey residential block, & 15 apts. in a mixed use block of 3/4 storeys, incorporating commercial neighbourhood facilities, incl. a creche, doctors surgery & retail space, with associated carparking; site development works incl., temporary sewerage treatment plant & providing new vehicular access points to the Cheshire House grounds & 3 neighbourhood dwellings on the site.	Granted by GCC 14/06/2001
04/724	Permission to construct ninety two semi-detached houses (92 no.) and fifteen detached houses (15 no.) to provide a new entrance from Coast Road (R338) and to provide new entrance from Doughiska Road to the development site together with all site services.	Granted by GCC 16/12/2004
15/194	Permission for development at this site at Roscam with access from the Oranmore Road (R338), Galway and measuring c. 2.24 hectares in area. The development will consist of 49 no. two-storey detached and semi-detached four bedroom houses, 2 no. two-storey semi-detached 3 bedroom houses and a three/four storey apartment block containing 12 no. 2 bedroom apartments and a crèche (166sq.m) at ground floor. Permission is also sought for all associated car-parking, landscaping, boundary treatments and ancillary site development works including amendments to car-parking, boundary treatment and Site no. 67 forming part of permitted development under Reg. Ref. 05/940 (subsequently amended by permission Reg. Ref. 13/347).	Granted by GCC 18/05/2016
16/187	Permission to construct a garage with all associated services	Granted by GCC 28/09/2016
16/228	Permission for a new residential development. The development consists of 16 no. 2-storey, five-bedroom, detached houses, together with individual garages, as applicable, new vehicular site accesses and roads with all ancillary site works, landscaping and service connections	Granted by GCC 21/03/2017

Application Reference	Description	Decision
17/283	Permission to construct 23 two storey Dwellinghouses consisting of Detached, Semi-detached and terrace including access/egress off the old coast road to Oranmore with sewer connection to adjacent sewer pumping station adjacent the Dublin Road and all associated services.	Granted by GCC 12/01/2018
18/187	Permission for a change of house type to previously granted planning permission (reference 16/228). These amendments consist of a change of house type C (on site 6 only) which is a 5-bedroom two storey detached house	Granted by GCC 05/09/2018
19/54	Permission for development which consists of the demolition of existing sun room and to replace it with a single storey extension to the front of dwelling house and a back porch to the side	Granted by GCC 28/05/2019
19/95	Permission for development which consists of the constructing 51 No. one, two and three bedroom apartments and two one bedroom Town Houses in 6 no. Blocks ranging in height from one storey up to four storey, with sewer connection to adjacent pumping station adjacent Dublin road, together with access/egress off the old coast road to Oranmore and all associated services at Doughiska and Merlin Park Townlands. (Previous Planning Ref No. 17/283)	Granted by GCC 26/06/2019
21/28	Permission for development which will consist of; variations to domestic garage design from that previously granted under 16/228 to include proposed domestic garage and gym and associated works.	Granted by GCC 29/03/2021
21/73	Permission for development which will consist of amendments to previously granted planning permission (ref 16/228). The amendments consist of the following changes : 1. Minor changes to boundaries of sites 8,9,10,11 to accommodate revised house types. 2. Minor changes to alignment of proposed access road and junction between sites 8 and 12. 3 Change of house types on sites 8,9,10,11 which are to remain 5 bedroom two storey detached houses. 4. Minor amendments to side and rear elevation of house type A1 currently granted on site 15. 5. Minor amendments to side and rear elevation of house type B2 currently granted on sites 12 and 13. 6. Proposed garages for sites 8,12,13,15.	Current Application

The potential for cumulative impacts arising from the proposed development and these projects have been set out in full in the relevant chapters of this EIAR, where appropriate. Detailed consideration of all potential cumulative impacts can therefore be found in the relevant sections of this EIAR.

3. REASONABLE ALTERNATIVES

3.1 Introduction

Article 5 of the Environmental Impact Assessment (EIA) Directive as amended by Directive 2014/52/EU states that the information provided in an Environmental Impact Assessment Report (EIAR) should include a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the final choice, taking into account the environmental effects.

The primary obligation under Article 5(1)(d) of the EIA Directive is upon the developer to provide a description of the ‘reasonable alternatives’ considered in the course of the application process. In this regard, the Directive states as follows:

(d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;

The consideration of alternatives is an effective means of avoiding environmental impacts. As set out in the ‘Draft Guidelines on The Information to be Contained in Environmental Impact Assessment Reports’ (EPA, 2017), the presentation and consideration of reasonable alternatives investigated is an important part of the overall EIA process.

This chapter of the EIAR contains a description of the reasonable alternatives that were considered in respect of the development of the site, in terms other land-use options, unit numbers, unit types, design, construction methods and site layout.

It is important to acknowledge that although the consideration of alternatives is an effective means of avoiding environmental impacts, there are difficulties and limitations when considering alternatives. Indeed, as is clear from the provisions of the EIA Directive itself, the requirement is to consider “reasonable alternatives” which are relevant to the project and its characteristics. In general terms, issues such as hierarchy, non-environmental factors and certain site-specific issues may also be relevant to the consideration of reasonable alternatives by the developer.

Hierarchy

EIA is concerned with projects. The Environmental Protection Agency’s draft guidelines (EPA, 2017) state that, in some instances, neither the applicant nor the competent authority can be realistically be expected to examine options that have already been previously determined by a higher authority, such as a national plan or regional programme for infrastructure which are examined by means of a Strategic Environmental Assessment (SEA), the higher tier form of environmental assessment.

Non-environmental Factors

EIA is confined to the potential significant environmental effects and that influences consideration of alternatives. However, other non-environmental factors will be important to the developer of a project, for example project economics, engineering feasibility or planning considerations.

Site-specific Issues

The EPA guidelines state that the consideration of alternatives also needs to be set within the parameters of the availability of the land, i.e. the site may be the only suitable land available to the

developer, or the need for the project to accommodate demands or opportunities that are site-specific. Such considerations should be on the basis of alternatives within a site, for example design and layout.

3.2 Methodology

The EU Guidance Document (EU, 2017) on the preparation of an EIA outlines the requirements of the EIA Directive and states that, in order to address the assessment of reasonable alternatives, the Developer needs to provide the following:

- A description of the reasonable alternatives studied; and
- An indication of the main reasons for selecting the chosen option with regards to their environmental impacts.

There is limited European and National guidance on what constitutes a ‘reasonable alternative’ however the EU Guidance Document (EU, 2017) states that reasonable alternatives “*must be relevant to the proposed project and its specific characteristics, and resources should only be spent assessing these alternatives*”.

The guidance also acknowledges that “*the selection of alternatives is limited in terms of feasibility. On the one hand, an alternative should not be ruled out simply because it would cause inconvenience or cost to the Developer. At the same time, if an alternative is very expensive or technically or legally difficult, it would be unreasonable to consider it to be a feasible alternative*”.

The current Draft EPA Guidelines (EPA, 2017) state that “*It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or ‘mini-EIA’) of each alternative is not required.*”

Consequently, taking consideration of the legislative and guidance requirements into account, this chapter addresses alternatives under the following headings:

- ‘Do Nothing’ Alternative;
- Alternative Sites;
- Alternative Layouts;
- Alternative Design Considerations;
- Alternative Land-uses;
- Alternative Processes and
- Alternative Mitigation Measures.

Each of these is addressed in the following sections.

3.3 “Do Nothing” Alternative

If the proposed development was not to proceed, the opportunity to develop 102 no. units comprising a mixture of house and apartments, childcare facility, commercial/retail unit, open space, landscaping and ancillary works at this long standing residential zoned site would be lost

Under the “Do Nothing” alternative, the zoned residential lands would not be used for the development of housing. There remains a long-standing housing need in Galway City and the area of the Galway MASP in general, as identified in the RSES and Galway City Development Plan 2017-2023. The City Council have, through the inclusion of the site for residential development in their adopted Plan, given their support for the site to be developed for residential purposes. Therefore, under this “Do Nothing” scenario, the construction of badly needed housing would have to occur on another site in the Galway MASP area to fulfil that need. It is entirely possible that any alternative site would be less suitable than the proposed development site. In circumstances where the utilisation of alternative unzoned lands and

the non-utilisation of lands zoned for residential development would represent an unsustainable land use, the “Do-Nothing” alternative was not considered the appropriate option.

3.3.1 Alternative Sites

The proposed development is located within lands which have been is zoned for Low Density Residential (LDR) under the Galway City Development Plan 2017-2023. As such consideration of alternative sites for the construction of residential units proposed in this development was not considered necessary. It is considered that the proposed site is the only suitably zoned LDR site available to the applicant for the proposed development. During the design process for the proposed development several iterations of the site layout and alternative designs were considered. This planning application demonstrates that the subject site and the surrounding area have the environmental capacity to accommodate the proposed development without any significant risk of impact upon environmental sensitivities due to the site location.

3.3.2 Alternative Layouts

This section provides an overview of how the proposed development has evolved to date. The design process was an iterative process, where findings at each stage of the assessment were used to further refine the design, always with the intention of minimising the potential for environmental impacts. The design process was an iterative process, where findings at each stage of the design’s evolution were used to further refine the design, always with the intention of minimising the potential for environmental impacts. In particular, in developing the proposed design, cognisance was taken of the designs proposed in respect a previous SHD proposal (ref: 306413-20), the applicants in this instance have ensured that the previous considerations of An Bord Pleanála were taken into account. The layout has also evolved through discussions with the City Council at pre-application stage, and following receipt of An Bord Pleanála’s Opinion at Section 5 pre-application discussion stage.

3.3.2.1 Alternative Layout 1

An initial design concept was circulated to the Planning Authority ahead of the initial Section 247 Stage 1 meeting which took place on the 3rd of December 2020. The proposal consisted of:

- 102 units comprising:
 - House Units:
 - 2no. 4-bed 2-storey Semi-detached type A,
 - 18no. 3-bed 2-storey Semi-detached type C,
 - 14no. 3-bed 2-storey Semi-detached type C1,
 - 1no. 3-bed 2-storey Semi-detached type ‘C2’ turn the corner house,
 - 6no. 3-bed 2-storey Long frontier semi-detached type ‘E’,
 - 6no. 4-bed 2-storey Long frontier semi-detached type ‘F’ turn the corner,
 - 15no. 3-bed 2-storey Terrace type ‘G’ townhouses, and,
 - 5no. 3-bed 3-storey Terrace type ‘G1’ turn the corner townhouses
 - Apartment Units:
 - 10no. 1 bed One storey ‘Type 1A’ apartments circa 49.2 sqm,
 - 22no. 2 bed One storey Type 2A’ apartments circa 78 sqm, and,
 - 3no. 2 bed One storey Type 2E’ apartments circa 70.6 sqm
- Commercial facility and creche,
- Overall site area of 4.0599ha with a developable site area of 2.8980ha,
- Density of 35.20 units per ha, and,
- Public open space of 15.35%.



Plate 3-1: Alternative Layout 1

3.3.2.2 Alternative Layout 2

Following the initial Section 247 Stage 1 meeting held on the 3rd of December 2020 a number of changes were made to the design of the overall scheme following discussions. The site layout is indicated under Plate 3-2 below. That proposal comprised of:

- 102 units, with a breakdown of 35 apartment units (34.3%) and 67 housing units (65.7%),
 - 10no. 1-bed 2-person Apartment (49.2sqm),
 - 22no. 2-bed 4-person Apartment (78sqm),
 - 3no. 2-bed 3-person Apartment (70.6sqm),
 - 2no. 4-bed semi-detached House (125.40sqm),
 - 17no. 3-bed semi-detached House (114.34sqm),
 - 10no. 3-bed end of terrace House (114.34sqm),
 - 1no. 3-bed semi-detached double front House (114.34sqm),
 - 5no. 3-bed semi-detached mid terrace House (114.34sqm),
 - 6no. 3-bed long semi-detached House (107.80sqm),
 - 6no. 4-bed long semi-detached House (129.80sqm),
 - 15no. 3-bed 2 storey town house terrace House (103.42sqm), and,
 - 5no. 3-bed 3 storey town house terrace House (146.38sqm).
- Commercial facility and creche
- Overall site area of 4.72ha with developable area of 2.91ha
- Density of 35 units per ha,
- Public open space of 15.35% (4,303sqm).

Following on from the initial meeting with Galway City Council a number of areas which were changed include the following:

- Revisions to the landscape design of the development such as:
 - *Additional consideration and redesign of the open space located at Cell No.1,*
 - *The addition of play equipment*
 - *The introduction of swales within the car park area at the apartment block*
 - *Further retention and reinforcement of a number of areas of trees on site*
- Various updates to the layout and design had been undertaken such as:
 - *Relocation of creche building following detailed discussions with GCC to the north-east corner of the site*

- *Staggering of the apartment block to create more visual interest in this location*
- *Further consideration to the car parking layout (both at the apartment block and along the main road fronting Cell No.1)*
- *A further diversity in house design to add to variety and distinctiveness across the site*
- *A review of pedestrian movement and access throughout the site.*

The above noted changes were presented to Galway City Council in the second Section 247 pre-application meeting with Galway City Council on the 14th of January 2021. The layout which was presented to Galway City Council at the noted meeting can be viewed overleaf at Plate 3-2:



Plate 3-2: Alternative Layout 2

3.3.2.3 Alternative Layout 3

Alternative 3 relates to the draft application pack with was issued to the An Board Pleanála (and Galway City Council) as part of the Section 5 consultation with the Board as part of the SHD process. That proposal comprised of:

- 102 units, with a breakdown of 35 apartment units (34.3%) and 67 housing units (65.7%)
 - 4no. Apartment Type '1A' - 1 bed 2 person (1 Storey),
 - 4no. Apartment Type '1B' - 1 bed 2 person (1 Storey),
 - 3no. Apartment Type '1C' - 1 bed 2 person (1 Storey),
 - 11no. Apartment Type '2A' - 2 bed 4 person (1 Storey),
 - 4no. Apartment Type '2B' - 2 bed 4 person (1 Storey),
 - 3no. Apartment Type '2C' - 2 bed 4 person (1 Storey),
 - 3no. Apartment Type '2D' - 2 bed 4 person (1 Storey),
 - 3no. Apartment Type '2E' - 2 bed 3 person (1 Storey),
 - 2no. House Type 'A/A1' - 4 Bed Semi Detached,
 - 8no. House Type 'B/B1' - 3 Bed Semi Detached,
 - 4no. House Type 'C/C1' - 3 Bed End of Terrace,
 - 2no. House Type 'C2' - 3 Bed Mid Terrace,
 - 2no. House Type 'D' - 2 storey town house - end of terrace - 3 bed,
 - 2no. House Type 'D2' - 3 storey town house - end of terrace - 4 bed,
 - 2no. House Type 'E' - 3 bed Long Semi-Detached,
 - 2no. House Type 'F' - 4 bed Long Semi-Detached,
 - 3no. House Type 'G' - 2 storey town house - end of terrace - 3 bed,
 - 6no. House Type 'G1' - 2 storey town house - mid terrace - 3 bed,
 - 3no. House Type 'G2' - 3 storey town house- end of terrace- 4 bed,
 - 1no. House Type 'H' - 3 Bed semi detached,

- 1no. House Type 'H1' - 3 Bed semi detached - Double front,
- 8no. House Type 'J/J1' - 3 Bed semi detached,
- 4no. House Type 'K' - 3 bed Long Semi-Detached,
- 4no. House Type 'L' - 4 bed Long Semi-Detached,
- 3no. House Type 'M' - 3 Bed End of Terrace,
- 3no. House Type 'M1' - 3 Bed End of Terrace,
- 3no. House Type 'M2' - 3 Bed Mid Terrace., and,
- 4no. House Type 'D1' - 2 storey town house - mid terrace - 3 bed
- Commercial facility (199.89sqm) and creche facility (398.8sqm),
- Overall site area of 4.72ha with developable area of 2.87ha
- Density of 35.48 units per ha,
- Public open space of 15.25% (4,383sqm).

Following the second Section 247 meeting with Galway City Council a number of additional amendments were made to the design of the project which includes taking in feedback surrounding open space, parking provisions and design details. A suite of changes made to the development including:

A suite of changes made to the development were made including:

- Additional revisions to a number of elements to the landscaping design which was presented including elements surrounding connectivity, play equipment, retention/reinforcement of tress, larger open, revisions to smaller areas of open space to make them more attractive and the introduction of public art elements.
- Various design changes were also introduced including amendments to the positioning of the apartment block, car parking, further development of the character of the site, amendments to road materials to promote traffic calming and the creation of further permeability.

Galway City Council noted that there were a number of positive changes within the revised scheme. The site layout is indicated below in Plate 3-3



Plate 3-3: Alternative Layout 3

3.3.2.4 Proposed Development

The proposed development layout is indicated in Plate 3-4 below. The proposed development is made up of 102 units across 30 different unit types (8 apartment variants and 22 house variants). The full wording of the proposed development is as follows:

1. Construction of 102no. residential units comprising of 35 apartments and 67 houses:

- a. 4no. Apartment Type '1A' - 1 bed 2 person
- b. 4no. Apartment Type '1B' - 1 bed 2 person
- c. 3no. Apartment Type '1C' - 1 bed 2 person
- d. 11no. Apartment Type '2A' - 2 bed 4 person
- e. 4no. Apartment Type '2B' - 2 bed 4 person
- f. 3no. Apartment Type '2C' - 2 bed 4 person
- g. 3no. Apartment Type '2D' - 2 bed 4 person
- h. 3no. Apartment Type '2E' - 2 bed 3 person
- i. 2no. House Type 'A/A1' - 4 Bed Semi Detached
- j. 8no. House Type 'B/B1' - 3 Bed Semi Detached
- k. 4no. House Type 'C/C1' - 3 Bed End of Terrace
- l. 2no. House Type 'C2' - 3 Bed Mid Terrace
- m. 2no. House Type 'D' - 2 storey town house - end of terrace - 3 bed
- n. 4no. House Type 'D1' - 2 storey town house - mid terrace - 3 bed
- o. 2no. House Type 'D2' - 3 storey town house - end of terrace - 4 bed
- p. 2no. House Type 'E' - 3 bed Long Semi-Detached
- q. 2no. House Type 'F' - 4 bed Long Semi-Detached
- r. 3no. House Type 'G' - 2 storey town house - end of terrace - 3 bed
- s. 6no. House Type 'G1' - 2 storey town house - mid terrace - 3 bed
- t. 3no. House Type 'G2' - 3 storey town house - end of terrace - 4 bed
- u. 1no. House Type 'H' - 3 Bed Semi Detached
- v. 1no. House Type 'H1' - 3 Bed Semi Detached - Double front
- w. 8no. House Type 'J/J1' - 3 Bed Semi Detached
- x. 4no. House Type 'K' - 3 bed Long Semi-Detached
- y. 4no. House Type 'L' - 4 bed Long Semi-Detached
- z. 3no. House Type 'M' - 3 Bed End of Terrace
- aa. 3no. House Type 'M1' - 3 Bed End of Terrace
- bb. 3no. House Type 'M2' - 3 Bed Mid Terrace

- 2. Demolition of the existing silage concrete apron (40sqm)
- 3. Childcare facility (399sqm over 2-storeys) associated outdoor play areas and parking
- 4. Retail/Commercial space (188.5sqm) including loading bay
- 5. Provision of shared communal and private open space, including play and fitness equipment
- 6. Car and cycle parking, including electric vehicle charging points
- 7. Provision of all associated surface water and foul drainage services and connections including pumping station
- 8. Landscaping, access routes and public art
- 9. Lighting and associated works
- 10. Access and junction improvements at Rosshill Road and Rosshill Stud Farm Road
- 11. Provision of a footpath connectivity link along Rosshill Road and Rosshill Stud Farm Road
- 12. All associated works and services

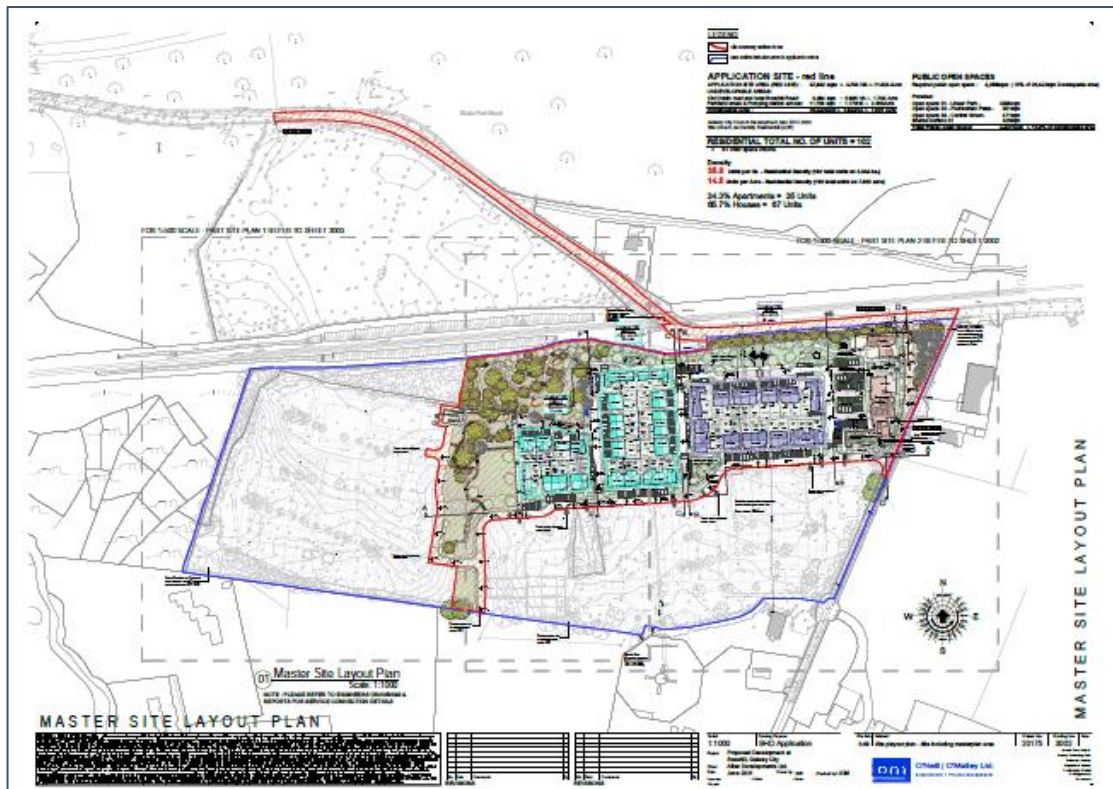


Plate 3-4: Proposed Development

3.3.3 Alternative Design Considerations

The proposed mix of uses are mutually compatible and support the viable completion of the development on site. Increased public access to the site facilities and amenities benefit both the future residents and the local community. The proposed development has been designed to take full cognizance of the existing area as well as the greater Galway City region, the proposed development will provide high quality housing on lands which have been zoned for the development of residential.

The proposed residential development has been prepared in accordance with the Policies and Objectives, contained in the National Planning Framework, Regional Spatial and Economic Strategy, Galway City Development Plan 2017-2023 and has been the subject of a pre-application consultations meetings with the Planning Authority and An Bord Pleanála prior to lodgment. The proposed development has been heavily influenced by the various pre-application consultations which have been carried out up to this point including revised locations of buildings/apartments, revised location of the pump station, the amendment of materials to be used, landscape design, amenity design, the placement of trees and shrubbery along with various other amendments. The applicants have taken full cognizance of the opinion of both An Bord Pleanála and Galway City Council in designing the proposed development as is clearly demonstrated in the above layout alternatives.

3.3.4 Alternative Land Uses

The proposed development comprises development of a greenfield site which has been zoned as LDR for low density residential. The principle of residential development at this site is clearly established within the sites zoning per the Galway City Development Plan 2017-2023. The proposed development provides for houses and apartments, a retail unit, a childcare facility, shared public open space and play areas, public art, public lighting, resident and visitor parking which are noted as compatible uses under Chapter 11 of the Galway City Development Plan 2017-2023. It is considered that the proposed land uses are deemed appropriate for 'LDR' zoned land as outlined in the Galway City Development Plan 2017-2023.

As such consideration of alternative land uses were not considered necessary as any alternative use would not be in line with the policy provisions of the extant Development Plan.

3.3.5 **Alternative Processes**

The management of processes that affect the volumes and characteristics of emissions, residues, traffic and the use of natural resources has formed part of the alternative's considerations through the projects development.

The construction of the site will require the use of raw materials in the form of energy to supply plant and machinery, standard building materials including stone, metals, pipework, concrete, electrical, plumbing etc and raw materials are consumed to manufacture building materials. The use of these resources will be controlled by the employment of best practice construction techniques including waste management practices. Where relevant, alternative processes are considered through the EIA.

3.3.6 **Alternative Mitigation**

The best practice design and mitigation measures set out in this EIA will contribute to reducing any identified risks and have been designed to break the any pathways between the site and any identified environmental receptors. The alternative is to either not propose these measures or propose measures which are not best practice and neither of these options is sustainable.

4. DESCRIPTION OF THE PROPOSED DEVELOPMENT

4.1 Introduction

This section of the Environmental Impact Assessment Report (EIAR) describes the proposed development and its component parts. The proposed development will consist of the following:

1. *Construction of 102no. residential units comprising of 35 apartments and 67 houses:*
 - 4no. Apartment Type '1A' - 1 bed 2 person
 - 4no. Apartment Type '1B' - 1 bed 2 person
 - 3no. Apartment Type '1C' - 1 bed 2 person
 - 11no. Apartment Type '2A' - 2 bed 4 person
 - 4no. Apartment Type '2B' - 2 bed 4 person
 - 3no. Apartment Type '2C' - 2 bed 4 person
 - 3no. Apartment Type '2D' - 2 bed 4 person
 - 3no. Apartment Type '2E' - 2 bed 3 person
 - 2no. House Type 'A/A1' - 4 Bed Semi Detached
 - 8no. House Type 'B/B1' - 3 Bed Semi Detached
 - 4no. House Type 'C/C1' - 3 Bed End of Terrace
 - 2no. House Type 'C2' - 3 Bed Mid Terrace
 - 2no. House Type 'D' - 2 storey town house - end of terrace - 3 bed
 - 4no. House Type 'D1' - 2 storey town house - mid terrace - 3 bed
 - 2no. House Type 'D2' - 3 storey town house - end of terrace - 4 bed
 - 2no. House Type 'E' - 3 bed Long Semi-Detached
 - 2no. House Type 'F' - 4 bed Long Semi-Detached
 - 3no. House Type 'G' - 2 storey town house - end of terrace - 3 bed
 - 6no. House Type 'G1' - 2 storey town house - mid terrace - 3 bed
 - 3no. House Type 'G2' - 3 storey town house- end of terrace- 4 bed
 - 1no. House Type 'H' - 3 Bed Semi Detached
 - 1no. House Type 'H1' - 3 Bed Semi Detached - Double front
 - 8no. House Type 'J/J1' - 3 Bed semi detached
 - 4no. House Type 'K' - 3 bed Long Semi-Detached
 - 4no. House Type 'L' - 4 bed Long Semi-Detached
 - 3no. House Type 'M' - 3 Bed End of Terrace
 - 3no. House Type 'M1' - 3 Bed End of Terrace
 - 3no. House Type 'M2' - 3 Bed Mid Terrace
2. *Demolition of the existing silage concrete apron (40sqm)*
3. *Childcare facility (399sqm over 2-storeys) associated outdoor play areas and parking*
4. *Retail/Commercial space (188.5sqm) including loading bay*
5. *Provision of shared communal and private open space, including play and fitness equipment*
6. *Car and cycle parking, including electric vehicle charging points*
7. *Provision of all associated surface water and foul drainage services and connections including pumping station*
8. *Landscaping, access routes and public art*
9. *Lighting and associated works*
10. *Access and junction improvements at Rosshill Road and Rosshill Stud Farm Road*

11. *Provision of a footpath connectivity link along Rosshill Road and Rosshill Stud Farm Road*
12. *All associated works and services*

4.2 Existing Site Description

4.2.1 Site Layout

The proposed development site comprises approximately 4.704 ha of land located within the townlands of Roscam and Merlin Park to the south east of Galway City. It is located south of Rosshill Road, which connects to the Old Dublin in the west and the Coast Road in the east. The general area is rural in character and is surrounded by a number of small residential developments and individual houses. A number of individual houses and the Rosshill Stud Farm lie to the south, with agricultural lands to the east. The Merlin Park Hospital lies to the north. Galway bay and agricultural lands lie to the west. The Galway to Dublin trainline runs along the northern border of the site.

There are no protected structures or archaeological monuments located within the application site; however, there is a National Monument Record (Record number GAA094-070) which is described as a 'folly' located circa 98 m south of the proposed site and a National Monument Record (Record number GA094-122) described as an 'enclosure' is located circa 60 m north of the proposed site. The site is also located to the south of a Protected Structure, Rosshill Railway Bridge (RPS 8806, NIAH 30409423)

The lands are not located in any Natura 2000 designated sites (European Ecologically designated sites). However, the site is located approximately 200 metres east of the Galway Bay Complex (SAC) and Special Protection Area (SPA), approximately 4.3 kilometres to the southeast of the Lough Corrib Special Area of Conservation. In this regard, an Appropriate Assessment Screening has been undertaken and a Natura Impact Assessment prepared.

Figure 4.1 provides an overview of the proposed development.

4.2.2 Site Access

Access to the proposed development is to be facilitated via the Rosshill Road as detailed in Figure 4.2.

A network of footpaths throughout the proposed development will provide a high rate of accessibility to the landscaped amenity areas including a playground, outdoor exercise equipment and kickabout areas. The inclusion of these attractive, well designed walking routes will encourage pedestrians to access the local facilities on foot as opposed to taking their personal vehicles.

4.2.3 Site Constraints

There are currently no site constraints which are creating issues for the proposed development.

4.3 Proposed Development Construction Operations

The detailed drawings for the proposed development can be seen as Appendix 4-1 to this EIAR. A Construction and Environmental Management Plan (CEMP) can be seen as Appendix 4-2.

4.3.1 Construction Phasing

It is anticipated that the construction of the proposed development will be completed over 3 phases as detailed in Figure 4.3 and the access and egress routes will change for the various phases. Traffic Management procedures will be implemented to ensure the safety of the users of the access routes, for both the residential access and the construction access. The proposed construction phases are as follows:

Phase 1A: This will consist of the construction of the pumping station, associated services and access roads including road widening of existing Rosshill Road. Construction will also include the most accessible houses for occupation consisting of 37 units.

Phase 1B: Construction of this phase will overlap with Phase 1A and allow a practical continuation of occupation of homes consisting of 30 units and opening up of the principle amenity space in the development for use by the residents.

Phase 1C: This will consist of the construction of the large apartment block which will be the slowest to finish and occupy. In conjunction with this the construction of the creche will be completed and made available to the residents of the development.

The construction phase of the proposed development is expected to last approximately 3 years in total.

4.3.2 Hoarding

The site will be enclosed with a hoarding along the Rosshill road, details of which are to be agreed with Galway City Council. Hoarding panels will likely be a maximum of 2.4 metres in height and will be maintained and kept clean for the duration of the project. Internal Phases 1-3 will be enclosed with Heras Fencing.

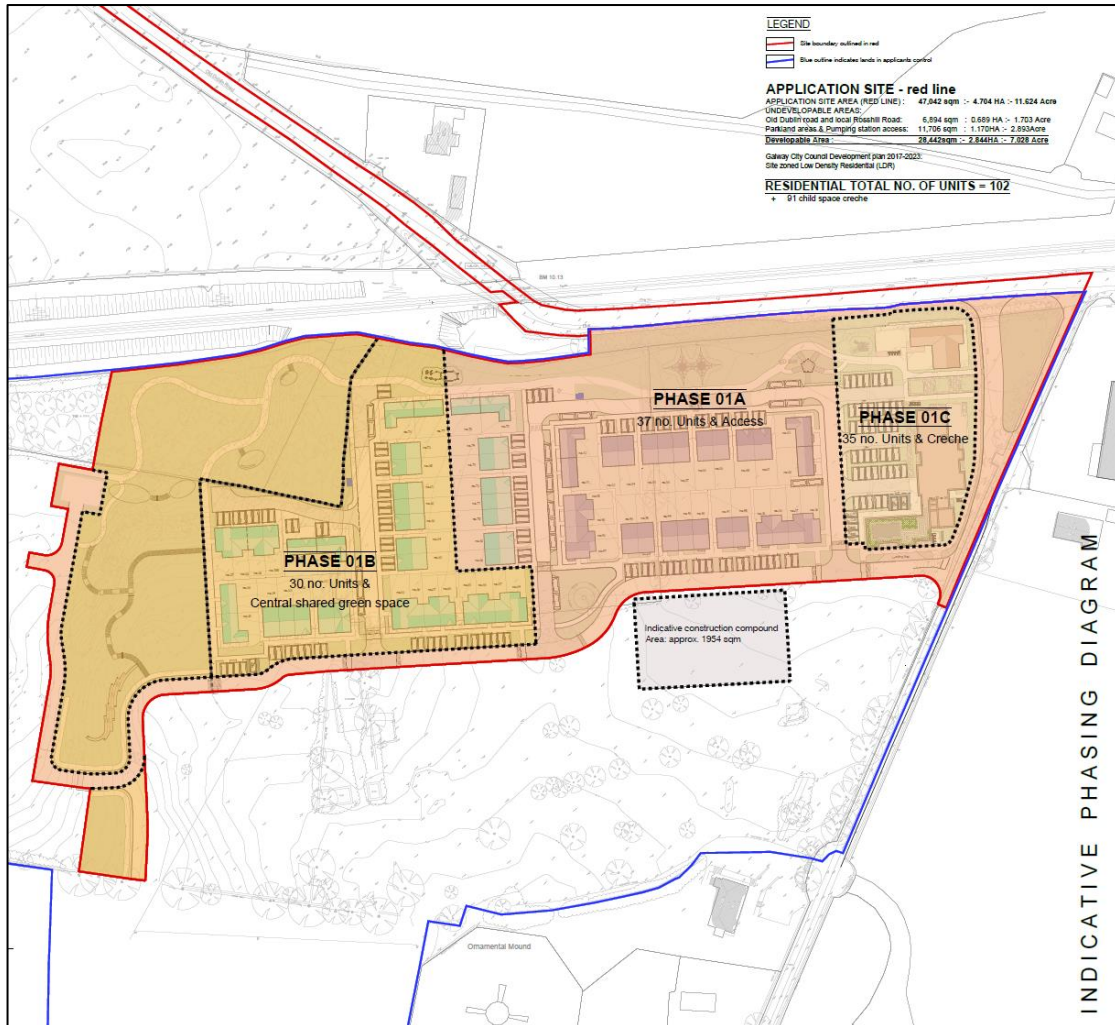


Figure 4-3 Phasing Map

4.3.3 Pedestrian and Cyclist Safety

Until such time as the construction of the first phase of construction work is complete, the new access road will not be open to members of the public. However, the general public will have right of way along the existing Rosshill Road. When vehicles are entering the site, or leaving the site, these movements should be supervised by road marshals. The construction site gates will be kept closed when not in use and monitored by security. Traffic cones and set-back signage should be put in place to warn and safely direct cyclists around obstructions.

It is proposed to provide a pedestrian footway from the development along the realigned Rosshill Road to the new junction with the Old Dublin Road. Pedestrians can then cross this roadway to use the existing Pedestrian Footway along the northern side of the Rosshill Road. This footway is under the control of Galway City Council. Sections of this footway are in a state of disrepair and some key linkages are missing. Improving this pedestrian footway should be prioritised by Galway City Council. This would provide access to the existing pedestrian facilities provided on the R338 Dublin Road which link to the City Centre and the Roscam/Doughiska residential areas.

A network of footpaths throughout the proposed development will provide a high rate of accessibility to the local facilities within the area. The inclusion of these attractive, well designed walking routes will encourage pedestrians to access the local facilities on foot as opposed to taking their personal vehicles.

4.3.4 **Proposed Hours in which Vehicles will Arrive and Depart**

In general, the hours in which vehicles will arrive and depart will coincide with the expected site working hours of 8.00am to 7.00pm in the evening from Monday to Friday, and 8:00am to 2:00pm on Saturday. The construction phase of the proposed development is expected to last approximately 3 years in total.

4.3.5 **Access Arrangements for Vehicles**

The access arrangements will be as specified in the statutory publications with reference to the publications “Traffic Management Guidelines” manual and the “Traffic Signs Manual” and as agreed with Galway City Council.

All deliveries and vehicles into site will access the site from the new site entrance which will be located on the south-eastern corner of the site boundary.

The location of the vehicular entrance and access will be regularly reviewed during the construction to ensure that the pedestrian and vehicular access points are located and maintained appropriately.

4.3.6 **Exclusion Zones on Site**

The areas of woodland and trees on site being retained are to be protected during the course of construction. An exclusion zone will be put in place around these areas/features, fenced off from site and the contractor will not have any storage, plant, or traffic going inside this exclusion zone during the construction period. Suitable fencing will be erected to ensure the flora and fauna are protected and preserved during the construction period, and regular checks and inspections will be carried out on this by the contractor.

4.3.7 **Size of Vehicles**

It is anticipated that there will be numerous types of delivery vehicles used to bring material to and from the site. These include:

- Skip lorries. These will standard yard skips for waste.
- Spoil excavation.
- Ready mix concrete lorries.
- Flatbed delivery vehicles for the delivery of various material.

4.3.8 **Parking and Loading Arrangements**

A “Just in Time” approach will be implemented for the delivery of particular building materials such as concrete formwork and large structural steels. The location of this materials storage facility will be within the site boundary and highlighted within the Construction Management Plan.

Materials will be stored within the boundary of the site. It is proposed to provide on-site car parking spaces for workers during the construction.

4.3.9 **Site Compound and Facilities**

Site accommodation will be provided including suitable washing and dry room facilities for construction staff, canteen, sanitary facilities, first aid room, office accommodation etc. Access to the compound will be security controlled and all site visitors will be required to sign in on arrival and sign out on departure. The compound will be constructed using a clean permeable stone finish and will be

enclosed with hoarding. Any wastewater will be removed by vacuum tanker using an authorized waste collector.

4.3.10 Property Management – Operational Stage

A property management company will be engaged at an early stage of the development to ensure that all property management functions are dealt with for the development.

The property management company will also have the following responsibilities for the apartments within the development once constructed:

- › Formation of an owners management company. The company will be a company limited by guarantee having no share capital. All future purchasers will be obliged to become members of the owners management company.
- › Preparation of annual service charge budget for the development common areas.
- › Fair and equitable apportionment of the annual operational charges in line with the MUD act.
- › Engagement of independent legal representation on behalf of the owners management company in keeping with the MUD act, including completion of the developer - owner management company agreement and transfer of common areas.
- › Transfer of documentation in line with schedule 3 of the MUD act.
- › Estate management.
- › Third party contractors procurement and management.
- › Owners management company reporting.
- › Accounting services.
- › Corporate services.
- › Insurance management.
- › After hours services.
- › Staff administration.

The property management company has a number of key responsibilities including compiling the service charge budget for the development for agreement with the owners management company. The service charge budget covers such items as cleaning, landscaping, insurance, maintenance, and security in accordance with the Multi User Development Act 2011.

The service charge budget also includes an allowance for a sinking fund and this allowance is determined following the review of the building investment fund report prepared by / for the owners management company. The building investment fund report, once adopted by the owners management company, determines an adequate estimated annual cost provision requirement based on the needs of the development over a 30 year cycle period. The building investment fund report will identify those works which are necessary to maintain, repair and enhance the premises over the 30 year life cycle period, as required by the Multi User Development Act 2011.

In line with the requirements of the Multi User Development Act 2011 the members of the owners management company will determine and agree each year at an AGM of the members the contribution to be made to the sinking fund, having regard to the building investment fund report produced.

4.3.11 Sustainable Energy Use

The following are an example of the energy saving measures that are planned for the dwellings to assist in reducing costs for the occupants:

- › A BER certificate will be provided for each dwelling in the proposed development which will provide detail of the energy performance of the dwellings. It is proposed to target an A2 rating for the houses, equating to the following emissions:

A2 - 25 to 50 kWh / m² /year with CO₂ emissions c. 10kg CO₂ / m² / year.

- The apartments will be heated by means of exhaust air heat pump systems. It is proposed to utilize exhaust air heat pumps. The unit is A++ rated. Aluminium radiators will be provided in each space complete with thermostatic radiator valves (TRVs) as required.
- The ventilation requirements for the houses will be met using a low maintenance Aereco demand control ventilation system. This system utilizes an central house extract fan and passive supply vents with mechanical humidity control around the house.

NZEB REQUIREMENTS

nZEB (Nearly Zero Energy Buildings), means a building that has a very high energy performance where the nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources including energy from renewable sources produced on-site or nearby.

In order to achieve this, a target of 20% Renewables Energy Ratio (RER) has been set as the NZEB energy from renewable sources onsite or nearby target. The software tool provided by SEAI will be provided to support the calculation of the RER. It is recognised that in certain confined situations it may not be possible to achieve the full 20% RER.

In addition to the reduced energy usage, all new buildings must generate 20% of their energy from renewable energy sources, although this may be reduced to 10% where the energy performance of the building is more than 10% better than the reference building. This option of further reducing energy use is likely to be selected for most buildings.

As part of the design process, consideration shall be taken in account with regards to the requirements of nZEB to ensure the building meets with its requirements. The 20% or 10% requirement can be provided by Heat Pumps or Heat pumps / PV's.

The building will be constructed to meet the latest building regulations and U-Values

Further information about the proposed energy efficiency proposals can be found in Appendix 8-1, the Mechanical and Electrical Services Planning Report

4.4

Site Landscaping

Before completion of the construction phase of the proposed development, landscaping works will be carried out to improve the visual amenity of the site. These landscaping works will follow the layout of the landscape plan provided by CSR Landscape Architects. Drawing No. 19112-4-100 and included in Appendix 4-3 in this EIAR

There are no landscape designations on the subject site. The site will not impact on any designated views or prospects within the Galway City Development Plan 2017-2023.

4.5

Construction Methodologies

This section describes the construction methodologies that will be used for the proposed housing development. Further details are also provided in the Construction and Environmental Management Plan (CEMP) included as Appendix 4-2 of this EIAR.

4.5.1 General Construction Measures

Communication with the public, local residences and businesses adjacent the development will be an important responsibility of the Senior Project Manager and delegated persons. All parties will be kept up to date and informed both shortly prior and during the construction period at all times. Two to three weeks before any work commencing reasonable efforts will be made to inform all parties of the oncoming works.

A Traffic Management Plan (TMP) will be issued to Galway City Council for approval prior to works commencing on site. The approved TMP and any revisions thereof will be set up and implemented on site. All necessary signage will be erected in the weeks prior to any works commencing along and on adjacent roads to the proposed development giving advance warning to traffic, pedestrians / members of the public. Every effort will be made to minimise the impact of the above works on local residences and traffic.

- All personnel will be inducted and made familiar with Risk Assessments / Method Statements (RAMS) and Traffic Management Plans.
- All site-specific safety rules will be adhered to.
- All plant operators will have appropriate CSCS training.
- All personnel will have SOLAS Safe Pass training
- Fire extinguishers and first aid supplies will be available in the work area.
- All adjacent roadways will be maintained in clean condition at all times.
- Helmets, high visibility clothing and safety footwear will be worn at all times.
- Competent foremen will be on site at all times.
- Biometric turnstiles will be used to prevent unauthorised access to the site.

4.5.2 Soil Stripping & Temporary Stockpiling

The excavation and stripping of soils and subsoils will be required across much of the site, and this soil will need to be redistributed and temporarily stockpiled around the site as the proposed development progresses. Prior to the construction phase of the proposal, site levelling will be undertaken. During these works, topsoil within the North Eastern section of the site will be stripped and stored in a designated storage area for reuse. Where these works occur, the following will apply:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies i.e. ESB, Bord Gáis, Eircom, Galway City Council etc. will be contacted and all drawings for all existing services sought.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- All plant operators and general operatives will be inducted and informed as to the identification of invasive species.
- A tracked 360-degree excavator will be used to strip the topsoil, and a dumper will be used to move the excavated materials to the temporary stockpile location.
- All excavated material which is not required for future landscaping works or for backfill of excavations will be removed to an authorised waste recovery facility. This will also apply to material which is not suitable for reuse on site.
- All stockpiles will be damped down or covered in a sheet of polythene, as required, which will prevent the creation of nuisance dust, and will also prevent sediment runoff in times of heavy precipitation.

4.5.3 Temporary Site Compound

One temporary construction compound is proposed for the construction phase of the proposed development, located to the south of the site within lands controlled by the developer. The proposed temporary compound area incorporates temporary site offices, staff facilities and car-parking areas.

A dedicated waste management area will be located within the compound, with waste to be sorted and collected from site by permitted collectors. Potable drinking water will be supplied via water coolers located within the staff facilities, which will be restocked on a regular basis as required during the construction phase. A supply contract will be set up with a water cooler supply company with water supplies delivered to site as required for the duration of the construction period.

Temporary port-a-loo toilets located within portacabins will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. Power will be supplied by a diesel generator, located within the compound until a temporary power supply is established. The construction compound will be used for temporary storage of some construction materials, prior to their delivery to the required area of the site.

4.5.4 Site Roads

The construction methodology for the proposed access road is outlined as follows:

- Excavation will take place until a competent stratum is reached.
- The competent stratum will be overlain with up to 500mm of granular fill.
- A layer of geogrid/geotextile may be required at the surface of the competent stratum.
- A final hard surface layer will be placed over the excavated road to provide a road profile to accommodate construction traffic.
- Prior to completion of the construction works on site, the finished road surface will be applied.

4.5.5 Excavation and Services Installation

Services will be required to each property in the proposed development. Where these are located, the following will apply:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies i.e. ESB, Bord Gáis, Eircom, Galway City Council etc. will be contacted and all drawings for all existing services sought.
- A traffic management plan will be produced if required for connection works to the existing service network.
- A road opening licence will be obtained where required for connection to existing services.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- A tracked 360-degree excavator or similar will be used to excavate the trench to the required dimensions.
- All excavated material will be removed to an authorised waste recovery facility or, if suitable, stock piled and reused for backfilling and landscaping where appropriate.
- Once the trench has been excavated the ducting/pipework will then be placed in the trench as per specification.
- Once the service ducts/pipework has been installed couplers will be fitted as required and capped to prevent any dirt etc. entering the ducts/pipes.

- The as built location of the ducting/pipework will be surveyed using a total station/GPS.
- Backfill material will be carefully placed so as not to displace the ducting/pipework within the trench.
- The appropriate warning/marker tape will be installed above the ducts/pipes at the appropriate depths.
- The surface will be reinstated as per original specification or to the requirements of the site layout/Local Authority as appropriate.

4.5.5.1 Existing Underground Services

Any underground services encountered during the works will be surveyed for level and where possible will be left in place. If there is a requirement to move the service, then the appropriate body (ESB, Gas Networks Ireland, etc.) will be contacted, and the appropriate procedure put in place. Back fill around any utility services will be with dead sand/pea shingle where appropriate. All works will be in compliance with required specifications.

4.5.6 House/Building Construction

The buildings will be constructed by the following methodology:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies i.e. ESB, Bord Gáis, Eircom, Galway City Council etc. will be contacted and all drawings for all existing services sought.
- The area of each building will be marked out using ranging rods or wooden posts and the soil and overburden stripped and removed to nearby storage area for later use in landscaping. Any excess material will be sent to an authorised recovery facility.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- A tracked 360-degree excavator or similar will be used to excavate the area down to the level indicated by the designer and appropriately shuttered reinforced concrete will be laid over it;
- The block work walls will be built up from the foundation (including a DPC) and the floor slab constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors;
- The block work will then be raised to wall plate level and the gables & internal partition walls formed. Scaffold will be erected around the outside of the buildings for this operation;
- Any concrete slabs will be lifted into position using an adequately sized mobile crane;
- The timber roof trusses will then be lifted into position using a telescopic load all or mobile crane depending on site conditions. The roof trusses will then be felted, battened, tiled and sealed against the weather.
- Windows, electrics, plumbing and all other building components and services will be installed in as timely a manner as is possible.
- Each building will be inspected and certified by an engineer at the appropriate stages of construction.

4.5.7 Construction Site Management Incorporated into Project Design

The following measures pertaining to water quality and invasive species have been incorporated into the design phase of the project to avoid effects on sensitive ecological receptors.

4.5.7.1 Prevention Pollution Control Measures

The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides guidance. This will ensure that surface water arising during the course of construction activities will contain minimum sediment. The following methods and best practice measures will ensure that sediment release and potential for pollution during the construction phase is minimised and reduced to insignificant:

Drainage

The proposed development site does not contain any mapped watercourses and no watercourses were identified within the site during site visits. Small stream channels can be seen along the Rosshill beach which emerges ~ 300m west of the western boundary of the site. It is likely that runoff is flowing along the field boundaries and discharging to the Galway Bay at this point.

However, the following measures will be put in place to prevent the transportation of silt laden water or pollutants from entering the wider environments including downstream watercourses.

- There will be no release of suspended solids to any watercourse as a direct or indirect result of the proposed works. There is no surface watercourse on the site of the proposed development.
- No watercourse will be interfered with as part of the proposed works. No temporary instream crossings or temporary culverting will take place. Instream works will not take place.
- Any requirement for temporary fills or stockpiles will be damped down or covered with polyethylene sheeting as required to avoid sediment release associated with heavy rainfall.
- Prior to the commencement of earthwork silt fencing will be placed down-gradient of the construction areas where drains or drainage pathways are present. These will be embedded into the local soils to ensure all site water is captured and filtered;
- As construction advances there may be a small requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground or disperse by diffuse flow into local drainage ditches;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing

Hydrocarbons

The use of hydrocarbons during the construction process can result in the potential for pollution and accidental spillage to enter natural watercourses downstream of the site via surface runoff and groundwater. The following measures have been built into the construction design phase of the project.

- On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site and will be towed around the site by a 4x4 jeep to where machinery is located. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations;
- Fuels stored on site will be minimised. Any storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction;

- The plant used should be regularly inspected for leaks and fitness for purpose; and,
- Spill kits will be available to deal with accidental spillages.

The following guidelines and documents will inform the detailed planning of the works phase: -

- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA) in particular;
- C532 Control of water pollution from construction sites: guidance for consultants and contractors (Masters-Williams et al, 2001); and
- SP156 Control of water pollution from construction sites - guide to good practice (Murnane et al, 2002).
- Requirements for the protection of fisheries habitat during construction and development works at river sites developed by the ERFB.
<http://www.fisheriesireland.ie/Research/recent-publications.html>.

4.5.8 Landscaping works

Prior to completion of works on the development site, the landscaping works will be carried out. The proposed landscaping plan is shown as Drawing No. 19112-4-100 (Landscape Master Plan) in Appendix 4-3. The finishes include areas of amenity grassland, footpaths and tree planting. This work will be carried out before the completion of the construction phase in order to ensure that the development will be aesthetically pleasing place for residents to live. These works will involve the use of plant and machinery in order to carry out tasks such as earth moving. Materials which have been stockpiled for the task will be used as much as possible, and material will only be imported where it is required. Hoarding will be erected around the site boundary for the duration of the construction works.

4.5.9 Invasive Species

The introduction and/or spread of invasive species such as Japanese Knotweed and Himalayan Knotweed for example, could result in the establishment of the species and this may have knock on effects on the surrounding environs.

Appropriate control measures will be incorporated into the design and construction phase of the development to ensure that the relevant measures (outlined in the following section below) will be implemented.

4.5.9.1 Control Measures for the Management of Invasive Species

Invasive species, such as Japanese Knotweed, Himalayan Knotweed, Himalayan Balsam, *Gunnera*, and Giant Hogweed pose a serious threat to biodiversity and the health of native vegetation types. Construction machinery can act as a vector for the spread of these plants. Machinery that has worked at an infected site is likely to cause the spread of such species by transferring their tiny seeds or plant fragments, in soil trapped in their tyre tread for instance. Equally, they can cause the spread of species within a site. The duration of the impact could be short-term or permanent depending on whether or not an eradication effort is made but once established, eradication is time-consuming and expensive. Himalayan Knotweed, for example, propagates vegetatively, forming a new plant from even very small plant fragments. Thus, there is a high risk of causing the spread of this species to other parts of the site. The UK Environment Agency's '*Japanese Knotweed Code of Practice*' provides guidance on managing Japanese Knotweed and Himalayan Knotweed on development sites. A number of control measures have been drawn up and included in the design and construction phase of the proposed works to avoid the introduction and spread of invasive plant species. The following project design elements have been devised to avoid such effects. The following measures address potential effects associated with the construction phase of the development:

- Care will be taken not to disturb or cause the movement of invasive species fragments, either intentionally or accidentally.
- There are not believed to be any existing stands of invasive species on site, but should any be found, they will be clearly demarcated by temporary fencing and tracking within them will be strictly avoided. A minimum buffer of seven metres will be applied to avoid disturbance of lateral rhizomes.
- If any excavations must be carried out in areas of Japanese Knotweed, the excavated material will not be moved from the location. The machinery must be thoroughly pressure-washed in a designated area at least 25 metres from any watercourse before moving on to an area that is not yet infected.
- All contractors and staff will be briefed about the presence, identification and significance of Japanese Knotweed before commencement of works.
- Good construction site hygiene will be employed to prevent the spread of these species with vehicles thoroughly washed prior to leaving any site with the potential to have supported invasive species. All plant and equipment employed on the construction site (e.g. excavator, footwear, etc.) will be thoroughly cleaned down using a power washer unit prior to arrival on site to prevent the spread of invasive plant species such as Japanese Knotweed and Rhododendron. All washing must be undertaken in areas with no potential to result in the spread of invasive species.
- When working at locations in proximity to natural watercourses, a suitable barrier will be erected between the watercourse and the stand of invasive species. This will assist in preventing the spread of any invasive species into the watercourse during their removal. There are no watercourses on the proposed development site, but cognizance will be had of any watercourses on neighbouring sites.
- Any material that is imported onto any site will be verified by a suitably qualified ecologist to be free from any invasive species listed on the ‘Third Schedule’ of Regulations 49 & 50 of Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). This will be carried out by searching for rhizomes and plant material.
- Any soils or subsoils contaminated with invasive species will be sent for disposal to an authorized waste facility.

The treatment and control of invasive alien species will follow guidelines issued by the National Roads Authority – *The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads* (NRA 2010) and the Environment Agency (2013) – *The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites* (Version 3, amended in 2013).

4.6 Other Site Details

4.6.1 Waste Management

The treatment of waste is to be employed by the contractor or a specialist waste management contractor as a trade package. This contractor is responsible for:

- Ensuring the site is kept clean and safe
- The collection of waste from a central point
- Segregation of waste on site.

The waste management contractor should ensure that all access routes, fire escapes and staircases are swept and kept clear of debris on a regular basis to maintain high standards of health and safety on the project. No fires will be permitted on site.

A Construction and Demolition Waste Management Plan has been prepared in accordance with the “Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects” (Department of Environment, Heritage and Local Government, 2006) and is included as an appendix to the CEMP (Appendix 4-2 of this EIAR). The contractor will ensure that all material is disposed of at an appropriately licensed land fill site.

In order to ensure appropriate segregation of waste on site, a material storage zone will be provided in the compound area. This storage zone will include material recycling areas and facilities. A series of ‘way finding’ signage will be provided to route staff and deliveries into the site and to designated compound or construction areas, as appropriate.

4.6.2 **Dust**

Dust prevention measures will be included for control of any site airborne particulate pollution.

Dust control will be achieved by:

- Dampening down the dust at the source
- Sheeting will be used as required for stockpiled materials
- Use of barriers such as debris netting on scaffolding around the building to block dust escaping where the building is within 10m of the site boundary where residential properties exist.
- Site road ways will be maintained in a stoned hard core condition not allowing soil to accumulate which when dry can create dust.
- Wheel wash equipment will be set up at the site exit gate for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.
- Plant and equipment that have the potential to create volumes of dust will have appropriate attachments to allow water source to dampen dust to not allow it to get airborne.
- Plant and equipment that have the potential to create volumes of dust will be located away from sensitive receptors where possible.
- Deploy Road Sweeper as required on External Roads.
- Deployment of dust monitors across the site if required

4.6.3 **Noise**

The Contractor will be required to monitor base noise levels at the site location before commencement of the project. Noise monitoring will be required throughout all phases of the project. Variation of noise levels from those experienced as part of everyday life in an area can result in extreme disruption. The Contractor will implement measures to eliminate where possible and reduce noise levels where not. Noise levels will be kept below those levels specified in the National Roads Authority – “Guidelines for the Treatment of Noise and Vibration in National Roads Schemes” or such further limits as imposed by Galway City Council. The proposed development will comply with BS 5228 “Noise Control on Construction and open sites Part 1: Code of practice for basic information and procedures for noise control.”

Construction equipment for use outdoors will comply with the European Communities Regulations– Noise Emission by Equipment for Use Outdoors – SI 241 - 2006.

Noise emissions arising from construction phase operations at the proposed development site will not exceed the identified 65 dB $L_{Aeq\ 1\ h}$ criterion at receptors.

No other specific mitigation measures are warranted. Several general measures are proposed as follows:

- Construction operations will in general be confined to the period Monday-Friday 0800-1900 h, and Saturday 08:00-14:00 h.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Where it is proposed to operate plant during the period 0700-0800 h, standard ‘beeper’ reversing alarms will be replaced with flat spectrum alarms.
- Erection of solid barriers (hoarding) to site boundary

4.6.4 Road Cleaning and Wheel Washing

The Contractor will make provision for the cleaning by road sweeper etc. of all access routes to and from the site during the course of the works as required. It is intended that cleaning will be undertaken on a daily basis during the excavation works and as required thereafter. A wheel wash facility will be provided on site to clean site traffic leaving the site. Waste water generated at this washing facility will be suitably treated on site and all settled silts disposed offsite to licensed landfill. All road sweeping vehicles will be emptied off site at a suitably licensed facility as per our construction stage environmental waste management document.

4.6.5 Water Supply

Water will be supplied on site by water tankers for general use. Potable water will be provided in the form of bottled water for staff use.

4.6.6 Wastewater Management

Portable toilets will be provided for the working on the construction site. Wastewater arising on-site from these toilets is stored in a sealed tank located within the portable toilets, and these will be emptied periodically (as required) by permitted waste contractors and transported to municipal wastewater treatment plants for treatment.

Any sewage or greywater generated during the operational phase of the proposed development will be directed to the local municipal wastewater treatment plants for treatment via the sewage collection network.

4.6.7 Surface water runoff

All surface water runoff will be generated on site will percolate to ground. Silt fencing will be placed down gradient of works during the construction phase of the proposal to avoid any potential for impact on downstream waterbodies. Water will be allowed to percolate naturally to ground. Where pumping is required, siltbuster bags will be used to prevent the generation of suspended solids. In addition, water will be pumped at rates capable of allowing natural percolation (greenfield rates).

4.6.8 Aggregates

The aggregates required for the construction of the proposed development will be sourced, as much as is possible and practicable, from quarries and suppliers located as near as possible to the proposed development. This will reduce the potential for any negative impacts associated with the haulage of the materials to the site of the proposed development. Existing soils and subsoils located on the site will be used where possible to reduce the amount of such materials required for import onto the site.

4.6.9 Construction Traffic/Plant

The following mitigation measures will be implemented in relation to construction traffic and plant/machinery:

- All vehicles to switch off engines when not in use – no idling vehicles
- Effective vehicle cleaning and wheel washing on leaving site and damping down of haul routes
- On-road vehicles to comply to set emission standards.
- All non-road mobile machinery (NRMM) to be fitted with appropriate exhaust system and be regularly serviced.
- Hard surfacing and effective cleaning of haul routes and appropriate speed limit around site

4.7 Operational Phase

The proposed development will require periodic maintenance throughout the operational phase. The operation of a residential development is not a recognized source of environmental emissions or nuisance and so there will be no adverse effects associated with its operation.

The proposed stormwater drainage system for the site will consist of a network of gravity sewers conveying surface water runoff from hard surfaces such as roads, roofs etc., to 6 no. soakaway tanks located in open spaces throughout the development. Water draining to soakaways will pass through silt traps and hydrocarbon interceptors prior to reaching each soakaway. No surface water from roofs or paved surfaces will be discharged from the site, other than via the soakaways to ground.

It is proposed to use a number of Bioswales as a primary tool for the management of storm water for the car parking area around the apartment block. The bioswales will primarily allow for infiltration directly to the ground while also allowing for a limited storage volume of runoff water. The Bioswales will include a high-level overflow connecting back to the main storm drainage for the development. Full details of the proposed storm water management proposal can be found in the engineering services report included as Appendix 4-4 of this EIAR.

The proposed on-site foul sewers will discharge by gravity to a pumping station to the northwest of the site, and the foul waste will discharge from this pumping station via pumped rising main to the existing public (Irish Water) foul sewer network.

An Operation Waste Management Plan (OWMP) has been prepared for the proposed development to ensure waste management prescriptions that adhere to a waste management hierarchy are implemented at the site. A copy of the OWMP is included as Appendix 4-5 of this EIAR.

4.8 Decommissioning Phase

It is not intended that the proposed buildings will be removed, as permanent planning permission is being sought for this development. The proposed development will form an integral part of the local housing needs. Therefore, it is intended that the proposed development will be retained as permanent and will not be decommissioned.

5. POPULATION AND HUMAN HEALTH

5.1 Introduction

This section of the Environmental Impact Assessment Report (EIAR) describes the potential impacts of the proposed development on human beings, population and human health and has been completed in accordance with the guidance set out by the Environmental Protection Agency (EPA) in ‘in particular the Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports’ (EPA, August 2017). The full description of the proposed development is provided in Chapter 3 of this EIAR.

One of the principal concerns in the development process is that people, as individuals or communities, should experience no diminution in their quality of life from the direct or indirect impacts arising from the construction and operation of a development. Ultimately, all the impacts of a development impinge on human beings, directly and indirectly, positively and negatively. The key issues examined in this section of the EIAR include population, human health, employment and economic activity, land-use, tourism, noise and health and safety.

5.2 Statement of Authority

This section of the EIAR has been prepared by Thomas Blackwell and Michael Watson, both of MKO. Thomas is an experienced environmental consultant and has over 15 years’ experience in environmental impact assessment. Thomas holds a BA (Hons) in Geography from Trinity College Dublin and a M.Sc. in Environmental Resource Management from University College Dublin. Prior to taking up his position with MKO in August 2019, Thomas worked as a Senior Environmental Scientist with HDR, Inc. in the United States and held previous posts with private consulting firms in both the USA and Ireland. Michael has over eighteen years’ experience in the environmental sector and had worked for the Geological Survey of Ireland and then a prominent private environmental & hydrogeological consultancy prior to joining MKO in 2014. Michael completed an MA in Environmental Management at NUI, Maynooth in 1999. Michael is a professional geologist (PGeo) and full member of IEMA (MIEMA) as well as a Chartered Environmentalist (CEnv).

5.3 Methodology

Information regarding human beings and general socio-economic data were sourced from the Central Statistics Office (CSO), the ‘Galway City Development Plan 2017– 2023’, Fáilte Ireland and any other literature pertinent to the area. The study included an examination of the population and employment characteristics of the area. This information was sourced from the Census of Ireland 2016, which is the most recent census for which a complete dataset is available, also the Census of Ireland 2011, the Census of Agriculture 2000 and 2010 and from the CSO website, www.cso.ie.

Census information is divided into State, Provincial, County, Major Town and District Electoral Division (DED or ED) level but may not be available for all levels. For the purposes of this section of the EIAR, Galway City data was used wherever possible. The information at this level was analysed and compared to the same information at national and county level. This method provides an average or standard with which the Human Beings Study Area information can be compared.

In order to make inferences about the population and other statistics in the vicinity of the subject site, the Human Beings Study Area for the Human Beings section of the EIAR was defined in terms of the Galway City. Galway City was selected to represent the Human Beings Study Area for the proposed development, as although the site is situated in the eastern extent of the city, it will have an impact on the entire population of Galway City.

The Human Beings Study Area is shown in Figure 4.1. The Human Beings Study Area, which is the area of Galway City, has a combined population of 78,668 persons and comprises a total land area of 4915 hectares or 49.15 square kilometres (Source: CSO Census of the Population 2016).

For reference, the proposed development site lies within Murrough DED, as shown in Figure 4.1, which runs alongside Ballybaan DED.

5.4 Receiving Environment

5.4.1 General Site Description

The site area comprises approximately 10ha of land located within the townlands of Roscam and Merlin Park to the southeast of Galway City. Access to the site is along on the Rosshill Road, which connects to the Old Dublin in the west and the Coast Road in the east. The development site is currently used for rough grazing agriculture and was formerly a golf course.

The proposed development is fully described in Chapter 4 but will consist of the following:

1. Construction of 102no. residential units comprising of 35 apartments and 67 houses:
2. Demolition of the existing silage concrete apron (40sqm)
3. Childcare facility (399sqm over 2-storeys) associated outdoor play areas and parking.
4. Retail/Commercial space (188.5sqm) including loading bay.
5. Provision of shared communal and private open space, including play and fitness equipment.
6. Car and cycle parking, including electric vehicle charging points.
7. Provision of all associated surface water and foul drainage services and connections including pumping station.
8. Landscaping, access routes and public art
9. Lighting and associated works
10. Access and junction improvements at Rosshill Road and Rosshill Stud Farm Road
11. Provision of a footpath connectivity link along Rosshill Road and Rosshill Stud Farm Road
12. All associated works and services

5.4.2 Settlement and Land-use

The proposed site is located within the Galway City boundary; however, the general area is rural in character and is surrounded by a number of small residential developments and individual houses.

There are numerous existing houses, located within 500m of the proposed development site. Other permitted and proposed developments are also located in the area surrounding the site, with the most significant described in Section 2.8.2 of this EIAR. The nearest residential housing is located along the Rosshill Road to the southeast of the site.

The primary land-use in the vicinity of the site comprises a mix of agricultural land and rural housing.

5.4.3 Population

5.4.3.1 Population Trends

In the four years between the 2011 and the 2016 Census, the population of Ireland increased by 3.8%. During this time, the population of Galway City grew by 4.2% to 78,668 persons. Other population

statistics for the State, County Galway and the Study Area have been obtained from the Central Statistics Office (CSO) and are presented in Table 5-1.

Table 5-1 Population 2011 – 2016 (Source: CSO)

Area	Population Change		% Population Change
	2011	2016	2011 - 2016
State	4,588,252	4,761,865	3.8
County Galway	175,124	179,390	2.4%
Galway City	75,529	78,668	4.2%

The data presented in Table 5.1 shows that the population of Galway City increased by 4.2% between 2011 and 2016. This rate of population growth is higher than that recorded at both County and national level from 2011 – 2016. The population for County Galway shows a 2.4% rate of growth for the time between 2011-2016. This is lower than the growth rates for both Galway City and the Republic of Ireland for the same time.

Map Legend

- EIA Study Area
- Galway City (Population Study Area)
- Electoral Divisions
- Murrough
- Ballybaan

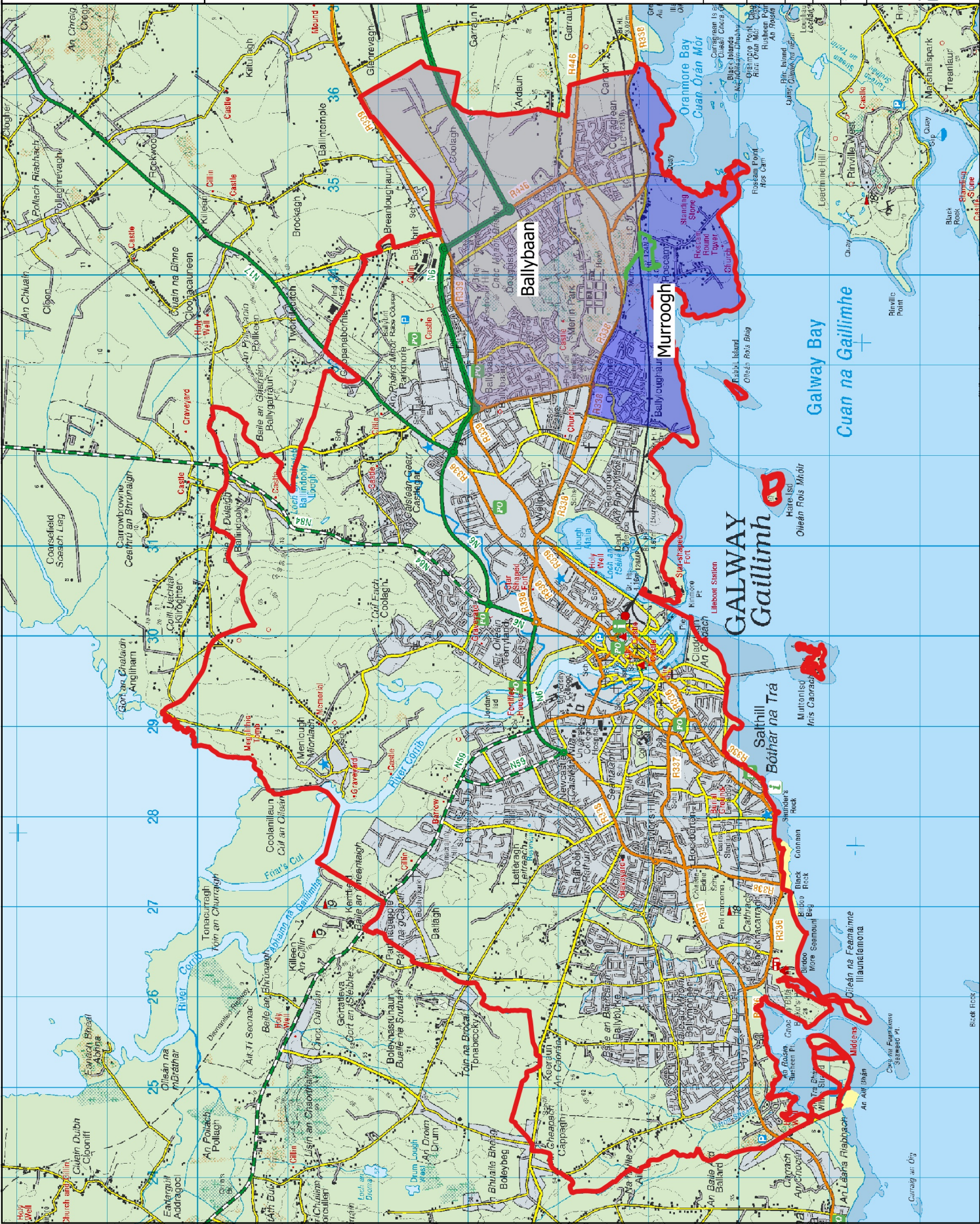
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Population Study Area

Project Title	Rosshill SHD
Drawn By	TB
Checked By	MW
Project No.	181058-b
Drawing No.	Figure 5.1
Date	29.06.2021
Scale	1:55000

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5.4.3.2 Population Density

The population densities recorded within the State, County Galway, and Galway City during the 2016 Census are shown in Table 5-2.

Table 5-2 Population Density in 2016 (Source: CSO)

Area	Population Density (Persons per square kilometre)	
	2011	2016
State	65.57	68.06
County Galway	41.77	43.00
Galway City	1536.7	1600.6

The population density of Galway City recorded during the 2016 Census was 1600.6 persons per square kilometre. This figure is significantly higher than the national population density of 69.6 persons per square kilometre and the county population density of 29.9 persons per square kilometre.

5.4.3.3 Household Statistics

The number of households and average household size recorded within the Republic of Ireland, Co. Galway, and Galway City during the 2011 and 2016 Censuses are shown in Table 5.3.

Table 5-3 Number of Household and Average Household Size 2011 – 2016 (Source: CSO)

Area	2011		2016	
	No. of Households	Avg. Size (persons)	No. of Households	Avg. Size (persons)
State	1,654,208	2.8	1,697,665	2.8
County Galway	62,456	2.8	63,040	2.8
Galway City	27,726	2.7	28,859	2.7

In general, the figures in Table 4.3 show that while the number of households in the Republic of Ireland, County and City level has continued to increase, the average number of people per household has remained the same, i.e., there are more households but similar or less people per house. Average household size recorded within Galway City during the 2011 and 2016 Censuses are in line with that observed at national and County level during the same time periods.

5.4.3.4 Age Structure

Table 5.4 presents the percentages for the Republic of Ireland, Co. Galway and Galway City population within different age groups as defined by the Central Statistics Office during the 2016 Census.

Table 5-4 Population per Age Category in 2016 (Source: CSO)

Area	Age Category				
	0 - 14	15 – 24	25 - 44	45 - 64	65 +
State	21.1%	12.1%	29.5%	23.8%	13.4%
County Galway	22.7%	10.9%	26.3%	25.6%	14.5%
Galway City	16.8%	17.1%	35.0%	19.8%	11.2%

The proportion of the population within each age category at county level is similar to those recorded at national level for most categories. Within Galway City where there is an expected difference, the highest population percentage occurs within the 25 - 44 age category.

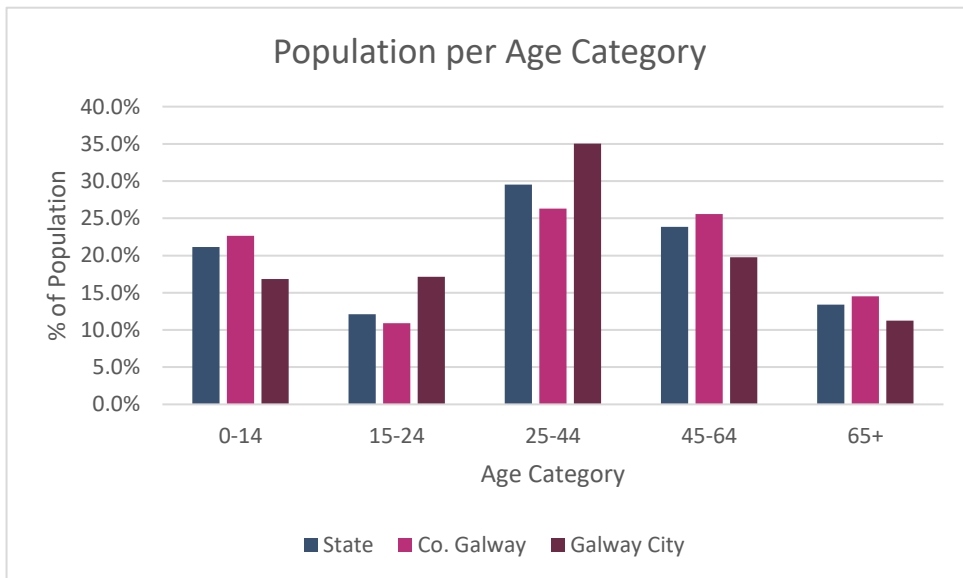


Figure 5.2 Population per Age Category in 2016 (Source: CSO)

5.4.4 Employment and Economic Activity

5.4.4.1 Employment by Socio-Economic Group

Socio-economic grouping divides the population into categories depending on the level of skill or educational attainment required. The ‘Higher Professional’ category includes scientists, engineers, solicitors, town planners and psychologists. The ‘Lower Professional’ category includes teachers, lab technicians, nurses, journalists, actors and driving instructors. Skilled occupations are divided into manual skilled, such as bricklayers and building contractors; semi-skilled, e.g., roofers and gardeners; and unskilled, which includes construction labourers, refuse collectors and window cleaners. Figure 5.3 shows the percentages of those employed in each socio-economic group in the Republic of Ireland, Co. Galway, and Galway City during 2016.

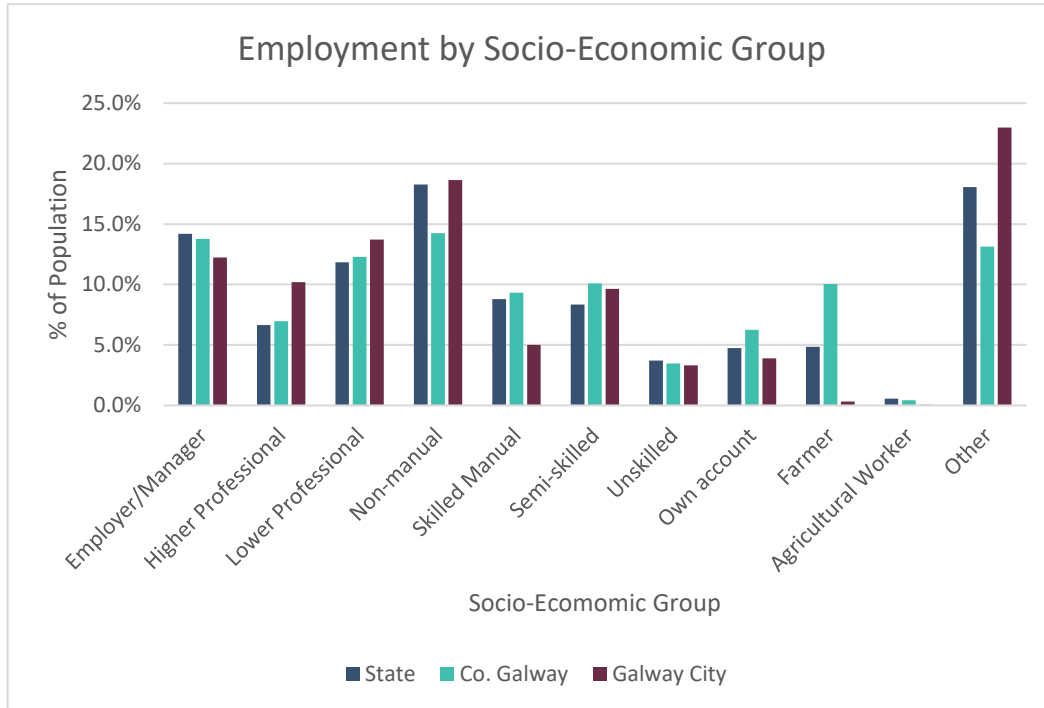


Figure 5.3 Employment by Socio-Economic Group in 2016 (Source: CSO)

The highest level of employment within Galway City was recorded in the ‘Other’ category. Approximately 23% of those employed within Galway City form part of this category, in comparison to 13.1% of the County population and 18.1% of the national population. After ‘Other’, the next highest levels of employment within the city are in the Non-manual and Lower Professional categories. The categories in which the lowest percentage of the Galway City population was recorded are Agricultural Worker (0.1% of the Study Area population) and Farmer (0.3% of Study Area population).

The CSO figures for socio-economic grouping have a limitation of including the entire population, rather than just those who are in the labour force. It is likely that this is what gives rise to the high proportion of the population shown to be in the "Other" category in Figure 5.3.

5.4.5 Land-use

The proposed development involves replacing the agricultural/greenfield land with a mixture of buildings and landscaped areas. The proposed development will ensure that all excavations are filled with soil and stone, and the entire site is left in a safe state. Once complete the landscaped areas will offer a useful amenity area for residents and those working within the site as well as for people in the locality. The proposed new development will provide much needed housing stock for the city of Galway.

Within the Galway City Development Plan 2017, the subject site is zoned for Low Density Residential (LDR) and Agriculture and Amenity (G) development. Other land use zoning objectives which are mapped in the area surrounding the site include Residential and Recreational and Amenity. This is shown in Figure 5.4.

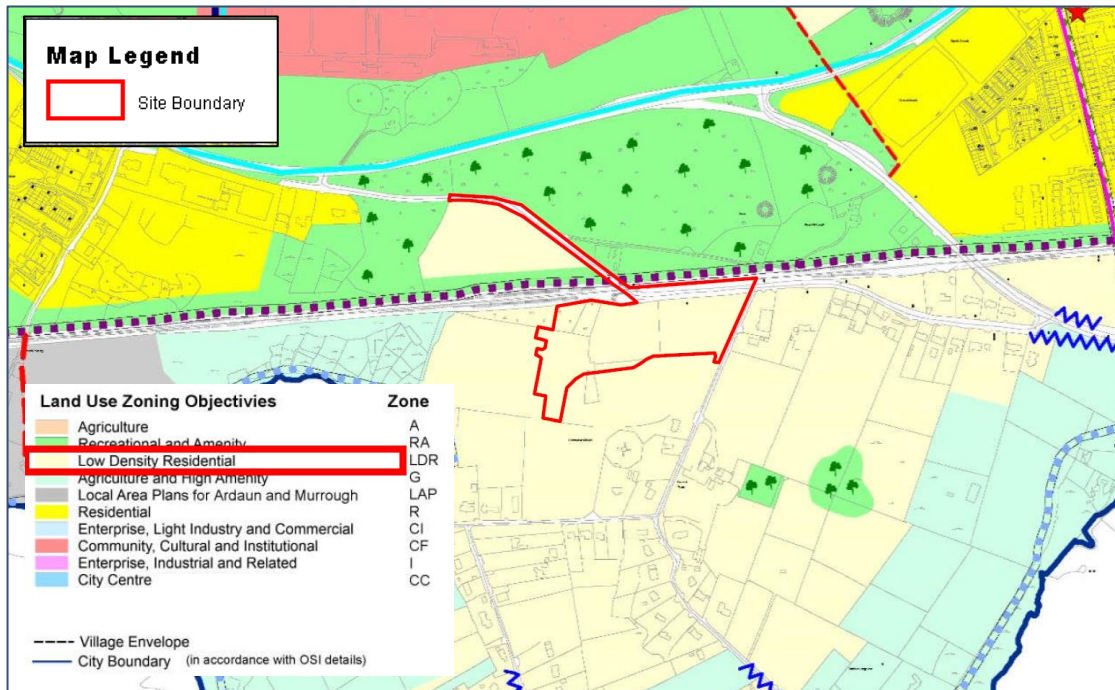


Figure 5.4 Land-use Zoning Map extracted from GCC Development Plan 2007-2023

5.4.6 Tourism

5.4.6.1 Tourist Numbers and Revenue

Tourism is one of the major contributors to the national economy and is a significant source of full time and seasonal employment. During 2019, total tourism revenue generated in Ireland was approximately €9.5 billion, an increase on the €9.4 billion revenue recorded in 2018. Overseas tourist visits to Ireland in 2019 grew by 0.7% to 9.67 million (‘Tourism Facts 2019’, Fáilte Ireland, March 2021).

Ireland is divided into seven tourism regions. Table 5-5 shows the total revenue and breakdown of overseas tourist numbers to each region in Ireland during 2018 (‘Tourism Facts 2019’, Fáilte Ireland, March 2021).

Table 5-5 Overseas Tourists Revenue and Numbers 2019 (Source: Fáilte Ireland)

Region	Total Revenue (€m)	Total Number of Overseas Tourists (000s)
Dublin	€2,210m	6,644
Mid-East/Midlands	€ 348m	954
South-East	€261m	945
South-West	€970m	2,335
Mid-West	€472m	1,432
West	€653m	1,943
Border	€259m	768

Region	Total Revenue (€m)	Total Number of Overseas Tourists (000s)
Total	€5,173 m	15,021

The proposed site is located within the West Region. According to ‘Regional tourism performance in 2019’ (Fáilte Ireland, March 2021) the West Region which comprises Counties Galway, Mayo, and Roscommon, benefited from approximately 12.9% of the total number of overseas tourists to the country and approximately 12.6% of the associated tourism income generated in Ireland in 2018.

5.4.6.2 Tourist Attractions

There are no tourist attractions pertaining specifically to the site of the proposed development. Key tourist attractions within the wider area of Galway City include NUI Galway, a number of theatres, Sports facilities (Eamon Deacy Park, The Sportsground, Galway Racecourse, Pierce Stadium, etc.). The proposed development does not directly impact on any of these sites of existing tourism attractions. The adjacent Menlo Park Hotel, Nox Hotel, Maldron Hotel, and other tourist accommodations in the wider area will attract a significant number of tourists to stay.

There are a number of large festivals and events held regularly in Galway City which attract a large number of visitors. These include the Galway Races, the Galway International Arts Festival, the Galway Oyster Festival, the Galway Comedy Festival, the Galway Food Festival, the Galway Film Fleadh, The Galway Christmas Market, Cuirt Literary Festival, and many others. These festivals attract large crowds and can result in an increase in traffic volumes on main roads at certain times.

There are no views within the footprint of the proposed development. There are no protected views within the site boundary of the proposed development. However, there are protected views within the study area, located within 5 km from the proposed development. These are **V8** - Seascape views of Galway Bay from the old Dublin Road to the city boundary, **V9** - Views towards the sea at Roscam., **V13** - Seascape views of Galway Bay at Ballyloughane from south of the railway bridge. For further information on these views, see Landscape and Visual, Chapter 12 of this EIAR.

The potential for visual impacts arising from the proposed development on the wider landscape and scenic roads is assessed in Chapter 12 of this EIAR.

5.4.7 Local Amenities

5.4.7.1 Education

The primary school located closest to the proposed development site is the Merlin Woods Primary School, located in Doughiska, approximately 1.2 kilometres northeast of the proposed development site. The secondary school located closest to the proposed development site is Colaiste Mhuirinne, which lies adjacent to the Merlin Woods Primary school and is also approximately 1.2 kilometres northeast of the site.

The third-level institution of Galway-Mayo Institute of Technology (Cluain Mhuire Campus) is located approximately 1.5 kilometres northwest of the proposed development site. The National University of Ireland (NUI) Galway main campus is located 4.8 kilometres to the west of the site. It is estimated that approximately 20% of the population of Galway city are students.

5.4.7.2 Access and Public Transport

Within the surrounding vicinity of the site, there are many local transport links and amenities which are available to all residents in the local area.

Ceannt train station (Galway City centre) is located approximately 4 kilometres west of the site, approximately 60 minutes' walk away or 15 minutes by bicycle. The station provides train services to Dublin, Limerick and Cork and intervening stations.

There are several bus stops along the old Dublin Road which runs parallel to the proposed development. The nearest is located approximately 1km from the site of the proposed development along the Old Dublin Road, approximately 350m from the Rosshill Road Junction. This bus stop is covered by two services with the 404 route and the 409 route. These provide transport to the city centre, and further west to Westside and east to Oranmore. Bus services from Galway city centre include Galway city (east and north), NUIG, GMIT, Dublin, Dublin Airport, Cork (via Limerick), Ennis (via Co Clare), Donegal (via Sligo) and intervening stops.

Within the proposed development site, the provision and maintenance of pedestrian and cycle infrastructure is intended, ensuring connectivity with adjoining routes and off-site networks. High quality secure bicycle parking facilities for both short term and long term bicycle parking requirements will also be provided.

5.4.7.3 Amenities and Community Facilities

Most of the amenities and community facilities, including GAA and other sports clubs, youth clubs and recreational areas, are available in the areas surrounding the site (i.e., Ballybane, Roscam and Doughiska), as well as in the wider Galway City. The main church located closest to the proposed development site is 2 kilometres to the west in Renmore.

There are a wide range of services available in the area. Retail and personal services are found throughout Galway city, with local services in Roscam, Doughiska, and Ballybane. Galway City Council has a branch library in Ballybane.

5.5 Human Health

The consideration of potential impacts on human health are examined separately in the Air & Climate, Noise & Vibration, Geology and Soils, Hydrology & Hydrogeology and Traffic Sections of the EIAR. These chapters should be consulted for detailed information on potential impacts; however, a brief summary of the key information is provided in Sections 5.7.2 and 5.7.3 below. Potential issues relating to health and safety, and amenity concerns are also discussed below.

5.6 Social and Economic Assessment

5.6.1 Market Demand for the Proposed Development

The Government's Action Plan for Housing and Homelessness, Rebuilding Ireland, July 2016 (the Action Plan), acknowledges that since the economic collapse in 2008, very low levels of housing have been constructed, especially in the main cities and urban areas where they have continued to be needed. The overarching aim of the Action Plan is to ramp up delivery of housing from its current under-supply across all tenures to help individuals and families meet their housing needs. The Plan sets ambitious targets to double the annual level of residential construction to 25,000 homes and deliver 47,000 units of social housing in the period to 2021, while at the same time making the best use of the existing housing stock and laying the foundations for a more vibrant and responsive private rented sector.

Furthermore, The Regional Spatial & Economic Strategy for the Northern & Western Regional Assembly (RSES NWRA) was adopted on 24th January 2020. The principal purpose of the (RSES) is to support the implementation of the National Planning Framework (NPF) and the economic policies and objectives of the Government by providing a long-term strategic planning and economic framework for the development of the regions. Section 3.6 of the RSES sets out the Galway Metropolitan Area Strategic Plan (MASP). The Vision of this MASP is that Galway will be a leading global city, renowned as a successful, sustainable, competitive, compact, and accessible city of scale that supports a high quality of life, maintains its distinctive identity, and supports its rich heritage, language, and cultural experience.

The RSES outlines arrangements for a co-ordinated metropolitan area strategic plan (MASP) for the Galway Metropolitan Area. The MASP has been provided with statutory underpinning to act as 12-year strategic planning and investment framework. The MASP is an opportunity for Galway to address recent growth legacy issues and build on key strengths, including a vibrant arts and cultural scene, year-round tourism, and an attractive natural setting.

As outlined in the MASP, in Section 3.6 of the RSES, the Galway Metropolitan Area has considerable land capacity that can significantly contribute to meeting the housing demands based on population targets set out in the NPF and RSES. The targets are as follows (per section 3.6.3.1 of the RSES):

1. *Population of Galway MASP to grow by 27,500 to 2026 and by a further 14,500 to 2031 with the population of the City and Suburbs accommodating 23,000 to 2026 and a further 12,000 to 2031.*
2. *Deliver at least half (50%) of all new homes that are targeted within the MASP to be within the existing built-up footprint.*

5.7 Likely and Significant Impacts and Associated Mitigation Measures

5.7.1 Do-Nothing Effects

If the proposed residential development were not to proceed, there would be no change to the existing environment. The potential for additional investment and employment in the area in relation to the construction and operation of the proposed residential site would be lost. It is considered that the ‘Do Nothing’ impact would be permanent, negative, and slight as the proposed development site is zoned for residential development and will contribute to the much-needed housing stock of Co. Galway.

5.7.2 Construction Phase

5.7.2.1 Health and Safety

During the construction phase, the operation of machinery, increased construction traffic and risk to health from onsite spillages, dust, and noise; pose a potential health and safety risk to the employees of the proposed development.

The presence and operation of heavy machinery and traffic entering and leaving the subject site also poses a potential risk to members of the public that make use of the surrounding access roads.

These are considered to be short term potential significant negative impacts.

Mitigation

- A site-specific Health and Safety Plan will be in place for the proposed facility. In the event that Covid-19 restrictions are in place at the commencement of the construction

phase, the Health and Safety Plan will include provisions regarding compliance with relevant Covid-19 restrictions. All site staff will be made aware of and adhere to the Health and Safety Plan.

- Operate a Site Induction Process for all site staff,
- Ensure all site staff will have current ‘Safe Pass’ cards,
- Only appropriately qualified and trained personnel will be permitted to operate machinery onsite.
- Appropriate barriers and signage will be used.
- The proposed development site will not be accessible to members of the public.
- The site will also be secure to prevent the risk of trespass through signage and provision of barriers.

Residual Effects

With the implementation of the above mitigation measures, there will be a Short-term, slight Negative Impact in terms of Health and Safety during the construction phase.

Significance of Effects

Based on the assessment above there will be no significant effects

5.7.2.2 Employment and Investment

There will be an improvement in employment in the area of the proposed development, as it is anticipated that there will be an increase in job opportunities for those working within the construction sector, building services and supplies, as well as in local businesses. Those to be employed at the proposed site will be from the local area so any increased revenue from this employment returns directly to the local community.

Residual Effect

The proposed development will result in a Short-term, slight positive impact on employment and investment during the construction phase.

Significance of Effects

Based on the assessment above there will be no significant effects.

5.7.2.3 Population

During the construction phase of the proposed development, there will be no negative impact on population, as it is predicted that the majority of staff and construction workers on site will be from the local or regional area.

Residual Effect

The proposed development will result in no negative impact on population during the construction phase.

Significance of Effects

Based on the assessment above there will be no significant effects.

5.7.2.4 **Tourism**

During the construction phase of the proposed development, there will be no negative impact on tourism, as there are no tourist attractions in the vicinity of the subject site.

Residual Effect

No negative impact

Significance of Effects

Based on the assessment above there will be no significant effects.

5.7.2.5 **Land-use**

The construction phase involves a change in land use of the site from a previous agricultural site, which has no current activity, to use as a temporary construction site. These activities will result in a permanent change in land-use to one of residential and commercial use. This is considered to be a permanent positive impact on an area of land that is zoned for this specific use.

Residual Effect

The proposed development will result in no negative impact on landuse.

Significance of Effects

Based on the assessment above there will be no significant effects.

5.7.2.6 **Economic Activity**

During the construction phase of the proposed residential development, increased employment is likely to result in an improvement in economic activity in the local area of the proposed development site, particularly within the construction sector, building services and supplies, as well as in local businesses. The increase in employment of construction workers within the local or regional area, will have a medium to long term Positive impact on the economy.

Residual Effect

The proposed development will result in no negative impact in terms of Economic Activity during the construction phase.

Significance of Effects

Based on the assessment above there will be no significant effects.

5.7.2.7 **Noise**

There will be an increase in noise levels in the vicinity of the proposed development site during the construction phase, as a result of heavy vehicles and building operations. The potential noise impacts that will occur during the construction phase of the proposed development are further described in Section 9 of this EIAR.

Noise emissions arising from construction phase operations at the proposed development site will not exceed the identified 65 dB LAeq 1 h criterion recommended by BS 5228-1:2009+A1:2014, and the 70 dB criterion recommended by the National Roads Authority (now Transport Infrastructure Ireland). At most offsite receptors, LAeq 1 h levels will be lower than 55 dB. The highest level will be received at the dwelling opposite the proposed site entrance where the received LAeq 1 h level during worst case scenario operations will reach 57 dB.

Mitigation

Best practice measures for noise control will be adhered to onsite during the construction phase of the proposed development in order to mitigate the slight negative impact associated with this phase of the development. The measures include:

- Construction operations will in general be confined to the period Monday-Friday 0800-1900 h, and Saturday 0800-1600 h.
- Where it is proposed to operate plant during the period 0700-0800 h, standard ‘beeper’ reversing alarms will be replaced with flat spectrum alarms.
- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Queuing of trucks outside the site entrance will be prohibited.
- A site representative will be appointed as a liaison officer with the local community. Prior to commencement of construction, contact details for the officer will be circulated to all local residents. The officer will notify local residents of upcoming works phases and likely noise sources.
- Where evening or night-time operations are required, local residents will be notified through the liaison officer.
- All complaints of noise received during the construction phase will be logged in a register and investigated immediately. Details of follow-up action will be included in the register.
- Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance.
- Guidance set out in British Standard BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase.

Prior to the commencement of construction, it is proposed to liaise with the operators of Rosshill Stud Farm to identify noise control measures specifically required by the stud farm. Identified measures will be included in a construction phase noise management plan.

Residual Effect

Short-term slight Negative Impact

Significance of Effects

Based on the assessment above there will be no significant effects.

5.7.2.8 Dust and Air Quality

Potential dust and vehicle emission sources during the construction phase of the proposed development include the use of machinery and plant and on-site vehicular traffic. The entry and exit of vehicles from

the site may result in the transfer of dust to the public road, particularly if the weather is wet. This may cause nuisance to residents and other road users, thereby creating a short-term slight negative impact.

The potential impacts that will occur during the construction phase of the proposed development are further considered in Section 9 of this EIAR. Dust emissions resulting from the construction of the proposed development, if uncontrolled have the potential to have a short term, slight, negative impact on human health.

Mitigation

The following measure will be enforced to ensure that dust and vehicle emission nuisance during the construction phase beyond the site boundary is minimised.

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- If dust levels become an issue, then all dust generating activities on site will cease until such time as weather conditions improve (e.g., wind levels drop or rain falls) or mitigation measures such as damping down of the ground are completed.
- Overburden will be progressively removed from the working area in advance of construction.
- Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the building to block dust escaping where the building is within 10m of the site boundary where residential properties exist.
- Site roadways will be maintained in a stoned hard-core condition not allowing soil to accumulate which when dry can create dust.
- Wheel wash equipment will be set up at the site exit gate for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.
- Plant and equipment that have the potential to create volumes of dust will have appropriate attachments to allow water source to dampen dust to not allow it to get airborne.
- Deploy Road Sweeper as required on External Roads.

Residual Effect

With the implementation of the above mitigation measures, there will be a Short-term, Imperceptible Negative effect in terms of dust and air quality, and a short term, imperceptible, negative effect in terms of human health during the construction phase.

Significance of Effects

Based on the assessment above there will be no significant effects.

5.7.2.9 Traffic

All deliveries and vehicles into site will access the site from the new site entrance which will be located on the eastern side of the site boundary along the Rosshill road.

The location of the vehicular entrance and access will be regularly reviewed during the construction to ensure that the pedestrian and vehicular access points are located and maintained appropriately.

The increase in traffic volumes as a result of construction vehicles visiting the site is not considered to be excessive and will be spread out over the duration of the construction phase of the development. Due to the designated access point off the Rosshill road, allowing delivery vehicles to pull off the road

into the site, there will be no significant disruption on the traffic flows on the Rosshill Road as a result of the construction of the development. It is recommended that all deliveries are provided with instructions / directions on accessing the site from the Rosshill Road and surrounding local road network. The potential impacts for traffic and transportation are discussed in detail in Section 13 of this EIAR.

Residual Effect

The proposed development will have a Short-term, Slight Negative Impact in terms of traffic during the construction phase.

Significance of Effects

Based on the assessment above there will be no significant effects.

5.7.2.10 Human Health

Dust emissions resulting from the construction of the proposed development, if uncontrolled have the potential to have a short term, slight, negative impact on human health. Likewise, there will be an increase in noise levels in the vicinity of the proposed development site during the construction phase, as a result of heavy vehicles and building operations. In the absence of mitigation, there is potential for short term, slight, negative impacts on human health as a result of noise.

Mitigation

The mitigation measures discussed above in Sections 5.7.2.7 and 5.7.2.8 will be implemented to minimise potential impacts on Human Health during the construction phase.

Residual Effect

With the implementation of the above mitigation measures, there will be a Short-term, Imperceptible Negative effect in terms of human health during the construction phase.

5.7.3 Operational Phase

5.7.3.1 Health and Safety

The proposed development will be constructed in compliance with all current health and safety regulation and specifications. Therefore, upon completion the proposed development is unlikely to have any negative significant impact on human health.

The design, layout and separation distances of the houses and apartment blocks have been designed to optimise the ingress of natural daylight/sunlight and to incorporate passive surveillance, with all units designed to include secure, passively surveyed, own door access.

