Planning and Environmental Consultants

Ecological Impact Assessment

Development at Droim na Gaoithe, Baile Chláir

DOCUMENT DETAILS

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Planning and Environmental Consultants

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1. INTRODUCTION

1.1 Background

MKO has been commissioned to conduct an Ecological Impact Assessment (EcIA) of a proposed residential development in Claregalway, Co. Galway (grid ref: M 37312 32235).

The EcIA includes an accurate description of all aspects of the proposed development during construction, operation and decommissioning (where relevant). It then provides a comprehensive description of the baseline ecological environment, which is based on an appropriate level of survey work that was carried out in accordance with the most appropriate guidelines and methodologies. The EcIA then completes a thorough assessment of the impacts of the proposed development on biodiversity. Where likely ecologically significant effects are identified, measures are prescribed to avoid or minimise or compensate for such effects.

1.2 Statement of Authority

Baseline ecological surveys were undertaken on the 16th of February 2022 by Aran von der Geest Moroney (B.Sc.) and assisted by Kieran Sugrue who was on work placement with MKO. Bat activity surveys were undertaken on the 28th July 2022 by Aran von der Geest Moroney (B.Sc.) and assisted by Kieran Sugrue who was on work placement with MKO. This report has been prepared by Aran von der Geest Moroney (B.Sc.) and reviewed by Rachel Walsh (B.Sc.) who has over 2 years' experience in ecological assessment.

1.3 Relevant Guidance

The guidelines listed below were consulted in the preparation of this document to provide the scope, structure and content of the assessment:

- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018, updated 2022).
- Revised guidelines on the information to be contained in Environmental Impact Statements (EPA, 2022).
- Environmental Impact Assessment of National Road Schemes –A Practical Guide (NRA, 2009).
- Guidelines for assessment of Ecological Impacts of National Road Schemes, (NRA, 2009).
- Bat Mitigation Guidelines for Ireland – V2. Irish Wildlife Manuals, No. 134. (Marnell, Kelleher & Mullen 2022)
- Bat Surveys for Professional Ecologists – Good Practice Guidelines (3rd edn.) (Collins, 2016)
- Guidelines for the Treatment of Bats during the Construction of National Road Schemes (NRA, 2006b)

2. DESCRIPTION OF PROPOSED DEVELOPMENT

2.1 Site Location

The proposed development site is located in Claregalway, Co. Galway (grid ref: M 37312 32235). The site is a greenfield site of approximately 6.9 ha which is bordered by the R381 to the west and Lakeview Road to the south.

The location in of the development site in relation to EU Designated Sites is shown in Figure 2-1.

2.2 Characteristics of the Proposed Development

The Development will consist of the construction of a total of 88 residential units, and creche. The proposal includes two estate entrances, one from R381 (to Oranmore) and one from the L7110. The proposed units mix is as follows:

- 2 four bedroom two storey houses,
- 19 three bedroom two storey houses,
- 18 two bedroom two storey houses,
- 15 three bedroom apartments,
- 21 two bedroom apartments,
- 13 one bedroom apartments,
- 1 Crèche.

The development also includes a children's playground to Lakeview Road, landscaped amenity public open space, and IW pumping station, ESB substation and all necessary site development works.

The Proposal also includes car parking, bicycle parking, hard & soft landscaping, site clearance works, roads, footpaths, amenity facilities, public lighting, signage, connections to existing services and all ancillary site development works.

The proposed site layout is provided in Figure 2-2.

2.2.1 Foul Water Management

A pre-commencement connection enquiry has been submitted to Irish Water to establish whether a wastewater connection to Irish Water infrastructure is possible. The letter confirming feasibility of connection is provided in Appendix D of the Civil Works Design Report submitted alongside this report.

The proposed wastewater drainage system for the proposed residential development will consist of a combination of gravity and pumped discharge to an existing local gravity foul sewer situated in the R381 regional road. All gravity sewers shall be laid under roads and open spaces. The proposed layout of the development site drainage can be seen in Appendix I.