Residual Effect

No negative impact

Significance of Effects

Based on the assessment above there will be no significant effects.

5.7.3.2 Employment and Investment

Once the site has been developed and is fully operational, the site will require the hiring of those with specialist skills in regard to upkeep and maintenance of the development, which could result in the transfer of these skills into the local workforce, thereby having a long-term moderate positive impact on the local skills base.

Residual Effect

No negative impact

Significance of Effects

Based on the assessment above there will be no significant effects.

5.7.3.3 Population

Once the site has been developed and is fully operational, there will be a change to the population of the Study Area, where an increase in housing will cause an influx of new residents into the area. This will allow for changes in population trends, population density, household size and age structure in a manner that has been planned and provided for in the Galway City Development Plan, RSES and NPF.

Residual Effect

No negative impact

Significance of Effects

Based on the assessment above there will be no significant effects.

5.7.3.4 Tourism

During the operational phase of the proposed development, there will be no negative impact on tourism. The increase in number of residents within the local or regional area, will have a slight long term positive impact on tourism.

Residual Effect

No negative impact

Significance of Effects

Based on the assessment above there will be no significant effects.

5.7.3.5 Land-use

The site is currently a greenfield site, past use as agricultural land. The proposed residential development will result in a change of land-use to residential. The total proposed area to be upgraded

measures approximately 4.704 hectares in area. The change in the land-use of this area would be significant in the context of the local and wider area, with resultant permanent moderate positive impact on land-use.

Residual Effect

There will be a permanent, moderate, positive impact in terms of Land-Use during the operational phase.

Significance of Effects

Based on the assessment above there will be no significant effects.

5.7.3.6 Noise

There will be a slight increase in noise levels in the vicinity of the proposed development site once the development has been built, as a result of increased population and increased vehicles making use of the development. The potential noise impacts that will occur during the operational phase of the proposed development are further described in Section 10 of this EIAR.

Residual Effect

There will be a permanent, slight, negative impact in terms on noise during the operational phase.

Significance of Effects

Based on the assessment above there will be no significant effects.

5.7.3.7 Dust and Air Quality

There will be no impact on human health from dust emissions in the vicinity of the proposed development site once the development has been built and all construction vehicles and personal are offsite.

Any further works which may need to occur on site as part of maintenance and repairs during the operation of the site, may cause slight short term dust emissions, and is unlikely to have any negative significant impact on human health. The potential dust and air quality impacts that will occur during the operational phase of the proposed development are further described in Section 9 of this EIAR.

Mitigation

No mitigation will be required on site as the impact is assessed as being imperceptible and will not be noticed within the area which already contains many residential developments.

Residual Effect

There will be a permanent, imperceptible, neutral impact in terms of Dust and Air Quality, and Human Health, during the operational phase.

Significance of Effects

Based on the assessment above there will be no significant effects.

5.7.3.8 **Traffic**

The Traffic and Transport Assessment, as summarised in Section 13 of the EIAR and presented in Appendix 13-1, calculates that during the operation phase of the proposed residential development, Access to the proposed development is to be facilitated via the existing road infrastructure. TRICS data for similar sized residential developments were obtained in order to inform the trip rate associated with such a development. It is anticipated that a total of 246 trip movements in the AM peak and a total of 199 trip movements in the PM peak are expected to result from the proposed development. Details of the TRICS data utilised are included in Appendix B of the Traffic and Transport Report included in this submission.

Further details on the traffic and transportation impact assessment are presented in Section 13 of this EIAR.

Mitigation

Details on the traffic and transportation mitigation measures are presented in Section 13.1.8.2 of this EIAR.

Residual Effect

Based on the implementation of the mitigation measures outlined in Section 13 of this EIAR the residual impact will be Long-term Slight Negative Impact

Significance of Effects

Based on the assessment above there will be no significant effects.

5.7.3.9 **Vulnerability of the Project to Natural Disaster**

A residential development is not a recognised source of pollution. Should a major accident or natural disaster occur the potential sources of pollution onsite during the operational phase is limited. Sources of pollution at the proposed residential development with the potential to cause significant environmental pollution and associated negative effects on health such as bulk storage of hydrocarbons or chemicals, storage of wastes etc. are limited.

Ireland is a geologically stable country with a mild temperate climate. The potential natural disasters that may occur are therefore limited to flooding and fire. The risk of flooding is addressed in Section 7 of this EIAR. It is considered that the risk of significant fire occurring, affecting the proposed site and causing the site to have significant environmental effects is limited. As described earlier, there are no significant sources of pollution within the proposed residential site with the potential to cause environmental or health effects.

Mitigation

There is no site-specific mitigation required for the proposed residential development.

Residual Effect

There will be an Unlikely Imperceptible Temporary Negative Impact in terms of vulnerability to natural disasters during the operational phase.

Significance of Effects

Based on the assessment above there will be no significant effects.

5.7.4 Cumulative effects resulting from Interactions between various elements of the proposed development.

The interaction of the various elements of the proposed development was considered and assessed in this EIAR with regards population and human health. The potential for each individual element of the proposed development on its own to result in significant effects on human beings was considered in the impact assessment. The entire project including the interactions between all its elements was also considered and assessed for its potential to result in significant effects on population and human health in the impact assessment presented.

All interactions between the various elements of the project were considered and assessed both individually and cumulatively within this chapter. Where necessary, mitigation was employed to ensure that no cumulative effects will arise as a result of the interaction of the various elements of the development with one another.

5.7.5 Cumulative In-Combination Effects

The potential cumulative effects of the proposed development in combination with the other projects described in Chapter 2 of this report have been considered in terms of impacts on Population and Human Health.

Of the projects listed in Chapter 2 of this EIAR it was determined that, due to proximity and scale, the ten projects listed in Table 5.6 below have to potential for cumulative effects on Population and Human Health in combination with the proposed development. There are 9 no. proposed housing developments with permission granted in the locality, and 1 current application for modifications to a previously granted development. Where appropriate the application documentation, EIAR and NIS have been reviewed to inform the assessment.

Table 5-6 Local/Nearby Developments

Application Reference	Description	Decision
99/687	Permission for 59 houses and associated site development works.	Granted by GCC. 22/03/2000
00/841	Permission for 304 two storey houses, 18 apts, in a 3-storey residential block & 15 apts. in a mixed-use block of 3/4 storeys, incorporating commercial neighbourhood facilities, incl. a creche, doctors' surgery & retail space, with associated carparking; site	Granted by GCC. 14/06/2001

Application Reference	Description	Decision
	development works incl., temporary sewerage treatment plant & providing new vehicular access points to the Cheshire House grounds&3 neighbourhood dwellings on the site.	
04/724	Permission to construct ninety-two semi-detached houses (92 no.) and fifteen detached houses (15 no.) to provide a new entrance from Coast Road (R338) and to provide new entrance from Doughiska Road to the development site together with all site services.	Granted by GCC. 16/12/2004
15/194	Permission for development at this site at Roscam with access from the Oranmore Road (R338), Galway and measuring c. 2.24 hectares in area. The development will consist of 49 no. two-storey detached and semi-detached four-bedroom houses, 2 no. two-storey semi-detached 3-bedroom houses and a three/four storey apartment block containing 12 no. 2 bedroom apartments and a crèche (166sq.m) at ground floor. Permission is also sought for all associated car-parking, landscaping, boundary treatments and ancillary site development works including amendments to car-parking, boundary treatment and Site no. 67 forming part of permitted development under Reg. Ref. 05/940 (subsequently amended by permission Reg. Ref. 13/347).	Granted by GCC. 18/05/2016
16/228	Permission for a new residential development. The development consists of 16 no. 2-storey, five-bedroom, detached houses, together with individual garages, as applicable, new vehicular site accesses and roads with all ancillary site works, landscaping, and service connections	Granted by GCC. 21/03/2017
17/283	Permission to construct 23 two storey Dwelling houses consisting of Detached, Semi-detached and terrace including access/egress off the old coast road to Oranmore with sewer connection to adjacent sewer pumping station adjacent the Dublin Road and all associated services.	Granted by GCC. 12/01/2018
18/187	Permission for a change of house type to previously granted planning permission (reference 16/228). These amendments consist of a change of house type C (on site 6 only) which is a 5-bedroom two storey detached house	Granted by GCC. 05/09/2018
19/95	Permission for development which consists of the constructing 51 No. one, two- and three-bedroom apartments and two one-bedroom Town Houses in 6 no. Blocks ranging in height from one storey up to four storeys, with sewer connection to adjacent pumping station adjacent Dublin road, together with access/egress off the old coast road to Oranmore and all associated services at Doughiska and Merlin Park Townlands. (Previous Planning Ref No. 17/283)	Granted by GCC. 26/06/2019
21/28	Permission for development which will consist of; variations to domestic garage design from that previously granted under 16/228 to include proposed domestic garage and gym and associated works.	Granted by GCC. 29/03/2021
21/73	Permission for development which will consist of amendments to previously granted planning permission (ref 16/228). The amendments consist of the following changes: 1. Minor changes to boundaries of sites 8,9,10,11 to accommodate revised house types. 2. Minor changes to alignment of proposed access road and junction between sites 8 and 12. 3 Change of house types on sites 8,9,10,11 which are to remain 5-bedroom two storey	Current Application

Application Reference	Description	Decision
	detached houses. 4. Minor amendments to side and rear elevation of house type A1 currently granted on site 15. 5. Minor amendments to side and rear elevation of house type B2 currently granted on sites 12 and 13. 6. Proposed garages for sites 8,12,13,15.	

5.7.5.1 Health and Safety

Any potential cumulative impacts between the construction of the proposed residential development and the other projects in terms of health and safety will be mitigated by the requirement for all projects to adhere to Health & Safety legislation.

5.7.5.2 Dust and Noise

Potential cumulative effects associated with dust and noise are addressed in Sections 8.3.5 and 9.5.7 of this ER respectively and conclude that there will be imperceptible effects.

5.7.5.3 Traffic

Potential cumulative effects associated with traffic are addressed in Sections 13.1.8.3 of this EIAR. The findings of the assessment indicate that there is only one other housing development proposed in the area that would result in potential cumulative traffic impacts with the proposed restoration scheme. However, the results of the assessment find that this will result in a long term imperceptible negative cumulative impact on local traffic.

5.7.5.4 Employment and Investment

In terms of employment and economic benefit, there will be a significant, short-term, positive, cumulative impact between the proposed residential site and the other projects due to the majority of construction workers and materials being sourced locally, thereby helping to sustain employment in the construction trade.

The injection of money in the form of salaries and wages to those employed during the construction phase of the proposed residential site and the other projects, has the potential to result in a slight increase in household spending and demand for goods and services in the local area. This would result in local retailers and businesses experiencing a short-term positive impact on their cash flow.

5.7.5.5 Population

Those working within the proposed residential site and the other projects in the area during the construction phase, will travel daily to the site from the wider area. These projects will have no impact on the population of the Study Area in terms of changes to population trends or density, household size or age structure.

5.7.5.6 Land-use

The surrounding land-uses of agriculture and residential will continue during the operation phase of the proposed residential site.

The impact of the proposed residential site is negligible as the site will have a positive impact on the surrounding area, on a site that previously had no other use. As there will be a negligible impact the potential for cumulative impacts is negligible.

5.7.5.7 **Tourism and Amenity**

There are no tourist attractions in the immediate vicinity of the proposed residential site. Key tourist attractions within the wider area of Galway City include NUI Galway, theatres, Sports facilities, etc as noted above in Section 5.4.6.2

There will be a slight positive cumulative operational impact on tourism between the proposed site and other projects in the area, where an increase in residents and tourists within the area will allow for a positive influence on local tourism.

6. BIODIVERSITY

6.1 Introduction

This chapter assesses the likely significant effects that the proposed housing development (the ‘Proposed Development’) may have on Flora and Fauna (and biodiversity) and mitigates any potential effects that are identified. Particular attention has been paid to species and habitats of ecological importance. These include species and habitats with national and international protection under the Wildlife Acts 1976-2012 the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) and the EU Birds Directive 2009/147/EC and EU Habitats Directive 2009/147/EC, 92/43/EC Habitats Directive among other relevant legislation. Where potential effects are identified, mitigation is prescribed and residual impacts on flora and fauna are assessed.

Between April 2019 and May 2021, a range of ecological survey work has been undertaken to provide comprehensive information on all ecological aspects of the location of the Proposed Development and the surrounding area. These surveys included detailed assessment of the site in terms of protected habitats and species. The studies and survey work undertaken provide a comprehensive inventory of the flora and fauna of the study area.

The chapter is structured as follows:

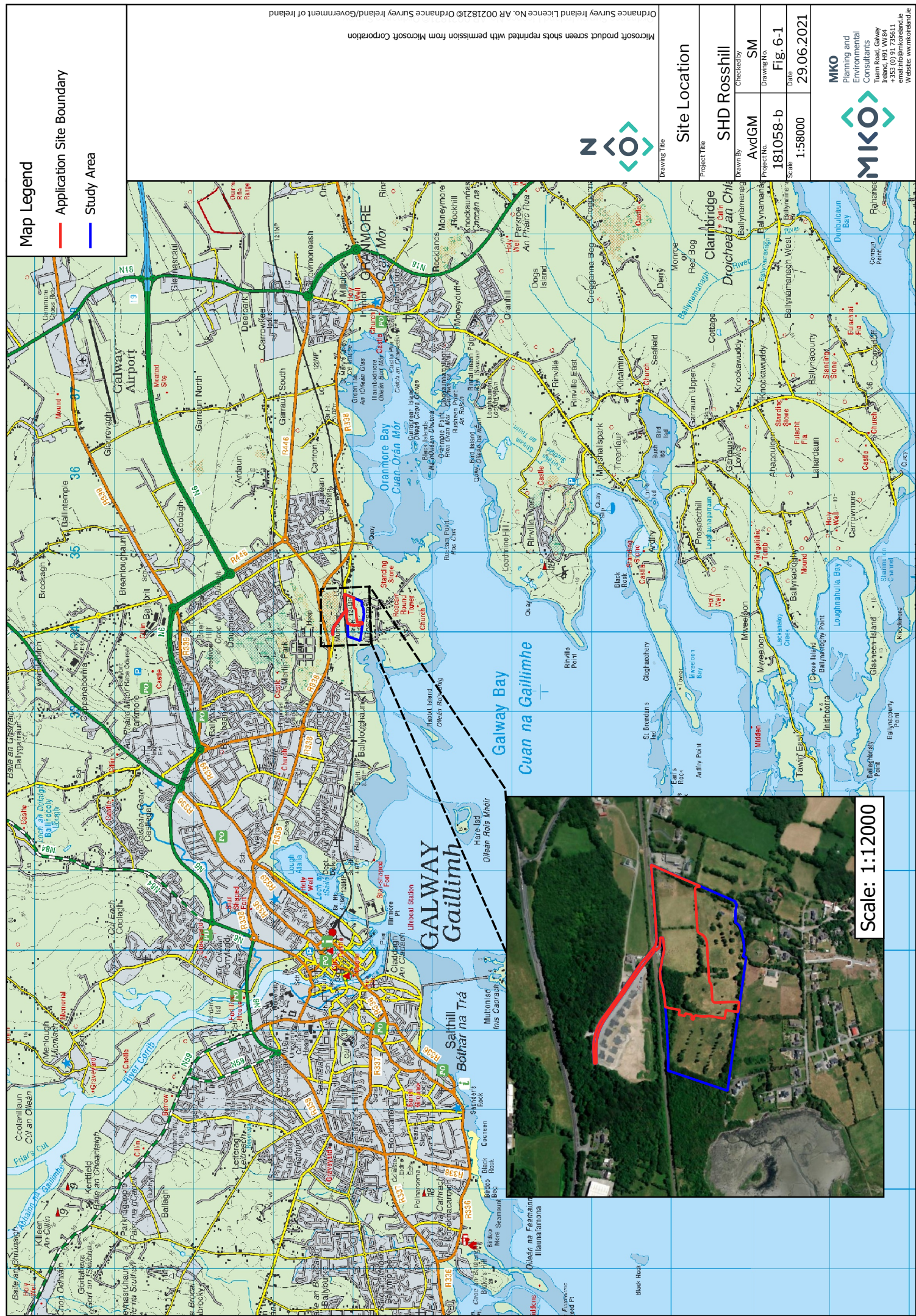
- › The Introduction provides a description of the legislation, guidance and policy context regarding Flora and Fauna.
- › This is followed by a comprehensive description of ecological survey and impact assessment methodologies that were followed to inform the robust assessment of likely significant effects on ecological receptors.
- › A description of the Baseline Ecological Conditions and Receptor Evaluation is then provided.
- › This is followed by an assessment of effects which are described with regard to the development. Potential Cumulative effects in combination with other plans and projects are fully assessed.
- › Proposed mitigation and best practice measures to ameliorate the identified effects are described and discussed. This is followed by an assessment of residual effects taking into consideration the effect of the proposed mitigation and best practice measures.
- › The conclusion provides a summary statement on the overall significance of predicted effects on Ecology.

A full description of the proposed project and all proposed works is presented in Chapter 4 of this EIAR.

The following defines terms utilised in this chapter:

- › The proposed development site forms part of a wider landholding, part of which was included within the study area for the ecological surveys undertaken for this Biodiversity Chapter. For the purposes of this chapter, the term ‘study area’ refers to the blue-line boundary as outlined in Figure 6-1. The terms ‘development site’ and ‘application site’ refer to the planning application site as outlined in red in Figure 6-1. While ecological surveys undertaken covered the entire ‘study area’, the impacts and cumulative assessments provided below deals with the proposed application site only. Any future development in lands to the south and west of the proposed application site, which form part of the ‘study area’ will be subject to its own assessment.
- › “Key Ecological Receptor” (KER) is defined as a species or habitat occurring within the zone of influence of the development upon which likely significant effects are anticipated.

- “Zones of Influence” (ZOI) for individual ecological receptors refers to the zone within which potential effects are anticipated. ZOIs differ depending on the sensitivities of particular habitats and species and were assigned in accordance with best available guidance and through adoption of a precautionary approach.



Map Legend

- Application Site Boundary
- Study Area



Site Location

Project Title		SHD Rosshill
Drawn By	AvdGM	SM
Project No.	181058-b	Fig. 6-1
Date	1:58000	29.06.2021



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6.2 Legislation, Guidance and Policy Context

This EIAR is prepared in accordance with the requirements of the 2011 EIA Directive as amended by EIA Directive 2014/52/EU.

The following is the key legislation applicable in respect of habitats and fauna in Ireland:

- Irish Wildlife Act 1976 to 2018.
- The European Communities (Birds and Natural Habitats) Regulations 2011 (transposes EU Birds Directive 2009/147/EC and EU Habitats Directive 2009/147/EC, 92/43/EC).
- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 and S.I. No. 722 of 2003 European Communities (Water Policy) Regulations which implement EU Water Framework Directive (2000/60/EC) and provide for implementation of ‘daughter’ Groundwater Directive (2006/118/EC).

The following legislation applies with respect to Invasive alien species:

- Regulation 49 and 50 of European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011) (as amended).

The guidelines listed below were consulted in the preparation of this document to provide the scope, structure and content of the assessment. They are among the recognised guidance in Environmental Impact Assessment and National Road Scheme assessments.

- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater and Coastal (CIEEM, 2018).
- Guidelines for assessment of Ecological Impacts of National Road Schemes, (NRA, 2009).
- EPA (2017). Draft revised guidelines on the information to be contained in Environmental Impact Statements. Environmental Protection Agency.
- Advice Notes for preparing Environmental Impact Statements (Environmental Protection Agency, Draft September 2015)
- Environmental Assessment and Construction Guidelines (NRA, 2006).

This assessment has been prepared with respect to the various planning policies and strategy guidance documents listed below:

- Planning and Development Acts 2000 – 2017.
- Galway City Council (2016). Galway City Development Plan 2017 – 2023.
- DoEHLG (2013). *Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment*. Department of the Environment, Community and Local Government (where relevant).
- European Commission (2002). *Assessment of plans and projects significantly affecting Natura 2000 sites*.

The Development Applications Unit (DAU) of the Department of Culture, Heritage & The Gaeltacht was consulted on the 15th February 2021 (Reference No: G Pre00047/2021). A response was received on the 8th of April 2021 (**Appendix 6-1**). The recommendations of the DAU have been considered in the preparation of this chapter.

6.3 Statement of Authority

An initial multi-disciplinary walkover survey was undertaken in April 2019 by Sarah Mullen (BSc, PhD) and Claire Stephens (BSc) of MKO. The site was revisited on multiple occasions between July 2019 and May 2021 by MKO ecologists Sarah Mullen, Julie O’Sullivan (B.Sc., M.Sc.), Rachel Walsh (B.Sc.), Neil Campbell (B.Sc.), Colin Murphy (B.Sc., M.Sc.), Laura McEntegart (B.Sc.) and Laura Hynes (B.Sc.). MKO ecologists are trained in field ecology and are experts in undertaking surveys to this level.

This report has been prepared by Sarah Mullen. This report has been reviewed by John Hynes (B.Sc., M.Sc., MCIEEM) who has over 10 years’ experience in ecological assessment.

6.4 Methodology

Assessing the impacts of any project and associated activities requires an understanding of the ecological baseline conditions prior to and at the time of the project proceeding. Ecological baseline conditions are those which exist in the absence of proposed activities (CIEEM, 2018).

The following sections outline the methodologies utilised to establish the baseline ecological condition of the proposed development site.

6.4.1 Desk Study

The desk study undertaken for this assessment included a thorough review of available ecological data including the following:

- Review of online web-mappers: National Parks and Wildlife Service (NPWS), EPA (Envision), Water Framework Directive (WFD).
- Review of Bird Atlases: (Sharrock, 1976; Lack, 1986; Gibbons *et al.*, 1993; Balmer *et al.*, 2013).
- Review of Irish Wetland Bird Survey (I-WeBs) surveys from proximal survey sites.
- Review of the Bat Conservation Ireland (BCI) Private Database (2019).
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper.
- Records from the National Parks and Wildlife Services (‘NPWS’) web-mapper and review of specially requested records from the NPWS Rare and Protected Species Database for the hectads in which the Proposed Development is located.
- Review of NPWS Article 17 Metadata and GIS Database Files

6.4.2 Field Surveys

6.4.2.1 Multi-disciplinary ecological walkover surveys

A multi-disciplinary ecological walkover survey was undertaken on 16th April 2019, in accordance with NRA *Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes* (NRA, 2009) by Sarah Mullen (B.Sc., Ph.D.) and Claire Stephens (B.Sc.) of MKO. The study area for the walkover survey included the proposed development site (also referred to as the application site) as well as the land to the south and west of the application site as outlined in blue in Figure 6-1. This survey provided baseline data on the ecology of the study area and assessed whether further detailed habitat or species-specific ecological surveys were required. The site was revisited by MKO ecologists in July 2019, September, October, November and December 2020 and in January, February, March, April and May 2021. During these visits, detailed habitat (grassland and woodland), bat and winter bird surveys of the development site were undertaken.

Habitats were identified in accordance with the Heritage Council’s ‘*Guide to Habitats in Ireland*’ (Fossitt, 2000). Habitat mapping was undertaken with regard to guidance set out in ‘*Best Practice Guidance for Habitat Survey and Mapping*’ (Smith *et al.*, 2011). Plant nomenclature for vascular plants follows ‘*New Flora of the British Isles*’ (Stace, 2010), while mosses and liverworts nomenclature follows ‘*Mosses and Liverworts of Britain and Ireland - a field guide*’ (British Bryological Society, 2010).

The walkover surveys were designed to detect the presence, or likely presence, of a range of protected habitats and species that may occur in the vicinity of the proposed development. Incidental sightings/observations of birds and additional fauna were noted during the site visits. Surveys were undertaken in accordance best practice guidance (TII, 2008: Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes).

During the multi-disciplinary ecological walkover surveys, a thorough search of the site for mammals was undertaken and the potential for the study area to support protected mammals listed in the Wildlife Acts, 1976–2019, such as pine marten, red squirrel, Irish hare, pygmy shrew, Irish stoat etc. was also assessed. During the walkover survey in 2021 a number of excavated burrows were recorded within and along the eastern edge of the woodland at the site’s northern boundary. Camera traps were deployed at a number of these burrows for a period of 1 week from the 26th April 2021 to the 5th May 2021 to monitor activity and determine whether any of the burrows were being utilised by badger.

A search for non-native invasive species was also undertaken. The survey focused on the identification of invasive species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (As Amended) (S.I. 477 of 2015).

Seasonal factors that affect distribution patterns and habits of species were taken into account when conducting the surveys. The potential of the site to support certain populations (in particular those of conservation importance that may not have been recorded during the field survey due to their seasonal absence or nocturnal/cryptic habits) was assessed.

All plants were readily identifiable, and it is considered that a comprehensive and accurate assessment of the habitats was achieved.

Dedicated bat and bird surveys were also carried out at the proposed development site. Details of these surveys can be found in the following subsections.

6.4.2.2 Bat Surveys

6.4.2.2.1 Habitat Suitability Assessment

Bat walkover surveys of the study area were carried out during daylight hours on the 16th of April 2019, 20th September 2020 and 20th April 2021. The landscape features on the site were visually assessed for potential use as bat roosting habitats and commuting/foraging habitats using a protocol set out in BCT *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn.) (Collins, 2016). Table 4.1 of the 2016 BCT Guidelines identifies a grading protocol for assessing structures, trees and commuting/foraging habitat for bats. The protocol is divided into four Suitability Categories: *High*, *Moderate*, *Low* and *Negligible*.

6.4.2.2.2 **Roost Survey**

During the bat walkover surveys, a search for roosts was undertaken within the application site boundary as well as the lands to the south and west of the development site which form part of the study area. The aim was to determine the presence of roosting bats and the need for further survey work or mitigation. During the walkover, mature trees within the development site and the ruins of the old building which are located just outside the southern boundary of the application site, were visually assessed for their suitability to support bats.

The survey of the ruin in 2019 comprised a detailed inspection of the remaining walls to look for evidence of bat use, including live and dead specimens, droppings, feeding remains, urine splashes and fur oil staining and noises (Collins, 2016). The ruins contained no roof, being entirely open in nature. The ruins are outside the proposed application site boundary and thus were not inspected again in 2020 and 2021.

6.4.2.2.3 **Dusk Activity surveys**

Dusk activity surveys were carried out on 16th April 2019, 20th September 2020 and 20th April 2021. Two surveyors were equipped with active full spectrum bat detectors, a Batlogger M (Elekon, Lucerne, Switzerland) and walked a transect route within the site, focusing on potentially suitable habitat features for bats. Where possible, species identification was made in the field and any other relevant information was also noted, e.g. numbers, behaviour, features used, etc. All bat echolocation was recorded for subsequent analysis to confirm species identifications.

The April 2019 dusk survey commenced 30 minutes before sunset and was completed within 3 hours after sunset. Conditions were suitable for bat survey as per Collins (2016); dry, mild (12 °C at sunset) with only light air (Beaufort Scale Force 1). The moon was almost full, and cloud cover was approximately 30% during the dusk survey.

The September 2020 dusk survey commenced 30 minutes before sunset and was completed within 3 hours after sunset. Conditions were suitable for bat survey as per Collins (2016); dry, mild (13 °C at sunset) with only light air (Beaufort Scale Force 1). Cloud cover was approximately 20% throughout the dusk survey.

The April 2021 dusk survey commenced 30 minutes before sunset and was completed within 3 hours after sunset. Conditions were suitable for bat survey as per Collins (2016); dry, mild (11 °C-12 °C at sunset), with only light air to light breeze (Beaufort Scale Force 1-2). Cloud cover was approximately 70% - 90% throughout the dusk survey.

April and September are within the suitable survey period for bat activity surveys, provided weather conditions are favourable (Collins, 2016). No limitations associated with seasonality, timing or weather conditions were identified.

6.4.2.2.4 **Static Detector Survey**

Full spectrum bat detectors, Song Meter SM4BAT (Wildlife Acoustics, Maynard, MA, USA), were deployed during static surveys to record bat activity in 2019, 2020 and 2021. Detectors were deployed in September 2019 at two fixed locations over a 1-week period, in September 2020 at two fixed locations over a 2-week period and in April 2021 at two fixed locations over a 1-week period. The locations of the static detectors are illustrated in Figure 6-10 below.

The locations of static detectors were selected to represent the range of habitats present within the study area, including favourable bat habitats as well as open spaces within the site. Settings used were those recommended by the manufacturer for bats, with minor adjustments in gain settings and band pass filters

to reduce background noise when recording. Detectors were set to record from 30 minutes before sunset until 30 minutes after sunrise. The Song Meter automatically adjusts sunset and sunrise times using the Solar Calculation Method when provided with GPS coordinates.

Two Song Meter SM4BAT detectors were deployed on site on 18th September 2019. The static detectors were collected on the 24th September 2019. Two Song Meter SM4BAT detectors were deployed on site on the 10th September 2020. The Song Meter SM4, dual-channel acoustic recorder is capable of the long-term acoustic monitoring of bats. The static detectors were collected on the 23rd September 2020. Two Song Meter Mini detectors were deployed on site on 12th April 2021. The static detectors were collected on the 20th April 2021.

6.4.2.3 Bird Surveys

During the walkover surveys undertaken in 2019, 2020 and 2021, all bird species observed and heard within the study area were recorded.

The proposed development is located approximately 260m from Inner Galway Bay SPA. Therefore, dedicated winter bird surveys were undertaken monthly at the development site between October 2020 and March 2021 to assess the suitability of the proposed development site to support a variety of wintering wildfowl and waders, including the bird species listed as Special Conservation Interests (SCIs) for the Inner Galway Bay SPA. Prior to the commencement of surveys, an initial field visit was undertaken to assess the habitats on site and to plan the surveys and identify suitable vantage points. The survey area covered the study area and the area of shoreline within Galway Bay SPA, approximately 600m west of the development site.

Surveys were undertaken monthly at alternate high/low tides, within two hours of high/low tide. A combination of low and high tide counts has been used due to the differences in behaviour and site use between tidal states, with different species likely to be foraging and roosting in different areas of Inner Galway Bay SPA and the surrounding terrestrial habitats, depending on the stage of the tidal cycle.

The surveys were undertaken by appropriately qualified ornithologists. All observations were recorded, and detailed point data was gathered for each species observation, with all bird species denoted using standard British Trust for Ornithology (BTO) codes and with the number of each species recorded next to each registration. The species recorded in the surveys were those covered by Irish Wetlands Bird Survey (I-WeBS) counts, i.e. all divers, grebes, cormorant, shag, herons, swans, geese, ducks, rails, crakes, waders, gulls and kingfisher. In addition to this, all other bird species, including all common and widespread passerines, were also recorded from within the proposed development site.

Wetland Bird Surveys

The winter bird surveys at the nearby SPA followed the Irish Wetland Bird Survey (I-WeBS) methodology; the simple 'look-see' method, whereby all birds present within a predefined area are counted (Gilbert et al., 2011; Birdwatch Ireland, 2018). The surveys were carried out at suitable vantage points, located overlooking sections of Inner Galway Bay SPA in close proximity to the proposed development site. Vantage points were chosen to have as large as possible a view of the identified wetland site and potential adjacent daytime foraging habitat in the vicinity of the proposed development. Vantage points focused on areas which were deemed to be of likely significance to wintering waterbirds of Inner Galway Bay SPA.

Details of the surveys carried out including date, time, duration, location and weather conditions are provided in the Winter Bird Survey report in **Appendix 6-2** of this document.

Transects

The proposed development site was scanned from suitable vantage points that gave unobstructed views of potentially suitable habitat and roosting locations for wintering waterfowl and waders within the study area in advance of walkover surveys.

Walked transects were undertaken within the site boundary. During the surveys species of note were recorded both within and adjacent to the development site. All bird species were denoted using standard British Trust for Ornithology (BTO) codes and with the number of each species recorded next to each registration. Details of the transects walked are shown in Figure 2.2 of the Winter Bird Survey report in **Appendix 6-2** of this document.

6.4.3 Methodology for Assessment of Effects

6.4.3.1 Geographical Framework

Guidance on Ecological Impact Assessment (CIEEM, 2018) recommends categories of nature conservation value that relate to a geographical framework (e.g. international, through to local). This assessment utilises the geographical framework described in *Guidelines for Assessment of Ecological Impact of National Road Schemes* (NRA 2009). The guidelines provide a basis for determination of whether any particular site is of importance on the following scales:

- > International
- > National
- > County
- > Local Importance (Higher Value)
- > Local Importance (Lower Value)

Locally Important (lower value) receptors include habitats and species that are widespread and of low ecological significance only in the local area. Internationally Important sites are designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna.

6.4.3.2 Characterising Ecological Impacts and Effects

Effects identified have been described in accordance with (EPA, 2017) impact assessment criteria presented in Table 6-1. The criteria for characterising magnitude and scale of ecological impacts are further contextualised based on CIEEM guidelines (CIEEM, 2019) in Table 6-2.

The following terms were utilised when quantifying duration:

- > Temporary – up to 1 year
- > Short-term – 1 to 7 years
- > Medium term – 7 to 15 years
- > Long term – 15 to 60 years
- > Permanent – over 60 years

Table 6-1 Criteria for assessing impact quality based on (EPA, 2017)

Effect Type	Criteria
Positive	A change which improves the quality of the environment e.g. increasing species diversity, improving reproductive capacity of an ecosystem or removing nuisances.
Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative	A change which reduces the quality of the environment e.g. lessening species diversity or reducing the reproductive capacity of an ecosystem or by causing nuisance.

Table 6-2 Criteria for characterising magnitude and scale of ecological impacts (CIEEM, 2019)

Characteristic	Definition
Positive or Negative	<p>Positive impact – a change that improves the quality of the environment e.g. by increasing species diversity, extending habitat or improving water quality. This may also include halting or slowing an existing decline in the quality of the environment.</p> <p>Negative impact – a change which reduces the quality of the environment e.g. destruction of habitat, removal of foraging habitat, habitat fragmentation, pollution.</p>
Extent	The spatial or geographical area over which the impact/effect may occur under a suitably representative range of conditions.
Magnitude	Magnitude refers to size, amount, intensity and volume. It should be quantified if possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population.
Duration	Impacts and effects may be described as short, medium or long-term and permanent or temporary and are defined in months/years. Duration is defined in relation to ecological characteristics.
Frequency and Timing	The number of times an activity occurs will influence the resulting effect. The timing of an activity or change may result in an impact if it coincides with critical life-stages or seasons.
Reversibility	An irreversible effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it. A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation.

6.4.3.3 Significance of Effect

The criteria for assessing impact significance based on EPA guidelines is outlined in Table 6-3 (EPA, 2017).

Table 6-3 Criteria for assessing impact significance based on (EPA, 2017)

Effect Magnitude	Definition
No change	No discernible change in the ecology of the affected feature.
Imperceptible effect	An effect capable of measurement but without noticeable consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight effect	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate effect	An effect that alters the character of the environment that is consistent with existing and emerging trends.
Significant effect	An effect which, by its character, its magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound effect	An effect which obliterates sensitive characteristics.

As per TII (NRA, 2009) and CIEEM (2018) best practice guidelines the following key elements should also be examined when determining the significance of effects:

- The likely effects on ‘integrity’ should be used as a measure to determine whether an impact on a site is likely to be significant (NRA, 2009)
- A ‘significant effect’ is an effect that either supports or undermines biodiversity conservation objectives (CIEEM, 2019).

6.4.3.3.1 Integrity

In the context of EcIA, ‘integrity’ refers to the coherence of the ecological structure and function, across the entirety of a site, that enables it to sustain all of the ecological resources for which it has been valued. Impacts resulting in adverse changes to the nature, extent, structure and function of component habitats and effects on the average population size and viability of component species, would affect the integrity of a site, if it changes the condition of the ecosystem to unfavourable.

6.4.3.3.2 Conservation status

An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status. According to CIEEM (2018) guidelines the definition for conservation status in relation to habitats and species are as follows:

- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area
- Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

As defined in the EU Habitats Directive 92/43/EEC, the conservation of a habitat is favourable when:

- Its natural range, and areas it covers within that range, are stable or increasing
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future
- The conservation status of its typical species is favourable.

The conservation of a species is favourable when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future
- There is and will probably continue to be, a sufficiently large habitat to maintain its population on a long-term basis.

According to the NRA/CIEEM methodology, if it is determined that the integrity and/or conservation status of an ecological feature will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (i.e. local, county, national, international).

6.4.3.4 Mitigation

The development has been designed to specifically avoid, reduce and minimise effects on biodiversity. Where potential effects on biodiversity are predicted, mitigation has been prescribed to avoid, reduce and abate such effects.

Proposed best practice design and mitigation measures are specifically set out and are realistic in terms of cost and practicality. They have been subject to detailed design and will effectively address the effects on identified biodiversity.

The potential effects of the proposed development were considered and assessed to ensure that all effects on biodiversity are adequately addressed and no significant residual effects are likely to remain following the implementation of mitigation measures / best practice.

6.4.3.5 Limitations

The information provided in this EIAR chapter accurately and comprehensively describes the baseline ecological environment; provides an accurate prediction of the likely ecological effects of the proposed development; prescribes best practice and mitigation as necessary; and, describes the residual ecological impacts. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines. The habitats and species on the site were readily identifiable and comprehensive assessments were made during the field visits undertaken between April 2019 and May 2021. This falls within the optimal time of year to undertake habitat surveys (Smith et al. 2011). Bat surveys were undertaken at the appropriate time of the year and in suitable weather conditions (Collins 2016).

No significant limitations in the scope, scale or context of the assessment have been identified.

6.5 Baseline Conditions and Receptor Evaluation

6.5.1 Desk Study

The following sections detail the results of a survey of published material that was consulted as part of the desk study for the purposes of the Ecological Assessment. These included the Site Synopses for designated sites and other data compiled by the National Parks and Wildlife Service (NPWS) of the Department of Culture, Heritage and the Gaeltacht, bird and plant distribution atlases, National Biodiversity Data Centre Records, the “Route Selection Report: Chapter 4” of the N6 Galway City Transport Project Environmental Impact Statement, the N6 Galway City Ring Road Environmental Impact Assessment Report (2018), NPWS Article 17 Metadata and GIS Database Files, Irish Wetland Bird Survey (I-WeBs) surveys from proximal survey sites and other research publications.

6.5.1.1 Designated Sites

The Habitats Directive (together with the Birds Directive) forms the cornerstone of Europe's nature conservation policy. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. All in all the directive protects over 1,000 animal and plant species and over 200 "habitat types" (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance.

With the introduction of the EU Habitats Directive (92/43/EEC) and Birds Directive (79/409/EEC) which were transposed into Irish law as S.I. No. 94/1997 *European Communities (Birds and Natural Habitats) Regulations 1997*, the European Union formally recognised the significance of protecting rare and endangered species of flora and fauna, and also, more importantly, their habitats. The 1997 Regulations and their amendments were subsequently revised and consolidated in S.I. No. 477/2011- *European Communities (Birds and Natural Habitats) Regulations 2011*. This legislation requires the establishment and conservation of a network of sites of particular conservation value that are to be termed ‘European Sites’.

6.5.1.1.1 Special Areas of Conservation

Articles 3 – 9 of the EU Habitats Directive (92/43/EEC) provide the EU legislative framework of protecting rare and endangered species of flora and fauna, and habitats. Annex I of the Directive lists habitat types whose conservation requires the designation of Special Areas of Conservation (SAC). Priority habitats, such as Turloughs, which are in danger of disappearing within the EU territory are also listed in Annex I. Annex II of the Directive lists animal and plant species (e.g. Marsh Fritillary, Atlantic Salmon, and Killarney Fern) whose conservation also requires the designation of SAC. Annex IV lists animal and plant species in need of strict protection such as Lesser Horseshoe Bat and Otter, and Annex V lists animal and plant species whose taking in the wild and exploitation may be subject to management measures. In Ireland, species listed under Annex V include Irish Hare, Common Frog and Pine Marten.

Species can be listed in more than one Annex, as is the case with Otter and Lesser Horseshoe Bat which are listed on both Annex II and Annex IV.

6.5.1.1.2 Special Protection Areas

Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (Birds Directive) has been substantially amended several times. In the interests of clarity and rationality the said Directive was codified in 2009 and is now cited as Directive 2009/147/EC. The Directive instructs Member States to take measures to maintain populations of all bird species naturally occurring in the wild state in the EU (Article 2). Such measures may include the maintenance and/or re-establishment of habitats in order to sustain these bird populations (Article 3).

A subset of bird species have been identified in the Directive and are listed in Annex I as requiring special conservation measures in relation to their habitats. These species have been listed on account of inter alia: their risk of extinction; vulnerability to specific changes in their habitat; and/or due to their relatively small population size or restricted distribution. Special Protection Areas (SPAs) are to be identified and classified for these Annex I listed species and for regularly occurring migratory species, paying particular attention to the protection of wetlands (Article 4).

6.5.1.1.3 **Nationally Designated Sites**

Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs) are heritage sites that were designated for the protection of flora, fauna, habitats and geological sites under the Wildlife (Amendment) Act 2000. These sites do not form part of the Natura 2000 network and the AA process, or screening for same, does not apply to NHAs or pNHAs.

6.5.1.1.4 **Identification of the Designated Sites within the Likely Zone of Influence of the Proposed Development**

Nationally Designated Sites

Using GIS software (MapInfo v10.0), sites designated for nature conservation within the vicinity of the proposed development were identified. Initially, sites within a 15 km radius of the proposed works were identified. Designated sites located outside the 15km buffer zone were also taken into account and assessed. In this case, no potential for impacts outside the 15km buffer was identified. The potential for the proposed development to result in effects on all these designated sites was considered in the completion of this assessment. The 15km buffer distance was extrapolated from DoEHLG Guidance on Appropriate Assessment (2010). The Nationally designated sites are listed in Table 6-4 and displayed in Figure 6-2.

Table 6-4 Nationally designated sites in the Zone of Influence

Designated Site	Distance from Proposed Development (km)
Natural Heritage Area (NHA)	
Cregganna Marsh NHA [000253]	3.7km
Moycullen Bogs NHA [002346]	7.3km
Proposed Natural Heritage Areas (pNHA)	
Galway Bay Complex	136m
Kiltullagh Turlough	4.6km
Lough Corrib	4.7km
Lough Fingall Complex	10.5km
Ballycuike Lough	12.0km
Rahasane Turlough	13.1 km
Kiltiernan Turlough	13.2 km
Castletaylor Complex	13.5km
East Burren Complex	14.3 km
Killarainy Lodge, Moycullen	14.5 km

European Sites

Using GIS software, European sites designated for nature conservation within the vicinity of the proposed development were identified. Initially, sites within a 15 km radius of the proposed works were identified as per DoEHLG Guidance (2010). European Sites located outside the 15km buffer zone were also taken into account and assessed. In this case, no potential for impacts outside the 15km buffer was identified. The designated sites are listed in Table 6-5 and displayed in Figure 6-3. The potential for the proposed development to result in effects on all these designated sites was considered in the completion of this assessment.

Table 6-5 European designated sites within 15km of the proposed development

Designated Site	Distance from Proposed Development (km)
Special Areas of Conservation (SAC)	
Galway Bay Complex SAC (000268)	136m
Lough Corrib SAC (000297)	4.1km
Lough Fingall Complex SAC (000606)	10.5km
Rahasane Turlough SAC (000322)	13.1km
Kiltiernan Turlough SAC (001285)	13.2km
Castletaylor Complex SAC (000242)	13.6km
East Burren Complex SAC (001926)	14.3km
Ardrahan Grassland SAC (002244)	14.5km
Special Protection Area (SPA)	
Inner Galway Bay SPA (004031)	260 m
Cregganna Marsh SPA (004142)	3.8km
Lough Corrib SPA (004042)	6.5km
Rahasane Turlough SPA (004089)	13.0km

Map Legend

- Site Location
- ▭ 15km Buffer
- ▭ Natural Heritage Area (NHA)
- ▭ Proposed Natural Heritage Area (pNHA)
- ▭ Hydrological Catchments

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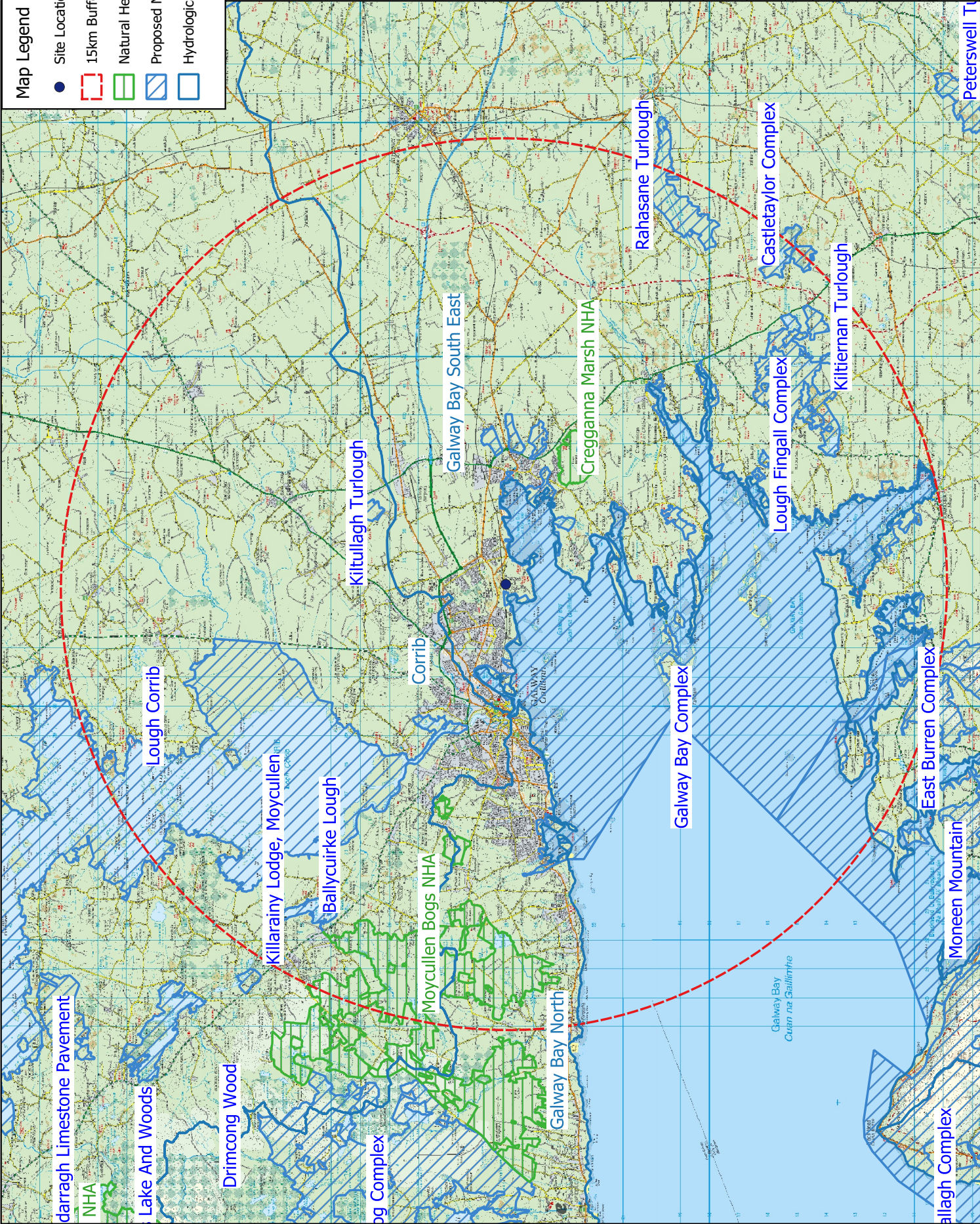
SHD Rosshill

Drawn By	AvdGM	Checked by	SM
Project No.	181058-b	Drawing No.	Fig 6-2
Scale	1:170000	Date	12.05.2021

N **<** **O** **>**

Nationally Designated Sites
within 15km Buffer

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Map Legend

- Site Location
- ▭ 15km Buffer
- ▭ Special Area of Conservation (SAC)
- ▭ Special Protection Area (SPA)
- ▭ Hydrological Catchments

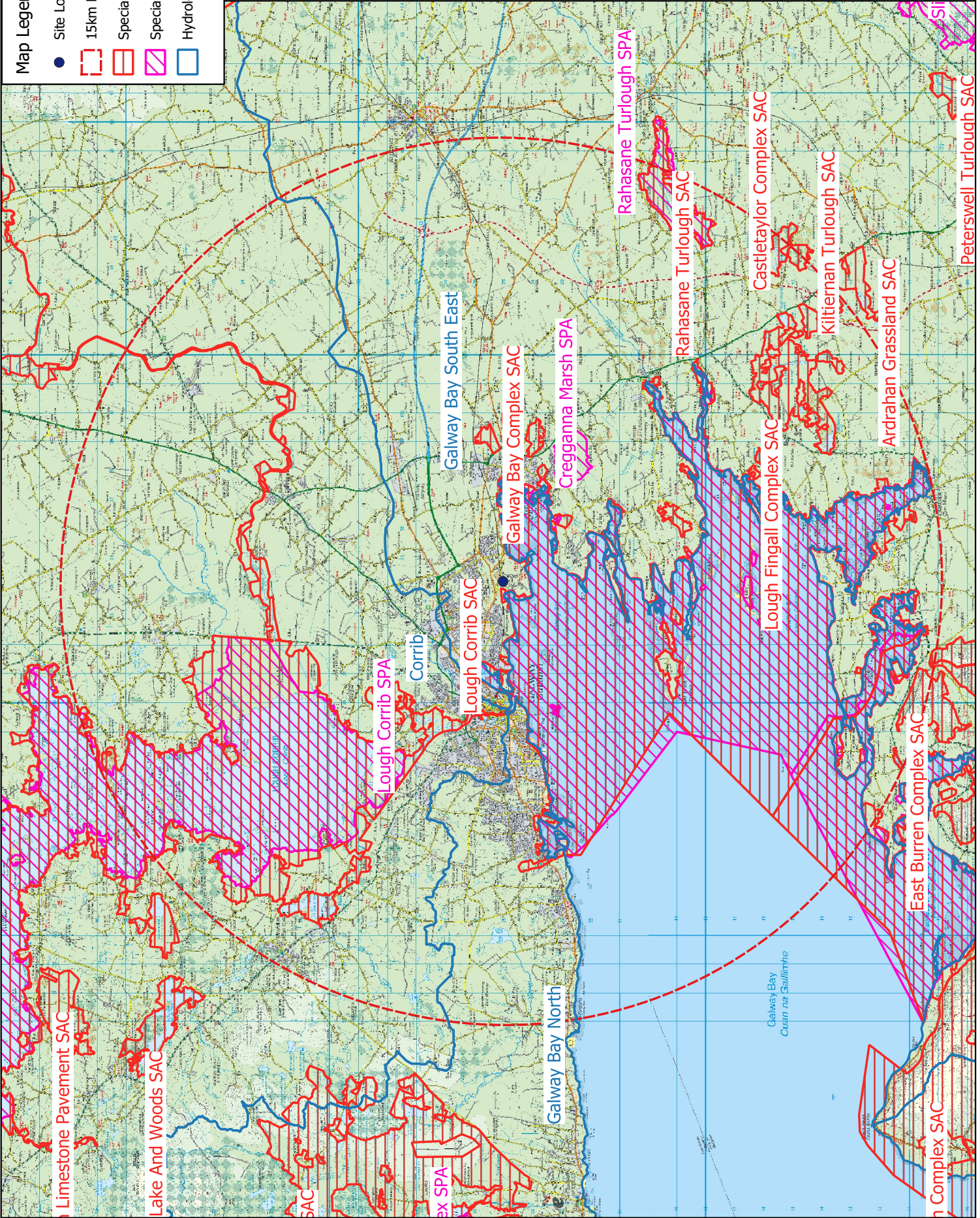
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Drawing Title	EU Designated Sites within 15km Buffer		
Project Title	SHD Rosshill		
Drawn By	AvdGM	Checked by	SM
Project No.	181058-b	Drawing No.	SM
Scale	1:170000	Fig.	6-3
Date	12.05.2021		

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6.5.1.2 New Flora Atlas

A search was made in the New Atlas of the British & Irish Flora (Preston et al., 2002), on 18/01/2021, to investigate whether any rare or unusual plant species listed as Annex II of the Habitats Directive which are listed as rare on the Red Data List (Curtis and McGough 1988) or protected under the Flora (Protection) Order, 1999 had been recorded in the relevant 10km squares in which the study site is situated (M32), during the 1987-1999 atlas survey (Table 6-6).

6-6 Records of species listed under the Flora Protection Order 2015 or the Irish Red Data Book for Vascular Plants

Common Name	Scientific Name	Status
Shepherd's needle	<i>Scandix pecten-veneris</i>	RE (Regionally Extinct)
Common wormwood	<i>Artemisia absinthium</i>	VU (Vulnerable)
Small-white orchid	<i>Pseudorchis albida</i>	VU (Vulnerable), FPO
Slender-flower thistle	<i>Carduus tenuiflorus</i>	NT (Near Threatened)
Sea-kale	<i>Crambe maritima</i>	NT (Near Threatened)
Dwarf spurge	<i>Euphorbia exigua</i>	NT (Near Threatened)
Spring gentian	<i>Gentiana verna</i>	NT (Near Threatened)
Autumn gentian	<i>Gentianella amarella</i>	NT (Near Threatened)
Henbane	<i>Hyoscyamus niger</i>	NT (Near Threatened)
Cheeseweed	<i>Malva neglecta</i>	NT (Near Threatened)
Thread-leaved Watercrowfoot	<i>Ranunculus baudotii</i>	NT (Near Threatened)
Least bur-reed	<i>Sparganium natans</i>	NT (Near Threatened)
Small white orchid	<i>Pseudorchis albida</i>	FPO
Yellow horned-poppy	<i>Glaucium flavum</i>	NT (Near Threatened)
Autumn Lady's-tresses	<i>Spiranthes spiralis</i>	NT (Near Threatened)
Marsh fern	<i>Thelypteris palustris</i>	NT (Near Threatened)
Common verbena	<i>Verbena officinalis</i>	Near Threatened (NT)
Knotted hedge-parsley	<i>Torilis nodosa</i>	NT (Near Threatened)
Green field-speedwell	<i>Veronica agrestis</i>	NT (Near Threatened)
Wildflower knapweed	<i>Centaurea scabiosa</i>	Near Threatened (NT)
Dwarf mallow	<i>Malva neglecta</i>	Near Threatened (NT)

6.5.1.3 National Biodiversity Data Centre

A search of the NBDC records for the relevant hectad, M32, provided details on a number of species of conservation concern. Table 6-7. lists the protected faunal species (excluding birds) recorded within the hectad M32. The findings of ecological surveys undertaken for the Galway City Transport Plan (GCTP, 2015) were also reviewed.

Table 6-7 National Biodiversity Data Centre Records

Common Name	Scientific Name	Red List Status	Conservation Status
Otter	<i>Lutra Lutra</i>	LC	Annex II, Annex IV, Wildlife Acts
Lesser Horseshoe Bat	<i>Rhinolophus hipposideros</i>	LC	Annex II, Annex IV, Wildlife Acts
Marsh Fritillary	<i>Euphydryas aurinia</i>	VU	Annex II
Bottle-nosed Dolphin	<i>Tursiops truncatus</i>	NE	Annex II, Annex IV, Wildlife Acts
Brown Long-eared Bat	<i>Plecotus auratus</i>	LC	Annex IV, Wildlife Acts
Lesser Noctule	<i>Nyctalus leisleri</i>	LC	Annex IV, Wildlife Acts
Common Lizard	<i>Zootoca vivipar</i>	LC	Wildlife Acts
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	LC	Annex IV, Wildlife Acts
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	LC	Annex IV, Wildlife Acts
Pine Marten	<i>Martes martes</i>	LC	Annex V, Wildlife Acts
Common Frog	<i>Rana temporaria</i>	LC	Annex V, Wildlife Acts
Common Dolphin	<i>Delphinus delphis</i>	NE	Annex IV, Wildlife Acts
Atlantic White-sided Dolphin	<i>Lagenorhynchus acutus</i>	NE	Annex IV, Wildlife Acts
Common Porpoise	<i>Phocoena phocoena</i>	NE	Annex II, Annex IV, Wildlife Acts
Striped Dolphin	<i>Stenella coeruleoalba</i>	NE	Wildlife Acts
Common Seal	<i>Phoca vitulina</i>	LC	Annex II, Annex V, Wildlife Acts
Grey Seal	<i>Halichoerus grypus</i>	LC	Annex II, Annex V, Wildlife Acts
Long-finned Pilot Whale	<i>Globicephala melas</i>	NE	Annex IV, Wildlife Acts
Sperm Whale	<i>Physeter macrocephalus</i>	NE	Annex IV, Wildlife Acts
Minke Whale	<i>Balaenoptera acutorostrata</i>	NE	Annex IV, Wildlife Acts
Eurasian Badger	<i>Meles meles</i>	LC	Wildlife Acts
Pygmy Shrew	<i>Sorex minutus</i>	LC	Wildlife Acts
Eurasian Red Squirrel	<i>Sciurus vulgaris</i>	LC	Wildlife Acts

Smooth Newt	<i>Lissotriton vulgaris</i>	LC	Wildlife Acts
West European Hedgehog	<i>Erinaceus europaeus</i>	LC	Wildlife Acts

Annex II, Annex IV, Annex V – Of EU Habitats Directive, Wildlife Acts – Irish Wildlife Acts (1976-2017).
 LC - least concern, NT – Near Threatened, VU – Vulnerable, EN – Endangered CR- Critically Endangered, NE – Not Evaluated.

6.5.1.3.1 Invasive Species

The NBDC database also contains records of invasive species identified within the relevant grid square M32. Records of invasive species for within the hectad M32 are provided in Table 6-8.

Table 6-8 NBDC records for Third Schedule invasive species in the hectad M32

Common Name	Scientific Name
Wireweed	<i>Sargassum muticum</i>
Japanese Knotweed	<i>Fallopia japonica</i>
Rhododendron	<i>Rhododendron ponticum</i>
Giant Hogweed	<i>Heracleum mantegazzianum</i>
Himalayan Knotweed	<i>Persicaria wallichii</i>
American Mink	<i>Mustela vison</i>
Canada Goose	<i>Branta canadensi</i>
Brown Rat	<i>Rattus norvegicus</i>

6.5.1.3.2 Bird Records

A number of sources were assessed to determine the likely usage of the site by both breeding and wintering bird species, including Bird Atlases, National Biodiversity Data Centre (NBDC), BirdWatch Ireland and Conservation Objectives Supporting Documents from the National Parks and Wildlife Service (NPWS) for nearby Special Protection Areas (SPAs).

The Bird Atlas 2007-11: The breeding and wintering birds of Britain and Ireland (Balmer *et al.*, 2013) provides the most up-to-date information regarding the distribution and relative abundance of bird species in Britain and Ireland, based on surveys carried out between 2007 and 2011.

Table 6-9 and Table 6-10 lists all the protected bird species recorded within the hectad which pertains to the current study area (M32) and includes birds listed in Annex I of the EU Birds Directive as well as those listed on the BoCCI Red List. Birds listed under Annex I are offered special protection by the EU Birds Directive.

Twenty-two species listed under Annex I of the EU Birds Directive have been recorded within the relevant 10km square (M32). A further twenty red-listed birds of conservation concern have been recorded within the relevant 10km square. It should be noted that many of the bird species recorded for the search area are associated with the coastal and marine environment. Consequently, these species are unlikely to be associated with the habitats found within or immediately adjacent to the site, i.e. grassland, woodland, and were not included for further assessment or consideration.

The detailed bird survey results for the N6 Galway City Transport Project were also reviewed. These indicate that there are no known significant nest/roost sites within or adjacent to Merlin Woods, located north of proposed development site, for protected bird species. Ecological surveys of Merlin Wood by Brown and Fuller 2009 recorded long-eared owl (*Asio otus*) breeding within the conifer woodland. The coniferous woodland habitat is predominantly located to the north of the existing Merlin Park University Hospital (Brown and Fuller 2009), north of the proposed development site.

Table 6-9 Bird Atlas Data for species recorded during Bird Atlas 2007-2011 Survey (hectad M32)

Common Name	Scientific Name	Breeding	Wintering	Designation
Little Egret	<i>Egretta garzetta</i>	Confirmed breeding	Yes	Protected EU Birds Directive Annex I Bird Species
Little Gull	<i>Larus minutus</i>	-	Yes	
Arctic Tern	<i>Sterna paradisaea</i>	Confirmed breeding	-	
Bar-tailed Godwit	<i>Limosa lapponica</i>	-	Yes	
Common Tern	<i>Sterna hirundo</i>	Confirmed breeding	-	
Sandwich tern	<i>Sterna sandvicensis</i>	-	Yes	
Mediterranean Gull	<i>Larus melanocephalus</i>	-	Yes	
Merlin	<i>Falco columbarius</i>	-	Yes	
Peregrine Falcon	<i>Falco peregrinus</i>	Possible breeding	Yes	
Whooper Swan	<i>Cygnus cygnus</i>	-	Yes	
Anser albifrons subsp. flavirostris	White-fronted Goose	-	Yes	
Red-throated Diver	<i>Gavia stellata</i>	-	Yes	
Dunlin	<i>Calidris alpina</i>	-	Yes	
Golden Plover	<i>Pluvialis apricaria</i>	-	Yes	
Black-headed gull	<i>Larus ridibundus</i>	Confirmed breeding	Yes	Birds of Conservation Concern (BoCCI)- Red List
Common scoter	<i>Melanitta nigra</i>	-	Yes	
Eurasian curlew	<i>Numenius arquata</i>	-	Yes	
Goldeneye	<i>Bucephala clangula</i>	-	Yes	
Grey Wagtail	<i>Motacilla cinerea</i>	-	Yes	
Herring Gull	<i>Larus argentatus</i>	-	Yes	
Barn Owl	<i>Tyto alba</i>	Confirmed breeding	-	
Lapwing	<i>Vanellus vanellus</i>	Confirmed breeding	Yes	
Long-tailed Duck	<i>Clangula hyemalis</i>	-	Yes	
Meadow Pipit	<i>Anthus pratensis</i>	Confirmed breeding	Yes	
Redshank	<i>Tringa tetanus</i>	-	Yes	
Pintail	<i>Anas acuta</i>	-	Yes	
Tufted Duck	<i>Aythya fuligula</i>	-	Yes	

Shoveler	<i>Anas clypeata</i>	-	Yes	
Wigeon	<i>Anas Penelope</i>	-	Yes	
Woodcock	<i>Scolopax rusticola</i>	-	Yes	
Knot	<i>Calidris canutus</i>	-	Yes	

Table 6-10 NBDC Records for Birds (M32)

Common Name	Scientific Name	Status
Arctic Tern	<i>Sterna paradisaea</i>	Annex I
Barn Owl	<i>Tyto alba</i>	BoCCI Red List [Breeding]
Bar-tailed Godwit	<i>Limosa lapponica</i>	Annex I
Black-headed Gull	<i>Larus ridibundus</i>	BoCCI Red List [Breeding]
Black-throated Diver	<i>Gavia arctica</i>	Annex I
Common Kingfisher	<i>Alcedo atthis</i>	Annex I
Common Redshank	<i>Tringa totanus</i>	BoCCI Red List (Breeding & Wintering)
Common Scoter	<i>Melanitta nigra</i>	BoCCI Red List [Breeding]
Common Tern	<i>Sterna hirundo</i>	Annex I
Corn Crake	<i>Crex crex</i>	Annex I, BoCCI Red List [Breeding]
Dunlin	<i>Calidris alpina</i>	Annex I
Eurasian Curlew	<i>Numenius arquata</i>	BoCCI Red List [Breeding & Wintering], WA
Eurasian Wigeon	<i>Anas penelope</i>	BoCCI Red List [Wintering], WA
Eurasian Woodcock	<i>Scolopax rusticola</i>	BoCCI Red List [Breeding]
European Golden Plover	<i>Pluvialis apricaria</i>	Annex I, BoCCI Red List (Breeding & Wintering)
Great Northern Diver	<i>Gavia immer</i>	Annex I
Greater White-fronted Goose	<i>Anser albifrons</i>	Annex I
Greenland White-fronted Goose	<i>Anser albifrons subsp. Flavirostris</i>	Annex I
Grey Partridge	<i>Perdix perdix</i>	BoCCI Red List [Breeding]
Hen Harrier	<i>Circus cyaneus</i>	Annex I
Herring Gull	<i>Larus argentatus</i>	BoCCI Red List [Breeding]
Little Egret	<i>Egretta garzetta</i>	Annex I
Little Gull	<i>Larus minutus</i>	Annex I

Common Name	Scientific Name	Status
Little Tern	<i>Sternula albifrons</i>	Annex I
Meadow Pipit	<i>Anthus pratensis</i>	BoCCI Red List [Breeding]
Mediterranean Gull	<i>Larus melanocephalus</i>	Annex I
Merlin	<i>Falco columbarius</i>	Annex I
Northern Lapwing	<i>Vanellus vanellus</i>	BoCCI Red List (Breeding & Wintering)
Northern Pintail	<i>Anas acuta</i>	BoCCI Red List (Wintering)
Northern Shoveler	<i>Anas clypeata</i>	BoCCI Red List (Wintering)
Peregrine Falcon	<i>Falco peregrinus</i>	Annex I
Red Grouse	<i>Lagopus lagopus</i>	BoCCI Red List [Breeding]
Red Knot	<i>Calidris canutus</i>	BoCCI Red List [Breeding]
Red-throated Diver	<i>Gavia stellate</i>	Annex I
Ruff	<i>Philomachus pugnax</i>	Annex I
Sandwich Tern	<i>Sterna sandvicensis</i>	Annex I
Tufted Duck	<i>Aythya fuligula</i>	BoCCI Red List (Wintering)
Twite	<i>Carduelis flavirostris</i>	BoCCI Red List [Breeding]
Whooper Swan	<i>Cygnus cygnus</i>	Annex I
Yellowhammer	<i>Emberiza citronella</i>	BoCCI Red List [Breeding]

Annex I – Of EU Birds Directive, Red List – Birds of Conservation Concern in Ireland (Population for which the species is red listed in brackets).

6.5.1.3.3 Bat Records

A review of the National Biodiversity Data Centre results was made on the 10/05/2021, to search for records of bats within 10km of the proposed site (hectad M32). Details of the results are provided in Table 6-11 below.

Searches of the Bat Conservation Ireland (BCI) database were undertaken in 2019. A search of a 1km buffer from the proposed development site (Grid Reference: IG 134208 224980), on 12th July 2019, yielded results for one ad-hoc observation record for three of Ireland’s resident bat species; Whiskered/Brandts Bat (*Myotis mystacinus/brandtii*), Soprano pipistrelle (*Pipistrellus pygmaeus*) and Brown long-eared bat (*Plecotus auratus*).

A search of a 10km buffer from the proposed development site resulted in 4 roost records along with records from 10 transects and 28 ad-hoc observations for bats. The roosts contained lesser horseshoe bat (*Rhinolophus hipposideros*), Daubenton’s bat (*Myotis daubentonii*) and Leisler’s bat (*Nyctalus leisleri*). Ten transect results returned records for Daubenton’s bat (*Myotis daubentonii*), soprano pipistrelle (*Pipistrellus pygmaeus*), Leisler’s bat (*Nyctalus leisleri*), Pipistrellus spp., Myotis spp. and unidentified bat species. Records from twenty-eight ad-hoc records included at least eight of Ireland’s nine resident bat species; Daubenton’s bat (*Myotis daubentonii*), Leisler’s bat (*Nyctalus leisleri*),

common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), whiskered/Brandt's Bat (*Myotis mystacinus/brandtii*), lesser horseshoe bat (*Rhinolophus hipposideros*), natterer's bat (*Myotis nattereri*), brown long-eared bat (*Plecotus auritus*), *Myotis* spp., and *Pipistrellus* spp.

The findings of ecological surveys undertaken for the Galway City Transport Plan (GCTP, 2015) were also reviewed. A Soprano pipistrelle roost (PBR42) is located less than 100m to the south of the proposed development site. There is also an unidentified bat roost (PBR136) located approximately 100m north of the proposed development site.

Table 6-11 Bat Records within 10km of Proposed Development (hectad M32)

Common Name	Scientific Name	Protection Status
Lesser Horseshoe bat	<i>Rhinolophus hipposideros</i>	HD Annex II, IV, WA
Brown Long-eared bat	<i>Plecotus auritus</i>	HD Annex IV, WA
Leisler's bat	<i>Nyctalus leisleri</i>	HD Annex IV, WA
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	HD Annex IV, WA
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	HD Annex IV, WA

The information gathered in the desk study provides a baseline understanding of bat species in the area and indicates that the region has been previously surveyed for bats. The records identify the wider area of the proposed development as being used by foraging and commuting bat species.

6.5.1.4 NPWS Records

NPWS online records were searched to determine whether any rare or protected species of flora or fauna were recorded in the 10 kilometre grid square, M32, in which the study area lies. A data request was also sent to the NPWS and data received in relation to the grid square. Table 6-12 lists the rare and protected species records which lie within hectad M32. All of these species are protected under the Wildlife Act (1976) and the Wildlife (Amendment) Act (2000).

Table 6-12 Records for rare and protected species, NPWS

Common Name	Scientific Name	Status
Small white orchid	<i>Pseudorchis albida</i>	FPO
Cornflower	<i>Centaurea cyanus</i>	Ex.
Lesser horseshoe bat	<i>Rhinolophus hipposideros</i>	Annex II, IV
Barn owl	<i>Tyto alba</i>	Annex I, RL
Otter	<i>Lutra lutra</i>	Annex II, Annex IV
Badger	<i>Meles meles</i>	WA
Common Frog	<i>Rana temporaria</i>	WA, Annex V
Irish hare	<i>Lepus timidus subsp. hibernicus</i>	Annex V, WA
Black henbane	<i>Hyoscyamus niger</i>	NT
Grey seal	<i>Halichoerus grypus</i>	Annex II, V, WA
West European Hedgehog	<i>Erinaceus europaeus</i>	WA

Common Name	Scientific Name	Status
Reindeer lichen	<i>Cladonia portentosa</i>	Annex V
Irish Stoat	<i>Mustela erminea</i>	WA
Blue fleabane	<i>Erigeron acer</i>	RE
Bottle-Nosed Dolphin	<i>Tursiops truncatus</i>	Annex II, IV, WA

Annex II, Annex IV, Annex V – Of EU Habitats Directive, WA – Irish Wildlife Acts (1976-2017), Red Data List (Curtis and McGough 1988), BoCCI Red List – Birds of Conservation Concern in Ireland (Population for which the species is red listed in brackets), AEWA -Agreement on the Conservation of African-Eurasian Migratory Waterbirds [1999].

6.5.1.5 Additional Fauna

The proposed development site does not fall within any sensitivity area for freshwater pearl mussel (*Margaritifera margaritifera*). The nearest such area, i.e. the Knock catchment (Catchments of other extant populations) is located over 11km west of the Study Area and is in a separate water catchment.

NBDC records show that marsh fritillary (*Euphydryas aurinia*), is known to occur within the hectad (M32). Other species, including pine marten, common frog and otter are likely to be recorded in the wider area, based on the results of the NBDC data search.

6.5.1.6 Merlin Woods Habitat Survey and Management Plan

Ecological surveys of Merlin Wood, located approximately 750m north of the proposal, were undertaken by Browne and Fuller (2009), which provide baseline information of the likely species and habitats occurring within or adjacent to the study area. This report describes the habitats on site as follows:

“Merlin Park Woodland was identified as an ‘Area of High Biodiversity Value’ in a habitats inventory of Galway City (NATURA 2005). The woodland is partly fragmented into several blocks by roads, tracks and the hospital complex. There are two main blocks, one to the north of the hospital complex (referred to here as the North Wood) and one to the south (referred to as the South Wood). These two blocks are separated by the main entrance road through the hospital buildings. The underlying geology of the whole site is limestone, which has a thin layer of soil in some areas, deeper in others and is exposed in a few locations. Despite the fact that there was extensive conifer and broadleaf planting, there is not much variation in the understorey vegetation composition throughout the site”.

“Dry meadows and grassy verges habitat occurs in the vicinity of Merlin Castle, on the verges of the bus corridor that runs through the North Wood and linking areas of woodland in the south wood.... A small area of wet grassland occurs in the South Wood in the floodplain of the small stream that flows through the site. This grassland is mowed adjacent to the main entrance to the hospital”.

6.5.1.7 Galway City Transport Project (2015)

A review of publicly available information, on studies undertaken as part of the Galway City Transport Project, was carried out. The development site has not been subject to assessment as part of the project. However, lands to the north and north-west of the development site were assessed and categorised as Oak-ash-hazel woodland (WN2). These were not found to conform to Annex I woodland habitat. Habitat mapping undertaken for the N6 Galway City Transport Project (GCTP) was reviewed. The habitats within the development site were not assessed as part of the project (GCTP, 2015).

The detailed bat survey results for the N6 Galway City Transport Project were also reviewed. A Soprano pipistrelle roost (PBR42) is located approximately less than 100m to the south of the proposed development site. There is also an unidentified bat roost (PBR136) located approximately 100m north of the proposed development site. No other roosts were identified within close proximity of the proposed development.

6.5.1.8 NPWS Article 17 Habitat Datasets

The available NPWS Article 17 habitats datasets were reviewed. There were no records for any EU Annex I habitats recorded within the proposed works site.

Annex I 4110 Tidal Mudflats, 1330 Atlantic Salt Meadows and 1310 Salicornia Mudflats have been mapped approximately 150m west of the proposed development site. Annex I 8240 Limestone pavement and 6210 Orchid rich calcareous grasslands have been mapped approximately 270m northwest of the proposed development site. 6510 Lowland Hay Meadows have been mapped to the northwest and northeast of the proposed development site. This habitat mapping was originally carried out as part of the Galway City transport Project (Galway County Council, 2017).

6.5.1.9 Water Quality

The proposed development is situated entirely within the EPA River Catchment 29, Galway Bay, South East River Catchment (<https://gis.epa.ie/EPAMaps/>). There are no watercourses within or adjacent to the proposed development boundary. The site is located in one sub-catchment: the Carrowmoneash [Oranmore] sub-catchment.

The Water Framework Directive (WFD) Transitional Waterbody risk score for the section of Galway Bay closest to the development site has been assessed as “not at risk” and the water quality is classed as “unpolluted”.

The site is located in the groundwater catchment; the Clarinbridge groundwater area (IE_WE_G_0008). The Water Framework Directive (WFD) Groundwater Monitoring Programme (2013-2018) assigned the groundwater catchment as having ‘good’ status. The Clarinbridge groundwater catchment has an assigned WFD Ground Waterbody Approved Risk of ‘at risk’.

6.5.1.10 Conclusions of the Desk Study

The desktop study has provided information about the existing environment in hectad M32, within which the proposed development is located. The mammal species recorded within the relevant tetrad have widespread range and distributions in Ireland and are likely to be recorded frequently throughout Ireland. Bat records within 10km of the proposed development site revealed that the wider area has been studied for bats and that a number of bat roosts for a variety of species have been recorded in the wider area. This suggests that the area offers potential for foraging and commuting bat species. A number of protected bird species have been previously recorded within the hectad M32. The proposed development is located within close proximity to the Galway Bay Complex SAC (located approximately 136m from the development site) and Inner Galway Bay SPA (approximately 260m from the development site), but is buffered from these sites by a woodland, treelines, residential dwellings and agricultural grassland.

There are records for protected Annex I habitats from the wider area, however, there are no mapped Annex I habitats within the development site itself.

6.5.2 Results of Ecological Surveys






6.5.2.1 Description of Habitats within the Ecological Survey Area

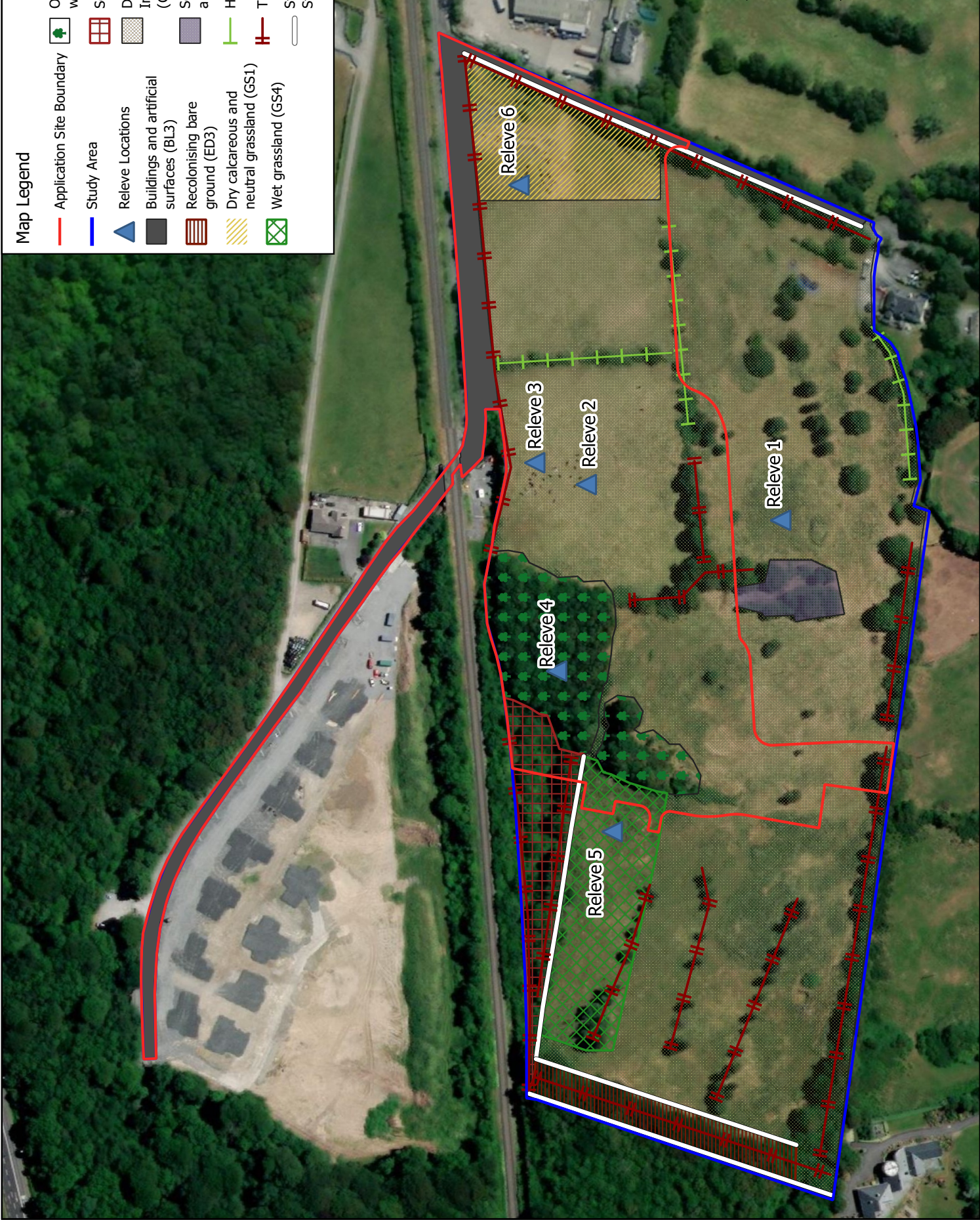
The multidisciplinary walkover survey comprehensively covered the proposed development site (the application site) as well as the wider study area. The habitats recorded during the site visit are listed in (Table 6-13). A habitat map is provided in Figure 6-4.

Table 6-13 Habitats recorded within the proposed development boundary (Fossitt, 2000)

Habitat	Code
Oak-ash-hazel woodland	WN2
Scrub	WS1
Dry calcareous and neutral grassland	GS1
Wet grassland	GS4
Treelines	WL2
Hedgerow	WL1
Stone walls and other stonework	BL1
Buildings and artificial surfaces	BL3

Map Legend

-  Application Site Boundary
-  Study Area
-  Revele Locations
-  Buildings and artificial surfaces (BL3)
-  Recolonising bare ground (ED3)
-  Dry calcareous and neutral grassland (GS1)
-  Wet grassland (GS4)
-  Oak-ash-hazel woodland (WN2)
-  Scrub (WS1)
-  Dry neutral grassland (GS1)/ Improved agricultural grassland (GA1) Mosaic
-  Scrub (WS1)/ Buildings and artificial surfaces (BL3) Mosaic
-  Hedgerows (WL1)
-  Treelines (WL2)
-  Stone Walls and other Stone Work (BL1)



Habitat Map

Project Title		SHD Rosshill	
Drawn By	AvdGM	Checked by	SM
Project No.	181058-b	Drawing No.	Fig. 6-4
Scale	1:2500	Date	29.06.2021

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The proposed development site is a former golf course. The majority of the site comprises a network of semi-improved, species poor *Dry neutral grassland (GS1)* (Plate 6-1). The dominant species was Yorkshire fog (*Holcus lanatus*). Other species present included common bent grass (*Agrostis capillaris*), rough meadow grass (*Poa trivialis*), cock's foot (*Dactylis glomerata*), creeping buttercup (*Ranunculus repens*), common sorrel (*Rumex acetosa*), curled dock (*Rumex crispus*), common mouse-ear (*Cerastium fontanum*), creeping thistle (*Cirsium arvense*) and white clover (*Trifolium pratense*). False oat grass (*Arrhenatherum elatius*), knapweed (*Centaurea nigra*), red clover (*Trifolium pratense*), selfheal (*Prunella vulgaris*), yarrow (*Alchemilla millefolium*) and smooth hawksbeard (*Crepis capillaris*) were recorded close to field boundaries. Evidence of grazing by horses was recorded during the site visits in July 2019 and site visits undertaken in 2020. A total of 4 no. relevés were taken within this habitat (refer to **Appendix 6-3** of this report for relevé data). The grassland was not found to correspond to Annex I grassland habitat as defined in O'Neill et al. 2013.

A small area of poorly-drained grassland at the north-west of the site was classified as *Wet grassland (GS4)*. Species present included Yorkshire fog, crested dog's tail (*Cynosurus cristatus*) marsh thistle (*Cirsium palustre*) and compact rush (*Juncus conglomeratus*) (Plate 6-2).

The north-eastern corner of the site consists of a relatively disturbed area with imported rock and rubble. Aerial photography was consulted and shows that the site has been subject to disturbance / clearance in this corner in the recent past. The grassland recolonising this area was classified as *Dry calcareous and neutral grassland (GS1)* (Plate 6-3). Species present included red clover, selfheal, glaucous sedge (*Carex flacca*), centaury (*Centaureum erythraea*), medick (*Medicago lupulina*), crested dog's tail, sweet vernal grass (*Anthoxanthum odoratum*), silverweed (*Potentilla anserina*), Yorkshire fog, meadow buttercup (*Ranunculus acris*), common mouse-ear, sheep's fescue (*Festuca ovina*) and tufted vetch (*Vicia cracca*). 1 no. relevé was taken within this habitat (refer to **Appendix 6-3** for relevé data). The grassland was not found to correspond to Annex I grassland as defined in O'Neill et al. 2013.

The eastern site boundary is delineated by a stone wall classified as ***Stonewalls and other stonework (BL1)***, and ***Treeline (WL2)*** comprised predominantly of ash. Field boundaries within the site are delineated by stone walls, treeline and ***Hedgerows (WL1)*** comprised of blackthorn (*Prunus spinosa*) and hawthorn. The stone walls were vegetated, predominantly with bramble (*Rubus fruticosus* agg.).

An area of woodland classified as *Oak-ash-hazel (WN2) woodland* (Plate 6-4) is present along the northern boundary of the development site towards the west of the site. Although immature ash is dominant on lower lying ground, sycamore and beech (*Fagus sylvatica*) are also frequent, particularly on more well drained higher ground. Species present in the understorey include hawthorn, hazel (*Corylus avellana*) and occasional holly (*Ilex aquifolium*). Ground flora included lesser celandine (*Ficaria verna*), lords and ladies (*Arum maculatum*), primrose (*Primula vulgaris*) and herb Robert (*Geranium robertianum*). 1 no. 10m x 10m relevé was taken in this habitat (refer to **Appendix 6-3** for relevé data). The woodland was not found to correspond to Annex I woodland habitat as defined in Perrin et al. 2008. An area of *Scrub (WS1)*, comprised of hawthorn, blackthorn and bramble (*Rubus fruticosus* agg.) with treelines to its north and south is present to the west of the woodland area.

Evidence of grazing by horses was recorded both within the grassland and woodland during the site visits.

The ruins of an old building are present directly adjacent to the southern boundary of the site. The remaining stone walls of the ruined building are categorised as ***Stonewalls and other stonework (BL1)***. The site of the ruined building has been utilised to create a modern silage pit classified as ***Buildings and artificial surfaces (BL3)***. Areas of gorse (*Ulex europaeus*) and bramble (*Rubus fruticosus* agg.) ***Scrub (WS1)***, and mature ash (*Fraxinus excelsior*) trees, are present in proximity to this area (**Error! Reference source not found.**).

None of the habitats within the works areas correspond to those listed on Annex I of the EU Habitats Directive. No watercourses were recorded within or adjacent to the development site.

The development site is located approximately 136m from Galway Bay Complex SAC and 260m from Inner Galway Bay SPA. No Annex I habitats associated with Galway Bay Complex SAC or any other SAC were recorded within the development site. The site does not support supporting wetland habitat for any SCI bird species associated with any SPA.



Plate 6-1 The majority of the site is comprised of semi-improved Dry neutral grassland (GSI).



Plate 6-2 Wet grassland (GS4) to the north-west of the site.



Plate 6-3 Dry calcareous and neutral grassland (GS1) in the north-east corner of the site.



Plate 6-4 Oak-ash-hazel woodland (WN2) within the development site close to the northern boundary.

6.5.2.2 Protected Flora

The desk study identified a number of plant species of conservation concern previously recorded within hectad M32, in which the proposed development is located. No Red Listed vascular plants or Flora Protection Order species, including those species identified in the desk study, were recorded at the development site during the site visits undertaken between April 2019 and May 2021.

6.5.2.3 Invasive Species

No invasive species listed under Regulations 49 and 50 of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011) were recorded within the proposed development site boundary.

6.5.2.4 Significance of Habitats

The habitats within and adjacent to the development site were evaluated in accordance with the criteria developed by the National Roads Authority (NRA) –outlined in *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009) which classifies sites in terms of their ecological importance, *i.e.* International Importance, National Importance, County Importance, Local Importance (Higher Value) or Local Importance (Lower Value).

None of the habitats within the works areas correspond to habitats listed on Annex I of the EU Habitats Directive.

The species poor *Dry neutral grassland (GS1)*, *wet grassland (GS4)*, *Buildings and artificial surfaces (BL3)* and vegetated *Stonewalls and other stonework (BL1)* habitats within the proposed project site were assigned *Local Importance (Lower Value)* as they are of low ecological significance and abundant in the wider area.

The area of *Dry calcareous and netural grassland (GS1)* in the disturbed, north-eastern corner of the site was assigned *Local importance (lower value)*. The area has been disturbed in the recent past and consists of imported rubble and rocks. The recolonising grassland area is small and the grassland was not found to correspond to the Annex I habitat *Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco – Brometalia)* (refer to Relevé data in **Appendix 6-3**).

The woodland *Scrub (WS1)*, *Hedgerow (WL1)* and *Treeline (WL2)* habitats were assigned *Local Importance (Higher Value)* as they help maintain links and ecological corridors between features of higher ecological value and are likely to be utilized by commuting and foraging bats. The area of *Oak-ash-hazel woodland (WN2)* was also assigned *Local Importance (Higher Value)*. Although small in area it helps maintain links to nearby larger areas of woodland. The woodland consisted of a mix of ash, sycamore, beech and hazel and was not found to correspond to any Annex I woodland habitat (refer to relevé data **Appendix 6-3**).

6.5.2.5 Fauna in the Existing Environment

6.5.2.5.1 Mammals

Non-volant mammals

A thorough survey of the development site was undertaken for mammals during the site visits undertaken in 2019, 2020 and 2021. The site is located 136m from Galway Bay Complex SAC which is designated for otter (*Lutra lutra*) and harbour seal (*Phoca vitulina*). The development site does not support suitable habitat for these species. There are no watercourses within or directly adjacent to the proposed development and the shoreline of Galway Bay is buffered from the proposed development by woodland, treelines, residential dwellings and agricultural grassland.

Numerous signs of rabbit (*Oryctolagus cuniculus*) activity, including numerous rabbit burrows and rabbit droppings, were identified throughout the site including within the woodland close to the northern boundary of the site as well as along the site's field boundaries.

A number of mammal paths were observed within the site, most notably along the sites' northern boundary and along the internal field boundaries. Evidence of fox (scats and clusters of fox hairs) was recorded within the site close to the northern boundary and along the eastern boundary of the woodland (Plate 6-5). Evidence of badger foraging (snuffle holes) was also recorded along the northern boundary of the site during site visits in 2021 (Plate 6-6).

A number of excavated burrows were recorded both within the woodland and along the eastern edge of the woodland during site visits in 2021 (Plate 6-7) (Refer to Figure 6-5 for locations). The majority were small in size (<20cm in width approx.) with abundant rabbit droppings recorded at the entrances. No signs of badger activity, including fresh bedding, spoil heaps, badger tracks, paths or latrines, were recorded at or surrounding the entrances to the burrows. However, as signs of badger activity were recorded within the wider development site, it was considered that there could be potential for some of the larger burrows to be utilised by badger, at least on occasion. Therefore, camera traps were deployed at a number of these burrows for a period of 1 week from the 26th April 2021 to the 5th May 2021 to monitor activity and determine whether any of the burrows were being utilised by badger. The footage revealed that the burrows were utilised by rabbits. This was consistent with the field signs observed which consisted of rabbit droppings at the burrow entrances. The only evidence of badger recorded on camera was a single specimen foraging in the woodland area. The badger did not enter or exist any of the burrows. The footage confirmed that the burrows are not utilised by breeding or resting badger. (Plate 6-8 and Plate 6-9).

The camera trap also recorded fox within the woodland area on multiple occasions.

A pine-marten (*Martes martes*) was observed within the development site within a small patch of scrub in 2019.



Plate 6-5 Fox scats and fox hair located close to the woodland within the site



Plate 6-6 Badger snuffle hole close to the northern boundary of the site



Plate 6-7 Examples of excavated burrows within the development site



Plate 6-8 Rabbit exiting burrow within the woodland at the development site



Plate 6-9 Rabbit exiting burrow in woodland at development site

Map Legend

- Application Site Boundary
- Study Area
- Excavated Burrows



Burrow Locations

Project Title

SHD Rosshill

Drawn By

SM

Checked By

JH

Project No.

181058-b

Drawing No.

6-5

Scale

1:2485

Date

29.06.2021

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Bats

2019

A dedicated bat survey was undertaken at the site on the 16th of April 2019 of the proposed study area. In summary, no evidence of roosting bats was recorded within the development site, including the remains of the old building, however a number of mature trees within the site provide potential roosting habitat. These trees are shown in Figure 6-6. Figure 6-7 shows the route of the transect walked during the bat survey as well as locations where bat activity was detected.

A detailed inspection of the remains of the old building was undertaken during daylight hours. No signs of bats, e.g. fur oil staining, droppings, etc. were observed during the inspection surveys. The building is open with no roof and only partial remains of the old outer walls still standing. Given the exposed nature of the building it was thus considered to be of “*Low Suitability*” for roosting bats (Collins, 2016). In addition, no bats were observed exiting or entering the remains of the building during the dusk activity surveys.

Mature trees within the development boundary were also inspected to determine whether they contained cavities and crevices suitable for roosting bats. No signs of bats were observed, however, a number of trees within and delineating the study area boundary contained ivy cover and/or small cavities and crevices and were considered to be of ‘*Moderate to High*’ suitability for bats given their roosting potential. These trees are shown in Figure 6-6.

Habitats within the proposed site were also assessed for foraging and commuting potential. Bat activity was low with a total of 27 bat passes recorded. These included Soprano pipistrelle, common pipistrelle and Leisler’s bat foraging and commuting in the area during the bat activity survey in 2019 (Plate 6-10). Treelines within and forming the proposed development boundary were assessed as *Moderate to High* Suitability for foraging and commuting bats. These habitats provide connectivity to the wider landscape including woodland to the west and north of the site.

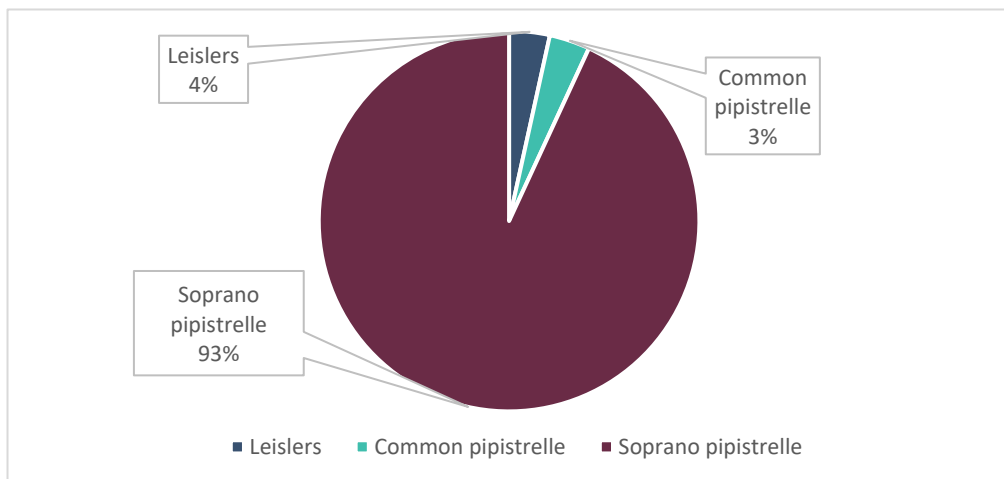


Plate 6-10 2019 Manual Transect Results

Two static detectors, were deployed on the site for one week in September 2019 (Figure 6-10), based on likely areas of bat activity. These detectors allowed a specified look into species composition, commuting and foraging activities within the site.

All recordings were later analysed using bat call analysis software Kaleidoscope Pro v.5.1.9 (Wildlife Acoustics, MA, USA). Bat species were identified using established call parameters, to create site-specific custom classifiers. All identified calls were also manually verified. In total, 338 bat passes were recorded.

Analysis of the detector recordings positively identified five bats to species level with *Myotis* genus also present. Bat species included: Soprano pipistrelle (*Pipistrellus pygmaeus*) (n=263) and Common pipistrelle (*Pipistrellus pipistrellus*) (n=25). Leisler’s bat (*Nyctalus leisleri*) (n=24) and *Myotis* sp. (n=14) were encountered less frequently. Brown long-eared bat (*Plecotus auritus*) (n=8) Nathusius’ pipistrelle (n=4) was rarely encountered, with 1% or less of total bats recorded.

Plate 6-11 shows total bat passes per detector. Rosshill-1 was located to the northeast of the site in an area of open grassland, adjacent to treelines along the eastern boundary. This area has strong linear features, providing suitable commuting and foraging opportunities for bats. Rosshill-2 was located to the southwest of the site adjacent to woodland buffering the Galway Bay Complex SAC and Inner Galway Bay SPA. This area provided opportunities for commuting and foraging as it was relatively sheltered compared to other areas within the site.

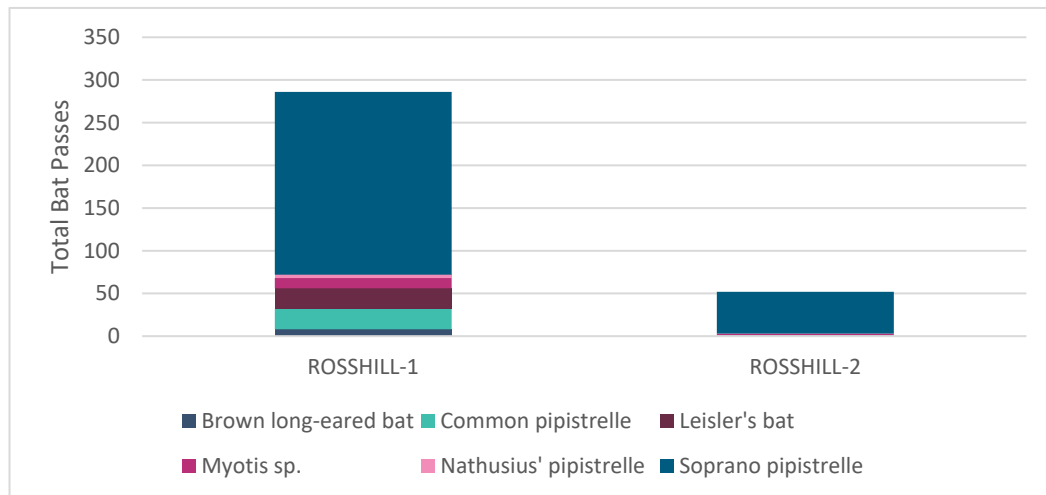


Plate 6-11 2019 Total Bat Passes Per Detector

2020

A dedicated bat survey was undertaken at the site on the 20th of September 2020. This survey focused particularly on the land within the development site boundary. No evidence of roosting bats was recorded within the development site. No signs of bats, e.g. fur oil staining, droppings, etc. were observed during the walkover survey. Figure 6-8 shows the route of the transect walked as well as locations where bat activity was detected.

Mature trees within the proposed development boundary were assessed for their potential to support roosting bats. No signs of bats were observed, however, a number of trees within and delineating the development site boundary contained ivy cover and/or small cavities and crevices and were considered to be of ‘Moderate to High’ suitability for bats given their roosting potential (refer to Figure 6-6 for the locations of trees with roosting potential).

Habitats within the proposed site were also assessed for foraging and commuting potential. Bat activity was low with a total of 78 bat passes recorded. Species present on site included, Soprano pipistrelle, common pipistrelle and Leisler’s bat which were recorded foraging and commuting in the area during the bat activity survey in 2020 (Plate 6-12). Treelines within and forming the proposed development boundary were assessed as Moderate to High Suitability for foraging and commuting bats. These habitats provide connectivity to the wider landscape including woodland to the west and north of the site.

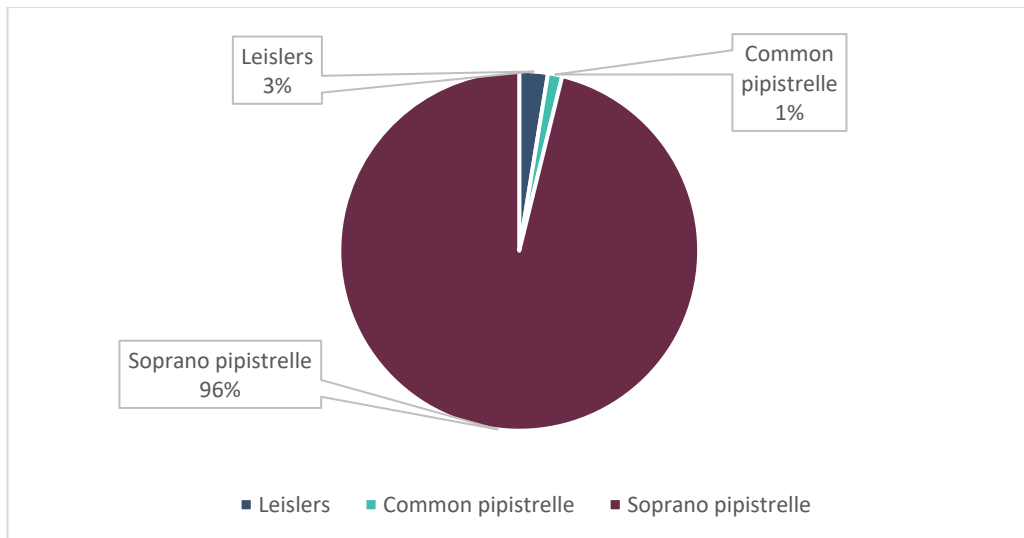


Plate 6-12 2020 Manual Transect Results

Two static detectors, were also deployed on the site for two weeks in September 2020 (Figure 6-10), based on likely areas of bat activity within the proposed development boundary. These detectors allowed a specified look into species composition, commuting and foraging activities within the site.

All recordings were later analysed using bat call analysis software Kaleidoscope Pro v.5.1.9 (Wildlife Acoustics, MA, USA). Bat species were identified using established call parameters, to create site-specific custom classifiers. All identified calls were also manually verified. In total, 9,541 bat passes were recorded.

Analysis of the detector recordings positively identified five bats to species level with *Myotis* genus also present. Bat species included: Soprano pipistrelle (*Pipistrellus pygmaeus*) (n=7,792) and Common pipistrelle (*Pipistrellus pipistrellus*) (n=1,216). Leisler’s bat (*Nyctalus leisleri*) (n=293) and *Myotis* sp. (n=179) were encountered less frequently. Brown long-eared bat (*Plecotus auritus*) (n=48) Nathusius’ pipistrelle (n=13) was rarely encountered, with 1% or less of total bats recorded.

Plate 6-13 shows total bat passes per detector. Rosshill-7049 was located along a treeline northeast of the site (Figure 6-6). Activity here was similar to the other detector (7104), which was located along the northern boundary beside an area of Oak-Ash-Hazel Woodland. These areas provided opportunities for commuting and foraging as they provide suitable linear features as well as being relatively sheltered compared to other areas within the site.

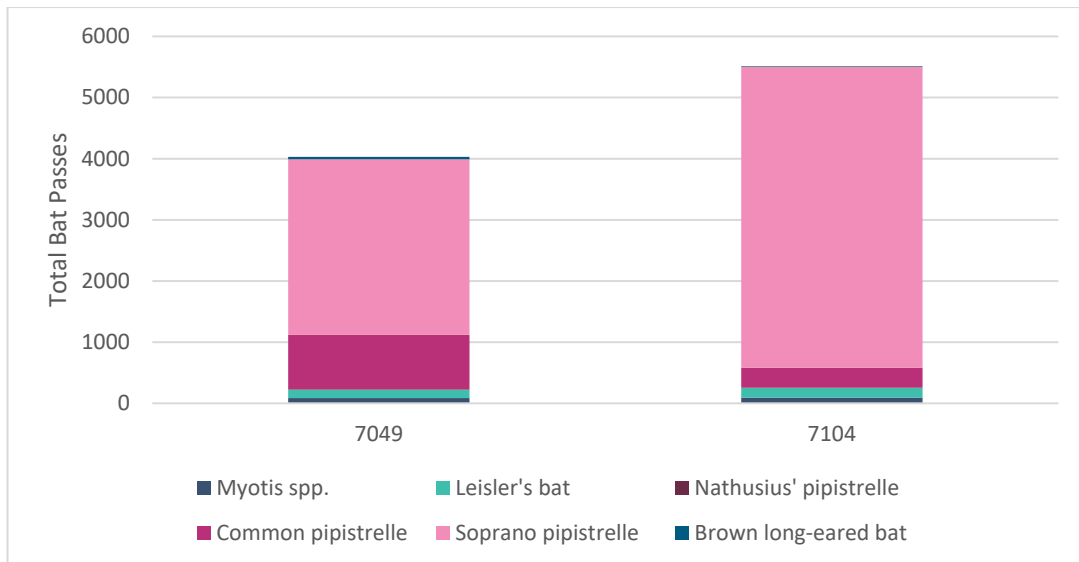


Plate 6-13 2020 Total Bat Passes Per Detector

Six bat species were recorded across the proposed development site. No roosting bats were identified within or using the derelict structure on the site. Foraging and commuting was mainly associated with woodland edge, hedgerows and treelines forming field boundaries. Overall activity within the site was relatively low.

2021

A dedicated bat survey was undertaken at the site on the 20th of April 2021. This survey focused particularly on the land within the development site boundary. No evidence of roosting bats was recorded within the development site. No signs of bats, e.g. fur oil staining, droppings, etc. were observed during the walkover survey. Figure 6-9 shows the route of the transect walked as well as locations where bat activity was detected.

Habitats within the proposed site were also assessed for foraging and commuting potential. Bat activity was low with a total of 47 bat passes recorded. Species present on site included, Soprano pipistrelle (n=27), Common pipistrelle (n=13), Leisler’s bat (n=5) and Brown long-eared bat (n=2) which were recorded foraging and commuting in the area. Plate 6-14 shows species composition during the dusk survey.

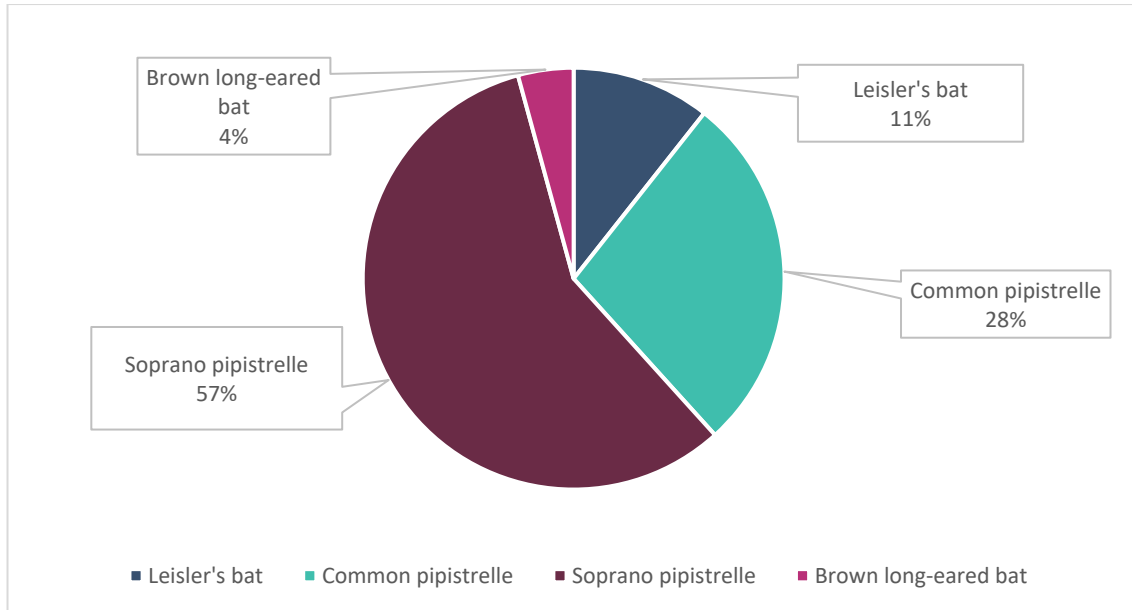


Plate 6-14 2021 Manual Transect Results

Two static detectors were also deployed on the site for one week in April 2021 (Figure 6-10), with consideration for open spaces within the site. These detectors allowed a specified look into species composition, commuting and foraging activities within the site.

All recordings were later analysed using bat call analysis software Kaleidoscope Pro v.5.1.9 (Wildlife Acoustics, MA, USA). Bat species were identified using established call parameters, to create site-specific custom classifiers. All identified calls were also manually verified. In total, 247 bat passes were recorded.

Analysis of the detector recordings positively identified four bats to species level with *Myotis* genus also present. Bat species included: Leisler’s bat (*Nyctalus leisleri*) (n=153), Soprano pipistrelle (*Pipistrellus pygmaeus*) (n=46) and Common pipistrelle (*Pipistrellus pipistrellus*) (n=36). *Myotis* sp. (n=10) and Brown long-eared bat (n=2) were encountered less frequently.

Plate 6-15 shows total bat passes per detector. D-3087 was located in an open area beside a single tree to the west of the site (south western site boundary) (Figure 6-7). Activity here was higher than the other detector (D-3248), which was located along an area of scrub along the southern boundary. D-3037 is located to the south of the oak-ash woodland and is surrounded by treelines on either side. There are some suitable linear habitat features adjacent to D-3248, however this particular area is relatively exposed compared to treelines and woodland habitats within the site. Overall, activity at these locations within the site was similar to those in April 2019 and significantly lower than the survey in September 2020.

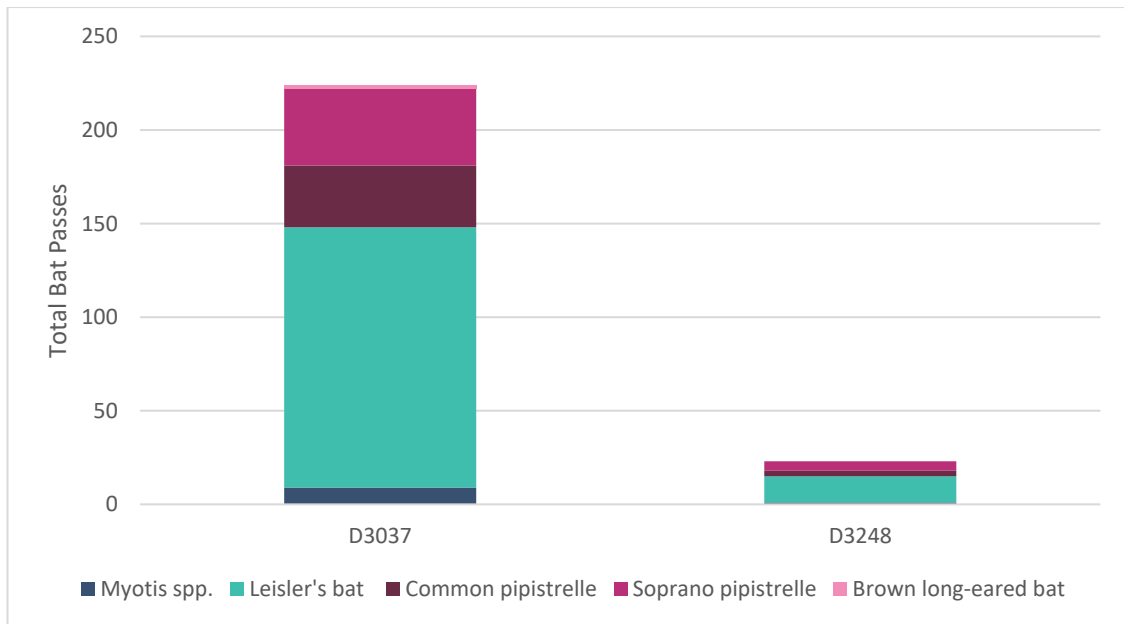


Plate 6-15 2021 Total Bat Passes Per Detector

Five bat species were recorded across the proposed development site in 2021. No roosting bats were identified within or using the derelict structure on the site. Foraging and commuting was mainly associated with woodland edge, hedgerows and treelines forming field boundaries. Overall activity within the site was relatively low.

The results of the bat surveys, carried out in 2019, 2020 and 2021 indicate that the proposed development site does not provide significant suitable habitat for a roosting bat population of ecological significance. Mature treelines, hedgerows and woodland edge habitats provide suitable commuting and foraging habitats throughout the site. The majority of mature trees are being retained as part of the proposed development.

Taking the above information into consideration and having regard to the precautionary principle, it is considered that the proposed development will not result in the significant loss of habitats of high ecological significance and will not have any significant impacts on the ecology of the wider area.

Provided that the proposed development is constructed and operated in accordance with the design, best practice and mitigation that is described within this report; no significant impacts on local bat populations will occur at any geographic scale.

Map Legend

-  Application Site Boundary
-  Study Area
-  Moderate - High suitability trees for roosting bats
-  Moderate - High suitability trees for roosting bats



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Drawing Title Trees with Suitable Bat Roosting Habitat	
Project Title SHD Rosshill	
Drawn By SM	Checked By JH
Project No. 181058-b	Drawing No. 6-6
Scale 1:2485	Date 01.07.2021

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Map Legend

- Application Site Boundary
- Study Area
- 2019 Transect Route
- 2019 Bat Activity**
- Leisler's bat
- Common pipistrelle
- Soprano pipistrelle

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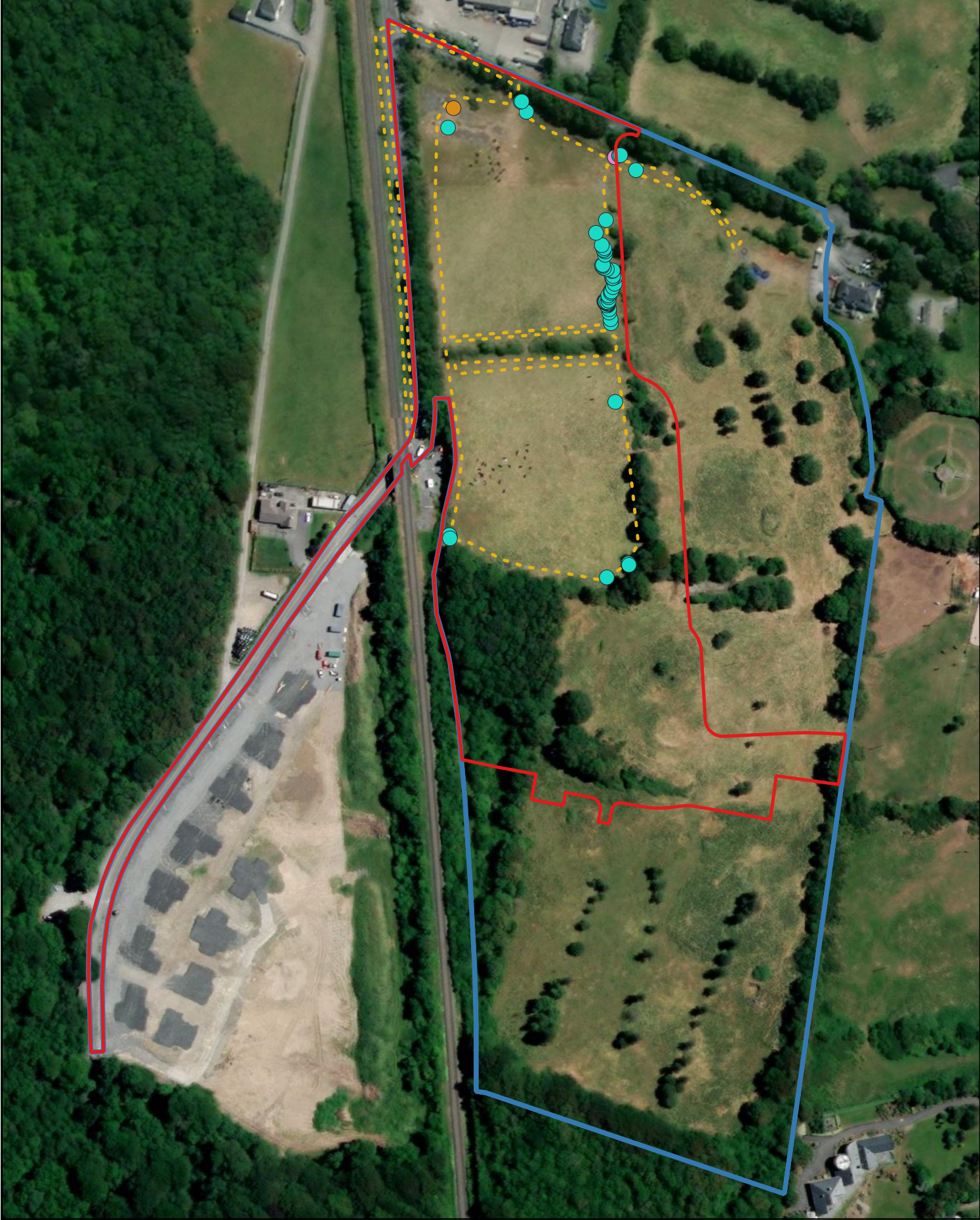


2019 Manual Bat Results

Project Title		SHD Rosshill	
Drawn By	AJ	Checked By	JH
Project No.	181058-b	Drawing No.	6-7
Scale	1:2485	Date	01.07.2021

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Map Legend

- Application Site Boundary
- Study Area
- 2020 Transect Route
- 2020 Bat Activity**
- Leisler's bat
- Common pipistrelle
- Soprano pipistrelle

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2020 Manual Bat Results

Drawing Title		SHD Rosshill	
Drawn By	AJ	Checked By	JH
Project No.	181058-b	Drawing No.	6-8
Scale	1:2485	Date	29.06.2021

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Map Legend

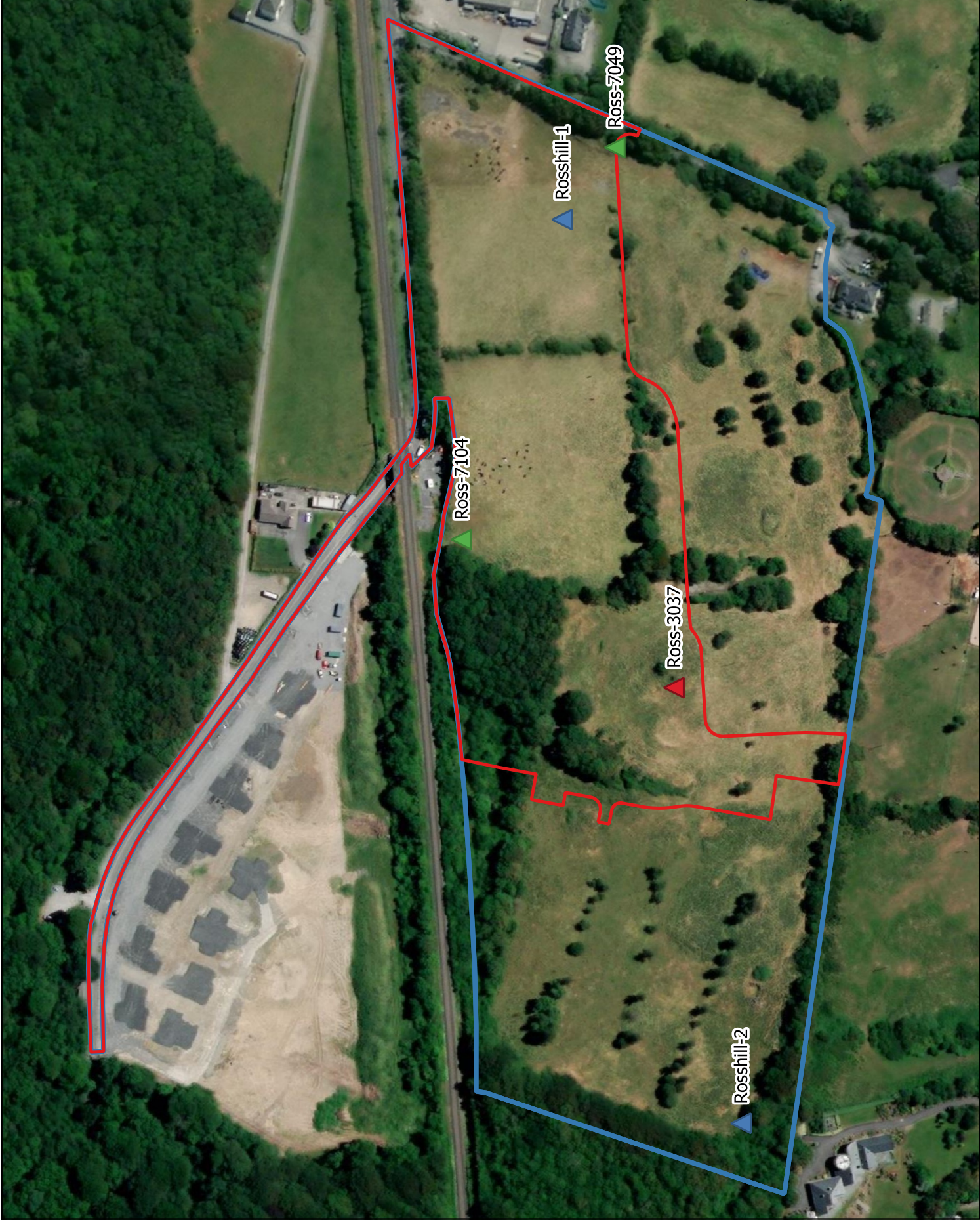
- Application Site Boundary
 - Study Area
 - 2021 Transect Route
- 2021 Bat Activity**
- Leisler's bat
 - Common pipistrelle
 - Soprano pipistrelle
 - Brown long-eared bat

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Drawing Title		2021 Manual Bat Results	
Project Title		SHD Rosshill	
Drawn By	AJ	Checked By	JH
Project No.	181058-b	Drawing No.	6-9
Scale	1:2485	Date	29.06.2021

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Map Legend

- Application Site Boundary
- Study Area
- Static Detector locations
 - ▲ 2021
 - ▲ 2020
 - ▲ 2019

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Static Detector Locations

Drawing Title		SHD Rosshill	
Drawn By	AJ	Checked By	JH
Project No.	181058-b	Drawing No.	6-10
Scale	1:2485	Date	29.06.2021

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6.5.2.5.2 Birds

Bird species recorded within the proposed development site during walkover surveys included common species such as blackbird (*Turdus merula*), robin (*Erithacus rubecula*), magpie (*Pica pica*) and bullfinch (*Pyrrhula pyrrhula*), chaffinch (*Fringilla coelebs*), wood pigeon (*Columba palumbus*), great tit (*Parus major*), jackdaw (*Corvus monedula*), hooded crow (*Corvus cornix*), wren (*Troglodytes troglodytes*), blue tit (*Parus caeruleus*), pied wagtail (*Motacilla alba yarrellii*) and meadow pipit (*Anthus pratensis*). blue tit (*Parus caeruleus*), pied wagtail (*Motacilla alba yarrellii*) and meadow pipit (*Anthus pratensis*).

The development site is located approximately 260m from Inner Galway Bay SPA which is designated for a number of wintering and reproducing wetland bird species. Although the development site does not support suitable wetland habitat for the SCI bird species for which the SPA is designated, dedicated winter bird surveys of the site were undertaken between October 2020 and March 2021.

2020 – 2021 Winter Bird Surveys

Dedicated winter bird surveys were undertaken monthly between October 2020 and March 2021. The full details of the winter bird surveys are contained within the Winter Bird Survey report in **Appendix 6-2** of this document and are summarised below.

No species listed as Special Conservation Interests (SCIs) for Inner Galway Bay SPA were recorded roosting or feeding within the proposed development site during the dedicated bird surveys.

There were three observations of SCI species flying over the site, including eight black-headed gulls, ten herring gulls, eight curlew and one grey heron. These species were not recorded using the habitats within the proposed development.

A section of Inner Galway Bay, approximately 600m to the south west of the development was also surveyed. The vantage point overlooked an area of tidal mudflat in order to record bird distribution during high and low tide and to determine whether birds listed as Special Conservation Interests of the Inner Galway Bay SPA may utilize the habitats within the development site. No movements of wintering wildfowl between the SPA and the proposed development site were observed.

The majority of the birds recorded within the site boundary and in the surrounding habitat during the winter bird surveys were an assemblage of common birds that are typical of the grassland, woodland and hedgerow habitats found within the wider area. Species recorded within the development site during the winter bird surveys included common farmland species; magpie (*Pica pica*), robin (*Erithacus rubecula*), wood pigeon (*Columba palumbus*), wren (*Troglodytes troglodytes*), long-tailed tit (*Aegithalus caudatus*), Great tit (*Parus major*), Dunnock (*Prunella modularis*), Hooded crow (*Corvus cornix*), Blackbird (*Turdus merula*), Bullfinch (*Pyrrhula pyrrhula*), Pheasant (*Phasianus colchicus*), Raven (*Corvus corax*), Redwing (*Turdus iliacus*), Starling (*Sturnus vulgaris*), Song thrush (*Turdus philomelos*), Pied wagtail (*Motacilla alba yarrellii*) and Mistle thrush (*Turdus viscivorus*).

A Peregrine falcon (*Falco peregrinus*) was recorded flying through the western section of the site in October 2020 and a kestrel (*Falco tinnunculus*) was recorded flying over the site and hunting in woodland to the west of and outside the development boundary a number of times between December 2020 and February 2021.

The results of the winter bird surveys indicate that the proposed development site does not provide significant habitat for wintering wildfowl or waders listed as SCIs for the Galway Bay Inner SPA. Habitats within the site consist primarily of dry neutral grassland (GS1), hedgerow (WL1) and treeline

(WL2). Species listed as SCIs for the Inner Galway Bay SPA are unlikely to depend on the habitats within the development site.

6.5.2.5.3 Other Faunal Taxa

The desk study identified records for the Annex II species marsh fritillary (*Euphydryas aurinia*) in the 10km hectad, M32, within which the proposed development is located. Therefore the site was assessed for suitable marsh fritillary habitat during the site visits between April 2019 and May 2021. The site was searched for devil's bit scabious (*Succisa pratensis*), the host plant for marsh fritillary. No devil's bit scabious was recorded within the proposed development site and no suitable habitat for marsh fritillary was recorded.

No evidence of any other protected faunal taxa was recorded on the site of the proposed development. No watercourses were present on the site and the habitats are typical of low intensity grazing and agricultural abandonment.

6.5.2.6 Significance of the Fauna

Based on the findings of the desk study, the species recorded within the site and the habitat composition, the proposed development site provides suitable habitat for commuting and foraging bat species of *Local Importance (Higher value)*. All bat species are listed on Annex IV of the EU Habitats Directive. The linear landscape features, including mature trees, within the site are likely to be utilized by bat populations of *Local Importance (Higher Value)*.

Peregrine falcon is listed on Annex I of the of the EU Birds Directive. Kestrel is red listed on the Bird of Conservation Concern Ireland- Red list. The site is likely to be utilized for hunting/flying by local populations of *Local Importance (Higher Value)*.

Badger is protected under the Irish Wildlife Act. No active badger setts were recorded within the proposed development site, however, signs of badger foraging activity, i.e. snuffle holes, were recorded within the site boundary and a single badger was recorded on one of the camera traps. Although no evidence of badger utilising excavated burrows within the development site was recorded there is potential that badger could occupy the site at some time in the future. The site is likely to be utilised by a local population of *Local importance (higher value)*.

Pine marten is listed on Annex V of the EU Habitats Directive and is also protected under the Irish Wildlife Act.

The site and surrounding area provide habitat and structural diversity for a wide range of common bird, mammal and invertebrate species and provide biodiversity in the local context. This assemblage of species is assigned *Local Importance (Higher Value)*.

The field visit found no evidence of the site of the proposed development providing significant habitat for any other protected faunal taxa.

6.5.2.7 Importance of Ecological Receptors

Table 6-14 lists all identified receptors and assigns them an ecological importance in accordance with the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009). This table also provides the rationale for this determination and identifies the habitats that are Key Ecological Receptors

Table 6-14 Importance of Ecological Receptors

Habitat and Geographic Importance	KER Y/N	Rationale
Habitats		
Habitats of Local Importance (Higher value): <ul style="list-style-type: none"> ➤ Oak-ash-hazel woodland (WN2) ➤ Treeline (WL1) ➤ Hedgerow (WL2) ➤ Scrub (WS1) 	Yes	<p>These habitats are classified as of <i>Local Importance (Higher value)</i> as they help maintain links and ecological corridors between features of higher ecological value and are likely to be utilized by commuting and foraging bats and other faunal species.</p> <p>These habitats are therefore included as KERs.</p>
Habitats of Local Importance (Lower value): <ul style="list-style-type: none"> ➤ Dry calcareous and neutral grassland (GS1) ➤ Dry neutral grassland (GS1) ➤ Wet grassland (GS4) ➤ Stone Walls and Other Stonework (BL1) ➤ Buildings and artificial surfaces (BL3) 	No	<p>These habitats are classified as of <i>Local Importance (Lower value)</i> as they are highly modified and/or are common and widespread in a local, national and international context.</p> <p>These habitats are therefore, not included as KERs.</p>
Fauna		
Bats – Local Importance (Higher value)	Yes	<p>Based on the information identified within the desk study, the assessment of the habitats and features on site during the site visit, and the results of the bat survey, bat species have been identified as of <i>Local Importance (Higher value)</i>.</p> <p>The woodland/treelines/hedgerows and scrub edge habitats within and adjacent to the proposed development may be used by commuting and foraging bats as they provide connectivity with the wider landscape.</p> <p>Roosting bats have also been identified in close proximity to the proposed development site. It is likely that these bats utilise the site for commuting and foraging.</p>
Badger – Local Importance (Higher value)	Yes	<p>Badger are protected under the Irish Wildlife Act. The site is likely to be utilised by a population of <i>Local importance (higher value)</i> for foraging. Although only rabbits were recorded utilising any of the excavated burrows within and along the eastern edge of the woodland, there is potential that badger could occupy the site at some time in the future. Badger are therefore included as a KER.</p>
Birds – Local Importance (Higher value) to International Importance	Yes	<p>The site was utilised by a bird population of <i>Local importance (higher value)</i>. The species assemblage was typical of the grassland and woodland habitats on site. SCI species were not dependent on the site for foraging, breeding or roosting.</p> <p>Although peregrine and kestrel were recorded flying over and adjacent to the proposed development, there is no nesting habitat for</p>

		<p>peregrine within the site. Suitable habitat for kestrel is common and widespread in the wider area.</p> <p>Birds of <i>Local importance (Higher value)</i> are included as a KER.</p>
Pine marten – Local Importance (Higher value)	No	<p>Pine marten is listed on Annex V of the EU Habitats Directive and is also protected under the Irish Wildlife Act. An incidental observation of one pine marten was recorded within the proposed development site. The site is likely to be utilized on occasion by a local population of <i>Local Importance (Higher Value)</i>. However, the site does not provide significant suitable habitat for breeding pine marten and are therefore, not included as a KER.</p>
Rabbit – Local Importance (Lower value)	No	<p>Signs of rabbit activity, including numerous rabbit burrows and rabbit droppings, were identified within and surrounding the woodland close to the northern boundary of the site as well as along the site and field boundaries.</p> <p>Rabbits are classified as <i>Local Importance (Lower value)</i> as they are common and widespread in the local and wider landscape and are therefore, not included as KERs.</p>
Designated Sites		
Galway Bay Complex SAC <i>International Importance</i>	Yes	<p>This SAC is located 136m from the development site. Taking a precautionary approach, there is potential for the proposed development to significantly affect this European Site through water pollution and thus it is included as a KER.</p>
Inner Galway Bay SPA <i>International Importance</i>	Yes	<p>This SPA is located approximately 260m from the site of the proposed development. Taking a precautionary approach, there is potential for the proposed development to significantly affect this European Site through water pollution and disturbance of SCI bird species and thus it is included as a KER.</p>
Galway Bay Complex pNHA <i>National Importance</i>	Yes	<p>This pNHA is located 136m from the development site. Taking a precautionary approach, there is potential for the proposed development to significantly affect this site through water pollution and therefore it is included as a KER.</p>

6.6 Ecological Impact Assessment

6.6.1 Do Nothing Effect

The site of the proposed development is dominated by species poor, grazed dry neutral grassland, with a small area of woodland along the northern boundary. If the proposed development were not to go ahead, it is likely that the development site would remain under its current management regime i.e. agricultural practices.

6.6.2 Impacts During Construction

Effects on the key ecological receptors (KERs) as defined in the preceding sections, during the construction phase of the proposed development are described in the sections below.

6.6.2.1 Impacts on Habitats

The development footprint will result in the permanent loss of species-poor semi-improved dry neutral grassland, species poor wet grassland, dry calcareous and neutral grassland, and stone walls and buildings and artificial surfaces, considered to be of *Local Importance (Lower value)*. Loss of these habitats to the footprint of the proposal is not considered to be significant at any geographic scale. These habitats are common and widespread in the locality and have a low biodiversity value.

The dry calcareous and neutral grassland is small in area and occurs where there has been recent disturbance of soil and imported rubble. The grassland recolonising this area does not correspond to the Annex I habitat Semi-natural dry grasslands (*Festuco-Brometalia*) [6210]. No mitigation is proposed for the loss of this habitat. The effect is assessed a permanent non-significant negative impact on a receptor of *Local Importance Lower Value*. Significant effects on these habitats, as a result of the proposed development, are not anticipated.

The loss, degradation or fragmentation of habitats that have been identified as Key Ecological Receptors to facilitate construction is described in the following sections.

6.6.2.1.1 Habitats of Local Importance Higher Value

Oak-ash-hazel woodland

Table 6-15 Impacts on Oak-ash-hazel woodland

Description of Effect	While the vast majority of the woodland on the site will be retained, the proposed development will result in the loss of approximately 0.03 ha (15 trees approx.) of the edge of the Oak-ash-hazel woodland consisting of a mix of native and non-native species close to the northern boundary of the site.
Characterisation of unmitigated effect	In the absence of mitigation, the loss of 0.03ha of mixed Oak-ash-hazel woodland constitutes a slight permanent negative effect on the habitat within the site. Whilst this habitat does not correspond to any Annex I Habitat, it adds considerable biodiversity value to the site. It also contributes to the ecological and habitat connectivity throughout the site and within the wider area. However, given the very small area of woodland edge to be lost and the presence of similar habitat in the wider area, the loss of oak-ash-hazel woodland is considered to be a permanent slight negative impact at the local scale.
Assessment of Significance prior to mitigation	The loss of 0.03 ha of this habitat is not significant at any geographic scale

Mitigation/Compensation	<p>The development has been designed to retain the vast majority of the woodland within the site boundary and to maintain connectivity with the woodland to the west of the study area, with only a small section of the woodland’s eastern edge to be lost to the development. Whilst no significant loss of woodland will occur, a landscaping plan has been prepared for the proposed development which provides for the replanting of native woodland habitat within the development site to ameliorate any tree loss and to maintain connectivity with the wider landscape.</p> <p>Mitigation</p> <ul style="list-style-type: none"> ➤ A landscaping plan has been prepared for the proposed development (Refer to Appendix 6-4) which includes for the planting of a linear strip of native woodland (70 trees approx.) along the site’s northern boundary to ameliorate any tree loss and ensure there is no net loss in suitable ecological habitat features. ➤ Planting will use predominantly native species found in the wider area. ➤ Access pathways through the woodland will be constructed using a minimalist intervention approach to ensure the preservation of woodland trees. The path will be constructed using a non-dig method using a combination of timber sleepers, cellweb system and gravel to ensure increased access to the root protection areas of the trees occurs in a manner not detrimental to the trees. The pathway will be constructed in a meandering manner so as to avoid the felling of existing trees. ➤ The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site. ➤ Trees to be retained will be protected in accordance with BS: 5837 (Trees in relation to Construction).
Residual Effect following Mitigation	<p>Following the implementation of the mitigation as described above no significant residual effects are anticipated.</p>
Potential for Cumulative Effect	<p>The proposed development will not result in any permanent or long-term loss of woodland habitat. It therefore cannot contribute to any significant cumulative effect in this regard</p>

Treeline and Hedgerow

Table 6-16 Impacts on hedgerow and treeline

Description of Effect	<p>The proposed development will result in the loss of sections of treeline along the site’s eastern and northern boundaries as well as the loss of short sections of treeline and scattered trees to the south of the oak-ash-hazel woodland. The treelines to be lost consist of a mix of ash, sycamore and beech. Approximately 250m of treeline comprising approximately 26 trees will be lost in total.</p> <p>Approximately 87m of hedgerow bisecting the centre of the site will also be removed.</p>
Characterisation of unmitigated effect	<p>The loss hedgerow and treeline constitutes a permanent negative effect on these habitats respectively. This is not reversible as it is within the construction footprint.</p> <p>The loss of treeline and hedgerow habitat is considered to be a permanent moderate negative impact at the local scale.</p>

Assessment of Significance prior to mitigation	This effect is not significant at any geographic scale Significant effect.
Mitigation	<p>Mitigation</p> <ul style="list-style-type: none"> > A landscaping plan has been prepared for the proposed development (refer to Appendix 6.4). The plan includes for the planting of trees and treelines (>55 native trees in addition to the native woodland to be planted within the site as described in Table 5.15 above) throughout the site to ameliorate any tree loss and to maintain connectivity to the wider area. Additional street trees will also be planted throughout the site. The number of trees to be planted within the site far outnumbers the number of trees to be lost and there will be no net loss in suitable ecological habitat features. > Planting will use predominantly native species found in the wider area. > The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site. > Trees to be retained will be protected in accordance with BS: 5837 (Trees in relation to Construction).
Residual Effect following Mitigation	Following the implementation of the mitigation as described above, the impact on treelines and hedgerows is reduced to a permanent slight negative effect. There will be no significant residual effect on linear landscape features at any geographic scale as a result of this development.
Potential for Cumulative Effect	The proposed development will not result in any permanent or long term loss of linear landscape features. It therefore cannot contribute to any significant cumulative effect in this regard

6.6.2.2 Impacts on Fauna

The potential impacts on faunal species that have been identified as Key Ecological Receptors to facilitate construction of the proposed development is described in the following sections.

6.6.2.2.1 Bats

Table 6-17 Impacts on Bats During Construction

Description of Effect	<p>Habitat Loss</p> <p>Mature trees within the development boundary were inspected to determine their suitability for roosting bats. No signs of bats were observed, however, a number of trees within and delineating the development site boundary contained ivy cover and/or small cavities and crevices and were considered to be of <i>'Moderate to High'</i> suitability for bats given their roosting potential.</p> <p>Where possible treelines will be retained, however, the development will result in the loss of sections of treeline and hedgerow within and delineating the boundaries of the proposed development site. Consequently, there is potential for loss of bat roosting habitat where high-quality trees are proposed to be removed.</p>
	<p>Habitat Fragmentation</p> <p>Treelines and hedgerow within and forming the proposed development boundary were assessed as <i>Moderate to High</i> suitability for foraging and commuting bats. These habitats</p>

	<p>provide connectivity to the wider landscape including woodland to the west and north of the site.</p> <p>The loss of these landscape features during construction could result in the fragmentation of foraging and commuting corridors for bat species.</p>
	<p>Disturbance</p> <p>Construction of the proposed development will result in increased human activity, noise and lighting within the proposed development site. Therefore, the potential for disturbance to bats requires consideration.</p> <p>However, the proposed development is bordered by existing residential and commercial developments to the southeast as well as busy local roads and railways to the east and north. It is likely that bat species in the area are accustomed to some levels of disturbance. In the absence of appropriate design, the development has the potential to disturb bats by illumination of commuting and foraging areas.</p>
<p>Characterisation of unmitigated effect</p>	<p>The construction of the proposed development has the potential to result in Short-Term Slight Negative effect on the local bat populations in the form of habitat loss, disturbance or direct mortality.</p>
<p>Assessment of Significance prior to mitigation</p>	<p>Significant effects on bats are not anticipated at any geographic scale during the construction of the proposed development.</p>
<p>Mitigation</p>	<p>Habitat Loss</p> <ul style="list-style-type: none"> • A landscape management plan has been designed to minimise habitat loss within the proposed development site. • Habitat loss will be minimised by temporarily fencing off the construction site during the construction phase of the development and not permitting any construction activity outside this fence. • A pre-construction survey will be undertaken on all trees with suitable potential roost features, to be felled, by a qualified ecologist prior to any works, to ensure there are no roosting bats. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the surveys in 2019 and 2020. • If bats are found to be roosting in any of the structures during the pre-commencement surveys, a bat derogation licence will be obtained, and further mitigation prescribed by a licenced ecologist. <p>Fragmentation</p> <p>Where removal of trees or hedgerows is unavoidable, additional hedgerow or tree planting will be carried out using predominantly native species. This has been incorporated into the Landscape Plan. There will be not net loss of linear landscape connectivity</p> <p>Disturbance</p> <p>The majority of works, during the construction phase, will occur during daylight hours. Therefore, there will be no requirement for exterior lighting within the site. Where lighting is unavoidable (i.e. health and safety), low-intensity lighting and motion sensors will be used to limit illumination. Exterior lighting, during construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the proposed development, and consequently on bats i.e. Lighting will be directed away from mature trees/hedgerows/treelines around the periphery of the site boundary to minimize disturbance to bats.</p>

	Directional accessories will be used to direct light away from these features, e.g. through the use of light shields (Stone, 2013). The luminaries will be of the type that prevent upward spillage of light and minimize horizontal spillage away from the intended lands.
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant effects are predicted.

6.6.2.2.2 Badger

Table 6-18 Impacts on Badger During Construction

Description of Effect	<p>Habitat Loss/fragmentation</p> <p>There will be some minimal loss of suitable badger foraging habitat, i.e. semi-improved grassland, hedgerow and woodland edge habitat. However, overall connectivity with the wider landscape will be maintained.</p> <p>There will be no loss of badger breeding or resting sites associated with the development.</p>
	<p>Disturbance</p> <p>There are no resting or breeding sites in the proposed development site. The species does occur in the area, however, no significant disturbance related impacts are predicted. Badger are nocturnal in nature and unlikely to be disturbed by the proposed construction works.</p>
Characterisation of unmitigated effect	<p>Habitat Loss/Fragmentation</p> <p>The loss of the foraging habitat is not considered to be significant given the scale of the proposed development footprint and the extensive area of available habitat in the wider area.</p>
	<p>Disturbance</p> <p>Badgers are nocturnal in nature. Therefore no significant effects on this species during the construction stage are anticipated.</p>
Assessment of Significance prior to mitigation	<p>Habitat Loss/Fragmentation</p> <p>No significant overall loss or fragmentation of badger foraging habitat is anticipated at any geographic scale.</p>
	<p>Disturbance</p> <p>Significant effects on badger are not anticipated at any geographic scale during the construction of the proposed development.</p>

Mitigation	<ul style="list-style-type: none"> ➤ A pre-construction badger survey of the development site will be undertaken by a suitably qualified ecologist prior to the commencement of any works to determine if badger have occupied the site. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the surveys in 2019, 2020 and 2021. ➤ If potential setts are identified within 50m of the development they will subsequently be monitored for a minimum period of 2 weeks using remote cameras in order to ascertain use by badgers and levels of activity. All badger survey work will be undertaken in line with current best practice guidance¹. ➤ Should the pre-construction survey identify badger have occupied the site, it will be necessary to apply to NPWS for a licence prior to undertaking any works. ➤ All conditions within the licence will be adhered to and further mitigation prescribed by a licenced ecologist. <p>All works will be completed during daylight hours and there will be no requirement for artificial lighting at any stage of the proposed construction works.</p>
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant effects are predicted.

6.6.2.2.3 Birds

Table 6-19 Impacts during the construction phase on Birds of Local Importance (Higher value)

Description of Effect	Habitat Loss / degradation
	The footprint of the proposal will result in the loss of approximately 0.03ha of woodland habitat along with short sections of hedgerow and tree line. These provide good nesting habitat for a range of common bird species.
Characterisation of unmitigated effect	Disturbance
	The loss of the woodland, hedgerow and tree line throughout the site has the potential to result in disturbance to birds and potentially to cause mortality to juvenile birds in the nest.

¹ National Roads Authority (2006) Guidelines for the treatment of badgers prior to the construction of National Road Schemes.

	<p>considered to be a slight effect on this receptor of local importance due to the presence of large areas of suitable habitat in the wider area.</p>
	<p>Disturbance</p> <p>In the absence of mitigation, the loss of woodland and linear features has the potential to result in a short-term negative effect on nesting bird species. The magnitude of this impact has the potential to be moderate if the works result in mortality of young birds in the nest.</p>
Assessment of Significance prior to mitigation	<p>Habitat Loss</p> <p>There is no potential for significant effects on this species as a result of habitat loss</p>
	<p>Disturbance</p> <p>There is potential for significant effects on this species as a result of disturbance.</p>
Mitigation	<p>Habitat Loss</p> <p>In order to mitigate for the loss of a small area of woodland, trees and hedgerow it is proposed to plant and maintain additional areas of native woodland and trees within the site boundary.</p>
	<p>Disturbance</p> <p>Where possible, all cutting of trees, scrub and tall vegetation will be undertaken outside the bird nesting season which runs from the 1st March to the 31st August. Any cutting of vegetation that may be required outside the season described above will be supervised by a suitably qualified ecologist to ensure that no birds nests are present. Should nesting birds be encountered, the trees will be left until nesting activity has concluded.</p>
Residual Effect following Mitigation	<p>Habitat Loss – No significant effect</p>
	<p>Disturbance – No significant effect.</p>
Potential for Cumulative Effect	<p>Habitat Loss</p> <p>The proposed development will not result in any significant effect in regard to habitat loss for otter. It therefore cannot contribute to any cumulative effect in this regard.</p>
	<p>Disturbance</p> <p>The proposed development will not result in any significant effect in regard to disturbance to otter. It therefore cannot contribute to any cumulative effect in this regard.</p>

6.6.2.3 Impacts on Water Quality

The potential for impacts on water quality is detailed in full in Chapter 8 of this EIAR. The chapter concluded that:

“Overall the proposal presents no significant impacts to surface water and groundwater quality provided the proposed mitigation measures are implemented.

There will be no net impact on the local hydrological regime, groundwater levels, or groundwater flowpaths during the construction and operational phase of the proposed development. There will be no direct or indirect hydrological impacts on the Galway Bay SAC.

No significant cumulative impacts on groundwater or designated sites are anticipated”.

Table 6-20 Impacts on Water Quality During Construction

<p>Description of Effect</p>	<p>No watercourses were identified within the proposed development site. Galway Bay is buffered from the proposed development by woodland, treelines, grassland and residential dwellings, however, in the absence of mitigation there is potential for pollution of surface and ground waters in Galway Bay as a result of pollution arising from construction activities.</p>
<p>Characterisation of unmitigated effect</p>	<p>In the absence of best practice design and mitigation the potential impact on water quality is considered to be a temporary moderate negative impact.</p>
<p>Assessment of Significance prior to mitigation</p>	<p>Significant effects on water quality are not anticipated at any geographic scale during the construction of the proposed development.</p>
<p>Mitigation</p>	<p>Surface Water</p> <ul style="list-style-type: none"> ➤ A CEMP has been prepared for the proposed development and is included as Appendix 4-2 of the EIAR. The CEMP incorporates the mitigating principles to ensure that the work is carried out in a manner which blocks all potential pathways for adverse water quality impacts. The CEMP will be in place prior to the start of the construction phase of the project. ➤ Prior to the commencement of earthworks, silt fencing will be placed down-gradient of the construction areas. Fences will be embedded into the local soils to ensure all site water (should any arise) is captured and filtered; ➤ As construction advances there may be a small requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge; ➤ Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing; ➤ Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present; ➤ No pumped construction water will be discharged directly into any local watercourse; ➤ Daily monitoring and inspections of site drainage during construction will be completed; ➤ Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation of watercourses; ➤ Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides information on these issues. This will ensure that surface

	<p>water arising during the course of construction activities will contain minimum sediment.</p> <p>Groundwater</p> <p>The use of hydrocarbons during the construction process can result in the potential for pollution and accidental spillage to groundwater. The following measures have been built into the construction design phase of the project.</p> <ul style="list-style-type: none"> > On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. > Only designated trained and competent operatives will be authorised to refuel plant on site. > Vehicles will never be left unattended during refuelling > Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations; > Fuels stored on site will be minimised. Any storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction; > The plant used will be regularly inspected for leaks and fitness for purpose; > Spill kits will be available to deal with accidental spillages. > The following guidelines and documents will inform the detailed planning of the works phase: <ul style="list-style-type: none"> ○ Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA) in particular; ○ C532 Control of water pollution from construction sites: guidance for consultants and contractors (Masters-Williams et al, 2001); and ○ SP156 Control of water pollution from construction sites - guide to good practice (Murnane et al, 2002). ○ Requirements for the protection of fisheries habitat during construction and development works at river sites developed by the ERFB. http://www.fisheriesireland.ie/Research/recent-publications.html. <p>In addition, standard best practice environmental control measures will also be incorporated in the Construction Environmental Management Plan (CEMP).</p>
<p>Residual Effect following Mitigation</p>	<p>With the implementation of the prescribed mitigation measures, no significant effects are predicted.</p>

6.6.3 Impacts During Operational Phase

6.6.3.1 Change of Habitat Use

There will be no additional habitat loss associated with the operational phase of the proposed development.

6.6.3.2 Disturbance to Fauna

The operational phase of the proposed development will be permanent. The proposed development provides 102 residential housing units in the Rosshill area. The development will result in some increased activity in the area as well as increased lighting and noise.

In the absence of best practice design, the lighting associated with the development has the potential to disturb foraging and commuting activity for bats as well as other fauna including badger that utilise the wider woodland area. In the absence of mitigation, this is considered to be a potential moderate effect.

No suitable habitat for QI species for the adjacent Galway Bay Complex SAC, harbor seal or otter, was identified on site during the site visits. There are no watercourses within the development site and the site is buffered from suitable marine habitat by woodland, treelines, agricultural grassland and residential dwellings. There is no potential for disturbance effects on these species during the operational stage of the development.

No SCI bird species associated with Inner Galway Bay SPA were recorded roosting or foraging within the site during winter bird surveys carried out between October 2020 and March 2021. The development site is extensively buffered from wetland habitat in the SPA by woodland, treelines, agricultural grassland and residential dwellings. The proposed development will not provide any additional connectivity to the SPA. The NIS submitted as part of the planning application fully assesses the potential for disturbance and displacement of SCI bird species associated with Inner Galway Bay SPA. No potential for disturbance effects on the SCI bird species for Inner Galway Bay SPA during the operational stage of the development was identified.

The Galway City Development Plan 2017-2023 was consulted. The site of the proposed development is located on lands that are zoned Residential, with a small strip to the west zoned as Agriculture and High Amenity. The Galway City Development Plan has been subject to Appropriate Assessment. The NIR concluded that *‘having incorporated mitigation measures, it is considered that the Plan 2017-2023 will not have a significant adverse effect on the integrity of European Sites’*.

It is not anticipated that the operational phase of the proposed development will have any significant impacts on badger. No active badger setts were identified within the proposed development and suitable foraging habitat is common and widespread in the wider area.

The potential impacts on bats during the operational stage of the development are described in the following below.

6.6.3.3 Bats

Table 6-21 Impacts on Bats During Operational Phase

<p>Description of Effect</p>	<p>There is no potential for loss or fragmentation of foraging or roosting habitat for bat species during the operational phase of the proposed development as there will be no additional loss of any habitats following construction.</p> <p>The operational phase of the proposed development will result in increased human activity, noise and lighting within the proposed site. Therefore, the potential for disturbance to bats requires consideration.</p> <p>However, the proposed development is bordered by existing residential and commercial developments to the southeast as well as busy local roads and railways to the east and north. It is likely that bat species in the area are accustomed to some levels of disturbance. In the absence of appropriate design, the development has the potential to disturb bats by illumination of commuting and foraging areas.</p>
<p>Characterisation of unmitigated effect</p>	<p>The operational phase of the proposed development has the potential to result in Medium-Term Negative effect on the local bat populations in the form of disturbance as a result of lighting.</p>

Assessment of Significance prior to mitigation	<p>Significant effects on bats are not anticipated at any geographic scale during the operation of the proposed development. There is potential for indirect effects during the operational stage as a result of lighting disturbance, prior to mitigation.</p>
Mitigation	<p>Disturbance</p> <p>The proposed lighting plan has been designed to direct light away from important habitat features and minimise light spillage, thus reducing any potential disturbance to bats.</p> <p>The proposed light fitting/scheme has been designed to help mitigate the effect of the artificial lighting on the local bat populations by incorporating:</p> <ul style="list-style-type: none"> • Warm White LED light source – less attractive to insects, and a good light source to enable directional luminaires. • Internal Louvres – to reduce light spill and eliminate upward light. • Lowest possible design illuminance levels considering the nature of the site. • Lighting control regime – reduced illuminance during hours of lower human activity (i.e. 12:30am – 5:30am). • Planting will be provided at the perimeter of the car park on the west of the site in order to minimise light spill.
Residual Effect following Mitigation	<p>With the implementation of the prescribed mitigation measures, no significant effects are predicted.</p>

6.6.3.4 Impacts on Water Quality

6.6.3.4.1 Production of Foul Sewage

The operational phase of the proposed project will result in the production of foul waters/sewage.

All foul water will be discharged to the public sewer and will be treated at the Galway Mutton Island Wastewater Treatment Plant before discharge to Galway Bay. Irish Water have upgraded the Mutton Island Wastewater Treatment facility under the Capital Investment Plan 2014-2016 (Galway Sewerage Scheme Phase 3 – Network Upgrade Contract No.1 Volume D). The upgrade increases the capacity of the plant from 92,000 to 170,000 p.e. (Reference City Plan).

Treatment process includes the following:

- Preliminary Treatment (Screening & Grit Removal)
- Primary Treatment (Upward Flow Settlement Tanks)
- Secondary Treatment (Activated Sludge)

There is full agreement with Irish Water that there is adequate capacity and capability to fully treat all sewage generated by the proposed project in the public sewage treatment system. Correspondence with Irish Water, Reference No CDS20006156 is provided in **Appendix 6-5** of this EIAR. The proposed project, as assessed for the confirmation of feasibility, is a standard connection, requiring no network or treatment plant upgrades or water or wastewater by either the customer or Irish Water. Given that waste will be appropriately treated to EPA standards; no potential for significant impact on water quality exists.

6.6.3.4.2 Surface Water Runoff

The storm water drainage strategy has been designed to cater for all surface water runoff from all hard surfaces in the proposed development. All stormwater generated on site from roadways and roofs will discharge via an oil/petrol interceptor to soakaways which are strategically situated throughout the site. The soakaways are constructed of a cellular storage unit providing 95% porosity or stone filled soakaway providing 40% void ratio. These will also attenuate storm water during and post storm events prior to infiltrating through the underlying fracture rock/boulders. Additional storage in the northwest corner of the site, which is prone to occasional pluvial flooding, is provided by means of an open attenuation in the form of a swale. All soakaways are designed to accommodate a 1 in 100 year storm event throughout the site. The networks to the west of the site are designed to accommodate the 1 in 100 year storm event with an overflow being provided which will allow any additional volume of storm water to convey to the naturally forming swale to the north of the site.

6.6.4 Impacts on Designated Sites

The EPA draft Guidance 2017 states:

“a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement” but should “incorporate their key findings as available and appropriate”.

This section provides a summary of the key assessment findings with regard to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

6.6.5 Impacts on European Sites

Potential indirect impacts on European Designated sites (SACs and SPAs) are assessed within a separate Screening for Appropriate Assessment (AA) and Natura Impact Statement.

The AASR identified a potential pathway for impact on Galway Bay Complex SAC and Inner Galway Bay SPA in the form of deterioration of surface water quality resulting from pollution associated with

the construction and operational phases of the development. Although no watercourses were identified on-site, the construction and operational phase of the proposed development may also result in pollution to groundwaters via the percolation of polluting materials through the limestone bedrock underlying the site. Pollution of groundwater may result in adverse impacts of the downstream aquatic or groundwater influenced QI/SCI habitats and species of Galway Bay Complex SAC and Inner Galway Bay SPA in the absence of mitigation.

It also identified a potential pathway for impact of Inner Galway Bay via disturbance of SCI bird species on a precautionary basis. The NIS objectively concluded that that the proposed project, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site.

The potential for the proposed works to result in indirect effects on these designated sites as a result of deterioration in surface water and groundwater quality during the construction and operational phase of the development was considered. The potential pathway for effect during the construction phase will be blocked via the mitigation outlined in the CEMP.

Standard best practice environmental control measures will be incorporated in the design of the development. All identified potential pathways for impact on water quality will be robustly blocked through the use of avoidance, appropriate design and mitigation measures.

Potential indirect impacts on European Designated sites (SACs and SPAs) are assessed within a separate Natura Impact Statement. This Natura Impact Statement objectively concluded that the proposal will not have any adverse effects on the Conservation Objectives or ecological integrity of any European site.

The NIS report concludes that:

“Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction, operation of the proposed development does not adversely affect the integrity of European sites.

Taking into consideration the reported residual impacts from other plans and projects in the area and the predicted impacts with the current proposal, no residual cumulative impacts have been identified with regard to any European Site.

Therefore, it can be objectively concluded that the proposed development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site”.

Residual Effect

No significant effect.

The potential for impact on European sites has been fully assessed in the NIS that has been prepared in support of the current application.

6.6.6 Impacts on Nationally Designated Sites

Impacts on nationally designated sites including NHAs and pNHAs are considered in this section of the report. Where such sites are also designated as SACs or SPAs (European Sites) they have been assessed and considered under that designation. Where there are pathways for effect on Nationally designated sites that are not also designated as European Sites, a full ecological impact assessment is provided below.

The proposed development is located 136 metres from Galway Bay Complex pNHA which overlaps with Galway Bay Complex SAC. There are no watercourses within the development site providing surface water connectivity between the proposed development and Galway Bay Complex pNHA. There is no potential for significant indirect effects on the pNHA based on the lack of connectivity and mitigation measures in place to protect the SAC (and pNHA) from pollution arising from construction activities.

No potential pathways for impact on any NHA or pNHA have been identified based on distance from the proposed development site and lack of hydrological connectivity.

No significant effects on nationally designated sites are anticipated.

6.6.7 Impacts of the Decommissioning Phase

The proposal is considered to be permanent and thus there will be no decommissioning works associated with the proposal. Any demolition or maintenance works on the site would be likely to have similar impacts in terms of disturbance to those associated with the construction phase of the project as detailed in previous sections.

6.7 Cumulative Impacts

6.7.1 Plans

The following plans have been reviewed and are taken into consideration as part of this assessment:

- Galway City Development Plan 2017-2023
- Galway County Heritage and Biodiversity Plan 2017-2022
- Galway BAP 2014 – 2020
- Northern and Western Regional Assembly Regional Spatial and Economic Strategy 2020-2032
- Galway City Transport Project 2015

The review focused on policies and objectives that relate to Biodiveristy (Table 6-22). **No potential for cumulative impacts when considered in conjunction with the current proposed conservation works were identified.**

Table 6.22 Review and Assessment of Compliance with Plans for Galway City

Plans	Key Policies/Issues/Objectives Directly Related to European Sites, Biodiversity and Sustainable Development in The Zone of Influence	Assessment of Conservation Works Compliance with Policy
<p>Galway City Council Development Plan 2017-2023</p>	<p>Policy 4.1 Green Network</p> <ul style="list-style-type: none"> ➤ Support sustainable use and management of areas of ecological importance, parks and recreation amenity areas and facilities through an integrated green network policy approach in line with Galway City Recreation and Amenity Needs Study, where it can be demonstrated that there will be no adverse impacts on the integrity of European Sites. ➤ Support the actions of the City Council's Heritage Plan 2016-2021 and Biodiversity Action Plan 2014-2024 relating to the promotion of ecological awareness and biodiversity. ➤ Ensure that all passive and active recreational proposals are considered in the context of potential impact on the environment, sites of ecological and biodiversity importance and general amenity <p>Policy 4.2 Protected Spaces: Sites of European, National and Local Ecological Importance</p> <ul style="list-style-type: none"> ➤ Protect European sites that form part of the Natura 2000 network (including Special Protection Areas and Special Areas of Conservation) in accordance with the requirements in the EU Habitats Directive (92/43/EEC), EU Birds Directive (2009/147/EC) and associated national legislation. ➤ Protect, conserve and promote the nationally designated sites of ecological importance, including existing and proposed Natural Heritage Areas (NHAs and pNHAs) in the city. ➤ Protect, conserve and support the development of an ecological network throughout the city which will improve the ecological coherence of the Natura 2000 network in accordance with Article 10 of the Habitats Directive. ➤ Protect Local Biodiversity Areas, wildlife corridors and stepping stones identified in the Galway City Habitat Inventory 2005 and Galway Biodiversity Action Plan 2014-2024 in supporting the biodiversity of the city and in the Council's role/responsibilities, works and operations, where appropriate. ➤ Protect and conserve rare and threatened flora and fauna and their key habitats, (wherever they occur) listed on Annex I and Annex IV of the EU Habitats Directive (92/43/EEC) and listed for protection under the Wildlife Acts 1976-2000 	<p>The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to biodiversity. No potential for cumulative impacts when considered in conjunction with the current proposal were identified.</p> <p>There will be no impact on designated sites or biodiversity as a result of the development. Best practice preventative measures will be implemented to avoid effects on biodiversity as outlined in section 6.6 of this report.</p>

	<p>Policy 4.3 Blue Spaces: Coast, Canals and Waterways</p> <ul style="list-style-type: none"> ➤ Conserve and protect natural conservation areas within the coastal area and along waterways and ensure that the range and quality of associated habitats and the range and populations of species are maintained. ➤ Ensure the protection of the River Corrib as a Salmonid River, where appropriate. ➤ Protect and maintain, where feasible, undeveloped riparian zones and natural floodplains along the River Corrib and its tributaries. Ensure that development does not have a significant adverse impact, incapable of satisfactory mitigation, on protected species. 	
<p>National Biodiversity Action Plan 2017-2021</p>	<p>Target 6.2 - Sufficiency, coherence, connectivity, and resilience of the protected areas network substantially enhanced by 2020.</p>	<p>The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to biodiversity. No potential for cumulative impacts when considered in conjunction with the current proposal were identified.</p> <p>There will be no impact on designated sites or biodiversity as a result of the development. Best practice preventative measures will be implemented to avoid effects on biodiversity as outlined in section 6.6 of this report.</p>
<p>Northern and Western Regional Assembly Regional Spatial and Economic Strategy 2020-2032</p>	<p>Regional Policy Objective 5.5 – Ensure efficient and sustainable use of all our natural resources, including inland waterways, peatlands, and forests in a manner which ensures a healthy society a clean environment and there is no net contribution to biodiversity loss arising from development supported in this strategy. Conserve and protect designated areas and natural heritage area. Conserve and protect European sites and their integrity.</p> <p>Regional Policy Objective 5.7 - Ensure that all plans, projects and activities requiring consent arising from the RSES are subject to the relevant environmental assessment requirements including SEA, EIA and AA as appropriate</p>	<p>The strategy was reviewed, with particular reference to Policies and Objectives that relate to biodiversity. No potential for cumulative impacts when considered in conjunction with the current proposal were identified.</p> <p>There will be no impact on designated sites or biodiversity as a result of the development. Best practice preventative measures will be implemented to avoid effects on biodiversity as outlined in section 6.6 of this report.</p>

6.7.2 Other Plans & Projects

The proposed development was considered in-combination with other plans and projects in the area that could result in cumulative impacts on European Sites. The online planning system for Galway City Council, was consulted on the 18/06/2021 for the townland of Rosshill. Additional projects identified in the townland of Rosshill, Roscam are;

- Permission for development which will consist of; variations to domestic garage design from that previously granted under 16/228 to include proposed domestic garage and gym and associated works (Planning ref: 2128)
- Permission for development which will consist of a new two storey side extension, alterations to front entrance porch, internal alterations and all ancillary site works (Planning ref: 2134)
- Permission for development which will consist of amendments to previously granted planning permission (ref 16/228). The amendments consist of the following changes : 1. Minor changes to boundaries of sites 8,9,10,11 to accommodate revised house types. 2. Minor changes to alignment of proposed access road and junction between sites 8 and 12. 3 Change of house types on sites 8,9,10,11 which are to remain 5 bedroom two storey detached houses. 4. Minor amendments to side and rear elevation of house type A1 currently granted on site 15. 5. Minor amendments to side and rear elevation of house type B2 currently granted on sites 12 and 13. 6. Proposed garages for sites 8,12,13,15 (Planning ref: 2173)
- Permission to construct 23 two storey Dwellinghouses consisting of Detached, Semi-detached and terrace including access/egress off the old coast road to Oranmore with sewer connection to adjacent sewer pumping station adjacent the Dublin Road and all associated service (Planning ref: 17/238)
- Permission for a development which will consist of demolition of existing single storey house, construction of new replacement house consisting of two storey and single storey elements, renovation of two existing sheds, upgrade of existing septic tank system to a tertiary wastewater treatment system, widening of existing site entrance, together with all associated landscaping and site works (Planning ref: 20168)
- Permission for development which will consist of (1) Retention permission for (i) laying of subsurface piping for the purpose of agricultural irrigation in respect to the agricultural use of the land (ii) 1 no bore well and associated water pump and concrete plinth upon which it is placed, (iii) 2 no. 6,500 litre water holding tanks on sand footing, and (iv) revised agricultural field entrance arrangement with new timber gate and (2) Planning Permission for (i) connection to ESB electrical supply network for the purpose of powering the water pump mentioned under item 1 (ii) above (in lieu of the existing on-site generator) including, erection of surface mounted electricity supply metering box/plinth as per the site-specific requirements and recommendations of the ESB guidance, and (iii) all associated site works (Planning ref: 20225).
- Permission for a change of house type to previously granted planning permission (reference 16/228). These amendments consist of a change of house type C (on site 6 only) which is a 5 bedroom two storey detached house (Planning Ref: 18187)
- Permission for a new residential development. The development consists of 16 no. 2-storey, five bedroom, detached houses, together with individual garages, as applicable, new vehicular site accesses and roads with all ancillary site works, landscape (Planning Ref: 16228)
- Permission and Retention permission for a development consisting of a change of House type to the residential dwelling on Site No. 1 which was granted planning permission

- under Reg. Ref 10/212 (extended under Reg. Ref 16/109) to now provide for a ne (Planning Ref: 18232)
- Permission is sought for the change of house type to the residential dwelling on site No. 1, previously granted planning permission under Pl. Ref. 10/212 & 16/109 & associated garden shed / garage store and all associated site works & services (Planning Ref: 19186)
 - E.O.D on Pl. Reg. Ref. No. 10/212 - Permission for the construction of 4 no. dwellinghouses (in dormer and two storey typology), 4 no. garden sheds and 4 no. individual effluent treatment plants and percolation areas on lands zoned 'L.D.R.' in the Ga (Planning Ref: 16109)
 - Permission is sought for the change of house type B at site 2 previously granted planning permission under P.L. ref 10/212 & 16/109 & associated garage store and all associated site works and services (Planning Ref: 19291)
 - Permission to construct a garage with all associated services (Planning Ref: 16187)
 - Permission is sought for change of house plan (from type D) and garage/store and all associated services previously granted under Planning Reg. Reference 10/212 and 16/109 (Planning Ref: 20110)
 - Permission for a new residential development which contains 3 no. 2 storey 4 bedroom detached houses with individual vehicular entrances and sewage treatment systems together with all ancillary site works, landscaping and service connections (Planning Ref: 16354)
 - Permission is sought for the development which will consist of 1) Demolish Existing Derelict Dwelling House, 2) Construct a new two storey Dwelling House with carport and external store (370m²), 3) Retain existing site entrance, 4) Provision for new (Planning Ref: 20100)
 - Permission for the construction of a single storey extension and all associated services onto an existing domestic garage. The extension will incorporate a studio and a home office (Planning Ref: 20174)
 - Permission for development which will consist of the construction of a dwelling house, external store, waste water treatment system and all associated site development and external works (Planning Ref: 1844)
 - Permission for development which will consist of the construction of a dwelling house, waste water treatment system and all associated site development and external works (Planning Ref: 17295)
 - Permission for development which consists of the construction of a dwelling house, external store, waste water treatment system and all associated site development and external works (Planning Ref: 1989)
 - Permission for development which consists of the demolition of existing sun room and to replace it with a single storey extension to the front of dwelling house and a back porch to the side (Planning Ref: 1954)
 - Permission for development which consists of the constructing 51 No. one, two and three bedroom apartments and two one bedroom Town Houses in 6 no. Blocks ranging in height from one storey up to four storey, with sewer connection to adjacent pumping station adjacent Dublin road, together with access/egress off the old coast road to Oranmore and all associated services at Doughiska and Merlin Park Townlands. (Previous Planning Ref No. 17/283) (Planning ref: 1995)
 - Permission for modifications to domestic garage plan approved under Planning Reference Number 12/232 to include carport extension at (Planning Ref: 16167)

In addition to the above the following developments are also planned within the immediate and wider area:

- Proposed SHD development at Moneyduff, Oranmore, Co. Galway. The proposed development will consist of the construction of 212 no. residential houses, amenity areas, a creche and associated parking facilities.

- A proposed Greenway cycling network runs along the south of the development site. It is a policy of the Galway City Development Plan to continue to develop and improve the greenway network in the city, including to facilitate a linked greenway from the city to the country area including Oranmore. According to the Development Plan, proposed greenways will be subject to a route selection process which will take cognisance of site-specific circumstances including consideration of ecological sensitivity.
- According to the Galway City Development Plan it is planned to develop Murrough, an area to the west of the development, in accordance with a Local Area Plan which will reserve a substantial bank of land for recreational purposes, allow for public access and allow for mixed use development which will create a sustainable neighbourhood and maximise the sustainable development of appropriate recreation facilities.
- The Natura Impact Statement and habitat mapping undertaken for the proposed N6 Galway City Ring Road was also consulted. The NIS concluded that *‘following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts from the proposed road development and with the implementation of the mitigation measures proposed, that the proposed road, development does not pose a risk of adversely affecting (either directly or indirectly) the integrity of any European Site, either alone or in combination with other plans or projects, and there is no reasonable scientific doubt in relation to this conclusion’*.

In the review of the projects that was undertaken, no connection between the site, that could potentially result in additional or cumulative impacts was identified. Neither was any potential for different (new) impacts resulting from the combination of the various projects and plans in association with the proposal. Taking into consideration the reported residual effects from other plans and projects in the area and the predicted effects with the current proposal, no significant residual cumulative effects have been identified with regard to biodiversity.

6.8 Conclusion

There will be no significant impacts on biodiversity given the nature, scale and design of the proposal. No significant residual effects on surface water quality, groundwater quality or the local hydrological/hydrogeological regime were identified.

The potential residual impacts on ecological receptors will not be significant and no potential for the proposed development to contribute to any cumulative impacts on biodiversity when considered in combination with other plans and projects was identified.

Provided that the proposed development is constructed and operated in accordance with the design described within this application, significant effects on biodiversity are not anticipated at any geographic scale.

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7. LAND SOILS AND GEOLOGY

7.1 Introduction

7.1.1 Background and Objectives

Hydro-Environmental Services (HES) was engaged by MKO Ireland (MKO), to carry out an assessment of the potential impacts and associated effects of a proposed housing development at Rosshill, Galway City, Co. Galway on the land, soil, and geological environment.

This report provides a baseline assessment of the environmental setting of the Proposed Development in terms of land, soils, and geology, and discusses the potential impacts that the construction and operation of the Proposed Development will have. Where required, appropriate mitigation measures to limit any identified significant impacts to soils and geology are recommended and an assessment of residual impacts and significance of effects provided.

7.1.2 Statement of Authority

Hydro-Environmental Services (HES) are a specialist geological, hydrological/hydrogeological and environmental practice which delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland and Northern Ireland. HES was established in 2005, and our office is located in Dungarvan, County Waterford.

Our core areas of expertise and experience includes soils, subsoils and geology. We routinely complete impact assessments for land soils and geology, hydrology and hydrogeology for a large variety of project types.

This chapter of the EIAR was prepared by Michael Gill and Adam Keegan.

Michael Gill (BA, BAI, Dip Geol., MSc, MIEI) is an Environmental Engineer and Hydrogeologist with over 17 years' environmental consultancy experience in Ireland. Michael has completed numerous hydrological and hydrogeological impact assessments of residential and infrastructure developments in Ireland. In addition, he has substantial experience in surface water drainage design and SUDs design, and surface water/groundwater interactions.

Adam Keegan (BSc, MSc) is a hydrogeologist with three years of experience in the environmental sector in Ireland. Adam has been involved in numerous hydrological and hydrogeological impact assessments, flood risk assessments and hydrogeological monitoring as part of the team at HES.

7.1.3 Chapter Descriptors

For the purposes of this EIAR, where the 'proposed development' is referred to, this relates to all the project components described in detail in Chapter 4 of this EIAR. Where the 'the site' or 'proposed development site' is referred to, this relates to the primary study area for the development, as delineated by the EIAR Site Boundary in green as shown on Figure 1-1 of Chapter 1 and within figures 7-1 to 7-4 included in this chapter (Chapter 7). The actual site boundary for the purposes of the planning permission application occupies a smaller area within the primary EIAR study area.

The EIAR Study Area, encompasses an area of approximately 5.33 hectares. The planning permission site boundary for the proposed development measures approximately 4.71 hectares. The proposed development is described in detail in Chapter 4 of this EIAR.

7.1.4 Relevant Legislation

The EIAR is prepared in accordance with the requirements of European Union Directive 2014/92/EU on the assessment of the effects of certain public and private projects on the environment (the ‘EIA Directive’) as amended by Directive 2014/52/EU.

Regard has also been taken of the requirements of the following legislation:

- S.I. No. 296 of 2018 European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2001-2018;
- European Communities (Environmental Impact Assessment) Regulations 1989 to 2006.
- S.I. No. 30 of 2000 the Planning and Development Act, 2000 as amended; and,
- S.I. No. 4 of 1995: The Heritage Act 1995 as amended.

7.1.5 Relevant Guidance

The land, soils and geology section of this EIAR is carried out in accordance with the ‘EIA Directive’ as amended by Directive 2014/52/EU and having regard where relevant to guidance contained in the following documents:

- Environmental Protection Agency (2017): Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements; and,
- National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoHPLG, 2018); and,
- Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU), (European Union, 2017).

7.2 Schedule of Works

7.2.1 Desk Study

A desk study of the Rosshill site and the surrounding area was completed in advance of undertaking a site walkover survey. The desk study involved collecting all the relevant geological data for the Proposed Development site/ study area. This included consultation with the following:

- Environmental Protection Agency database (www.epa.ie);
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Bedrock Geology 1:100,000 Scale Map Series, Sheet 14 (Geology of Galway Bay). Geological Survey of Ireland (GSI, 1994);
- Geological Survey of Ireland – 1:25,000 Field Mapping Sheets; and,
- General Soil Map of Ireland 2nd edition (www.epa.ie);

7.2.2 Site Investigations

A site inspection of the proposed development site and surrounding area was undertaken by HES on 10th September 2019 and on 13th April 2021.

The objectives of the site inspection were to determine the topographic layout of the proposed site, to investigate the geological and hydrological regime of the site, including any potential karst features and to determine potential flood patterns and flood zones at the development location.

7.2.3 **Impact Assessment Methodology**

Using information from the desk study and data from the site investigation, an estimation of the importance of the soil and geological environment within the study area is assessed using the criteria set out in **Table 7-1** (NRA, 2008).

Table 7-1: Estimation of Importance of Soil and Geology Criteria (NRA, 2008).

Importance	Criteria	Typical Example
Very High	<p>Attribute has a high quality, significance or value on a regional or national scale.</p> <p>Degree or extent of soil contamination is significant on a national or regional scale.</p> <p>Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.</p>	<p>Geological feature rare on a regional or national scale (NHA).</p> <p>Large existing quarry or pit.</p> <p>Proven economically extractable mineral resource</p>
High	<p>Attribute has a high quality, significance or value on a local scale.</p> <p>Degree or extent of soil contamination is significant on a local scale.</p> <p>Volume of peat and/or soft organic soil underlying site is significant on a local scale.</p>	<p>Contaminated soil on site with previous heavy industrial usage.</p> <p>Large recent landfill site for mixed wastes Geological feature of high value on a local scale (County Geological Site).</p> <p>Well drained and/or highly fertility soils.</p> <p>Moderately sized existing quarry or pit</p> <p>Marginally economic extractable mineral resource.</p>
Medium	<p>Attribute has a medium quality, significance or value on a local scale.</p> <p>Degree or extent of soil contamination is moderate on a local scale.</p> <p>Volume of peat and/or soft organic soil underlying site is moderate on a local scale.</p>	<p>Contaminated soil on site with previous light industrial usage.</p> <p>Small recent landfill site for mixed Wastes.</p> <p>Moderately drained and/or moderate fertility soils. Small existing quarry or pit.</p> <p>Sub-economic extractable mineral Resource.</p>
Low	<p>Attribute has a low quality, significance or value on a local scale.</p> <p>Degree or extent of soil contamination is minor on a local scale.</p> <p>Volume of peat and/or soft organic soil underlying site is small on a local scale.</p>	<p>Large historical and/or recent site for construction and demolition wastes.</p> <p>Small historical and/or recent landfill site for construction and demolition wastes.</p> <p>Poorly drained and/or low fertility soils. Uneconomically extractable mineral Resource.</p>

The guideline criteria (EPA, 2002, 2003, 2015 and 2017) for the assessment of impacts require that likely impacts are described with respect to their extent, magnitude, type (i.e., negative, positive or neutral) probability, duration, frequency, reversibility, and transfrontier nature (if applicable). The descriptors used in this environmental impact assessment are those set out in EPA (2017) Glossary of Impacts as shown in Chapter 1 of this EIAR. In addition, the two impact characteristics, proximity and probability are described for each impact and these are defined in **Table 7-2**.

In order to provide an understanding of this descriptive system in terms of the geological/hydrological environment, elements of this system of description of impacts are related to examples of potential impacts on the geology and morphology of the existing environment, as listed in **Table 7-3**.

Table 7-2: Additional Impact Characteristics.

Impact Characteristic	Degree/Nature	Description
Proximity	Direct	An impact which occurs within the area of the proposed project, as a direct result of the proposed project.
	Indirect	An impact which is caused by the interaction of effects, or by off-site developments.
Probability	Low	A low likelihood of occurrence of the impact.
	Medium	A medium likelihood of occurrence of the impact.
	High	A high likelihood of occurrence of the impact.

Table 7-3: Impact descriptors related to the receiving environment.

Impact Characteristics		Potential Hydrological Impacts
Quality	Significance	
Negative only	Profound	<p>Widespread permanent impact on:</p> <ul style="list-style-type: none"> ➤ The extent or morphology of a cSAC. ➤ Regionally important aquifers. ➤ Extents of floodplains. <p>Mitigation measures are unlikely to remove such impacts.</p>
Positive or Negative	Significant	<p>Local or widespread time dependent impacts on:</p> <ul style="list-style-type: none"> ➤ The extent or morphology of a cSAC / ecologically important area. ➤ A regionally important hydrogeological feature (or widespread effects to minor hydrogeological features). ➤ Extent of floodplains. <p>Widespread permanent impacts on the extent or morphology of an NHA/ecologically important area,</p> <p>Mitigation measures (to design) will reduce but not completely remove the impact – residual impacts will occur.</p>

Impact Characteristics		Potential Hydrological Impacts
Quality	Significance	
Positive or Negative	Moderate	Local time dependent impacts on: <ul style="list-style-type: none"> ➤ The extent or morphology of a cSAC / NHA / ecologically important area. ➤ A minor hydrogeological feature. ➤ Extent of floodplains. Mitigation measures can mitigate the impact OR residual impacts occur, but these are consistent with existing or emerging trends
Positive, Negative or Neutral	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Positive, Negative or Neutral	Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Neutral	Imperceptible	No impacts, or impacts which are beneath levels of perception, within normal bounds of variation, or within the bounds of measurement or forecasting error.

7.3 Existing Environment

7.3.1 Site Description and Topography

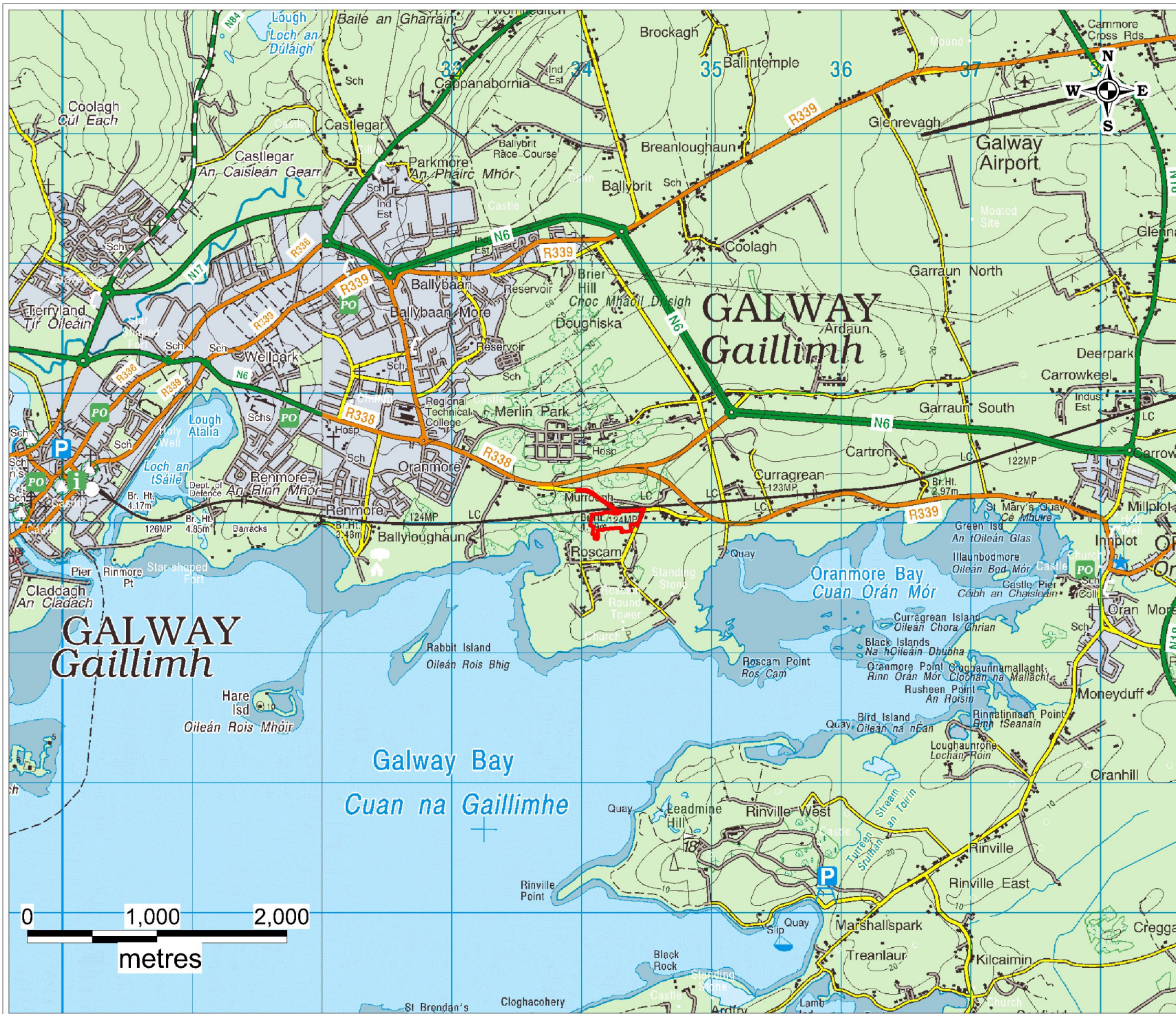
The Proposed Development site is located in the townlands of Roscam and Merlin Park, Galway City, Co. Galway. The Proposed Development is a Strategic Housing Development broadly consisting of 67 no. houses, 35 no. apartment units, a childcare facility and retail/commercial space. A full Project Description is given below in Section 7.4.

The Proposed Development site is currently grassland and used for rough grazing, with minor areas of forestry in the northwest corner of the site.

The elevation of the Proposed Development site ranges between approximately 8 and 20m OD (metres above Ordnance Datum) The overall local topography generally slopes from east to west, towards the shoreline located ~ 500m southeast of the proposed site.

The topography of the site was further investigated during a site visit on 10th September 2019 and 13th April 2021. The ground is undulating but relatively flat from the eastern edge to the centre of the Proposed Development site, the ground then slopes with a larger gradient towards the western margin of the site, where elevation drops from ~16 mOD to ~8mOD over a c.80m distance. To the south of the Proposed Development site, the ground generally slopes uphill towards Rosshill Farm before sloping down towards the coastline. The dominant land use on the bordering land is agricultural, with Rosshill Farm Stud located ~ 200m south of the Proposed Development site.

A site location map is shown as **Figure 7.1**. A site photograph is included as **Plate 7-1**.



Legend

 EIAR Study Area

	HYDRO ENVIRONMENTAL SERVICES
22 Lower Main St Dungarvan Co. Waterford Ireland	tel: +353 (0)5844122 fax: +353 (0)5844244 email: info@hydroenvironmental.ie web: www.hydroenvironmental.ie

Title: Site Location Map

Client: MKO

Job: Rosshill, Co. Galway

Project No: P1489-1

Figure No: 7-1

Sheet Size: A4

Drawing No: P1489-1-0621-A4-701-0A

Date: 29/06/2021

Scale: 1:40,000

Drawn By: GD Checked By: MG



Plate 7-1: Site photograph from northeast entrance to site

7.3.2 Soils and Subsoils

According to GSI mapping (www.gsi.ie), the site is dominated by deep, well drained, mainly basic mineral soils (BminDW) with areas of shallow, well drained, mainly basic soils (BminSW) located towards the northwest of the site within the small afforested area. The areas surrounding the site are all mapped as having similar soils, with the exception of smaller areas at the shoreline to the south and southwest, which are mapped as peaty gleys.

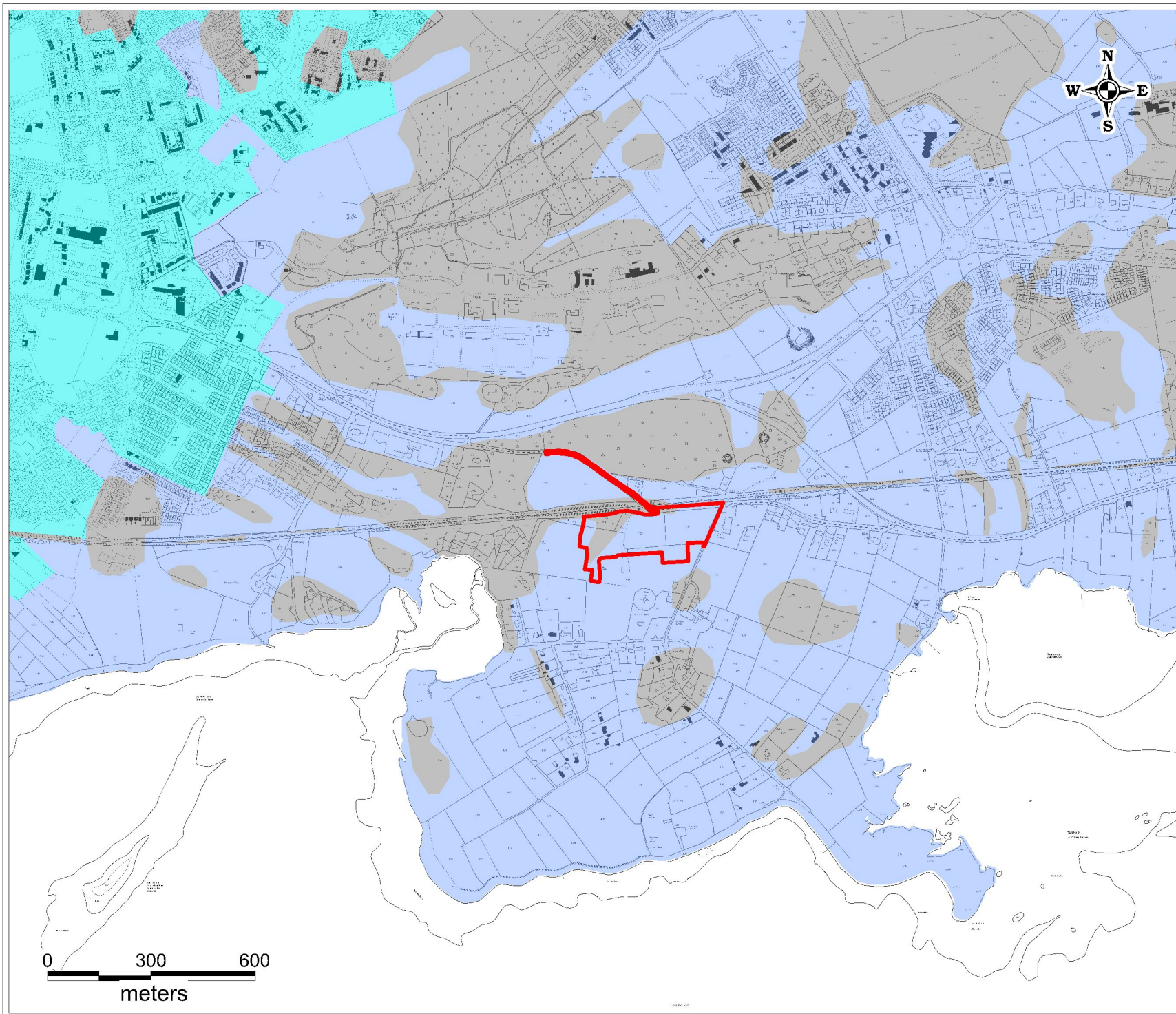
A small cut section was exposed within the site on the 13th April 2021 (E134421, N225045), the exposed section was ~0.5m deep and loose silty, sandy light brown topsoil was observed through the entire depth.

The mapped subsoil type (www.gsi.ie) for the proposed site indicate that the majority of the site is underlain by Tills derived from Limestone with some smaller areas of karstified bedrock outcrop/subcrop (KaRck) towards the south of the site. No karst features were observed within the site boundary or the surrounding fields during both site visits. The local subsoils map is shown as **Figure 7.2**.

7.3.3 Bedrock Geology

Based on the GSI bedrock map of the region, the Proposed Development site is underlain by the Burren Formation which is described as pale grey clean skeletal limestone. The limestones are classified by the GSI as a Regionally Important Aquifer – Karstified (conduit) (Rkc).

An outcrop of bedrock is visible from the Old Dublin Road (E134273, N225087), along the northern section of the proposed development site, at the railway crossing. The Limestone bedrock appears to have medium to large bedding, pale grey on the weathered section with minor fractures and jointing. The exposed face is ~8-10m high, with ~0.5-1m of overburden visible above the top of the formation. No seepage of groundwater was observed within the face. A bedrock geology map of the area is attached as **Figure 7.3**.

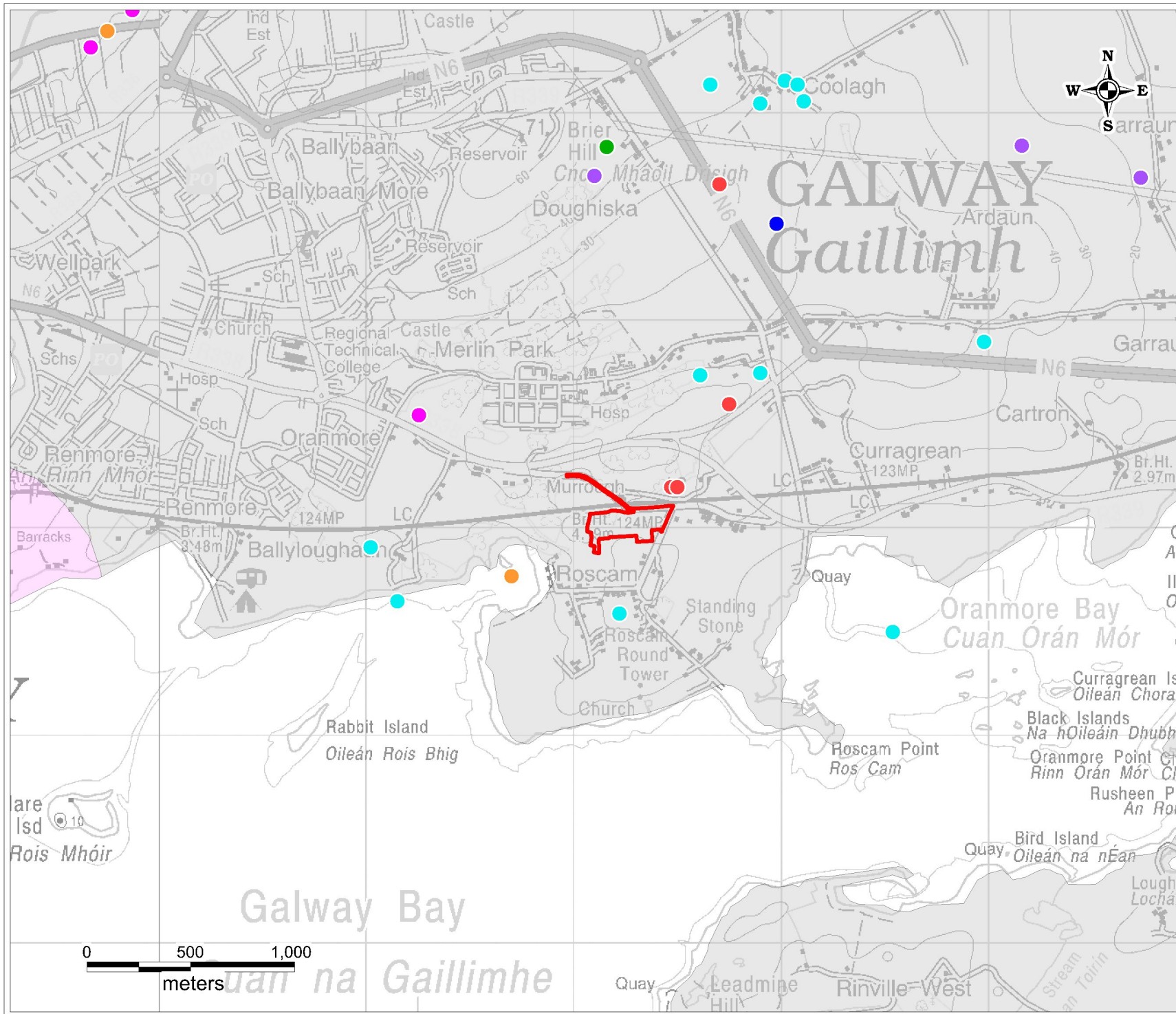


Legend




- EIAR Study Area
- Karstified bedrock outcrop or subcrop
- Till derived from limestones
- Urban

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Title: Local Subsoils Map	
Client: MKO	
Job: Rosshill, Co. Galway	
Project No: P1489-1	
Figure No: 7-2	
Sheet Size: A4	
Drawing No: P1489-1-0621-A4-702-0A	
Date: 29/06/2021	
Scale: 1:15,000	
Drawn By: GD	Checked By: MG



Legend

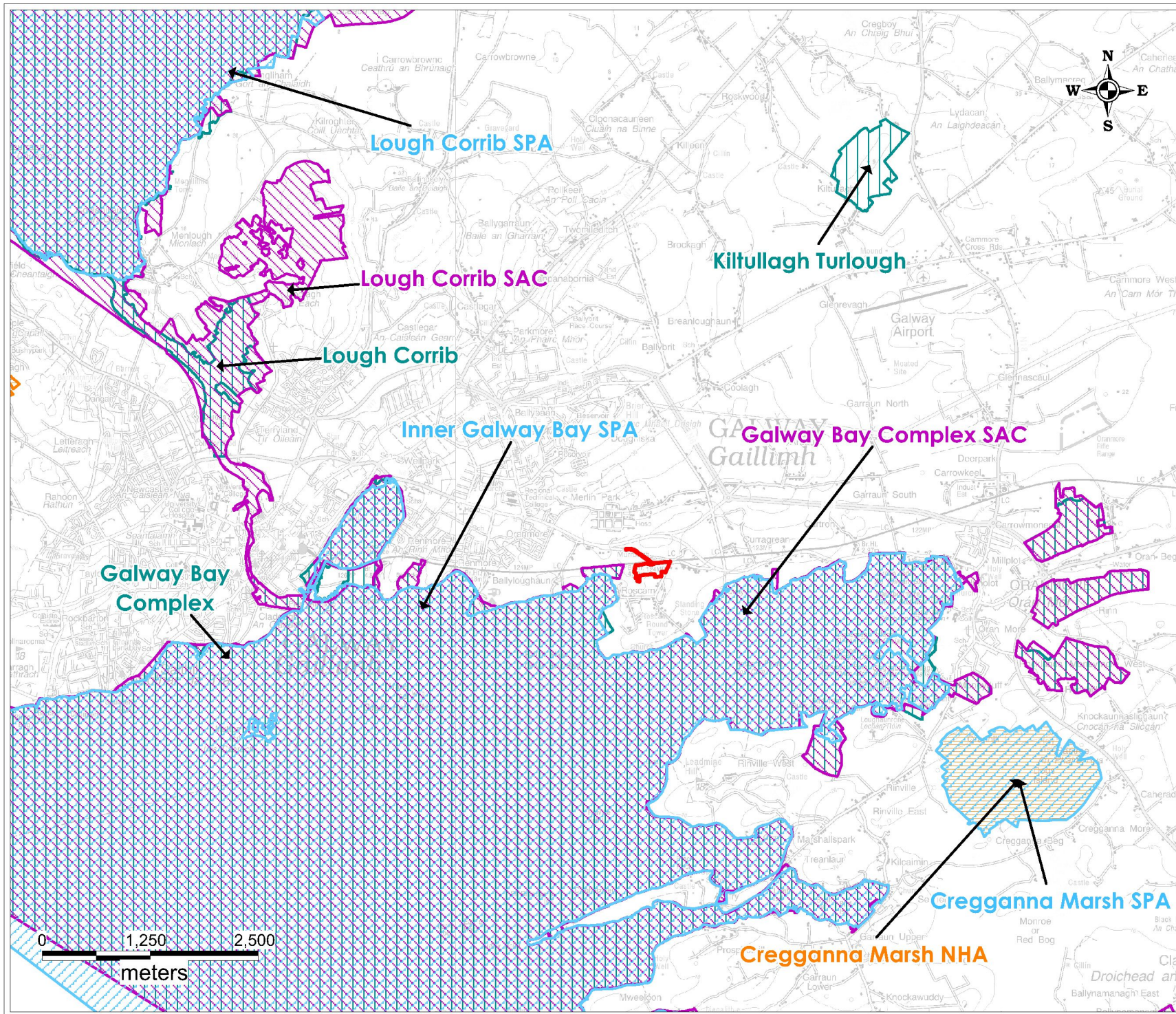
-  EIAR Study Area
-  Metagabbro & orthogneiss suite
-  Visean Limestones (undifferentiated)

Karst Feature Legend






-  Borehole
-  Cave
-  Enclosed Depression
-  Spring
-  Superficial Solution Features
-  Swallow Hole
-  Turlough

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Title: Local Bedrock Geology Map	
Client: MKO	
Job: Rosshill, Co. Galway	
Project No: P1489-1	
Figure No: 7-3	
Sheet Size: A4	
Drawing No: P1489-1-0621-A4-703-0A	
Date: 29/06/2021	
Scale: 1:25,000	
Drawn By: GD	Checked By: MG



Legend

-  EIAR Study Area
-  SPA
-  SAC
-  pNHA
-  NHA

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Title: Designated Sites Map	
Client: MKO	
Job: Rosshill, Co. Galway	
Project No: P1489-1	
Figure No: 7-4	
Sheet Size: A4	
Drawing No: P1489-1-0621-A4-704-0A	
Date: 29/06/2021	
Scale: 1:60,000	
Drawn By: GD	Checked By: MG

7.3.4 Geological Heritage and Designated Sites

There are no recorded Geological Heritage sites within the proposed development area. The closest geological heritage site is Merlin Park Quarry (IGH 8 Lower), a disused quarry which hosts Galway Black Marble, which is located approximately 0.7km north of the site.