Due to the topography of the proposed development site, a pumping station is required to service a portion of the proposed development. This pumping station will be located in the north of the proposed development site and will provide 24-hours storage for approx. 54 no. residential units and 1 no. creche and will comply with the requirements of the IW Code of Practice for Wastewater Infrastructure. Wastewater will be pumped from the pumping station via a proposed 110mm HDPE rising main to a newly constructed discharge manhole and then via gravity will be discharged to the

proposed 150mm foul sewer line. Wastewater generated in the remaining 34 no. residential developments will discharge to the same proposed 150mm foul sewer line. All wastewater generated from the proposed development will ultimately discharge to the existing manhole and 300mm foul sewer line which runs parallel to the R381 across from the proposed development entrance via the proposed 150mm foul sewer line. The foul sewer network within the proposed development site was designed to cater for 90 no. units.

The pumping station will be located 13m from the boundary of the nearest dwelling. The pumping station will allow for a 4m space in front of it (in accordance with Irish Water Standard Detail STD-WW-26) to allow for an occasional tanker or service vehicle to be parked outside. Tanker movements to the pumping station are expected to be minimal and subject to the operational efficiencies of the pumping station. It is anticipated that no more than 2-4 tanker visits would be required per annum.

2.2.2 Surface Water Management

The proposed storm water drainage system for the proposed development has been designed to cater for all surface water runoff from all hard surfaces within the proposed development i.e. roadways, roofs, parking areas etc. Precast concrete gullies including lockable cast iron grating and frame connected to a piped system will be provided to collect run-off from these areas.

It is proposed that the storm water drainage generated within the proposed development site will flow by gravity and discharge via an Oil/ petrol interceptor to 2 no. soakaway units located strategically throughout the development as shown in Appendix I. The soakaway units within the proposed development site will be of cellular storage providing 95% void ratio. All soakaways within the proposed development site are designed to accommodate a 1 in 100 year storm event + 20% for climate change.

2.2.3 Flood Risk Assessment

JBA Consulting have carried out a flood risk assessment (FRA) for the proposed development site located in Claregalway, Co. Galway (grid ref: M 37312 32235). The risk of flooding to the development site via different pathways is outlined below. The full FRA can be seen in Appendix II.

Fluvial Flood Risk

There is no historical evidence for fluvial risk to the development site. The development site is located predominantly within flood zone C, with a small area to the northeast within flood zone B. As such the proposed works adhere to the "The Planning System and Flood Risk Management" guidance. A low risk to fluvial flooding is also outlined within the Clare River Flood Relief Study.

Pluvial Flood Risk

According to the OPW PFRA mapping, the central area of the proposed development site has the potential to act as a collection point for rainfall. Pluvial flooding has the potential to be a risk in conjunction with groundwater flooding. In addition, the transition of the greenfield site to hard standing areas may increase risk of pluvial flooding.

Groundwater Flood Risk

The primary risk to flooding on the development site is that of groundwater flooding. This is due to the high groundwater vulnerability (3-10m bedrock depth) which the majority of the development site is located within. A small proportion located within extreme groundwater vulnerability (0-3m bedrock depth). There is a history of groundwater flooding at the development site. Previous flooding at the development has been attributed to groundwater influences due to turloughs within the vicinity (northwest and south of the development site). The site is considered to be at risk of flooding due to groundwater.

Clare River Flood Relief Scheme

The Clare River Flood Relief scheme was undertaken in order to provide flood relief in the Claregalway and surrounding area. Within the vicinity of the development site flooding was identified to be caused predominantly by groundwater influence, namely two turloughs located south of the development site and north west of the development site. The turlough located to the south of the development site was found to be higher than the turlough at the north west of the development site. A link between the two was identified resulting in groundwater related flooding issues to the north west of the development site. A 1.65km pipeline was constructed and completed in 2018 to reduce the impacts of flooding in regions impacted by groundwater flooding. This pipeline runs along the eastern boundary of the development site with the outfall to the Clare River located c. 60m upstream of the bridge. This pipeline is shown as a green line within This scheme provides a level of flood relief of 1% AEP with an additional 20% allowance for climate change.