The Galway Bay Complex SAC (Code: 000268) is situated ~0.25km west of the proposed development site, while the Inner Galway Bay SPA (Code: 004031) is situated ~ 450m west of the proposed site. The Galway Bay Complex is also listed as a proposed NHA. A designated sites map is included as **Figure 7.4**.

7.3.5 Soil Contamination

There are no known areas of soil contamination on the site. During the site walkovers, no areas of particular contamination concern were identified. Any material on the site appears to be excavated subsoil/rock type material.

According to the EPA online mapping (<http://gis.epa.ie/Envision>), there are no licensed waste facilities on or within the immediate environs of the proposed development site.

There are no historic mines at or in the immediate vicinity of the site that could potentially have contaminated tailings.

7.3.6 Economic Geology

The GSI Online Minerals Database accessed via the Public Data Viewer shows no quarries within the proposed development area. The now disused Merlin Park quarry is located ~ 0.7 km north of the site.

The GSI online Aggregate Potential Mapping Database shows that the proposed development site is not located within an area mapped as being of Very High or High granular aggregate potential (i.e. potential for gravel reserves).

7.4 Characteristics of the Proposed Development

The proposed development is described in Chapter 4 and will generally comprise the following:

- Construction of 102no. residential units comprising of 35 apartments and 67 houses;
- Demolition of the existing silage concrete apron (40sqm);
- Childcare facility (398.8sqm over 2-storeys);
- Retail/Commercial space (216sqm) including loading bay;
- Provision of shared communal and private open space, including play and fitness equipment;
- Car and cycle parking, including electric vehicle charging points;
- Provision of all associated surface water and foul drainage services and connections including pumping station;
- Landscaping, access routes and public art;
- Lighting and associated works;
- Access and junction improvements at Rosshill Road and Rosshill Stud Farm Road; and,
- All associated works and services

The proposed development will typically require minor alteration of ground levels to ensure it is at an adequate level for the proposed surface water drainage, foul water drainage and to mitigate flood risk.

Excavation of soil and subsoil will be required for the proposed development in preparation for the construction of building foundations and in the preparation of a suitable sub-formation for road construction, trenching for foul and drainage water infrastructure and other services.

Surface Water Drainage

It is proposed that the development will drain via gravity to 6 no. soakaways proposed on site. Water draining to soakaways will pass through silt traps and hydrocarbon interceptors prior to reaching each soakaway. No surface water from roofs or paved surfaces will be discharge from the site, other than via the soakaways to ground. It is proposed to use Bioswales for the management of storm water at the car parking area near the apartment block.

Water Supply

Water supply to the site will be via connection to the adjacent public (Irish Water) watermain.

Wastewater Infrastructure

The proposed on-site foul sewers will discharge by gravity to a pumping station to the north-west of the site, and the foul waste will discharge from this pumping station via pumped rising main to the adjacent public (Irish Water) foul sewer network that leads to the Merlin Park pumping station, which has sufficient capacity to accommodate the proposed 102 units.

7.5 Potential Impacts of the Proposed Development

7.5.1 Do Nothing Scenario

The use of the proposed development site for rough grazing by livestock would continue. The impact to the topsoil from compaction and poaching of soft ground from the presence of livestock would continue as a result of the Do-Nothing Scenario. The potential impacts are imperceptible.

7.5.2 Likely impacts and Mitigation Measures – Construction Stage

The likely impacts of the proposed residential development and mitigation measures that will be put in place to eliminate or reduce them are shown below. These relate to the construction stage. It should be noted that the main potential impacts on the soils and geology environment will occur during the construction stage.

7.5.2.1 Subsoil Excavation and Bedrock Excavation

Excavation of existing coarse gravel from agricultural roads, subsoil and bedrock will be required for site levelling, for the installation of foundations for the access roads, carpark and buildings, and service trenching. The cut and fill works on the site will be neutral, and there will be a requirement for import of aggregate for building works. This will result in a permanent relocation of soil and subsoil at most excavation locations. The excavated materials are expected to include quarry material, existing fill material, topsoil/subsoil, limestone bedrock.

Mechanism: Extraction/excavation.

Receptor: Land, topsoil, subsoil and bedrock.

Pre-Mitigation Potential Impact: Negative, slight/moderate, direct, likely, permanent impact on soil, subsoil and bedrock.

Mitigation Measures/Impact Assessment

- Excavated (existing) overburden material will be reused on site, where possible;
- A minimal volume of topsoil and subsoil will be removed to allow for infrastructural work to take place due to optimisation of the layout by mitigation by design; and,
- Construction of service trenching, pumping station and surface water attenuation features will generate excess material, and all excess material will be used locally within the site for landscaping.

Post Mitigation Residual Impact: Negative, direct, slight, likely, permanent impact on topsoil, subsoils and bedrock.

Significance of Effects: No significant effects on land, topsoil, subsoils or bedrock are anticipated.

7.5.2.2 Contamination of Soil by Leakages and Spillages and Alteration of Soil Geochemistry

Pathway: Topsoil, subsoil and bedrock pore space.

Receptor: Topsoil, subsoil and bedrock.

Pre-Mitigation Potential Impact: Negative, direct, slight, short term, unlikely impact on topsoil, subsoils and bedrock.

Mitigation Measures/Impact Assessment:

- All plant and machinery will be serviced before being mobilised to site;
- No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed;
- Refuelling will be completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;
- Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored;
- Ancillary equipment such as hoses and pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and,
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment.

Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A named person will be given the task of overseeing the pollution prevention measures agreed for the site to ensure that they are operating safely and effectively.

Post Mitigation Residual Impact: Negative, Imperceptible, direct, short term, unlikely impact.

Significance of Effects: No significant effects on land, soils, subsoils or bedrock are anticipated.

7.5.2.3 Soil and Subsoil Compaction

Mechanism: Excavation / handling / storage.

Receptor: Land, topsoil, subsoil.

Pre-Mitigation Potential Impact: Negative, direct, slight, likely impact on topsoil and subsoils.

Mitigation Measures

The underlying in-situ soils and subsoils will be subject to a certain amount of compaction, but this will be unavoidable.

Any infill material/landscaping that is required will be placed and levelled in appropriate lift thicknesses to ensure the material is not over compacted thereby retaining its drainage properties.

Post Mitigation Residual Impact: Negative, slight, direct, likely impact on topsoil and subsoils.

Significance of Effects: No significant effects on land, soils, subsoils are anticipated.

7.5.2.4 Geological impact on local Designated Sites or mapped/unmapped Karst features

Mechanism: Excavation / handling / storage of soil/subsoils.

Receptor: Land, topsoil, subsoil and bedrock and associated nearby designated sites.

Pre-Mitigation Potential Impact: None, no direct excavation or development of any local designated sites or mapped/unmapped karst features are proposed. No unmapped karst features were identified over the 2 no. site walkover surveys.

Residual Impact: None.

Significance of Effects: None.

7.5.3 Likely Impacts and Mitigation Measures – Operational Stage

Due to the nature of the proposed development, no impacts on soils and geology are anticipated during the operational phase. The operational stage of the residential development consists of the typical activities in a residential area and will not involve further disturbance to the topsoil, subsoils and geology of the area.

No cumulative impacts on the land, soils and geology environment are envisaged during the operational stage.

7.5.4 Assessment of Health Effects

Potential health effects arise mainly through the potential for soil and ground contamination. Residential developments are not a recognized source of significant potential pollution and so the potential for effects during the construction phase are negligible. Hydrocarbons will be used onsite during construction. However, the volumes will be small in the context of the scale of the project and will be handled and stored in accordance with best practice mitigation measures. The potential residual impacts associated with soil or ground contamination and subsequent health effects are negligible.

7.5.5 Cumulative effects resulting from Interactions between various elements of the proposed development

The interaction of the various elements of the proposed development was considered and assessed in this EIAR with regards land, soils and geology. The potential for each individual element of the proposed development on its own to result in significant effects on land, soils and geology was considered in the impact assessment. The entire project including the interactions between all its elements was also considered and assessed for its potential to result in significant effects on geological receptors in the impact assessment presented. The complex interactions between the requirement for site grading and the requirement to protect surface waters, human health, and other receptors were taken into account for the entire project and any impacts avoided through a series of mitigation measures that were fully described. The management and handling of potentially harmful materials across the entire project was assessed with mitigation proposed and described fully.

All interactions between the various elements of the project were considered and assessed both individually and cumulatively within this chapter. Where necessary, mitigation was employed to ensure that no cumulative effects will arise as a result of the interaction of the various elements of the development with one another.

7.5.6 7.5.6 Cumulative In-combination Effects

There are 10 no. proposed housing developments with permission granted in the locality, although 18/187 and 19/95 relate to 2 no previous planning permissions granted within **Table 7-4** and are within the same respective sites. A description of the development types are outlined in **Table 7-4**.

Table 7-4: Local developments within cumulative assessment

Application Reference	Description
99/687	Permission for 59 houses and associated site development works.
00/841	Permission for 304 two storey houses, 18 apts, in a 3 storey residential block, & 15 apts. in a mixed use block of 3/4 storeys, incorporating commercial neighbourhood facilities, incl. a creche, doctors surgery & retail space, with associated carparking; site development works incl., temporary sewerage treatment plant & providing new vehicular access points to the Cheshire House grounds & 3 neighbourhood dwellings on the site.
04/724	Permission to construct ninety two semi-detached houses (92 no.) and fifteen detached houses (15 no.) to provide a new entrance from Coast Road (R338) and to provide new entrance from Doughiska Road to the development site together with all site services.
15/194	Permission for development at this site at Roscam with access from the Oranmore Road (R338), Galway and measuring c. 2.24 hectares in area. The development will consist of 49 no. two-storey detached and semi-detached four bedroom houses, 2 no. two-storey semi-detached 3 bedroom houses and a three/four storey apartment block containing 12 no. 2 bedroom apartments and a crèche (166sq.m) at ground floor. Permission is also sought for all associated car-parking, landscaping, boundary treatments and ancillary site development works including amendments to car-parking, boundary treatment and Site no. 67 forming part of permitted development under Reg. Ref. 05/940 (subsequently amended by permission Reg. Ref. 13/347).
16/228	Permission for a new residential development. The development consists of 16 no. 2-storey, five-bedroom, detached houses, together with individual garages, as applicable, new vehicular site accesses and roads with all ancillary site works, landscaping and service connections
17/283	Permission to construct 23 two storey Dwellinghouses consisting of Detached, Semi-detached and terrace including access/egress off the old coast road to Oranmore with sewer connection to adjacent sewer pumping station adjacent the Dublin Road and all associated services.
18/187	Permission for a change of house type to previously granted planning permission (reference 16/228). These amendments consist of a change of house type C (on site 6 only) which is a 5-bedroom two storey detached house
19/95	Permission for development which consists of the constructing 51 No. one, two and three bedroom apartments and two one bedroom Town Houses in 6 no. Blocks ranging in height from one storey up to four storey, with sewer connection to adjacent pumping station adjacent Dublin road, together with access/egress off the old coast road to Oranmore and all associated services at Doughiska and Merlin Park

Application Reference	Description
99/687	Permission for 59 houses and associated site development works. Townlands. (Previous Planning Ref No. 17/283)
21/28	Permission for development which will consist of; variations to domestic garage design from that previously granted under 16/228 to include proposed domestic garage and gym and associated works.
21/73	Permission for development which will consist of amendments to previously granted planning permission (ref 16/228). The amendments consist of the following changes : 1. Minor changes to boundaries of sites 8,9,10,11 to accommodate revised house types. 2. Minor changes to alignment of proposed access road and junction between sites 8 and 12. 3 Change of house types on sites 8,9,10,11 which are to remain 5 bedroom two storey detached houses. 4. Minor amendments to side and rear elevation of house type A1 currently granted on site 15. 5. Minor amendments to side and rear elevation of house type B2 currently granted on sites 12 and 13. 6. Proposed garages for sites 8,12,13,15.

The potential cumulative effects of the proposed development in combination with the other projects described in Chapter 2 of this report, and listed in Table 7.4 above, have been considered in terms of impacts on land, soils and geology. Where appropriate the application documentation, EIAR and NIS have been reviewed to inform the assessment. There are no active quarries, major earthworks, or other associated activities which could impact upon the soils and geological environment near the proposed development site.

No significant cumulative impacts on land, soils and geology environment are anticipated during the construction or operation phases as long as mitigation measures outlined are put in place.

7.5.7 Worst Case Scenario

Permanent removal of soil/subsoil. No significant impacts on bedrock geology.

7.5.8 Conclusion

Excavation of existing fill, topsoil, peat, subsoil and bedrock will be required for site levelling and for the installation of drainage and services (wastewater, water supply, electricity, etc.) infrastructure. This will result in a permanent removal of soil, subsoil and bedrock at most excavation locations.

All excess material will be used for reinstatement and landscaping works around the site at the end of the construction phase. Storage and handling of hydrocarbons/chemicals will be carried out using best practice methods. Measures to prevent soil and subsoil erosion during excavation and reinstatement will be undertaken to prevent water quality impacts.

No significant impacts on the land, soil and geology of the site will occur.

No cumulative impacts on the land, soil and geology of the site will occur.

BIBLIOGRAPHY

Bedrock Geology 1:100,000 Scale Map Series, Sheet 14 (Geology of Galway Bay). Geological Survey of Ireland (GSI, 1994);

Residential Development, Rosshill, Galway – Report on Civil Works, Planning Stage (Tobin Consulting Engineers, 2021)

8. HYDROLOGY AND HYDROGEOLOGY

8.1 Introduction

8.1.1 Background and Objectives

Hydro-Environmental Services (HES) was engaged by MKO Ireland (MKO), to carry out an assessment of the potential impacts of a proposed housing development at Rosshill, Galway City on water aspects (hydrology and hydrogeology) of the receiving environment.

The objectives of the assessment are:

- Produce a baseline study of the existing water environment (surface water and groundwater including connectivity with local designated sites) in the area of the proposed development site;
- Identify likely negative impacts of the Proposed Development on surface water and groundwater during construction, operational and decommissioning phases of the development;
- Identify mitigation measures to avoid, remediate or reduce significant negative impacts; and,
- Assess significant residual impacts and cumulative impacts of the Proposed Development along with other local residential and infrastructural developments.
- Perform a site visit and walkover survey (April 2021) to assess locally mapped karst features and identify any potential karst features present within the Proposed Development Site.

8.1.2 Statement of Authority

Hydro-Environmental Services (HES) are a specialist geological, hydrological/hydrogeological and environmental practice which delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland and Northern Ireland. HES was established in 2005, and our office is located in Dungarvan, County Waterford. We routinely complete impact assessments for hydrology and hydrogeology for a large variety of project types.

This chapter of the EIAR was prepared by Michael Gill and Adam Keegan.

Michael Gill PGeo (BA, BAI, Dip Geol., MSc, MIEI) is an Environmental Engineer with over 18 years' environmental consultancy experience in Ireland. Michael has completed numerous hydrological and hydrogeological impact assessments of residential and infrastructure developments in Ireland. In addition, he has substantial experience in surface water drainage design and SUDs design, and surface water/groundwater interactions.

Adam Keegan (BSc, MSc) is a hydrogeologist with three years of experience in the environmental sector in Ireland. Adam has been involved in numerous hydrological and hydrogeological impact assessments, flood risk assessments and hydrogeological monitoring as part of the team at HES.

8.1.3 Chapter Descriptors

For the purposes of this EIAR, where the 'proposed development' is referred to, this relates to all the project components described in detail in Chapter 4 of this EIAR. Where the 'the site' or 'proposed development site' is referred to, this relates to the primary study area for the development, as delineated by the EIAR Site Boundary in green as shown on Figure 1-1 of Chapter 1 and within Figures 8-1 to 8-3

included in this chapter (Chapter 8). The actual site boundary for the purposes of the planning permission application occupies a smaller area within the primary EIAR study area.

The EIAR Study Area, encompasses an area of approximately 5.33 hectares. The planning permission site boundary for the proposed development measures approximately 4.71 hectares. The proposed development is described in detail in Chapter 4 of this EIAR.

8.1.4 Relevant Legislation

The EIAR is carried out in accordance with the following Irish legislation:

- S.I. No. 349 of 1989: European Communities (Environmental Impact Assessment) Regulations, and subsequent Amendments (S.I. No. 84 of 1995, S.I. No. 352 of 1998, S.I. No. 93 of 1999, S.I. No. 450 of 2000 and S.I. No. 538 of 2001), S.I. No. 30 of 2000, the Planning and Development Act, and S.I. 600 of 2001 Planning and Development Regulations and subsequent Amendments. These instruments implement EU Directive 85/373/EEC and subsequent amendments, on the assessment of the effects of certain public and private projects on the environment;
- Directives 2011/92/EU and 2014/52/EU on the assessment of the effects of certain public and private projects on the environment, including Circular Letter PL 1/2017: Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive);
- Planning and Development Act, 2000, as amended;
- S.I. No. 94 of 1997: European Communities (Natural Habitats) Regulations, resulting from EU Directives 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) and 79/409/EEC on the conservation of wild birds (the Birds Directive);
- S.I. No. 293 of 1988: Quality of Salmon Water Regulations, resulting from EU Directive 78/659/EEC on the Quality of Fresh Waters Needing Protection or Improvement in order to Support Fish Life;
- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 and S.I. No. 722 of 2003 European Communities (Water Policy) Regulations which implement EU Water Framework Directive (2000/60/EC) and provide for implementation of ‘daughter’ Groundwater Directive (2006/118/EC). Since 2000 water management in the EU has been directed by the Water Framework Directive (WFD). The key objectives of the WFD are that all water bodies in member states achieve (or retain) at least ‘good’ status by 2015. Water bodies comprise both surface and groundwater bodies, and the achievement of ‘Good’ status for these depends also on the achievement of ‘good’ status by dependent ecosystems. Phases of characterisation, risk assessment, monitoring and the design of programmes of measures to achieve the objectives of the WFD have either been completed or are ongoing. In 2015 it will fully replace a number of existing water related directives, which are successively being repealed, while implementation of other Directives (such as the Habitats Directive 92/43/EEC) will form part of the achievement of implementation of the objectives of the WFD;
- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009;
- S.I. No. 9 of 2010: European Communities Environmental Objectives (Groundwater) Regulations 2010; and,
- S.I. No. 296 of 2009: European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009.

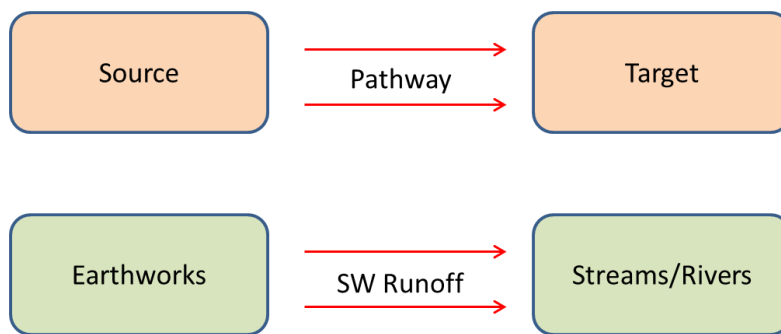
8.1.5 Relevant Guidance

The water section of the EIAR is carried out in accordance with guidance contained in the following:

- Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU);
- Environmental Protection Agency (2017): Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note);
- PPG5 – Works or Maintenance in or Near Watercourses (UK Guidance Note);
- CIRIA (Construction Industry Research and Information Association) 2006: Guidance on ‘Control of Water Pollution from Linear Construction Projects’ (CIRIA Report No. C648, 2006); and,
- CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006.

8.1.6 Overview of Impact Assessment Process

The conventional source-pathway-target model (see below, top) was applied to assess potential impacts on downstream environmental receptors (see below, bottom as an example) as a result of the proposed housing development.



Where potential impacts are identified, the classification of impacts in the assessment follows the descriptors provided in the Glossary of Impacts contained in the following guidance documents produced by the Environmental Protection Agency (EPA):

- Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017);
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003).

The description process clearly and consistently identifies the key aspects of any potential impact source, namely its character, magnitude, duration, likelihood and whether it is of a direct or indirect nature.

In order to provide an understanding of the stepwise impact assessment process applied below (Section 7.5), we have firstly presented below a summary guide that defines the steps (1 to 7) taken in each element of the impact assessment process (refer to Table 8-1). The guide also provides definitions and descriptions of the assessment process and shows how the source-pathway-target model and the EPA impact descriptors are combined.

Using this defined approach, this impact assessment process is then applied to the development construction and operational activities which have the potential to generate a source of significant adverse impact on the geological and hydrological/ hydrogeological (including water quality) environments.

Table 81: Impact Assessment Methodology

Step 1	Identification and Description of Potential Impact Source This section presents and describes the activity that brings about the potential impact or the potential source of pollution. The significance of effects is briefly described.	
Step 2	Pathway Mechanism: /	The route by which a potential source of impact can transfer or migrate to an identified receptor. In terms of this type of development, surface water and groundwater flows are the primary pathways, or for example, excavation or soil erosion are physical mechanisms by which a potential impact is generated.
Step 3	Receptor:	A receptor is a part of the natural environment which could potentially be impacted upon, e.g. human health, plant / animal species, aquatic habitats, soils/geology, water resources, water sources. The potential impact can only arise as a result of a source and pathway being present.
Step 4	Pre-mitigation Impact:	Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impact before mitigation is put in place.
Step 5	Proposed Mitigation Measures:	Control measures that will be put in place to prevent or reduce all identified significant adverse impacts. In relation to this type of development, these measures are generally provided in two types: (1) mitigation by avoidance, and (2) mitigation by engineering design.
Step 6	Post Mitigation Residual Impact:	Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impacts after mitigation is put in place.
Step 7	Significance of Effects:	Describes the likely significant post mitigation effects of the identified potential impact source on the receiving environment.

8.2 Methodology

8.2.1 Desk Study & Preliminary Hydrological Assessment

A desk study of the Proposed Development study area was largely completed prior to the undertaking of field mapping and walkover assessments. The desk study involved collecting all relevant geological, hydrological, hydrogeological and meteorological data for the area. This included consultation with the following:

- Environmental Protection Agency database (www.epa.ie);
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Met Eireann Meteorological Databases (www.met.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive Map Viewer (www.catchments.ie);
- Bedrock Geology 1:100,000 Scale Map Series, Sheet 14 (Geology of Galway Bay). Geological Survey of Ireland (GSI, 2004);
- Geological Survey of Ireland - Groundwater Body Characterisation Reports;
- OPW Indicative Flood Maps (www.floodinfo.ie);
- Environmental Protection Agency – “Hydrotool” Map Viewer (www.epa.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie); and,
- Department of Environment, Community and Local Government on-line mapping viewer (www.myplan.ie).

8.2.2 Site Data

The following data were used in preparation of this chapter:

- A walkover survey, including detailed drainage mapping, was undertaken by HES on 10th September 2019 and 13th April 2021. The walkover survey and hydrological/hydrogeological mapping of the site and the surrounding area were undertaken on the 10th September 2019, whereby water flow directions and drainage patterns were recorded. During a further site visit on 13th April 2021, mapping of any karst features or hydrogeological surface expressions was completed as well as further hydrological mapping; and,
- A flood risk assessment for the proposed development footprint area completed by Tobins (May 2021).

8.2.3 Impact Assessment Methodology

Please refer to Chapter 1 of the EIAR for details on the impact assessment methodology (EPA, 2002, 2003, 2015 and 2017). In addition to the above methodology, the sensitivity of the water environment receptors was assessed on completion of the desk study and baseline study. Levels of sensitivity which are defined in **Table 8-2** are then used to assess the potential effect that the Proposed Development may have on them. refer to Chapter 1 of the EIAR for details on the impact assessment methodology (EPA, 2002, 2003, 2015 and 2017). In addition to the above methodology, the sensitivity of the water environment receptors was assessed on completion of the desk study and baseline study. Levels of sensitivity which are defined in **Table 8-1** are then used to assess the potential effect that the Proposed Development may have on them.

Table 8-2 Receptor Sensitivity Criteria (Adapted from www.sepa.org.uk)

Sensitivity of Receptor	
Not sensitive	Receptor is of low environmental importance (e.g. surface water quality classified by EPA as A3 waters or seriously polluted), fish sporadically present or restricted). Heavily engineered or artificially modified and may dry up during summer months. Environmental equilibrium is stable and is resilient to changes which are considerably greater than natural fluctuations, without detriment to its present character. No abstractions for public or private water supplies. GSI groundwater vulnerability “Low” – “Medium” classification and “Poor” aquifer importance.
Sensitive	Receptor is of medium environmental importance or of regional value. Surface water quality classified by EPA as A2. Salmonid species may be present and may be locally important for fisheries. Abstractions for private water supplies. Environmental equilibrium copes well with all natural fluctuations but cannot absorb some changes greater than this without altering part of its present character. GSI groundwater vulnerability “High” classification and “Locally” important aquifer.
Very sensitive	Receptor is of high environmental importance or of national or international value i.e. NHA or SAC. Surface water quality classified by EPA as A1 and salmonid spawning grounds present. Abstractions for public drinking water supply. GSI groundwater vulnerability “Extreme” classification and “Regionally” important aquifer

8.3 Receiving Environment

8.3.1 General Site Description

The Proposed Development site is located in the townlands of Roscam, Merlin Park and Murrough, Galway City, Co. Galway.

The Proposed Development site is currently rough grassland used for rough grazing with minor areas of forestry at the northwest of the site.

The elevation of the Proposed Development site ranges between approximately 8 and 20m OD (metres above Ordnance Datum) The overall local topography generally slopes from east to west, towards the shoreline located ~ 500m southeast of the site.

The topography of the Proposed Development site was investigated during site visits on 10th September 2019 and 14th April 2021. Within the Proposed Development site, the ground is undulating but relatively flat from the eastern edge to the centre of the site, the ground then slopes with a larger gradient towards the western margin of the site, where elevation drops from ~16 mOD to ~8mOD over a c.80m distance. To the south of the Proposed Development site, the ground generally slopes uphill towards Rosshill Farm before sloping down towards the coastline. The dominant land use on the bordering land is agricultural, with Rosshill Farm Stud located ~ 200m south of the Proposed Development site.

The Proposed Development site does not contain field drains or natural watercourses and it is likely that much of the rainfall that falls on the site drains through the soils, *i.e.*, percolates to ground.

8.3.2 Water Balance

Long term rainfall and evaporation data was sourced from Met Éireann. The 30-year annual average rainfall (1981 - 2010) recorded at Athenry station, located northeast of the Proposed Development site, are presented in **Table 8-3** below. This is the closest station to the proposed development site.

(Please note that these rainfall data are used for baseline characterisation purposes only and are not used for assessing runoff volumes pre/post development or for drainage design).

Table 8-3: Local Average long-term Rainfall Data (mm)

Station		X-Coord		Y-Coord		Ht (MAOD)		Opened		Closed		
Athenry		08° 47'08" W		53° 17'21" N		40		1945		N/A		
Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Total
117	88	95	72	75	80	87	108	100	129	120	123	1,193

The closest synoptic station where the average potential evapotranspiration (PE) is recorded is at Claremorris station, approximately 51 kilometres north of the site. The long-term average PE for this station is 408mm/yr. This value is used as a best estimate of the site PE. Actual Evaporation (AE) at the site is estimated as 388mm/yr (which is $0.95 \times PE$).

The effective rainfall (ER) represents the water available for runoff and groundwater recharge. The ER for the site is calculated as follows:

$$\text{Effective rainfall (ER)} = \text{AAR} - \text{AE}$$

$$= 1,193\text{mm/yr} - 388\text{mm/yr}$$

$$\text{ER} = 805\text{mm/yr}$$

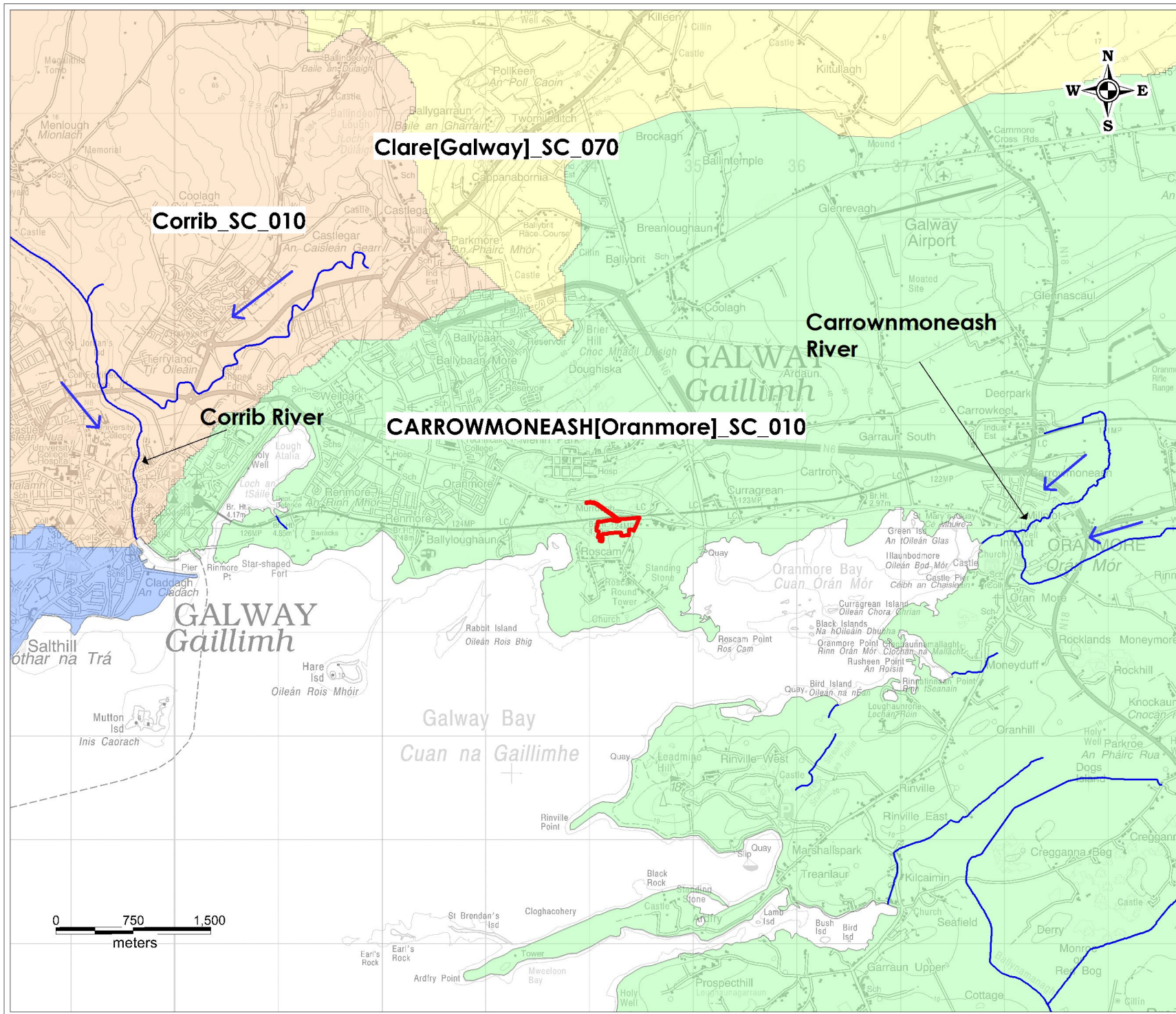
Based on groundwater recharge coefficient estimates at the site (which range from 60% to 85%) from the GSI (www.gsi.ie) an estimate of 563mm/year average annual recharge is given for the study area (70% recharge coefficient). This means that the hydrology of the study area is characterised by low surface water runoff rates and high groundwater recharge rates. The site is also relatively close to the coast (~500m), and all drainage from the site will ultimately end up in Galway Bay.

Therefore, annual recharge and runoff rates for the site are estimated to be 563mm/yr and 242mm/yr respectively. The large coverage of well-draining mineral soils and relatively flat ground means recharge rates are likely to be towards the higher end of the GSI range. This is further emphasised by the lack of surface water drainage features at/near the site.

8.3.3 Regional Hydrology

On a regional scale, the site is located within Hydrometric Area 29. The site is located in the Galway Bay South East catchment and Carrowmoneash (Oranmore)_SC_010 sub-catchment under the Water Framework Directive (WFD). A local hydrology map is shown as **Figure 8.1**.

The Carrowmoneash river is situated ~ 1.5 km southeast of the proposed site, on the opposite side of Oranmore bay. Therefore, it is unlikely that any rainfall falling at the site makes it to this river, given the distance and topography. It is more likely that run-off will flow west/southwest towards the coastline.



Legend

- EIAR Study Area
- Watercourses

		HYDRO ENVIRONMENTAL SERVICES
22 Lower Main St Dunganvan Co. Waterford Ireland		tel: +353 (0)5844122 fax: +353 (0)5844244 email: info@hydroenvironmental.ie web: www.hydroenvironmental.ie

Title: Local Hydrology Map	
Client: MKO	
Job: Rosshill, Co. Galway	
Project No: P1489-1	
Figure No: 8-1	
Sheet Size: A4	
Drawing No: P1489-1-0621-A4-801-0A	
Date: 29/06/2021	
Scale: 1:50,000	
Drawn By: GD	Checked By: MG

8.3.4 Site Drainage

The site appears to be well drained from observations during the site visits. No evidence of water logging, such as the growth of reeds was observed, apart from a small area in the northeast corner of the site.

Small stream channels can be seen along the Rosshill beach which emerges ~ 200m west of the western boundary of the site. It is likely that runoff is flowing along the field boundaries and discharging to the Galway Bay at this point.

There is no evidence of any surface water-groundwater connections or connections to karst conduits at the Proposed development site. A concise site walkover was taken across the Proposed Development site and within the surrounding landholding. No karst features, such as swallow holes or enclosed depressions, which would be associated with a regionally karstified bedrock area, were observed during the walkover.

8.3.5 Flood Risk Identification

A Flood Risk Assessment was completed by Tobin Engineers in May 2021 and is include in Appendix 8-1. The results of this assessment are summarized as the following:

- The proposed development is classified as a “highly vulnerable development” in terms of its sensitivity to flooding under the PSFRM guidelines. Such developments are considered appropriate within Flood Zone C areas.
- The FRA concluded that the site is not liable to fluvial flooding during a 1000-year MRFS, as such the risk of fluvial flooding to the site is minimal.
- Based on a review of PFRA mapping and karst features, it is estimated that the risk of groundwater flooding at the site is minimal.
- Pluvial modelling, carried out as part of the PRFA mapping indicated that the site may be liable to pluvial flooding. As such, mitigation measures were included in the Flood Risk Assessment which included, but were not limited to:
 - Site drainage and storm water will cater for surface water runoff for a design return period 100-year storm event;
 - Surface water runoff from the site will be limited to greenfield runoff rates by the proposed surface water management system in accordance with SUDS design principles;
 - The landscaping and topography of the developed site shall provide safe exceedance flow paths in the event of extreme flood events or in the case of a blockage in the drainage system; and,
 - In an extreme weather event, overflow from the attenuation tank will exit via a high-level overflow to a detention basin located at the north west corner of the proposed development site. During extreme rainfall events, any surface water runoff which exceeds the underground site drainage capacity shall be permitted to flow through a defined flow path to the detention.
- Based on the results of coastal modelling, it is estimated that the Proposed Development site is not at risk from coastal flooding during a 1000-year coastal flood event. Existing ground levels

at the site are $\geq 2\text{m}$ above the estimated 1000-year (0.1%AEP) MRFS coastal flood level of 4.56 mOD. Finished floor level of proposed dwellings (15.65 mOD) provide over 11m of freeboard above the extreme coastal flood event.

- It is estimated that the risk of flooding the proposed residential development will be minimal, and it is predicted that the development will not increase the risk of flooding elsewhere.

8.3.6 Surface Water Hydrochemistry

Q-rating status data is not available for the Carrowmoneash river as no EPA monitoring points exist on this watercourse. No watercourses or field drains exist within the Proposed Development site to determine surface water hydrochemistry.

8.3.7 Hydrogeology

The Burren Formation limestones, which are mapped to underlie the Proposed Development site are classified by the GSI (www.gsi.ie) as a Regionally Important Aquifer – Karstified (conduit). A bedrock aquifer map with the location of mapped karst features is shown as **Figure 8.2**.

The closest mapped karst feature is an enclosed depression situated ~150m north of the proposed development site. A second enclosed depression is located ~250m north-northwest of the site. These depression are also marked on the historic 25" map. The enclosed depressions could not be accessed, however a walkover/visual survey was conducted along the Old Dublin road and the adjoining agricultural lands, with no evidence of emerging springs or groundwater/surface water of any kind. It is unlikely that any near surface groundwater/surface water interaction between the site and the enclosed depressions existed, and it is certainly unlikely to be in existence anymore, due to the emplacement of the road surface and railway line between the site and the mapped features.

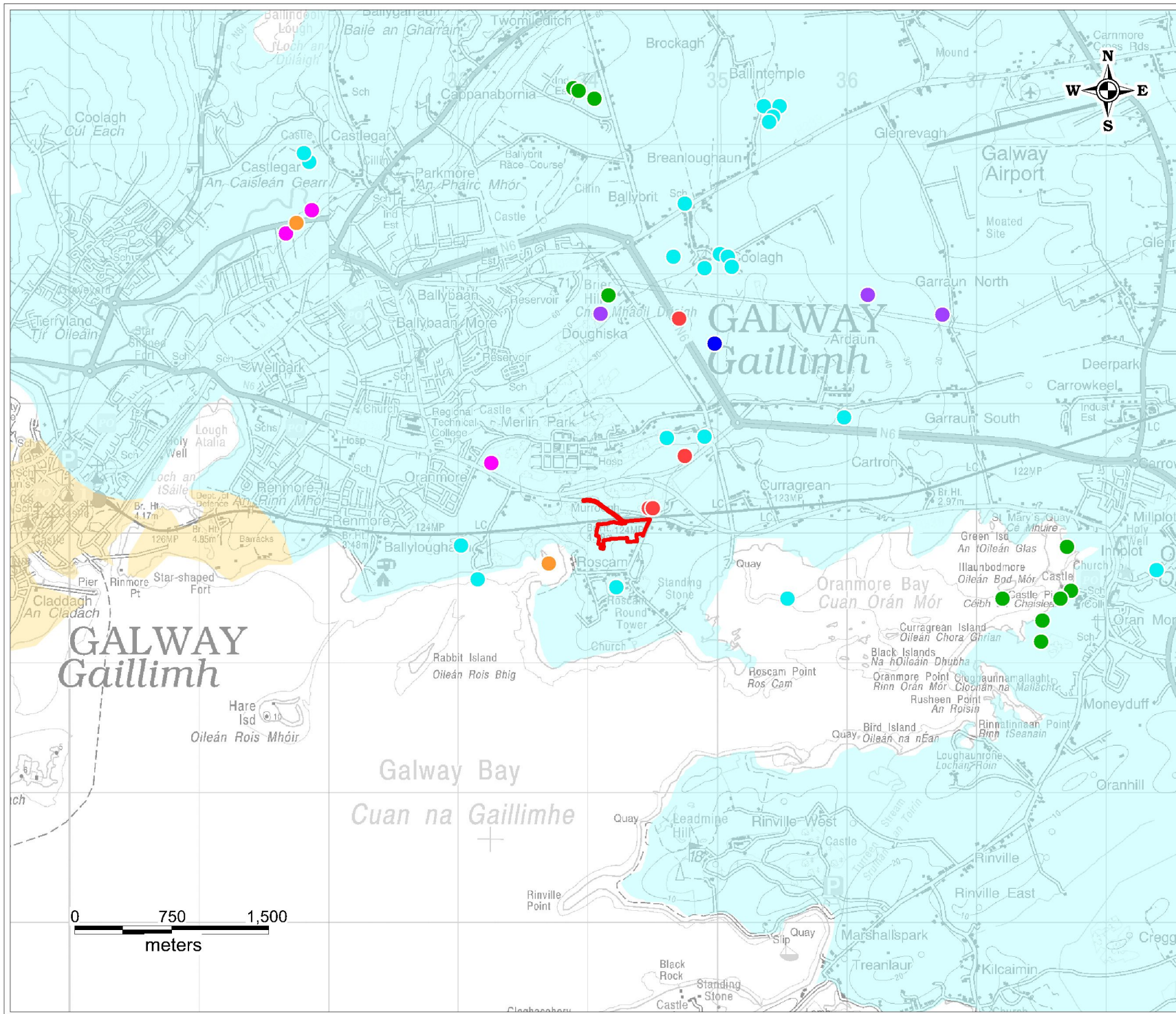
A spring is mapped by the GSI ~470m south of the proposed development site. The spring is topographically upgradient of the site at an elevation of ~22-23 mOD. A walkover survey was conducted along the public roads in this area, the mapped feature could not be accessed as it is on private land. The topography of the ground near this spring slopes steeply towards the coast to the West, not in the direction of the proposed development site.

There are a further 2 no. springs situated ~1.2km and 1.3km west of the site respectively near Murroogh House. The spring nearest the house is at an elevation of ~8 mOD, while the southern of the two is situated along the shoreline at ~0-1 mOD. The topographic gradients would suggest a catchment to these springs which is north of Murroogh House.




A tidal cave is mapped ~500m southwest of the site within Galway Bay. From observations of aerial photography this appear as a small tidal lagoon, where the Limestone has been preferentially eroded and a depression which fills during high tide has formed.

In terms of the aquifer type, this bedrock type has typically high transmissivity and low storativity with lower gradients closer to the coast. Groundwater flow occurs along fissures, faults, joints and bedding planes.








Groundwater flow directions are generally to the west but as flow pathways are often determined by discrete conduits, actual flow directions will not necessarily be perpendicular to the assumed water table contours (GSI, 2004). Due to the proximity to the coastline at the site, and the topography, flow directions are likely to be to the south/southwest.



Legend

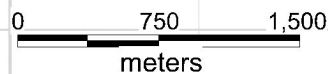
-  EIAR Study Area
-  Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
-  Regionally Important Aquifer - Karstified (conduit)

Karst Features Legend

-  Borehole
-  Cave
-  Enclosed Depression
-  Spring
-  Superficial Solution Features
-  Swallow Hole
-  Turlough

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Title: Local Bedrock Aquifer Map	
Client: MKO	
Job: Rosshill, Co. Galway	
Project No: P1489-1	
Figure No: 8-2	
Sheet Size: A4	
Drawing No: P1489-1-0621-A4-802-0A	
Date: 29/06/2021	
Scale: 1:40,000	
Drawn By: GD	Checked By: MG



8.3.8 Groundwater Vulnerability

The vulnerability rating of the aquifer within the overall site is classified as “Extreme (E) which is broadly defined as bedrock at a depth of 1-3m below the ground surface. Some bedrock can be observed near the ground surface on higher ground south of the site, but within the proposed site boundary there is likely a deeper subsoil. A soil profile of ~0.5m was observed within a small cut section towards the northeast of the site. The base depth of this soil or subsoil below could not be seen.

8.3.9 Groundwater Hydrochemistry

There are no groundwater quality data for the proposed development site and groundwater sampling would generally not be undertaken for this type of development in terms of EIAR reporting as groundwater quality impacts would not be anticipated. There are also no proposed direct discharges to ground. The WFD status for the local groundwater body in terms of water quality is Good and therefore this is assumed to be the baseline condition for groundwater in the area of the proposed development.

Based on data from GSI publication Calcareous/Non calcareous classification of bedrock in the Republic of Ireland (WFD,2004), alkalinity for this bedrock type generally ranges from 9.6 – 990mg/L while electrical conductivity and hardness were reported to have mean values of 691µS/cm and 339mg/L respectively.

8.3.10 Water Framework Directive Water Body Status & Objectives

Local Groundwater Body and Surface Water Body status and risk result are available from (www.catchments.ie).

The proposed development site predominately drains to the underlying subsoil and aquifer.

No River water quality data is available for watercourses near the site.

8.3.11 Groundwater Body Status

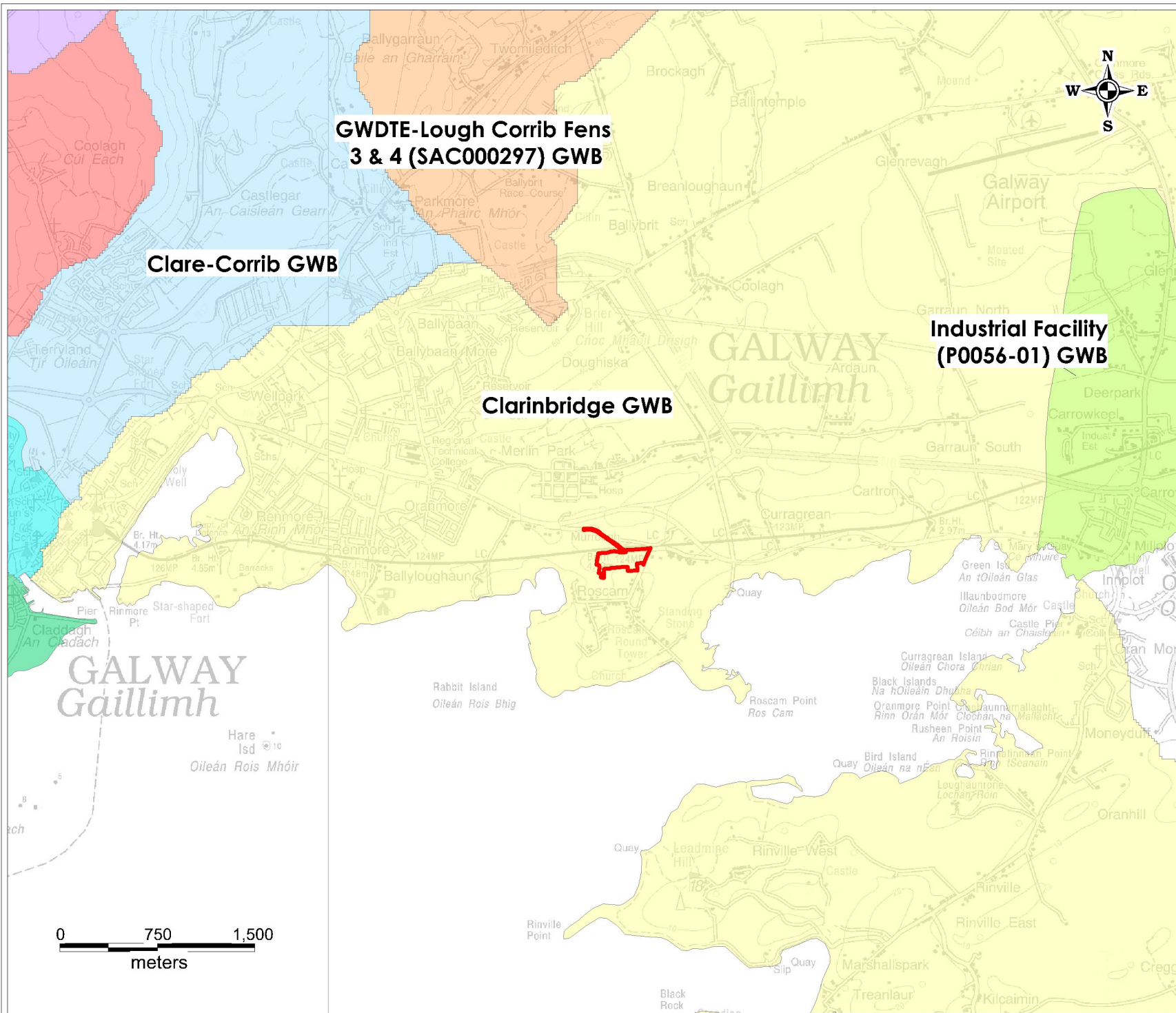
Local Groundwater Body (GWB) status information are available (www.catchments.ie). Refer to **Figure 8.3** for the location and extent of local groundwater body.

The Clarinbridge GWB (IE_WE_G_0008) which underlies the Proposed Development site is assigned ‘Good’ status under the WFD 2010-2015.

8.3.12 Designated Sites & Habitats

Designated sites include National Heritage Areas (NHAs), Proposed National Heritage Areas (pNHAs), Special Areas of Conservation (SACs), candidate Special Areas of Conservation (cSAC) and Special Protection Areas (SPAs).

Immediately to the west of the proposed site is the Galway Bay Complex SAC (Code: 000268), and drainage from the site enters the Inner Galway Bay SPA (Code: 004031) approximately 500m downstream (west) of the proposed site. The Galway Bay Complex is also listed as a proposed NHA. A designated sites map is attached as **Figure 7-4** of Chapter 7.



Legend

 EIAR Study Area

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Title: Groundwater Bodies Map	
Client: MKO	
Job: Rosshill, Co. Galway	
Project No: P1489-1	
Figure No: 8-3	
Sheet Size: A4	
Drawing No: P1489-1-0621-A4-803-0A	
Date: 29/06/2021	
Scale: 1:40,000	
Drawn By: GD	Checked By: MG

8.3.13 Water Resources

There are no groundwater protection zones mapped within the proposed development site or study area. There is 1 no. mapped private well (GSI database to accuracy of <50m) located ~0.5km at Murrough House, which was obtained from the GSI well database (www.gsi.ie). This well is listed as being 9.8m deep and likely coincides with the mapped karst spring near Murrough House.

No groundwater wells would be expected in the area, given the proximity to the sea. Notwithstanding this, an assessment of groundwater resources relative to the proposed development is included in Section 8.5.1.

8.3.14 Receptor Sensitivity

Due to the nature of residential developments, being near surface construction activities, impacts on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during impact assessments. There is, however, a distinct lack of surface water channels near the site, therefore drainage from the site will likely be through the subsoils and potentially through the bedrock aquifer in the direction of Galway Bay to the south of the proposed development site. The primary risk to groundwater at the site would be from cementitious materials, hydrocarbon spillage and leakages. The above are common potential impacts on all construction sites (such as road works and industrial sites). All potential contamination sources are to be carefully managed at the site during the construction and operational phases of the development and mitigation measures are proposed below to deal with these potential minor impacts.

Based on criteria set out in **Table 8.1** above, the Regionally Important Karstified Aquifer (i.e. Limestone) at the site can be classed as Sensitive to pollution. Also, any contaminants which may be accidentally released on-site may also discharge through the subsoil or unmapped local surface water drainage channels, and then on into Galway Bay.

Comprehensive surface water and groundwater mitigation and controls are outlined below to ensure protection of all downstream receiving waters during construction and operational phases of the development. Mitigation measures will ensure that any surface runoff from the developed areas of the site will be of a high quality and will therefore not impact on the quality of downstream surface water bodies. Any introduced drainage works at the development site will mimic the existing hydrological and hydrogeological regime, and discharge will be to ground via soakaways, thereby avoiding changes to surface water flow volumes leaving the site.

8.3.15 Proposed Site Infrastructure and Drainage Management

It is proposed that the development will drain via gravity to 6 no. soakaways proposed on site. Water draining to soakaways will pass through silt traps and hydrocarbon interceptors prior to reaching each soakaway. No surface water from roofs or paved surfaces will be discharge from the site, other than via the soakaways to ground. Bioswales are proposed for the management of storm water near the car parking areas around the apartment block.

Water supply to the site will be via connection to the adjacent public (Irish Water) watermain.

The proposed on-site foul sewers will discharge by gravity to a pumping station to the northwest of the site, and the foul waste will discharge from this pumping station via pumped rising main to the adjacent public (Irish Water) foul sewer network.

Characteristics of the Proposed Development

The proposed development is described in Chapter 3 and will generally comprise the following:

- Construction of 102no. residential units comprising of 35 apartments and 67 houses;
- Demolition of the existing silage concrete apron (40sqm);
- Childcare facility (398.8sqm over 2-storeys);
- Retail/Commercial space (216sqm) including loading bay;
- Provision of shared communal and private open space, including play and fitness equipment;
- Car and cycle parking, including electric vehicle charging points;
- Provision of all associated surface water and foul drainage services and connections including pumping station;
- Landscaping, access routes and public art;
- Lighting and associated works;
- Access and junction improvements at Rosshill Road and Rosshill Stud Farm Road; and,
- All associated works and services

The proposed development will typically require minor alteration of ground levels to ensure it is at an adequate level for the proposed surface water drainage, foul water drainage and to mitigate flood risk.

Excavation of soil and subsoil will be required for the proposed development in preparation for the construction of building foundations and in the preparation of a suitable sub-formation for road construction, trenching for foul and drainage water infrastructure and other services.

Surface Water Drainage

It is proposed that the development will drain via gravity to 6 no. soakaways proposed on site. Water draining to soakaways will pass through silt traps and hydrocarbon interceptors prior to reaching each soakaway. No surface water from roofs or paved surfaces will be discharge from the site, other than via the soakaways to ground. Bioswales are proposed for the management of storm water near the car parking areas around the apartment block.

Water Supply

Water supply to the site will be via connection to the adjacent public (Irish Water) watermain.

Wastewater Infrastructure

The proposed on-site foul sewers will discharge by gravity to a pumping station to the north-west of the site, and the foul waste will discharge from this pumping station via pumped rising main to the adjacent public (Irish Water) foul sewer network that leads to the Merlin Park pumping station, which has sufficient capacity to accommodate the proposed 102 units.

8.5 Potential Impacts and Mitigation Measures

8.5.1 Construction Phase Potential Impacts

8.5.1.1 Earthworks (Removal of Vegetation Cover, Excavations and Stock Piling) Resulting in Suspended Solids Entrainment in Surface Waters

Construction phase activities including site levelling, service trench construction, levelling/construction and building foundation excavation will require earthworks resulting in removal of vegetation cover and excavation of any minor local pockets of organic soil/subsoils, and bedrock. Such excavations will be relatively shallow and temporary. The main risk will be from surface water runoff from bare soil and soil storage areas during construction works.

The site is relatively unique in that there are no adjacent natural or man-made watercourses and surface water generally percolates to ground. However, construction activities can result in the release of suspended solids to local drainage features and can result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies, such as Oranmore Bay/Galway Bay. However, as outlined in the Natura Impact Statement (NIS), Section 7.1, there is “no direct surface water connectivity between the site of the proposed project and any EU designated site”. This statement aligns with observations made by HES during the walkover surveys. This potential impact cannot directly affect the Galway Bay SAC.

Surface water has the potential to carry suspended sediment via overland flow. Due to the nature of the site topography, the pathway for overland flow is limited and surface waters are expected to stay within the site boundary and percolate through the soil/subsoil. This potential impact (overland flow transporting suspended sediment) can potentially indirectly effect areas of the Galway Bay SAC.

Pathways: Drainage and surface water discharge routes. Overland drainage.

Receptors: Down-gradient transitional and water dependent ecosystems.

Pre-Mitigation Impact: Indirect, negative, slight, temporary, low probability impact.

Proposed Mitigation Measures:

Management of surface water runoff and subsequent treatment prior to release off-site will be undertaken during construction work as follows:

- Prior to the commencement of earthwork silt fencing will be placed down-gradient of the construction areas where unmapped drains or drainage pathways are located, if present. These will be embedded into the local soils to ensure all site water is captured and filtered;
- As construction advances there may be a small requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing;
- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;

- Daily monitoring and inspections of site drainage during construction will be completed;
- Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation of watercourses; and,
- Good construction practices such as wheel washers and dust suppression on site roads, and regular plant maintenance will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment.

Residual Impact: No impacts on water quality or downstream designated sites are anticipated.

Significance of Effects: No significant impacts on surface water quality are expected due to site excavation work. There is limited hydraulic connectivity between the site and watercourses and mitigation measures will be employed on a precautionary basis.

8.5.1.2 Potential Surface Water Quality Impacts from Shallow Excavation Dewatering

Some groundwater seepages will likely occur in foundation excavations and especially where more permeable weathered bedrock is encountered. Dewatering, if undertaken, will create additional volumes of water to be treated by the runoff management system. Inflows will likely require management and treatment to reduce suspended sediments. No contaminated land was noted at the site and therefore historical pollution sources are not anticipated. Such works will be temporary.

Pathway: Overland flow and site drainage network.

Receptor: Down-gradient surface water bodies.

Pre-Mitigation Impact: Indirect, negative, moderate, temporary, low probability impact to surface water quality.

Impact Assessment

Management of excavation seepages and subsequent treatment prior to discharge into the site drainage network will be undertaken as follows:

- Appropriate temporary interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place if required;
- If required, pumping of excavation inflows will prevent build-up of water in the excavation;
- The pumped water volumes will be discharged onto ground for infiltration or into temporary sediment attenuation ponds adjacent to excavation areas, or via silt bags; and,
- There will be no direct discharge to any water body, and therefore no risk of hydraulic loading or contamination will occur.

The temporary nature of such works (if they are required), and also the limited shallow depth of any such requirement will not affect the local hydrological regime, the level of the water table, nor the throughflow of shallow or deeper groundwater flow below the development site.

Residual Impact: Indirect, negative, slight, temporary, low probability impact on downstream surface waters.

No impact on groundwater levels or groundwater quality.

Significance of Effects: No significant impacts on surface water quality, groundwater levels or groundwater quality are expected due to excavation dewatering.

8.5.1.3 Potential Effects on Groundwater Vulnerability and Site Hydrogeology

The excavation of soils and subsoils within the proposed development site can impact the groundwater vulnerability by reducing the thickness of soil/subsoil overlying the bedrock aquifer. The excavation of soils and subsoils can also impact on near surface (Karst) hydrogeological features such as dolines/swallow holes.

Pathway: Excavation/removal of soil/subsoil.

Receptor: Groundwater vulnerability and near surface hydrogeological features.

Pre-Mitigation Impact: Indirect, negative, slight, medium term, likely impact to local groundwater vulnerability.

Indirect, negative, significant, short term, unlikely impact to karst features (No karst features observed during 2 no. site surveys).

Proposed Mitigation Measures - Mitigation by Design:

- Soil and subsoil excavated at the site will be temporarily stored and used for the landscaping at the proposed development site. The volume removed from the site will essentially be neutral, thus the average thickness of soil/subsoil will remain the same at the site.
- Surface water drainage from the site will be directed towards soakaways, which will be constructed in areas of considerable overburden thickness.
- There will be no wastewater discharge directly to site.

Residual Impact: Indirect, negative, imperceptible, long term, unlikely impact on groundwater vulnerability.

Indirect, negative, imperceptible, long term, very unlikely impact on unmapped karst features.

Significance of Effects: No significant effects on groundwater vulnerability or the site hydrogeological regime are anticipated.

8.5.1.4 Potential Release of Hydrocarbons during Construction Stage

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms.

Pathway: Groundwater flowpaths and site drainage network.

Receptor: Groundwater and surface water.

Pre-Mitigation Impact: Indirect, negative, slight, short term, likely impact to local groundwater quality.

Indirect, negative, significant, short term, unlikely impact to surface water quality.

Proposed Mitigation Measures - Mitigation by Design:

- On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site and will be towed around the site by a 4x4 jeep to where machinery is located. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations;
- Fuels stored on site will be minimised. Any storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction;
- The plant used should be regularly inspected for leaks and fitness for purpose; and,
- An emergency plan for the construction phase to deal with accidental spillages will be contained within Environmental Management Plan. Spill kits will be available to deal with accidental spillages.

Residual Impact: Indirect, negative, imperceptible, temporary, unlikely impact on groundwater and surface water.

Significance of Effects: No significant effects on surface water or groundwater quality are anticipated.

8.5.1.5 Groundwater and Surface Water Contamination from Wastewater Disposal

Release of effluent from on-site wastewater systems has the potential to impact on groundwater and surface waters.

Pathway: Groundwater flowpaths and site drainage network.

Receptor: Down-gradient well supplies, groundwater quality and surface water quality.

Pre-mitigation Impact: Indirect, negative, significant, temporary, unlikely impact to surface water quality.

Indirect, negative, slight, temporary, unlikely impact to local groundwater.

Proposed Mitigation Measures - Mitigation by Avoidance:

- A self-contained port-a-loo with an integrated waste holding tank will be used at the site compound, maintained by the providing contractor, and removed from site on completion of the construction works; and,
- No wastewater will be discharged on-site during either the construction or operational phase.

Residual Impact: No impact.

Significance of Effects: No significant effects on surface water or groundwater quality are anticipated.

8.5.1.6 Release of Cement-Based Products

Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative impacts on water quality. They generate very fine, highly alkaline silt (pH 11.5) that can

physically damage fish by burning their skin and blocking their gills. Entry of cement-based products into the site drainage system, into surface water runoff, and hence to surface watercourses or directly into watercourses represents a risk to the aquatic environment.

Pathway: Site drainage network.

Receptor: Surface water and transitional water hydrochemistry.

Pre-Mitigation Impact: Indirect, negative, moderate, short term, unlikely impact to surface water.

Proposed Mitigation Measures - Mitigation by Avoidance:

- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place;
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;
- Where concrete is delivered on site, only the chute need be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be tanked and removed from the site to a suitable, non-polluting, discharge location;
- Use weather forecasting to plan dry days for pouring concrete; and,
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.

Residual Impact: Negative, Indirect, imperceptible, short term, unlikely impact.

Significance of Effects: No significant effects on surface water quality are anticipated.

8.5.1.7 Potential Impacts on Hydrologically Connected Designated Sites

The lands to the east, west and south of the proposed site are located within the Galway Bay Complex SAC (Code: 000268). A review of available hydrogeological information has been used to assess impacts on the SAC east and west of the site.

Possible effects during the construction phase include surface and ground water quality impacts which could be significant if mitigation is not put in place.

There will be no impacts on the local hydrological regime or water quality during the construction phase for the following reasons:

- There is no direct hydrological connection to any other watercourse from the site, which limits the pathway for surface water to overland flow only.
- No significant dewatering is proposed during construction. Any pumping required will be temporary and at a very shallow depth.
- No new open drainage channels are proposed.
- All building works are proposed at or very near existing ground levels with minimal ground disturbance proposed.
- No deep foundations are required or are proposed. As such there will be no interruption or blocking of shallow or deep groundwater pathways below the site.
- Measures to prevent impacts from earthworks are set out in Section 8.5.1.1.
- Measures will be in place to protect against potential impacts on groundwater as set out in Sections 8.5.1.3 – 8.5.1.5

Groundwater flowpaths will be maintained as any excavation proposed will be shallow, and any required dewatering during construction will also be shallow and temporary in nature. Groundwater flowpaths from east to west below the site will be unaltered by the proposed development.

Pathway: Surface water and groundwater flowpaths.

Receptor: Down-gradient water quality and hydrological regime of designated sites.

Pre-Mitigation Impact: Indirect, negative, moderate - significant, long term, likely impact to surface water and groundwater quality.

No impacts on groundwater levels or existing hydrological regime or flowpaths.

Proposed Mitigation Measures

The proposed mitigation measures for protection of surface water quality which will include on site drainage control measures (i.e. silt fences, silt bags etc) will ensure that the quality of runoff from proposed development areas will be good. As outlined above controls will also be put in place to manage risks associated with hydrocarbons/chemicals and cement-based products used during construction phase and this will provide protection to groundwater.

All surface water arising on site will drain via soakaways to ground, with no proposed outfall. Groundwater quality risks are reduced during the operational phase by use of hydrocarbon interceptors and silt traps prior to discharge to the soakaways.

Residual Impact: No impacts on water quality or downstream designated sites will occur. No impacts on groundwater levels or existing hydrological regime or groundwater flowpaths relating to the Galway Bay SAC.

Significance of Effects: No significant effects on groundwater or surface water quality and downstream designated sites are anticipated.

No significant impacts on groundwater levels, existing hydrological regime, or groundwater flowpaths relating to the Galway Bay SAC.

8.5.2 Operational Phase Impacts

8.5.2.1 Potential Increased Flood Risk due to Increased Hardstanding Area

Replacement of the greenfield surface with hardstand surfaces will result in an increased risk of pluvial flooding due to low permeability surfaces which will inhibit any downward percolation of rainwater.

All surface water arising on site will drain via soakaways to ground, with no proposed outfall. Towards the northwest of the site, where there is a risk of pluvial flooding, a retention swale for storm overflow is proposed.

There will be no net change in the volume of rainfall infiltrating to ground or leaving the site as runoff due to the proposed development. The potential for a high rate of groundwater recharge is evident at the site from the lack of surface water channels at/near the site.

Under the low-medium and high emissions scenarios for future climate change, it is estimated that there will be an overall reduction in rainfall in Ireland of ~0-20%, while the frequency of high rainfall events may increase by up to 20%. This would give a net reduction in effective rainfall at the site of up to 160mm, with more frequent heavy rainfall events during the winter. The intensity of future rainfall

events is difficult to model and ascertain, but under the current conditions of ~805mm of effective rainfall, there are no issues in the ability of the soil, subsoil and bedrock to accommodate recharge. The introduction of soakaways may channel the rainfall towards a smaller net area, however this is taken into account within the design of the soakaways.

Pathway: Site surface water drainage network.

Receptor: Site, adjacent lands and nearby infrastructure

Pre-Mitigation Impact: Direct, negative, slight, long term, low probability impact.

Proposed Mitigation Measures

The risk of pluvial flooding is minimised by using soakaways for drainage management. A retention swale for storm overflow is also proposed.

Residual Impact: Direct, negative, imperceptible, long term, low probability impact in relation to flood risk.

Significance of Effects: No significant effects in terms of flooding are expected due to the proposed development.

8.5.2.2 Potential Impacts on Hydrologically Connected Designated Sites

The lands and coastal areas to the east, west and south of the proposed site are located within the Galway Bay Complex SAC (Code: 000268), as well as the Inner Galway Bay SPA.

Possible effects during the operational phase continue to include water quality impacts which could be significant if ongoing mitigation is not put in place.

There will be no impacts on the local hydrological regime during the operational phase of the development for the following reasons:

- There will be no net change in recharge at the Development Site. Soakaways will be used for roof water to recharge into ground.
- Petrol/Oil Interceptors will be installed at the soakaways.
- No dewatering will occur during the operational phase of the development.
- No new drainage channels are proposed.
- All building works will be complete and will have been installed at or very near existing ground levels with minimal ground disturbance having occurred.
- No deep foundations will have been installed. As such there will be no interruption or blocking of shallow or deep groundwater pathways below the site during the operational phase.

Groundwater flowpaths will be maintained during the operational phase as any excavation proposed will be shallow. Groundwater flowpaths during the operational phase from east to west below the site will be unaltered by the proposed development.

Pathway: Surface water and groundwater flowpaths.

Receptor: Down-gradient water quality and hydrological regime of designated sites.

Pre-Mitigation Impact: Indirect, negative, moderate, long term, likely impact to surface water and groundwater quality.

No impacts on groundwater levels or existing hydrological regime or flowpaths.

Proposed Mitigation Measures

During the operational phase, all surface water arising on site will drain via soakaways to ground, with no proposed outfall. Groundwater quality risks are reduced during the operational phase by use of hydrocarbon interceptors and silt traps prior to discharge to the soakaways.

There will be no surface water discharge from the proposed development site which could impact on the designated sites. Runoff from internal roads, roofs and other hardstanding areas will discharge via the soakaways.

Residual Impact: No impacts on water quality or downstream designated sites are anticipated.

No impacts on groundwater levels or existing hydrological regime or groundwater flowpaths relating to the Galway Bay SAC and Inner Galway Bay SPA.

Significance of Effects: No significant impacts on groundwater or surface water quality and downstream designated sites will occur.

No significant impacts on groundwater levels, existing hydrological regime, or groundwater flowpaths relating to the Galway Bay SAC and Inner Galway Bay SPA.

8.5.3 **Assessment of Potential Health Effects**

Potential health effects are associated with negative impacts on public and private water supplies and potential flooding. There are no mapped public supply group water scheme groundwater protection zones in the area of the proposed housing site.

The proposed site design and mitigation measures outlined in the previous subsections ensures that the potential for impacts on the water environment are not significant.

The flood risk assessment for the development has also shown that the risk of the proposed housing development contributing to downstream flooding is also very low, and also that the risk of inundation of the houses within the site post construction is very low due to the proposed design floor levels and site layout.

8.5.4 **Do Nothing Scenario**

Current land use (grassing/agriculture/scrub) will continue. Surface water drainage and infiltration to ground will continue as is occurring currently with no impact on either surface or groundwater.

8.5.5 **Worst Case Scenario**

Contamination of surface water streams (although a direct hydraulic connection to any stream/river was not identified during the site visit) during the construction and operational phases, which in turn could affect the ecology and quality of the downstream water bodies such as the Galway Bay. Also, potentially localised groundwater contamination may occur. However, measures will be put in place to prevent this from happening.

8.5.6 Cumulative effects resulting from Interactions between various elements of the proposed development

The interaction of the various elements of the proposed development was considered and assessed in this EIAR with regards hydrology. The potential for each individual element of the proposed development on its own to result in significant effects on water receptors was considered in the impact assessment. The entire project including the interactions between all its elements was also considered and assessed for its potential to result in significant effects on water receptors in the impact assessment presented. The interactions between the requirement for site drainage and the requirement to protect surface waters, ground water, and other receptors were taken into account for the entire project and any impacts avoided through a series of mitigation measures that were fully described. The management and handling of potentially harmful materials across the entire project was assessed with mitigation proposed and described fully.

All interactions between the various elements of the project were considered and assessed both individually and cumulatively within this chapter. Where necessary, mitigation was employed to ensure that no cumulative effects will arise as a result of the interaction of the various elements of the development with one another.

8.5.7 Cumulative Impacts

The potential cumulative effects of the proposed development in combination with the other projects described in Chapter 2 of this report have been considered in terms of impacts on hydrology and hydrogeology. There are 10 no. proposed housing developments with permission granted in the locality. A description of the development types are included below within

Table 8-4 and where appropriate the application documentation, EIAR and NIS have been reviewed to inform the assessment.

Table 8-4: Local/Nearby Developments

Application Reference	Description
99/687	Permission for 59 houses and associated site development works.
00/841	Permission for 304 two storey houses, 18 apts, in a 3 storey residential block, & 15 apts. in a mixed use block of 3/4 storeys, incorporating commercial neighbourhood facilities, incl. a creche, doctors surgery & retail space, with associated carparking; site development works incl., temporary sewerage treatment plant & providing new vehicular access points to the Cheshire House grounds & 3 neighbourhood dwellings on the site.
04/724	Permission to construct ninety two semi-detached houses (92 no.) and fifteen detached houses (15 no.) to provide a new entrance from Coast Road (R338) and to provide new entrance from Doughiska Road to the development site together with all site services.
15/194	Permission for development at this site at Roscam with access from the Oranmore Road (R338), Galway and measuring c. 2.24 hectares in area. The development will consist of 49 no. two-storey detached and semi-detached four bedroom houses, 2 no.

Application Reference	Description
99/687	Permission for 59 houses and associated site development works.
	two-storey semi-detached 3 bedroom houses and a three/four storey apartment block containing 12 no. 2 bedroom apartments and a crèche (166sq.m) at ground floor. Permission is also sought for all associated car-parking, landscaping, boundary treatments and ancillary site development works including amendments to car-parking, boundary treatment and Site no. 67 forming part of permitted development under Reg. Ref. 05/940 (subsequently amended by permission Reg. Ref. 13/347).
16/228	Permission for a new residential development. The development consists of 16 no. 2-storey, five-bedroom, detached houses, together with individual garages, as applicable, new vehicular site accesses and roads with all ancillary site works, landscaping and service connections
17/283	Permission to construct 23 two storey Dwellinghouses consisting of Detached, Semi-detached and terrace including access/egress off the old coast road to Oranmore with sewer connection to adjacent sewer pumping station adjacent the Dublin Road and all associated services.
18/187	Permission for a change of house type to previously granted planning permission (reference 16/228). These amendments consist of a change of house type C (on site 6 only) which is a 5-bedroom two storey detached house
19/95	Permission for development which consists of the constructing 51 No. one, two and three bedroom apartments and two one bedroom Town Houses in 6 no. Blocks ranging in height from one storey up to four storey, with sewer connection to adjacent pumping station adjacent Dublin road, together with access/egress off the old coast road to Oranmore and all associated services at Doughiska and Merlin Park Townlands. (Previous Planning Ref No. 17/283)
21/28	Permission for development which will consist of; variations to domestic garage design from that previously granted under 16/228 to include proposed domestic garage and gym and associated works.
21/73	Permission for development which will consist of amendments to previously granted planning permission (ref 16/228). The amendments consist of the following changes : 1. Minor changes to boundaries of sites 8,9,10,11 to accommodate revised house types. 2. Minor changes to alignment of proposed access road and junction between sites 8 and 12. 3 Change of house types on sites 8,9,10,11 which are to remain 5 bedroom two storey detached houses. 4. Minor amendments to side and rear elevation of house type A1 currently granted on site 15. 5. Minor amendments to side and rear elevation of house type B2 currently granted on sites 12 and 13. 6. Proposed garages for sites 8,12,13,15.

No significant cumulative impacts on the water environment are anticipated during the construction or operational phases as long as mitigation measures outlined are put in place. The 10 no. developments are topographically upgradient of the proposed development with appropriate water and wastewater services.

There are no proposed discharges of any substance from the site during the construction phase of the proposed development. The hydrological regime, which includes percolation of rainfall to ground, will not be altered significantly during the construction phase. Potential emissions from the site are therefore related to potential uncontrolled releases and so a range of procedures, management plans and infrastructural mitigation proposals have been identified and described earlier in this chapter and will be implemented to ensure that such uncontrolled releases do not occur. The potential for residual impacts on water and ground water receptors is considered to be imperceptible and so the potential for cumulative effects associated with these receptors is limited. It is highly unlikely that all nearby proposed developments projects (as listed in Table 8-4) would be constructed at the same time and so the potential for multiple uncontrolled releases to water are also not likely. Should some or all nearby proposed development projects be constructed at the same time, the water quality controls at the Proposed Development site will ensure no likely significant cumulative effects will occur. Furthermore, it should be noted that planning and construction standards require that similar water quality controls will be implemented at other nearby development sites (as listed in Table 8-4), thus further reducing the potential for likely, significant cumulative effects.

During the operational phase, all surface water arising within the Proposed Development site will drain via soakaways to ground, with no proposed outfall. The water quality controls at the Proposed Development site will ensure no likely significant effects cumulatively will occur during the operational phase. Mandated water quality controls at the other nearby development sites will further reduce the potential for likely, significant cumulative effects.

Wastewater effluent arising from the operational phase of the proposed development will be piped to, and treated at, the municipal wastewater treatment plant via the Merlin Park pumping station. The Mutton Island treatment plant operates under licence from the EPA. The EPA cannot issue a licence in the event that emissions from that facility could lead to unacceptable environmental emissions. In circumstances where Irish Water has confirmed that the waste water arising from the proposed development will be treated at the Mutton Island wastewater treatment plant, the potential for cumulative effects associated with the wastewater discharges does not arise.

No significant cumulative impacts on the water environment are anticipated during the construction or operational phases in circumstances where the proposed mitigation measures are implemented effectively. The 10 no. developments in the locality of the proposed development have been designed with appropriate water and wastewater services as has the Proposed Development.

8.5.8 Conclusion

The Proposed Development site is naturally separated from any local watercourses, and this setback distance means that there is limited potential for impact on water quality or the downstream designated sites.

Notwithstanding this, during each phase of the proposed housing development at Rosshill (construction and operation) a number of activities will take place on the proposed development site, some of which will have the potential to affect the hydrological regime or water quality at the site or its vicinity. These potential impacts generally arise from sediment input from runoff and other pollutants such as hydrocarbons and cement-based compounds, with the former having the most potential for impact during the construction phase.

Surface water drainage measures, pollution control and other preventative measures have been incorporated into the project design to minimise significant adverse impacts on water quality and downstream designated sites.

The surface water drainage plan will focus on silt management using silt fences, and silt bags, and to control runoff rates. The key surface water control measure is that there will be no direct discharge of

development runoff into local watercourses. This will be achieved by avoidance methods and design methods (i.e. surface water drainage to soakaways).

Preventative measures during construction include fuel and concrete management and a waste management plan which will all be incorporated into the Construction and Environmental Management Plan.

Overall, the Proposed Development presents no significant impacts to surface water and groundwater quality provided the proposed mitigation measures are implemented.

There will be no net impact on the local hydrological regime, groundwater levels, or groundwater flowpaths during the construction and operational phase of the proposed development. There will be no direct or indirect hydrological impacts on the Galway Bay SAC.

No significant cumulative impacts on groundwater or designated sites are anticipated.

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9. AIR & CLIMATE

9.1 Introduction

MKO prepared the Air & Climate section of this Environmental Impact Assessment Report (EIAR) for the proposed housing development at Rosshill, Co. Galway.

This Chapter examines the effect of the proposed development on air and climate. Where required, appropriate mitigation measures to limit any identified significant impacts to air and climate are recommended.

9.1.1 Statement of Authority

This section of the EIAR has been prepared by Thomas Blackwell and reviewed by Michael Watson, both of MKO. Thomas Blackwell is a Senior Environmental Scientist with MKO with over 15 years of progressive experience in environmental consulting in Ireland and the USA. Thomas holds a BA (Hons) in Geography from Trinity College Dublin and a M.Sc. in Environmental Resource Management from University College Dublin. Michael completed an MA in Environmental Management at NUI, Maynooth in 1999. Michael is a professional geologist (PGeo) and full member of IEMA (MIEMA) as well as a Chartered Environmentalist (CEnv).

9.1.2 Relevant Guidance

The air quality and climate section of this EIAR has been prepared out in accordance with the ‘EIA Directive’ as amended by Directive 2014/52/EU. It has also been carried out in accordance with the guidance listed in Section 1.5.4 of Chapter 1: Introduction, where relevant and the ‘Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment’ (European Commission, 2013).

9.2 Air

9.2.1 Background

The proposed development site is approximately 4.7 hectares in extent and is located between Galway city centre and Oranmore town (approximately 4km from each). It is anticipated that the construction of the development will be completed over 3 phases (See ONOM phasing plan ref 3028) and is expected to last approximately 2.0 years in total.

Due to the nature of the development, the general character of the surrounding environment and publicly available information on air quality, air quality sampling, was deemed to be unnecessary for this Environmental Impact Assessment Report (EIAR).

9.2.2 Air Quality Standards

In 1996, the Air Quality Framework Directive (96/62/EC) was published. This Directive was transposed into Irish law by the Environmental Protection Agency Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999. The Directive was followed by four Daughter Directives, which set out limit values for specific pollutants:

- The first Daughter Directive (1999/30/EC) deals with sulphur dioxide, oxides of nitrogen, particulate matter and lead.
- The second Daughter Directive (2000/69/EC) addresses carbon monoxide and benzene. The first two Daughter Directives were transposed into Irish law by the Air Quality Standards Regulations 2002 (SI No. 271 of 2002).
- A third Daughter Directive, Council Directive (2002/3/EC) relating to ozone was published in 2002 and was transposed into Irish law by the Ozone in Ambient Air Regulations 2004 (SI No. 53 of 2004).
- The fourth Daughter Directive, published in 2007, deals with polycyclic aromatic hydrocarbons (PAHs), arsenic, nickel, cadmium and mercury in ambient air.

The Air Quality Framework Directive and the first three Daughter Directives have been replaced by the Clean Air for Europe (CAFE) Directive (Directive 2008/50/EC on ambient air quality), which encompasses the following elements:

- The merging of most of the existing legislation into a single Directive (except for the Fourth Daughter Directive) with no change to existing air quality objectives.
- New air quality objectives for PM_{2.5} (fine particles) including the limit value and exposure concentration reduction target.
- The possibility to discount natural sources of pollution when assessing compliance against limit values.
- The possibility for time extensions of three years (for particulate matter PM₁₀) or up to five years (nitrogen dioxide, benzene) for complying with limit values, based on conditions and the assessment by the European Commission.

Table 9-1 below sets out the limit values of the CAFE Directive, as derived from the Air Quality Framework Daughter Directives. Limit values are presented in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$) and parts per billion (ppb). The notation PM₁₀ is used to describe particulate matter or particles of ten micrometres or less in aerodynamic diameter. PM_{2.5} represents particles measuring less than 2.5 micrometres in aerodynamic diameter.

The CAFE Directive was transposed in to Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). These Regulations supersede the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and the Ambient Air Quality Assessment and Management Regulations 1999 (S.I. No. 33 of 1999).

Table 9-1 European sites within likely zone of impact of the Proposed Development

Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m ³)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Sulphur dioxide (SO ₂)	Protection of Human Health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO ₂)	Protection of human health	24 hours	125	47	Not to be exceeded more than 3 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO ₂)	Protection of vegetation	Calendar year	20	7.5	Annual mean	19th Jul 2001
Sulphur dioxide (SO ₂)	Protection of vegetation	1st Oct to 31st Mar	20	7.5	Winter mean	19th Jul 2001
Nitrogen dioxide (NO ₂)	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010
Nitrogen dioxide (NO ₂)	Protection of human health	Calendar year	40	21	Annual mean	1st Jan 2010
Nitrogen monoxide (NO) and nitrogen dioxide (NO ₂)	Protection of ecosystems	Calendar year	30	16	Annual mean	19th Jul 2001
Particulate matter 10 (PM ₁₀)	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in	1st Jan 2005

Pollutant	Limit Value Objective	Averaging Period	Limit Value ($\mu\text{g}/\text{m}^3$)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
					a calendar year	
Particulate matter 2.5 ($\text{PM}_{2.5}$)	Protection of human health	Calendar year	40	-	Annual mean	1st Jan 2005
Particulate matter 2.5 ($\text{PM}_{2.5}$) Stage 1	Protection of human health	Calendar year	25	-	Annual mean	1st Jan 2015
Particulate matter 2.5 ($\text{PM}_{2.5}$) Stage 2	Protection of human health	Calendar year	20	-	Annual mean	1st Jan 2020
Lead (Pb)	Protection of human health	Calendar year	0.5	-	Annual mean	1st Jan 2005
Carbon Monoxide (CO)	Protection of human health	8 hours	10,000	8,620	-	1st Jan 2005
Benzene (C_6H_6)	Protection of human health	Calendar Year	5	1.5	-	1st Jan 2010

The Ozone Daughter Directive 2002/3/EC is different from the other Daughter Directives in that it sets target values and long-term objectives for ozone rather than limit values. Table 9-2 presents the limit and target values for ozone.

Table 9-2 Target values for Ozone Defined in Directive 2008/50/EC

Objective	Parameter	Target Value for 2010	Target Value for 2020
Protection of human health	Maximum daily 8 hour mean	120 mg/m^3 not to be exceeded more than 25 days per calendar year averaged over 3 years	120 mg/m^3
Protection of vegetation	AOT40 calculated from 1 hour values from May to July	18,000 $\text{mg}/\text{m}^3\cdot\text{h}$ averaged over 5 years	6,000 $\text{mg}/\text{m}^3\cdot\text{h}$
Information Threshold	1 hour average	180 mg/m^3	-
Alert Threshold	1 hour average	240 mg/m^3	-

AOT₄₀ is a measure of the overall exposure of plants to ozone. It is the sum of the excess hourly concentrations greater than 80 g/m³ and is expressed as g/m³ hours.

9.2.2.1 Air Quality and Health

The Environmental Protection Agency (EPA) 2016 report ‘Ireland’s Environment – An Assessment’ noted that in Ireland, the premature deaths attributable to air pollution are estimated at 1,200 people per year. A more recent European Environmental Agency Report, ‘Air Quality in Europe – 2018 Report’ highlights the negative effects of air pollution on human health. The report assessed that poor air quality accounted for premature deaths of approximately 422,000 people in Europe in 2015, with regards to deaths relating to PM_{2.5}. The estimated impacts on the population in Europe of exposure to NO₂ and O₃ concentrations in 2015 were around 79,000 and 17,700 premature deaths per year respectively. From this, 1,100 Irish deaths were attributable to fine particulate matter (PM_{2.5}), 30 Irish deaths were attributable to nitrogen oxides (NO₂) and 20 Irish deaths were attributable to Ozone (O₃) (Source: Air Quality in Europe – 2018 Report’, EEA, 2018). These emissions, along with others including nitrogen oxides (NO_x) and sulphur oxides (SO_x) are produced during fossil fuel based electricity generation in various amounts, depending on the fuel and technology used.

Whilst there is the potential of such emissions to be generated from the construction operations, a number of mitigation measures will be implemented at this site to reduce the impact from dust and vehicle emissions, which are discussed in Sections 9.3.2.1 below.

9.2.3 Air Quality Zones

The Environmental Protection Agency (EPA) has designated four Air Quality Zones for Ireland:

- Zone A: Dublin City and environs.
- Zone B: Cork City and environs.
- Zone C: 16 urban areas with population greater than 15,000.
- Zone D: Remainder of the country.

These zones were defined to meet the criteria for air quality monitoring, assessment and management described in the Framework Directive and Daughter Directives. The site of the proposed development lies within Zone C, which represents urban areas with a population of greater than 15,000.

9.2.4 Existing Air Quality

The EPA publishes Air Monitoring Station Reports for monitoring locations in all four Air Quality Zones. The ambient air quality monitoring carried out closest to the subject site is at Bohermore in Galway City. This monitoring location also lies within Zone C which comprises urban areas with populations greater than 15,000. The air quality in the vicinity of the proposed development site is likely to be quite similar in nature and composition.

For the purposes of this assessment, air quality monitoring data from the station at Bohermore in Galway City is used. Data for Bohermore in Galway City is available in the EPA report ‘Ambient Air Monitoring in Galway City; March 13th 2001 – 23rd October 2001’. Similar measurement values for all air quality parameters would be expected for the proposed development site.

9.2.4.1 Sulphur Dioxide (SO₂)

Data for sulphur dioxide (SO₂) monitoring carried out in Galway City for 2001 is shown in Table 9.3.

Table 9-3 Sulphur Dioxide Data for Galway City in 2001

Parameter	Measurement
No. of measured values	3,672
Percentage Coverage	68.6%
Maximum hourly value	87.8 µg/m ³
98 percentile for hourly values	42.3 µg/m ³
Mean hourly value	10.0 µg/m ³

The hourly limit value was not exceeded during the measurement period. The lower assessment threshold was not exceeded during the measurement period. The mean hourly value of 10 µg.m-3 exceeds the lower assessment threshold for the protection of ecosystems but not the upper assessment threshold. However, this threshold may not be relevant to monitoring in an urban environment. Air quality of the proposed development site would be expected to be similar.

9.2.4.2 Particulate Matter (PM10)

Sources of particulate matter include vehicle exhaust emissions, soil and road surfaces, construction works and industrial emissions. No limit values were exceeded during this measurement period in Galway City. PM10 monitoring results from 2001 are presented in Table 9.4 below.

Table 9-4 Particulate Matter (PM₁₀) Data for Galway City in 2001

Parameter	Measurement
No. of measured values	187
Percentage Coverage	83.8%
Maximum daily value	49.9 µg/m ³
98 percentile for daily values	45.8 µg/m ³
Mean daily value	22.1 µg/m ³

The twenty four hour limit value for the protection of human health (50µg.m-3) was not exceeded during the measurement period. The upper assessment threshold was exceeded on 32 days (17.1% of measured values), the lower assessment threshold was exceeded on 96 days (51.3% of measured values). The directive stipulates that each of the assessment thresholds should not be exceeded more than 7 times in a calendar year. The mean of the daily values during the measurement period (22.2 µg.m-3) is below the annual limit value for the protection of human health (40 µg.m-3). Air quality of the proposed development site would be expected to be similar in terms of PM10 levels.

9.2.4.3 Nitrogen Dioxide (NO₂)

The values for the concentrations of nitrogen dioxide recorded in Galway City from 2001 are displayed in Table 9.5 below. Daily and annual limit values for the protection of human health were not exceeded during the assessment.

Table 9.5 Nitrogen Dioxide and Oxides of Nitrogen Data Galway City 2001

Parameter	Measurement
No. of measured values	4,531
Percentage Coverage	84.6%
Maximum hourly value (NO ₂)	120.7 µg/m ³
98 percentile for hourly values (NO ₂)	50.5 µg/m ³
Mean hourly value (NO ₂)	19.9 µg/m ³
Mean hourly value (NO _x)	34.8 µg/m ³

The hourly limit value was not exceeded during the measurement period. One hourly mean NO₂ value was above the lower assessment threshold, the directive stipulates that the lower assessment threshold should not be exceeded more than 18 times in a calendar year. With the exception of this value, all other hourly mean NO₂ values were below the lower assessment threshold. The mean hourly NO₂ value (19.9µg.m⁻³) during the measurement period was below the annual lower assessment threshold for the protection of human health (26 µg.m⁻³). The mean hourly value of NO_x (34.8 µg.m⁻³ NO₂) during the measurement period exceeded the annual limit value for the protection of vegetation (30 µg.m⁻³ NO₂). However, the applicability of this limit to urban air pollution monitoring is questionable.

9.2.4.4 Carbon Monoxide (CO)

Carbon monoxide data has been sourced from air quality monitoring carried out in Galway City (March to October 2001) and is presented in Table 9.6. The mean hourly concentration of carbon monoxide recorded was 0.5 mg/m³. The carbon monoxide limit value for the protection of human health is 10 mg/m³. On no occasions were values in excess of the 10 mg limit value set out in Directives 2000/69/EC or 2008/69/EC recorded.

Table 9.6 Carbon Monoxide Data for Galway City 2001

Parameter	Measurement
No. of hours	5,356
No. of measured values	4,533
Percentage Coverage	84.6%
Maximum hourly value	2.8 mg/m ³
98 percentile for hourly values	1.3 mg/m ³
Mean hourly value	0.5 mg/m ³
Maximum 8-hour mean	1.6 mg/m ³
98 percentile for 8-hour mean	1.1 mg/m ³

9.2.4.5 Ozone (O₃)

Ozone data for the Mace Head Atmospheric Research Station for 2008 is presented in Table 9.7. The maximum daily eight-hour mean limit of 120 µg/m³ was exceeded on three days. The legislation stipulates that this limit should not be exceeded on more than 25 days.

Table 9-7 Summary statistics for rolling 8-hr O₃ concentrations in 2008: Mace Head

Parameter	Measurement
Annual Mean	77 µg/m ³
Median	77 µg/m ³
% Data Capture	100%
No. of days > 120	3 days
Maximum 8-hour value	132 µg/m ³

9.2.5 Likely and Significant Air Quality Impacts of the Proposed Development and Associated Mitigation Measures

9.2.5.1 “Do-Nothing” Scenario

If the proposed development were not to proceed, there would be no change to existing air quality conditions in the area and therefore there would be no negative effects. There would be no potential for minor emissions to occur as a result of the construction and operational phases of the proposed development.

9.2.5.2 Construction Phase Potential Impacts and Mitigation Measures

9.2.5.2.1 Dust Emissions

The potential for dust to be emitted will depend on the type of activity being carried out in conjunction with environmental factors including levels of rainfall, wind speed and wind direction.

Dust generation rates depend on the site activity, particle size (in particular the silt content, defined as particles smaller than 75 microns in size), the moisture content of the material and weather conditions. Dust emissions are dramatically reduced where rainfall has occurred due to the cohesion created between dust particles and water and the removal of suspended dust from the air. It is typical to assume no dust is generated under “wet day” conditions where rainfall greater than 0.2 mm has fallen. Information collected from Shannon Airport Meteorological Station (1981-2010) identified that typically 211 days per annum are “wet”. Thus for greater than 55% of the time no significant dust generation will be likely due to meteorological conditions. Without mitigation, the likely effect of construction phase dust emissions will be short term, slight, and negative.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Overburden will be progressively removed from the working area in advance of construction.
- Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the building to block dust escaping where the building is within 10m of the site boundary where residential properties exist.
- Site roadways will be maintained in a stoned hard core condition not allowing soil to accumulate which when dry can create dust.
- Wheel wash equipment will be set up at the site exit gate for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.
- Plant and equipment that have the potential to create volumes of dust will have appropriate attachments to allow water source to dampen dust to not allow it to get airborne.
- Deploy Road Sweeper as required on External Roads.
- Dust levels will be monitored visually, on a daily basis by the project Environmental Officer. If dust levels become an issue, then all dust generating activities on site will cease until such time as weather conditions improve (e.g. wind levels drop or rain falls) or mitigation measures such as damping down of the ground are completed.
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-2). A CEMP is included with this

application and includes further details of the above dust suppression measures and dust monitoring measures.

Residual Effect

Following implementation of the mitigation measures outlined above, residual impacts of dust generation from the construction phase will be Short-term Imperceptible Negative

Significance of Effects

Based on the assessment above there will be no significant effects.

9.2.5.2.2 **General Air Quality**

The construction of the proposed development will require the use of machinery and plant, thereby giving risk to exhaust emissions. This is likely to have a short to medium-term slight negative effect, which will be reduced through the use of the best practices mitigation measures as presented below.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Machinery will be switched off when not in use.

Residual Effect

Following implementation of the mitigation measures outlined above, residual impacts will be Short term (2.0 years), Imperceptible, Negative

Significance of Effects

Based on the assessment above there will be no significant effects.

9.2.5.3 **Operational Phase Potential Impacts and Mitigation Measures**

There will be no impact on the environment or human health from dust emissions in the vicinity of the proposed development site once the development has been built and all construction vehicles and personal are offsite.

Any further works which may need to occur on site as part of maintenance and repairs during the operation of the site, may cause localised slight temporary dust emissions, and is unlikely to have any negative significant impact on human health. In the case of such occasional maintenance works, Section 9.3.2.1 above can be referred to for air quality and dust related impacts.

Mitigation

No mitigation will be required on site during the majority of the operational phase for the proposed development, as the impact is assessed as being imperceptible, and will not be noticed within the area which already contains many residential developments.

Residual Effect

Short term Imperceptible Negative Impact

Significance of Effects

Based on the assessment above there will be no significant effects.

9.2.5.4 **Assessment of Potential for Impacts on Health**

Whilst the construction phase of the proposed development is likely to lead to dust and vehicle emissions, the implementation of the mitigation measures described above will prevent or minimise potential effects and the residual effects will be imperceptible. The CEMP submitted with this application provides that the proposed development will be constructed in accordance with good management practice including good site design and layout, adopting appropriate working methods, choosing the right equipment and ensuring that the workforce understands the company’s responsibilities and is familiar with good working practice and dust suppression techniques. The potential for health effects arising from the construction stage are considered short term, imperceptible, and negative as the potential for both exhaust and dust emissions will be limited and controlled through the mitigation measures described above.

During the operational phase, there will be no impact on human health from dust emissions in the vicinity of the proposed development site once the development has been built and all construction vehicles and personal are offsite.

9.3 Climate

9.3.1 Climate Change and Greenhouse Gases

Climate change is one of the most challenging global issues facing us today and is primarily the result of increased levels of greenhouse gases in the atmosphere. These greenhouse gases come primarily from the combustion of fossil fuels in energy use. Changing climate patterns are thought to increase the frequency of extreme weather conditions such as storms, floods and droughts. In addition, warmer weather trends can place pressure on animals and plants that cannot adapt to a rapidly changing environment. Moving away from our reliance on coal, oil and other fossil fuel-driven power plants is essential to reduce emissions of greenhouse gases and combat climate change.

9.3.1.1 Greenhouse Gas Emission Targets

Ireland is a Party to the Kyoto Protocol, which is an international agreement that sets limitations and reduction targets for greenhouse gases for developed countries. It is a protocol to the United Nations Framework for the Convention on Climate Change. The Kyoto Protocol came into effect in 2005, as a result of which, emission reduction targets agreed by developed countries, including Ireland, are now binding.

Under the Kyoto Protocol, the EU agreed to achieve a significant reduction in total greenhouse gas emissions in the period 2008 to 2012. Ireland's contribution to the EU commitment for the period 2008 – 2012 was to limit its greenhouse gas emissions to no more than 13% above 1990 levels.

9.3.1.1.1 Doha Amendment to the Kyoto Protocol

In Doha, Qatar, on 8th December 2012, the "Doha Amendment to the Kyoto Protocol" was adopted. The amendment includes:

- New commitments for Annex I Parties to the Kyoto Protocol who agreed to take on commitments in a second commitment period from 1 January 2013 to 31 December 2020;
- A revised list of greenhouse gases (GHG) to be reported on by Parties in the second commitment period; and
- Amendments to several articles of the Kyoto Protocol which specifically referenced issues pertaining to the first commitment period and which needed to be updated for the second commitment period.

During the first commitment period, 37 industrialised countries and the European Community committed to reduce GHG emissions to an average of five percent against 1990 levels. During the second commitment period, Parties committed to reduce GHG emissions by at least 18 percent below 1990 levels in the eight-year period from 2013 to 2020; however, the composition of Parties in the second commitment period is different from the first.

Under the protocol, countries must meet their targets primarily through national measures, although market based mechanisms (such as international emissions trading can also be utilised).

9.3.1.1.2 COP21 Paris Agreement

COP21 was the 21st session of the Conference of the Parties (COP) to the United Nations Convention. Every year since 1995, the COP has gathered the 196 Parties (195 countries and the European Union)

that have ratified the Convention in a different country, to evaluate its implementation and negotiate new commitments. COP21 was organised by the United Nations in Paris and held from 30th November to 12th December 2015.

COP21 closed on 12th December 2015 with the adoption of the first international climate agreement (concluded by 195 countries and applicable to all). The twelve-page text, made up of a preamble and 29 articles, provides for a limitation of the temperature rise to below 2°C above pre-industrial levels and even to tend towards 1.5°C. It is flexible and takes into account the needs and capacities of each country. It is balanced as regards adaptation and mitigation, and durable, with a periodical ratcheting-up of ambitions.

9.3.1.1.3 Emissions Projections

In 2016, the EPA published an update on Ireland’s Greenhouse Gas Emission Projections to 2020. Ireland’s target is to achieve a 20% reduction of non-Emissions Trading Scheme (non-ETS) sector emissions, i.e. agriculture, transport, residential, commercial, non-energy intensive industry and waste, on 2005 levels, with annual binding limits set for each year over the period 2013 – 2020.

Greenhouse gas emissions are projected to 2020 using two scenarios; ‘With Measures’ and ‘With Additional Measures’. The ‘With Measures’ scenario assumes that no additional policies and measures, beyond those already in place by the end of 2014 are implemented. The ‘With Additional Measures’ scenario assumes implementation of the ‘With Measures’ scenario in addition to full achievement of Government renewable and energy efficiency targets for 2020, as set out in the National Renewable Energy Action Plan and the National Energy Efficiency Action Plan.

The EPA Emission Projections Update notes the following key trends:

- Ireland’s non-Emissions Trading Scheme (ETS) emissions are projected to be 6% and 11% below 2005 levels in 2020 under the ‘With Measures’ and ‘With Additional Measures’ scenarios, respectively. The target for Ireland is a 20% reduction.
- Ireland is projected to exceed its annual binding limits in 2016 and 2017 under both scenarios, ‘With Measures’ and ‘With Additional Measures’.
- Over the period 2013 – 2020, Ireland is projected to cumulatively exceed its compliance obligations by 12 Mt CO₂ (metric tonnes of Carbon Dioxide) equivalent under the ‘With Measures’ scenario and 3 Mt CO₂ equivalent under the ‘With Additional Measures’ scenario.

The EPA report states that “Failure to meet 2020 renewable and energy efficiency targets will result in Ireland’s emission levels moving even further from its emission reduction targets”. The report also concludes:

- The latest projections estimate that by 2020 non-ETS emissions will be at best 11% below 2005 levels compared to the 20% reduction target. Emission trends from agriculture and transport are key determinants in meeting targets, however emissions from both sectors are projected to increase in the period to 2020.
- It is clear that Ireland faces significant challenges in meeting emission reduction targets for 2020 and beyond. (‘Greenhouse Gas Emission Projections to 2020 – An Update’, EPA, 2016).

9.3.1.1.4 Progress to Date

The ‘Europe 2020 Strategy’ is the EU’s agenda for growth and jobs for the current decade. The Europe 2020 Strategy targets on climate change and energy include:

- Reducing greenhouse gas (GHG) emissions by at least 20% compared with 1990 levels;

- Increasing the share of renewable energy in final energy consumption to 20%; and
- Moving towards a 20% increase in energy efficiency.

Regarding progress on targets, the ‘Europe 2020 indicators – climate change and energy’ report provides a summary of recent statistics on climate change and energy in the EU.

In 2014, EU greenhouse gas emissions, including emissions from international aviation and indirect carbon dioxide (CO₂) emissions, were down by 23% when compared with 1990 levels. However, regarding the progress of individual Member States, and Ireland in particular, the Europe 2020 indicators include the following statements:

- 24 countries are on track to meet their GHG targets, except Austria, Belgium, **Ireland** and Luxembourg.
- Luxembourg emitted the most GHG per capita in the EU in 2014 ... followed by Estonia, **Ireland**, the Czech Republic and the Netherlands.
- In 2014, France, the Netherlands, the United Kingdom and **Ireland** were farthest from reaching their national targets.

While the EU as a whole is projected to exceed its 2020 target of reducing GHG emissions by 20%, Ireland is currently one of the countries project to miss its national targets.

9.3.2 Climate and Weather in the Existing Environment

County Galway has a temperate oceanic climate, resulting in mild winters and cool summers. The prevailing wind direction is between south and west which bring moist air and frequent rain. According to Met Éireann, the average number of wet days per year in the west of Ireland is 225. The wettest months are December and January and April is usually the driest. July is the warmest month with an average temperature of 15.7° Celsius. The Met Éireann weather station at Shannon, County Clare is the nearest weather and climate monitoring station with 30-year averages, to the subject site, located approximately 65km south of the site. Meteorological data recorded at Shannon over the 30-year period from 1981-2010 is shown in Table 9.8 overleaf. The wettest months are October and December, and April is the driest. July is the warmest month with a mean daily temperature of 16.4° Celsius.

9.3.2.1 Wind

The wind field characteristics of the area are important climatological elements in examining the potential for the generation of fugitive dust emissions from the site. Fugitive dust emissions from a surface occur if the winds are sufficiently strong and turbulent and the surface is dry and loose, together causing re-suspension of particulate matter from the ground. A wind speed at ground level in excess of about five metres per second is considered to be the threshold above which re-suspension of fine sized material from an exposed surface may occur. The surface needs to have a relatively low moisture content for this type of dust emission to take place and any wetting either by rainfall or sprayers, will greatly reduce the potential of fugitive dust emissions. The mean annual wind speed at the station, in Shannon, is 4.6 metres per second.

9.3.2.2 Rainfall

Long term rainfall data was obtained from the monitoring station at Shannon. The 30-year annual average rainfall for Shannon is 978 mm/yr. This is considered to be high when compared to the annual average rainfall for Dublin (Merrion Square) which recorded annual average rainfall of 730 mm/yr over the same period. This will be due to Galway’s oceanic position on the Atlantic seaboard.

Table 9-8 Data from Met Éireann Weather Station, Shannon, Co. Clare 1981 to 2010

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
Mean daily max	8.8	9.2	11.1	13.3	16.0	18.3	19.8	19.6	17.7	14.3	11.1	9.0	14.0
Mean daily min	3.2	3.2	4.5	5.7	8.2	10.9	12.9	12.7	10.8	8.2	5.5	3.6	7.4
Mean temperature	6.0	6.2	7.8	9.5	12.1	14.6	16.4	16.2	14.2	11.2	8.3	6.3	10.7
Absolute max.	14.8	15.5	18.3	23.5	27.2	30.2	30.6	29.8	26.1	22.3	17.6	15.3	30.6
Absolute min.	-2.4	0.9	3.5	5.4	8.0	11.8	13.8	13.0	11.1	7.0	0.8	-6.0	-6.0
Mean num. of days with air frost	11.8	12.3	11.7	13.0	15.3	17.8	19.4	19.3	17.8	16.3	13.4	12.9	19.4
Mean num. of days with ground frost	-11.2	-5.5	-5.8	-2.3	0.2	3.6	6.7	4.4	1.7	-2.0	-6.6	-11.4	-11.4
RELATIVE HUMIDITY (%)													
Mean at 0900UTC	13.7	12.6	11.0	8.3	3.3	0.3	0.0	0.1	1.2	3.8	9.5	12.5	76.3
Mean at 1500UTC													
SUNSHINE (Hours)													
Mean daily duration	80.5	74.6	70.5	64.4	63.3	65.1	68.0	68.2	69.2	75.2	80.5	83.1	71.9
Greatest daily duration													
Mean no. of days with no sun	1.6	2.3	3.2	5.1	5.8	5.2	4.5	4.5	3.9	2.9	2.0	1.4	3.5
RAINFALL (mm)													

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean monthly total	102.3	76.2	78.7	59.2	64.8	69.8	65.9	82.0	75.6	104.9	94.1	104.0	977.6
Greatest daily total	38.2	29.4	28.1	40.2	25.0	40.6	39.5	51.0	52.3	36.9	26.9	41.2	52.3
Mean num. of days with $\geq 0.2\text{mm}$	20	16	19	16	16	15	16	18	16	20	20	19	211
Mean num. of days with $\geq 1.0\text{mm}$	16	12	14	11	12	11	12	13	12	16	15	15	159
Mean num. of days with $\geq 5.0\text{mm}$	8	5	5	4	4	4	4	5	4	7	6	7	63
WIND (knots)													
Mean monthly speed	10.3	10.2	10.0	9.0	8.9	8.5	8.5	8.2	8.4	9.2	9.1	9.4	9.1
Max. gust	75	80	65	62	59	51	52	55	62	71	66	83	83
Max. mean 10-minute speed	52	46	44	40	37	37	38	35	40	47	41	57	57
Mean num. of days with gales	1.7	0.9	0.8	0.3	0.2	0.1	0.0	0.1	0.1	0.6	0.7	1.2	6.7
WEATHER (Mean No. of Days With:)													
Snow or sleet	2.3	2.3	1.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.3	8.0
Snow lying at 0900UTC	0.6	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.9
Hail	3.6	3.3	3.4	2.2	1.2	0.1	0.1	0.1	0.3	0.9	1.1	2.4	18.6
Thunder	0.9	0.5	0.4	0.3	0.5	0.5	0.8	0.4	0.2	0.4	0.4	0.5	5.7
Fog	3.3	2.0	2.1	1.9	1.5	1.4	1.4	2.0	2.9	2.9	3.9	4.2	29.6

9.3.3 Likely and Significant Climate Impacts and Associated Mitigation Measures

9.3.3.1 ‘Do-Nothing’ Effect

If the proposed development were not to proceed, there would be no change to existing climate conditions and therefore there would be no negative effects. There would be no potential for minor emissions to occur as a result of the construction and operational phases of the proposed development.

9.3.3.2 Construction Phase Impacts

The construction of the proposed development will require the operation of construction vehicles and plant. Greenhouse gas emissions, e.g. carbon dioxide (CO₂), carbon monoxide and nitrogen oxides associated with vehicles and plant will arise as a result of the construction activities. This potential impact will be slight, given the insignificant quantity of greenhouse gases that will be emitted, and will be restricted to the duration of the construction phase. Therefore, this is a short-term slight negative impact. Mitigation measures to reduce this impact are presented below.

The transport of construction materials to the site will also give rise to greenhouse gas emissions associated with the transport vehicles. This constitutes a slight negative impact in terms of air quality. Mitigation measures in relation to greenhouse gas emissions are presented below.

Mitigation Measures

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Aggregate materials for the construction of site access tracks and all associated infrastructure will all be locally sourced, where possible, which will further reduce potential emissions.

Residual Effect

With the implementation of the mitigation measures discussed above there will be a Short-term Imperceptible Negative Impact on Climate as a result of greenhouse gas emissions

Significance of Effects

Based on the assessment above there will be no significant effects

9.3.3.3 Operational Phase Impacts

The proposed development will be landscaped with green areas and trees. The proposed scheme is designed to comply with Building Regulations Part L 2017 nZEB (near zero energy building). Therefore, the climate impacts from the proposed development are expected to be imperceptible. Full details of the thermal performance and energy saving measures proposed for the development are given in the Mechanical and Electrical Services Report, which forms Appendix 9-1 of this EIAR.

Mitigation Measures

As the proposed development will have no significant negative effects on climate, mitigation measures are not proposed other than the measures outlined in Mechanical and Electrical Services Report in

Appendix 9-1 of this EIAR. These measures will minimise any effect that the development might have on climate in the long-term.

Residual Effect

There will be a Long-term, Imperceptible, Neutral Effect on climate associated with the proposed project.

Significance of Effects

Based on the assessment above there will be no significant effects

9.3.3.4 Assessment of Potential for Impacts on Human Health

Whilst the construction phase of the proposed development has the potential to lead to slight increases in greenhouse gas emissions, the implementation of the mitigation measures described above will prevent or minimise potential effects of this and the residual effects will be short term and imperceptible. The CEMP submitted with this application provides that the proposed development will be constructed in accordance with good management practice including good site design and layout, adopting appropriate working methods, choosing appropriate materials and equipment and ensuring that the workforce understands the company’s responsibilities and is familiar with good working practice and emission minimisation techniques. The potential for health effects are considered imperceptible as the potential for greenhouse gas emissions will be limited and controlled through site and project design and mitigation measures.

Mitigation Measures

As the proposed development will have no significant negative effects on climate, mitigation measures are not proposed other than all machinery and plant will be maintained in good operational order while on-site, minimising any emissions that are likely to arise. These measures will minimise any effect that the development might have on climate in the long-term.

Residual Effect

There will be a Short-term Imperceptible Negative Impact on Human Health as a result of the construction phase of the proposed development.

9.4 Cumulative effects resulting from Interactions between various elements of the proposed development

The interaction of the various elements of the proposed development was considered and assessed in this EIAR with regards air and climate. The potential for each individual element of the proposed development on its own to result in significant effects on air and climate was considered in the impact assessment. The entire project including the interactions between all its elements was also considered and assessed for its potential to result in significant effects on air and climate in the impact assessment presented.

All interactions between the various elements of the project were considered and assessed both individually and cumulatively within this chapter. Where necessary, mitigation was employed to ensure that no cumulative effects will arise as a result of the interaction of the various elements of the development with one another.

9.5 Potential Cumulative In-Combination Effects

The potential cumulative effects on air and climate arising from the proposed development, in combination with other developments in the vicinity, including all those listed in Chapter 2 of this EIAR, are now considered.

It is noted that the other land use activities in the area are mostly residential or commercial land uses. The majority of the developments listed in Chapter 2 consist of modifications to, or extensions of, existing houses or buildings and it was determined that there was no potential for cumulative impacts on Air and Climate from these projects in combination with the Proposed development. There are no other large developments proposed in the immediate vicinity of the proposed development.

There are ten developments located within 2km of the proposed development that are imminent or have been granted permission. These projects are listed in Table 2.3 of Chapter 2 of this EIAR. It was determined that, due to proximity and scale, the projects listed in Table 2.3 have the potential for cumulative effects in combination with the proposed development. Where appropriate the application documentation, EIAR and NIS have been reviewed to inform the assessment.

9.5.1 General Air Quality

Agriculture, light commercial activity, residential heating, transport vehicles and other local construction activities and the construction of the proposed development will require the consumption of fossil fuels and therefore will lead to a minor level of air emissions cumulatively. However, with the implementation of the mitigation measures discussed above, there will be no significant cumulative impacts arising from the construction phase of the proposed development (as the air quality impacts will be imperceptible) and other local existing and planned developments. Cumulative impacts resulting from the proposed development, in combination with other projects, will be negative, short term, and imperceptible

9.5.2 Dust Emissions

Dust emissions from the other land use activities in the area are likely to be imperceptible and localised to the immediate area of those projects. The potential for dust emissions from the construction phase of the proposed development exist but the residual effects will be imperceptible given the proposed mitigation measures in Section 8.2.5.2.1 above. Therefore, cumulative impacts resulting from the proposed development, in combination with other projects, will be negative, short term, and imperceptible

9.5.3 Climate

The construction of the proposed development, in conjunction with other developments in the area (listed in Chapter 2 of this EIAR), will require plant items which consume fossil fuels and therefore will lead to a minor emission of greenhouse gases cumulatively. However, given the small-scale operations and proposed mitigation measures for the proposed development, the cumulative impacts will be short term, negative, and imperceptible in the context of the potential for impacts on climate change. There is no potential for significant cumulative climate impacts between the operational phase of the proposed development and the other projects listed in Chapter 2.

10. NOISE & VIBRATION

10.1 Introduction

10.1.1 Overview

Potential noise and vibration impacts may be divided into the following categories:

- Construction phase noise impacts on surrounding receptors.
- Construction phase vibration impacts on surrounding receptors.
- Post-completion noise impacts on surrounding receptors.
- Post-completion vibration impacts on surrounding receptors.
- Noise impacts within the completed development from external sources ('inward impacts').

Following a preliminary scoping exercise, it was concluded that the proposed development will not give rise to any vibration impacts following commissioning, and this category has therefore been scoped out. The remaining four categories are assessed in this chapter.

10.1.2 Methodology

Typical ambient noise levels across the local area were measured, and these used to identify appropriate construction phase noise criteria. Likely construction plant were identified, and their noise emissions data used to predict likely noise levels at surrounding receptors. Predicted levels were assessed in the context of identified criteria, and mitigation measures identified where required. Potential sources of vibration during the construction phase were identified, and impacts assessed by reference to commonly applied criteria.

Noise sources associated with the commissioned development were reviewed, and potential impacts assessed. Such impacts relate chiefly to traffic, and a proposed commercial block at the northeast corner of the site. In line with emerging best practice, an assessment of inward noise impacts was undertaken, and the requirement for enhanced façade treatments was assessed.

10.1.3 Documents consulted

The following documents were consulted during the preparation of this chapter:

- Report RI 8507: Structural Response And Damage Produced By Ground Vibration From Surface Mines Blasting (US Bureau Of Mines, 1980).
- British Standard BS 7385-2:1993 Evaluation And Measurement For Vibration In Buildings – Part 2: Guide To Damage Levels From Groundborne Vibration (1993).
- Guidelines On Community Noise (World Health Organisation, 1999).
- Directive 2002/49/EC Of The European Parliament And Of The Council Relating To The Assessment And Management Of Environmental Noise (2002), Transposed Into Irish Law By The European Communities (Environmental Noise) Regulations 2018 (SI No. 549/2018).
- Night Noise Guidelines For Europe (World Health Organisation, 2009)
- Design Manual For Roads And Bridges (UK Highways Agency, 2011).
- British Standard BS 4142:2014 Methods For Rating And Assessing Industrial And Commercial Sound (2014).

- Galway County Council – Preliminary Appraisal Report – N6 Galway City Outer Bypass (ARUP, 2014).
- British Standard BS 5228-1:2009+A1:2014 Code Of Practice For Noise And Vibration Control On Construction And Open Sites – Part 1: Noise (2014).
- British Standard BS 5228-2:2009+A1:2014 Code Of Practice For Noise And Vibration Control On Construction And Open Sites – Part 2: Vibration (2014).
- British Standard BS 8233:2014 Guidance On Sound Insulation And Noise Reduction For Buildings (2014).
- Good Practice Guidance For The Treatment Of Noise During The Planning Of National Road Schemes (National Roads Authority (Now Transport Infrastructure Ireland), 2014).
- Technical Guidance Document TGD-021-5: Acoustic Performance In New Primary & Post Primary School Buildings (Department Of Education & Skills, 2015).
- Galway County Council Development Plan 2015-2021 (2015).
- Draft Advice Notes On Current Practice In The Preparation Of Environmental Impact Statements (Environmental Protection Agency, 2015).
- NG4 Guidance Note For Noise: Licence Applications, Surveys And Assessments In Relation To Scheduled Activities (Environmental Protection Agency, 2016).
- Draft Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports (Environmental Protection Agency, 2017).
- Propg Planning & Noise: Professional Practice Guidance On Planning & Noise – New Residential Development (Association Of Noise Consultants, Institute Of Acoustics & Chartered Institute Of Environmental Health, 2017).
- Environmental Noise Guidelines For The European Region (World Health Organisation, 2018).
- Galway Noise Action Plan 2019-2023 (2019).

A baseline noise survey was undertaken in accordance with International Standard ISO 1996-2:2017 Acoustics – Description, Measurement And Assessment Of Environmental Noise, Part 2: Determination Of Environmental Noise Levels (2017). Predictive modelling was carried out using International Standard ISO 9613-2:1996 Acoustics: Attenuation Of Sound During Propagation Outdoors – Part 2 General Method Of Calculation (1996).

10.1.4 Statement of Authority

The noise and vibration assessment was undertaken by Damian Brosnan of Damian Brosnan Acoustics who has over 20 years’ experience in scoping and carrying out such impact assessments. His qualifications are as follows:

- BSc (Honours) 1993 (University College Cork).
- Diploma in Acoustics & Noise Control 2009 (Institute of Acoustics).
- MSc (Distinction) in Applied Acoustics 2015 (University of Derby).
- Member of Institute of Acoustics (MIOA) & secretary of Irish branch.
- Founder member of Association of Acoustic Consultants of Ireland (AACI).
- Member of Engineers Ireland (MIEI).
- 1996-2001: Noise Officer with Cork County Council.
- 2001-2014: Partner with DixonBrosnan Environmental Consultants, specialising in EIA.
- 2015–: Principal at Damian Brosnan Acoustics.

10.2 Guidance & criteria

10.2.1 Construction phase noise

There are no national mandatory noise limits relating to the construction phases of projects. In granting planning permission, a local authority may stipulate construction phase noise limits applicable to daytime, evening, night-time and weekend hours as appropriate. There are no national guidelines available regarding the selection of such limits. Many local authorities chose to apply a 65 dB $L_{Aeq,T}$ limit.

The chief noise guidance document applied in Ireland and the UK in construction phase noise assessments is British Standard BS 5228:2009+A1:2014 Code Of Practice For Noise And Vibration Control On Construction And Open Sites Part 1: Noise (2014). Annex E of the document sets out several methods to draw up suitable noise criteria applicable to the construction phase of a project. The most appropriate method here is considered to be the ‘ABC method’, which provides for the selection of criteria based on existing ambient noise data. On the basis of noise data recorded in the vicinity of the study site, as discussed below, a daytime $L_{Aeq,1h}$ criterion of 65 dB is identified. This criterion is identical to that typically applied by local authorities, and is thus applied in this assessment. The $L_{Aeq,1h}$ parameter describes the total noise emissions from all construction sources occurring during any 1 h period, averaged over that hour.

BS 5228:2009+A1:2014 states that the 65 dB criterion is applicable to the periods Monday-Friday 0700-1900 h and Saturday 0700-1300 h. Construction operations are unlikely to be undertaken during evening or night-time hours, or on Sundays. This assessment therefore applies the 65 dB criterion in respect of all construction works.

The 65 dB criterion is considered relevant to most of the construction phase. However, this criterion is considered overly onerous with respect to landscaping works proposed around the margins of the site, in proximity to offsite receptors, particularly as (a) such works will be short term, lasting no more than several hours or several days at any position, and (b) landscaping works will benefit nearby offsite receptors in the long term. For such works, an $L_{Aeq,1h}$ limit of 70 dB is considered suitable, derived from the National Roads Authority (now Transport Infrastructure Ireland) document Good Practice Guidance For The Treatment Of Noise During The Planning Of National Road Schemes (2014). The daytime 70 dB criterion recommended in the NRA document is commonly applied to non-road projects in the absence of any other Irish guidance.

The 65 dB main works criterion, and the 70 dB landscaping criterion, are considered applicable to surrounding receptors, in their immediate curtilage. In this regard, the Environmental Protection Agency Document NG4 Guidance Note For Noise: Licence Applications, Surveys And Assessments In Relation To Scheduled Activities (2016) defines a noise sensitive locations as:

Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires absence of noise at nuisance levels.

As construction projects tend to be relatively short, and as construction works areas are usually localised and mobile, the 65 and 70 dB limits are usually not subject to any additional criteria such as tone and impulse restrictions.

10.2.2 Construction phase vibration

As with noise, there are no national limits relating to groundborne vibration, and reference is usually made to guidance set out in British Standard BS 5228-2:2009+A1:2014 Code Of Practice For Noise And Vibration Control On Construction And Open Sites – Part 2: Vibration (2014). Table 10-1 presents guidance included in the document with respect to human perception of peak particle velocity (PPV), the most commonly applied descriptor of groundborne vibration.

Table 10-1 Human perception of vibration, from BS 5228-2:2009+A1:2014

PPV	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10.0 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

During construction and demolition projects, reference is usually made to criteria relevant to buildings, in order to avoid potential cosmetic or structural damage. Guidance presented in the NRA’s 2014 document with respect to construction vibration has seen increasing application to non-road projects due to the absence of any other Irish guidance. NRA criteria, listed in Table 10-2, are informed by documents such as British Standard BS 7385-2:1993 Evaluation And Measurement For Vibration In Buildings – Part 2: Guide To Damage Levels From Groundborne Vibration (1993). The criteria apply to the closest part of any relevant building or structure.

Table 10-2 Building vibration criteria, from NRA (2014)

Frequency	<10 Hz	10-50 Hz	>50 Hz
PPV (mm/s)	8	12.5	20

NRA limits set out above are considerably lower than criteria recommended by two respected international authorities, as presented in Table 10-3. The criteria presented are those below which cosmetic damage (hairline cracking, etc.) to buildings is unlikely to occur. Limits relating to structural damage are significantly higher.

Table 10-3 Recommended vibration limits

Structure	Lower frequencies	Higher frequencies	Source
Modern dwellings	<40 Hz: 19 mm/s	>40 Hz: 51 mm/s	1
Older dwellings	<40 Hz: 12.7 mm/s	>40 Hz: 51 mm/s	1
Industrial & heavy commercial	4-15 Hz: 50 mm/s	>15 Hz: 50 mm/s	2&3
Residential & light commercial	4-15 Hz: 15-20 mm/s	>15 Hz: 20-50 mm/s	2&3

Sources:

1 US Bureau Of Mines Report RI 8507: Structural Response And Damage Produced By Ground Vibration From Surface Mines Blasting (1980).

2 BS 5228-2:2009+A1:2014 Code Of Practice For Noise And Vibration Control On Construction And Open Sites – Part 1: Vibration (2014).

3 BS 7385-02: 1993 Evaluation And Measurement For Vibration In Buildings – Part 2: Guide To Damage Levels From Ground Borne Vibration (1993).

10.2.3 Post-completion noise

There are no national mandatory noise limits applicable to commissioned developments. While a number of guidance documents have been issued with respect to certain sectors, none relate to residential developments such as those assessed in this report. Two elements of the commissioned development may give rise to noise emissions (outside of those associated with external residential activities such as children playing and grass cutting): a proposed commercial building, and traffic. These are typically assessed differently.

10.2.3.1 Commercial Emissions

Most environmental noise guidance documents issued across Europe ultimately derive limits from guidance issued by the World Health Organisation (WHO). The WHO document Guidelines On Community Noise (1999) sets out guideline values considered necessary to protect communities from environmental noise. With respect to residential settings, the document notes that an outdoor $L_{Aeq\ 16\ h}$ level of 55 dB is an indicator of serious annoyance during daytime and evening hours, with 50 dB being an indicator of moderate annoyance. The 55 dB criterion was first suggested by the WHO in their 1980 document Environmental Health Criteria 12.

Since 1980, the 55 dB criterion has become the de facto daytime limit applied by most Irish regulatory authorities to commercial and industrial operators. Although the WHO criterion applies to daytime periods of 16 hours, authorities typically specify shorter periods, and thus limits as $L_{Aeq\ 15\ min}$, $L_{Aeq\ 30\ min}$ and $L_{Aeq\ 1\ h}$ are variously applied. In issuing licences to industrial facilities, the EPA typically specifies a daytime $L_{Aeq\ T}$ limit of 55 dB at receptors. The EPA currently considers daytime to refer to 0700-1900 h. A similar daytime limit is usually included in noise conditions attached to planning permission issued by local authorities.

The WHO's 1999 guidance document recommends an external night-time criterion of 45 dB to prevent sleep disturbance. Although the WHO document Night Noise Guidelines For Europe (2009) makes reference to a 40 dB night-time criterion, this relates to the $L_{night, outside}$ parameter, which is the long term average measured throughout a whole year. The 45 dB criterion is considered more appropriate to short term measurement intervals. As before, $L_{Aeq\ 15\ min}$, $L_{Aeq\ 30\ min}$ and $L_{Aeq\ 1\ h}$ intervals are variously applied by regulatory authorities, rather than the 8 hour period to which the WHO's 45 dB criterion applies. The EPA considers that night-time refers to 2300-0700 h.

Neither of the WHO documents identified above makes reference to evening periods, and indeed their 1999 document assumes that daytime extends to 2300 h. However, a trend towards the separate assessment of evening impacts is currently evident, partly driven by EPA document NG4 Guidance Note For Noise: Licence Applications, Surveys And Assessments In Relation To Scheduled Activities (2016). The original 2012 version of the document introduced the evening period 1900-2300 h. The NG4 document recommends an evening criterion of 50 dB, applicable externally at receptors.

Many authorities require that a penalty be added to measured noise levels where emissions are tonal and/or impulsive. NG4 specifies the addition of a 5 dB penalty to site specific $L_{Aeq T}$ levels measured during daytime or evening hours. During night-time hours, the EPA prohibits tones and impulses entirely, stating that such characteristics should not be ‘clearly audible or measurable’. With respect to short term impulsive sources, the WHO recommends a night-time L_{Amax} limit of 60 dB outside bedroom windows during night-time hours. No L_{Amax} limit is recommended for daytime periods.

The above criteria, summarised in Table 10-4, are considered relevant to commercial sources at the proposed development. A measurement interval of 15 minutes is considered appropriate. Rather than allowing daytime and evening levels to be rated for tonal or impulsive features, the table assumes that such features are avoided at all times. Criteria apply externally at receptors.

Table 10-4 Noise criteria appropriate to commercial emissions

Period	Parameter	Limit
0700-1900 h	$L_{Aeq 15 min}$	55 dB
1900-2300 h	$L_{Aeq 15 min}$	50 dB
2300-0700 h	$L_{Aeq 15 min}$	45 dB
2300-0700	L_{AFmax}	60 dB

In addition to the absolute criteria above, the impact of noise emissions from commercial sources may be assessed by reference to relative criteria. The most commonly applied standard here is British Standard BS 4142:2014 Methods For Rating And Assessing Industrial And Commercial Sound (2014) which provides for the comparison of specific $L_{Aeq T}$ levels (i.e. noise levels attributable to the source(s) in question) with background levels, and provides an indication of impact depending on the difference. Specific levels may be rated to take tonal, impulsive and other characteristics into account. The standard notes that the background noise environment may include existing industrial emissions unrelated to the specific source.

BS 4142:2014 states that a difference between specific and background levels of 10 dB or more is indicative of a significant adverse impact. A difference of 5 dB suggests an adverse impact, with lower differences suggesting reduced impacts. The standard adds that the perception of impact will be increased or reduced depending on local context.

10.2.3.2 Traffic Emissions

Local offsite receptors are currently subject to existing traffic noise levels on the surrounding road network. The proposed development is likely to increase traffic volumes locally, with a consequent increase in traffic noise levels. The Design Manual For Roads And Bridges (UK Highway Agency, 2011) notes that the resulting noise impact is linked to the magnitude of the noise increase. Table 10-5 sets out the DMRB guidance. Included in the table are impact categories listed by the EPA in their 2017 document Draft Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports (Environmental Protection Agency, 2017).

Table 10-5 Noise criteria appropriate to commercial emissions

Noise level increase	Subjective reaction	DMRB impact	EPA impact
0 dB	None	No change	Neutral
0-3 dB	Imperceptible	Negligible	Imperceptible to not significant
3-5 dB	Perceptible	Minor	Not significant to slight
5-10 dB	Up to a doubling of loudness	Moderate	Slight to moderate
>10 dB	Doubling of loudness or greater	Major	Significant to profound

10.2.4 Inward noise

The assessment of inward noise impacts on proposed residential developments is a relatively new feature in the Irish planning system, and no national guidance has been issued to date. In the absence of Irish guidance, assessments are typically undertaken in accordance with UK guidance. Most UK assessments are now carried out using ProPG Planning & Noise: Professional Practice Guidance On Planning & Noise – New Residential Development (2017), jointly issued by the Association of Noise Consultants, the Institute of Acoustics and the Chartered Institute of Environmental Health. ProPG provides for good acoustic design through a five step process:

- Stage 1: Initial noise risk assessment of the proposed development site.
- Stage 2 element 1: Demonstrating a good acoustic design process.
- Stage 2 element 2: Observing internal noise level guidelines.
- Stage 2 element 3: Undertaking an external amenity area noise assessment.
- Stage 2 element 4: Consideration of other relevant issues.

Internal noise guidelines recommended by ProPG, drawn from British Standard BS 8233:2014 Guidance On Sound Insulation And Noise Reduction For Buildings (2014), are presented in Table 10-6.

Table 10-6 Recommended internal criteria from BS 8233:2014 and ProPG

Activity	Location	0700-2300 h	2300-0700 h
Resting	Living room	$L_{Aeq\ 16\ h}$ 35 dB	-
Dining	Dining area	$L_{Aeq\ 16\ h}$ 40 dB	-
Sleeping or daytime resting	Bedroom	$L_{Aeq\ 16\ h}$ 35 dB	$L_{Aeq\ 8\ h}$ 30 dB

BS 8233:2014 adds that:

Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values.

ProPG adds further advice here:

In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used to that individual noise events to not normally exceed 45 dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events.

With respect to external amenity areas such as gardens in the curtilage of dwellings, BS 8233:2014 states:

For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such a city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces, but should not be prohibited.

Although the WHO updated their noise guidance in 2018, through the document Environmental Noise Guidelines For The European Region, the new guidance has not yet filtered through to acoustic standards. The guidance is currently aspirational, and is expected to inform future guidance documents issued by standards authorities and governments, and future noise action plans issued by local authorities.

With respect to the proposed creche, there are no specific creche criteria in force. Reference may be made to Technical Guidance Document TGD-021-5: Acoustic Performance In New Primary & Post Primary School Buildings (Department of Education & Skills, 2015). The document recommends an indoor ambient $L_{Aeq,30\text{ min}}$ level of 35 dB. This criterion is applied in this assessment. The document adds that an external $L_{Aeq,30\text{ min}}$ criterion of 51-55 dB (range dependent on ventilation type) at the façade, opening windows and vents may be suitable.

10.2.5 Development plan

The Galway County Council Development Plan 2015-2021 (2015) includes two objectives in relation to noise as follows:

Objective TI 12 – Noise

Require all new proposed development, which is considered to be noise sensitive within 300 m of existing, new or planned national roads, or roadways with traffic volumes greater than 8,200 AADT, to include a noise assessment and mitigation measures if necessary with their planning application documentation. The cost of mitigation measures shall be borne by the developer. Mitigation measures in order to protect the noise environment of existing residential development will be facilitated or enforced as necessary.

DM standard 24 of the development plan includes a similar requirement:

Require all new proposed development, within 300 m of roadways with traffic volumes greater than 8,220 AADT, to include a noise assessment and mitigation measures if necessary with their planning application documentation.

The proposed development site lies within 250 m of regional route R338 which is nearest road of significance. Traffic count information presented in Galway County Council – Preliminary Appraisal Report – N6 Galway City Outer Bypass (ARUP, 2014) indicates that the R338 AADT in 2012 was 24,349, thus exceeding the 8,200 threshold. More recent data included in the Galway Noise Action Plan 2019-2023 (2019) indicates that the AADT is 23,913 in the vicinity of the site. This chapter therefore includes an assessment of mitigation requirements as required by the development plan.

10.2.6 Noise action plan

The Galway Noise Action Plan 2019-2023 (2019) produced by Galway County Council describes a strategic plan based on noise mapping undertaken in 2017 ('round 3' mapping). Preparation of the plan is a requirement of Directive 2002/49/EC Of The European Parliament And Of The Council Relating To The Assessment And Management Of Environmental Noise (2002), transposed into Irish law by the European Communities (Environmental Noise) Regulations 2018 (SI No. 549/2018). The Directive requires preparation of noise plans for all roads with annual traffic volumes over 3 million vehicles. This includes regional route R338 near the proposed development site.

The noise action plan proposes that mitigation will be applied where L_{den} levels exceed 70 dB, and L_{night} levels exceed 57 dB. The plan includes several stipulations with respect to noise sensitive land uses (libraries, hospitals, nursing homes, schools, etc.) in areas subject to high noise levels, and with respect to development facing major roads. None of these is considered relevant to the proposed development, as baseline noise data indicate that the site is not subject to high noise levels.

10.3 Baseline

10.3.1 Location & land use

The proposed development site consists of an approximately rectangular 4.7 ha plot on the southeast fringes of Galway City (Figure 10-1). The plot represents phase 1 of a long-term larger scale development envisaged for the holding.

The northern boundary of the proposed development area adjoins the railway line into the city, although at the northeast corner of the site, the railway line is separated from the site by Rosshill Road. The road veers north underneath the railway line 200 m from the northeast corner, and the railway directly adjoins the boundary over a distance of 130 m to the northwest corner of the phase 1 plot. The eastern boundary of the site is formed by Rosshill Stud Farm Road which meets Rosshill Road at the northeast corner. The western and southern boundaries adjoin the remainder of the holding, and are currently under pasture. A spur at the southwest corner runs further south, and is surrounded on all sides by pasture.



Figure 10-1 Site location N

The existing ground elevation varies widely across the site. At its northeast corner, adjacent to Rosshill Road and Rosshill Stud Farm Road, the elevation lies at approximately 16 m aOD, and is relatively level with both roads and the railway line. The elevation initially rises westwards over a distance of 250 m, reaching a maximum of 18 m aOD at the southern boundary. Outside the northern boundary, the elevation of Rosshill Road decreases to 9 m aOD as it passes underneath the railway line. At this location, the northern boundary of the site lies at approximately 18 m aOD, and thus lies significantly above the road. The elevation of the railway line also falls gradually westwards, and in the vicinity of the road underpass lies at 15 m aOD. Thus the site lies 3 m above the railway line at this point.

The western margins of the site lie at a considerably lower elevation than the main site block. The transition between the two is relatively sudden, particularly in the northern region. Here the elevation drops by approximately 9 m within 100 m, falling to a floor of 7 m aOD near the northwest corner. The railway line's fall westwards begins to level out, and outside the northwest corner the railway runs at an elevation of approximately 14 m aOD. In this area, the railway runs on a substantial embankment which extends to a height of 5-6 m above surrounding ground level.

The site is currently under a mixture of pasture, hedgerows and scattered trees. The surrounding area is also under pasture, with extensive proliferation of one-off dwellings along the local road network. Being within 1 km of the shore, Rosshill Stud Farm Road and its tributaries are cul de sacs, and there is no through-traffic. Rosshill Road is, however, a through-road, and sees heavy traffic at commuting times between Oranmore and the city.

10.3.2 Receptors

There are no noise receptors on the proposed development site itself. The nearest receptors are as follows:

- To the north, a dwelling lies close to the railway underpass, 70 m from the site boundary.
- Also to the north, on the far side of the railway embankment, 16 new dwellings have been recently completed. The nearest of these lies 70 m from the site boundary.
- A dwelling lies close to the northeast corner of the site, 25 m from the boundary. A second dwelling lies further north, 60 m from the corner. These dwellings mark the western end of ribbon development.

- A dwelling immediately outside the southeast corner of the holding lies 100 m from the phase 1 plot. Several other dwellings lie further south and southeast, forming an extensive cluster.
- Similarly, a dwelling 160 m from the southwest corner marks the northern tip of a dwelling cluster.
- The dwelling clusters to the southeast and southwest meet to the south of the site. Several dwellings here lie 140-200 m from the boundary.

Receptors within 500 m of the phase 1 plot boundary are shown in Figure 10-2. There are 81 detached dwellings within 500 m, with an additional 50-60 dwellings located at the southwest end of a residential estate to the northeast.

All identified receptors within 500 m consist of dwellings. No other receptors such as creches, schools, care centres or nursing homes have been identified. Commercial and industrial premises in the distance to the north and northwest are not considered to be noise sensitive receptors. The only other receptor of note is Rosshill Stud Farm located outside the southern boundary of the holding, and which includes stables (circled green in Figure 10-2). A commercial facility opposite the northeast corner of the site is not considered noise sensitive.



Figure 10-2 Receptors within 500 m. Rosshill Stud Farm stables circled green. N↖

10.3.3 Noise mapping

The Galway Noise Action Plan 2019-2023 (2019) includes maps relating to road noise around the city, as required by Directive 2002/49/EC Relating To The Assessment And Management Of Environmental Noise. Due to its traffic volume, the R338 is included in the maps. The R338 runs in an east-west direction to the north of the proposed development site. From the R338, Coast Road runs southeast, to the east of the site.

Relevant traffic mapping is shown in Figures 10-3 and 10-4. The maps indicate that modelled contours do not extend as far as the proposed development site, reflecting the minimal intrusion of R338 traffic noise at the site.

Mapping has also been undertaken by Iarnrod Eireann with respect to the national rail network where the number of train passages per annum exceeds 30,000. As the railway line adjacent to the proposed development site sees significantly less traffic than this threshold, the railway line has not been mapped. The railway line, and associated noise emissions, are discussed further in Section 9.3.5 below.



Figure 10-3 R338 L_{den} contours N^A



Figure 10-2 R338 Lnight contours N

10.3.4 Noise survey

A baseline noise survey was carried out at the proposed development site over the period 15.09.19–17.09.19. The purpose of the survey was to provide up to date ambient noise data, and to allow subsequent calibration of the noise model. Monitoring was carried out at four positions on the holding, shown in Figure 10-5 and Plates 10-1 to 10-4, and described in Table 10-7. The survey consisted of a mixture of unattended and attended monitoring. Survey methodology, equipment specifications and weather conditions are listed in Appendix 10-1. Recorded time history profiles are shown in Figures 10-6 to 10-9. Noise data are presented in Appendix 10-2, and summarised in Table 10-8.



Figure 10-3 Baseline noise stations N



Plate 10-1 N1, looking NW.



Plate 10-2 N2, looking N to railway



Plate 10-3 N3 looking NW to railway embankment.



Plate 10-4 N4 looking SW towards dwelling outside boundary.

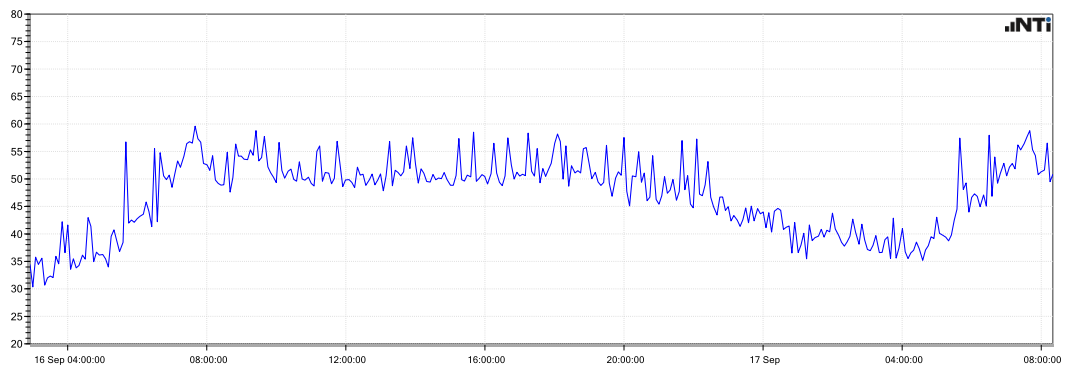


Figure 10-4 LAeq 1 s profile at N1

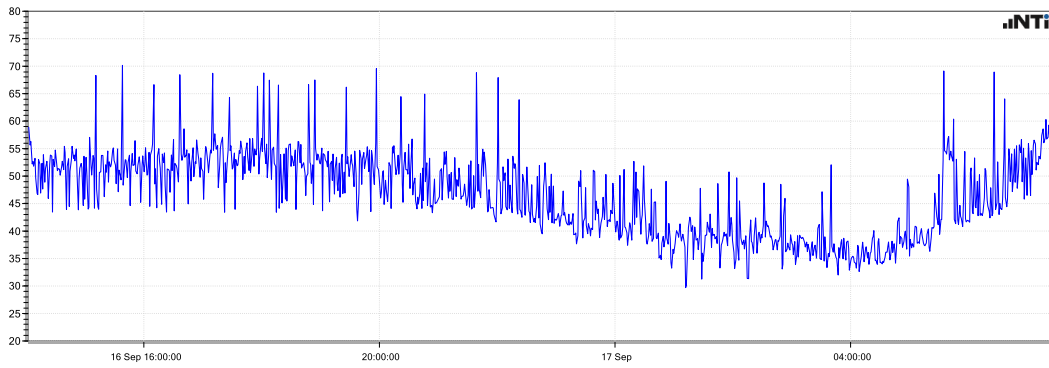


Figure 10-5 LAeq 1 s profile at N2

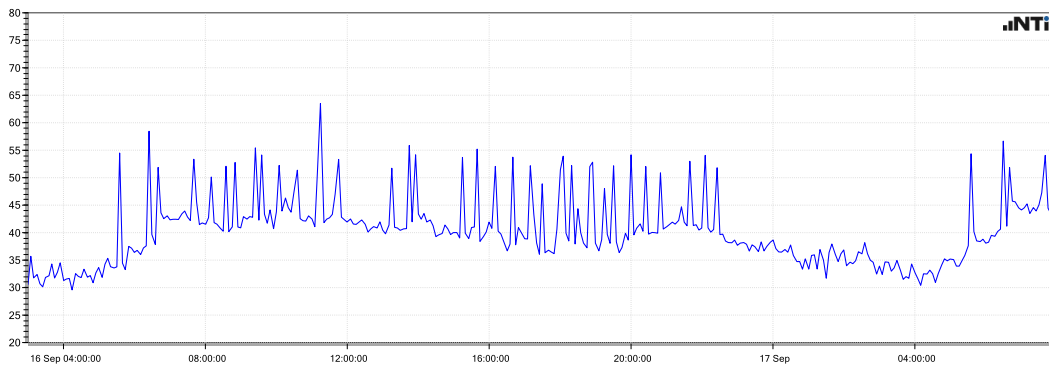


Figure 10-6 LAeq 1 s profile at N3

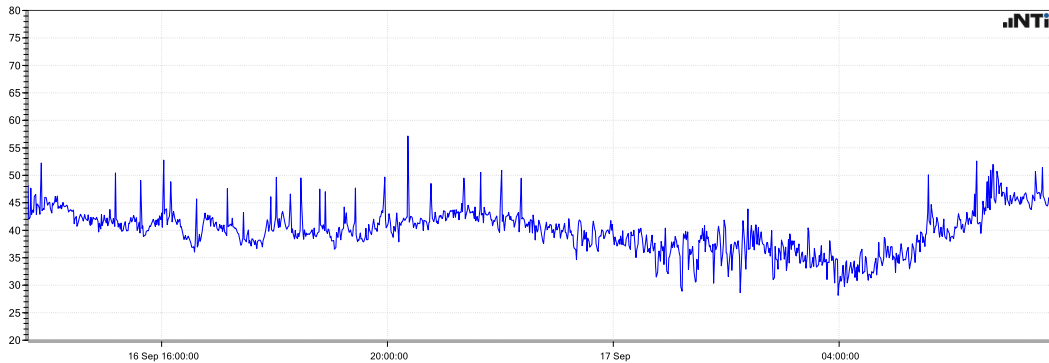


Figure 10-7 LAeq 1 s profile at N4

Table 10-7 Noise stations

Station	NGR	Reason for selection
N1	534363 725095	To provide indication of baseline soundscape in vicinity of NE corner, and assess impact due to local road and rail activity
N2	534212 725100	To assess impact of rail noise at positions overlooking rail line
N3	533981 725057	To assess impact of rail noise near NW corner, below embankment
N4	533880 724966	To provide indication of baseline soundscape away from roads

Table 10-8 Noise data summary

Period	Parameter	N1	N2	N3	N4
0700-1900 h	L _{Aeq} 15 min range	49-58	52-60	37-61	38-47
	L _{Aeq} 15 min average	53	56	46	43
	L _{AF90} 15 min range	41-50	42-51	35-50	36-44
	L _{AF90} 15 min average	45	44	39	40
1900-2300 h	L _{Aeq} 15 min range	45-54	46-59	38-50	40-47
	L _{Aeq} 15 min average	50	52	44	42
	L _{AF90} 15 min range	40-45	40-45	35-41	37-42
	L _{AF90} 15 min average	43	43	38	39
2300-0700 h	L _{Aeq} 15 min range	32-54	36-59	31-54	38-43
	L _{Aeq} 15 min average	42	43	37	38
	L _{AF90} 15 min range	28-46	31-45	27-42	28-44
	L _{AF90} 15 min average	35	36	32	34
24 h	L _{den}	55	58	51	47
0700-2300	L _{Aeq} 16 h	53	56	49	43
2300-0700 h	L _{night}	46	49	43	40

The main noise source audible at all four stations was distant road traffic, which was continuously audible at all times in the background throughout daytime, evening and night-time periods. Stations N1 and N2 were additionally affected by intermittent traffic on Rosshill Road and Rosshill Stud Farm Road, particularly during the morning peak when traffic was observed queuing on the former, with the queue stretching from the R338 back as far as the Rosshill Stud Farm Road. At all four stations, measured L_{AF90} 15 min levels reflect the intrusion of distant traffic noise. It is important to note that the

survey predates covid-19 travel restrictions, and measured levels thus represent travel movements outside of lockdown.

All four stations were additionally affected by passing rail traffic, although the frequency of movements was observed to be low (typically 1-2 passes per hour, increasing to 4 passes per hour during commuting peaks). Other noise sources included bird song/calls, aircraft, dog barking, and sporadic emissions (chiefly truck movements) from the commercial premises opposite the northeast corner of the site.

L_{den} and L_{night} levels are considerably lower than the respective 70 and 57 dB thresholds set out in the Galway Noise Action Plan 2019-2023 (2019) with respect to traffic noise mitigation.

ProPG includes criteria by which the noise risk of a site may be assessed. Data presented in Table 9-8 suggest that the site is ‘low risk’. In this regard, ProPG states that:

...the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an acoustic design statement which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.

ProPG notes that the risk category of a particular site will be influenced by the number of L_{AFmax} events which exceed 60 dB externally during night-time hours. Where the number of such events exceeds 10, mitigation may be required even where L_{night} levels are below relevant criteria. Night-time L_{AFmax} levels attributable to traffic were as follows:

- At N1, L_{AFmax} levels due to Rosshill Road traffic movements typically reached 62 dB at their highest, with rail movements reaching 76 dB at their highest.
- These levels typically reached 66 and 80 dB at their highest at N2.
- N3, affected only by rail traffic, typically saw L_{AFmax} levels reach 75 dB.
- N4, also affected only by rail, saw L_{AFmax} levels reach 62 dB.

A review of recorded data indicate that the number of night-time L_{AFmax} events over 60 dB was less than 10 at N1, N3 and N4. At N2, night-time traffic movements on Rosshill Road generated several L_{AFmax} events which exceeded 60 dB. In addition, resumption of rail traffic at 0535 h resulted in three L_{AFmax} events over 60 dB prior to 0700 h. Combined road and rail traffic generated approximately 20 night-time events over 60 dB at N2. These events were mirrored at N1, although the number which exceeded 60 dB was less due to the increased set back distance of N1 from the northern boundary. The data indicate that the northern margins of the site, from the northeast corner to approximately 50 m west of the road underpass, receive more than 10 L_{AFmax} events >60 dB during night-time hours, and that this zone extends approximately 40-50 m into the site.

10.3.5 **Railway line**

The northern boundary of the proposed development adjoins the Galway-Athenry railway line, which forms part of the Galway-Dublin railway line, and also connects Galway to the unfinished Western Rail Corridor which passes through Athenry. The line, consisting of a single track, runs on a low embankment several meters above the western end of the site. A hedgerow along the northern boundary of the site extends to the base of the embankment. The railway directly adjoins the site over a distance of 130 m. At the northeast corner, an additional 200 m is separated from the site by Rosshill Road.

At the time of writing, there were 18 eastbound and 17 westbound scheduled services each weekday between Galway and Athenry, decreasing to 21 trains on Sunday. Movements commence shortly after 0530 h, and continue to approximately 2220 h. Three movements occur prior to 0700 h. During the

baseline noise survey, the number of passages was typically 1-2 per hour, increasing to 4 per hour during commuting peaks. The first movement each day was recorded at 0535 h, and the last at 2221 h.

The sound exposure level (L_{AE}) attributable to each train pass was determined using data recorded during the survey described above. L_{AE} levels were 80-83 dB at N1, 87-88 dB at N2, and 77-78 dB at N3. On some occasions, blowing of the train horn as the road underpass was approached resulted in a significant increase in L_{AE} levels, on one occasion reaching 88 dB at N3.

10.3.6 Future trends

EPA EIAR guidance recommends that a noise impact assessment should include a description of the likely evolution of the future receiving acoustic environment in the absence of the proposed development. The local noise environment is semi-urban in character, with the chief background noise sources being local and distant traffic. In the medium term, traffic noise levels are likely to increase across the study area, due to continuing development in the city and its ongoing expansion. The development of a city bypass, currently at planning stage, is expected to reduce R338 traffic slightly. While engine noise emissions will also reduce, due to increasing take-up of electric vehicles, it is noted that traffic noise above 40-50 km/h arises chiefly from tyre noise, and such tyre noise is unlikely to be less in electric vehicles.

Outside of traffic, the most prominent noise source is railway noise. Although occurring infrequently, railway emissions dominate the soundscape during each train pass. As Galway City expands, it is likely that in future years the frequency of train passes will increase, due to increasing reliance on public transport and due to the possible long term development of a suburban rail network in Galway, as set out in policy objective TI 2b of the Galway County Council Development Plan 2015-2021 which aims to ‘Continue the provision of a range of transport options...including...a range of bus and rail services...’. In this regard, it is noted that the study site lies between Galway City and the expanding Oranmore area. Table 5.1 of the County Development Plan, which lists priority transport infrastructure projects, includes the installation of a second track along the line, which will allow increased capacity.

With respect to the development site itself, it is expected that, should the proposed development not proceed (the ‘do nothing’ scenario), no noise emissions are expected to arise other than those from land management practices, depending on how the site is used into the future. Given the site’s strategic location close to the city, it is likely that the site will be earmarked for development at a later date should the current proposal not proceed.

Future increases in road and rail traffic noise are unlikely to increase L_{den} , $L_{Aeq\ 16\ h}$ or L_{night} levels above criteria discussed in Section 9.2.6. The chief impact of any increases in such traffic is a possible rise in the number of L_{AFmax} events greater than 60 dB during night-time hours along the northern margins of the site.

10.4 Noise emissions

10.4.1 Proposal summary

It is proposed to construct 102no. residential units comprising of 35 apartments and 67 houses, a childcare facility, and retail/commercial space.. A four-storey apartment block with 35 apartments and ground floor retail space will be constructed on the eastern boundary. Apartments will be provided with balconies. A separate creche building will be provided at the northeast corner. A pumping station on the western site boundary will be required to manage wastewater.

The site will be served by a network of onsite roads. Open spaces will be landscaped. Access to the finished estate will be provided by an entrance on the eastern boundary, from Rosshill Stud Farm Road. At the northeast corner of the site, this road will be realigned, to improve visibility at its junction with Rosshill Road. The proposed layout is shown in Figure 10-10. A full description of the proposed development is provided in Chapter 4 of this EIAR.

Construction will be undertaken on a phased basis, beginning within six months of grant of planning permission, and will be managed from a temporary onsite compound. The overall construction project is expected to last three years. Construction hours will be 0800-1900 h Monday-Friday and 0800-1400 h on Saturdays.

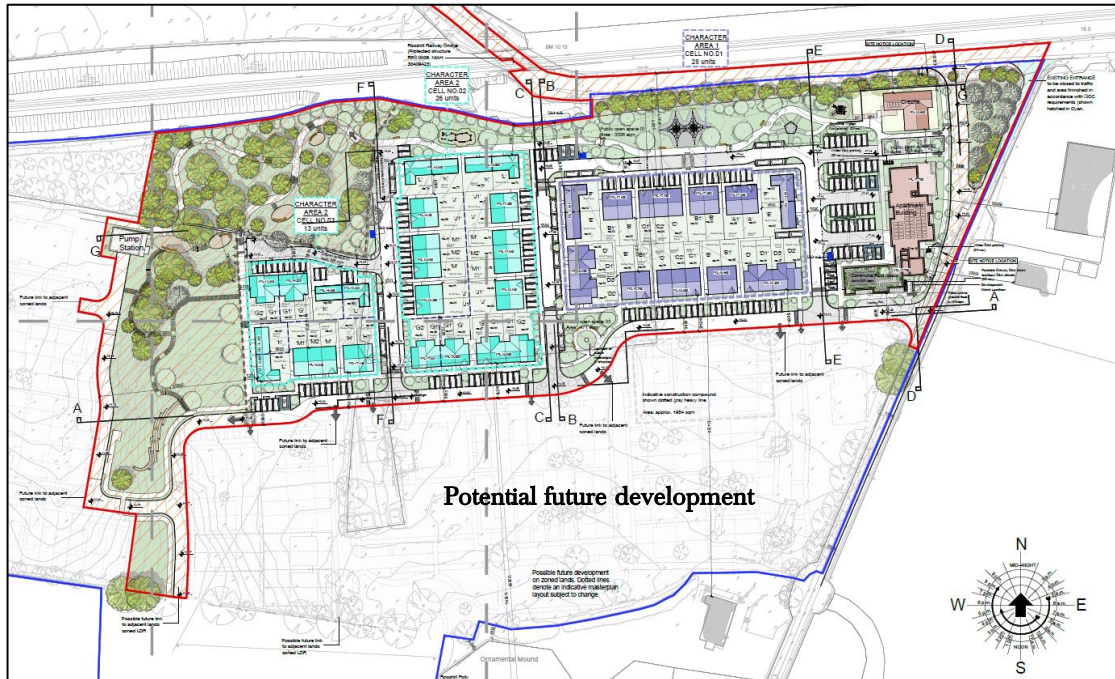


Figure 10-8 Proposed layout

10.4.2 Construction noise sources

Construction works will include the following activities, undertaken variously throughout the construction phase and in different areas of the site:

- Soil stripping & temporary stockpiling.
- Installation of temporary site compound.
- Provision of hardcore stone on onsite roadways.
- Excavation of dwelling foundations.
- Excavation of ground services trenches.
- Installation of services including sewerage network.
- Pouring & floating of concrete floor slabs.
- Block work and roof work.
- Building finishing (windows, doors, etc.).
- Laying of asphalt.
- Site landscaping.

During the construction phase, the chief source of noise emissions will be plant used onsite. Construction plant required onsite at various stages of the project are listed in Table 10-9. The table includes details of typical sound pressure levels, taken from BS 5228-1:2009+A1:2014. Rock breaking is unlikely to be required.

Table 10-9 Expected construction plant. Levels at 10 m.

Plant	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	Total LAeq
Asphalt paving machine with tipper truck	78	77	72	72	71	69	62	56	75
Discharging concrete mixer truck	80	69	66	70	71	69	64	58	75
Tracked excavator (16 t)	78	70	72	68	67	66	73	65	76
Wheeled backhoe loader (9 t)	68	67	63	62	62	61	54	47	67
Consaw	73	67	70	68	73	78	78	77	84
Mobile generator	78	71	66	62	59	55	56	49	65
Dumper	84	81	74	73	72	68	61	53	76
Vibro-roller	88	83	69	68	67	65	62	59	74
Telescopic handler	85	79	69	67	64	62	56	47	71
Truck (driving)	73	78	78	78	74	73	68	66	80

Noise emissions arising during the construction phase of the proposed development will vary considerably due to several reasons:

- The site is relatively large. Emissions will arise from plant operating across the site, and thus the site will not constitute a single point source.
- The large construction area will result in differing propagation conditions with respect to receptors at different locations.
- The construction phase will last several years. During this time, plant associated with different activities will relocate around the site as required.
- Different plant will be required at different times, and construction operations will vary on a daily basis. There may be extended periods during the construction phase with minimal noise emissions.
- Each machine item may operate under different loading conditions or be in varying states of repair.
- Construction works may be concentrated for certain periods, followed by periods of seeming inactivity. Localised works may require several hours of intense activity.
- During later stages of the construction phase, emissions from some operations will be screened by previously completed buildings.
- As buildings near completion, activity will gradually relocate indoors.
- With respect to particular plant, the models selected will change depending on requirements. The method of construction may be modified shortly before commencement, resulting in the need to import different equipment. Construction projects tend to be fluid in nature, with plant requirements changing as the site is progressed and circumstances change on the ground. The need for specific plant may often be established only following the start of a project.

From the foregoing, it is clear that construction phase noise emissions will vary, and it is not possible or practical to calculate a single sound power output figure for the entire site. With respect to surrounding noise sensitive receptors, worst case scenario emissions will arise when localised works are undertaken close to their respective boundaries.

10.4.3 Construction vibration sources

Potential sources of groundborne vibration during the construction phase are as follows:

- Delivery truck movements: Trucks may give rise to vibration at positions adjacent to the road. However, such emissions are typically imperceptible beyond 10 m, and are highly unlikely to be perceptible at dwellings alongside the road. Emissions will not be higher than those attributable to existing truck traffic.
- Plant movements: The movement of plant onsite is not considered to constitute a source of groundborne vibration, and is not listed in typical vibration documents such as BS 5228-2:2009. In addition, plant machinery used onsite is likely to be small to mid-sized, and similar to those used on other urban construction projects.
- Ground works: Excavation of trenches and pits for foundation and services will be required. These activities are not typically associated with offsite ground-borne vibration impacts. It is noted that piling is not proposed.
- Rock breaking: Unlike the activities listed above, breaking of rock involves a direct and repetitive impact to the rock stratum, which may generate relatively high levels of ground borne vibration locally. Although not envisaged at this time it is possible that breaking may be required locally onsite. This activity is discussed below.

Rock breaking may give rise to vibration close to the breaking zone. The vibration tends to contain relatively little energy in the lower frequencies at which buildings and occupants are most vulnerable. In addition, higher frequencies attenuate more rapidly than low frequencies, thus minimising the impact zone. For this reason, most vibration guidance documents such as BS 5228-2:2009 ignore rock breaking vibration. Table 10-10 lists various PPV levels reported in literature at sites where hydraulic rock breaking has been undertaken. The range in levels noted reflects variations in equipment power and rock type.

Table 10-10 Reported rock breaking PPV levels (various sources)

At 5 m	At 10 m	At 20 m	At 50 m
0.2-4.5 mm/s	0.06-3.0 mm/s	0.02-1.5 mm/s	0.1-0.3 mm/s

Rock breaking vibration levels are significantly lower than criteria listed in Tables 10-1, 10-2 and 10-3. Thus rock breaking, if required, is unlikely to give rise perceptible groundborne vibration at offsite receptors. It follows that construction operations are unlikely to be perceptible offsite, or to cause cosmetic or structural damage to buildings.

10.4.4 Post-completion noise sources

Apart from a retail space and a creche near the northeast corner, the entire development will consist of residential units accessed by a network of roadways. Noise emissions from these will arise from typical residential estate sources such as playing children, lawnmowers and car movements. Emissions will also arise from vans associated with deliveries, and waste collection trucks. All such emissions are highly unlikely to be significant onsite or offsite. Onsite traffic speeds will be low, thus minimising tyre noise.

At the retail unit, noise emissions may arise from air handling units (AHUs) such as fans, vents and air conditioning cassettes installed on external walls. Any such AHUs will be relatively small, and it will not be necessary to install industrial grade units. Emissions from these are highly unlikely to be audible beyond the site boundary.

Deliveries are likely to occur at the retail unit on a daily basis. Delivery vehicles are likely to consist of small trucks and vans during daytime hours. Evening or night-time deliveries are unlikely. Noise emissions from delivery vehicles will not be significant in the context of the local urban traffic environment. Little or no noise emissions are expected from the delivery operations themselves, as these will be small in scale.

The proposed site layout will incorporate open spaces which will be grassed and planted with trees. It is likely that a maintenance contract will be awarded to a local landscaping company. Maintenance activities undertaken at the proposed site will chiefly include regular mowing of open green areas. While mower emissions are likely to be audible at the nearest receptors, such emissions will blend into the urban soundscape, particularly during the summer when the daytime/evening noise environment in any urban area tends to include at least one mower audible in the distance at any time.

The proposed development will give rise to increased traffic on the local road network. A review of the traffic impact assessment document indicates that a significant increase in traffic volumes will arise on Rosshill Road, and at its junction with Rosshill Stud Farm Road.

It is proposed to install a wastewater pumping station at the northwest corner of the phase 1 plot. The station will include submerged pumps. Noise emissions from these are highly unlikely to be audible beyond 5 m. There will be no above-ground noise sources.

10.5 Potential impacts

10.5.1 Overview

As identified above, several sources are highly unlikely to give rise to offsite impacts. These are as follows:

- Construction phase activities are not expected to give rise to perceptible groundborne vibration at offsite receptors.
- Similarly, the completed project will not give rise to groundborne vibration.
- Following completion, noise emissions arising within the site will be urban-residential in character, and will not give rise to offsite impacts.
- Noise emissions associated with a retail unit, including air handling units and deliveries, are highly unlikely to give rise to adverse impacts offsite.
- The proposed pumping station will not give rise to audible noise emissions.
- Completed dwellings and apartments at the proposed site are highly unlikely to received perceptible levels of groundborne vibration from railway activity. In the author’s experience, vibration PPV due to passing trains typically dissipates to less than 0.1 mm/s beyond 10 m from the rail line

In contrast, potential impacts may arise with respect to three sources, and these are discussed below:

- Construction phase noise emissions may affect offsite receptors.
- Following completion, traffic noise levels on surrounding roads will increase, resulting in noise impacts.

- Residents at the proposed development may suffer inward impacts, due to road and/or rail noise.

10.5.2 Construction noise

Construction noise emissions will vary in time and location, and it is not possible to determine a single overall noise output figure for the construction phase. The most appropriate approach here is to assess worst case scenario emissions. A potential worst case scenario is shown in Figure 10-11.

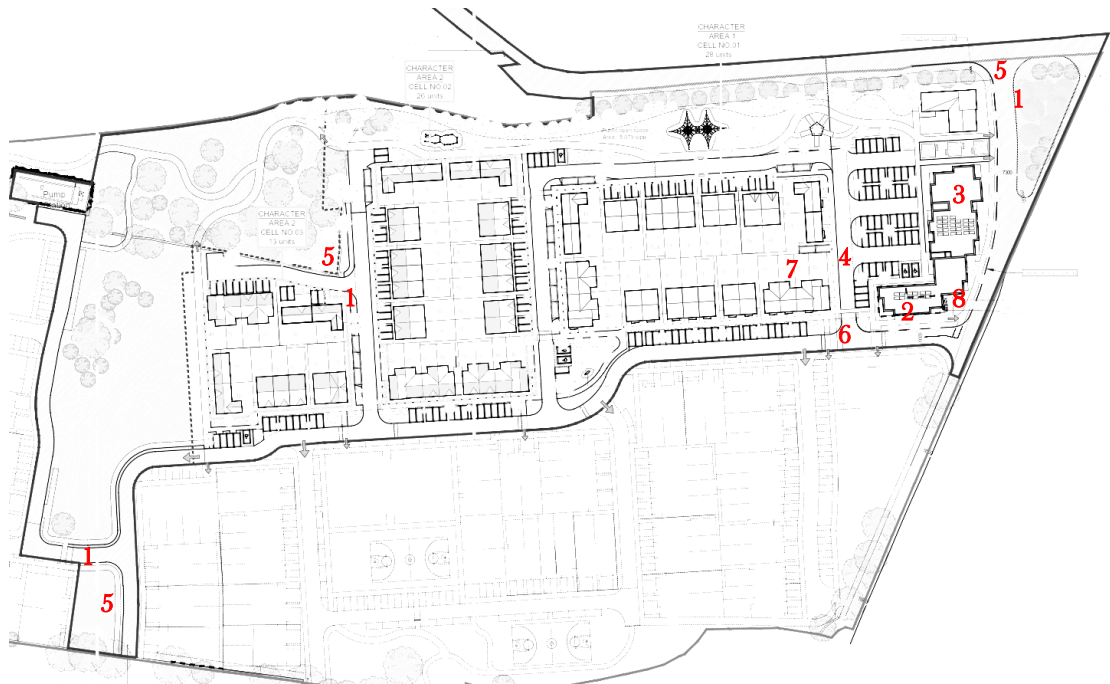


Figure 10-9 Potential worst case noise scenario during construction phase

Key:

- 1 Tracked excavator.
- 2 Discharging mixer truck.
- 3 Wheeled backhoe.
- 4 Consaw.
- 5 Dumper.
- 6 Vibro-roller.
- 7 Telescopic handler.
- 8 Truck.

Noise emissions from the above were modelled using DGMR iNoise v.2021 software. Input parameters were as follows:

- Model algorithm: International Standard ISO 9613-2:1996 Acoustics: Attenuation Of Sound During Propagation Outdoors – Part 2 General Method Of Calculation (1996).
- Soft ground assumed throughout.
- No screening.

- Receiver height: 4 m.
- Levels not rated for character.
- Plant output data taken from Table 10-9.
- 31.5 Hz levels (not provided in BS 5228) assumed to be same as 63 Hz levels.
- Plant on-times per hour: excavator (80 %), mixer truck (50 %), backhoe (50 %), consaw (10 %), roller (90 %), handler (20 %).
- Dumpers following 50 m haul route in proximity to SW and NE corners.
- Trucks following 100 m haul route near entrance.

The model output is shown in Figure 10-12. $L_{Aeq\ 1\ h}$ levels predicted at the three nearest receptors (close to their respective facades), located outside the three corners of the site, are listed in Table 10-11. Levels are also predicted with respect to Rosshill Stud Farm.

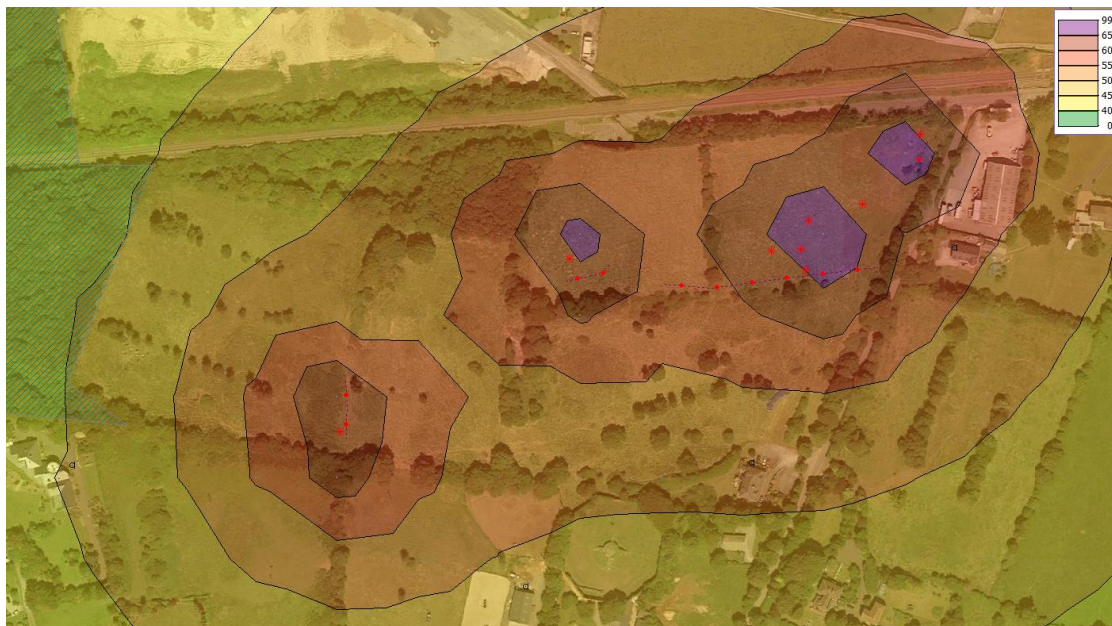


Figure 10-10 Construction phase $L_{Aeq\ 1\ h}$ levels – potential worst case scenario

Table 10-11 Construction phase $L_{Aeq\ 1\ h}$ levels at nearest receptors

Receptor	$L_{Aeq\ 1\ h}$ (dB)
Dwelling opposite E boundary	57
Dwelling to SE	52
Dwelling to SW	46
Rosshill Stud Farm stables	49

The highest $L_{Aeq\ 1\ h}$ level predicted is 57 dB, calculated with respect to the dwelling opposite the eastern boundary. Levels at all other dwellings will be considerably lower. Levels at all receptors will be lower than the 65 dB criterion recommended by BS 5228-1:2009+A1:2014 with respect to construction phase

works. Levels will also be lower than the 70 dB criterion recommended by the National Roads Authority (now Transport Infrastructure Ireland).

BS 5228:2009+A1:2014 data suggest that construction phase emissions will not be tonal. Apart from hammering, emissions are also unlikely to be impulsive. Hammering will be sporadic, typically occurring during roofing, and scaffolding erection and dismantling. Associated noise emissions will be brief and localized. Rock breaking, although unlikely to be required, will be impulsive.

It is reiterated here that the above predictions are based on a likely worst case scenario, arising when a number of different machines operate simultaneously. In reality, this is unlikely to occur regularly. Experience indicates that, at most residential building sites, construction managers direct machines to different areas in order to minimise the possibility of one activity intruding on another. Thus machines rarely operate at the same location at the same time. Typically, most operations at a particular location onsite require just 1-2 machines. Thus, throughout most, if not all, of the construction phase, received $L_{Aeq\ 1h}$ levels are likely to be less than presented in Table 10-11. On this basis, construction phase noise levels are likely to be short-term and slightly adverse at worst.

Throughout the construction phase, vehicles will arrive at, and depart from, the site during the working day. Vehicle movements will be associated with workers' arrival and departure, and delivery of materials. The approximate numbers of workers employed onsite over the entire construction period will fluctuate depending on schedules. Numbers are unlikely to exceed 40 at any time, due to project phasing.

All personnel and deliveries will access the proposed development site from Rosshill Stud Farm Road, via a proposed entrance on the eastern boundary of the site. Construction traffic volumes are expected to be inconsequential in the context of existing traffic volumes. Thus construction phase traffic noise impacts are not expected to be significant.

Although construction phase noise emissions will be considerably less than the 65 dB criterion at the stud farm, it will be advisable to liaise with the stud farm operator prior to the commencement of construction in order to establish noise management requirements.

Residual Impact Assessment

Construction operations will be short term. Residual noise impacts during the construction phase from onsite activity will be moderate negative short term during periods of activity in proximity to surrounding receptors. There will be extended periods where impacts will be neutral to slight negative, depending on works.

Significance of Effects:

Construction phase effects will be short term moderate negative. There will be no significant effects in terms of construction noise

10.5.3 Post-completion road traffic noise

Noise impacts at offsite receptors attributable to car movements on roadways within the completed site are expected to be negligible due to a combination of low traffic speeds, low numbers of movements, screening by buildings and separation distance. However, impacts may arise at offsite dwellings due to increased traffic on public roads in the vicinity. Dwellings most vulnerable here are as follows:

- A single dwelling on Rosshill Stud Farm Road, opposite the proposed site entrance.
- A dwelling adjacent to Rosshill Road, north of the railway underpass.
- Ribbon development along Rosshill Road to the east of the site.
- Merlin Park dwellings, northwest of the underpass.

A review of the traffic impact assessment report indicates that the number of vehicle movements generated by the proposed development will be approximately 250 during the morning peak, and 200 during the evening peak. Table 10-12 shows the increase in Rosshill Road traffic determined by the project traffic consultants. Included in the table is the resulting increase in $L_{Aeq T}$ levels. It is important to note that the increase indicated relates solely to Rosshill Road traffic – locations which are influenced by additional sources outside Rosshill Road traffic will see smaller increases.

Table 10-12 2024 traffic increases post-completion

Location	Period	Direction	2024 without dev	2024 with dev	dB increase
Rosshill Road west (via underpass)	AM	W-bound	472	500	-
		E-bound	22	30	-
		Total	494	530	0.3 dB
	PM	W-bound	39	44	-
		E-bound	139	159	-
		Total	178	203	0.6 dB
Rosshill Road east towards Coast Road	AM	W-bound	471	483	-
		E-bound	30	65	-
		Total	501	548	0.4 dB
	PM	W-bound	57	85	-
		E-bound	145	159	-
		Total	202	244	0.8 dB

The change in traffic volume required to increase the $L_{Aeq T}$ level by 3 dB, which is the smallest change perceptible by the human ear, is 100 % i.e. traffic needs to double before the listener concludes that noise levels have increased. In all cases, increases in traffic noise levels will be lower than 1 dB. From Table 10-5 above, such increases will be imperceptible, and resulting impacts will be imperceptible.

Traffic volumes on Rosshill Stud Farm Road, between the proposed site entrance and the Rosshill Road T junction, will increase significantly as a result of the development. Information provided by the traffic team indicates that the morning peak volume will increase from 31 to 94 movements (2024 figures). The evening peak increase will be from 32 to 52. The resulting increase in $L_{Aeq T}$ level will be 5 dB during the morning peak, and 2 dB during the evening peak. The resulting noise impact will be slight at worst. It is noted that the project proposals include a proposal to realign Rosshill Stud Farm Road at the junction. During these works, it is recommended that the occupants of the dwelling be offered the opportunity to have an acoustic barrier installed on the western boundary of the property in order to reduce traffic noise arising on the road between the site entrance and the junction. This is discussed below under Mitigation.

Mitigation

No mitigation measures are specifically required with respect to the completed development, other than implementation of speed restrictions on internal roadways in order to minimise traffic noise emissions.

Residual Impact Assessment

On the basis of the above, the increase in local traffic noise, although measurable, is likely to be consistent with local soundscape context, thus minimising impacts. Context forms a key element in the assessment of noise impacts, as set out in *British Standard BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound* (2019). Given the minimal increases which will arise in traffic noise levels, it is concluded that noise impacts at most receptors will be neutral. Impacts will be permanent and slight adverse at the nearest receptors close to the Rosshill Road – Rosshill Stud Farm Road junction.

Significance of Effects

Based on the assessment above there will be no significant effects on traffic related noise.

10.5.4 Inward impacts

10.5.4.1 Inward sources

Inward impacts relate to noise immissions received at a receptor due to emissions emitted by one or more sources. Emerging best practice provides for the design of new developments such that occupants are not subject to high immissions from existing (and potential future) offsite noise sources. Such sources usually consist of transport (road, rail and aircraft), and industry. Internal and external criteria considered appropriate to new residential developments are identified in Section 10.2.4.

At the proposed development site, inward immissions arise from the following sources:

- R338 traffic to the north.
- Coast Road traffic to the east.
- Rosshill Road traffic outside the northeast corner.
- Rosshill Stud Farm Road traffic outside the east boundary.
- Rail traffic outside the north boundary.
- Activity at the commercial premises opposite the northeast corner.

Noise levels measured at the site indicate the following:

- Minimal noise emissions of significance arise from the commercial premises in question.
- R338 and Coast Road traffic emissions are continuously present, and determine the background soundscape at the site. Measured $L_{AF90\ 15\ min}$ levels are representative of these emissions. $L_{AF90\ 15\ min}$ levels averaged 39-45 dB across the site during daytime hours, falling to 32-36 dB during the evening. The data indicate that these emissions are not a major contributor to L_{den} , $L_{Aeq\ 16\ h}$ and L_{night} levels across the site, particularly across its northern half.
- The Galway Noise Action Plan 2019-2023 proposes that mitigation will be applied when L_{den} levels exceed 70 dB and L_{night} levels exceed 57 dB. L_{den} levels at the site are currently 47-58 dB, and L_{night} levels are 40-49 dB. These levels are significantly below the threshold values. Future growth in road and rail traffic is unlikely to alter this conclusion.
- The highest noise levels at the site are seen close to the northern boundary, particularly close to the road underpass where Rosshill Road and rail traffic combine to generate L_{den} , $L_{Aeq\ 16\ h}$ and L_{night} levels of 58, 56 and 49 dB respectively. These levels marginally decrease to the east and west. It follows that Rosshill Road and the rail line are the noise sources of greatest significance at the site.

- During night-time hours, individual road and rail movements result in occasional L_{AFmax} exceedances of 60 dB along the northern margins of the site.
- Traffic on Rosshill Stud Farm Road is not of major acoustic consequence at the study site. However, completion of the proposed development will see a marked increase in traffic volumes near the junction with Rosshill Road, and night-time L_{AFmax} activity may also be an issue near the junction.

10.5.4.2 Modelled baseline

In order to quantify noise levels across the site, predictive modelling was undertaken using DGMR iNoise v.2021 software. The following input parameters were applied:

- Model algorithm: International Standard ISO 9613-2:1996 Acoustics: Attenuation Of Sound During Propagation Outdoors – Part 2 General Method Of Calculation (1996).
- Contours taken from mapping.
- Modelled heights: 2 and 4 m, to allow comparison with measured values.
- Rosshill Road and Rosshill Stud Farm Road traffic volumes taken from the traffic impact report.
- R338 and Coast Road traffic volumes taken from the Galway Noise Action Plan 2019-2023 which indicates an AADT of 23,913 and 8227 respectively. An equal east-west split is assumed, with a 3 % HGV content.
- Rail movements taken from the Iarnrod Eireann timetable, adjusted to align with field observations.

The model output is shown in Figures 10-13 and 10-14. Table 10-13 presents a comparison between modelled and measured L_{den} and L_{night} levels. Modelled levels at the four measurement positions are within 2 dB of measured levels. The model is therefore considered reasonably valid for the purposes of this assessment.

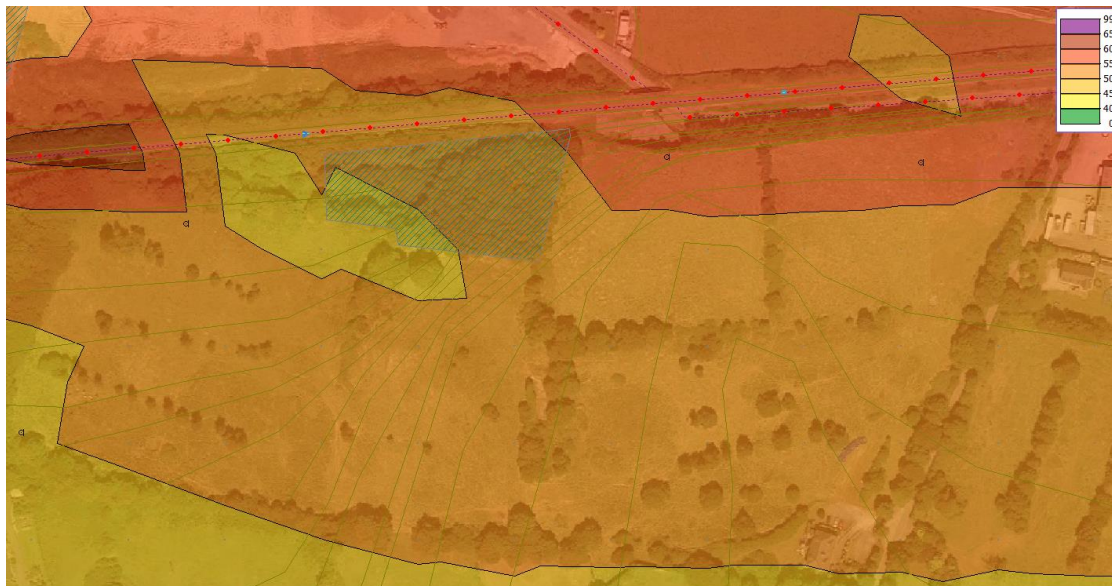


Figure 10-11 Existing L_{den} levels at 4 m

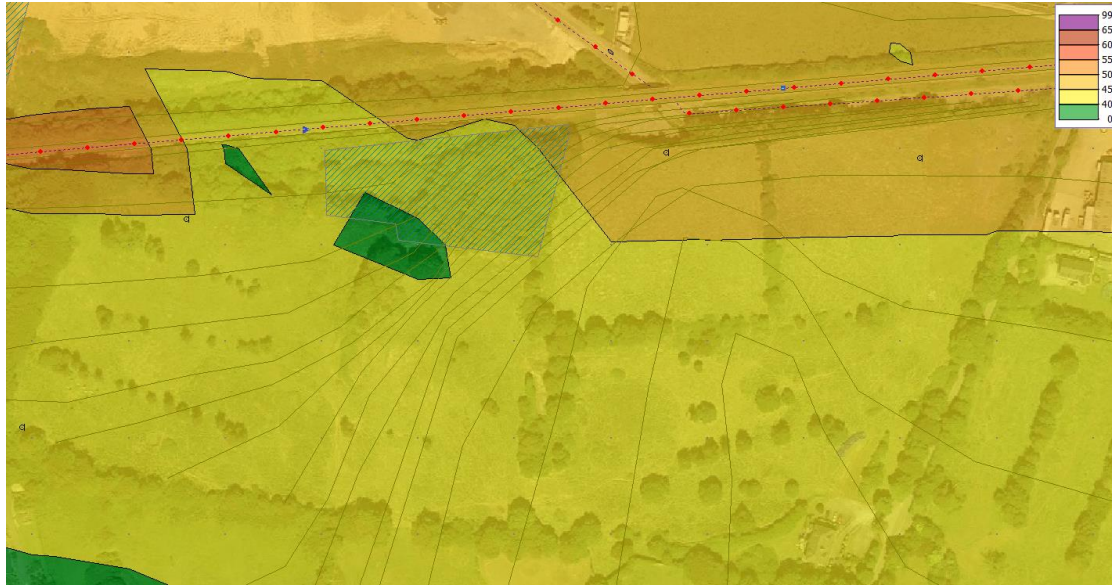


Figure 10-12 Existing L_{night} levels at 4 m

Table 10-13 Modelled and measured L_{den} and L_{night} levels.

Parameter		N1	N2	N3	N4
L_{den}	Measured	55	58	51	47
	Modelled	55	57	50	49
L_{night}	Measured	46	49	43	40
	Modelled	46	48	41	40

10.5.4.3 Modelled future scenario

In order to provide for future increases in noise levels, the model was modified to reflect the following:

- A 10 % increase in traffic volumes on the R338 and Coast Road.
- A 25 % increase in Rosshill Road traffic following completion.
- The introduction of approximately 1000 traffic movements per day on the Rosshill Stud Farm Road, north of the proposed site entrance.
- The proposed realignment of this road.
- A 20 % increase in passing rail traffic.

The model was also updated to include the built development, and rerun at the additional height of 11 m to reflect the top floor of the proposed apartment building. The model output is shown in Figures 10-15 to 10-18. $L_{Aeq 16h}$ and L_{night} levels are shown, as these are most relevant to the assessment. Predicted levels at the most vulnerable facades are listed in Table 10-14. Levels at other facades will be lower.

Table 10-14 Future LAeq 1 h and Lnight levels

Location	2 nd floor		4 th floor	
	LAeq 16 h	Lnight	LAeq 16 h	Lnight
Apartment block N wing – N façade	49-57	42-47	50-55	43-46
Apartment block N wing – S façade	49-52	42-45	50-54	42-45
Apartment block N wing – E façade	56-59	48-50	54-57	45-47
Apartment block N wing – W façade	46-49	40-41	47-48	40-41
Apartment block W wing – N façade	45-46	38-40	40-45	38-40
Apartment block W wing – S façade	<30	<30	<45	<35
Apartment block W wing – E façade	45	39-40	47-50	39-40
Apartment block W wing – W façade	44	37	45	38
Apartment block centre – E façade	55-58	47	55	44-46
Apartment block centre – S façade	51-56	43-45	50-54	41-43
Dwellings along N boundary, by underpass – N facade	49-52	41-43	-	-
Dwellings along N boundary, E of underpass – N facade	49-50	45	-	-



Figure 10-13 Future LAeq 16 h levels at 4 m



Figure 10-14 Future Lnight levels at 4 m



Figure 10-15 Future LAeq 16 h levels at 11 m



Figure 10-16 Future L_{night} levels at 11 m

10.5.4.4 L_{AFmax} levels

As noted previously, the number of night-time L_{AFmax} events above 60 dB is likely to exceed 10 along the northern margin of the site. At the western end of the phase 1 area, rail movements contribute to these exceedances. The number of night-time rail movements is currently three. A future doubling of night-time rail activity will thus result in six events which exceed 60 dB.

At the central and eastern end of the phase 1 area, L_{AFmax} events arise due to Rosshill Road and rail traffic. Noise levels across the phase 1 area were established by modifying the predictive model to reflect L_{AF} levels from two line sources, and validated using the following data:

- At N1, typical L_{AFmax} level of 62 dB due to Rosshill Road traffic, and 76 dB due to rail.
- At N2, respective levels of 66 and 80 dB.

Figures 10-19 and 10-20 show the L_{AFmax} contours. The figures indicate that L_{AFmax} levels across the phase 1 area exceed 60 dB due to rail movements.

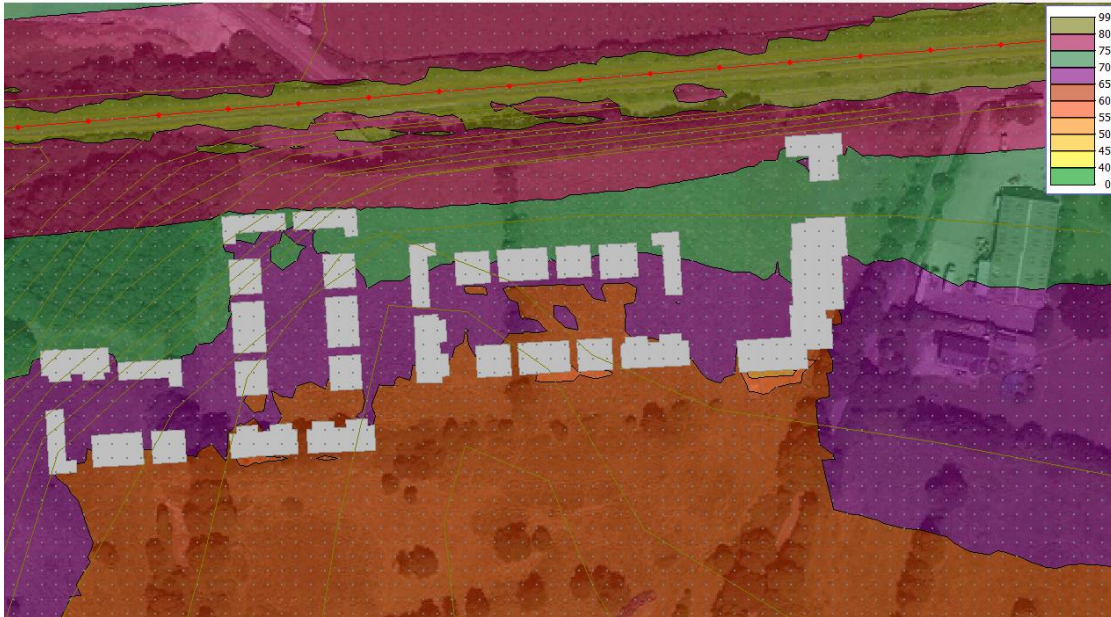


Figure 10-17 LAFmax levels due solely to rail movements (4 m)



Figure 10-18 LAFmax levels due solely to Rosshill Road traffic (4 m)

Even where the number of rail movements doubles, the number of night-time events >60 dB will not exceed 10. Rosshill Road traffic, in contrast, gives rise to more than 10 events >60 dB during night-time hours, but the zone of influence is much less, extending to approximately 40 m into the site.

Figure 10-20 was modified to include Rosshill Stud Farm Road, realigned as proposed. Figure 10-21 shows the modified model. The figure shows that L_{AFmax} levels at onsite receptors near the site entrance will receive L_{AFmax} levels over 60 dB. The number of such events is likely to exceed 10 per night, most of which will be attributable to traffic related to the development itself.



Figure 10-19 LAFmax levels at east end of site due solely to Rosshill Road traffic & realigned Rosshill Stud Farm Road (4 m)

10.5.4.5 ProPG assessment

10.5.4.5.1 Stage 1: Risk assessment

The model indicates that future noise levels, based on increased traffic and rail volumes, will result in incident $L_{Aeq\ 16\ h}$ levels which approach 60 dB at facades along the northern margins of the site, highest towards the northeast corner. L_{night} levels will reach 50 dB at their highest. Levels within the site will be lower. The levels indicate that the site will continue to be ‘low risk’ into the future.

Properties located within 40 m of Rosshill Road, in addition to the closest onsite receptors to the site entrance, will receive more than 10 events >60 dB L_{AFmax} during night-time hours.

10.5.4.5.2 Stage 2: Element 1 – Good acoustic design process

In designing the overall site layout, the following principles of good acoustic design have been applied:

- Dwellings are set back from the northern boundary as much as possible.
- Much of the northern boundary is given to green space, enhanced with a specific planting programme including medium trees, street trees, hedgerows and meadows, thus providing an attractive space for residents.
- Dwellings are generally orientated east-west, so that gables face north towards Rosshill Road, thus reducing the number of bedroom windows exposed to road traffic and rail noise.

10.5.4.5.3 Stage 2: Element 2 – Internal noise level guidelines

Internal noise criteria are discussed in Section 10.2.4 above. Assuming a 15 dB reduction through an open window (the conventionally accepted value, identified in DEFRA report NANR116), and by reference to Table 10-14 above, the following conclusions are drawn:

- Recommended internal daytime $L_{Aeq\ 16\ h}$ criteria are 35-40 dB. These criteria will be met with open windows where incident levels do not exceed 50-55 dB. The criteria will be

met across most of the phase 1 area with windows open. At dwellings and apartments close to the northern boundary, the criteria will be met with windows closed, assuming standard thermal glazing. No residential unit will require acoustic grade windows to meet the criteria.

- The recommended L_{night} criterion in bedroom is 30 dB. As before, this criterion will be met across much of the site with windows open. At facades close to the northern boundary, it will be necessary to close windows to meet this criterion. Again, standard thermal glazing will provide the required attenuation.
- Facades near the northeast corner will be exposed to more than 10 L_{AFmax} events at night which exceed 60 dB. The World Health Organisation (1999) recommends that L_{AFmax} levels in bedrooms should not exceed 45 dB to prevent sleep disturbance. Where the number of events exceeds 10 per night, the objective is thus to ensure that internal L_{AFmax} levels with windows closed remain below 45 dB. L_{AFmax} levels will reach 74 dB at the most exposed facades on the apartment building. Enhanced glazing will therefore be required here. Standard thermal glazing will be sufficient at other facades.

10.5.4.5.4 **Stage 2: Element 3 – External amenity area noise assessment**

BS 8233:2014 recommends that $L_{\text{Aeq } 1 \text{ h}}$ levels should ideally not exceed 50-55 dB in external amenity areas. This criterion will be met in rear gardens across the site. The only exceedances identified will arise at east facing balconies on the apartment block, where received $L_{\text{Aeq } 16 \text{ h}}$ levels will marginally exceed 55 dB. However, as recommended by ProPG, residents here will benefit from onsite park areas where $L_{\text{Aeq } 1 \text{ h}}$ levels are less than 50 dB.

On this basis, noise levels in amenity areas will be satisfactory.

10.5.4.5.5 **Stage 2: Element 4 – Assessment of other relevant issues**

Other issues assessed, as recommended by ProPG, include the following:

- Compliance with relevant national and local policy: The most relevant policies are those set out in the Galway Noise Action Plan 2019-2023. The plan proposes that mitigation will be applied where L_{den} levels exceed 70 dB, and L_{night} levels exceed 57 dB. Onsite noise levels do not exceed these criteria, and are not expected to exceed them in the future.
- Magnitude and extent of compliance with ProPG: $L_{\text{Aeq } 16 \text{ h}}$ and L_{night} levels in almost all proposed units will meet identified criteria without specific acoustic mitigation measures. Several mitigation measures which are required are discussed below.
- Likely occupants of the development: The proposed development is expected to be occupied by a typical sample of the population, and is unlikely to see a predominance of one particularly sensitive group.
- Acoustic design versus unintended adverse consequences: No adverse consequences have been identified.
- Acoustic design versus wider planning objectives: No issues have been identified.

One additional item requires consideration here. At the proposed creche, incident $L_{\text{Aeq } 16 \text{ h}}$ levels at the northern and eastern facades will reach 58 dB, due to proximity to Rosshill Stud Farm Road traffic. $L_{\text{Aeq } 30 \text{ min}}$ levels are likely to reach 60 dB during the daytime. This level exceeds the 51-55 dB range suggested by Technical guidance document TGD-021-5, and thus appropriate mitigation measures will be required here as discussed below.

10.5.5 Population & human health

The assessment of impacts on human health is typically undertaken by reference to WHO guidance, which has been revised over the last four decades according as noise and health studies have been published. The WHO currently recommends the following:

- In residential settings, a daytime/evening $L_{Aeq\ 16\ h}$ level of 50 dB is an indicator of moderate annoyance.
- A night-time $L_{Aeq\ 8\ h}$ level of 45 dB is recommended to prevent sleep disturbance.
- With respect to short term impulsive sources, the WHO recommends a night-time L_{Amax} limit of 60 dB outside bedroom windows during night-time hours.

Impacts assessed above may be reviewed in light of the WHO recommendations. The review indicates the following:

Construction phase

- The WHO daytime 55 dB criterion is based on an interval of 16 h. It is highly unlikely that construction activities will result in $L_{Aeq\ 16\ h}$ levels above 55 dB, given that worst case scenario $L_{Aeq\ 1\ h}$ levels at most receptors will be 55 dB or less.
- The only receptor where construction phase $L_{Aeq\ 1\ h}$ levels will exceed 55 dB is the dwelling outside the proposed site entrance. However, it is unlikely that $L_{Aeq\ 16\ h}$ levels at this dwelling will exceed 55 dB. If periods of intense activity are anticipated near this position over extended periods i.e. greater than several hours, mitigation will be required with respect to this dwelling.
- The night-time WHO $L_{Aeq\ 8\ h}$ and L_{Amax} criteria are unlikely to be exceeded at any receptor during the construction phase, as night-time construction works are not envisaged.

Operation phase

- Following completion and occupation of the completed development, daytime and night-time WHO criteria are not expected to be exceeded at any offsite receptor as a result of onsite emissions.
- Traffic noise arising from public roads in the vicinity will increase slightly as a result of the proposed development. The increase will be slight, being less than 1 dB in all cases.
- With respect to inward impacts, external noise levels will be satisfactory in the context of WHO criteria. While slight exceedances may occur at east facing balconies on the apartment block, residents will benefit from external amenity areas onsite. Internal noise levels will be satisfactory.

On this basis, it is considered that there will be no adverse noise impact on the local population or on human health, subject to the mitigation measures discussed below.

10.5.6 Mitigation

10.5.6.1 Construction

Construction phase $L_{Aeq\ 1\ h}$ levels will be lower than the 65 dB criterion recommended by BS 5228-1:2009+A1:2014, and the 70 dB criterion recommended by the National Roads Authority (now Transport Infrastructure Ireland). At most offsite receptors, $L_{Aeq\ 1\ h}$ levels will be lower than 55 dB. The

highest level will be received at the dwelling opposite the proposed site entrance where the received $L_{Aeq\ 1\ h}$ level during worst case scenario operations will reach 57 dB. If periods of intense activity are anticipated near this position over extended periods i.e. greater than several hours, it is recommended that the occupants of the dwelling be notified in advance.