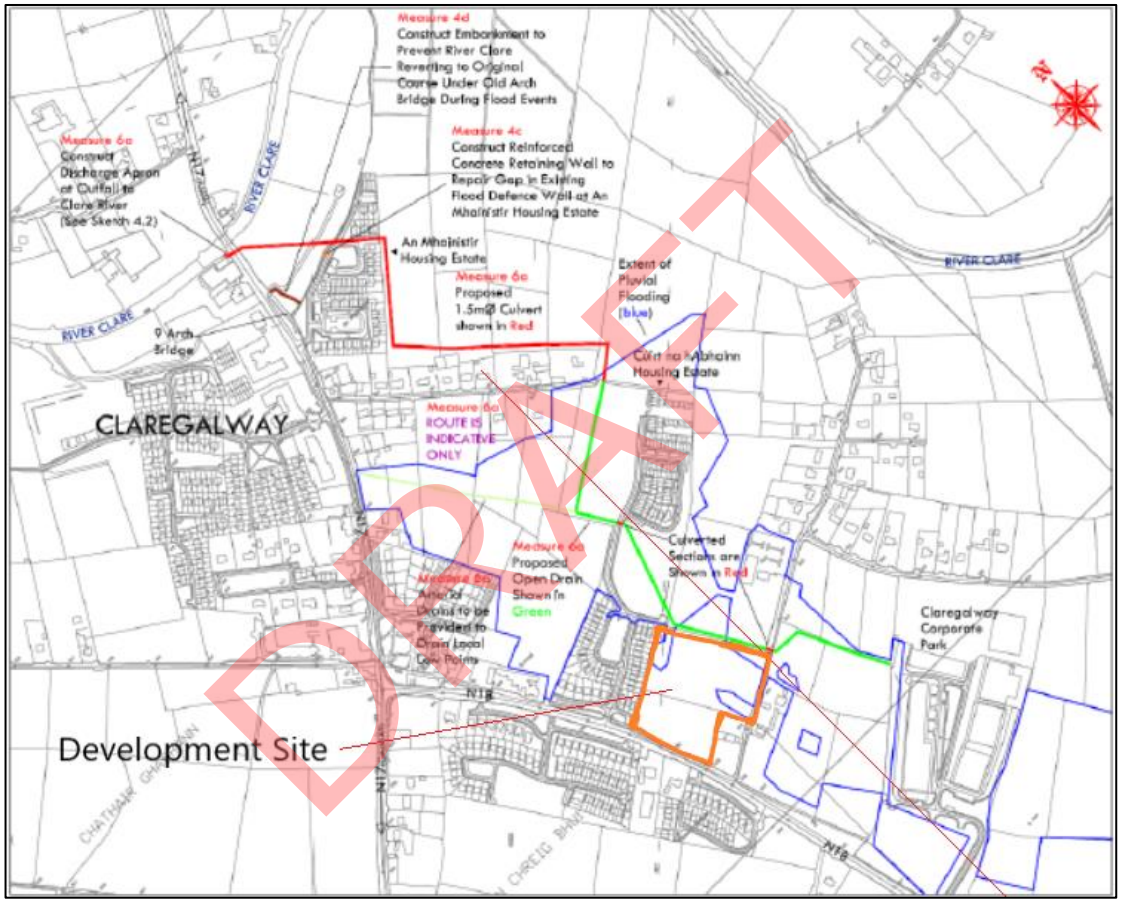

Plate 2-1 Clare Flood Relief Scheme Pipeline (In green) located adjacent to Development Site (In orange) (Image source JBA Consulting).

Suggested FRA mitigations.

Suggested mitigation measures outlined within the FRA prepared by JBA Consulting include the following:

- A surface water drainage system that replicates existing greenfield conditions and that is in accordance to the GDSDS should be considered.
- Finished Floor levels for the development should be set to 1% AEP event levels, including freeboard of 300mm.