The following general mitigation measures are proposed during the construction phase:

- Construction operations will in general be confined to the period Monday-Friday 0800-1900 h, and Saturday 0800-1600 h.
- Where it is proposed to operate plant during the period 0700-0800 h, standard ‘beeper’ reversing alarms will be replaced with flat spectrum alarms.
- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Queuing of trucks outside the site entrance will be prohibited.
- A site representative will be appointed as a liaison officer with the local community. Prior to commencement of construction, contact details for the officer will be circulated to all local residents. The officer will notify local residents of upcoming works phases and likely noise sources.
- Where evening or night-time operations are required, local residents will be notified through the liaison officer.
- All complaints of noise received during the construction phase will be logged in a register, and investigated immediately. Details of follow-up action will be included in the register.
- Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance.
- Guidance set out in British Standard BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase.

Prior to the commencement of construction, it is proposed to liaise with the operators of Rosshill Stud Farm to identify noise control measures specifically required by the stud farm. Identified measures will be included in a construction phase noise management plan.

10.5.6.2 Commercial unit

At the proposed retail unit, noise emissions may arise from dispersed sources such as extraction fans, vents and air conditioning cassettes. Noise emissions from these sources are unlikely to be audible beyond 10 m, and are thus highly unlikely to affect offsite receptors outside the northeast corner of the site.

Plant details are not available at this stage. Once details are finalised, it is proposed to assess the impact of such emissions on residential units in the same building and nearby. Any mitigation measures identified as necessary will be installed prior to occupation of these units.

Noise emissions associated with deliveries and visitors to the commercial units are not expected to negatively impact surrounding receptors, whether onsite or offsite. It is proposed to apply a prohibition on night-time deliveries at the units.

10.5.6.3 Traffic

Increases in $L_{Aeq\ T}$ levels at properties near the proposed development site will be minor, being less than the 3 dB detection threshold of the human ear. However, the increase at a dwelling opposite the

proposed site entrance will be 2-5 dB at peak times. It is recommended that, during the proposed road alignment works, the occupants of the dwelling be offered the opportunity to have an acoustic barrier installed on the western boundary of the property in order to attenuate traffic noise arising between the site entrance and the T junction. Such a barrier may consist of a blockwork wall or timber acoustic panelling. Any such structure will be required to extend to a minimum height of 2 m, and should run the length of the western boundary of the garden.

10.5.6.4 Inward

An assessment in accordance with ProPG indicates that the site is low risk with respect to current road and rail traffic volumes, and will continue to be low risk in the future. Internal $L_{Aeq,T}$ criteria will be met at all residential units using standard thermal glazing. However, facades near the northeast corner will be exposed to more than 10 L_{AFmax} events at night which exceed 60 dB. The World Health Organisation recommends that L_{AFmax} levels in bedrooms should not exceed 45 dB to prevent sleep disturbance. Where the number of events exceeds 10 per night, the objective is thus to ensure that internal L_{AFmax} levels with windows closed remain below 45 dB. The affected facades are (a) north facing bedrooms at dwellings facing Rosshill Road, (b) north, east and south facing bedrooms at the apartment block north wing, and (c) south facing bedrooms at the apartment block west wing. At these façades, it is proposed to install glazing with a minimum R_W value of 35 dB. Table 10-15 shows octave band spectra, measured at N1 during traffic and train pass-bys, which will be used to inform glazing selection.

Table 10-15 Typical pass-by spectra measured at N1 (levels as dBZ).

Source	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Rosshill Road pass-by	58	55	51	53	56	50	37
Train pass-by	69	71	72	70	71	68	57

External amenity areas will be satisfactory in the context of WHO and ProPG criteria.

At the proposed creche, $L_{Aeq,16h}$ levels received at the northern and eastern facades will reach 58 dB, thus exceeding the 51-55 dB range suggested by Technical guidance document TGD-021-5, and appropriate mitigation measures will be required here. It will be necessary to install glazing so as to ensure that internal ambient $L_{Aeq,30min}$ levels do not exceed 35 dB. A minimum R_W value of 37 dB is recommended, optimised with respect to the vehicle spectrum shown in Table 10-15 above.

10.5.7 Cumulative effects resulting from Interactions between various elements of the proposed development

The interaction of the various elements of the proposed development was considered and assessed in this EIAR with regards to noise and vibration. The potential for each individual element of the proposed development on its own to result in significant effects on noise receptors was considered in the impact assessment. The entire project including the interactions between all its elements was also considered and assessed for its potential to result in significant effects on noise receptors in the impact assessment presented.

All interactions between the various elements of the project were considered and assessed both individually and cumulatively within this chapter. Where necessary, mitigation was employed to ensure that no cumulative effects will arise as a result of the interaction of the various elements of the development with one another.

10.5.8 Cumulative In-Combination Effects

The potential cumulative noise and vibration effects of proposed development, in combination with other developments in the vicinity, including all those listed in Chapter 2 of this EIA, were also considered as part of this assessment. Where appropriate the application documentation, EIA and NIS have been reviewed to inform the assessment. There are no large scale developments previously permitted or proposed in the immediate vicinity of the Proposed Development. Thus potential cumulative noise and vibration impacts are unlikely to arise.

10.5.9 Summary of effects

The construction phase is expected to last 2 years. Construction will be undertaken in stages, and is unlikely to extend beyond 18 months in any particular zone. Several mitigation measures are proposed. Noise impacts will be short term and slight adverse at worst. No vibration impacts are expected.

Noise impacts associated with onsite sources at the proposed commercial units will be neutral. With respect to traffic, the proposed development will result in a slight increase in local noise levels. Impacts will be permanent and slight adverse at the nearest receptors close to the Rosshill Road – Rosshill Stud Farm Road junction.

Inward noise levels will be satisfactory in the context of WHO and ProPG criteria, subject to certain mitigation measures.

No indirect impacts or interactive effects have been identified.

There are no large scale developments previously permitted or proposed in the local area. Thus potential cumulative impacts are unlikely to arise.

Noise emissions from train movements on the adjacent railway line have been assessed, and have been used to inform the site design process. Train noise emissions are not significant when assessed using PropPG. Cumulative noise impacts with the railway line will not be significant.

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GLOSSARY

Ambient: Total noise environment at a location, including all sounds present.

A-weighting: Weighting or adjustment applied to sound level to approximate non-linear frequency response of human ear. Denoted by suffix A in parameters such as $L_{Aeq T}$, $L_{AF10 T}$, etc.

Background level: A-weighted sound pressure level of residual noise exceeded for 90 % of time interval T. Denoted $L_{AF90 T}$.

Broadband: Noise which contains roughly equal energy across frequency spectrum. Does not contain tones, and is generally less annoying than tonal noise.

Decibel (dB): Unit of noise measurement scale. Based on logarithmic scale so cannot be simply added or subtracted. 3 dB difference is smallest change perceptible to human ear. 10 dB difference is perceived as doubling or halving of sound level. Examples of decibel levels are as follows: 20 dB: very quiet room; 30-35 dB: night-time rural environment; 55-65 dB: conversation; 80 dB: busy pub; 100 dB: nightclub. Throughout this report noise levels are presented as decibels relative to 20 μ Pa.

Effect: Consequence of an impact.

Emissions: Noise originating from source under consideration, spreading spherically, hemispherically or otherwise into surrounding environment.

Fast response: 0.125 seconds response time of sound level meter to changing noise levels. Denoted by suffix F in parameters such as $L_{AF10 T}$, $L_{AF90 T}$, etc.

Free field: Measurement position removed from acoustically reflective surfaces other than ground.

Frequency: Number of cycles per second of a sound or vibration wave. Low frequency noise may be perceived as hum, while whine represents higher frequency. Range of human hearing approaches 20-20,000 Hertz.

Hertz (Hz): Unit of frequency measurement.

Immissions: Inward noise received at receptor, whether from all sources (ambient) or source under consideration (specific).

Impact: Change resulting from an action, such as implementation of a project.

Impulse: Noise which is of short duration, typically less than one second, sound pressure level of which is significantly higher than background.

Incident level: Noise level at façade or other structure which would arise if façade was absent. Thus ignores façade reflections. May be measured directly, or calculated from measurements at specified distance from façade.

Interval: Time period T over which noise parameters are measured at position. Denoted by T in $L_{Aeq T}$, $L_{AF90 T}$, etc.

L_{AE} : Sound exposure level. Measure of noise level of an event, standardised to interval of one second, and containing same acoustical energy as actual event.

$L_{Aeq T}$: Equivalent continuous sound pressure level during interval T, effectively representing average A-weighted noise level of ambient noise environment.

L_{AF} : Instantaneous sound pressure level measured every 0.125 s. Highest level measured each second is displayed and recorded. Useful indicator in fluctuating noise environment.

$L_{AF10 T}$: Sound pressure level exceeded for 10% of interval T, usually used to quantify traffic noise.

$L_{AF90 T}$: Sound pressure level exceeded for 90% of interval T, usually used to quantify background noise. May also be used to describe noise level from continuous steady or almost-steady source, particularly where local noise environment fluctuates.

L_{AFmax} : Maximum A-weighted sound pressure level occurring during measurement interval.

$L_{AReq T}$: Rating noise level, derived from $L_{Aeq T}$ plus specified adjustments for tonal and impulsive characteristics. Equivalent to $L_{Ar T}$ used by EPA.

L_{day} : The A-weighted long term average incident sound pressure level determined over all the daytime periods of a year, where the daytime period is typically 0700-1900 h.

L_{den} : Day-evening-night noise level. Calculated from separate L_{day} , $L_{evening}$ and L_{night} levels using formula specified in EU Directive 2002/49/EC.

$L_{evening}$: The A-weighted long term average incident sound pressure level determined over all the evening periods of a year, where the evening period is typically 1900-2300 h.

L_{night} : The A-weighted long term average incident sound pressure level determined over all the night-time periods of a year, where the night-time period is typically 2300-0700 h.

Noise sensitive location: Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires absence of noise at nuisance levels.

Octave band: Frequency spectrum may be divided into octave bands. Upper limit of each octave is twice lower limit.

Peak particle velocity (PPV): Rate of change of displacement of particles in solid medium due to vibration, measured as mm/s. Usually used to assess vibration in relation to activities such as blasting as correlates well with human perception of vibration and property damage.

Reflective field: Noise levels measured close to walls or other surfaces (apart from ground) will be increased due to reflections. Levels may be corrected to calculate incident level. Correction of 3 dB typically applies where distance to surface is 0.5 to 2 m. Other corrections may apply depending on location and source spectrum.

Residual level: Noise level remaining when specific source is absent or does not contribute to ambient.

R_w : Overall sound reduction index provided across a range of frequencies, determined from laboratory measured sound insulating properties of material or building element in each frequency band.

Sound pressure: Deviation over ambient atmospheric pressure due to passing sound wave. Human ear is sound pressure detector, and thus acoustic parameters ultimately relate to sound pressure. Sound pressure level is ratio of measured sound pressure to reference value.

Soundscape: Acoustic environment as perceived, experienced or understood by listeners, taking context into account.

Specific level: $L_{Aeq T}$ level produced by specific noise source under consideration during interval T, measured directly or by estimation or calculation.

Tone: Character of noise caused by dominance of one or more frequencies which may result in increased noise nuisance.

Z-weighting: Standard weighting applied by sound level meters to represent linear scale. Denoted by suffix *Z* in parameters such as $L_{Z_{eq} T}$, $L_{ZF90 T}$, etc. Typically used to describe spectral band levels.

11. ARCHAEOLOGY AND CULTURAL HERITAGE

11.1 Introduction

This archaeological, architectural, and cultural heritage chapter was prepared by Tobar Archaeological Services. It presents the results of an archaeological, architectural and cultural heritage impact assessment of the proposed Rosshill Strategic Housing Development (SHD) at Roscam and Merlin Park townlands, Galway. The proposed development will comprise 102 residential units and creche facility, car parking and associated infrastructure.

The purpose of this chapter is to assess the potential direct and indirect effects of the Proposed Development on the surrounding archaeological, architectural and cultural heritage landscape. The assessment is based on both a desktop review of the available cultural heritage and archaeological data and a comprehensive programme of field walking of the Proposed Development area. The report amalgamates desk-based research and the results of field walking to identify areas of archaeological/architectural/ cultural significance or potential, likely to be impacted either directly or indirectly by the Proposed Development. An assessment of potential effects, including cumulative effects, is presented, and a number of mitigation measures are recommended where appropriate. The visual effect of the Proposed Development on known recorded monuments is also assessed.

11.1.1 Proposed Development

The Proposed Development is described in detail in Chapter 4 of this EIAR and in summary will consist of the following:

Planning permission is sought by **Alber Developments Ltd** for development on a site extending to 4.704 hectares on lands to the south of Rosshill Road, west of Rosshill Stud Farm Road.

The development will consist of:

1. Construction of 102no. residential units comprising of 35 apartments and 67 houses
2. Demolition of the existing silage concrete apron (40sqm)
3. Childcare facility (399sqm over 2-storeys) associated outdoor play areas and parking
4. Retail/Commercial space (188.5sqm) including loading bay
5. Provision of shared communal and private open space, including play and fitness equipment
6. Car and cycle parking, including electric vehicle charging points
7. Provision of all associated surface water and foul drainage services and connections including pumping station
8. Landscaping, access routes and public art
9. Lighting and associated works
10. Access and junction improvements at Rosshill Road and Rosshill Stud Farm Road
11. Provision of a footpath connectivity link along Rosshill Road and Rosshill Stud Farm Road
12. All associated works and services

The primary EIAR Study Area encompasses an area of approximately 5.33 hectares.

11.1.2 Statement of Authority

This chapter of the EIAR has been prepared by Miriam Carroll and Annette Quinn of Tobar Archaeological Services. Miriam and Annette both graduated from University College Cork in 1998 with a Masters degree in Methods and Techniques in Irish Archaeology. Both are licensed by the Department of Culture, Heritage and the Gaeltacht to carry out excavations and are members of the Institute of Archaeologists of Ireland. Annette Quinn and Miriam Carroll have been working in the field of archaeology since 1994 and have undertaken numerous projects for both the private and public sectors including excavations, site assessments (EIAR) and surveys. Miriam Carroll and Annette Quinn are directors of Tobar Archaeological Services which has been in operation for 17 years.

11.1.3 Legislation and Guidelines

The chapter has been prepared in compliance with all relevant EIA legislation and guidance (see Chapter 1: Introduction for relevant guidance and legislation).

11.1.3.1 Current Legislation

Archaeological monuments are safeguarded through national and international policy, which is designed to secure the protection of the cultural heritage resource. This is undertaken in accordance with the provisions of the European Convention on the Protection of the Archaeological Heritage (Valletta Convention). This was ratified by Ireland in 1997.

Both the National Monuments Acts 1930 to 2004 and relevant provisions of the Cultural Institutions Act 1997 are the primary means of ensuring protection of archaeological monuments, the latter of which includes all man-made structures of whatever form or date. There are a number of provisions under the National Monuments Acts which ensure protection of the archaeological resource. These include the Register of Historic Monuments (1997 Act) which means that any interference to a monument is illegal under that Act. All registered monuments are included on the Record of Monuments and Places (RMP).

The Record of Monuments and Places (RMP) was established under Section 12 (1) of the National Monuments (Amendment) Act 1994 and consists of a list of known archaeological monuments and accompanying maps. The Record of Monuments and Places affords some protection to the monuments entered therein. Section 12 (3) of the 1994 Amendment Act states that any person proposing to carry out work at or in relation to a recorded monument must give notice in writing to the Minister (Culture, heritage and the Gaeltacht) and shall not commence the work for a period of two months after having given the notice. All proposed works, therefore, within or around any archaeological monument are subject to statutory protection and legislation (National Monuments Acts 1930-2004).

The term ‘national monument’ as defined in Section 2 of the National Monuments Act 1930 means a monument *‘the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto’*. National monuments in State care include those which are in the ownership or guardianship of the Minister for Culture, Heritage and the Gaeltacht. Section 5 of the National Monuments Act (1930) allows owners of other national monuments to appoint the Minister for the Culture, Heritage and the Gaeltacht or the relevant local authority as guardian of such monuments, subject to their consent. This means in effect that while the property of such a monument remains vested in the owner, its maintenance and upkeep are the responsibility of the State. Some monuments are also protected by Preservation Orders and are also regarded as National Monuments. National Monuments also includes (but not so as to limit, extend or otherwise influence the construction of the foregoing general definition) every monument in Saorstát Éireann to which the Ancient Monuments Protection Act, 1882, applied immediately before the passing of this Act, and the said expression shall be construed as including,

in addition to the monument itself, the site of the monument and the means of access thereto and also such portion of land adjoining such site as may be required to fence, cover in, or otherwise preserve from injury the monument or to preserve the amenities thereof.

Under the Heritage Act (1995) architectural heritage is defined to include *‘all structures, buildings, traditional and designed, and groups of buildings including street-scapes and urban vistas, which are of historical, archaeological, artistic, engineering, scientific, social or technical interest, together with their setting, attendant grounds, fixtures, fittings and contents...’*. A heritage building is also defined to include *‘any building, or part thereof, which is of significance because of its intrinsic architectural or artistic quality or its setting or because of its association with the commercial, cultural, economic, industrial, military, political, social or religious history of the place where it is situated or of the country or generally’*.

11.1.3.1.1 Granada Convention

The Council of Europe, in Article 2 of the 1985 Convention for the Protection of the Architectural Heritage of Europe (Granada Convention), states that *‘for the purpose of precise identification of the monuments, groups of structures and sites to be protected, each member State will undertake to maintain inventories of that architectural heritage’*. The Granada Convention emphasises the importance of inventories in underpinning conservation policies.

The NIAH was established in 1990 to fulfill Ireland's obligations under the Granada Convention, through the establishment and maintenance of a central record, documenting and evaluating the architectural heritage of Ireland. Article 1 of the Granada Convention establishes the parameters of this work by defining 'architectural heritage' under three broad categories of Monument, Groups of Buildings, and Sites:

- Monument: all buildings and structures of conspicuous historical, archaeological, artistic, scientific, social or technical interest, including their fixtures and fittings;
- Group of buildings: homogeneous groups of urban or rural buildings conspicuous for their historical, archaeological, artistic, scientific, social or technical interest, which are sufficiently coherent to form topographically definable units;
- Sites: the combined works of man and nature, being areas which are partially built upon and sufficiently distinctive and homogenous to be topographically definable, and are of conspicuous historical, archaeological, artistic, scientific, social or technical interest.

The Council of Europe's definition of architectural heritage allows for the inclusion of structures, groups of structures and sites which are considered to be of significance in their own right, or which are of significance in their local context and environment. The NIAH believes it is important to consider the architectural heritage as encompassing a wide variety of structures and sites as diverse as post boxes, grand country houses, mill complexes and vernacular farmhouses.

11.2 Policies of the Galway City Development Plan 2017-23

The Galway City Development Plan 2017-2023 outlines a number of policies relating to archaeology and built heritage as follows.

11.2.1 Policy 8.5 Archaeology

Protect the archaeological heritage of the city.

Ensure that proposed development within the designated city centre Zone of Archaeological Potential is not detrimental to the character of an archaeological site or its setting.

Have regard to the archaeological recommendations of the Department of Arts, Heritage, Rural, Regional and Gaeltacht Affairs on any planning applications.

Endorse the sustainable use of archaeological heritage as an educational and cultural resource and promote public awareness of the archaeological heritage of the city.

Require the surveying, recording or excavation of archaeological heritage during the development process where appropriate.

Seek the preservation in-situ or, at a minimum, preservation by record of archaeological sites/monuments included in the Record of Monuments and Places.

Ensure that any development proposal with potential to impact on archaeological heritage includes for an archaeological assessment. This includes within terrestrial, riverine, inter-tidal and sub-tidal environments.

Promote the protection of the varied industrial heritage of the city and encourage greater appreciation and public awareness of this heritage.

The Development Plan also outlines policies and objective in relation to built heritage such as Protected Structures, Vernacular Structures etc. It notes that ‘It is policy to encourage the protection, enhancement and active use of protected structures. Any alteration to protected structures is required to enhance the character or setting of the structure and be carried out to best conservation practice. The Architectural Heritage Protection Guidelines for Planning Authorities (2011) provides detailed guidance in this regard.’

11.2.2 **Policy 8.2 Built Heritage - Record of Protected Structures**

Encourage the protection and enhancement of structures listed in the Record of Protected Structures.

Ensure new development enhances the character or setting of a protected structure.

Avoid protected structures becoming endangered by neglect or otherwise by taking appropriate action in good time.

Consider the inclusion in the Record of Protected Structure of buildings and structures of special interest.

Consult with the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs regarding any planning applications relating to protected structures and national monuments.

Implement proactive measures to encourage the conservation of protected structures.

11.2.3 **Policy 8.4 Vernacular Heritage**

Encourage the rehabilitation, renovation and re-use of existing structures that contribute to the character of the city.

Increase public awareness of the vernacular heritage of the city through publication of the Survey and Inventory of Galway City’s Thatched Buildings.

11.2.4 Statutory Consultations

The Development Applications Unit provided a response, to a scoping consultation by MKO, on Archaeology (G Pre00047/2021). The observations were as follows:

‘Archaeology

All proposed development and strategies should be in compliance with the National Monuments Acts 1930 to 2004 and with the national policy on protection of archaeological heritage – ‘Framework and Principles for the Protection of the Archaeological Heritage’ published in 1999.

General Guidance

1. All areas of archaeological heritage should be addressed, including;
 - a) Immovable cultural heritage e.g., monuments and ancient field boundaries.
 - b) Underwater cultural heritage.
 - c) Movable cultural heritage e.g., loose carved stones, sculptures, architectural fragments etc.
2. All impacts which may impinge on the archaeological heritage should be assessed by a suitably qualified archaeologist.
3. Where appropriate, specialists in the field of archaeological heritage should be consulted throughout the process, from design through to implementation.
4. All surveys pertaining to archaeological heritage must be of a high standard in order to allow informed decisions to be taken.
5. All impacts must be assessed, to include ground disturbance, impacts on the setting of the monuments and visual impacts. These should include direct, indirect, temporary and cumulative impacts.
6. Mitigation of impacts, identified through consultation, should be taken into account within the development at the earliest possible stages. Various approaches should be considered, such as avoidance, design modification and relocation where appropriate.
7. Where there are no archaeological monuments present but the development is large in scale, e.g., over 0.5 hectares in area and over 1 kilometre in length, it is recommended that an archaeological assessment should be undertaken, unless there are substantial grounds to show that it is not necessary. Refer to Framework and Principles for the Protection of the Archaeological Heritage 1999, in particular section 3.6.6 in regard to EIA’.

It is considered that all such impacts have been addressed through the assessment process.

11.2.5 Location and Topography

The proposed development site is situated in the townlands of Roscam and Merlin Park c. 3.5km east of Galway city. Planning permission will be sought for the proposed SHD which will comprise the construction of 102 residential units, a creche facility and associated works. The SHD area comprises a largely greenfield site which is currently divided into a number of fields under pasture. The site is bound to the north by a railway line and a local road which allows access to the R338 further to the north. Galway bay is located to the west, with Oranmore Bay c. 600m to the south-east. A portion of the proposed development area was previously utilised as a golf course.

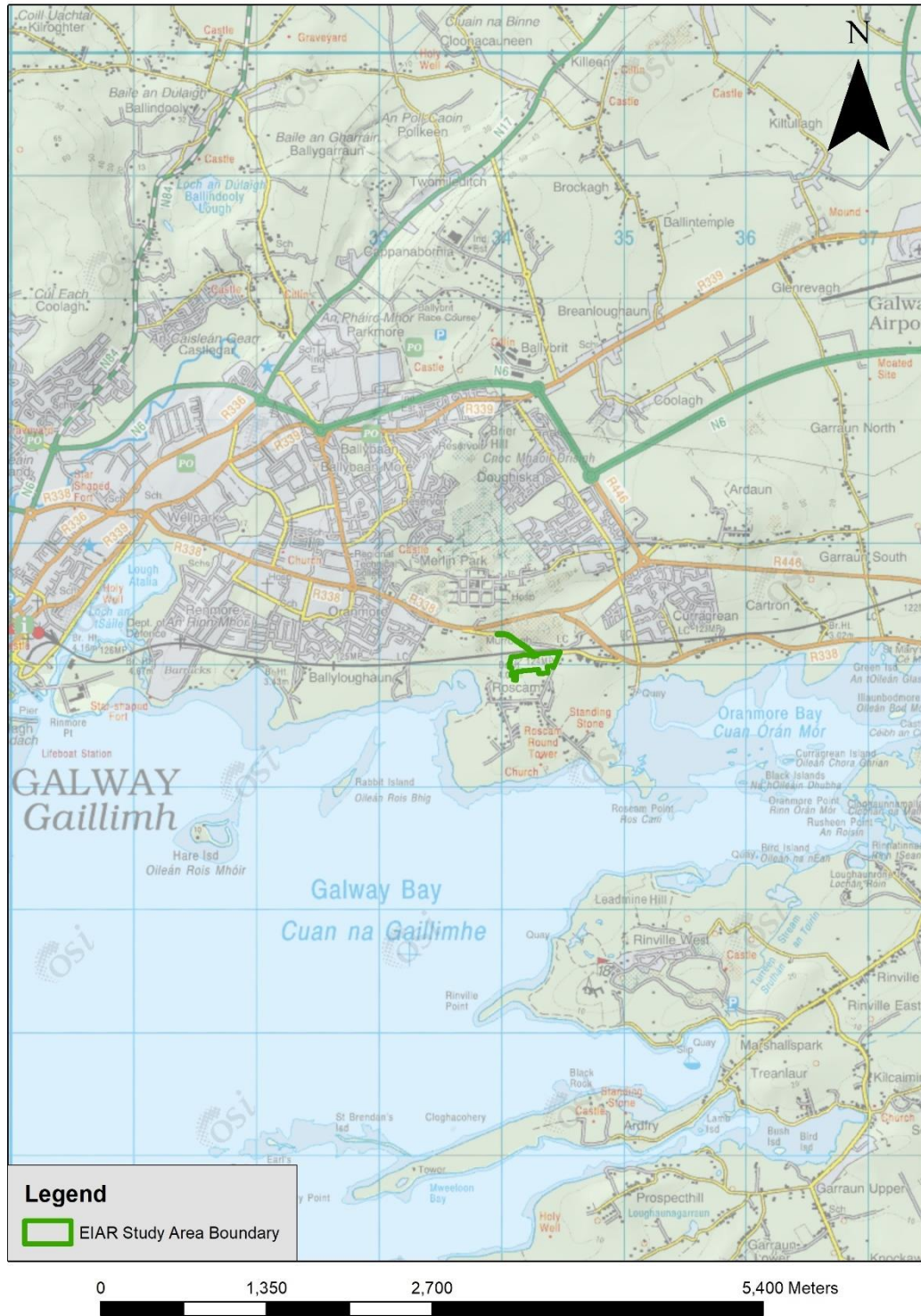


Figure 11-1: Site location map.



Figure 11-2: Site location on aerial background.

11.3 Assessment Methodology

The assessment of the archaeology, architecture and cultural heritage of the Proposed Development area included GIS mapping and desk-based research followed by field inspection. A desk-based study of the Proposed Development site was initially undertaken in order to assess the archaeological, architectural and cultural heritage potential of the area and to identify constraints or features of archaeological/cultural heritage significance within or near to the Proposed Development site.

11.3.1 Geographical Information Systems

GIS is a computer database which captures, stores, analyses, manages and presents data that is linked to location. GIS is geographic information systems which includes mapping software and its application with remote sensing, land surveying, aerial photography, mathematics, photogrammetry, geography and tools that can be implemented with GIS software. A geographic information system (GIS) was used to manage the datasets relevant to the archaeological and architectural heritage assessment and for the creation of all the maps in this section of the report. This involved the overlaying of the relevant archaeological and architectural datasets on georeferenced aerial photographs and road maps (ESRI), where available. The integration of this spatial information allows for the accurate measurement of distances of a Proposed Development from archaeological and cultural heritage sites and the extraction of information on ‘monument types’ from the datasets. Areas of archaeological or architectural sensitivity may then be highlighted in order to mitigate the potential negative effects of a development on archaeological, architectural and cultural heritage.

11.3.2 Desktop Assessment

The following sources were consulted as part of the desktop assessment for the Proposed Development:

- › The Sites and Monuments Record (SMR)
- › The Record of Monuments and Places (RMP)
- › The Topographical Files of the National Museum of Ireland on www.heritagemaps.ie
- › Down Survey Barony maps (1656-8) (www.downsurvey.tcd.ie)
- › First edition Ordnance Survey map
- › Second edition Ordnance Survey map
- › Third edition Ordnance Survey map
- › Aerial photographs
- › Excavations Database
- › National Inventory of Architectural Heritage (NIAH)
- › Galway City Development Plan 2017-2023
- › Archaeological Assessment at Roscam townland, Rosshill, Galway (Carey 2019) unpublished report.

11.3.2.1 Record of Monuments and Places

A primary cartographic source and base-line data for the assessment was the consultation of the Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP) for Galway. All known recorded archaeological monuments are indicated on 6 inch Ordnance Survey (OS) maps and are listed in this record. The SMR/RMP is not a complete record of all monuments as newly discovered sites may not appear in the list or accompanying maps. In conjunction with the consultation of the SMR and RMP the electronic database of recorded monuments which may be accessed at <http://webgis.archaeology.ie/historicenvironment> was also consulted.

11.3.2.2 Cartographic sources and aerial photography

The 1st (1840s) and 2nd (1900s) edition OS maps for the area were consulted as was OSI aerial photography and Down Survey Barony maps (1656-8).

11.3.2.3 Topographical Files - National Museum of Ireland

Details relating to finds of archaeological material and monuments in numerous townlands in the country are contained in the topographical files held in the National Museum of Ireland. The townland within which the development is located were checked for such finds on www.heritagemaps.ie.

11.3.2.4 Excavations Database

The excavations database is an annual account of all excavations carried out under license in Ireland. The database is available online at www.excavations.ie and includes excavations from 1985 to 2020. This database was consulted as part of the desktop research for this assessment to establish if any archaeological excavations had been carried out within or near to the proposed development area.

11.3.2.5 National Inventory of Architectural Heritage (NIAH)

This source lists some of the architecturally significant buildings and items of cultural heritage and is compiled on a county by county basis by the Department of Culture, Heritage and the Gaeltacht. The NIAH database was consulted for all townlands within and adjacent to the study area. The NIAH survey for Galway has been published and was downloaded on to the base mapping for the proposed development. The National Inventory of Architectural Heritage (NIAH) is a state initiative under the administration of the former Department of Arts, Heritage and the Gaeltacht and established on a statutory basis under the provisions of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999.

The purpose of the NIAH is to identify, record, and evaluate the post-1700 architectural heritage of Ireland, uniformly and consistently as an aid in the protection and conservation of the built heritage. NIAH surveys provide the basis for the recommendations of the Minister for the Department of Culture, Heritage and the Gaeltacht to the planning authorities for the inclusion of particular structures in their Record of Protected Structures (RPS). The published surveys are a source of information on the selected structures for relevant planning authorities.

11.3.2.6 Record of Protected Structures

The dataset for Galway City Protected Structures is available on-line and was added to the base mapping for the proposed development in order to assess any potential impacts to such structures.

11.3.3 Field Inspection

A walkover survey and field inspection was undertaken on the 16th March 2021. The Proposed Development site and its surrounds were inspected by Tobar Archaeological Services. The inspection consisted of a walk-over examination of the Proposed Development site, an assessment of any recorded monuments, architectural, built or cultural heritage items within the site and the potential direct and indirect impacts on those monuments. A full photographic record of the site was made and is described below in Section 11.4.1.

11.3.3.1 Limitations Associated with Fieldwork

There were no limitations associated with any aspect of the assessment and full access to the site was gained.

11.3.4 Assessment of Likely Significant Effects

The likely effects on the existing archaeological, architectural and cultural heritage environment are assessed using the criteria as set out in the draft *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (EPA, 2017) and as outlined in Section 1.7.2 of Chapter 1. The following terminology is used when describing the likely effects of the Proposed Development from a Cultural Heritage perspective.

11.3.4.1 Types of Impact

- Direct impacts arise where an archaeological heritage feature or site is physically located within the footprint of the development whereby the removal of part, or all of the feature or site is thus required.
- Indirect impacts may arise as a result of subsurface works undertaken outside the footprint of the development, secondary environmental change such as a reduction in water levels and visual impacts.
- Cumulative Impacts arise when the addition of many impacts create a larger, more significant impact.
- Residual Impacts are the degree of environmental changes that will occur after the proposed mitigation measures have been implemented.

11.3.4.1.1 Magnitude of Effects (Significance)

- Profound: Applies where mitigation would be unlikely to remove adverse effects. Reserved for adverse, negative effects only. These effects arise where an archaeological site is completely and irreversibly destroyed.
- Very Significant: An effect which by its character, magnitude, duration or intensity significantly alters most of the sensitive aspect of the environment.
- Significant: An effect which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment. An effect like this would be where part of a site would be permanently impacted upon, leading to a loss of character, integrity and data about an archaeological site.
- Moderate: A moderate effect arises where a change to an archaeological site is proposed which though noticeable, is not such that the integrity of the site is compromised and which is reversible. This arises where an archaeological site can be incorporated into a modern day development without damage and that all procedures used to facilitate this are reversible.
- Slight: An effect which causes changes in the character of the environment which are not high or very high and do not directly impact or affect an archaeological site.
- Not Significant: An effect which causes noticeable changes in the character of the environment but without significant consequences.
- Imperceptible: An effect on an archaeological site capable of measurement but without noticeable consequences.

11.3.5 **Methodology for the assessment of impacts on visual setting (indirect effects)**

A standardised approach was utilised for the assessment of impacts of visual setting (indirect effects) according to types of monuments and cultural heritage assets which may have varying degrees of sensitivity. This assessment does not include visits to each and every site outside the EIAR site boundary as many monuments are located in private lands. Publicly accessible monuments were visited however.

While direct physical impacts to a site or monument can easily be assessed in quantitative terms, the assessment of impacts on setting can be subjective and as such is a matter of qualitative, professional judgement and experience. The assessment of impacts on setting are regarded as appropriate and are based on professional judgement. The assessment of impacts on visual setting also considers the existing context in which the proposed development is located.

11.4 Existing Environment

11.4.1 Description of the Proposed development

A photographic record of the proposed development site is described below and further photographic records are presented in the relevant sections under Archaeological Heritage (Section 11.4.2) and Architectural Heritage (Section 11.4.3) below.



Plate 11-1: Protected structure 8806, 19th century railway bridge to the north of the proposed development site along public road.



Plate 11-2: North-western section of EIAR boundary looking southwest. Note remains of low 19th century field boundary evident.



Plate 11-3: North western corner of EIAR boundary looking west outside development area.

Plate 11-4: Western section of EIAR boundary looking southwest.



Plate 11-5: View of ruinous and overgrown outbuildings, taken from western section of site looking east.



Plate 11-6: View west looking at western side of ELAR boundary and beyond same.



Plate 11-7: View from southern ELAR boundary looking east towards northernmost outbuilding located towards centre of site.



Plate 11-8: View of concrete structures and remains of stone buildings (northern range) looking south.



Plate 11-9: Photo taken from southern EIAR boundary looking southwest towards outbuildings just outside EIAR boundary



Plate 11-10: Eastern section of EIAR boundary looking south.



Plate 11-11: Photo taken from eastern section of site looking east towards eastern side of EIAR boundary.



Plate 11-12: View from southern side of site towards northeastern side of site.

11.4.2 Archaeological Heritage

Archaeological Heritage includes National Monuments, sites which are subject to a preservation order, sites listed in the RMP/SMR and newly discovered archaeological sites. Each of these are addressed in the following sections.

11.4.2.1 National Monuments

The term ‘national monument’ as defined in Section 2 of the National Monuments Act (1930) means a monument ‘the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto...’. National monuments in State care include those which are in the ownership or guardianship of the Minister for Arts, Heritage and the Gaeltacht (DAHG). Other owners of national monuments are empowered under Section 5 of the National Monuments Act (1930) to appoint the Minister for Culture, Heritage and the Gaeltacht as guardian of such monuments. This means in effect that while the property of such a monument remains vested in the owner, its maintenance and upkeep are the responsibility of the State. Monuments which may be defined as national monuments are also in the ownership or guardianship of Local Authorities which have similar responsibilities under the National Monuments Acts (1930-2004) to DCHG.

For national monuments in the ownership or guardianship of the Minister or a Local Authority or which are subject to a preservation order or temporary preservation order, the prior written consent of the Minister is required for any works at or in proximity to the monument.

No National Monuments are located within the proposed development area. Two National Monuments in the Ownership of the state (early medieval ecclesiastical site at Roscam No. 46 and Merlinpark Castle, No. 609) are located within 1km of the proposed Rosshill SHD boundary. Both are also recorded monuments and Protected Structures (see below).

The nearest National Monument comprises the ecclesiastical enclosure and associated structures at Roscam (Nat. Mon. No. 46) which is situated approximately 600m to the south. The ecclesiastical enclosure and structures contained therein are in the ownership of the state. The complex of monuments contained within the early medieval ecclesiastical enclosure are described below. All descriptions are derived from the Historic Environment Viewer (HEV) www.webgis.archaeology.ie/historicenvironment.

Impacts are addressed in Section 11.5.

The ecclesiastical site at Roscam includes a church, round tower, a graveyard, two bullaun stones, an unusual tomb or shrine all enclosed in a vallum monasticum or monastic enclosure. The D-shaped enclosing element measuring between 702 and 704 meters in circumference and the wall is upwards of 170 cms to 180 cms thick in places. A double púirín or sheep gap with triangular heads to the opes was present until the 1970's when it was destroyed. Several modern field walls occur within the enclosure. The cemetery contains a remarkable array of carved and cut stones including elements of the church including a holed stone, window, door-case fragments, gable corbels along with three medieval unscribed grave slabs. A possible roughout for a medieval slab and an Early Christian cross-inscribed stone also occur. The inscribed funerary monuments are mainly of 19th and 20th century date and 19th century tombs have been set into the north-side wall and floor of the church. Some chambered string courses of 12th – 13th century type occur in the interior of the east wall of the church. Some fragments of walling show that there was another structure attached to the North East corner of the church. Some rough works such as small millstones or querns occur on the site. Some plain and decorated quern fragments, a stone maul and a fragment of the elaborate west portal of the church along with some iron slag are preserved in Galway City Museum. A stone harbour possibly of lobsterclaw shape has been identified recently to the side of the South at the edge of the bay. Some of the 19th – 20th century funerary monuments which were present in the 1990's have since been replaced by others. Little is known of the history of the site. The son of Odhran and a brother of St. Ciaran of Clonmacnoise is associated with Roscam. An Abbot of the place, Forbasach ma Maeltola died in 779. According to the Annals of Ulster it was attacked by Vikings in 807 and its princeps Ceallach Mac Forbasach was killed in the Battle of Drung in 836. It was later the property of St. Nicholas' Collegiate Church until the early 19th century.

GA094-072001-

Class: Church

Townland: ROSCAM

Scheduled for inclusion in the next revision of the RMP: Yes

Description: Within the W half of an early ecclesiastical enclosure (GA094-072002-) at Roscam. This is a much-ruined multiphase medieval church (E-W; L c. 22m, Wth 6.48m). The N wall may have been rebuilt inside the line of the original wall as its lower courses are not bonded into the E gable wall, which extends northwards beyond it. Traces of two doorways are evident in the N wall; that at the W end is blocked up while only the opening survives of that at the E end. There is a robbed-out window in the E gable; traces of two others are evident in the S wall. Access to roughly three quarters of the interior of the church is impossible due to the massive amount of field-clearance rubble that has been dumped inside it. Only a short section at the E end is free of this material. (O'Flanagan 1927a, Vol. 1, 323-4; Fahey 1901a, 228-9; Athy 1914, 162-3).

GA094-072002-

Class: Ecclesiastical enclosure

Townland: ROSCAM

Scheduled for inclusion in the next revision of the RMP: Yes

Description: On a S-facing slope in pastureland on the NE shore of Galway Bay, commanding panoramic views across the bay to the S and the Burren uplands to the SW. This early ecclesiastical settlement is associated with St Odran, a brother of St Ciarán of Clonmacnoise (Gwynn and Hadcock 1970, 402). The ecclesiastical enclosure (N-S 200m, E-W 190m), defined by a massive drystone wall (av. H 1.5m; Wth c. 2m), is roughly D-shaped in plan and is very well preserved. Most of the

enclosing wall has been raised over the years by the addition of field-clearance rubble on top of it. At E a modern entrance is possibly on the site of the original one. A collapsed triangular-headed sheep-gap was noted to the S of it in 1984 (SMR file). The following features are located within the interior: a round tower (GA094-072004-), a church (GA094-072001-), a separate graveyard (GA094-072003-) within which are an early Christian cross-slab (GA094-072012-), a possible leacht (GA094-072013-), a holed stone (GA094-072007-), two multiple bullauns (GA094-072008- and GA094-072009-) and medieval graveslabs (GA094-072005-, GA094-072006- and GA094-072011-). The bullauns were regarded locally as holy wells (Fahey 1901a, 229) but were marked on OS 6-inch maps as 'Penitential Station'. Numerous architectural fragments (GA094-071014-) are scattered throughout the graveyard, including a number of bowtell mouldings, possibly from a window or doorway, suggesting that there may have been another church located within it. Another early Christian cross-slab (GA094-072015-) was recorded by Higgins (1992, 209-12). (Frazer 1896, 162; Athy 1914, 163-4; Harbison 1975, 99).

GA094-072003-

Class: Graveyard

Townland: ROSCAM

Scheduled for inclusion in the next revision of the RMP: Yes

Description: On a S-facing downslope in the S sector of an ecclesiastical enclosure (GA094-072002-). This graveyard, roughly P-shaped in plan (L c. 65m on W side; Wth c. 30m on N side; L c. 24m on E side; L of E side of stem of 'P' c. 35m; Wth c. 8m at S tip), is defined by a double-faced rubble-built drystone wall. Access is via a gateway at the SW end. Numerous grave-markers orientated E-W are visible, many running in a N-S running linear pattern. Inscribed headstones date to the 19th and 20th centuries. A possible leacht (GA094-072013-) is visible in the NE corner and an early Christian cross-slab (GA094-072012-) and medieval graveslabs (GA094-072006- and GA094-072011-) are also associated. Within the S section are two multiple bullaun stones (GA094-072008- and GA094-072009-). Numerous dressed and moulded architectural fragments (GA094-072015-) are scattered throughout the graveyard.

GA094-072004-

Class: Round tower

Townland: ROSCAM

Scheduled for inclusion in the next revision of the RMP: Yes

Description: In NW sector of an ecclesiastical enclosure (GA094-072002-). The stump of a tower (D 4.55m ext., c. 11m), built of dressed and coursed limestone on a narrow plinth. The trabeate doorway, 1.1m above present ground surface, faces SE. The interior is rubble-filled to level of the doorway, but the presence of four floors is indicated by corbels and joist holes. There is a partially blocked window on 3rd storey facing ESE, and numerous putlog holes are visible externally. A later parapet and stone steps leading to doorway may represent a later reuse. (Barrow 1979, 104-6; O'Flanagan 1927a, Vol. 1, 318-22; Wakeman 1895, 284-5).

GA094-072005-

Class: Graveslab

Townland: ROSCAM

Scheduled for inclusion in the next revision of the RMP: Yes

Description: Standing upright in the NW corner of a small modern walled enclosure that has been built against the SE corner of the church (GA094-072001-) within the early ecclesiastical enclosure (GA094-072002-) at Roscam. When initially visited by the Galway Survey in March 1983 this medieval graveslab (L 1.59m; Wth across top 0.41m; base Wth 0.15m) was lying on the grass to the S of the church; by November 1988 it had been moved to its current location (SMR file). The slab, which is bevelled, tapers from top to bottom and it is inscribed with a two-line Latin cross with a decorated head. While the decoration is difficult to make out it appears that the arms of cross bifurcate towards the terminals and there may be a fleur-de-lis at the head of the cross. The shaft of the cross extends along the length of the slab.

GA094-072006-

Class: Graveslab

Townland: ROSCAM

Scheduled for inclusion in the next revision of the RMP: Yes

Description: This medieval graveslab has been placed lying on a 20th-century grave plot in the graveyard (GA094-072003-) within the early ecclesiastical enclosure (GA094-072002-) at Roscam. The slab (L 1.16m; Wth across top 0.36m; Wth across base 0.24m; T 0.08m), which tapers from top to bottom, is broken in two pieces. The break is roughly across the lower third of the slab. It bears an incised Latin cross with a beautifully decorated head consisting of seven fleur-de-lis motifs radiating out from a central circular area. The shaft of the cross extends along the length of the slab. A holed stone (GA094-072007-) has also been placed on the grave plot, to the N of the graveslab.

GA094-072007-

Class: Holed stone

Townland: ROSCAM

Scheduled for inclusion in the next revision of the RMP: Yes

Description: This holed stone has been placed lying on a 20th-century grave plot in the graveyard (GA094-072003-) within the early ecclesiastical enclosure (GA094-072002-) at Roscam. When recorded by Wakeman (1895, 286) it was standing upright in the graveyard, about 50m to the SE of the church (GA094-072001-). The part of the slab (L 0.66m; Wth 0.43m; T 0.13m) that would have been visible when it was upright is rectangular in shape but the lower section is roughly subtriangular. The hole (diam. 0.09m) which pierces the stone is set off-centre to the top right. A medieval graveslab (GA094-072006-) has also been placed on the grave plot, to the S of the stone.

GA094-072008-

Class: Bullaun stone

Townland: ROSCAM

Scheduled for inclusion in the next revision of the RMP: Yes

Description: This double bullaun stone (1.8m N-S; 1.53m E-W) is lying deeply embedded in the ground in the S section of the graveyard (GA094-072003-) within the early ecclesiastical enclosure (GA094-072002-) at Roscam. It contains two almost circular basins: that at the E side of the stone is very shallow (dims. 0.31m x 0.29m; D 0.08m), while that at the W side is deeper (dims. 0.43m x 0.41m; D 0.18m). A triple bullaun is visible c. 1m to the SE. Both bullaun stones were regarded locally as holy wells (Fahey 1901a, 229). Named on the 1944-5 revision of the OS 6-inch maps as 'Penitential Station'.

GA094-072009-

Class: Bullaun stone

Townland: ROSCAM

Scheduled for inclusion in the next revision of the RMP: Yes

Description: This triple bullaun stone (L 1.35m; H 0.95m; T 0.34m) is located c. 1m to the SE of a double bullaun stone (GA094-072008-) in the S section of the graveyard (GA094-072003-) within the early ecclesiastical enclosure (GA094-072002-) at Roscam. It is set upright in the ground with the basins facing SW. The uppermost basin (dims. 0.43m x 0.36m) is slightly larger than the middle one (dims. 0.41m x 0.3m). The lower basin (diam. 0.37m) is partially embedded in the ground. Both bullaun stones were regarded locally as holy wells (Fahey 1901a, 229). Named on the 1944-5 revision of the OS 6-inch maps as 'Penitential Station'.

GA094-072011-

Class: Graveslab

Townland: ROSCAM

Scheduled for inclusion in the next revision of the RMP: Yes

Description: This medieval graveslab (L 1.84m; Wth across top 0.6m; base Wth 0.48m) is lying on a possible stone-lined grave plot in the graveyard (GA094-072003-) within the early ecclesiastical enclosure (GA094-072002-) at Roscam. The sides of the slab, which tapers from top to bottom and also decreases in thickness from the top (T 0.12m) towards the bottom (Wth 0.08m), are bevelled. It is broken in two just below the mid-way point and a small portion of the top of the lower portion is also fractured. It bears a two-line Latin cross in false relief within a frame. The head and arms of the cross end in fleur-de-lis motifs and there appears to be four other similar motifs extending from the top and sides of the slab into towards the centre of the cross. The shaft of the cross extends along the length of the slab.

GA094-072012-

Class: Cross-slab

Townland: ROSCAM

Scheduled for inclusion in the next revision of the RMP: Yes

Description: This small early Christian sandstone cross-slab (H 0.4m; base Wth 0.38m; T 0.14m) is embedded in the ground in the graveyard (GA094-072003-) within the early ecclesiastical enclosure (GA094-072002-) at Roscam. The slab is roughly subrectangular in plan and rounded across the top. It bears a deeply incised but crudely punched two-line equal-armed cross. The arms (Wth c. 0.1m) appear to expand slightly towards the terminals. Another similar cross-slab (GA094-072015-) is also associated with this site.

GA094-072013-

Class: Leacht

Townland: ROSCAM

Scheduled for inclusion in the next revision of the RMP: Yes

Description: Located in the NE corner of the graveyard (GA094-072003-) within the early ecclesiastical enclosure (GA094-072002-) at Roscam. This possible leacht (3.65m N-S; 2.8m E-W; max. H 1.1m) is rectangular in plan and is defined by large boulders on all sides. The W and N sides are best preserved where regularly coursed massive cyclopean-like boulders are visible; one boulder on the W side is 1.2m long and 0.45m high. The E and S sides are in a more collapsed state and large boulders from both sides are strewn about on the ground immediately to the E and S. The interior is also strewn with boulders.

GA094-072014-

Class: Architectural fragment

Townland: ROSCAM

Scheduled for inclusion in the next revision of the RMP: Yes

Description: Numerous architectural fragments are strewn about the graveyard (GA094-072003-) within the early ecclesiastical enclosure (GA094-072002-) at Roscam. Most are dressed and a number of bowtell mouldings are evident; the latter are most likely from the column of doorway or window of 13th-century date. The presence of so many fragments suggests the probability that there was formerly a church located within the graveyard and that it possibly pre-dates the church (GA094-072001-) c. 25m to the NW.

GA094-072015-

Class: Cross-slab

Townland: ROSCAM

Scheduled for inclusion in the next revision of the RMP: No

Description: This early Christian cross-slab was noted by Higgins (1992, 209-12) in a section of the field wall between the round tower (GA0094-072004-) and the church (GA094-072001-) in the early ecclesiastical enclosure (GA094-072002-) at Roscam. The oblong slab of sandstone (L 0.52m; Wth 0.34m; T 0.13-14m) bears a crudely pocked single-line Latin cross which is set off-centre within a subrectangular frame. The slab has been crudely worked but its shape is natural and unaltered. It seems unlikely that it was set upright but was rather a recumbent cross-slab that was laid on a grave (ibid.). Another early Christian cross-slab (GA094-072012-) is located within the graveyard (GA094-072003-).

Other Sources/bodies of work on Roscam

The monuments at Roscam have caught the attention of numerous antiquarians in the 18th, 19th and early 20th centuries who were aware of its presence.

For example, in 1901 The Very Rev. Jerome Fahey, P.P. wrote of Roscam:

‘The parish of Roscam derived its name from a little headland on the sea-shore, about two miles from Galway. But, though generally called Roscam, we sometimes find it referred to as Rosceaunin. At Roscam the ruins of an ancient church and round tower are the principal objects of interest. The description of it, which we have from the pen of Mr. O’Donovan, may be quoted here: " The ruins of the Church of Roscam consist of an extensive portion of the south side-wall, of nearly the whole of the north one, and of the east gable. The west gable, and a great portion of the south side-wall, were pulled down. The original length of the church may be calculated to have been 28 yards, and the breadth between 21 and 22 feet. There was a window in the east gable which became a breach. The gable itself is reduced to nearly the level of the side-wall. A window, which appears to be of lancet style, is to be seen in the south side-wall near the east gable, constructed with small stones cemented with lime and sand mortar. On the same wall there was another lancet window, having now become a breach towards the west gable. There was an entrance on the north side-wall, which was inclining to an arch form, and is now closed up. On this wall, near the east gable, is a breach, where an entrance is had into the church." From the foregoing description, it is quite clear that the existing church is not one of very great antiquity. It occupies the site of the original church. "We find it recorded in the li Book of Leinster," a.d. 1177, that "the church of Roscannin (Roscam) and the castle of the port of Galway were burnt down by the English." The existing church may have been constructed on its site. There can be no doubt that it was the parish church, as we find frequent reference to the parish of Roscam in connexion with the annexation of parishes to the Wardenship of Galway. In our day the whole interior of the church, except the chancel, is filled to a height of several feet with the light stones found on the surface of the surrounding fields. Close to the church stands the remains of the Round Tower of Roscam.’

It was also noted by Lord Killinan in his description of the National Monuments of County Galway in 1951.

More recently the round tower at Roscam was documented by O’Keeffe (2004, 89) who suggests a tenth or early 11th century date for the structure. In his gazetteer of towers O’Keeffe (ibid., 151) describes it as follows:

Roscam, Co. Galway

A rural graveyard, 6km east of Galway on the old Galway-Oranmore road.

This tower survives to less than half its original height; its present top is late medieval, suggesting that the tower was a ruin by the fifteenth century. The tower is built of local limestone, nicely squared and arranged in fairly regular courses. The drum is ringed by putlog (scaffolding) holes. The doorway is lintelled. The window above it – the only other opening in the tower – is also lintelled.

The graveyard at Roscam was subject to a full survey by www.historicgraves.com which was funded by the Heritage Council and Galway City Council as an action of the Galway City Heritage Plan. Historic Graves is a community based heritage project which digitally records and publishes historic

graveyard surveys and stories. The survey of Roscam notes the earliest inscribed ledger stone in the graveyard as dating to 1789 and the association of the site with Clonmacnoise.



Plate 11-13: Round tower at Roscam, looking north. (Photo: Tobar Archaeological Services)



Plate 11-14: Graveyard at Roscam, looking SE. (Photo: Tobar Archaeological Services)

As described above, the National Monument at Roscam is defined by a large enclosing stone wall which forms the ecclesiastical enclosure around the site. This wall is situated between c. 615m-650m to the south of the southern portion of the Rosshill redline boundary. The round tower is situated c. 669m to the south of the redline boundary.

The second National Monument within 1km of the proposed development site comprises a tower house known as Merlinpark Castle (Nat. Mon. No. 609). It is situated c. 840m to the north-west of the northern portion of the redline boundary. The monument is described in the HEV as follows:

GA094-023—

Class: Castle - tower house

Townland: MERLINPARK

Scheduled for inclusion in the next revision of the RMP: Yes

Description: On a short rise in the former demesne of Merlin Park House. This Nat. Mon., known as 'Doughiske Castle' until the mid-18th C, was in existence in 1574 when it was in the possession of Stephan Lynch (Nolan 1901, 113). It consists of a well-preserved four-storey rectangular tower (L 8.95m, Wth 7.85m) over a basement. A doorway, centrally placed in E wall, gives access, via a lobby, to ground floor, to spiral stairs in SE corner and to basement stairs in NE. There are subsidiary chambers and latrines to S of the main rooms on ground and 1st floors and an intramural passage in same position on 2nd floor. Stone vaults exist between basement/ground floor and 2nd/3rd floors. Fireplaces occur in N wall of the basement, 2nd, and 3rd floors. Two small chambers (one concealed) occupy the thickness of the vault between the 2nd/3rd floors. The gabled roof contained a garret and had wall-walks with machicolations at parapet level on N, S and W walls. Apart from the horizontal gun slits on ground floor, all the windows are either single or double lights with ogival heads. A sheela-na-gig (GA094-023001-) figure is carved onto the spandrel of a single-light ogee-headed window on 2nd floor of S wall. A later extension adjoined at E, where traces of a high pitched roofline, a doorway inserted off the spiral stairs and a raised platform indicate a former two-storeyed building, possibly of 17th-C date. (Lynch Athy 1914, 146-52; O'Flanagan 1927a, Vol. 1, 330)



Plate 11-15: Merlinpark castle, National Monument No. 609). Photograph courtesy of Galway City Council.



Figure 11-3: National monuments within 1km of the proposed development boundary.

11.4.2.2 Recorded Monuments

No recorded monuments are located within the redline boundary. Two recorded monuments as listed in **Error! Reference source not found.** below are located within c. 100m of the proposed development boundary and comprise an enclosure (GA094-122) and a folly (designed landscape feature) (GA094-070) which is also a Protected Structure (Ref. 8803) (see below).

Table 11.1: Recorded monuments in vicinity of the proposed development

SMR NO.	Townland	DESCRIPTION	ITM E	ITM N	Distance to EIAR Boundary
GA094-070	Roscam	Designed landscape - folly	534217	724854	98m
GA094-122	Roscam	Enclosure	534275	725181	60m

Descriptions of these monuments are not currently available on the HEV website, however, the Archaeological Survey of Ireland files for both were obtained from the National Monuments Service Archive Unit.

GA094-070

The designed landscape feature – folly (GA094-070) is situated centrally within a stone-built octagonal walled garden which itself is located c. 98m to the south of the Phase4 1 SHD redline boundary. It is both a recorded monument and a Protected Structure (Ref. 8803). It is described in the Galway city Record of Protected Structures as a ‘multistep pyramid folly within a walled garden’ (see below for further discussion). The Archaeological Survey of Ireland file for this monument was consulted and provides an annotated hand drawn sketch of the octagonal walled garden and the folly within same. The sketch notes the location of bee boles built into the wall of the walled garden. A description of the monument in 1978 notes that it occupies land which once belonged to the Davenport Estate. It also noted the presence of the ‘recesses in the enclosure wall’ which were designed to hold beehives. The description also refers to a good example of a dove cot ‘across the field....in the gable wall of an old granary or barn.’ (Fox et al., 1978, 50).

Follies are generally considered ornamental structures which are typically associated with a house and its estate/demesne. They comprise structures that demonstrate eccentricity or excess rather than practical purpose and can take many forms including sham castles and ruins, towers, hermit's cells or grottoes. They generally date from the 17th to the 19th century AD. Examples of stepped pyramid follies are known elsewhere in Ireland, e.g. ‘The Pyramid of Dublin’ at Killiney Hill and on the former estate of Neale House in Co. Mayo.

The folly at Roscam is depicted on the first and second edition OS maps for the area, being named ‘ornamental mound’ on the latter 25 inch OS map (see below). The folly is associated with Rosshill House which is situated to the east, and is located within the demesne around same.

The SHD development area is not located in close proximity to the folly, however, the overall masterplan boundary is located immediately north of this monument.

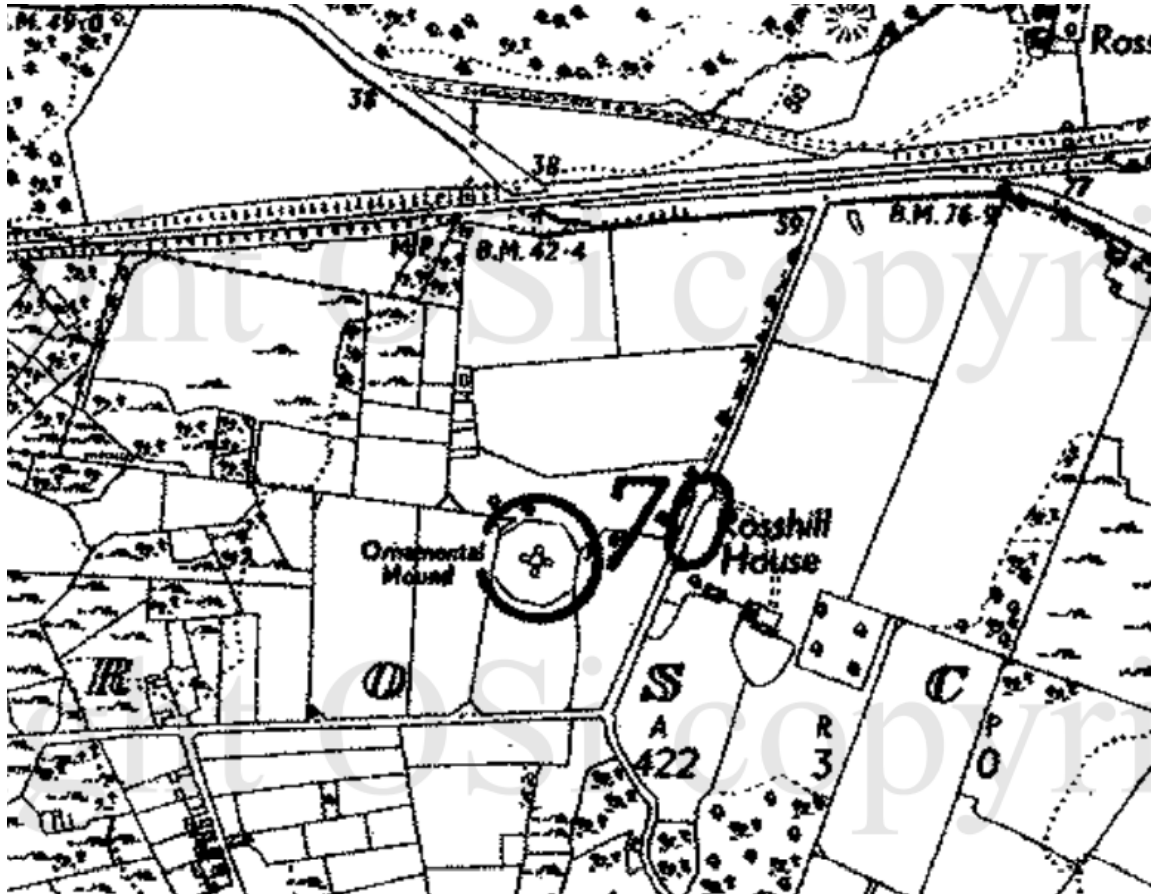


Figure 11-4: Extract from RMP map sheet 94 showing designed landscape feature – folly GA094-070.

GA094-122—

As outlined above, a description for this monument is not currently available on the HEV. The Archaeological Survey of Ireland file was therefore consulted in which it is listed as a possible enclosure. The monument is indicated on the 1st edition OS map as a semi-circular hachured area immediately south of a public road, to the north of which is dense woodland. A review of the available aerial photography for the area did not show any cropmark for this feature. The monument is situated c. 60m to the north of the SHD boundary.



Figure 11-5: Recorded monuments adjacent to the proposed SHD development site boundary.

11.4.2.3 Archaeological Investigations/Excavations undertaken within the Proposed Development site

A review of the database of excavations undertaken in Ireland yielded two results for Roscam townland and three results for Merlinpark townland, which are summarised as follows:

2010:363 - Roscam Vernacular outbuildings, Galway

County: Galway Site name: Roscam Vernacular outbuildings

Sites and Monuments Record No.: N/A Licence number: 10E0172

Author: Thaddeus C. Breen, 13 Wainsfort Crescent, Dublin 6W for project director Valerie J. Keeley.

Site type: 13436 22421

ITM: E 529516m, N 724990m

Excavations took place in July 2010, in advance of a proposed development of a three-bay slatted house and milking parlour. Archaeological features identified consisted of a small burnt pit of unknown antiquity, and some vernacular archaeology. The vernacular archaeology consisted of a clay-bonded wall, a mortar and cobble surface and a possible threshing platform. These features are likely to have been associated with outbuildings which are believed to have survived on the site until the 1940s. The location of the burnt pit close to a known medieval complex (GA094–072002) suggests that it may date to the medieval period.

2018:683 - Roscam, Galway

County: Galway Site name: Roscam

Sites and Monuments Record No.: n/a Licence number: 18E0311

Author: Miriam Carroll

Site type: No archaeology found

ITM: E 534153m, N 724406m

The testing was carried out on foot of a condition of planning permission. The testing was undertaken over one day in June 2018. Six trenches were excavated on the site and natural subsoil was exposed throughout. No archaeological finds, features or deposits were uncovered in any of the excavated trenches.

2002:0736 - Merlin Park, Galway, Galway

County: Galway Site name: Merlin Park, Galway

Sites and Monuments Record No.: SMR 94:23 Licence number: 02E1364

Author: Martin Fitzpatrick, Arch. Consultancy Ltd, Ballydavid South, Athenry, Co. Galway.

Site type: Adjacent to tower-house

ITM: E 529932m, N 725147m

Nineteen test-trenches were excavated across three fields to the north of Merlin Park tower-house before the construction of a Galway Corporation housing development. The stratigraphy across the site was relatively uniform throughout. A thin sod layer overlay an orange/brown silty clay that in turn overlay a creamy white, sandy boulder clay with protruding boulders and bedrock. The depth of topsoil varied across the site, and the level of the protruding boulders and bedrock also rose and fell. The topsoil was relatively free of inclusions, and few finds were noted across the site, apart from modern crockery, ceramic tiles, occasional pottery sherds, fragments of dark and clear glass, shell and fragments of disarticulated animal bone.

A number of features were noted in some of the trenches. Substantial, linear, loose-stone dumps were noted in Trenches 10 and 13–15. They appeared just below the sod layer, were cut into the topsoil and boulder clay and seemed to be too large to represent drainage features, but this remains a possibility. Two small shell middens were noted in Trenches 7 and 14. A rough stone surface was revealed in the southern end of Trench 6. A number of worked cobbles were noted in the topsoil; however, the excavated surface was composed of rough, rounded stones. A small pit, revealed in section farther to the south, was cut into the topsoil and boulder clay and contained a layer of charcoal-rich silt and an ash-like deposit. In Trench 5 two features were noted: a thin band of charcoal

and a rectangular trench cut into the boulder clay. However, none of the features revealed could be described as highly significant, and it is unlikely that any substantial features related to the tower-house will be disturbed during construction. It is believed, however, that construction work across the development site may reveal larger shell middens and other features. It is therefore considered necessary to monitor the topsoil-stripping across the entire site.

2002:0737 - Merlin Park, Galway, Galway

County: Galway Site name: Merlin Park, Galway

Sites and Monuments Record No.: SMR 94:23 Licence number: 02E0113

Author: Martin Fitzpatrick, Arch. Consultancy Ltd, Ballydavid South, Athenry, Co. Galway.

Site type: Tower-house

ITM: E 534591m, N 725941m

The archaeological brief at Merlin Park was determined by extensive groundworks that had taken place in the immediate vicinity of the tower-house in 2001. These works included the excavation of a large pit/hole to the west of the building and the stripping of large areas of ground immediately surrounding the tower-house. The ground was stripped to bedrock level and was backfilled with stone excavated from the area. After consultation, it was agreed that a programme of works should be undertaken to assess the damage and to catalogue the archaeological features/finds in the area. A survey conducted at the site included the area immediately surrounding the tower-house, where disturbance to the original ground level had taken place. Piles of rubble to the south-west of the building were examined, and architectural fragments were collected. In addition to the disturbance caused in 2001, it was noticed that four further areas had been disturbed in more recent months. These areas are to the south-west of the tower-house, and the disturbance involved the felling of trees to accommodate corridors measuring c. 90m by 6m, which were subsequently levelled, with all works being undertaken without archaeological supervision. Deposits of disturbed shell were found in three of these corridors, with the greatest concentration consisting of a large shell midden in the second corridor from the west.

The disturbed areas to the east and south-east of the tower-house were also examined, and the removal of the stone was monitored. Two further shell deposits, which had been greatly disturbed by the previous year's work, were identified in this area. Finds from the area included occasional pottery and glass fragments, a fragment of a quernstone, architectural fragments and fragments of roof tiles. Similar finds of modern (20th-century) pottery and glass fragments were recovered from the monitoring in the north and south of the tower-house. Some 13m north-east of the building, faint traces of a structure were uncovered during the monitoring. A second structure survives c. 22m east of the tower-house.

Eight trenches were manually excavated: three to the west of the tower-house, one to the south and four to the immediate east. Faint traces of the south-facing wall of the ancillary building were visible before the testing, which sought to locate and record the other walls of the building. Trenches E, G and H corresponded with the northern, southern and western limits of the ancillary building, and their excavation revealed the walls of the structure, which measured c. 6.5m by 7.32m and had a maximum height of 2.1m. In these trenches hardcore and disturbed topsoil overlay a loose, brown, sandy clay that was probably dump material. Finds from this context included fragments of pottery and glass. The topsoil overlay a light brown, silty clay with similar inclusions. Where the walls of the ancillary structure survived, it was apparent that it was of similar construction to the tower-house. It was composed of fairly well-coursed limestone blocks with mortar throughout. Cut-and-dressed blocks were reserved for the quoin stones at the eastern end. A stone plinth extended from the base of the walls.

These results highlight the significance of the building on both a local and a national scale. Such well-constructed tower-houses with finely cut stone and decorated spandrels are a rarity in County Galway and indicate the importance of the building and its occupants from the 15th/16th century onwards. The obvious displays of wealth of the occupants are further apparent in the construction of a large extension/hall against the eastern wall of the structure. Access to this ancillary building was via a doorway in the north-east corner of the tower-house. The doorway (1.1m wide) was indicated by dressed and chamfered jambstones. Immediately east of the doorway two large limestone steps are all that survived of a stairway that ascended to the north-east corner of the tower-house, suggesting that a second doorway was situated at this level. This theory is substantiated by the identification of a stop-

stone protruding from the east wall of the tower-house. This cut-and-dressed stone was the basal stone of a doorway that may have given access to the first floor of the hall and/or the first-floor entrance of the tower-house. The identification of a wall running north–south against the east wall of the tower-house and the survival of a number of protruding stones at this level suggest that the steps led to a doorway in the north-western corner of the hall building, which in turn gave access to the first-floor entrance to the tower-house. The internal layout of the hall structure is not known, as it has been backfilled with rubble. The testing also revealed an external garderobe/latrine structure that was built against the south-east corner of the tower-house and serviced the upper floor/floors of the ancillary structure. Constructed of well-coursed cut stone and with a basal batter, this feature blended in with the tower-house and the additional building. This rectangular structure measured 1.23m by 1.92m and survived to a maximum height of 2m.

Ancillary buildings constructed onto tower-houses are not uncommon in Ireland and were obviously the solution to obtaining extra accommodation space. A stone hall was found in association with castle remains at Askeaton, Co. Limerick, while at Lemenagh, Co. Clare, a hall was added to a tower-house in 1643. Coolhull, Co. Wexford, is an example of a fortified house that possibly developed from the hall castle. These are three-storey structures that usually do not have a vault. The houses are more spacious and comfortable than tower-houses but have many of their defensive features. Although only the lower walls of the ancillary building survive at Merlin Park, it is evident that the stonework and dressing are similar to that in the tower-house. With only the outer walls of the building exposed, it is not possible to determine the layout of the interior, but the traces of gable surviving on the east wall suggest that it was a three-storey structure. It is clear that, whatever the layout of this ancillary structure, its construction allowed for a greater display of wealth and a more spacious and luxurious interior.

2002:0738 - Merlin Park/Doughiska, Galway, Galway

County: Galway Site name: Merlin Park/Doughiska, Galway

Sites and Monuments Record No.: N/A Licence number: 02E0793

Author: Markus Casey, Swan House, Flood Street, Galway.

Site type: Monitoring

ITM: E 534402m, N 726353m

Monitoring took place before pipe laying through Merlin Park and Doughiska townlands in St Nicholas’s parish in Galway. Bedrock close to the surface resulted in months of rock breaking, with no archaeology visible in the 0.05–0.1m of soil cover.

11.4.2.4 **Topographical Files of the National Museum of Ireland**

The database of find spots held in the National Museum of Ireland was checked on www.heritagemaps.ie for any recorded finds within the study area. No find spots are recorded for the area of the proposed development site. The nearest find spot is located c. 1km to the north-west in Merlinspark townland and comprises a polished stone axehead.

National Museum Area:

Shape

Name 1940:119

Object Type Polished Stone Axehead

11.4.2.5 **Previous Archaeological Work Carried out on the site**

An archaeological assessment of the overall proposed SHD at Roscam was carried out in 2019 (Carey, 2019) and comprised an archaeological field and desk study. The report highlighted the presence of ‘a heavily-overgrown range of ruined masonry outbuildings’ within the site which are those depicted on the 1st and 2nd edition OS maps as detailed below in section 11.4.3.1. The assessment notes that the buildings ‘were examined but dense overgrowth, particularly of ivy, did not

allow for a detailed survey'. A photograph of the outbuilding containing the dove cote is reproduced in the assessment (after Spellissy 1999) and shows the structure without ivy cover (Plate 11-16).



Plate 11-16: Dove cote in gable of stone outbuilding at Roscam, after Spellissy 1999.

11.4.3 Architectural and Cultural Heritage

11.4.3.1 Cartographic Review

A review of the available historic mapping for the area does not show any potential archaeological features on the proposed development site. The proposed development area is located in the Barony of Galway and the parish of Oranmore. The Down Survey map (1656-8) for Galway names Roscam and a church is depicted therein, presumably that within the ecclesiastical complex to the south of the proposed development site.



Figure 11-6: Extract from 17th century Down survey map showing Roscam.

The first edition 6-inch OS map for the area shows that the proposed SHD boundary is located within the demesne for Rosshill House. A rectangular structure is depicted within the southern portion of the proposed development site, with adjacent buildings extending outside the boundary further to the south (Figure 11-7). The structures were accessed at that time by a track which led from the public road to the east, east of which is Rosshill House. The walled garden and folly are also depicted to the south of the aforementioned track to the south-east of the rectangular structures. The remainder of the proposed development area is shown as largely open land with some field divisions to the west and north-west of the rectangular structures. The structures are likely to represent outbuildings associated with Rosshill House.

The later second (25-inch) edition map shows the proposed development area as largely unchanged, with the outbuildings and adjacent field divisions still extant. The track/passage which led from the public road to the outbuildings is not depicted on the 25 inch map. By this time the Midland Great Western Railway had been built and bounds the proposed development area to the north. A public road is also shown passing under the railway just north of the site and is the location of a railway bridge (Protected Structure 8806) which dates to 1851 (see below for further detail).

As outlined above, the octagonal walled garden and central folly are also shown on this map with the folly indicated as ‘Ornamental Mound’ (Figure 11-8).

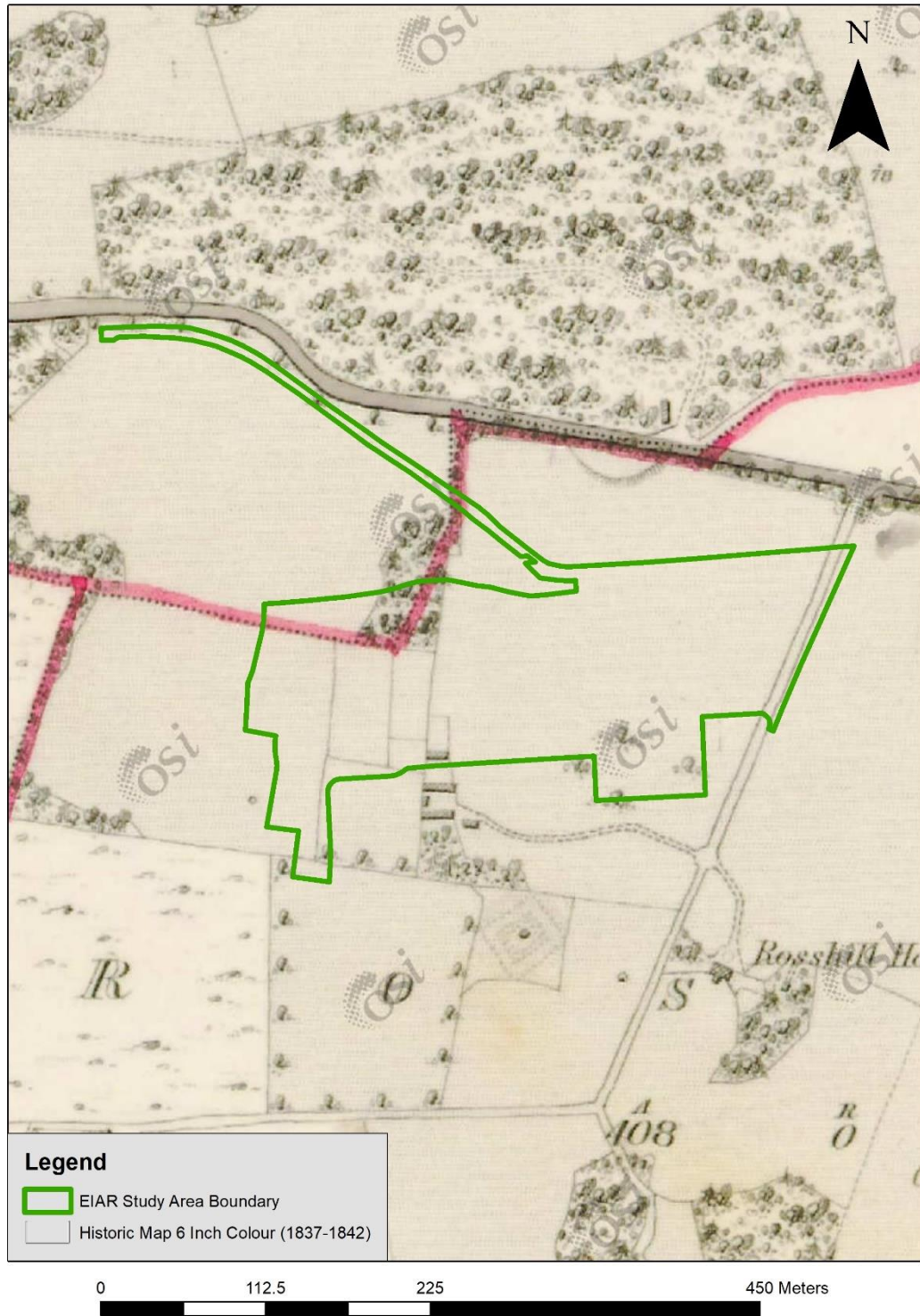


Figure 11-7: Proposed SHD boundary on 6-inch 1st edition OS background.

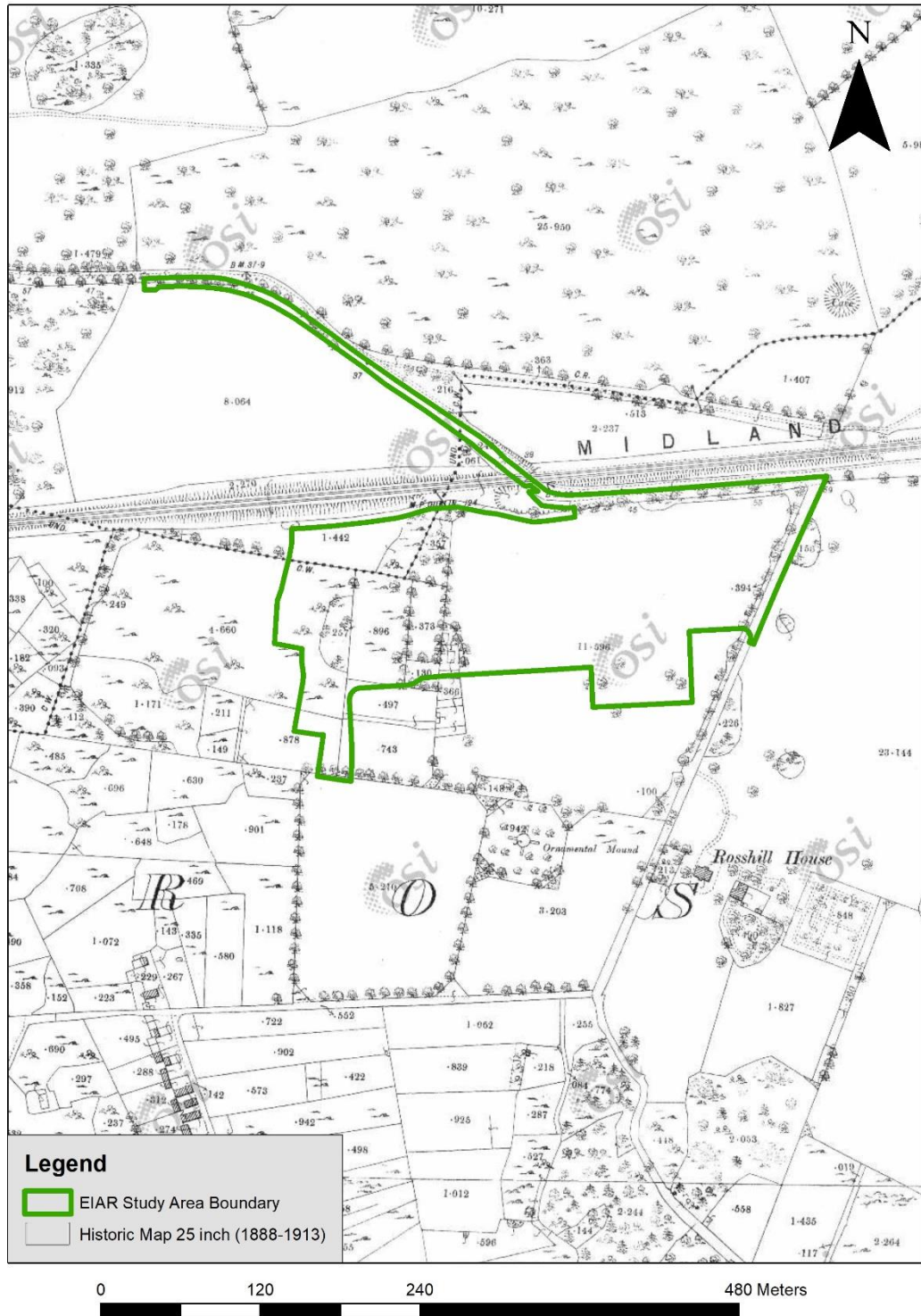


Figure 11-8: Proposed SHD boundary on 25-inch 2nd edition OS background.

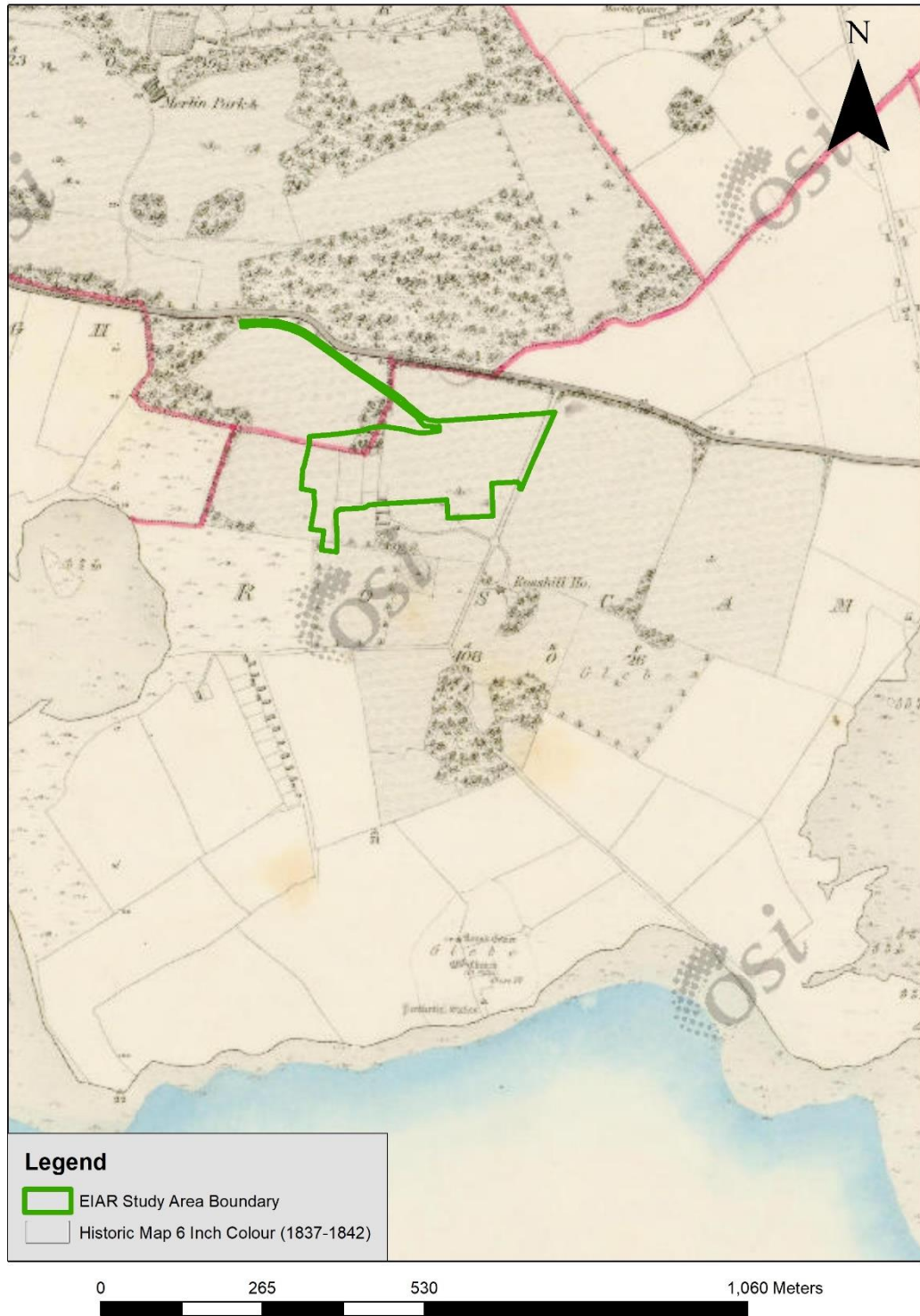


Figure 11-9: Proposed SHD boundary in relation to the demesne of Rosshill House, shown as shaded area. Merlin Park Demesne lies immediately to NW.

11.4.3.2 Protected Structures

11.4.3.2.1 Railway Bridge RPS 8806

The redline boundary extends along the public road under protected structure (Ref. 8806) which comprises a 19th century railway bridge. The bridge spans the public road along which the redline boundary extends to the north of the main portion of the proposed development area. The features of the bridge as referenced in the Galway RPS consist of cast-iron beams and panels and limestone abutments. The limestone abutments are in the typical rusticated rubble style utilised in many railway bridges of this date.



Plate 11-17: Protected structure 8806, 19th century railway bridge. Photo courtesy of Galway RPS.

11.4.3.2.2 Folly RPS 8803

A second protected structure (Ref. 8803) is located c. 100m to the south of the boundary. It comprises the multistep pyramid folly within a walled garden as shown on the first and second edition OS maps. The features of this Protected Structure, as referenced in the Galway City RPS comprise bee boles, kerbing, cart house and a dove cote.

The bee boles are located within the wall of the walled garden surrounding the folly (as depicted in the Archaeological Survey of Ireland monument file).

The dove cote is located within the gable of an outbuilding situated approximately 60m to the north-west of the folly. A recent photographic survey of the outbuildings to the south of the SHD boundary was undertaken by O'Neill O'Malley Ltd and thereafter by Tobar Archaeological Services in March 2021. It is possible that the dove cote survives under the dense ivy which currently obscures the top of the east facing gable in the south-east corner of the building range (Plate 11-18). Only the northern

portion of the range of outbuildings, which takes the form of a modern silage concrete apron, is located within the SHD boundary, however, the remainder are located within the overall SHD development site.



Plate 11-18: Southeast corner of range of outbuildings which possibly contains ivy-covered dove cote (same building as that shown in Plate 11-16 above).

11.4.3.3 Protected Structures and Curtilage

The Architectural Heritage Protection Guidelines for Planning Authorities (2011) discusses the notion of curtilage and attendant grounds associated with protected structures. While the notion of curtilage is not defined by legislation, it is taken to be the 'parcel of land immediately associated with that structure and which is (or was) in use for the purposes of the structure.' (ibid., 191). In the case of a large country house items such as stable buildings, walled gardens, lawns and ha-has may all be considered to form part of its curtilage unless at a distance from the building (ibid.). It is also noted, however, that the extent of the curtilage of a protected structure would need to be determined on a case-by-case basis and 'ideally should be identified by the planning authority prior to inclusion of the structure in the RPS...' (ibid.). The Guidelines go on to say that in instances where the curtilage of a protected structure has not previously been identified 'a planning authority should take the opportunity to identify its extent at the time of making a declaration in respect of the protected structure' (ibid., 192).

A similar scenario exists when determining the attendant grounds of a protected structure. Attendant grounds are those lands located outside the curtilage but which are associated with the structure and are 'intrinsic to its function, setting and/or appreciation' (ibid.). A planning authority has the power to protect all features of importance which lie within the attendant grounds of a protected structure, however, such features must be specified in the RPS. The Guidelines go on to say that where the curtilage of a protected structure has not been established at the time of inclusion in the RPS, the planning authority should ensure that all important features are either 'a) specified as being in the

attendant grounds of the protected structure or b) are themselves entered into the RPS and c) the owners and occupiers notified of the protection.'

The entry for 8803 Folly in Galway city Councils Record of Protected Structures describes the structure as '*Multistep pyramid folly within walled garden*' and notes that it is of archaeological/historical interest (Figure 11-10). The extent of the curtilage of the folly has not been identified in the RPS entry for 8803. In the 'Site features' however, the entry lists '*beebowls, kerbing, cart house and dove cote*'. The map associated with the entry only shows the location of the folly itself and does not identify the location of the '*beebowls, kerbing, cart house and dove cote*' (Figure 11-10). It would seem that some of these features, namely the dove cote and cart house, are located in the range of ruined outbuildings located a short distance to the north-west of the folly. It has been established that the dove cote is contained within the gable of the southeast building in the overall range which is now obscured by ivy. This feature is situated a short distance outside the development boundary (Figure 11-12).

The development proposals will involve the removal of the northern part of the range of outbuildings. This portion of the outbuilding contains a modern concrete apron which was utilised as a silage pit.

The Record of Protected Structures

Galway City Council

Unique Identity Number: 8803

Address: Roscam Folly, Roscam.

Description: Multistep pyramid folly within walled garden.

Map: O.S. 3409–B Scale: 1:2500

National Grid Co-Ordinates: E134245 N224821

Special Interest: Archaeological / Historical.

Site Features: Beebowls, kerbing, cart house and dovecote.

Section of Map Indicating Structure: Shaded Green.

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Licence number 2003/07CCMA/Galway City Council.

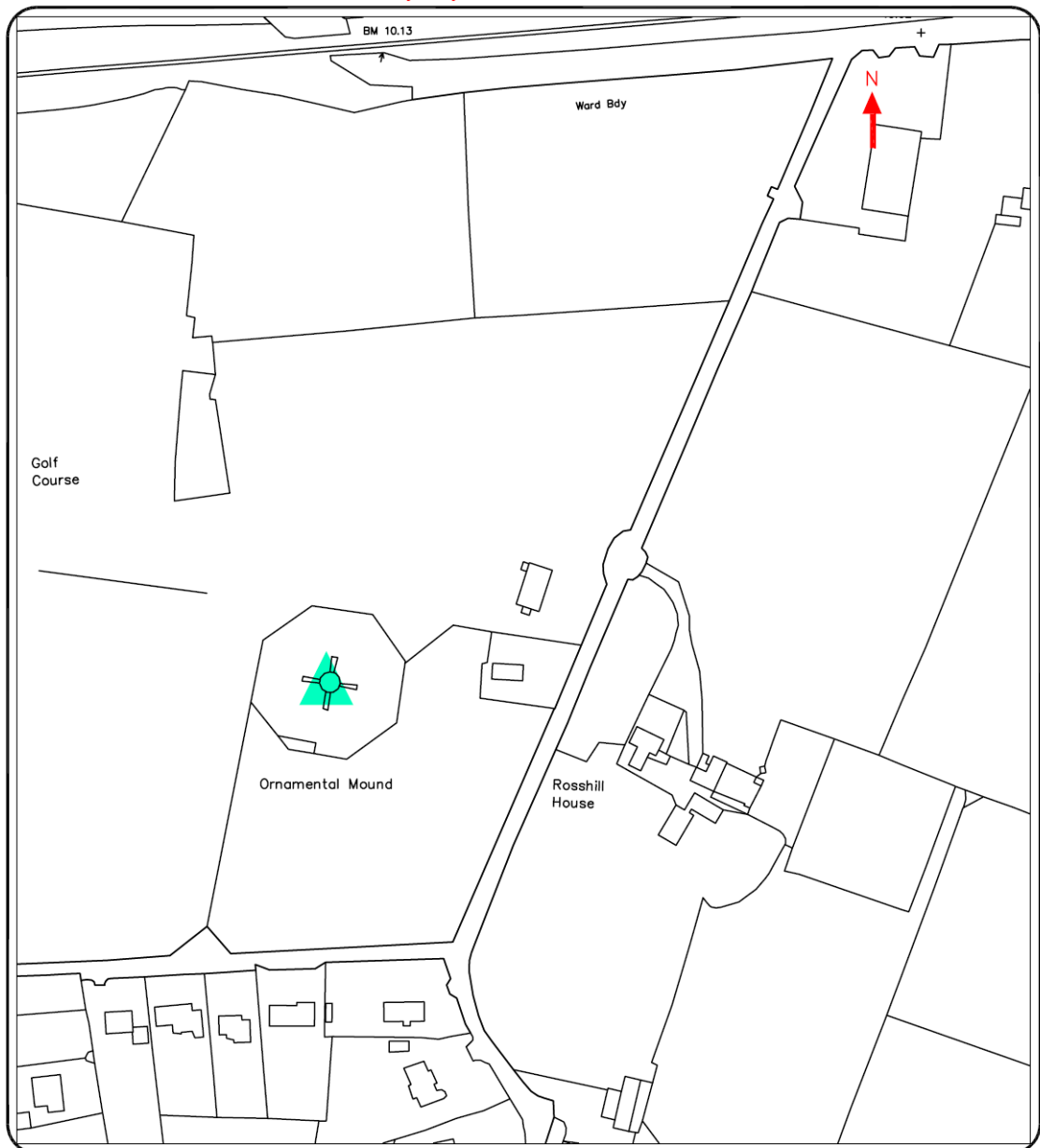


Figure 11-10: Extract from Galway City Council RPS Record 8803.



Figure 11-11: SHD boundary in relation to Galway City Council RPS.

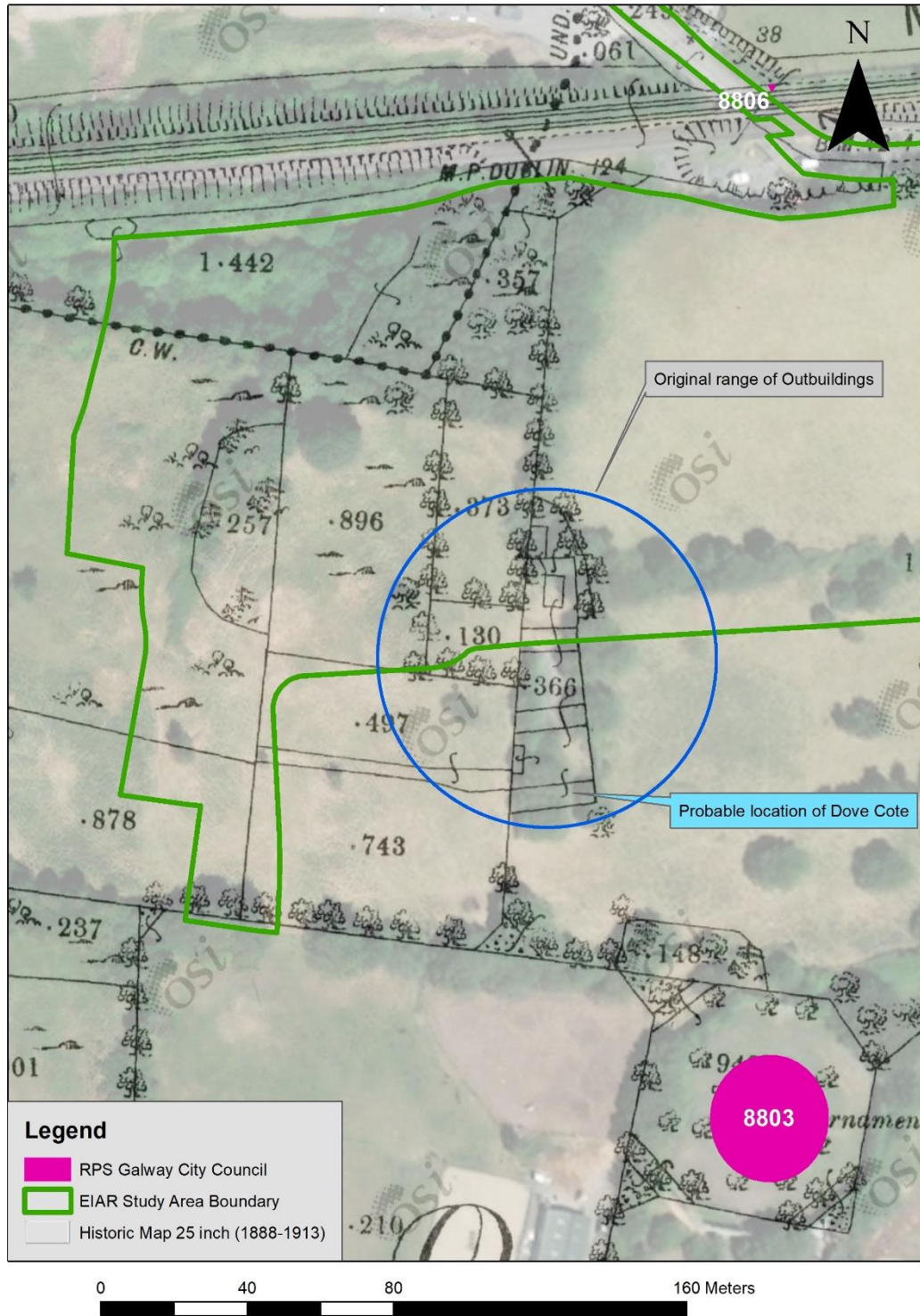


Figure 11-12: SHD boundary in relation to outbuildings and Folly.

11.4.4 NIAH Structures and Historic Gardens

The redline boundary extends along the public road under NIAH structure (Reg. 30409423) which comprises a 19th century railway bridge. The bridge is also a Protected Structure (RPS 8806) (see section 11.4.3.2 above). The bridge is described on the NIAH as follows:

Description

Single-span railway bridge, built 1851, carrying Galway to Dublin railway line over road. Cast-iron and steel panelled superstructure supported on rock-faced limestone abutments with cut-stone copings. Wrought-iron railings to east parapet. Recent snecked dressed limestone to upper parapet walls.

Appraisal

This is a typically robust mid-nineteenth-century railway bridge of good technical merit and showcases the skill of nineteenth-century stone masons. It is built using the rock-faced rustication that is a typical feature of such structures constructed during the mid-nineteenth century, creating a solid and durable appearance.

Rosshill, Co. Galway is also included in the NIAH Garden Survey (Site ID 5509). While the entry for the site notes that ‘A significant number of modern buildings have been constructed in this landscape’, it also notes the survival of the walled garden landscape feature.



Figure 11-13: Proposed SHD boundary in relation to NIAH structures and Historic Gardens.

11.5 Likely Significant Effects and Associated Mitigation Measures

Archaeological and cultural heritage is a non-renewable resource. The overall objective of this assessment of impacts of the proposed development is to ensure that where a potential impact has been identified, that it can be mitigated against to ensure that the archaeological and cultural heritage will be available for future generations. The potential impacts on the archaeological and cultural heritage, both recorded and potential sub-surface sites, are assessed here.

Impact will be discussed according to the types of impacts that may occur during and after the project has been completed.

11.5.1 Do Nothing Scenario

The do-nothing scenario seeks to describe the consequences that are reasonably likely to occur without the proposed project. If the Proposed Development were not to proceed, the site would continue to be managed as agricultural land. Indirect effects to Cultural Heritage, in particular, in the wider landscape setting would not occur.

11.5.2 Construction Phase Potential Impacts – Indirect

Indirect effects, in terms of archaeology, architectural and cultural heritage are considered to be those effects which happen away from ‘the site’. This includes impacts on visual setting of any cultural heritage asset in the wider landscape. Since these effects are only possible once the proposed houses and associated facilities are constructed, they are considered operational effects and are therefore discussed in Section 11.5.4 below. No indirect effects were identified which would occur at the construction stage.

11.5.3 Construction Phase Potential Impacts - Direct

Direct impact refers to a ‘physical impact’ on a monument or site. The construction phase of the development consists largely of earthmoving activities such as topsoil removal and the excavation of house foundations, service trench excavation and any other groundworks deemed necessary as part of the overall proposed development. The potential impacts on the known and potential archaeological, architectural and cultural heritage of the area are outlined below with the suggested mitigation measures. Where any potential direct impacts do occur, they are negated through the use of suitable mitigation measures such as exclusions zones (buffer zones), testing and/or monitoring.

11.5.3.1 National Monuments in State Care including those with Preservation Order (Direct Effects)

No National Monuments in State Ownership/Guardianship are located within or immediately adjacent to the EIAR site boundary and therefore no direct impacts on these aspects of the archaeological resource are identified. Indirect Operational effects are addressed in Section 11.5.5 below.

11.5.3.2 Recorded Monuments (Direct Effects)

No recorded monuments are located within the proposed SHD site boundary. No direct impacts to this resource are therefore identified.

11.5.3.3 Newly Recorded site within the EIA site boundary (Direct Effects)

No new above ground monuments were noted within the proposed development site and therefore no impacts will occur in this regard.

11.5.3.4 Previously unrecorded sub-surface archaeological features

The proposed development area comprises a largely greenfield site with some scrub and tree cover. A review of the available aerial photography demonstrates that some localised ground disturbance took place within some areas of the boundary when the site was utilised as a golf course in the form of bunkers, etc. The remainder of the site appears relatively undisturbed. While no recorded monuments are located within the proposed development area the potential still exists for the presence of sub-surface archaeological deposits on the site and appropriate mitigation measures are recommended in order to ameliorate any potential impacts to such features. Roscam Ecclesiastical Enclosure is located 600m to the south with a second recorded monument GA094-122— c. 60m to the north. The presence of these monuments demonstrates that the surrounding area is of high archaeological potential. Furthermore, given the large size and greenfield nature of the site, there is the potential for hitherto unknown subsurface archaeological remains within the proposed development lands. The following measures are recommended in order to ascertain the below ground potential of the site and to minimise the risk of revealing archaeological remains during the construction phase of the project.

11.5.3.4.1 Pre-mitigation Impact

Ground works associated with the proposed SHD will involve topsoil removal, excavation of foundation trenches as well as service trenches throughout the development area. Should sub-surface archaeological finds, features or deposits exist within the proposed development area a direct, negative impact to same will occur as a result of ground works in the absence of appropriate mitigation.

11.5.3.4.2 Mitigation measures (Pre-Construction stage)

- A pre-construction Geophysical Survey of the proposed development site should be undertaken and a report compiled detailing the results of same.
- A programme of pre-construction targeted archaeological testing of any potential geophysical anomalies within the proposed development site (licensed by the National Monuments Service). This measure will provide greater clarity as to the potential nature and extent of sub-surface archaeological remains if they exist within the site. Should planning permission be granted, by carrying out these measures in advance of construction, it minimises the risk of delays occurring on site due to previously unidentified archaeological features being revealed. The developer will make provision to allow for and fund whatever archaeological work may be required at the site and the post excavation requirements in accordance with the National Monuments Legislation (1930–2004). All recommendations are subject to the approval of the National Monuments Service of the DHLGH. A full report on the findings will be compiled on completion of the testing.
- Preservation in-situ and preservation by record may be required depending on the results of the Geophysical Survey and targeted testing.

11.5.3.4.3 **Mitigation measures (Construction stage)**

- Construction Stage archaeological monitoring of all topsoil removal associated with the development by a suitably qualified archaeologist. A report on the monitoring will be compiled on completion of the works and submitted to the relevant authorities. Should archaeological finds or features be uncovered during the course of the monitoring the National Monuments Service shall be informed of such findings and further mitigation in the form of preservation in situ or preservation by record (excavation) may be required.

11.5.3.5 **Protected Structures/NIAH within the proposed EIA site boundary (direct effects)**

The site boundary extends along the public road under protected structure (RPS 8806 – Railway Bridge), while a second protected structure (RPS 8803 – Folly) is situated outside the boundary to the south. Features associated with the folly are located within a range of outbuildings, the northernmost portion of same being within the boundary. A direct impact to the northern end of the outbuildings has been identified as a result of the proposed development which will involve the removal of this portion of the range. This area of the outbuilding is now occupied by a modern concrete apron and has been in use as a silage pit.

No impacts to the Railway Bridge (RPS 8806) are anticipated as part of the SHD.

11.5.3.5.1 **Pre-mitigation Impact**

Ground works associated with the proposed development will involve the removal of the northern portion of the range of 19th century outbuildings. This portion of the outbuilding is currently occupied by a modern concrete apron for use as a silage pit. No direct impacts to the dove cote which is situated at the south-east end of the range is anticipated as a result of the works.

11.5.3.5.2 **Pre-Construction Mitigation measures**

- A full photographic, descriptive and drawn record of any elements of the range of outbuildings to be directly impacted by the proposed development should be carried out prior to the commencement of any works on site. A report on same should be compiled and submitted to the relevant authorities.
- Given the proximity of the remainder of the outbuildings to the proposed development site, measures should be put in place to ensure the preservation of those buildings. A structural engineers report on the buildings should be undertaken to determine any Health and Safety issues or considerations associated with the structures and their future retention.
- A protective buffer zone should be established around the remainder of the outbuildings prior to the commencement of any site works and should be maintained for the duration of the construction phase of the project.

11.5.3.6 **NIAH and Garden Survey**

One NIAH structure (Reg. 30409423) comprising a 19th century railway bridge is located within the SHD boundary. No works to the structure are proposed as part of the development therefore no direct impacts to same are identified.

The proposed SHD boundary is partially located within the demesne for Rosshill House. Rosshill is included in the NIAH Garden Survey which notes the presence of the walled garden landscape feature but also notes that a number of modern buildings have been constructed in this landscape. Direct impacts to the historic garden are not anticipated. A change to the wider setting of the historic garden is acknowledged and is discussed below.

11.5.4 Operational Phase Potential Impacts (Direct)

In terms of archaeology, architecture and cultural heritage, since groundworks and development works would be complete, it is considered that no direct effects would occur at the operational stage.

11.5.5 Operational Phase Potential Impacts (Indirect)

Indirect impacts are where a feature or site of archaeological, architectural heritage merit or their setting is located in close proximity to a Proposed Development. Indirect impacts here are mainly concerned with impacts on setting. Impacts on settings of sites may arise when a development is proposed immediately adjacent to a recorded monument or cluster of monuments or any cultural heritage asset. While the Proposed Development may not physically impact on a site, it may alter the setting of a monument or group of monuments. There is no standardised Irish industry-wide approach in for assessing the degree of impact to the setting of a monument. The assessment is based on previous experience, Geographical Information Systems and the ‘*Guidance on Setting and the Historical Environment*’ (Historic Environment Division Northern Ireland) was utilised. According to the aforementioned document ‘*A range of tools may be employed in defining and assessing changes to setting, for example historic landscape analysis using Geographical Information Systems (GIS), which may include viewshed analysis*’.

Potential impact to the visual amenity of a site or area and the significance of same is dependent on a number of factors regarding the sensitivity of the location or ‘receptor’ and the scale or magnitude of the Proposed Development as well as the context within which a proposed development is taking place, e.g. largely untouched landscape, partially developed, industrial, etc.

Potential operational impacts are discussed below.

11.5.5.1 National Monuments in State Care including those with Preservation Order (Indirect Effects)

Pre-Mitigation Impact

No National Monuments are located within the proposed SHD boundary.

The nearest national monument comprises the ecclesiastical complex at Roscam (Nat. Mon. No. 46) which is situated c. 600m to the south-east. Given the distance between the proposed development and the ecclesiastical complex no indirect impacts to its immediate setting will occur. Many private residential properties are located along the local road network between the national monument and the proposed development resulting in continued changes to the wider setting of the complex. The addition of the proposed development to this wider setting will also result in a change to same. A visual effect on the wider setting within which the ecclesiastical enclosure and associated round tower are located is therefore acknowledged but is regarded as Not Significant.

Proposed Mitigation Measures

As it is not possible to mitigate the indirect effects of the proposed development in the wider landscape setting there are no mitigation measures for this potential impact. Screening in the form of an appropriate landscaping and planting scheme would alleviate any potential impacts arising from hard landscaping effect.

Residual Impact

The residual impacts, where an impact has been identified are considered to be not significant.

Significance of Impacts

Proposed development will not have any significant/adverse indirect effects on the nearby National Monuments and therefore impacts will be Not Significant.

11.5.5.2 Recorded Monuments

Pre-Mitigation Impact

No recorded monuments are located on the boundary of or within the proposed development site. The nearest monument (GA094-070) designed landscape feature – folly is situated centrally within a stone-built octagonal walled garden which itself is located c. 100m to the south of the SHD site boundary. Visual impacts to the immediate setting of the monument as a result of the development are not anticipated, however, a change to its wider setting is acknowledged. The potential impact on setting of the monument as a result of the development is regarded as Not Significant given the intervening distance between same and the changes which have already taken place in the surrounding landscape.

Proposed Mitigation Measures

No mitigation measures are being proposed. Landscaping and planting will however alleviate potential impacts on the wider setting of the recorded archaeological resource.

Residual Impact

Residual Impacts will not occur.

Significance of Impacts

The Proposed development will not have any significant/adverse indirect effects on the nearby Recorded Archaeological resource and therefore impacts will be Not Significant.

11.5.5.3 Protected Structures

Pre-Mitigation Impact

The site boundary extends along the public road under protected structure Railway Bridge (RPS 8806). The bridge is situated to the north of the greenfield area within which main development will take place and spans the public road located immediately north of the proposed development site. As no works are proposed to the bridge impacts to its immediate setting are not anticipated. A change to the wider setting in which the bridge is located is acknowledged but is regarded as Not Significant.

A second protected structure (RPS 8803 – Folly) is situated outside the boundary just under 100m to the south. The immediate setting of the folly and walled garden within which the latter is located will not be impacted by the development proposals. A change to the wider setting of the folly and walled garden as a result of the development is acknowledged but is regarded as slight. The setting of this structure has already been significantly altered through the addition of modern residential developments immediately to the south and south-east.

A change to the immediate setting of some features associated with the folly as listed in the RPS entry 8803 is also identified. The northern portion of the range of buildings within which the dove cote is located will be removed as part of the development. A slight-moderate impact on the setting of the outbuildings will therefore occur.

Proposed Mitigation Measures

No mitigation measures are being proposed.

Residual Impact

No mitigation measures are being proposed therefore residual effects will remain as Not Significant, Slight and Slight/Moderate as detailed above.

Significance of Impacts

The Proposed development will not have any significant/adverse indirect effects on the nearby Protected Structures and therefore impacts will vary from Not Significant (Railway Bridge (RPS 8806), Slight (RPS 8803 – Folly) and slight/moderate (outbuilding associated with the folly as listed in the RPS entry 8803).

11.5.5.4 NIAH and Garden Survey

The proposed SHD boundary is partially located within the demesne for Rosshill House. Rosshill is included in the NIAH Garden Survey which notes the presence of the walled garden landscape feature but also notes that a number of modern buildings have been constructed in this landscape. In this regard the original historic garden has been much altered and while important features are extant (e.g. folly, walled garden and associated outbuildings to the NW) the extent of the demesne in the landscape is not easily discernible. The development of a portion of the demesne will further alter this area resulting in a change to its setting. Given that many changes have already occurred within the demesne, including the addition of a concrete apron to the northern portion of the outbuildings, their use as a silage pit, and that the demesne is not easily recognisable in the landscape the potential impacts to the setting of the historic garden are regarded as slight.

11.6 Cumulative Impacts

Cumulative impact is defined as ‘*The addition of many small impacts to create one larger, more significant, impact*’ (EPA 2017). Cumulative impacts encompass the combined effects of multiple developments or activities on a range of receptors. In this case, the receptors are the archaeological monuments and architectural/cultural heritage sites in the immediate vicinity of the Proposed Development. Cumulative Impacts at the Construction and Operational Stages are considered.

The following projects are considered in the context of the proposed development and consist mainly of residential developments:

Application Reference	Description
99/687	Permission for 59 houses and associated site development works.
00/841	Permission for 304 two storey houses, 18 apts, in a 3 storey residential block, & 15 apts. in a mixed use block of 3/4 storeys, incorporating commercial neighbourhood facilities, incl. a creche, doctors surgery & retail space, with associated carparking; site development works incl., temporary sewerage treatment plant & providing new vehicular access points to the Cheshire House grounds & 3 neighbourhood dwellings on the site.
04/724	Permission to construct ninety two semi-detached houses (92 no.) and fifteen detached houses (15 no.) to provide a new entrance from Coast Road (R338) and to provide new entrance from Doughiska Road to the development site together with all site services.
15/194	Permission for development at this site at Roscam with access from the Oranmore Road (R338), Galway and measuring c. 2.24 hectares in area. The development will consist of 49 no. two-storey detached and semi-detached four bedroom houses, 2 no. two-storey semi-detached 3 bedroom houses and a three/four storey apartment block containing 12 no. 2 bedroom apartments and a crèche (166sq.m) at ground floor. Permission is also sought for all associated car-parking, landscaping, boundary treatments and ancillary site development works including amendments to car-parking, boundary treatment and Site no. 67 forming part of permitted development under Reg. Ref. 05/940 (subsequently amended by permission Reg. Ref. 13/347).
16/228	Permission for a new residential development. The development consists of 16 no. 2-storey, five-bedroom, detached houses, together with individual garages, as applicable, new vehicular site accesses and roads with all ancillary site works, landscaping and service connections
17/283	Permission to construct 23 two storey Dwellinghouses consisting of Detached, Semi-detached and terrace including access/egress off the old coast road to Oranmore with sewer connection to adjacent sewer pumping station adjacent the Dublin Road and all associated services.
18/187	Permission for a change of house type to previously granted planning permission (reference 16/228). These amendments consist of a change of house type C (on site 6 only) which is a 5-bedroom two storey detached house
19/95	Permission for development which consists of the constructing 51 No. one, two and three bedroom apartments and two one bedroom Town Houses in 6 no. Blocks ranging in height from one storey up to four storey, with sewer connection to adjacent pumping station adjacent Dublin road, together with access/egress off the old coast road to Oranmore and all associated services at Doughiska and Merlin Park Townlands. (Previous Planning Ref No. 17/283)
21/28	Permission for development which will consist of; variations to domestic garage design from that previously granted under 16/228 to include proposed domestic garage and gym and associated works.

Application Reference	Description
21/73	Permission for development which will consist of amendments to previously granted planning permission (ref 16/228). The amendments consist of the following changes : 1. Minor changes to boundaries of sites 8,9,10,11 to accommodate revised house types. 2. Minor changes to alignment of proposed access road and junction between sites 8 and 12. 3 Change of house types on sites 8,9,10,11 which are to remain 5 bedroom two storey detached houses. 4. Minor amendments to side and rear elevation of house type A1 currently granted on site 15. 5. Minor amendments to side and rear elevation of house type B2 currently granted on sites 12 and 13. 6. Proposed garages for sites 8,12,13,15.

11.6.1 Cumulative Impacts (Construction Stage)

Since all potential direct effects of the proposed development on cultural heritage have been assessed and mitigated, cumulative direct impacts will not occur at the construction stage of the Proposed Development. Each additional project as listed above has already been considered by the planning authority and would be deemed to have already been assessed by the relevant authorities as part of the planning process. The appropriate archaeological planning conditions would be attached to each application if relevant, thereby addressing any potential impacts on each development. Overall, the mitigation measures which will be implemented for the Proposed Development are such that any potential negative effects are addressed at the pre-construction and construction stage.

No construction stage cumulative effects will arise as a result of the addition of the proposed project to the other projects therefore.

11.6.2 Cumulative Impacts (Operational Impacts on Setting)

The combination of multiple developments within an area which contains archaeological/architectural heritage could result in an overall cumulative effect on setting. The ‘carrying capacity’ of an area has to be considered therefore (i.e. – the capacity of a receptor (archaeological monuments) to absorb proposed change), i.e. if the area is largely undeveloped, partially developed etc.

The immediate setting of the Ecclesiastical Complex at Rosscam to the south has been largely preserved maintaining unspoilt views over the bay to the south. Rosshill demesne further north has now been altered and contains numerous private residential properties, but at a remove from the ecclesiastical complex. The wider setting of the archaeological complex has changed and is altered somewhat and when the proposed development is considered alone, the effects have been identified as Not Significant. When considering all projects combined, the cumulative effects on setting could increase to Slight.

11.7 Conclusion

This chapter comprises an assessment of the potential impact of the Proposed Development on the Cultural Heritage resource. Cultural heritage includes archaeology, architectural heritage and any other tangible assets. The assessment was based on GIS based mapping, desktop analysis of all baseline data and a comprehensive programme of field inspection of the Proposed Development.

The proposed SHD boundary does not contain any recorded monuments, or protected structures. The SHD boundary does extend along the public road under protected structure 8806, a 19th century railway bridge. No direct impacts to the structure as a result of the proposed development are

identified. A second protected structure (Folly 8803) is situated just under 100m to the south of the proposed boundary. No direct impacts to the folly or the walled garden within which the latter is located are identified. Some features associated with the protected structure as listed by Galway City council in RPS entry 8803 are located in a range of outbuildings situated to the north-west of the folly. The features include a dove cote and a cart house. The northern portion of the outbuildings, currently occupied by a concrete apron and utilised as a silage pit, will be removed as part of the development. No direct impact to the dove cote which is located at the south-east end of the range of outbuildings will occur as part of this phase of the proposed development and is located outside the proposed development boundary.

Appropriate mitigation measures have been recommended to ameliorate any potential impacts to the archaeological and cultural heritage resource as a result of the proposed development, including any potential sub-surface archaeology which may exist within the site. The mitigation measures include geophysical survey and targeted archaeological testing under licence which should be undertaken prior to construction. Monitoring at the construction stage will also be undertaken.

Impacts on setting on National Monuments are considered to be Not Significant as the monument (Roscam Ecclesiastical Complex) and its immediate setting are well preserved. This effect could increase to Slight (cumulative) when considering all projects combined.

Visual impacts to the immediate setting of the Recorded Monuments as a result of the development are not anticipated, however, a change to its wider setting is acknowledged. The potential impact on setting of the monument as a result of the development is regarded as Not Significant given the intervening distance between same and the changes which have already taken place in the surrounding landscape.

References

Carey, A., 2019, Archaeological Assessment at Roscam townland, Rosshill, Galway. Unpublished report.

Fox., E, Leonard, M., O’Dowd, P., 1978, *Introduction to Burrenology*. Regional Technical College Galway.

Record of Monuments and Places (RMP) for County Galway

1st Edition 6 inch OS map

2nd Edition 25 inch OS map

Historic Environment Viewer (HEV) www.webgis.archaeology.ie/historicenvironment

Other Sources

Record of Monuments and Places (RMP) for County Galway.

1st Edition 6 inch OS maps (1835)

2nd Edition 25 inch OS maps (1903)

www.webgis.archaeology.ie/historicenvironment

www.excavations.ie

www.buildingsofireland.ie

www.logainm.ie

12. LANDSCAPE AND VISUAL

12.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIA) addresses the potential landscape and visual impacts of a proposed Strategic Housing Development at Rosshill, Galway City. The emphasis in this chapter is on the likely significant effects of the proposal. It covers the assessment methodology, a description of the proposed development and the existing landscape as well as landscape policy and relevant guidance. It includes a description of Galway City Council's landscape policy and the area in which the proposed development site is located.

The landscape of the area is described in terms of its existing character, which includes a description of landscape values and the landscape's sensitivity to change. The landscape and visual impact assessment of the proposed development includes the use of representative viewpoints as well as an assessment of landscape value and landscape sensitivity. The potential impacts in both landscape and visual terms are then assessed, including potential cumulative impact.

A full description of the proposed development is provided in Chapter 4 of this EIA.

12.1.1 Statement of Authority

This chapter was written by Jack Workman, a Landscape and Visual Impact Professional. Jack is an Environmental Scientist and Landscape and Visual Impact Assessment (LVIA) specialist with MKO. Jack's primary role at MKO is producing the LVIA chapter of EIA reports. Jack holds an MSc. in Coastal and Marine Environments and membership with the Chartered Institute of Water and Environmental Management.

This chapter was reviewed by Michael Watson. Michael is Project Director and head of the Environmental Team at MKO, an Irish planning and environmental consultancy. Michael has extensive expertise conducting LVIA's and 20 years' professional consultancy experience as a project director, project manager and lead coordinator of environmental impact assessments for large-scale infrastructure projects.

12.1.2 'Do Nothing' Scenario

If the proposed development was not to proceed, the opportunity to develop 102 no. units comprising a mixture of house and apartments, childcare facility, commercial/retail unit, open space, landscaping and ancillary works at this long standing residential zoned site would be lost.

Under the "Do Nothing" alternative, the zoned residential lands would not be used for the development of housing. There remains a long-standing housing need in Galway City and the area of the Galway MASP in general, as identified in the RSES and Galway County Development Plan 2015 – 2021. Therefore, under this "Do Nothing" scenario, the construction of badly needed housing would have to occur on another site in the Galway MASP area to fulfil that need. It is entirely possible that any alternative site would be less suitable than the proposed development site. In circumstances where the utilisation of alternative unzoned lands and the non-utilisation of lands zoned for residential development would represent an unsustainable land use, the "Do-Nothing" alternative was not considered the appropriate option.

In the 'Do Nothing' scenario, the proposed development would not take place. The site would continue to exist in its current state as an unkept green field site of grassland and woodland zoned for Low Density Residential Purposes. There would be no landscape or visual effects associated with the "Do Nothing" alternative.

12.1.3

Proposed Development Description

Planning permission is sought by Alber Developments Ltd for a development on a site extending to 4.73 hectares on lands to the south of Rosshill Road, west of Rosshill Stud Farm Road. The proposed development is a residentially lead Strategic Housing Development consisting of:

1. Construction of 102no. residential units comprising of 35 apartments and 67 houses;
2. Demolition of the existing silage concrete apron (40sqm)
3. Childcare facility (399sqm over 2-storeys) associated outdoor play areas and parking
4. Retail/Commercial space (188.5sqm) including loading bay
5. Provision of shared communal and private open space, including play and fitness equipment
6. Car and cycle parking, including electric vehicle charging points
7. Provision of all associated surface water and foul drainage services and connections including pumping station
8. Landscaping, access routes and public art
9. Lighting and associated works
10. Access and junction improvements at Rosshill Road and Rosshill Stud Farm Road
11. Provision of a footpath connectivity link along Rosshill Road and Rosshill Stud Farm Road
12. All associated works and services

Proposed Landscaping Plan

The proposed development includes the provision of public realm landscaping. The proposed development and landscaping plan is shown in Figure 12-1 below.



Figure 12-1 Proposed Landscaping Plan for Rosshill SHD

A dedicated Landscape Design has been completed by CSR and is included in Appendix 4-3 of this EIAR. An overriding principle of the proposed landscape design philosophy is to retain the best of the existing trees present on the site to help create a high-quality external setting and environment for the proposed development. As such a BS5837:2012 tree survey was undertaken at the project outset and used to inform the project design team during the layout development process. Other areas prioritised

for retention include native boundary trees and areas of contiguous woodland scrub with ecological value.

The landscape design aims to create a variety of connected public open spaces suitable for both passive and active recreation needs of future residents, including pathways interspersed with play and exercise stations. The design has been cognisant of the existing topography and vegetation cover on the site, the planting plans include the addition of native trees and native woodland along the northern and western extent of the site, in order to complement existing vegetation. Most built form (aside from the creche at the north-eastern perimeter) is set-back from the main public road (Rosshill Road) to the north of the site. The landscaping plan makes use of the existing trees along this northern boundary, as well as additional line of native woodland, these trees are likely to provide some screening of views from the main public road.

The design and implementation of the landscape plan has a material effect on the potential landscape and visual effects of the project.

12.1.4 Scoping Replies/Pre-Planning Meetings

A scoping and consultation exercise has been carried out by MKO with Galway City Council as detailed in Chapter 2 of this EIAR.

As part of the SHD process the applicant has also engaged with the Council and An Bord Pleanála via the formal tripartite meeting.

Planning History Pertaining to Landscape

In 2020 a planning application was submitted for a similar development (of larger scale) at the subject lands in Rosshill. Section 10.6 of the Inspector's Report (ABP 306413-20) issued by An Bord Pleanála in April 2020 addressed Landscape and Visual Impacts of the previous proposal. The Inspectors Report found the likely landscape and visual impact of the previous proposal to be acceptable, noting:

"I accept the EIAR assessment which concludes that the proposed development when complete will not have a significant negative effect on visual amenity given the topography and short distance views of the site from the surrounding area."

In relation to the previous EIAR, the inspector concluded the following in Section 12.16.6:

"I have considered all of the written submissions made in relation to landscape and visual impact. I am satisfied that the identified impacts would be avoided, managed and mitigated by the measures which form part of the layout and design of the proposed scheme, and through suitable conditions. I am therefore satisfied that the proposed development would not have any unacceptable direct, indirect or cumulative effects on the landscape or on visual impact."

The proposed development has a smaller footprint than the previous application with greater set-back distance from surrounding roads and visual receptors. A key focus of the proposed landscaping plan and development design is to incorporate existing landscape elements such as existing trees and other vegetation of ecological value, as well as current topographical characteristics. In a general sense, the aforementioned factors are likely to mitigate likely landscape and visual effects to a greater degree than the previous SHD application.

12.2

Methodology and Assessment Criteria

This section broadly outlines the methodology used to undertake the landscape and visual assessment of the proposed development, and the guidance used in the preparation of each section. There are four main sections to the assessment:

- Outline of guidance followed
- Baseline landscape and visual assessment
- Nature and visibility of the proposed development
- Assessment of potential impacts

12.2.1

Guidance/Reference Documents

In 2000, the Department of the Environment and Local Government (DoEHLG) published 'Landscape and Landscape Assessment: Consultation Draft of Guidelines for Planning Authorities', which recommended that all local authorities adopt a standardised approach to landscape assessment for incorporation into development plans and consideration as part of the planning process. This document remains in Draft.

In 2002, Ireland signed and ratified the European Landscape Convention (ELC). This introduced a pan-European concept that centres on the quality of landscape protection, management and planning. The Department of Arts, Heritage and the Gaeltacht published a National Landscape Strategy for Ireland in 2015. The strategy aims to ensure compliance with the ELC and contains six main objectives, including undertaking a National Landscape Character Assessment and developing landscape policies.

Although the DoEHLG 2000 guidance remains in draft form, this section of the LVIA has been informed by the landscape assessment guidelines presented in the DoEHLG document as well as a range of other guidelines, which include:

- Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVIA3) (The Landscape Institute/Institute of Environmental Management and Assessment, UK, 2013)
- 'Photography and Photomontage in Landscape and Visual Assessment'; Landscape Institute Advice Note 01/2011 (2011);
- Galway City Development Plan 2017-2023 Study (Galway City Council, 2016)
- Galway City Recreation and Amenity Needs Study (Galway City Council, 2008)

Consideration is also given to the Draft EPA (2017) guidance documents for EIAR.

12.2.2

Baseline Landscape Assessment

As part of this assessment, an initial desk study was undertaken which identified relevant policies and guidelines, both at national and local level. This includes policies on landscape and landscape character, designated landscapes, and protected views. The site and study area are described in terms of landscape character types as identified in 'Landscape and Landscape Assessment: Consultation Draft of Guidelines for Planning Authorities' (DoEHLG, 2000), while the surrounding landscape within 2 km kilometres of the site is described with reference to landscape character as well as other landscape designations contained in the Galway City Council Development Plan 2017 – 2023 and as identified in the DoEHLG 2000 guidelines. In addition, field visits were undertaken to assess the landscape character and elements both on the site itself, and in the wider landscape.

12.2.3

Scope and Definition of Landscape and Visual Impact (LVIA) Study Area

For the purposes of this EIAR, where the ‘proposed development site’ or ‘the site’ is referred to in the LVIA, this relates to the primary EIAR study area for the proposed development, as delineated in green on the EIAR figures (maps). This total area measures approximately 5.3 hectares. The proposed housing development site is discussed in some detail in terms of its landscape character.

The landscape and visual baseline mapping and viewpoint selection are based on a wider study area, consisting of all the area within 2 km from the development site boundary. Due to the scale and nature of the proposed development, impacts beyond 2 km will be either imperceptible or insignificant. This is the area for which the baseline maps and viewpoint locations are produced and is referred to as the Landscape and Visual Impacts (LVIA) Study Area or ‘study area’.

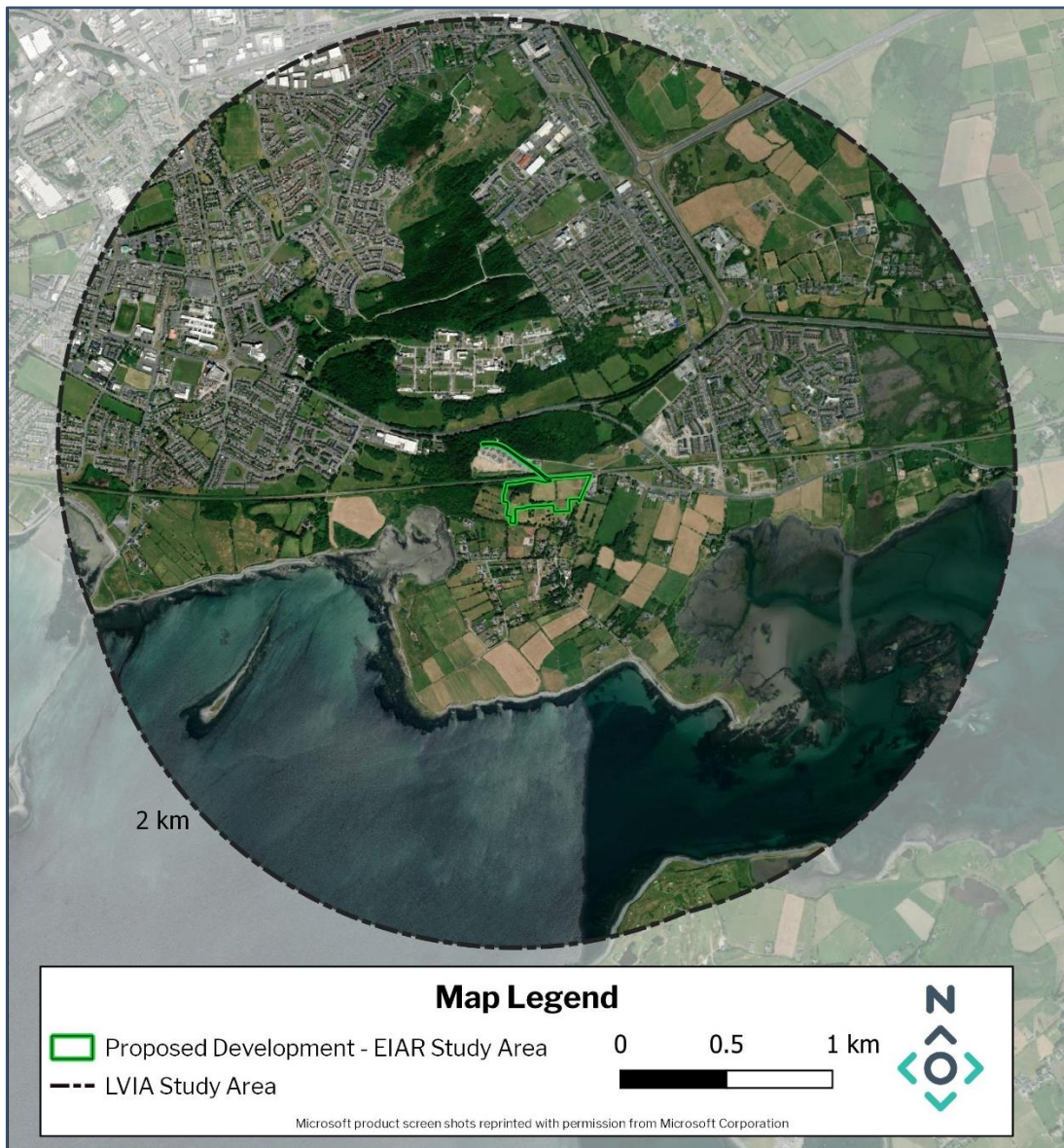


Figure 12-2 Proposed Development and LVIA Study Area

12.2.4 Assessing Landscape Effects

The methodology uses qualitative methods in order to arrive at an assessment, which is based on the Landscape and Landscape Assessment (DoEHLG, 2000) Guidelines as well as the GLVIA3 (LI and IEMA, 2013).

Landscape effects can be described as changes which affect the landscape as a resource. This includes how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects and its landscape character. Landscape effects also relate to changes in the structure of the landscape. Under the GLVIA3 (2013) guidance, the assessment of likely significant effects on landscape receptors includes a judgement on both the sensitivity of the receptor as well as magnitude of the change.

12.2.4.1 Assessing Landscape Sensitivity

Landscape Sensitivity, which is described in the GLVIA3 (2013) as a combination of the landscape’s susceptibility to change as well as the value attached to the landscape

Susceptibility to change can be described as the ability of the landscape receptor (either the overall character, quality of the landscape or a particular landscape feature) to accommodate the proposed development without undue consequences for the maintenance of the baseline (existing) landscape and/or the aims of landscape planning policies and strategies. Landscape value is a combination of values which are assessed in the landscape baseline, including any formal landscape designations.

For the purposes of this LVIA and the assessment of landscape sensitivity, the following landscape sensitivity ratings are assigned to areas in the LVIA study area based on designations in the *Galway City Development Plan 2017-2023* and findings from on-site appraisals during site investigations:

- > Very High
- > High
- > Moderate
- > Low

12.2.4.2 Assessing Magnitude of Change in the Landscape

The magnitude of change in each landscape character area is a combination of the visual presence - size and scale - of the change, the extent of the area to be affected, and the duration and reversibility of the effect. The magnitude of change for each landscape character area was assessed using the definitions outlined in Table 12-1 below.

Table 12-1 Magnitude of Landscape Change Assessment Criteria

Magnitude of Change	Description
Substantial	Where a landscape will experience the loss of key landscape features or the introduction of uncharacteristic additions over a large area. The changes to the landscape are prominent and large in scale. The level of change has an effect on the overall landscape character. The effects are likely long term and may be irreversible.
Moderate	A more limited loss of or change to landscape features over a medium extent which will result in some change to landscape features and aesthetics. Could include the addition of some new uncharacteristic features or elements that would lead to the potential for change in landscape character in a localised area or part of a landscape character area. Would include

Magnitude of Change	Description
	moderate effects on the overall landscape character that do not affect key characteristics. The effects could be long to medium term and/or partially reversible.
Slight	The loss of or change to landscape features of limited extent, or changes to landscape character in smaller areas. Changes would not affect key characteristics. The addition of any new features or elements to the landscape would only result in low-level changes to the overall aesthetics of the landscapes. Changes to the landscape are more evident at a local level and not over a wide geographical area. The effects could potentially be medium to short term and/or reversible.
Negligible	A change affecting smaller areas of landscape character including the loss of some landscape elements or the addition of features or elements which are either of low value or hardly noticeable. The effects could be short term and/or reversible.

12.2.4.3 Landscape Effects Assessment Matrix

The significance of landscape effect was arrived at by combining the magnitude and sensitivity classifications, using the assessment matrix in Table 12-2 below, where landscape sensitivity is shown in the left-hand first column and magnitude of change is shown in the first row at the top of the table.

Table 12-2 Landscape effects significance assessment matrix

	Substantial	Moderate	Slight	Negligible
Very High	Major	Major/Moderate	Moderate	Moderate/Minor
High	Major/Moderate	Moderate	Moderate/Minor	Minor
Moderate	Moderate	Moderate/Minor	Minor	Minor/Negligible
Low	Moderate/Minor	Minor	Minor/Negligible	Negligible

The determination of significance uses a seven-point scale, ranging from Major to Negligible. This seven-point scale is translated to the EPA impact assessment classifications of significance, as outlined in Table 12-6 below in Section 12.2.5.4.

12.2.5 Assessing Visual Effects

Visual effects relate to changes in views and visual amenity of the surroundings of individuals or groups of people. These may result from changes in content and character of views as a result in changes to the landscape. The assessment of visual effects is based on views shown in photomontages as well as actual visibility on the ground.

It should be noted that in assessing visual effects, there are different types of visual effects:

- Visual obstruction: This occurs when there is an impact on a view which blocks the view
- Visual intrusion: This occurs when there is an impact on a view but which does not block the view.

Visual effects relate to changes in views and visual amenity of the surroundings of individuals or groups of people. These may result from changes in content and character of views because of changes to the landscape. The significance of the effect on visual receptors is a combination of the sensitivity of the receptor as well as the magnitude of the change.

12.2.5.1 Viewpoint Selection

A step-by-step process was followed in selecting appropriate photomontage locations. The first step was to select a number of representative locations following a detailed desk top study of mapping. These locations were based on the following criteria:

- Potential visibility of the development site;
- Critical landscape designations e.g. views and prospects, scenic routes, areas classed as sensitive;
- Proximity to receptors such as settlements or groups of residential dwellings;
- Within public areas or on public roads, particularly more trafficked routes;
- Views that cover a wide area in terms of geographical location, elevation and varying distance from site.

Finally, following a site visit, to assess visibility on the ground, a total of 5 no. locations were identified as suitable viewpoints for photomontage production. The locations provide a representative range of local views.

12.2.5.2 Visual Receptor Sensitivity

Visual Receptor Sensitivity depends on the occupation or activity of the people, as well the extent to which the attention is focused on views and visual amenity, according to the GLVIA Guidelines (2013). Visual receptor sensitivity is assessed as either being High, Medium or Low, based on the definition of descriptions and examples set out in Table 12-3 below.

Table 12-3 Visual Receptor Sensitivity Assessment Criteria

Sensitivity of Visual Receptor(s)	Description
Very High	Included in this category are viewers that are primarily focused on views from this particular location, such as visitors to popular destinations identified for their outstanding views or residents in close proximity or medium proximity whose primary views will be in the direction of the development.
High	Includes viewers at designated views or landscapes. Viewers such as residents in medium proximity to the viewpoint; viewers at well-known heritage or popular tourist or recreational areas, viewers along scenic or tourist routes
Medium	Includes viewers who may have some susceptibility to a change in view, such as those from views which are not designated but may have local recreational uses or those travelling along routes or at view which are considered moderately scenic.
Low	Includes viewers engaged in activities where the focus is not on the landscape or view. These including those travelling along a busy route, viewers at work or engaged in sport not related to views or experience of the landscape.

12.2.5.3 Magnitude of Visual Change

The magnitude of the visual change resulting at each viewpoint is a combination of scale of the change, the extent of the area to be affected and the duration and reversibility of the effect, determined by reviewing the photomontage and wireframe images for each viewpoint. The magnitude of change is determined in accordance with the definitions and descriptions included in Table 12-4 below.

Table 12-4 Magnitude of Visual Change Assessment Criteria

Magnitude of Change	Description
Substantial	Substantial change, where the proposals would result in large-scale, prominent or very prominent change, leading to substantial obstruction of existing view or complete change in character and composition of the baseline through removal of key elements or addition of uncharacteristic elements which may or may not be visually discordant. This includes viewpoints where the proposed development is fully or almost fully visible over a wide extent, at close proximity to the viewer. This change could be long term or of a long duration.
Moderate	The change in the view may involve partial obstruction of existing view or partial change in character and composition of the baseline through the introduction of new elements or removal of existing elements. Likely to occur at locations where the development is partially visible over a moderate or medium extent, and which are not in close proximity to the development. Change may be readily noticeable but not substantially different in scale and character from the surroundings and wider setting.
Slight	The proposals would be partially visible or visible at sufficient distance to be perceptible and result in a low level of change in the view and its composition and a low degree of contrast. The character of the view may be altered but will remain similar to the baseline existing situation. This change could be short term or of a short duration.
Negligible	Any change would only be barely distinguishable from the status quo “do-nothing scenario” in the surroundings. The composition and character of the view would be substantially unaltered, approximating to little or no change.

12.2.5.4 Visual Effects Assessment Matrix

Table 12-5 below shows the significance of visual effects, arrived at by combining the visual receptor sensitivity and the magnitude of change classifications. Visual receptor sensitivity is shown in the left-hand first column and magnitude of visual change is shown in the first row at the top of the table.

Table 12-5 Visual effects significance assessment matrix

	Substantial	Moderate	Slight	Negligible
Very High	Major	Major/Moderate	Moderate	Moderate/Minor
High	Major/Moderate	Moderate	Moderate/Minor	Minor
Medium	Moderate	Moderate/Minor	Minor	Minor/Negligible
Low	Moderate/Minor	Minor	Minor/Negligible	Negligible

The determination of significance uses a seven-point scale, ranging from Major to Negligible. This seven-point scale is translated to the EPA impact assessment classifications of significance, as outlined in Table 12-6 below.

Table 12-6 EPA Impact Assessment Significance Classification for Landscape and Visual Effects

Matrix Classification Significance	EPA Significance Classification	EPA (2017) Definition of Significance
Major	Profound	An effect which obliterates sensitive characteristics
Major/Moderate	Very significant	An effect, which by its character, magnitude, duration or intensity alters most of a sensitive aspect of the environment
Moderate	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Moderate/Minor	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
Minor	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Minor/Negligible	Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Negligible	Imperceptible	An effect capable of measurement but without significant consequences

12.2.5.5 Residual Visual Effect

After determining the significance of the visual effect using the above visual effects assessment matrix, mitigating factors are taken into consideration to arrive at the final residual effect.

12.2.5.6 Photomontage Production

Photomontages are photorealistic visualisations that superimpose an image of the proposed Development upon a photograph or series of photographs. They are intended as graphical representations of how a proposed development will appear in the existing landscape and are used as a tool to inform the LVIA process.

Verified photomontage imagery has been produced by integrating a 3D architectural model of the proposed development (provided by the architect in AutoCAD format) within a GPS validated model of the landscape from a high-resolution topographical survey. Images were captured from a height of 1.7 metres and a rendering has been applied to the imagery that best represents the proposed materials from which the proposed development will comprise in the light conditions when the photomontage was captured.

Photomontage visualisations can never show exactly what the proposed development will look like in reality due to factors such as; atmospheric lighting and weather conditions which vary through time and

season. Where possible, photomontage viewpoints are chosen to show open views of the proposed development, however, in reality they are representative of viewing conditions encountered; in many instances, some or all of the proposed development is screened from view by intervening vegetation, topography or built form existent within the baseline landscape.

The images provided give a reasonable impression of the scale of the development and the distance to the development, however, there are likely to be minor inaccuracies. It is recommended that decision-makers and any interested parties or members of the public should ideally visit the viewpoints on site, where visualisations (photomontages) can be compared to the 'real life' view, and the full impact of the proposed development can be understood.

The following images are shown in the Photomontage Booklet for each viewpoint location (1-5):

- **Existing View:** Shows the baseline landscape/streetscape conditions as it currently exists in a do-nothing scenario.
- **Outline View:** Shows a yellow outline of the proposed development within the current view. The outline indicates the physical position and scale of the proposed development irrespective of screening.
- **Proposed Photomontage** (labelled 'Montage View' in the images): Shows a scaled render of the proposed development within the current landscape/streetscape. Red wirelines indicate areas where the ridge line of the proposed development exists when it is screened by intervening structures and / or vegetation.

Photomontage images have been produced with reference to best practice and the following industry guidelines:

- Visual Representation of Development Proposals', Landscape Institute, Technical Guidance Note 06/19, 17 September 2019; and
- Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3), (Landscape Institute and Institute of Environmental Management and Assessment, 2013).

Photomontages are displayed in the photomontage booklet which forms Volume 2 of this EIAR. An assessment of the visual effects of the proposed development from each of the five photomontages is included in Section 12.4.3 of this chapter.

12.3 Landscape Baseline

This section of the LVIA identifies and describes landscape policy designations and sensitive landscape receptors located in the LVIA Study Area (within 2 km from the Development site boundary). The receiving landscape of the development site and surrounding areas are also described in terms of their landscape character and landscape value.

12.3.1 Policy Context: Galway City Council Development Plan 2017-2023

The Galway City Development Plan 2017-2023 (GCDP) sets out policies and objectives for the city. Chapter 4 of the GCDP contains specific landscape related zoning, policies and objectives. These include recreation and amenity land use zoning and associated objectives as well as proposed greenways in the city and protected views.

The Galway City Development Plan 2017-2023 (GCDP) sets out an overall strategy for the proper planning and sustainable development of the administrative area of Galway City Council.

“Policy 2.6 Ensure a balance between the reasonable protection of the residential amenities and the character of the established suburbs and the need to provide for sustainable residential development.”

12.3.1.1 GCDP - Landscape Zoning and Designations

There are currently no landscape designations within the proposed site. Chapter 11 of the GCDP discusses the land use zoning objectives and development standards and guidelines, the location of the designated zoning within the LVIA Study Area is illustrated in Figure 12-3 below.

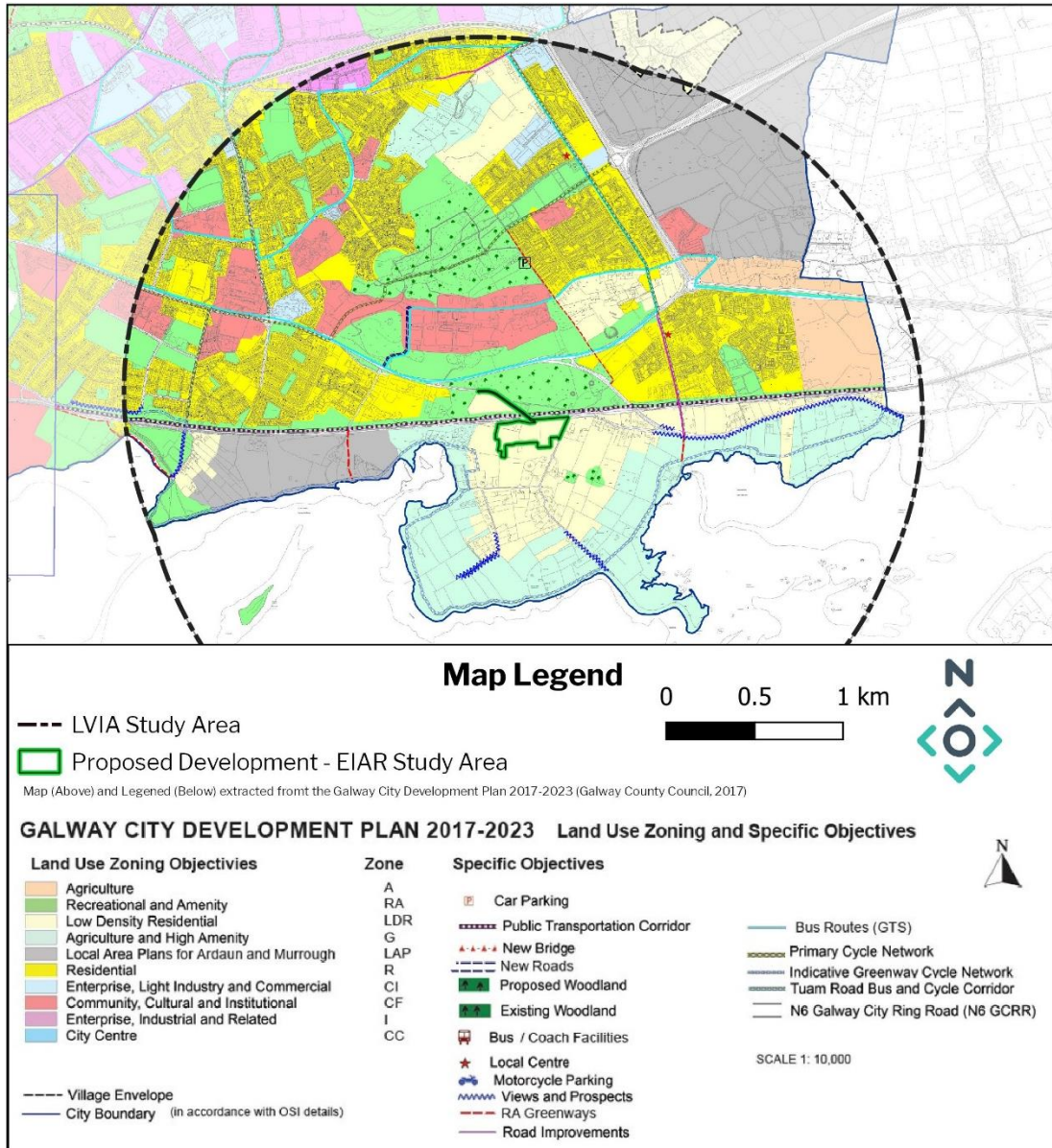


Figure 12-3 The Proposed Development, LVIA Study Area and the Land Use Zoning Map extracted from the 'Land Use Zoning and Specific Objectives' Figure in the GCDP (Galway County Council, 2017).

As shown in Figure 12-3 above, the site is located in a 'Low Density Residential' (LDR) zone. This residential zone is called 'LDR Roscam Pitch and Putt and adjacent lands', this zone is shown in Figure 12-4 (right) which has been extracted from the GCDP.

Three objectives are given for these subject lands in the GCDP (area shown in Figure 12-4); the following objective specifically pertains to landscape: *"This layout will have regard to the sylvan character of the site, and where appropriate the protection of existing trees and the Roscam Folly".*



Figure 12-4 Map of Area designated as Low Density Residential Housing Development at 'LDR Roscam Pitch and Putt and adjacent lands' (Figure 11.13 in the GCDP)

The following policy item (Policy 2.9 of the CDP) applies to ‘Low Density Residential Areas’:

“Protect the character of these areas by ensuring new development has regard to the prevailing pattern, form and density of these areas.”

“Protect the characteristics of these areas through development standards and guidelines.”

As shown Figure 12-3, the proposed development is surrounded by LDR zoning to the east, south and west. The preservation of the character in terms of landscape and housing is imperative to this proposed development.

Lands immediately north of the proposed development are zoned as Recreational and Amenity Areas (areas in green) in Figure 12-3. These Recreational Amenity areas primarily comprise woodlands such as Aunteen Woods (north); Uncleen Woods (north-west) and Merlin Woods north of the R338 Regional Road (Dublin Road). The following objective is stated in relation to Residential Amenity zoning in Section 11.2.2 of the GCDP.

Zoning Objective RA: *“to provide for and protect recreational uses, open space, amenity uses and natural heritage”.*

Other land use zoning in the LVIA Study Area includes ‘Agriculture and High Amenity’, shown as Zone G (light blue) in Figure 12-3 above. These areas are located to the west, south and east of the proposed development, along the coastline of Galway Bay. Areas zoned in the GCDP as Agriculture Areas G align with the following Objective:

Zoning Objective G: *“provide for the development of agriculture and protect areas of visual importance and/or high amenity”*

The Zone G areas in the LVIA Study Area are of high visual importance on account of the scenic amenity afforded by the coastal areas of Galway Bay (blue space) south of the site. These areas are therefore deemed to be landscape of high sensitivity. Although visibility is expected to be very limited, the potential for adverse landscape and visual effects as a result of the proposed development is assessed from these ‘Agriculture and High Amenity’ zones later in this chapter (Section 12.4.1).

12.3.1.2 GCDP - Protected Views

Section 4.5.3 of the GCDP is dedicated to the protection of views ‘*due to their distinctive scenic amenity, aesthetic or cultural value*’, although it is acknowledged ‘*that views are not static and some changes in a view can be absorbed without visually depreciating the integrity of the view*’.

Policy 4.5.3 relating to Protected Views of Special Amenity Value and Interest of the GCDP states:

“Protect views and prospects of special amenity value and interest, which contribute significantly to the visual amenity and character of the city through the control of inappropriate development.

Require landscaping schemes as part of planning applications to have regard to such views and limit any planting which could have a detrimental impact on the value of protected views.”

Galway City Council identifies two categories of protected views: linear and panoramic. There are no protected views within the site boundary of the proposed development. However, there are protected views within the study area, located within 2 km from the proposed development. These scenic views are illustrated and identified in Figure 12-5 (below) and are described in the GCDP as:

- **V8** Seascape views of Galway Bay from the old Dublin Road to the city boundary.

- > V9 Views towards the sea at Roscam.
- > V13 Seascape views of Galway Bay at Ballyloughane from south of the railway bridge.

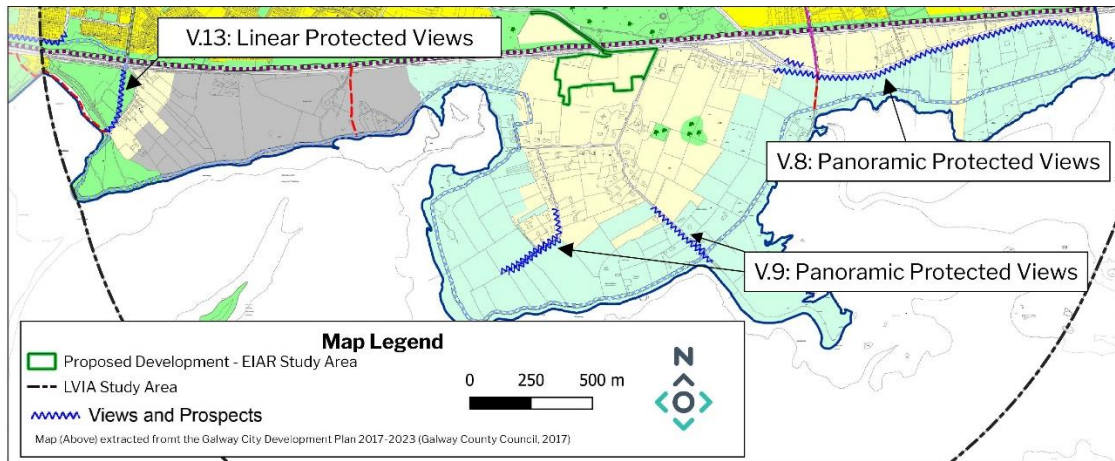


Figure 12-5 Designated Views and Prospects within the LVIA Study Area – extracted from the ‘Land Use Zoning and Specific Objectives’ Figure in the GCDP (Galway County Council, 2017)

V8 and V9 are panoramic protected views and V13 is a linear protected view. The value of all three designated views is attributed to the scenic amenity of the coastline and Galway Bay. Therefore, the focus of all three views is in an offshore direction away from the proposed development site (south, south-east and south-west). Considering the geography of these views in relation to the site (Figure 12-5) and their described directional focus, the proposed development will not intrude upon any of these protected views. Actual visibility of the proposed development from these views is assessed in Section 12.4.1 of this Chapter – *Visibility of the Proposed Development*.

12.3.1.3 GCDP - Green Network

Chapter 4 of the GCDP states that the aim is ‘to provide a green network for the city that will allow for sustainable use, management and protection of natural heritage, recreation amenity areas, parks and open spaces in an integrated manner’. The plan goes on to list the spaces in the city that form the Green Network.

- > “Blue Space of the city’s coastal areas, rivers, lakes and canals,
- > Protected Spaces of ecological and biodiversity importance,
- > Green spaces of woodland parks,
- > Open Spaces including recreational and amenity and agricultural zoned lands and,
- > Community Spaces, which afford direct access by the community to nature and amenity e.g. greenways.”

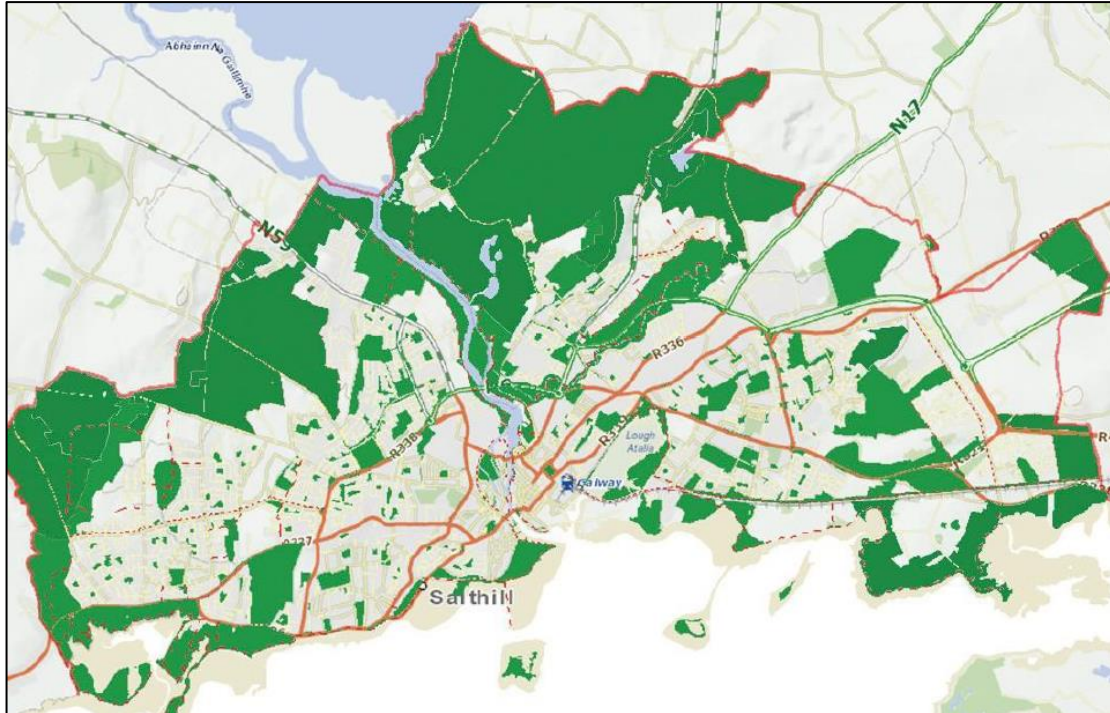


Figure 12-6 Galway City Green Network (Source: Galway City Development Plan)

The Galway City Council published the Recreation and Amenity Needs Study in 2008, conclusions of which have since been adopted into the current GCDP. This study established a hierarchy of parks provision within the city, including; Citywide Parks, Neighbourhood Parks and Local Parks. The nearest of the Citywide Parks is Merlin Park Woods approximately 1km north of the proposed development site boundary.

12.3.1.4 Greenways

Greenways are also mentioned as established or potential amenity corridors for non-motorised travel (pedestrian and cyclists). Three RA greenway routes exist in the LVIA Study Area;

- A fully developed route at Ballyloughane beach, approximately 1.85 km west of the site;
- A small undeveloped route south of the trainline in the townland of Murrough, approximately 850 metres west of the proposed development.
- A semi developed route on the Doughiska road north and south of the intersection with the Old Coast Road, approximately 650 metres east of the proposed development.

On-site appraisal determined that there would be no visibility of the proposed development from the three aforementioned RA greenway routes. The proposed development will not inhibit any future development or intrude upon the amenity of these greenway corridors.

It is a short-term objective of the GCDP to “Facilitate the extension of existing coastal greenway and linkages from Bearna to Oranmore” and a Medium/Long term goal to develop a greenway “Extending from Galway Docks to Roscam Point”. The proposed route of this coastal greenway is shown in Figure 12-3 above as the ‘Indicative Greenway Cycle Network’, it traces the coastline to the south of the site and comes within approximately 130 metres from the western extent of the site. The proposed public footpath oriented east to west along the northern extent of the site (shown in the landscaping plan - Figure 12-1, above) could potentially link up with this proposed greenway route and provide safe non-motorised access to the greenway from residential amenity in the area.

Actual visibility of the proposed development from Merlin Woods and the proposed greenway route assessed in Section 12.4.1 of this Chapter – *Visibility of the Proposed Development*.

12.3.1.5 Walking Routes, Tourism Routes and Cycleways

Galway City Development Plan outlines the importance of walkways and cycleways within the city environs. The walking routes and cycle routes listed below all fall within a 5 km radius of the proposed site. It is a policy of the council to (Policy 3.6):

“Support the Galway Transport Strategy proposals for a primary cycle network to facilitate safe and convenient medium distance journeys.

Support the proposed Greenways as part of the primary cycle network and as part of a link to Beama, Oranmore, Maigh Cuilinn and Oughterard

Promote the implementation of a Wayfinding Scheme with provision of directional information and signage at appropriate locations across the city as part of a greater public realm strategy.”

Objective RA6 in the Development Plan notes the following:

“Prohibit the intrusion of development along public walking routes and public rights of way, particularly those in scenic areas, the sea-coast and along inland waterways.”

The following trails and cycleways are the closest to the site.

The Wild Atlantic Way is a tourism trail on the west coast, and on parts of the north and south coasts, of Ireland. The 2,500 km driving route passes through nine counties and three provinces, stretching from County Donegal's Inishowen Peninsula in Ulster to Kinsale, County Cork, in Munster, on the Celtic Sea coast. One section of this trail is approximately 280 metres north-east of the proposed site at its closest point on the Coast Road. On-site appraisal determined that there would be very limited visibility from this route.

Aunteen Woods contains a recreational walking trail, immediately north of the development site. As these trails are located within dense woodland, visibility of the proposed development will be very limited. Plate 12-1 below shows that there is likely to be some limited visibility of the proposed site from within the Car Park off the Rosshill Road. It is unlikely that the proposed development will intrude upon or detract from the recreational value of these trails.



Plate 12-1 View towards the Proposed Development from the Car Park at Aunteen woods, off the L5037 Rosshill Road.

12.3.2 Landscape Character

Landscape character refers to the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how people perceive this. It reflects particular combinations of geology, landform, soils, vegetation, land-use and human settlement, and creates the particular sense of place found in different areas.

12.3.2.1 Landscape Character of the Proposed Development Site

The greenfield site comprises an area of approximately 4.704 ha of pasture located within the townlands of Roscam and Merlin Park to the south east of Galway City. Mature native woodland is a prominent feature of the site, contributing to it being perceived as a landscape of Sylvan character. The proposed development site and the general area is rural in character; however, low-density residential settlements comprise much of the surrounding lands within 500 metres to the south, east and north-west of the site.



Plate 12-2 Landscape of Sylvan Character

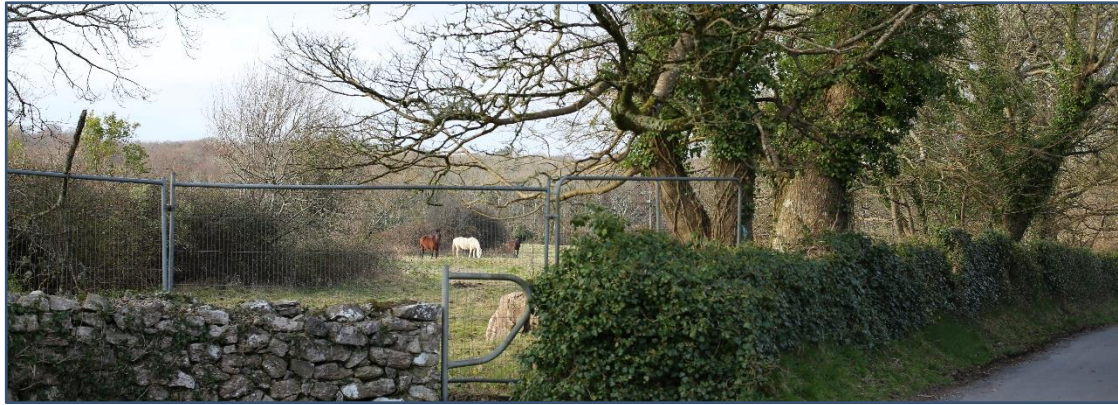


Plate 12-3 Horses grazing in the fields at the east of the site.

Landcover and Land Uses

The land cover of the site primarily comprises open fields of semi-improved agricultural grassland enclosed by scrub and mature trees. The grasslands consist of species poor dry neutral grassland, these are currently used as grazing pasture for horses (see Plate 12-3) belonging to a Stud Farm located on the southern boundary. Lands immediately surrounding the site to the south and south-west was previously used as a par 3 golf course, which ceased operation in the early 2000's. The linear lines of mature trees and scrub was artificially managed where field borders and different holes of the golf course were aligned, as is evidenced by the plan view design of the receiving landscape in Figure 12-7 and aerial imagery in Figure 12-8 (below).

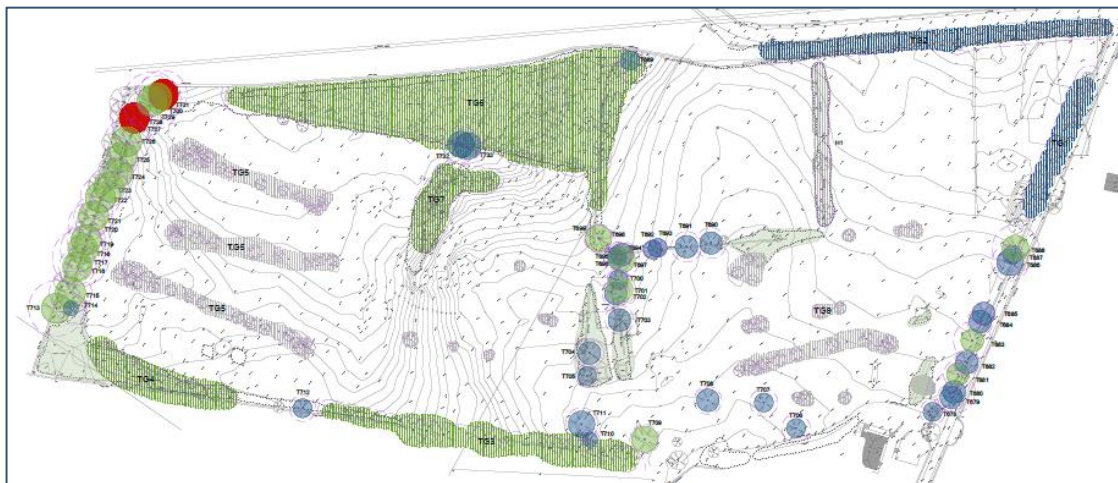


Figure 12-7 Extract from the 'Tree Constraints Drawing' (Cunnane Stratton Reynolds), showing the spatial arrangement of trees, plants and topography of the receiving landscape.

Scattered native and non-native trees are present throughout the site. A number of relatively immature trees are located to the southeast of the site. Treelines comprised predominantly of mature and immature ash, sycamore and beech demarcate the southern, eastern and part of the northern boundaries of the development site. The field boundaries in the centre and east of the site are delineated by dry stone walls, as well as hedgerows of blackthorn and treelines predominantly comprising ash.



Figure 12-8 Aerial Imagery of the Proposed Development Site (Source: Bing Maps, Microsoft product screen shots reprinted with permission from Microsoft Corporation).

There is evidence of ground works or disturbance in the north-eastern corner of the site as evidenced by the rock and rubble shown in Plate 12-5 and a trench in Plate 12-6 (seen below).



Plate 12-4 View across the proposed site to the south-west from the north eastern boundary.



Plate 12-5 View west from the norther eastern boundary of the site



Plate 12-6 View to the south from the northern boundary of the site.

A large cluster of mature native woodland (Oak, Ash and Hazel) is located at the north-western boundary of the site (top left of the red line boundary in Figure 12-8). A primary principle of the landscape design philosophy for the proposed development is to retain the best of the existing high value trees present on the site in order to retain the Sylvan landscape character whilst promote biodiversity and habitat value within the proposed development. Land-use on the site is limited to agricultural grazing pasture. Aside from occasional dog-walkers, the site holds no significant recreational amenity value. No landscape or environmental designations apply to the site.



Plate 12-7 Mature native woodland located at the north-west of the site.

Topography and Drainage

Although the area surrounding the proposed development site can be described as generally flat or gently undulating, some substantial height variation occurs within the site itself. Figure 12-9 and Figure 12-10 (below) show the elevation gradients existent within the proposed development site. The most easterly field of the site slopes gently from elevated ground in the south to areas of lower elevation along the northern boundary (See Plate 12-5 and Plate 12-6 above). The northern perimeter comprises a steep embankment down to the L5037 Rosshill Road as shown in Plate 12-8 below.

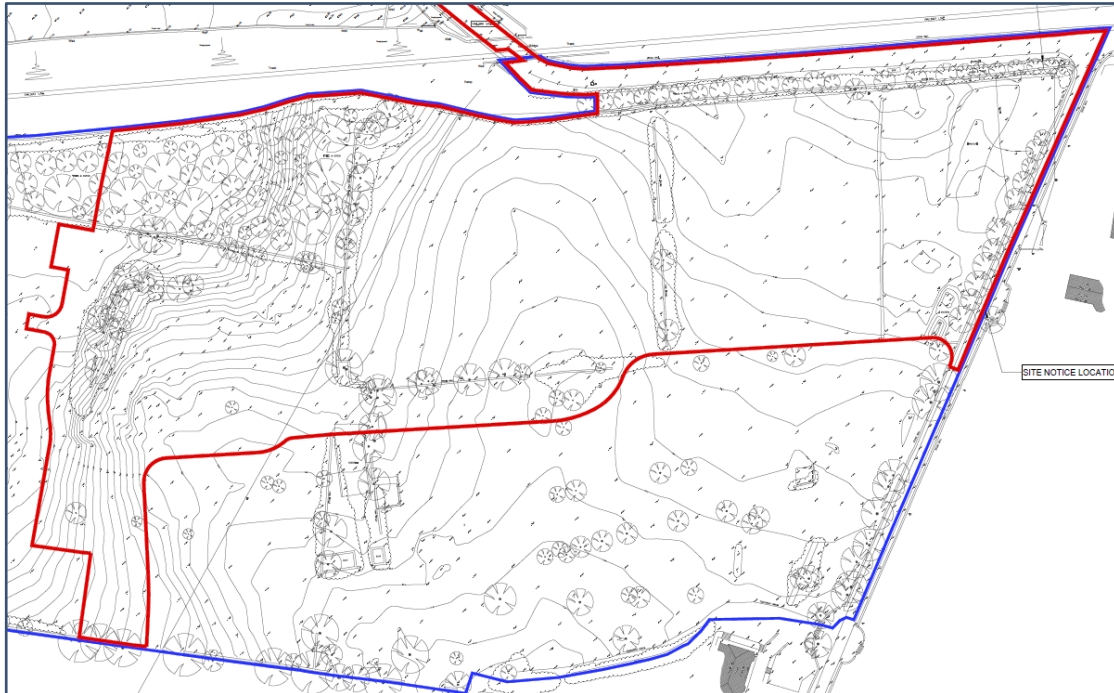


Figure 12-9 Topographical Survey (Source: 'Overall Existing Site Survey' - O'Neill O'Malley Ltd, 2019)

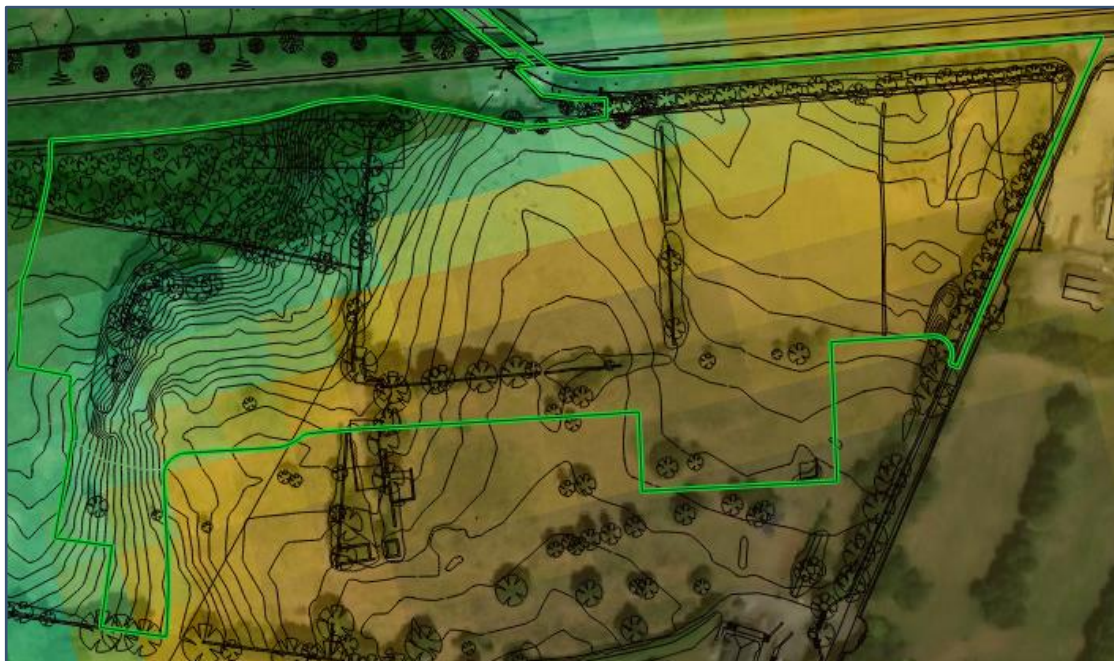


Figure 12-10 Indication of Topography Gradients: Brown = higher elevation; Green = Lower elevation.



Plate 12-8 Steep embankment along the northern boundary of the site on the Rosshill Road.

The highest elevation within the red line boundary is in the southern part of the central field, views to the north-east from this location are shown in Plate 12-9 below. The steepest elevation gradients exist in the western portion of the site, where the landform slopes down to the woodland in the north-western extent of the site. Every effort has been made to incorporate the existing landform and topography into the design of the Landscaping Plan, as this is a critical to achieving successful tree retention. Figure 12-11 shows a side sectional view of the Proposed Development Design, the left of the section shows how the existing embankment visible in Plate 12-9 will be incorporated into the view.

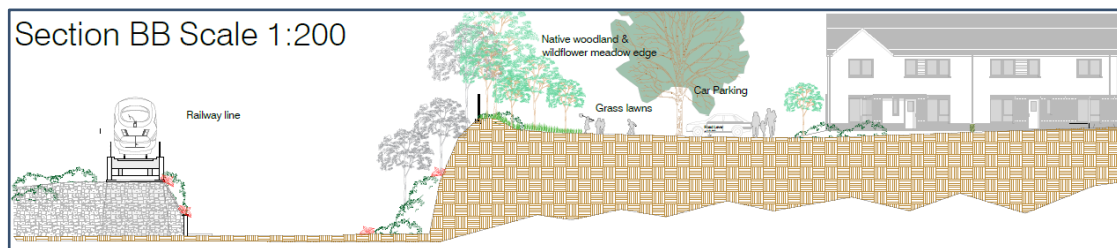


Figure 12-11 Extract from the 'Land Planning and Design' drawing (Cunnane Stratton Reynolds), showing the plan to keep existing topography.

There are no watercourses on the site and drainage is generally a product of the localised topography. The site appears to be well drained from observations during the site visit. No evidence of water-logging apart from a small area in the northeast corner of the site.

Small stream channels can be seen along the Rosshill beach which emerges ~ 300m west of the western boundary of the site. It is likely that runoff is flowing along the field boundaries and discharging to Galway Bay at this point. Further information relating to drainage can be found in Chapter 8 of this EIAR.



Plate 12-9 View to the north-east from the elevated land at the south and centre of the Development Site.



Plate 12-10 View to the north from the south-west corner of the development site, a relatively steep east to west gradient.



Plate 12-11 The steep embankment at the western boundary of the development site.

12.3.3 Character of the Surrounding Landscape

Landscape to the North

The landscape to the north of the site is less rural in nature due to the presence of transport infrastructure, housing developments and its closer proximity to Galway City. The proposed site is located immediately south of the L5037 the Rosshill Road, which connects to the Old Dublin Road (R338) in the west and the Coast Road in the east. Immediately north of the site, the Galway to Dublin trainline passes east to west along the whole extent of the northern perimeter. The Ross Alta residential development is currently under construction to the north of the train line, north-west of the proposed development.



Plate 12-12 View to the south-east along the Rosshill Road, Galway-Dublin trainline crosses the bridge in the centre of the image and the (under construction) Ross Alta development is seen to the right of the road.

Aunteen woods and recreational walking trails are located beyond the Rosshill road to the north, as well as Merlin Park, Merlin Woods and Merlin Park Hospital which are located to the north of the Dublin road. Due to substantial screening afforded by these dense woodlands, there is no feasible visibility of the site from the Dublin Road or any other areas north or north-west of the site beyond 500 metres from the site boundary. Most open visibility of the site from the north and north-west only occurs in the view shown in Plate 12-12 above.

Landscape to the South, West and East

Plate 12-13 shows low density residential housing to the south of the site along the L50371 local road. A stone walled folly and an operational stud farm are also located at the eastern end of this road.



Plate 12-13 Residential houses on the L50371 Local road, south of the site.

The landscape to the south-east is sparsely settled agricultural land to the east (Plate 12-14). Very little settlement exists beyond 1km to the south and south-west, where the agricultural and coastal landscape is strongly influenced by Galway Bay. Areas of historical significance lie directly south by the bay, as a Round Tower and the ruins of the Roscam Abbey Church reside there.



Plate 12-14 Agricultural lands to the south-east of the LVIA Study Area.

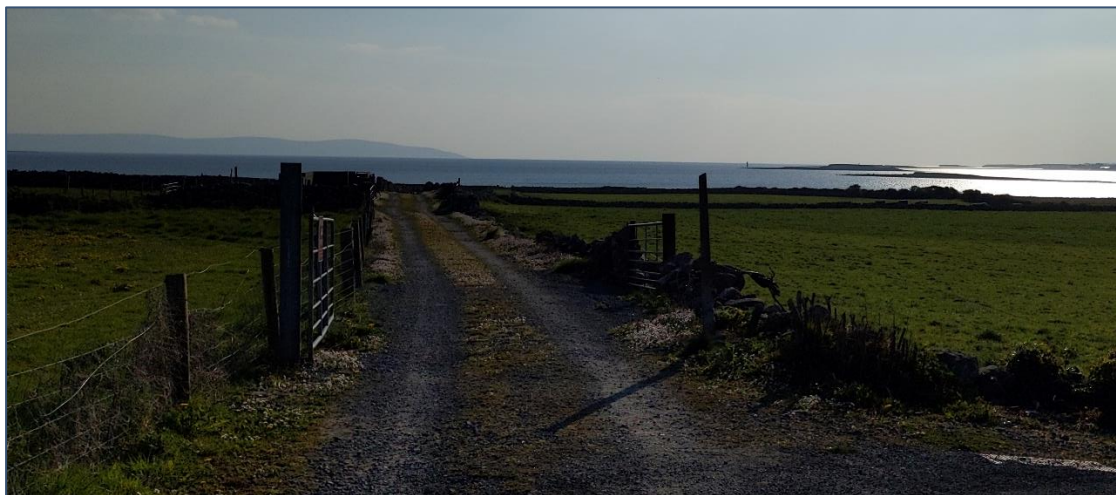


Plate 12-15 Sparsely settled, agricultural and coastal landscape approximately 600 metres south-east of the Proposed Development

On-site assessments determined that there will be very limited visibility from any areas beyond 100 metres south, west and east of the site due to screening from localised topography, mature woodland and other vegetation.

The proposed development will not intrude upon or impact the valuable scenic amenity in the rural and coastal landscape south of the site.

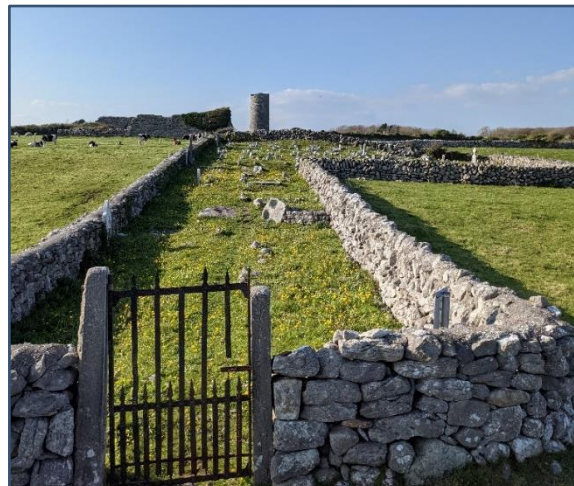


Plate 12-16 View looking towards the Proposed Development from Roscam Round Tower and the Ruins of Roscam Abbey

12.3.4 Landscape Value

In order to determine the landscape sensitivity, and ultimately the likely significance of the effects, assessments of landscape value for the proposed development site and wider (LVIA) study area were assessed. Landscape value includes designations such as scenic views and sensitivity designations found in Development Plans, as well as values which are attached to undesignated landscapes. A number of criteria were developed in order to assess the landscape values of the study area. These then contribute to the assessment of landscape sensitivity.

Table 12-7 Indications of Landscape Value

Feature	Description
Landscape Designations	The proposed development site is zoned as 'Low Density Residential' with a variety of zonings in the wider LVIA study area. There are no protected views within the proposed site. However, there are three protected views within the study area as set out in Galway City Development Plan 2017-2023 (V8, V9 and V13). Merlin Park Woods, situated approximately 1 km north of the proposed site, is one of three parks described in the CDP as Citywide Parks. Three RA greenway routes are also located within the LVIA Study Area as well as a prospective greenway route, shown in the 'Land Use Zoning and Specific Objectives' Map, to the south-west of the proposed development site. The proposed development will not be visible from any of the protected views, greenway routes or the Citywide Park.
Landscape Elements Quality/Condition	This refers to the physical state of the landscape and the condition of individual elements. The site in its current state is in good condition acting as a green field site with plentiful vegetation. There are limited attractive landscape elements other than a number of mature trees. Site vegetation mainly consists of rough grassland with area of semi-mature trees and shrubs and in itself is not of high landscape value.
Aesthetic Qualities	Due to the relatively enclosed nature of the site, only short-range views are available due to the screening from mature treelines and other vegetation that bound the perimeter of the site. From elevated vantage points at the south-western extent of the site, there are occasional short-distance views of some aesthetic quality towards Galway Bay to the south and south-west. However, in general, views within the site have limited aesthetic quality.
Wildness/naturalness	There is some sense of naturalness on the site due to the vegetation on the site and its proximity to woodland, however, with the number of developments surrounding the site the sense of wildness and naturalness has been diluted.
Rarity/Conservation Interests	There are no rarity/conservation interests on the development site. See Chapter 5 of the ELAR for further information.
Cultural Meaning/Associations	There are no cultural associations on the development site. A Folly (protected structure, See Chapter 11 – <i>Cultural Heritage</i>) exists approximately 105 metres south of the site boundary. Visibility of the proposed development from the Folly will be substantially screened from view by intervening vegetation. A round tower and the ruins of Roscam Abbey Church (See Plate 12-16 above) approximately 750 metres south of the proposed site boundary, which holds cultural and historical meaning

Feature	Description
	and associations. There is no expected visibility of the Proposed Development from these sites. See Chapter 11 of the EIAR for further information on Cultural Heritage.
Recreation Value	The site itself is privately owned and not currently used for recreation. The closest amenity facility would be the Merlin Park Woods directly north of the proposed site and the recreational trails at Aunteen woods.

In consideration of the indicators detailed in Table 12-7 above, and taking the landscape policies from the Galway City Development Plan into account, the landscape value of the site is deemed to be **Moderate**.

12.4 Visual Baseline

This section of the LVIA establishes the likely visibility of the proposed development from landscape and visual receptors located in the LVIA Study Area. This includes a description of views towards the proposed development from a variety of perspectives which informed the selection of Photomontage viewpoints. Certain areas were screening out from assessment where it is very unlikely that any visibility will occur due to factors such as screening from vegetation, localised topography and built form. Section 12.4.3 includes a description of the five viewpoints selected for the production of photomontages, from which visual impact assessments were conducted.

12.4.1 Visibility of the Proposed Development – Views Towards the site.

A site visit was conducted during April 2021, visibility was appraised from all of the local and regional roads surrounding the site and sensitive receptors and landscape policy designations identified in the previous section of this chapter - *Landscape Baseline*.



Figure 12-12 Plate/Image Capture Locations.

Visibility from GCDP Designations

On-site assessments determined that there is no visibility of the proposed development from the High Amenity areas around Merlin Woods due to the screening from dense Woodland to the south. There is also very limited visibility from Uncleen Woods and Aunteen woods. The proposed development will be partially visible down the Rosshill Road (L5037) at the southern entrance to Aunteen woods, this view is shown in Plate 12-12 (seen previously in Section 12.3.3).



Plate 12-17 View to the north from the L5037 Rosshill Road and Ross Alta Housing Development – Dense Woodland of Aunteen Woods seen in the background of the view.

Plate 12-17 (above) shows a view to the north, away from the proposed development from the L5037 Rosshill Road. Aunteen Woods are seen in the background, the dense woodland significantly screens views towards the proposed development from the R338 Old Dublin Road and Merlin Park Woodlands which is located beyond the trees.

Plate 12-18 (below) shows the view towards the proposed development from the most westerly extent of designated Protected View V8 at the junction between the Coast Road and L5037 Rosshill Road. The proposed development will be completely screened from view by residential houses and distant vegetation. The proposed development is located at lower elevation than the viewpoint shown in Plate 12-18, therefore, it is highly unlikely that even the highest ridgelines of the proposed development will be visible above the screening from this location. Plate 12-19 shows the view to the east from this junction in the opposite direction from the proposed development where there are ‘Seascape Views of Galway Bay’. Therefore, the proposed Development will have no effect on the scenic amenity of this designation.



Plate 12-18 View west towards the Proposed Development at the junction between the Coast Road and Rosshill Road at the western extent of the GCDP Protected View V8.



Plate 12-19 View to the east at the junction between the Coast Road and Rosshill Road at the western extent of the GCDP Protected View V8.

The Coast Road seen in Plate 12-19 forms part of the Wild Atlantic Way. As shown in the image, this section of road near the coast is at a low elevation compared to the location of this viewpoint. There will be no visibility from this road towards the proposed Development due to substantial screening by the landform of higher ground where this image was captured.

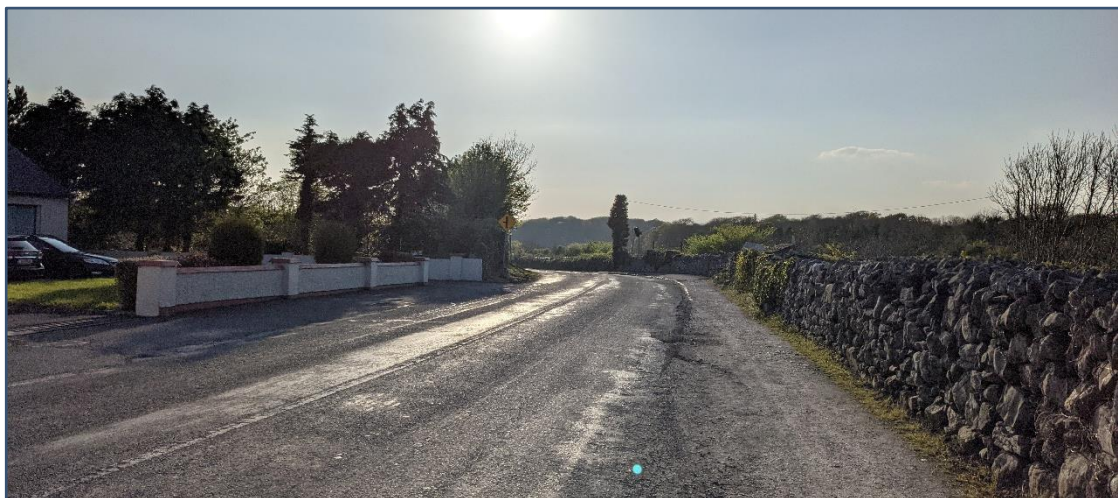


Plate 12-20 View towards the Proposed Development from the L5037 Rosshill Road, 160 metres east of the proposed development

There is very limited visibility of the proposed development as one travels east along the L5037 Rosshill Road from the Coast Road. As shown in Plate 12-20 mature treelines and residential houses will screen views up until the road turns down a small hill within 100 metres of the site.

Designated Protected Panoramic View V9 is described as ‘Views towards the sea at Roscam’ in the GCDP. These views (as shown in Figure 12-5) are located on two separate forks of the L50371 Local road south-east and south-west of the site. As the description suggests these views are directed offshore towards Galway Bay and not inland in a northerly direction towards the proposed development. As shown in Plate 12-21 and Plate 12-22 the topography and vegetation is such that only enclosed, short-distance views are available towards the proposed development from designated V9 protected views. It is unlikely that the proposed Development will be visible from these locations.



Plate 12-21 View north-east from Protected V9 (south-western fork) towards the Proposed Development



Plate 12-22 View north-west from Protected V9 (south-eastern fork) towards the Proposed Development.

Due to distance and screening from topography no visibility will occur from the Linear Protected Views V13 at Ballyloughane. On-site appraisals also determined that there is likely to be no visibility and no visual effects from other designation such as the RA Greenway routes or designated walking trails identified in the Landscape Baseline.

Visibility from Receptors in the wider LVIA Study Area.

Dense road-side vegetation precludes visibility of the housing development from a majority of the roads within the LVIA Study Area. Due to the topography of the surrounding area and the site itself, there are limited areas where visibility is expected. The land tapers down-hill to the coast in a southerly, south-easterly and south-westerly direction from the site, therefore, any elements of the landscape such as treelines, localised undulations in the landform and residential houses cause a disproportionate screening effect upon uphill views from any perspective to the south of the site.

Most visibility is expected to occur on the level terrain immediately north and north-west of the site on the L5037 Rosshill Road; The embankment upon which the Dublin - Galway trainline sits and the train bridge to the north of the site are likely to limit views from the L5037 around the Ross Allta housing development (See Plate 12-12 previously). From this location there will be some visibility, although only the upper storeys and elevated ridgelines of the north facing facades of the proposed buildings are likely to have any visibility (see Viewpoint 01 in the photomontage booklet). Due to its elevated position upon the northern boundary, travellers on the train will have open views of the proposed development, however, this will be a momentary glimpse and visual effects are not deemed to be significant.

Open views to the proposed development (south-east) were found across an open field from a small section of the R338 Coast Road, 280 metres north-east of the site. Due to differences in topography and screening effects from intervening vegetation upon the elevated land before and after the trainline, the proposed development is unlikely to be visible from this location.



Plate 12-23 View to the south from the L5037 Rosshill Road showing the train bridge approximately 35 metres north of the site.

Visibility in Close Proximity to the Site

On-site appraisals determined that visibility of the proposed housing development is only likely to occur in the immediate vicinity of the site (within 100 metres) on roads that border the site itself. Plate 12-24 and Plate 12-25 (below) show the dense roadside screening along the L50371 Local Road which runs perpendicular to the southern boundary of the site, immediately south of the Stud Farm. Views towards the proposed development from this road will be very limited due to the extent of dense vegetation screening. This road is also set-back from the site boundary by 175 metres, further reducing visibility.



Plate 12-24 View to the East along the L50371 Local Road, immediately south of Stud Farm and southern site boundary.



Plate 12-25 View to the West along the L50371 Local Road, immediately south of Stud Farm and southern site boundary

The L50371 Local Road tracks to the north along the eastern perimeter of the site, this road is also known as the Rosshill Stud Farm Road. Plate 12-26 (below) shows the current view to the north-east along this road. As shown in the landscaping design (Figure 12-1, Section 12.1.3), the proposed infrastructure and buildings of the development (including road re-alignment) will have the least set-back distance from the location where Plate 12-26 was captured than any other public space within the LVIA Study Area. In terms of visibility and visual impact, the largest magnitude of change is likely to occur along this road, therefore locations at both ends of this road have been used as viewpoints for the preparation of photomontages (see Photomontage Viewpoints 03 and 04).

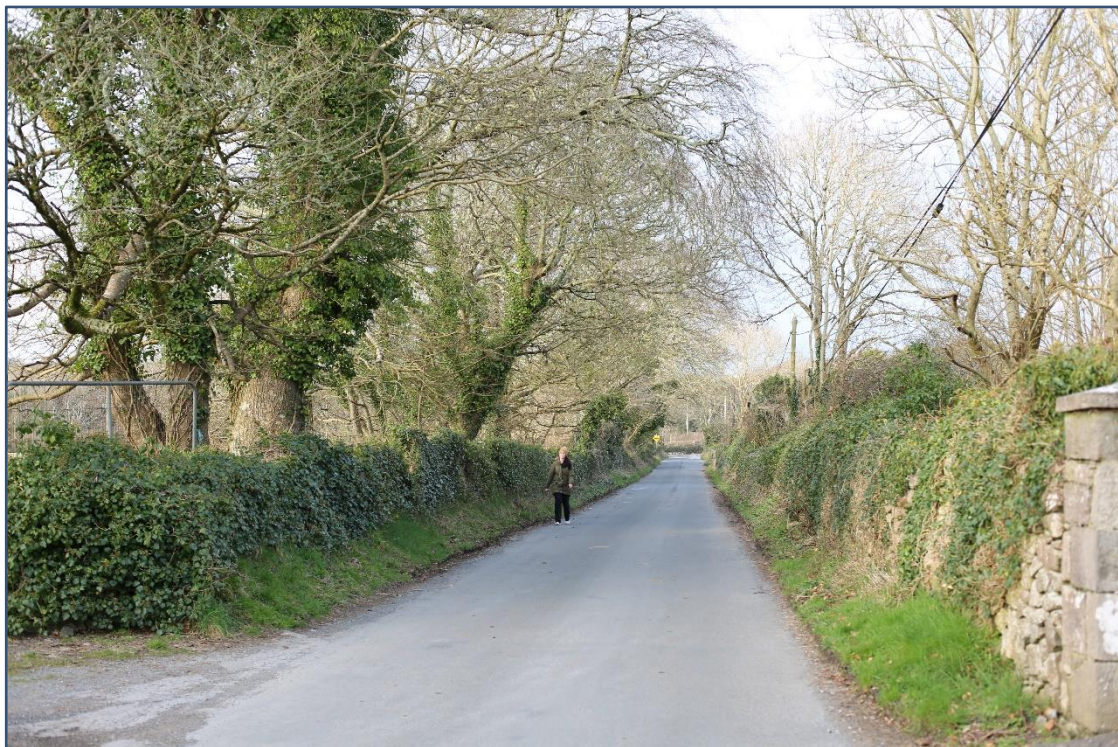


Plate 12-26 View north-northeast along the eastern Perimeter of the site along the L50371 Local Road

Plate 12-27 (below) shows a view to the east along the L50371 Rosshill Road on the northern perimeter of the site. This photo shows another stretch of public road where the proposed development is likely to be visually prominent. As shown in the landscaping design, the infrastructure and buildings of the proposed development are slightly set-back from this road and the natural embankment and existing trees (right of Plate 12-27) will be retained. Retention of these features and the set-back distance is likely to reduce visibility of the Proposed infrastructure from this road. Locations at both ends of this road have been used as viewpoints for the preparation of photomontages (see Photomontage Viewpoints 02 and 03).

A location with unobstructed views towards the proposed development site was found on the L50371 Local Road to the south-west of the site. Plate 12-28 (below) was captured on a cul-de-sac adjacent to four residential houses. Plate 12-28 was captured from a location where foot and vehicular traffic is low, therefore this location is not a highly sensitive visual receptor. However, this is the closest location (on public land) to the proposed coastal greenway route where it is likely that some of the ridgelines of proposed buildings may be visible. Therefore, this location has been selected as a viewpoint for the photomontage production (see Photomontage Viewpoint 05).

Summary of Visibility

In general, visibility of the proposed development within the LVIA Study Area is highly localised to areas in close proximity to the site. The local topography and vegetation characteristics of the site and within the surrounding landscape significantly obscures visibility from a majority of the LVIA Study Area. Visibility only occurs in very close proximity to the site. Where available, views towards the site are short-distance and relatively enclosed by the existent landscape elements. The proposed development is unlikely be visible within any scenic views of aesthetic value.



Plate 12-27 View to the east along the L5037 Rosshill Road on the northern perimeter of the site.



Plate 12-28 View to the north-east, towards the Proposed Development from cul-de-sac on the L50371 Local road, south-west of the site.

12.4.2 Photomontage Viewpoint Locations

Photomontage viewpoints were selected upon the criteria outlined previously in Section 12.2.5.1 in consideration of the visibility assessments conducted during site visits. A total of 5 no. photomontage locations were selected and are described in Table 12-8 below. A map showing the locations of the photomontage viewpoints is seen below in Figure 12-13.

Table 12-8 Photomontage Viewpoint Locations

Viewpoint	Description	Grid Ref (ITM)
1	View to the south-east towards the proposed development from the Ross Allta housing development on the Rosshill Road in the townland of Murrough. The viewpoint is located approximately 160m north-west of the northern embankment of the development site on the Rosshill Road.	E: 534104 N: 725210
2	View of the Proposed Development from beneath the train bridge on the Rosshill Road in the townland of Roscam. The viewpoint is located approximately 15m north of the northern embankment of the development site.	E: 534,226 N: 725,131
3	View of the Proposed Development in a south-westerly direction at the junction between the Rosshill Road and Rosshill Stud Farm Road in the townland of Roscam, Galway City. The viewpoint is approximately 2 metres east of the most north-eastern extent of the EIAR Study Area.	E: 534,448 N: 725,134
4	View north-west along the eastern perimeter of the Proposed Development site from the Rosshill Stud Farm Road in the townland of Roscam, Galway City. The viewpoint is located on the south-eastern boundary of the EIAR Study Area.	E: 534,394 N: 725,013
5	View to the north-east towards the Proposed Development site from a Local Road (L50371) to the south-west of the site. The viewpoint is located approximately 235 metres south-west of the proposed development in a small residential cul-de-sac.	E: 533,867 N: 724,774



Figure 12-13 Photomontage Viewpoint Locations.

12.4.3 Photomontage Viewpoint Assessment Descriptions

The photomontages can be seen in more detail in the photomontage booklet which forms Volume 2 of this EIAR. It is recommended that the following section should be read in conjunction with the photomontage booklet. In order to aid descriptions, smaller images of photomontages are also included within this document followed by an assessment table. Each viewpoint assessment table describes the ‘existing view’, this is the existing baseline conditions at each viewpoint. The sensitivity of each viewpoint is determined in consideration of local receptors. The proposed photomontage is then described with a focus on determining the magnitude of change that will occur at each viewpoint. The likely significance of visual effects is then be calculated using the Methodology outlined in Section 12.2.5 of this chapter. Mitigation measure are also noted and factored into the assessment process to give a residual visual effect.

**Please note – Viewpoints 01, 03 and 05 show the proposed development within a 80° field of view. Due to their positioning in very close proximity to the proposed development, viewpoint 02 shows a 160° field of view and viewpoint 04 shows a 120° field of view in order to show the full extent of the proposed development.*

12.4.3.1 Viewpoint 1



Plate 12-29 Viewpoint 1 – Existing View (Extracted from the Volume 2 Photomontage Booklet)



Plate 12-30 -Viewpoint 1 Existing View with Development Outline (Extracted from the Volume 2 Photomontage Booklet)

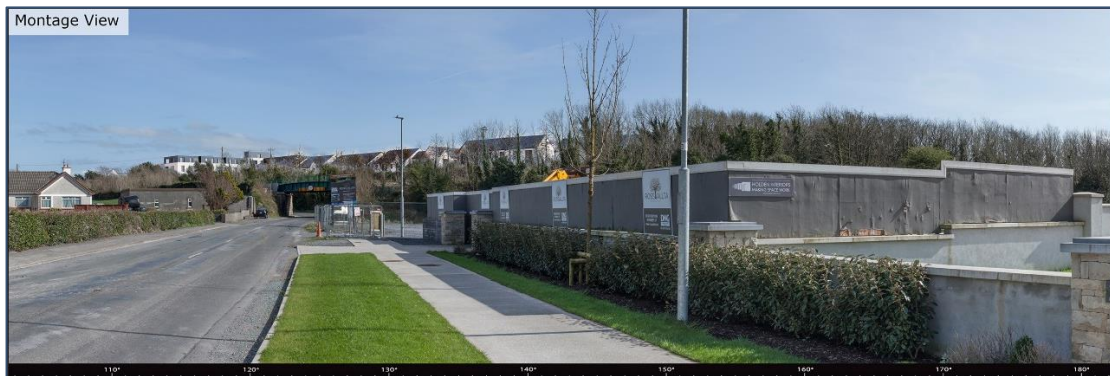


Plate 12-31 Viewpoint 1 Proposed Photomontage (Extracted from the Volume 2 Photomontage Booklet)

Table 12-9 Viewpoint 1 – Photomontage Assessment

Viewpoint 1	
Viewpoint Description	<ul style="list-style-type: none"> ➤ View towards the Proposed Development from the Ross Allta housing development on the Rosshill Road in the townland of Murrrough. ➤ The Viewpoint is located in close proximity to the recreational walking trails at Aunteen Woods ➤ The viewpoint is located approximately 160m north-west of the northern embankment of the development site on the Rosshill Road. ➤ Field of View: South-East

Viewpoint 1	
Visual Receptors and their Sensitivity	Motorised traffic and pedestrians on the Rosshill Road – Low Residential Receptors on the Rosshill Road including the partially constructed Ross Allta Housing Development – Medium/High
Description of 'Existing View'	<p>The image shows a short-distance view down the Rosshill Road of a semi-rural, semi-urban landscape. Suburban elements of the Ross Allta housing development are seen in the foreground to the right of the image, as well as evidence of on-going residential construction activity and an advertising billboard. A small working farm-yard and residential property is visible to the left of the Rosshill Road.</p> <p>An embankment and train bridge supporting the Galway – Dublin trainline is visible in the middle distance. The trainline embankment is lined by tall vegetation on both sides of the bridge (left and right of the image). Deciduous trees and tall hedges beyond the bridge form a dense treeline which comprises the background of this view. Tall lamp posts and overhead utility infrastructure are vertical man-made elements visible above the horizon.</p>
Proposed Photomontage Description	<p>Nine buildings of the proposed development are visible above the embankments and treelines in the background of the photomontage. Ground floor elements are screened from view by the intervening topography and vegetation. Due to the elevated location of the proposed development from this perspective, the building ridgelines are visible as a linear extent above the horizon to the left of the photomontage. The proposed buildings are an addition to the view, the mass of built form is viewed above the existing horizon and does not obscure any landscape views.</p> <p>Two residential buildings of Character Area 2 are visible through the trees in the centre of the image and the five proposed buildings visible in the centre-left of the photomontage are residential units of Character Area 1 (See proposed development architectural plans). The roof and eaves of the single storey creche is visible at the very left periphery of the photomontage, the upper levels of the three-storey apartment and commercial building is seen beyond it to the right. As shown in the outline image, the proposed development theoretically comprises a large horizontal extent of the view, however, as shown in the photomontage, the buildings to the right (Residential buildings of Character Area 2 – See proposed development architectural plans) of the image will be screened from view by the mature treelines beyond the trainline to the right of the photomontage.</p>
Cumulative Effects	<p>The proposed development will be viewed in conjunction with the Ross Allta housing development, a residential property of this development is currently under construction, as seen by the hoarding and fencing on the right side of the Rosshill road. The cumulative addition of buildings (proposed development and the Ross Allta development) contributes to an urbanisation of this landscape view. However, visibility of both developments is highly localised to this viewpoint location and other locations within 100 metres north-west along this road. These are the only areas in which both the proposed development and the Ross Allta development will be visible in conjunction with each other.</p>

Viewpoint 1	
Sensitivity of Visual Receptor(s) <i>(Definition, See Section 12.2.5)</i>	Medium: Includes viewers who may have some susceptibility to a change in view, such as those from views which are not designated but may have local recreational uses or those travelling along routes or at view which are considered moderately scenic.
Magnitude of Change <i>(Definition, See Section 12.2.5)</i>	Slight: The proposals would be partially visible or visible at sufficient distance to be perceptible and result in a low level of change in the view and its composition and a low degree of contrast. The character of the view may be altered but will remain similar to the baseline existing situation. This change could be short term or of a short duration.
Significance of Effect <i>(Definition, See Section 12.2.5)</i>	Medium X Slight = Minor = Slight (EPA, 2017) An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Mitigation Factors	<ul style="list-style-type: none"> ➤ Proposed planting along the northern boundary of the site will further mitigate visibility when the proposed vegetation establishes and matures. ➤ Retention of the existing trees and topography of the existing environment screens lower portions of the proposed development from view. ➤ Visibility of the proposed development is likely to be very limited from other areas beyond the Rosshill Road to the north-west of this viewpoint location, due to screening from vegetation and built form existent within the landscape. There will be very limited visibility from recreational receptors at Aunteen Woods (See Plate 12-1). ➤ The proposed development is located in lands zoned for residential development (Galway City Development Plan). ➤ Most residential properties in the Ross Allta housing development are oriented so that the gable end of properties face towards the proposed development. Therefore, primary scenic amenity from these residential receptors will not be focussed towards from the proposed development.
Residual Effect (incl. mitigating factors)	Slight (EPA, 2017) An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.

12.4.3.2 Viewpoint 2



Plate 12-32 Viewpoint 2 – Existing View (Extracted from the Volume 2 Photomontage Booklet)



Plate 12-33 -Viewpoint 2 – Existing View with the Proposed Development Ridgeline Indicated in Yellow (Extracted from the Volume 2 Photomontage Booklet)



Plate 12-34 Viewpoint 2 – Proposed Photomontage (Extracted from the Volume 2 Photomontage Booklet)

Table 12-10 Viewpoint 2 – Photomontage Assessment

Viewpoint 2	
Viewpoint Description	<ul style="list-style-type: none"> ➤ View of the Proposed Development from beneath the train bridge on the Rosshill Road in the townland of Roscam. ➤ The viewpoint is located approximately 15 metres north of the northern embankment of the development site on the Rosshill Road. ➤ Field of View: South
Visual Receptors and their Sensitivity	Motorised traffic and pedestrians on the Rosshill Road – Low Train Passengers (momentary view) – Low
Description of ‘Existing View’	The image shows a short-distance enclosed view across the Rosshill Road towards a steep rocky embankment from underneath the Galway-Dublin rail bridge. The stone-walled embankments that support the bridge and rail line above are visible to the periphery of both sides of the image. A steel fence cordons of a private access road for the rail line to the right of the view, the Rosshill Road, road signage and tall roadside hedgerows are visible to the left. The steep bank beyond the road and fence is heavily vegetated with ivy, bushes and deciduous trees.
Proposed Photomontage Description	The upper storeys and rooves of seven proposed buildings are visible above the horizon in the centre of the photomontage. The two buildings to the right are from Character Area 2 and the two to the left are from Character Area 1. The lower portions of the proposed development are screened from view by the intervening topography and vegetation.

Viewpoint 2	
Cumulative Effects	No other permitted or proposed developments are visible in conjunction with the proposed development from this viewpoint, therefore there are no cumulative visual effects.
Sensitivity of Visual Receptor(s) <i>(Definition, See Section 12.2.5)</i>	Low: Includes viewers engaged in activities where the focus is not on the landscape or view. These including those travelling along a busy route, viewers at work or engaged in sport not related to views or experience of the landscape.
Magnitude of Change <i>(Definition, See Section 12.2.5)</i>	Moderate: The change in the view may involve partial obstruction of existing view or partial change in character and composition of the baseline through the introduction of new elements or removal of existing elements. Likely to occur at locations where the development is partially visible over a moderate or medium extent, and which are not in close proximity to the development. Change may be readily noticeable but not substantially different in scale and character from the surroundings and wider setting.
Significance of Effect <i>(Definition, See Section 12.2.5)</i>	Low X Moderate = Minor = Slight (EPA, 2017) An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Mitigation Factors	<ul style="list-style-type: none"> ➤ Retention of the existing trees and topography of the existing environment screens much of the proposed development from view. ➤ Proposed planting along the northern boundary of the site will further mitigate visibility when the proposed vegetation establishes and matures. ➤ Many visual receptors at this location are likely to be engaged in some form of transport and will only have a momentary view of the proposed development. ➤ The proposed development is viewed as a residential development located in lands zoned for residential development (Galway City Development Plan).
Residual Effect (incl. mitigating factors)	Slight (EPA, 2017) An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.

12.4.3.3 Viewpoint 3



Plate 12-35 Viewpoint 3 – Existing View (Extracted from the Volume 2 Photomontage Booklet)



Plate 12-36 Viewpoint 3 - Existing View with the Proposed Development Ridgeline Indicated in Yellow (Extracted from the Volume 2 Photomontage Booklet)



Plate 12-37 Viewpoint 3 – Proposed Photomontage (Extracted from the Volume 2 Photomontage Booklet)

Table 12-11 Viewpoint 3 – Photomontage Assessment

Viewpoint 3	
Viewpoint Description	<ul style="list-style-type: none"> ➤ View from the junction between the Rosshill Road and Rosshill Stud Farm Road in the townland of Roscam. ➤ The viewpoint is located approximately 2 metres east of the most north-eastern extent of the ELAR Study Area ➤ Field of View: South-west
Visual Receptors and their Sensitivity	Motorised traffic and pedestrians on the Rosshill Road and Rosshill Stud Farm Road – Low

Viewpoint 3	
Description of 'Existing View'	<p>The image shows a short-distance view along the Rosshill Stud Farm Road to the left and down the Rosshill Road to the right. The centre of the image comprises a vegetated embankment bordering both roads to the left and right. Tall dense hedges and undergrowth is visible along the Rosshill road to the right, tall vegetation is intermittently distributed along the Rosshill Stud Farm Road to the left and centre. In the centre of the image there is a short distance view into the field beyond the treeline/hedgerow, where scrub and small trees are visible.</p> <p>Existing utility infrastructure (telegraph poles and overhead lines) and sign posts are man-made features visible within the image. A bus stop shelter is visible along the Rosshill Road to the right of the image.</p>
Proposed Photomontage Description	<p>The three-storey apartment is visible to the left of the photomontage although it is partially screened by intervening vegetation. The northern profile of the proposed creche is visible to the right of the photomontage where the new road layout links with the Rosshill road. The mass of other buildings are just perceptible through the roadside vegetation, but they are substantially obscured from view. The proposed development is an addition to this view and all elements are viewed above the horizon, it does not obscure any existing landscape view from this perspective.</p>
Cumulative Effects	<p>No other permitted or proposed developments are visible in conjunction with the proposed development from this viewpoint, therefore there are no cumulative visual effects.</p>
Sensitivity of Visual Receptor(s) <i>(Definition, See Section 12.2.5)</i>	<p>Low: Includes viewers engaged in activities where the focus is not on the landscape or view. These including those travelling along a busy route, viewers at work or engaged in sport not related to views or experience of the landscape.</p>
Magnitude of Change <i>(Definition, See Section 12.2.5)</i>	<p>Moderate: The change in the view may involve partial obstruction of existing view or partial change in character and composition of the baseline through the introduction of new elements or removal of existing elements. Likely to occur at locations where the development is partially visible over a moderate or medium extent, and which are not in close proximity to the development. Change may be readily noticeable but not substantially different in scale and character from the surroundings and wider setting.</p>
Significance of Effect <i>(Definition, See Section 12.2.5)</i>	<p>Low X Moderate = Minor = Slight (EPA, 2017) An effect which causes noticeable changes in the character of the environment without affecting its sensitivities</p>
Mitigation Factors	<ul style="list-style-type: none"> ➤ Retention of the existing trees and topography of the existing environment screens much of the proposed development from view. Proposed planting along the northern boundary of the site will further mitigate visibility when the proposed vegetation establishes and matures. ➤ Many visual receptors at this location are likely to be engaged in some form of transport and will only have a momentary or very short-term view of the proposed development. ➤ The proposed development is viewed as a residential development located in lands zoned for residential development (Galway City Development Plan).

Viewpoint 3	
Residual Effect (incl. mitigating factors)	Slight (EPA, 2017) An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.

12.4.3.4 Viewpoint 4



Plate 12-38 Viewpoint 4 – Existing View (Extracted from the Volume 2 Photomontage Booklet)



Plate 12-39 Viewpoint 4 - Existing View with the Proposed Development Ridgeline Indicated in Yellow (Extracted from the Volume 2 Photomontage Booklet)



Plate 12-40 Viewpoint 4 – Proposed Photomontage (Extracted from the Volume 2 Photomontage Booklet)

Table 12-12 Viewpoint 4 – Photomontage Assessment

Viewpoint 4	
Viewpoint Description	<ul style="list-style-type: none"> ➤ View along the eastern perimeter of the Proposed Development site from the Rosshill Stud Farm Road in the townland of Roscam, Galway City. ➤ The viewpoint is located on the south-eastern boundary of the EIAR Study Area. ➤ Field of View: North-West
Visual Receptors and their Sensitivity	Motorised traffic and pedestrians on the Rosshill Stud Farm Road – Low

Viewpoint 4	
Description of 'Existing View'	The existing view shows a very short-distance view from the Rosshill Stud Farm Road towards the roadside verge comprising hedgerows trees and scrub. An open field and a cluster of short deciduous trees are visible through the foliage to the left of the image and a distant treeline is visible to the background of the view.
Proposed Photomontage Description	The three-storey apartment building, commercial building and the entry road is located in very close proximity to this viewpoint location and it consequently comprises a very large spatial extent of this view. The substantial mass of buildings and built form brings about an urbanisation of the immediate landscape to the centre and right of the photomontage. The urbanisation is slightly offset by natural features of the proposed development such as the hedge, trees and planted grasses visible in the foreground. Several other residential buildings are visible to the left of the photomontage in the middle distance, beyond the existing roadside vegetation.
Cumulative Effects	No other permitted or proposed developments are visible in conjunction with the proposed development from this viewpoint, therefore there are no cumulative visual effects.
Sensitivity of Visual Receptor(s) <i>(Definition, See Section 12.2.5)</i>	Low: Includes viewers engaged in activities where the focus is not on the landscape or view. These including those travelling along a busy route, viewers at work or engaged in sport not related to views or experience of the landscape.
Magnitude of Change <i>(Definition, See Section 12.2.5)</i>	Substantial: Substantial change, where the proposals would result in large-scale, prominent or very prominent change, leading to substantial obstruction of existing view or complete change in character and composition of the baseline though removal of key elements or addition of uncharacteristic elements which may or may not be visually discordant. This includes viewpoints where the proposed development is fully or almost fully visible over a wide extent, at close proximity to the viewer. This change could be long term or of a long duration.
Significance of Effect	Low X Substantial = Moderate/Minor = Moderate (EPA, 2017) An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
Mitigation Factors	<ul style="list-style-type: none"> ➤ The proposed development is viewed as a residential development located in lands zoned for residential development (Galway City Development Plan). ➤ Potential loss of the natural landscape elements is offset by plans to plant new vegetation within and surrounding the proposed development. ➤ The proposed development is not obstructing or obscuring any existing landscape views of value in this area. ➤ Visual effects are very localised to this viewpoint location (and areas immediately north). Roadside screening is likely to significantly reduce visibility from the Rosshill Stud Farm Road, south of this location.

Viewpoint 4	
Residual Effect (incl. mitigating factors)	Moderate (EPA, 2017) An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends

12.4.3.5 Viewpoint 5



Plate 12-41 Viewpoint 5 – Existing View (Extracted from the Volume 2 Photomontage Booklet)



Plate 12-42 Viewpoint 5 - Existing View with the Proposed Development Ridgeline Indicated in Yellow (Extracted from the Volume 2 Photomontage Booklet)



Plate 12-43 Viewpoint 5 - Proposed Photomontage (Extracted from the Volume 2 Photomontage Booklet)

Table 12-13 Viewpoint 5 – Photomontage Assessment

Viewpoint 5	
Viewpoint Description	<ul style="list-style-type: none"> ➤ View to the north-east towards the Proposed Development site from a Local Road (L50371). ➤ The viewpoint is located approximately 235 metres south-west of the EIAR Study Boundary in a small residential cul-de-sac. ➤ Field of View: North-East
Visual Receptors and their Sensitivity	Residential Receptors (five properties within 150 metres of this viewpoint) – Medium/High Proximity to the Future Proposed Greenway Route - Medium
Description of ‘Existing View’	The image shows a view across a low bank of scrub and gorse to a field of improved grassland used as grazing pasture for a horse, the field is bordered by brown and green fencing. A mature treeline comprising a mix of deciduous and coniferous trees is visible across the view in the middle-distance, as well as an outbuilding of a residential property to the right of the view. An open field and dense treeline is visible upon the slightly elevated land beyond the trees and fencing in the middle distance.
Proposed Photomontage Description	The ridgelines and rooves of the westerly proposed residential buildings visible above the treeline in the background of the image. A majority of the proposed development is obscured from view behind intervening vegetation. As shown by the yellow outline image, the proposed development is located on slightly elevated land from this location. Due to distance and screening the proposed development comprises a very small spatial extent of this view and does not obstruct views of any other landscape elements.
Cumulative Effects	No other permitted or proposed developments are visible in conjunction with the proposed development from this viewpoint, therefore there are no cumulative visual effects.
Sensitivity of Visual Receptor(s) <i>(Definition, See Section 12.2.5)</i>	Medium: Includes viewers who may have some susceptibility to a change in view, such as those from views which are not designated but may have local recreational uses or those travelling along routes or at view which are considered moderately scenic.
Magnitude of Change <i>(Definition, See Section 12.2.5)</i>	Slight: The proposals would be partially visible or visible at sufficient distance to be perceptible and result in a low level of change in the view and its composition and a low degree of contrast. The character of the view may be altered but will remain similar to the baseline existing situation. This change could be short term or of a short duration.
Significance of Effect <i>(Definition, See Section 12.2.5)</i>	Medium X Slight = Minor = Slight (EPA, 2017) An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Mitigation Factors	<ul style="list-style-type: none"> ➤ Valuable scenic amenity in the vicinity of this viewpoint is directed to the south and west, towards the coast, away from the proposed development. The proposed development does not impact upon any of the valuable scenic amenity in this area. ➤ Retention of existing treelines surrounding the site substantially reduces visibility of the proposed development from this location.

Viewpoint 5	
	<ul style="list-style-type: none"> ➤ The proposed development is not obstructing or obscuring any existing landscape views. ➤ The nearest proposed buildings are set back at distances greater than 220 metres from the domestic curtilage of all residential receptors to the east, west and north of this viewpoint location.
Residual Effect (incl. mitigating factors)	<p>Not Significant (EPA, 2017) An effect which causes noticeable changes in the character of the environment but without significant consequences.</p>

12.5 Likely Significant Landscape and Visual Effects

12.5.1 'Do Nothing' Scenario

If the proposed development was not to proceed, the opportunity to develop 102 no. units comprising a mixture of house and apartments, childcare facility, commercial/retail unit, open space, landscaping and ancillary works at this long standing residential zoned site would be lost.

In the 'Do Nothing' scenario, the proposed development would not take place. The site would remain a green field site zoned for Low Density Residential Purposes. There would be no landscape or visual effects associated with the "Do Nothing" alternative.

12.5.2 Potential Impacts of the Proposed Development

The potential effects of the proposed development relate to the potential effects without the consideration of mitigation or proposed landscape works. This enables recognition of potential, rather than actual effects which facilitates the identification of suitable landscape mitigation measures.

At the construction phase, potential landscape and visual effects will result as the site changes from an area of open agricultural fields with some woodland, on the eastern edge of Galway City, to a construction site of considerable size. This is expected to be carried out across a period of approximately 36 months. Potential landscape effects include vegetation removal, earthworks and a subsequent change in character. These effects will include permanent negative effects, where vegetation is removed, and the land is re-graded, and short-term effects such as the activities of machinery, noise and dust in the landscape. Construction phase visual effects include potential negative effects on the nearby visual receptors as a result of the vegetation removal, earthworks and machinery. These visual effects will be most pronounced in the immediate vicinity of the site, where there are several residential areas. The construction phase effects will be short term in duration.

Potential landscape effects during the operational phase are a result of the change in character of the areas from open agricultural fields and woodland on the edge of the urban area, to a built-up suburban residential area with areas of open space. This will cause relatively localised negative effects on the character of the landscape. Due to the limited visibility of the site, visual effects arising after the completion of construction will be experienced locally from receptors located in adjacent residences or the street network in immediate proximity to the site.

12.5.3 Avoidance, Remedial & Mitigation Measures

Mitigation, remedial and avoidance measures have been integral in the design and which reduce the potential landscape and visual effects of the proposed development and therefore are not assessed separately to the development.

A dedicated landscape design (see Figure 12-1, Section 12.1.3) has been completed by CSR and is included in Appendix 4-3. An overriding principle of the proposed scheme's landscape design philosophy is to retain the best of the existing trees present on the site to help create a high-quality external setting an environment for the proposed development and retain the Sylvan character of the site. As such a BS5837:2012 tree survey was undertaken at the project outset and used to inform the project design during the layout development process. Other areas prioritised for retention include native boundary trees and areas of contiguous woodland scrub with ecological value.

12.5.4 Construction Phase Effects

12.5.4.1 Likely Landscape Effects – Construction Phase

The predicted impacts upon the landscape arising from the construction phase will include the transformation of the landscape from requisite earthworks and construction activities, as well as the noise and dust from construction operations, material transport, and increased site traffic.

The mitigation measures proposed include the implementation of appropriate site management procedures – such as the control of site lighting, storage of materials, placement of compounds, delivery of materials, car parking.

Significance of Landscape Effects – Construction Phase

The construction phase is expected to last approximately 36 months. Overall, the proposed development will have a localised **Moderate, but Short-Term negative effect** on the landscape during the construction phase. The effect on the landscape is localised and will not affect the wider character of the landscape surrounding the site. The effects of the operational phase are outlined below.

12.5.4.2 Likely Visual Effects – Construction Phase

In general, visibility of the proposed development site is largely restricted by screening from vegetation and topographical characteristics of the surrounding area. It can only be seen from a very limited area outside the site as demonstrated by the assessments conducted as part of the Visual Baseline in Section 12.4. As illustrated by the photomontages, visibility is confined to locations immediately surrounding the site. The proposed development site will only be partially visible due to the presence of semi-mature to mature trees and hedges immediately adjacent to roads in the intervening landscape, as well as localised undulations and variations in topography which obscure views.

Visual impact during the construction phase will be mitigated somewhat through appropriate site management measures, work practices and a waste management plan to ensure the site is kept tidy, dust is kept to a minimum and that public areas are kept free from building material and site rubbish.

Site hoarding will be appropriately scaled, finished and maintained for the period of construction of each section of the works as appropriate. To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to. The visual impact of the site compound, and scaffolding visible during the construction phase are of a temporary to short term nature only and therefore it is expected that this will require no remedial action other than as stated above.

Significance of Visual Effects – Construction Phase

There are likely to be short-term slight negative visual impacts associated with the construction works. This will be due to the process of substantial site clearance, earthworks and building processes required to construct the proposed development. Effects on visual receptors are limited in that there are few sensitive receptors with views into the site, however, any impacts by their nature are predominantly negative. Visual effects of the construction phase are deemed to be short term in duration and of Slight significance.

12.5.5 Operational Phase Effects

12.5.5.1 Likely Landscape Effects – Operational Phase

Magnitude of Change and Landscape Sensitivity

During the operational phase, the construction of the development including: 102 no. units comprising 67 no. houses and 35 no. apartments; retail/commercial spaces; car parking; and a two-storey childcare facility, will result in a relatively large scale change to the local area. The Landscape Plan, which forms part of the site design is included in Appendix 4-3.

The character of the immediate vicinity will undergo change, and although the development type is consistent with the residential land uses in the surrounds, the scale of the change will be significant, and the rural qualities or parts of the site will change. Therefore, the magnitude of the change is considered **Moderate**.

During the desktop study, landscape designations set out in the Galway City Development Plan 2017-2023 in terms of ratings for landscape value and sensitivity and designated focal points and views, were identified for the proposed development site. The landscape value and sensitivity of the proposed development site is Medium. No landscape designations applied to the development site nor will the landscape designations in the surrounding landscape be affected by the proposed development. Furthermore, there were no rare landscape features identified on site. The changes to the landscape are localised yet do alter the character of the site. The change of landscape character aligns with the zoning of the subject lands in an area for low density residential housing set out in the GCDP.

Although the landscape within will undergo a considerable change, due to the site being visually segregated by vegetative screening, visual effects on the landscape will be predominantly confined to the proposed site and visual effects on the wider landscape will be Slight.

Significance of Landscape Effects – Operational Phase

The landscape sensitivity is considered **Medium** and the magnitude of the change is considered **Moderate**.

There are some permanent changes in the character of the site and immediate vicinity, with the removal of the open fields and requisite changes in topography of the site to facilitate construction. In turning what was a rural area on the edge of the city into suburban area will have an effect on the character and fabric of the site and immediate vicinity. However, the effect will be relatively localised and is not likely to have significant effects on the landscape character of the wider area.

Where possible, existing trees, scrub and hedgerows will be retained and integrated into the development, particularly in the extensive public areas around the periphery of the site to the north and west. As shown in the landscaping plan, existing trees will be complemented by new planting and addition of other features of environmental, aesthetic and recreational benefit.

Overall, the predicted landscape impact is considered to be **Long Term, Slight**, as a result of the level of screening provided, however the overall character of the area will be slightly affected.

12.5.5.2 Proposed Mitigation Measures – Landscape Effects

Mitigation and avoidance measures have been designed into the proposed development and the landscaping plan and are an integral factor reducing the potential for adverse landscape effects of the proposed development. The landscape illustrates a variety of design proposals, which will introduce a positive aesthetic quality to the area.

Residual Landscape Effects

As stated above, it is expected that immediately post-construction, the landscape effects in the site and immediate vicinity are likely to be Slight, negative effects. However, once mitigation measures, particularly the additional planting, have become established in the medium to long-term, landscape effects are expected to be ameliorated. While some of the landscape effects will remain negative, the proposed landscape and offsetting measures will have a neutral to positive effect as the development will be better assimilated into the landscape once the vegetation establishes.

The residual effects on the wider landscape character are considered Permanent, Slight and neutral. Therefore, based on the assessment above there are no significant effects at the upon the character of the wider landscape.

12.5.5.3 Likely Visual Effects – Operational Phase

The desktop study, site visit, photomontages and proposed development layout all inform the assessment of visual effects. During the site visit, views towards the site from the surrounding road network, as well as from other areas, were assessed. Visibility of the proposed development site could be excluded from the vast majority of the LVIA study area as a direct result of the screening provided by existing vegetation and landform that is set to be retained as part of the proposed development. There is no likely visibility from any designated scenic views or prospects or any visual receptors of high sensitivity.

Open visibility of the proposed development was established on the road network immediately surrounding the site: Rosshill Road (north), the Rosshill Stud Farm Road (east) and a cul de sac to the south-west of the site. There is likely to be very limited visibility of the proposed development from beyond 300 metres from the site. All photomontage viewpoints are located within 230 metres of the proposed development (VPs 01, 02, 03 and 04 are located within 100 metres), despite this, the proposed development is only partially visible in all of the photomontages due to the topographical characteristics of the site and screening elements to be retained in the surrounding landscape and along the site perimeter.

A detailed assessment of visual effects from photomontages is included in Section 12.4.3 – *Photomontage Viewpoint Assessment Descriptions*. Visual receptor sensitivity was considered Low from photomontage viewpoints 02, 03 and 04 as the only visual receptors are likely to be local traffic or pedestrians. There are no residential receptors in close proximity to viewpoint locations 02, 03 and 04. Photomontage Viewpoint 01 was given a sensitivity of ‘Medium’ in consideration of residential receptors located on the Rosshill Road such as those of the Ross Allta Development. It is noted that existent houses on the Rosshill road are oriented such that the gable faces the proposed development, and the proposed development is unlikely to be the focus of primary scenic amenity from these residential receptors. Photomontage viewpoint 05 is located on an isolated cul-de-sac of very low traffic density, however, it was given a receptor sensitivity of Medium in consideration of the residential receptors surrounding the viewpoint.

The magnitude of change occurring as a result of the proposed development was deemed to be the greatest (‘substantial’) along the Rosshill Stud Farm Road (Photomontage 04) where there is the most exposure of the proposed infrastructure. The new roads, apartment block and commercial area at the south-eastern extent of the site will be viewed as prominent features from viewpoint 04 and will consequently substantially alter the existing character of this localised area. It is noted that while the change in view is substantial, it is not obstructing or obscuring any existing landscape views of value and the urbanisation of this area aligns with the zoning of these lands. Any potential loss of the natural landscape elements in this area is offset by plans to plant new vegetation within and surrounding the proposed development site. Visual effects were deemed to be of ‘Moderate’ significance from viewpoint 04.

Visual effects were assessed from the Rosshill Road to the north of the site via photomontages 01, 02 and 03. Residual visual effects were deemed to be of 'Slight' significance from these locations as changes occurring at these locations will not effect the sensitivities of the existing landscape or intrude upon or obscure any valuable landscape views.

There is very partial visibility of the proposed development in photomontage 05 and consequently a very slight magnitude of change. It is also noted that valuable scenic amenity in the vicinity of this viewpoint is directed to the south and west, towards the coast, away from the proposed development. Therefore, the proposed development does not intrude upon any views of scenic value. Residual visual effects were deemed to be 'Not significant'.

Residual Effects

Vegetation planting is a key part of the landscaping plan. When the vegetation establishes in the medium to long-term, visual effects are expected to improve in quality. Retention of existing treelines and hedges surrounding the site substantially reduces visibility of the proposed development from many locations as well as enabling the area to retaining some of the semi-rural character and perceptual aesthetics of the existing environment.

A design statement produced by the project architects - *O'Neill-O'Malley* is enclosed with the application pack. As noted in the design statement, every effort has been taken to incorporate materials sympathetic to the surrounding landscape, and provide an aesthetically pleasing development design suitable for these lands which are zoned for residential development.

Due to the screening by local topography and vegetation the proposed development will not have significant visibility within the LVIA study area and is unlikely to be visible within any valuable scenic views. Considering the highly localised visibility and the mitigation measures including tree retention and landscaping plan, overall, **visual effects** are deemed to be **Long-Term** and are either '**Imperceptible**' or of '**Slight**' significance.

12.5.6 Cumulative effects resulting from interactions between various elements of the proposed development

The interaction of the various elements of the proposed development was considered and assessed in this EIAR with regards landscape. The potential for each individual element of the proposed development on its own to result in significant effects on visual receptors was considered in the impact assessment. The entire project including the interactions between all its elements was also considered and assessed for its potential to result in significant effects on landscape or visual receptors in the impact assessment presented.

All interactions between the various elements of the project were considered and assessed both individually and cumulatively within this chapter. Where necessary, mitigation was employed to ensure that no cumulative effects will arise as a result of the interaction of the various elements of the development with one another.

12.5.7 Cumulative In-Combination Effects

The potential cumulative effects of the proposed development in combination with the other projects described in Chapter 2 of this report have been considered in terms of impacts on landscape.

It was determined that there will be no intervisibility between most of the projects described in Chapter 2 of this EIAR and the proposed development. However, there will be some instances where the Ross

Allta development (PL Ref. 16/228) will be viewed in conjunction with the proposed development, however, this is from a very localised area on the Rosshill Road to the north of the site beyond the Galway-Dublin railway line (See photomontage Viewpoint 01), where cumulative visual effects will be mitigated by distance and vegetation screening.

No significant cumulative landscape and visual effects are likely to occur as a result of the proposed development in-combination with other permitted developments.

12.6 Conclusion

Desk studies and site visits determined that there would be very limited visibility of the proposed Rosshill Housing Development beyond 300 metres from the site and likely no effects on sensitive visual and landscape receptors or landscape designations in the LVIA Study Area. Photomontage assessments determined that there would be partial visibility of the proposed development from localised areas on the local road network surrounding the site.

Perceptual and aesthetic changes to the wider landscape character surrounding the site are likely to be insignificant as a result of the very limited and localised visibility. The greatest changes will occur on the footprint of the development site where the landscape will be materially altered from an unkept green field site of grassland and woodland to a suburban housing development. Considering the proposed retention of existing woodland, proposed landscaping plan and the zoning of these lands for residential purposes, landscape effects are not deemed to be significant.

Due to very effective screening of the proposed development by landform and existing vegetation there will be in minimal visual changes in the landscape of the LVIA Study Area. There are no sensitive visual receptors surrounding the site that will be impacted by the proposed development and the proposed development is unlikely to obscure or intrude upon any existing valuable scenic views. In this regard, likely visual effects are not deemed to be significant.

To conclude, likely landscape and visual effects anticipated from the proposed development are not deemed to be significant. Considering the mitigation plans in place and the zoning of these lands as residential, residual effects upon the landscape and visual amenity can be deemed to be neutral.

13. MATERIAL ASSETS

13.1 Traffic and Transport

13.1.1 Introduction

13.1.1.1 Purpose of Section

The purpose of this Traffic and Transport EIAR Section is to assess the potential impact of the proposed Housing Development at Rosshill Co. Galway on the existing local transport network and to review whether the proposed site access (and the existing junctions which fall within the scope of the study) will have adequate capacity to carry the development traffic and the future growth in existing road traffic to the design year and beyond and to also identify possible mitigation measures to reduce traffic impacts. An assessment of the accessibility of the site for cyclists, pedestrians and public transport users has also been made.

This section is written as a concise summary of the Traffic and Transport Statement, included as Appendix 13-1 of this EIAR. Rather than repeat the detailed traffic assessments carried out within this Traffic and Transport Statement, it is referred to throughout this chapter, with the impact assessment findings discussed below.

13.1.2 Statement of Authority

This EIAR Section was written by Micheál Geraghty of Tobin Consulting Engineers. Tobin Consulting Engineers have appointed CST Group Chartered Consulting Engineers to prepare the Traffic and Transport Statement for the project. TOBIN Consulting Engineers are in operation for over 60 years and have carried out numerous Traffic and Transportation Assessments (TTA's) for various residential, commercial, business, retail and leisure developments. TOBIN has also drafted various Traffic Chapters for EIAR's. The drafting of TTAs and Traffic Chapters involve the followings tasks:

- Liaising with local authorities, TII, clients and other key stakeholders,
- Analysis of the suitability of haul routes,
- Design and analysis of access points to all types of developments,
- Access and site layout arrangements using AutoTRACK, swept path analysis software,
- Junction analysis on uncontrolled, signalised and roundabout junctions

13.1.3 Receiving Environment

13.1.3.1 Location and network summary

13.1.3.1.1 Existing Road Network

The layout of the local road network is presented in the Figure below. The proposed development is bounded to the north by the Rosshill Road and the Galway Dublin Rail Line, and to the East by the Rosshill Farm Stud Road.

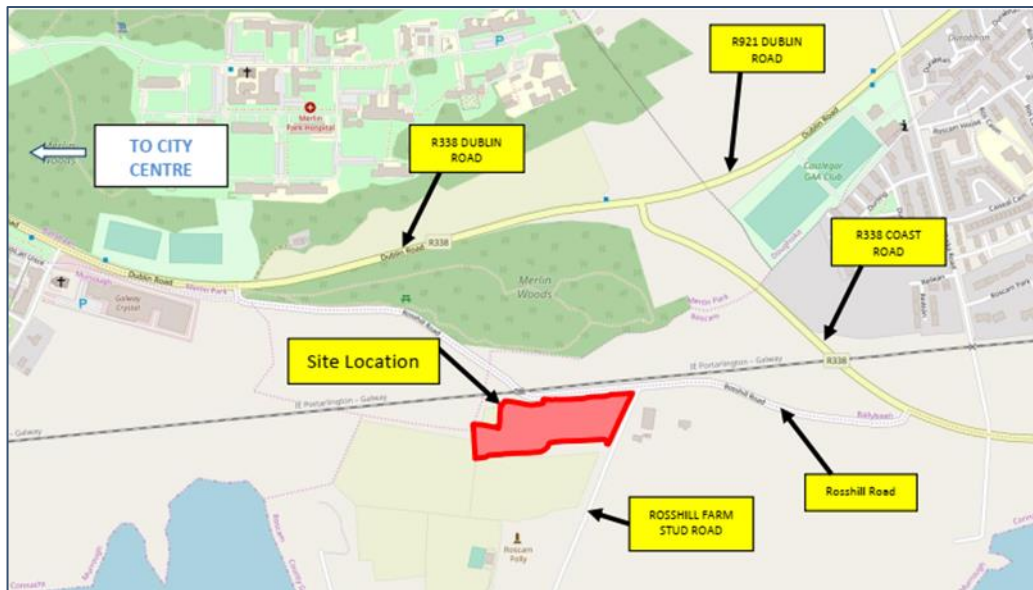


Figure 13.1 Site location and surrounding road network

A brief description of the local road network and associated junctions is provided as follows:

Rosshill Road

The Rosshill road is a single carriageway road with one lane in each direction. The Rosshill Road connects to the R338 Coast Road at its eastern end and the R338 Dublin Road at its western ends. Both junctions are priority-controlled T-junctions that include right turning lanes on the regional road. There is a footway along the majority of the Northern Side of the Rosshill Road. It is constructed from an unbound material and currently is in a state of disrepair.

R338 Coast Road

The R338 Coast Road is a single carriageway road with one lane in each direction. The R338 links to the R338 Dublin Road via a signalised T-junction at its western end and to the Oranmore region to the East. There are no footways provided on the Coast Road. There is a hard shoulder along both sides of the R338 Coast Road which is used by pedestrians and cyclists.

R338 Dublin Road

The R338 Dublin Road is a single carriageway road with one lane in each direction and a segregated bus lane on the westbound (citybound) direction. The R338 Dublin Road links to the City Centre to the west and to the R338 Coast Road and R921 Old Dublin Road to the east (via a signalised T-junction). There is a footway provided along the southern side of this road which connects to pedestrian infrastructure to the west (city centre) and to the east (Roscam and Doughiska residential areas).

Rosshill Farm Stud Road

The Rosshill Farm Stud Road is a single carriageway county lane that runs southerly from the Rosshill Road via a Priority-Controlled T-junction. There are no pedestrian or cyclist facilities provided on this road. The existing road meets Rosshill Road at an angle more than 70 degrees and is not ideal for the increased usage as motorists are required to undertake a sharp turn at this junction. Also, elderly users can experience difficulty when attempting to look over their shoulder to observe oncoming traffic when exiting at such a sharp junction. As a result of this, the existing Rosshill Farm Stud / Rosshill Road Junction is to be realigned as part of the proposed development. This will involve construction of new

carriageway from the proposed entrance to the development to the intersection with the Rosshill Road. A footway and cycleway will be provided along this new section of roadway as shown on in the Figure below. The procedure to close this section of road will be undertaken and carried out in accordance with Galway City Council's requirements.

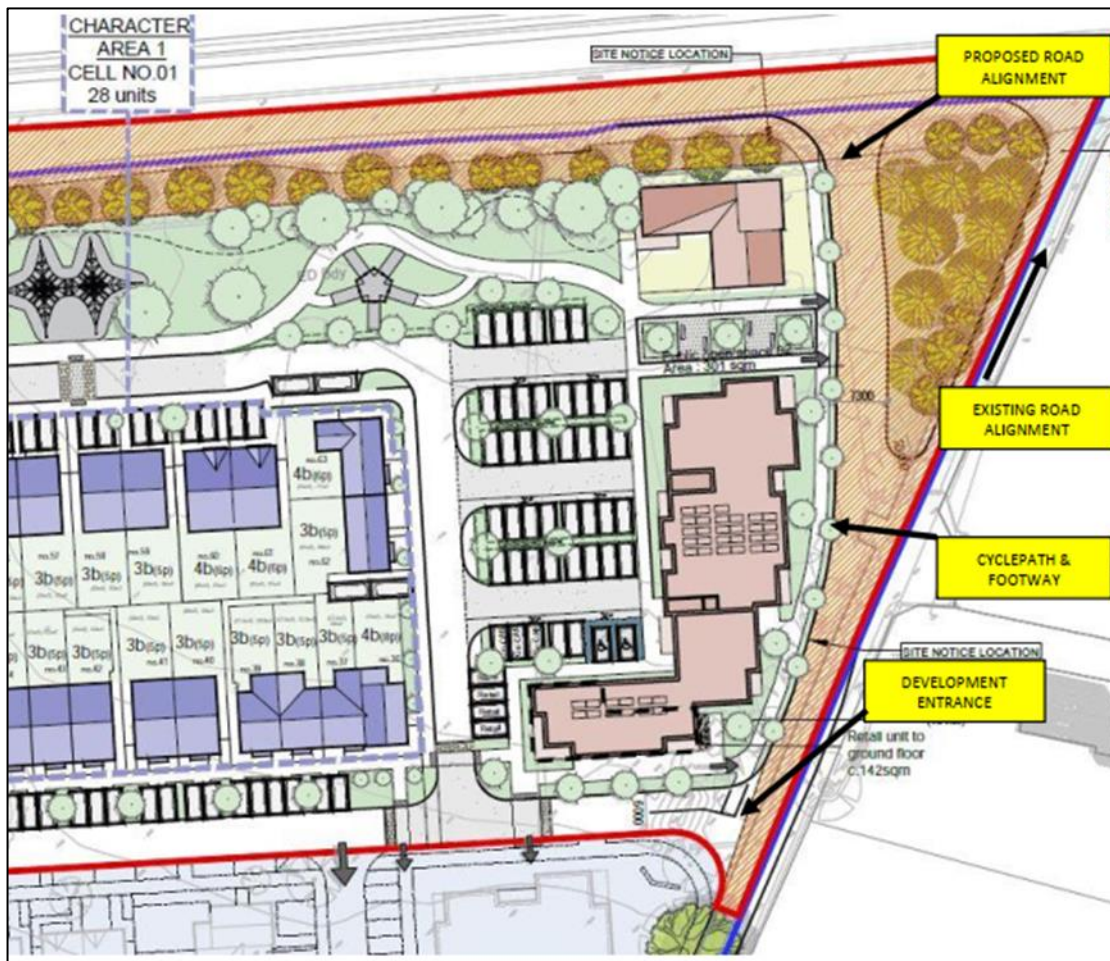


Figure 13.2 realignment of Rosshill farm Stud Road

13.1.4 Scoping

Tobin Consulting Engineers initially contacted Galway City Council's Roads Department in relation to the proposed development in November 2020. Galway City Council requested that analysis be carried out at the following junctions:

- > Junction 1: R338 Dublin Rd.- Rosshill Rd. Junction
- > Junction 2: R338 Dublin Road - R338 Coast Road Junction
- > Junction 3: R921 Old Dublin Road - Doughiska Road
- > Junction 4: R338 Coast Road - Rosshill Road Junction
- > Junction 5: Rosshill Road - Rosshill Farm Stud Junction

The outcomes of this exercise were incorporated into the draft Traffic and Transport Assessment and draft design drawings. The design and access options were further reviewed and discussed at the Stage 1 meeting held between the Client / Design Team and Galway City Council in January 2021. Again, the resulting comments were taken on board and amendments to the design were incorporated where possible.

Galway City Councils Roads Department had further comments on the final draft design submitted prior to the Pre-Application Consultation Meeting. These were discussed at the Pre-Application Consultation Meeting held in March 2021. The main items raised by the Roads Department (and Design Team responses as discussed) are outlined as follows:

- A lack of pedestrian, cycling and public transport in the area resulting in high levels of commuting by car causing further traffic congestion in the area.
 - Tobin Consulting Engineers identified the pedestrian, cycling and public transport linkages to the site on drawings 10690-2013 and 2014. This information was tabled at the second meeting with Galway City Council's Roads Department. The information is also included in this final revision of the Traffic and Transport Assessment (refer to Section 14 of this Report). This shows that currently, there are public transport links within 1.1 km (a 12-minute walking time from the proposed development) with plans for future upgrading of the Dublin Road to incorporate bus lanes on both sides as part of the strategy to provide a better bus service in Galway City. Cycle lanes will also be provided on both sides of the road which will further enhance the linkages of the site to the City centre.
 - To further enhance the linkage to the site, the Developer has proposed to carry out maintenance works on the existing footpath network linking the site with the Dublin Road and the existing Bus Stops.
 - Consultation has also commenced between the Developer and the City Direct Bus Company in relation to the provision of a new bus service in the vicinity of the proposed development to serve the proposed development and surrounding residential developments in the area. A letter stating same is provided from City Direct and is appended to this Report.
- That the proposed cycle parking facilities have not been given due consideration during the design process.
 - The rationale behind the bicycle parking was to provide ample parking for the apartment blocks to facilitate cyclists living in and people visiting these apartments. The cycle parking to be provided will be of a high standard and in accordance with the City Council's guidelines. It is envisaged that those living in houses can utilise their back gardens to store their bicycles.
- There is concern that the traffic analysis, particularly in relation to the Doughiska Rd / Dublin Road junction, is inadequate and doesn't reflect the current or expected situation in the area.
 - The analysis which was carried out for the draft revision of the Traffic and Transport Assessment reflected the queue lengths averaged out over the peak hour, not the peak 15 min period. This resulted in the outputs which were obtained from the LinSig analysis and the discrepancy with the expected outcomes. The analysis has been updated to reflect the current situation more accurately and the timeframes have also changed to reflect 15 min periods.
 - Also, the analysis has assumed the trip distribution will match current patterns and has not yet incorporated an allowance for traffic which will travel East to utilise the Oranmore Train Station to commute into the City.

13.1.5 Road Safety Audit

A road safety audit has been carried out by CST Group Chartered Consulting Engineers independently from the design team on the proposed development. The Audit identified a number of items which were reviewed by the Design Team and the design amended where necessary. The recommended measures and proposals were agreed and signed off by the Designers, Client and Auditors. The final site layout provides a roads network throughout the development which incorporates measures (such as curved alignments, surface materials to differentiate pedestrian and vehicle routes etc.) that ultimately

provide a high level of safety for both the pedestrian and the driver without comprising the overall quality of the development.

Please refer to the CST Road Safety Audit included as part of this submission for further details.

13.1.6 Proposed Development

13.1.6.1 Trip generation of Proposed Development

CST Group Chartered Consulting Engineers have procured Trip Rate Information Computer System (TRICS) data for similar sized residential developments in order to inform the trip rate associated with such a development. However, Galway City Council indicated that trip rates recommended by TRICS (Trip Rate Computer Information System) were not acceptable for the proposed development. Therefore, a traffic count was undertaken at a similar development (An Réileán Development) to calculate the turn-in rates at the proposed development. The similar development consists of 82 housing units and 2 apartment blocks (24 apartments). These figures were applied pro-rata to the relevant number of housing and apartment units within the proposed development. The estimated total number of vehicular trips generated by the proposed development is shown in the Table below which details the generated traffic for the AM and PM peak hours.

Table 13.1 Traffic Generation

	Residential Units	AM Arrivals	AM Departures	PM Arrivals	PM Departures
Proposed Mixed Residential (Apartments & Houses)	102	15	54	40	15
Proposed Mixed Residential (Apartments & Houses) Remainder of Adjacent zoned lands	240	36	127	95	36
<i>Adjacent Development Houses Privately Owned (TRICS)</i>	16	4	9	8	5
Total		56	190	143	56

The above table demonstrates that a total of 246 trip movements in the AM peak and a total of 199 trip movements in the PM peak are expected to result from the proposed development.

13.1.7 Existing Traffic Flows and Traffic Impact of Proposed Development

13.1.7.1 Existing traffic flows on the local network and the traffic impact of the proposed Development

In the absence of any specific local traffic growth information, it was assumed that baseline traffic will continue to grow at the levels recommended by TII in the Project Appraisal Guidelines (PAG) – Unit 5.3 ‘Travel Demand Projections’ publication (PE-PAG-02017). The Project Appraisal Guidelines describe three levels of transport model functionality. The simple model, which reflects traffic volumes

on the basis of link flows, is best suited to the proposed development. Such models do not attempt any route assignment, and hence are applicable for networks where no change in traffic flows will result from a proposed scheme. Growth rates recommended in PAG – Unit 5.3 have been used to determine future traffic flows on the road network within the vicinity of the development. We have used figures from it for the Mid-West area which includes Galway City.

The year of opening of the scheme was assumed to be 2024. The central growth factors from the Project Appraisal Guidelines – Unit 5.3 publication were used and are detailed below: -

- TII Link Based Growth Rates: Annual Growth Factor for 2013-2030 = 1.0099 (LVs) and 1.0237 (HVs);
- TII Link Based Growth Rates: Annual Growth Factor for 2030-2050 = 1.0000 (LVs) and 1.0176 (HVs).

The annual growth factors for Light Vehicles (LVs) and Heavy Vehicles (HV) were applied to surveyed values of vehicles counted.

With regards to the volume of traffic using the road, the passenger car is adopted as the standard unit and other vehicles are assessed in terms of PCU's. Cars and Light Goods Vehicles are grouped together as Light Vehicles (LV). All other Goods Vehicles, Buses and Coaches are defined as Heavy Vehicles (HV).

The classification of vehicles in PCU's is shown below:

Table 13.2 Classification of Passenger car Units

Vehicle	PCU
Car	1
Light Goods Vehicle	1
Other Goods Vehicle (2 -3 axle)	1.5
Other Goods Vehicle (4 -5 axle)	2.3
Bus	2
Cycle	0.4

13.1.8 Likely and Significant Effects and Associated Mitigation Measures

13.1.8.1 Construction Phase

Construction traffic travelling to the proposed development site in Rosshill, Co. Galway will use the Rosshill Road. A Traffic Management Plan (which will be completed by the Contractor) for the construction stage will identify haulage routes and restrictions as appropriate in discussion with the Local Authority. There is a height restriction where the railway line goes over Rosshill Road.

The increase in traffic volumes as a result of construction vehicles visiting the site is not considered to be excessive and will be spread out over the duration of the construction phase of the development which will be developed in phases.

Due to the designated access point off the Rosshill road, allowing delivery vehicles to pull off the road into the site, there will be no significant disruption on the traffic flows on the Rosshill Road as a result of the construction of the development. It is recommended that all deliveries are provided with instructions / directions on accessing the site from the Rosshill Road and surrounding local road network. Overall, there will be a short-term slight negative impact to local traffic during the construction phase.

13.1.8.1.1 **Mitigation measures during the construction phase**

The mitigation measures proposed during the construction phase are as follows;

- A detailed haulage plan will be put in place to ensure minimal impact on the surrounding road network.
- All deliveries and removals will be subject to stringent site rules governing the loading / off-loading times, location of loading / off loading, covering of loads and cleaning of vehicles exiting the site, etc.
- No vehicle will be allowed to stop or park on the access road to the proposed development site.
- Ample parking will be provided within the site to cater for the staff and visitors during the construction phases of the proposed development.
- Construction traffic will be managed and scheduled to ensure no queueing occurs on either the internal road system or the main approach roads. The provision of an on-site vehicle staging area will facilitate waiting vehicles.
- Routine sweeping/cleaning of the road and footpaths in front of the site; and
- No uncontrolled runoff to the public road from dewatering/pumping carried out during construction activity.

13.1.8.1.2 **Construction Phase Residual Impacts**

The implementation of the above mitigation measures will assist in managing the significance of the potential impacts however there will remain a short term, imperceptible, negative impact on the surrounding road network.

13.1.8.1.3 **Significance of Effects Arising from Construction Phase**

There will be a slight negative impact due to construction traffic. However, this impact will be short term. This will be mitigated by the introduction of a Design Process Traffic Management Plan (DPTMP). The DPTMP will manage these potential impacts but they shall remain at a similar level. Residual impacts for the construction phase will therefore be short term imperceptible negative effect.

13.1.8.2 **Operational Phase**

Access to the proposed development is to be facilitated via the existing road infrastructure. As previously noted, traffic counts were undertaken at a similar type of mixed residential development and the figures applied pro-rata to the relevant number of housing and apartment units within the proposed development. It is anticipated that 69 trip movements are expected during the AM peak period and 55 movements during the PM peak period. Details of the data utilised are included in Appendix A of the Traffic and Transport Statement, which is itself included as Appendix 13-1 of this EIAR.

Based on the assessment, a number of the junctions assessed are predicted to be approaching or above capacity before the design year. These junctions are predicted to be above capacity in any case without the development, but one will occur earlier with the inclusion of the Development traffic. The Dublin Road/Rosshill Road priority junction is forecast to be above capacity earlier due to the development. Overall, there will be a long-term slight negative pre-mitigation impact to local traffic during the operational phase.

13.1.8.2.1 **Mitigation measures during the operational phase**

Mitigation measures proposed during the operational stage are as follows;

- Provision of “STOP” road markings at the access junctions in accordance with Figure 7.35 of the Traffic Signs Manual (TII, 2019).
- Suitable Lighting of all junctions with lighting columns being positioned at the back of the footways.
- It is proposed to provide advanced warning signs on the Rosshill road as it approaches the site entrance. The signage will be in accordance with Chapter 6 of the Traffic Signs Manual (TSM) for road users travelling in the eastern and western direction towards the entrance to the development.
- The extension of the existing footpath on the Rosshill Road will allow connectivity to the existing Bus Stops on the Dublin Road.
- The provision of bicycle stands to encourage cycling. The proposed extension of the cycle lanes on the Dublin Road will also encourage residents to cycle.
- The existing Oranmore train station on the Galway-Dublin line is 2.8km away and will provide a sustainable alternative to travel by car into the city.
- The development management company will include a GoCar scheme for the apartment blocks.
- Charging points for electric vehicles are being provided for the apartments.

13.1.8.2.2 **Operational Phase Residual Impact**

During the operation of the proposed development (Opening Year) there will be a long term slight negative impact due to increased traffic flows. This will be mitigated by the transportation characteristics integrated into the development as previously noted.

Additionally, during operation there will be an increase in pedestrian and cyclist movements, due to the development's proximate location to the town centre and its services, amenities and public transport facilities and the upgrade of the linkages both on the Dublin Road and the Rosshill Road from the proposed development to the City centre. This will positively impact the proposed development and will assist in reducing dependency on car travel.

Residual impacts for the operational phase will therefore be long term, not significant, and of negative effect.

13.1.8.2.3 **Significance of Effects Arising from Operational Phase**

There will be a long-term negative effect due to the operational phase traffic associated with proposed development. However, this effect will be not significant. The existing road network consisting of junctions and links will experience an increase in traffic levels as noted within the Traffic and Transport Assessment and in the previous sections. This will be mitigated by the introduction of a range of mitigation measures that intrinsically form part of the proposed development, including footpaths, links, traffic and speed management features, co-location of creche, amenities and residential units to reduce the trip levels associated with same, improved pedestrian connections and high-quality cycle parking. These measures will manage the potential impacts to ensure that they shall remain at a similar level. Residual impacts for the operational phase will therefore be long term, not significant, and of negative effect.

13.1.8.3 **Cumulative In-Combination Effects**

The cumulative assessment considered all committed developments within the vicinity of the site. This includes sites which have previously been granted planning permission, but which are yet to become operational. Based on these projects, some potential cumulative impacts are discussed below.

There is only one major housing development adjacent to the proposed site. This consists of:

- 16 No. 2-storey, 5-bedroom, detached houses, together with individual garages. This development was granted planning permission in 2017. The development will be accessed via a new priority junction along the Rosshill Road to the northwest of the site. Work has already commenced on this development. A new footway is also being constructed along the road frontage of the site

An allowance was made in the Traffic and Transport Assessment for the trip generation from the above committed development site based on best predictions using all available information and in keeping with recognised standards. The analysis found that the housing units will result in a minor increase in the traffic on the Rosshill Road with 13 trips predicted in the AM peak hour and 13 trips in the PM peak hour. The analysis indicated that traffic generated from the proposed development will have a minimal effect on the traffic volumes.

This will result in a long term imperceptible negative cumulative impact on local traffic.

13.1.8.4 Residual Impact

As population grows throughout Ireland and in particular, in popular commuting hub areas like Rosshill, a continued increase in traffic volumes is not sustainable. As a result, an ever-increasing approach by designers and planners to providing sustainable commuting alternatives is required. The use of public transport and promotion of walking and cycling will ultimately increase the overall quality of life for the people living in these fast paced, busy towns and villages located within commuter belts.

The proposed development has integrated a number of measures in line with the relevant standards and guidelines, such as DMURS 2019 and the National Cycle Manual, which promotes the use of sustainable travel to and from the site. The Road Safety Audit carried out for the site allowed the design team to address any concerns initially flagged in the Road Safety Audit. A continued and collaborative approach with the road safety auditors meant that a desirable and safe site layout could be achieved without negatively impacting the overall quality of the development.

The use of the private car will still be maintained as a primary mode of transport for a number of the residents in the development. Trip generations to and from the proposed development are 69 in the morning peak and 55 in the evening peak as noted above. The internal roads on the development to be constructed have been suitably designed in accordance with the DMURS manual.

Progressive and regular liaising with Galway City Council Roads Department in relation to the internal roads and the permitted link roads layouts contributed to the final road design for the development.

As noted previously, mitigation measures are to be implemented to promote and encourage more sustainable transport modes. The maintenance of the footpaths on the Rosshill Road will encourage pedestrians to walk to the Dublin Road Bus Stops which are 1.2km away from the site. The proximity of the Bus Stops, along with Galway City Council's improved Bus Service proposals, will encourage pedestrians to utilise the higher frequency Public Transport options. Preliminary discussions have been held by the applicant with local Bus Operators to ascertain the feasibility of the commencement of an active route servicing the development via the existing bus stop on the Rosshill Road.

The proposed development is located close to a number of amenities such as local shops to the east and north of the proposed development, some 12 minutes walking (approx. 1km). A café / restaurant / homewares area is located a 10-minute walk away (800m). Roscam residential estate is 1km to the east and Murrough residential estate 1.2km west. Merlin Park University Hospital is just over 2km from the site. Also, the provision of the creche and local shops onsite will significantly reduce the vehicular trips in and out of the proposed development which are usually associated with these types of amenities.

The above will result in a slight negative cumulative residual impact on local traffic which will not be significant.

13.1.8.5 Significance of Effects

Based on the assessment above, a number of the junctions assessed are predicted to be approaching or above capacity before the design year. These junctions are predicted to be above capacity in any case without the development, but one will occur earlier with the inclusion of the Development traffic. Whilst the Dublin Road / Doughiska Road traffic signal junction is predicted to operate above capacity in the AM peak period, only 7 trips are added to it from the development and those are all travelling away from the City. As they are going against the traffic flow entering the City, they do not decrease the capacity of the City bound traffic lanes. The Dublin Road/Rosshill Road priority junction is predicted to be above capacity earlier due to the development.

As noted previously, there will be a long-term slight negative cumulative residual impact on local traffic. However, this effect will be not significant.

13.2 Summary & Conclusions

13.2.1 Summary

An assessment of the traffic impact of the proposed development in Rosshill was undertaken. The site is forecast to generate 69 vehicle movements during the AM peak and 55 movements during the PM peak times.

The Road Safety Audit carried out for the proposed development during the planning stage considered various aspects such as, junction design, provision for pedestrians, provisions for cyclists and road signage, marking and lighting. Recommendations noted from the independent company undertaking the road safety audit, CST Group Chartered Consulting Engineers, have been taken into account and the concerns raised have either been designed out or will be considered and suitable measures put in place during the detailed design stage.

The proposed development has integrated a number of measures in line with the relevant standards and guidelines, such as DMURS 2019 and the National cycle Manual, which promotes the use of sustainable travel to and from the site.

13.2.2 Conclusion

Based on this assessment it is considered that in general, the traffic generated by the proposed development in Rosshill, Co. Galway will be adequately accommodated on the local highway network in the vicinity. The Dublin Road junctions are predicted to be above capacity without the development traffic in the future design years. The analysis shows that the inclusion of the development traffic will result in a slight increase in the degree of saturation for the junctions.

The proposed Galway Bypass will ultimately reduce traffic flow at these junctions. The development is being phased and this will allow some additional time towards implementation of the bypass. Also, with the implementation of the Operational Phase mitigation measures, such as the pedestrian, public transport and cycling measures, a shift in the modal split can be accomplished resulting in a reduction in the impact on the junction capacities.

13.3 Water and Other Services

13.3.1 Statement of Authority

This section of the EIAR has been prepared by Thomas Blackwell and reviewed by Michael Watson, both in MKO. Thomas Blackwell is a Senior Environmental Scientist and Michael Watson is a Project

Director with MKO; with over 15 and 18 years of experience in the environmental sector respectively. Their environmental experiences involve report writing of Environmental Reports (ER), Environmental Impact Statements/Environmental Impact Assessment Reports (EIS/EIAR) & Strategic Environmental Assessments (SEA) as well as project management of a variety of small and large scale jobs, including residential and commercial development projects.

13.3.2 Consultation

The relevant national and regional authorities and bodies listed in Section 2.7 were consulted to identify any potential impact on material assets. Acknowledgements were received from ESB Networks , Transport Infrastructure Ireland (TII), and the National Transport Authority, but no comments were made on the development. The scoping responses are discussed in further detail in Section 2.7.2 of this EIAR.

13.3.3 Construction Methodology

The construction methodology detailed in Chapter 4 of this EIAR describes the manner in which the proposed development will be constructed, including excavations and installation of services. Prior to works, the area where excavations are planned will be surveyed and all existing services will be identified. All relevant bodies i.e. ESB, Bord Gáis, Eir, Galway City Council etc. will be contacted and all drawings for all existing services sought.

Any underground services encountered during the works will be surveyed for level and where possible will be left in place. If there is a requirement to move the service, then the appropriate body (ESB, Gas Networks Ireland, etc.) will be contacted, and the appropriate procedure put in place. Back fill around any utility services will be with dead sand/pea shingle where appropriate. All works will be in compliance with required specifications. Construction methodologies are described in further detail in Chapter 4 of this EIAR.

13.3.4 Receiving Environment

The existing site is almost entirely a greenfield site, and so the presence of underground services will be limited in extent, if present at all. It is not proposed to do any significant excavation works at the site boundary. With this in mind, the proposed development could have the potential to impact the following:

- Electricity Network
- Telecommunications Networks (including phone and broadband)
- Water Supply Networks
- Wastewater Networks
- Land Use
- Waste Management

13.3.4.1 Electricity

There are some overhead electricity cables on the site of the proposed development. While it is unlikely that there will be any underground electrical services encountered during the construction works (as the site is greenfield agricultural land), there is still a possibility that an issue may occur while carrying out works, particularly at the site boundaries. The striking of an underground electricity cable during construction operations could potentially result in serious injury or death of site staff. Details on the existing electrical cables at the development site are provided in the Mechanical and Electrical Services Report (Appendix 9-1 of this EIAR). All proposed works for the project have been designed to avoid these services as much as possible, but where any moving of electricity lines is required, this will be carried out in consultation with ESBN.

13.3.4.2 Telecommunications

There are no known telecommunication cables within the site of the proposed development. However, there is existing EIR infrastructure that currently runs both along the north and east boundaries via underground ducts and overhead cables. While it is unlikely that there will be any underground telecommunications services encountered during the construction works (as the site is greenfield agricultural land), there is still a possibility that an issue may occur while carrying out works, particularly at the site boundaries. The breaking of an underground telecommunications cable during construction operations could potentially result in disruption to businesses and homes in the area. Details on the existing electrical cables at the development site are provided in the Mechanical and Electrical Services Report (Appendix 9-1 of this EIR). All proposed works for the project have been designed to avoid these services as much as possible.

13.3.4.3 Water Supply

While it is unlikely that there will be any water mains encountered during the construction works (as the site is greenfield agricultural land), there is still a possibility that an issue may occur while carrying out works, particularly near the site boundaries. Rupturing a water main during construction operations could potentially result in disruption to local supply. All proposed works for the project have been designed to avoid this network as much as possible and is provided in the Engineers Services Report (Appendix 4-4 of this EIR). The project has received a confirmation of feasibility for connection to Irish Water assets outside the proposed development.

13.3.4.4 Wastewater Networks

There are no existing wastewater networks within the proposed development site. It is proposed to discharge wastewater from the site via gravity to a proposed new pumping station located in the west of the site and then discharge via rising main to the existing Merlin Park pumping station. Irish Water have confirmed that sufficient capacity is available currently to cater for the proposed development of 102 no. units plus 1 no. creche.

The rising main will transverse through the site located within the roads and connect to an existing rising main on the Rosshill Road previously constructed during the construction of the adjacent development.

13.3.4.5 Land Use

The subject site is currently in use for extensive pastoral livestock grazing. The current statutory planning policy document for the subject lands is the Galway City Development Plan 2017-2023 (GCDP). The plan is generally supportive of high quality residential development provided they adhere to the sustainable development and proper planning of the area and several objectives and policies support this. The subject lands are zoned as a matrix of open space and low to medium density residential.

The proposed development will assist Galway City Council in meeting its commitment to provide for residential development and for associated support development, which will ensure the protection of existing residential amenity and will contribute to sustainable residential neighbourhoods.

The proposed scheme includes a series of measures to encourage/increase the use of public transport, walking and cycling for residents, staff and visitors and for work-related travel and to facilitate travel by bicycle, bus and train.

In summary, it is submitted that the proposed development results in a development which accords fully with the proper planning and development of the area while providing an attractive, high quality, contemporary development which enhances the development of the area.

13.3.4.6 Waste Management

As with any project of this scale, there will be significant volumes of waste produced, both during the construction and operational phases. For the construction phase, a project specific Waste Management Plan (WMP) will be adhered to by all Subcontractors / Specialists and all other site personnel involved in the project. The WMP which will be explained during the induction process for all site personnel. The waste hierarchy will always be employed to ensure that the least possible amount of waste is produced during the construction phase. Reuse of certain types of construction wastes such as broken rock will cut down on the cost and requirement of raw materials therefore further minimising waste levels. The WMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage. Recycling of waste will be the preferred option with disposal of waste to landfill minimised as much as possible. Further details on waste management for the project during both the construction and operational phases are provided in Sections 4.6.1 and in Appendix 4-2, EIAR.

13.3.5 Likely and Significant Impacts and Associated Mitigation Measures

13.3.5.1 Construction Phase

The construction of the proposed development will have no impact on above ground or underground telecommunications networks.

There is the potential for short-term nuisance to users of local networks and services that may be accommodated underground within the works footprint. The overall proposed development will have a short-term, slight, negative impact.

Mitigation

Specific measures are incorporated into the Construction and Environmental Management Plan, included as Appendix 4-2 of this EIAR, to ensure that the construction of the proposed development will not have any adverse effect on any service networks in the vicinity. The mitigation measures include the following:

- Any area where excavations are planned will be surveyed and all existing services will be identified prior to commencement of any works.
- Liaison will be had with the relevant sections of the Local Authority including all the relevant area engineers to ensure all services are identified.
- Excavation permits will be completed and all plant operators and general operatives will be inducted and informed as to the location of any services.

Residual Impacts

There will be an overall short term, imperceptible, neutral impact on telecoms and other services.

Significance of Effects

Based on the assessment above there will be no significant effects.

13.3.5.2 Operational Phase

There will be no operational phase impacts or associated effects on telecoms or other services associated with the proposed development. Wastewater will be accommodated by the public waste

system which has the capacity to treat wastewater from the development. There will therefore be no operational phase impacts on wastewater infrastructure.

13.3.5.3 Decommissioning Phase

The proposed housing development will become a permanent part of the local housing supply, and therefore the requirement for decommissioning is not foreseen. There is therefore considered to be no potential for impacts on telecoms and other services.

13.3.5.4 Cumulative effects resulting from Interactions between various elements of the proposed development

The interaction of the various elements of the proposed development was considered and assessed in this EIAR with regards material assets. The potential for each individual element of the proposed development on its own to result in significant effects on material assets was considered in the impact assessment. The entire project including the interactions between all its elements was also considered and assessed for its potential to result in significant effects on material assets in the impact assessment presented.

All interactions between the various elements of the project were considered and assessed both individually and cumulatively within this chapter. Where necessary, mitigation was employed to ensure that no cumulative effects will arise as a result of the interaction of the various elements of the development with one another.

13.3.5.5 Cumulative In-Combination Effects

The potential cumulative impacts and associated effects between the proposed development and the projects described in Section 2.8.2 of this EIAR, hereafter referred to as the other projects, have been considered in terms of water and other services. Where appropriate the application documentation, EIAR and NIS associated with the other projects have been reviewed to inform the assessment.

The measures outlined above and in the Construction and Environmental Management Plan (CEMP), included as Appendix 4-2 of this EIAR, will eliminate any potential for cumulative effects in relation to telecommunications and other services during the construction phases of the proposed development and the other projects.

There will be no cumulative operational phase effects in relation to water, telecommunications and other services.

14. INTERACTION OF THE FOREGOING

14.1 Introduction

The preceding sections of this Environmental Impact Assessment Report (EIAR) identify the potential environmental impacts that may occur in terms of Population and Human Health, Biodiversity, Land Soils and Geology, Water, Air and Climate, Noise & Vibration, Landscape & Visual, Cultural Heritage and Material Assets (including Traffic), as a result of the proposed development. All of the potential impacts of the proposed development and the measures proposed to mitigate them have been outlined in the preceding sections of this report. However, for any development with the potential for significant environmental impact there is also the potential for interaction amongst these impacts. The result of interactive impacts may either exacerbate the magnitude of an impact or ameliorate it.

A matrix is presented in Table 14-1 to identify interactions between the various aspects of the environment already discussed in this report. The matrix highlights the occurrence of potential positive or negative impacts of the proposed development. The matrix is symmetric, with each environmental component addressed in the previous sections of this report being placed on both axes of a matrix, and therefore, each potential interaction is identified twice. Interaction in the matrix does not imply a cumulative impact.

Table 14-1 Interaction Matrix

	Population, Human Health	Flora & Fauna	Soils & Geology	Hydrology & Hydrogeology	Air & Climate	Noise & Vibration	Landscape	Cultural Heritage	Material Assets
Population, Human Health	Black	Grey	Grey	Pink	Pink	Pink	Yellow	Grey	Pink
Biodiversity, Flora & Fauna	Grey	Black	Pink	Pink	Grey	Pink	Grey	Grey	Grey
Land, Soils & Geology	Grey	Pink	Black	Pink	Grey	Grey	Grey	Grey	Grey
Hydrology & Hydrogeology	Pink	Pink	Pink	Black	Grey	Grey	Grey	Grey	Grey
Air & Climate	Pink	Grey	Grey	Grey	Black	Grey	Grey	Grey	Pink
Noise & Vibration	Pink	Pink	Grey	Grey	Grey	Black	Grey	Grey	Grey
Landscape & Visual	Yellow	Grey	Grey	Grey	Grey	Grey	Black	Grey	Grey
Cultural Heritage	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Black	Grey
Material Assets	Pink	Grey	Grey	Grey	Pink	Grey	Grey	Grey	Black
Legend:	Potential Positive Effect:				Green				
	Potential Neutral Effect:				Yellow				
	Potential Negative Effect:				Pink				
	No Interacting Effect:				Grey				

The potential for interaction of effects, where it exists, has been assessed as part of the Impact Assessment process. This EIAR was edited and collated by MKO as an integrated report of findings from the impact assessment process, rather than a collection of individual assessments carried out in isolation, and impacts that potentially interact have been discussed in the individual chapters of the EIAR above.

14.2 Impact Interactions

Where any potential negative effects have been identified during the assessment process, these impacts have been avoided by design or reduced by the proposed mitigation measures.

14.2.1 Population and Human Health

Population & Human health and Noise & Vibration

The construction phase of the proposed development has the potential to create noise and some vibration, which could give rise to nuisance for occupants of nearby dwellings. Mitigation measures are presented in Chapter 10 to minimise the risk of any such issues. With the implementation of these mitigation measures the residual impact on Population and Human Health will be slight, negative in the short term. As discussed in chapter 10, the implementation of mitigation measures will ensure that there will be no adverse noise impact on the local population or on human health.

Population & Human health and Air & Climate

The proposed development has the potential to create dust and other less noticeable air pollutants, which could give rise to nuisance for occupants of nearby dwellings. Mitigation measures are presented in Chapter 9 to minimise the risk of any such issues.

Population & Human health and Hydrology & Hydrogeology (Water)

Any impacts associated with any development on water has the potential to impact on human health in particular where water abstraction sources are present. The proposed development has limited potential to give rise to water pollution as a result of site activities due to the lack of hydrological feature's on or immediately adjacent the site. Also, there are no water abstraction points in the vicinity of the site. Mitigation measures are presented in Chapter 8 to minimise the risk of any such issues.

Population & Human health and Landscape

Although the scrub and grassland that covers the site will be removed during the construction phase of the proposed development, the restricted visibility of the site ensures that the development will not significantly change the character of the local landscape. The planned landscaping, surrounding residential land use, retention of certain elements of the site and the planting of trees means that the change in landscape character will not be particularly apparent from the outside. The strategic phasing of the construction of the proposed development will also mitigate against potential visual impacts.

Population & Human health and Material Assets (Traffic)

Construction phase vehicle emissions have the potential to impact human health, however, as set out in section 9.3.3.4 it is considered that the risk to human health arising from construction activities is low. Traffic emissions mitigation measures will be implemented on site and as such impacts to human health are predicted to be imperceptible and short-term.

14.2.2 Biodiversity

Biodiversity and Hydrology & Hydrogeology (Water)

Site activities have the potential to give rise to some water pollution (although this is limited), and consequential impacts on flora and fauna that rely on or use that water within the same catchment. These potential impacts have been assessed, and the relevant measures will be in place to avoid any water pollution and subsequent effect on flora and fauna.

Biodiversity, Flora & Fauna and Noise & Vibration

Site activity during the construction of the proposed development has the potential to give rise to noise and some vibration that could disturb fauna. This will occur only during the construction phases which will be temporary and the site is located within an urban area so potential effects are limited. The implementation of the mitigation measures presented in this chapter will ensure that there will be no significant impacts on biodiversity as a result of noise and vibration. Residual impacts on Biodiversity are predicted to be slight, short term, and negative.

Biodiversity and Land, Soils & Geology

The disturbance of soils and potentially bedrock within the proposed development area will result in habitat loss and some disturbance of fauna in the areas surrounding the works area. Where possible, the excavated soil will be used for reinstatement and landscaping works around the site. Residual impacts on Biodiversity are predicted to be slight.

14.2.3 Land, Soils and Geology

Land, Soils & Geology and Hydrology & Hydrogeology

The movement and/or removal of soils, overburden and rock as part of the construction activity has the potential to have secondary impacts on water quality in the absence of mitigation. Mitigation measures are presented in Chapter 7. No residual impacts on Hydrology and Hydrogeology are predicted.

Air and Climate

Air Quality and Climate has a limited number of interactions with other parameters. The most important interaction, in the context of this proposed development, is between air quality and human beings (Population and Human Health). Interactions between air quality and traffic also have the potential to be significant.

Air & Climate and Population and Human Health

Construction phase dust emissions and emissions of other less noticeable air pollutants have the potential to impact human health, however, as set out in section 9.3.3.4 it is considered that the risk to human health arising from construction activities is low. Dust and general emissions mitigation measures will be implemented on site and as such impacts to human health are predicted to be imperceptible and short-term.

Air & Climate and Material Assets (Traffic)

The movement of vehicles both within and to and from the site has the potential to give rise to noise and dust nuisance effects during the construction phase. This is assessed further in Chapter 9 of this EIAR, and mitigation measures are presented to minimise any potential effects.

Traffic related vehicle exhaust emissions have the potential to impact air quality and produce greenhouse gasses during both the construction and operational phases of the proposed development, however as set out in sections 9.2.5 and 9.3.3 of this EIAR mitigation measures will be implemented on site and as such impacts to Air and Climate are predicted to be imperceptible, negative in the short term and imperceptible, neutral in the long term.

14.3 Mitigation and Residual Impacts

Where any potential interactive negative impacts have been identified in the above, a full suite of appropriate mitigation measures has already been included in the relevant sections (Chapters 5-13) of the EIAR. The implementation of these mitigation measures will reduce or remove the potential for these effects. Information on potential residual effects, and their significance, is also presented in each relevant chapter. Based on the implementation of the mitigation measures set out in chapter 5-13 there will be no significant residual interactive impacts.

15. SCHEDULE OF MITIGATION

15.1 Introduction

All mitigation measures relating to the pre-commencement and construction phases of the proposed development are set out in the relevant chapters of the EIAR and associated documents submitted as part of this strategic housing development (SHD) application.

It is intended that the CEMP will be updated where required prior to the commencement of the development, to include all mitigations measures, conditions and or alterations to the EIAR and application documents should they emerge during the course of the planning process and would be submitted to the Planning Authority for written approval.

All mitigation measures proposed for the project are outlined in Table 15-1. The mitigation measures have been grouped together according to their environmental field/topic and are presented under the following headings:

- Construction Management
- Soils and Ground Water Protection
- Drainage and Surface Water Quality
- Biodiversity
- Air Quality and Dust Control
- Noise and Vibration
- Material Assets including Traffic
- Cultural Heritage
- Environmental Management

The mitigation and monitoring proposals are set out in separate tables in the CEMP (Appendix 4-2) for clarity and tracking of the pre-commencement survey requirements. Where particular monitoring proposed is considered to be a measure of mitigation, it has been included in the consolidated table for all mitigation measures proposed (Table 15-1)

The mitigation proposals in the below format provides an easy to audit list that can be reviewed and reported on during the future phases of the project. The proposal for site inspections and environmental audits are set out in the Construction and Environmental Management Plan (CEMP) which is included as Appendix 4-2 of this EIAR.

Table 15-1 Mitigation Measures

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
Pre-Commencement Phase			
1	All measures identified in the Construction Environmental Management Plan, which will be finalised subsequent to any permission granted by An Bord Pleanála and updated prior to construction will include all mitigation measures identified to be adhered to during the pre-commencement, construction and operational phases of the proposed development.		
2	Construction Manager engaged who will also fulfil the role of Environmental Manager (EM), and to monitor all site works and to ensure that methodologies and mitigation are followed throughout construction to avoid negatively impacting on the receiving environment.		
3	<p>Prior to the commencement of any excavation or construction activities, the works area will be clearly demarcated with fencing and no works will take place outside the fences.</p> <p>Where potential for run off from the site is identified (i.e. along the stream to the east) a silt fence will be attached to the fencing and buried beneath the ground to filter any runoff that may occur as a result of the proposed works.</p>		
4	The compound for the site will be of adequate size to accommodate site staff parking appropriate to the level of site activity anticipated for a site of this scale.		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
5	Baseline laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken prior to construction at two locations on the Truskey stream.		
6	An environmental officer with the responsibility for ensuring the environmental measures prescribed in this document are adhered to will be assigned to the project.		
Construction Phase			
Construction Management			
7	A site-specific Health and Safety Plan will be in place for the proposed facility. In the event that Covid-19 restrictions are in place at the commencement of the construction phase, the Health and Safety Plan will include provisions regarding compliance with relevant Covid-19 restrictions. All site staff will be made aware of and adhere to the Health and Safety Plan		
8	A Site Induction Process for all site staff will be maintained which will also ensure all staff will have current 'Safe Pass' cards		
9	Only appropriately qualified and trained personnel will be permitted to operate machinery onsite.		
10	The proposed development site will not be accessible to members of the public. Appropriate barriers and signage will be used. The site will also be secured to prevent the risk of trespass through signage and provision of barriers.		
11	Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place. No batching of wet-cement products will occur on site.		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
12	No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;		
13	Whilst significant inundation of surface or ground water is not anticipated, any such water arisings that require pumping out during construction will be discharged to ground within the site through a silt bag. There will be no direct discharge of construction waters to any watercourse.		
Soils and Ground Water Protection			
14	<ul style="list-style-type: none"> ➤ Excavated (existing) overburden material will be reused on site, where possible; ➤ A minimal volume of topsoil and subsoil will be removed to allow for infrastructural work to take place due to optimisation of the layout by mitigation by design; and, ➤ Construction of service trenching, pumping station and surface water attenuation features will generate excess material, and all excess material will be used locally within the site for landscaping. 		
15	<ul style="list-style-type: none"> ➤ All plant and machinery will be serviced before being mobilised to site; ➤ No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed; ➤ Refuelling will be completed in a controlled manner using drip trays at all times; ➤ Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water; ➤ Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores; 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<ul style="list-style-type: none"> ➤ Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored; ➤ Ancillary equipment such as hoses and pipes will be contained within the bund; ➤ Taps, nozzles or valves will be fitted with a lock system; ➤ Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage; ➤ Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills; ➤ Only designated trained operators will be authorised to refuel plant on site; ➤ Procedures and contingency plans will be set up to deal with emergency accidents or spills; and, ➤ An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment. <p>Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A named person will be given the task of overseeing the pollution prevention measures agreed for the site to ensure that they are operating safely and effectively</p>		
16	Any infill material/landscaping that is required will be placed and levelled in appropriate lift thicknesses to ensure the material is not over compacted thereby retaining it drainage properties.		
Drainage and Surface Water Quality			

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
17	<ul style="list-style-type: none"> ➤ Management of surface water runoff and subsequent treatment prior to release off-site will be undertaken during construction work as follows: ➤ Prior to the commencement of earthwork silt fencing will be placed down-gradient of the construction areas where unmapped drains or drainage pathways are located, if present. These will be embedded into the local soils to ensure all site water is captured and filtered; ➤ As construction advances there may be a small requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground; ➤ Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing; ➤ Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present; ➤ Daily monitoring and inspections of site drainage during construction will be completed; ➤ Earthworks will take place during periods of low rainfall to reduce runoff and potential siltation of watercourses; and, ➤ Good construction practices such as wheel washers and dust suppression on site roads, and regular plant maintenance will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides information on these issues. 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<p>This will ensure that surface water arising during the course of construction activities will contain minimum sediment.</p>		
18	<ul style="list-style-type: none"> ➤ Soil and subsoil excavated at the site will be temporarily stored and used for the landscaping at the proposed development site. The volume removed from the site will essentially be neutral, thus the average thickness of soil/subsoil will remain the same at the site. ➤ Surface water drainage from the site will be directed towards soakaways, which will be constructed in areas of considerable overburden thickness. ➤ There will be no wastewater discharge directly to site. 		
19	<ul style="list-style-type: none"> ➤ On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site and will be towed around the site by a 4x4 jeep to where machinery is located. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations; ➤ Fuels stored on site will be minimised. Any storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction; ➤ The plant used should be regularly inspected for leaks and fitness for purpose; and, ➤ An emergency plan for the construction phase to deal with accidental spillages will be contained within Environmental Management Plan. Spill kits will be available to deal with accidental spillages. 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
20	<ul style="list-style-type: none"> ➤ A self-contained port-a-loo with an integrated waste holding tank will be used at the site compound, maintained by the providing contractor, and removed from site on completion of the construction works; and, ➤ No wastewater will be discharged on-site during either the construction or operational phase. 		
21	<ul style="list-style-type: none"> ➤ No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place; ➤ No washing out of any plant used in concrete transport or concreting operations will be allowed on-site; ➤ Where concrete is delivered on site, only the chute need be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be tanked and removed from the site to a suitable, non-polluting, discharge location; ➤ Use weather forecasting to plan dry days for pouring concrete; and, ➤ Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event. 		
Biodiversity			
22	<p>The development has been designed to retain the vast majority of the woodland within the site boundary and to maintain connectivity with the woodland to the west of the study area, with only a small section of the woodland’s eastern edge to be lost to the development. Whilst no significant loss of woodland will occur, a landscaping plan has been prepared for the proposed development which provides for the replanting of native woodland habitat within the development site to ameliorate any tree loss and to maintain connectivity with the wider landscape.</p>		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
23	<ul style="list-style-type: none"> ➤ A landscaping plan has been prepared for the proposed development (Refer to Appendix 6-4) which includes for the planting of a linear strip of native woodland (70 trees approx.) along the site’s northern boundary to ameliorate any tree loss and ensure there is no net loss in suitable ecological habitat features. ➤ Planting will use predominantly native species found in the wider area. ➤ Access pathways through the woodland will be constructed using a minimalist intervention approach to ensure the preservation of woodland trees. The path will be constructed using a non-dig method using a combination of timber sleepers, cellweb system and gravel to ensure increased access to the root protection areas of the trees occurs in a manner not detrimental to the trees. The pathway will be constructed in a meandering manner so as to avoid the felling of existing trees. ➤ The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site. ➤ Trees to be retained will be protected in accordance with BS: 5837 (Trees in relation to Construction). 		
24	<ul style="list-style-type: none"> ➤ A landscaping plan has been prepared for the proposed development (refer to Appendix 6.4). The plan includes for the planting of trees and treelines (>55 native trees in addition to the native woodland to be planted within the site as described in Table 5.15 above) throughout the site to ameliorate any tree loss and to maintain connectivity to the wider area. Additional street trees will also be planted throughout the site. The number of trees to be planted within the site far outnumber the number of trees to be lost and there will be no net loss in suitable ecological habitat features. 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<ul style="list-style-type: none"> ➤ Planting will use predominantly native species found in the wider area. ➤ The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site. ➤ Trees to be retained will be protected in accordance with BS: 5837 (Trees in relation to Construction). 		
25	<ul style="list-style-type: none"> ➤ Habitat loss will be minimised by temporarily fencing off the construction site during the construction phase of the development and not permitting any construction activity outside this fence. ➤ A pre-construction survey will be undertaken on all trees with suitable potential roost features, to be felled, by a qualified ecologist prior to any works, to ensure there are no roosting bats. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the surveys in 2019 and 2020. ➤ If bats are found to be roosting in any of the structures during the pre-commencement surveys, a bat derogation licence will be obtained, and further mitigation prescribed by a licenced ecologist. 		
26	<p>Where removal of trees or hedgerows is unavoidable, additional hedgerow or tree planting will be carried out using predominantly native species. This has been incorporated into the Landscape Plan. There will be not net loss of linear landscape connectivity</p>		
27	<p>The majority of works, during the construction phase, will occur during daylight hours. Therefore, there will be no requirement for exterior lighting within the site. Where lighting is unavoidable (i.e. health and safety), low-intensity lighting and motion sensors will be used to limit illumination. Exterior lighting, during construction, shall be designed</p>		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<p>to minimize light spillage, thus reducing the effect on areas outside the proposed development, and consequently on bats i.e. Lighting will be directed away from mature trees/hedgerows/treelines around the periphery of the site boundary to minimize disturbance to bats.</p> <p>Directional accessories will be used to direct light away from these features, e.g. through the use of light shields (Stone, 2013). The luminaries will be of the type that prevent upward spillage of light and minimize horizontal spillage away from the intended lands.</p>		
28	<ul style="list-style-type: none"> ➤ A pre-construction badger survey of the development site will be undertaken by a suitably qualified ecologist prior to the commencement of any works to determine if badger have occupied the site. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the surveys in 2019, 2020 and 2021. ➤ If potential setts are identified within 50m of the development they will subsequently be monitored for a minimum period of 2 weeks using remote cameras in order to ascertain use by badgers and levels of activity. All badger survey work will be undertaken in line with current best practice guidance¹. ➤ Should the pre-construction survey identify badger have occupied the site, it will be necessary to apply to NPWS for a licence prior to undertaking any works. ➤ All conditions within the licence will be adhered to and further mitigation prescribed by a licenced ecologist. 		

¹ National Roads Authority (2006) Guidelines for the treatment of badgers prior to the construction of National Road Schemes.

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<ul style="list-style-type: none"> ➤ All works will be completed during daylight hours and there will be no requirement for artificial lighting at any stage of the proposed construction works. 		
29	Where possible, all cutting of trees, scrub and tall vegetation will be undertaken outside the bird nesting season which runs from the 1st March to the 31st August. Any cutting of vegetation that may be required outside the season described above will be supervised by a suitably qualified ecologist to ensure that no birds nests are present. Should nesting birds be encountered, the trees will be left until nesting activity has concluded.		
Air Quality and Dust Control			
30	All vehicles to switch off engines when not in use – no idling vehicles		
31	Effective vehicle cleaning and wheel washing on leaving site and damping down of haul routes		
32	<ul style="list-style-type: none"> ➤ On-road vehicles to comply to set emission standards. ➤ All non-road mobile machinery (NRMM) to be fitted with appropriate exhaust system and be regularly serviced. 		
33	Hard surfacing and effective cleaning of haul routes and appropriate speed limit around site		
34	Dust control will be achieved by: <ul style="list-style-type: none"> ➤ Dampening down the dust at the source ➤ Sheeting will be used as required for stockpiled materials 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<ul style="list-style-type: none"> ➤ Use of barriers such as debris netting on scaffolding around the building to block dust escaping where the building is within 10m of the site boundary where residential properties exist. ➤ Site road ways will be maintained in a stoned hard core condition not allowing soil to accumulate which when dry can create dust. ➤ Wheel wash equipment will be set up at the site exit gate for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways. ➤ Plant and equipment that have the potential to create volumes of dust will have appropriate attachments to allow water source to dampen dust to not allow it to get airborne. ➤ Plant and equipment that have the potential to create volumes of dust will be located away from sensitive receptors where possible. ➤ Deploy Road Sweeper as required on External Roads. ➤ Deployment of dust monitors across the site if required 		
35	<ul style="list-style-type: none"> ➤ All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise. ➤ Machinery were switched off when not in use. 		
36	<ul style="list-style-type: none"> ➤ All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise. ➤ Overburden will be progressively removed from the working area in advance of construction. ➤ Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the building to block dust 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<p>escaping where the building is within 10m of the site boundary where residential properties exist.</p> <ul style="list-style-type: none"> ➤ Site roadways will be maintained in a stoned hard core condition not allowing soil to accumulate which when dry can create dust. ➤ Wheel wash equipment will be set up at the site exit gate for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways. ➤ Plant and equipment that have the potential to create volumes of dust will have appropriate attachments to allow water source to dampen dust to not allow it to get airborne. ➤ Deploy Road Sweeper as required on External Roads. ➤ Dust levels will be monitored visually, on a daily basis by the project Environmental Manager. If dust levels become an issue, then all dust generating activities on site will cease until such time as weather conditions improve (e.g. wind levels drop or rain falls) or mitigation measures such as damping down of the ground are completed. 		
Noise			
37	All vehicles to switch off engines when not in use – no idling vehicles		
38	<p>Best practice measures for noise control will be adhered to onsite during the construction phase of the proposed development. The measures include:</p> <ul style="list-style-type: none"> ➤ Construction operations will in general be confined to the period Monday-Friday 0800-1900 h, and Saturday 0800-1400 h. ➤ Where it is proposed to operate plant during the period 0700-0800 h, standard ‘beeper’ reversing alarms will be replaced with flat spectrum alarms. 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<ul style="list-style-type: none"> ➤ Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times. ➤ Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced. ➤ Queuing of trucks outside the site entrance will be prohibited. ➤ A site representative will be appointed as a liaison officer with the local community. Prior to commencement of construction, contact details for the officer will be circulated to all local residents. The officer will notify local residents of upcoming works phases and likely noise sources. ➤ Where evening or night-time operations are required, local residents will be notified through the liaison officer. ➤ All complaints of noise received during the construction phase will be logged in a register, and investigated immediately. Details of follow-up action will be included in the register. ➤ Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance. ➤ Guidance set out in British Standard BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase. <p>The above mitigation measures relating to noise will be implemented to minimise potential impacts on Human Health during the construction phase</p>		
Material Assets			

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
39	All construction activities will be managed and directed by a Traffic Management Plan (TMP). The details of the TMP will be agreed with the roads department of the Local Authority in advance of construction activities commencing on-site.		
40	<ul style="list-style-type: none"> ➤ A detailed haulage plan will be put in place to ensure minimal impact on the surrounding road network. ➤ All deliveries and removals will be subject to stringent site rules governing the loading / off-loading times, location of loading / off loading, covering of loads and cleaning of vehicles exiting the site, etc. ➤ No vehicle will be allowed to stop or park on the access road to the proposed development site. ➤ Ample parking will be provided within the site to cater for the staff and visitors during the construction phases of the proposed development. ➤ Construction traffic will be managed and scheduled to ensure no queueing occurs on either the internal road system or the main approach roads. The provision of an on-site vehicle staging area will facilitate waiting vehicles. ➤ Routine sweeping/cleaning of the road and footpaths in front of the site; and ➤ No uncontrolled runoff to the public road from dewatering/pumping carried out during construction activity. 		
41	<p>Mitigation measures proposed during the operational stage are as follows;</p> <ul style="list-style-type: none"> ➤ Provision of “STOP” road markings at the access junctions in accordance with Figure 7.35 of the Traffic Signs Manual (TII, 2019). ➤ Suitable Lighting of all junctions with lighting columns being positioned at the back of the footways. ➤ It is proposed to provide advanced warning signs on the Rosshill road as it approaches the site entrance. The signage will be in accordance with 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<p>Chapter 6 of the Traffic Signs Manual (TSM) for road users travelling in the eastern and western direction towards the entrance to the development.</p> <ul style="list-style-type: none"> ➤ The extension of the existing footpath on the Rosshill Road will allow connectivity to the existing Bus Stops on the Dublin Road. ➤ The provision of bicycle stands to encourage cycling. The proposed extension of the cycle lanes on the Dublin Road will also encourage residents to cycle. ➤ The existing Oranmore train station on the Galway-Dublin line is 2.8km away and will provide a sustainable alternative to travel by car into the city. ➤ The development management company will include a GoCar scheme for the apartment blocks. ➤ Charging points for electric vehicles are being provided for the apartments. 		
42	<ul style="list-style-type: none"> ➤ Any area where excavations are planned will be surveyed and all existing services will be identified prior to commencement of any works. ➤ Liaison will be had with the relevant sections of the Local Authority including all the relevant area engineers to ensure all services are identified. ➤ Excavation permits will be completed and all plant operators and general operatives will be inducted and informed as to the location of any services. 		
Cultural Heritage			
43	<ul style="list-style-type: none"> ➤ A pre-construction Geophysical Survey of the proposed development site should be undertaken and a report compiled detailing the results of same. 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<ul style="list-style-type: none"> ➤ A programme of pre-construction targeted archaeological testing of any potential geophysical anomalies within the proposed development site (licensed by the National Monuments Service). This measure will provide greater clarity as to the potential nature and extent of sub-surface archaeological remains if they exist within the site. Should planning permission be granted, by carrying out these measures in advance of construction, it minimises the risk of delays occurring on site due to previously unidentified archaeological features being revealed. The developer will make provision to allow for and fund whatever archaeological work may be required at the site and the post excavation requirements in accordance with the National Monuments Legislation (1930–2004). All recommendations are subject to the approval of the National Monuments Service of the DHLGH. A full report on the findings will be compiled on completion of the testing. ➤ Preservation in-situ and preservation by record may be required depending on the results of the Geophysical Survey and targeted testing. 		
44	<ul style="list-style-type: none"> ➤ A full photographic, descriptive and drawn record of any elements of the range of outbuildings to be directly impacted by the proposed development should be carried out prior to the commencement of any works on site. A report on same should be compiled and submitted to the relevant authorities. ➤ Given the proximity of the remainder of the outbuildings to the proposed development site, measures should be put in place to ensure the preservation of those buildings. A structural engineers report on the buildings should be undertaken to determine any Health and Safety issues or considerations associated with the structures and their future retention. 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<ul style="list-style-type: none"> ➤ A protective buffer zone should be established around the remainder of the outbuildings prior to the commencement of any site works and should be maintained for the duration of the construction phase of the project. 		
45	Construction Stage archaeological monitoring of all topsoil removal associated with the development by a suitably qualified archaeologist. A report on the monitoring will be compiled on completion of the works and submitted to the relevant authorities. Should archaeological finds or features be uncovered during the course of the monitoring the National Monuments Service shall be informed of such findings and further mitigation in the form of preservation in situ or preservation by record (excavation) may be required.		
Environmental Management			
46	Effective vehicle cleaning and wheel washing on leaving site and damping down of haul routes		
47	The machinery used to install the outfalls to the Trusky Stream will be thoroughly cleaned, dried and disinfected prior to arrival on site and before relocating to another site post-works using Virkon 1% biocide and departure from the site to prevent the spread of invasive species such as Asian Clam, Zebra Mussel, Crayfish plague. This process will be detailed in the method statement.		
48	All operatives working on the site will be made fully aware of the environmental responsibilities, conditions and requirements along with a full description of the methods to be employed. This information will be imparted at a dedicated site induction prior to commencing work on the site.		



Mitigation Measure	Mitigation Measure	Audit Result	Action Required
49	The construction management team will be regularly monitoring the works and will be fully briefed and aware of the environmental constraints and protection measures to be employed.		
50	A checklist will be filled in on a weekly basis to show how the measures above have been complied with. Any environmental incidents or non-compliance issues will immediately be reported to the project team.		

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