The FRA identifies a risk of groundwater flooding within the development site. However, the FRA has concluded that although the CFRAM mapping shows a groundwater flood risk at the site, the Clare

River Flood Relief Scheme has since mitigated the risk of groundwater flooding at the proposed development site.

2.2.4 Landscaping

A landscape plan for the proposed residential development has been prepared and is shown in Appendix III of this report. A linear open space consisting of grass, trees and clipped hedgerow will be implemented along the existing and to be retained stone wall adjacent to the R381 at the east of the proposed development site. This will create a linear area of vegetation that will enhance connectivity with the neighbouring residential development and the lands to the south. Similarly linear sections of trimmed hedging and trees are proposed throughout the site establishing connectivity within the site. Clipped hedging and trees will be planted along the southern boundary of the proposed development site within the retained stone wall and will further add to the connectivity of the site and the surrounding lands. Within the north eastern portion of the site there will be an area of mixed native woodland and mixed wildflower and bulb planting which will aid in the biodiversity of the proposed development site and in keeping with the All Ireland Pollinator Plan.

Planting throughout the proposed development site has been designed among other factors to use biodiverse plants to increase the biodiversity of the site as well as contribute to local biodiversity. Full details on plant species can be found within the landscape plan shown in Appendix III of this report and within the associated landscape report submitted as part of this application.

Approximately 222m of linear vegetation is proposed along the southern and western boundaries of the proposed development site. The open green space, native woodland and pollinator friendly meadows within the northeast of the site covers approximately 0.3ha of the proposed site boundary.

2.2.5 Lighting

The lighting plan for the operational phase of the proposed development, has been designed in accordance with Bat Conservation Ireland (*Bats and Lighting: Guidance Notes for Planners, Engineers, Architects and Developers*, BCI, 2010) and the Bat Conservation Trust (*Guidance Note 08/18 Bats and Artificial Lighting in the UK* (BCT, 2018), to direct light away from important habitat features and minimise light spillage, thus reducing any potential disturbance to bats. The Public Lighting Layout and Reality Lighting Contours drawings can be seen in Appendix IV.

The proposed light fitting/scheme has been designed to help mitigate the effect of the artificial lighting on the local bat populations by incorporating:

- The Upward Light Output Ratio (ULOR) will be 0%. Lighting fixtures will have a 0-degree tilt and will be fitted with back-louvers on the columns to reduce light spill.
- The proposed lighting consists of 'Veelite Metro Streetlight 27w LED Street Optic' and 'Veelite Metro Streetlight 27w LED Forward Throw A Optic' and will be of the LED colour temperature - Warm White (3000K).
- All LED streetlights will be mounted on 6m poles.
- Minimal lighting (<1lux) surrounding the public area in the northern section of the proposed development site to allow for commuting/foraging. Additionally, light spillage on the treeline along the western boundary has been designed with minimum lux levels <2lux in most areas.

2.2.6 Ground Investigations

Irish Drilling Ltd. (IDL) carried out site investigation works at the site of the proposed residential development between 31st January 2022 and 11th March 2022 in order to provide detailed geotechnical

information of the underlying ground conditions at the proposed development. The full Site Investigation Report is submitted alongside this report as part of the application.

Eight cable percussion boreholes were completed to 'refusal' or to client specified depths, with borehole depths ranging between 1.4m and 2.2m below ground level. Five rotary core boreholes were carried out to depths ranging between 7.1m and 24m below ground level. The rotary core boreholes were predominantly carried out in the case where the cable percussive borehole encountered 'refusal'. Nine trial pits were excavated throughout the site with a track excavator. Ground conditions, pit stability, water ingress and services encountered were all recorded. Soil infiltration tests were also carried out at three of the nine trial pits.

Ground Conditions:

Ground conditions consisted predominantly of Glacial Till overlaying bedrock. Intact bedrock was encountered at depths varying from 2.1m to 21m below ground level and is described as 'very strong, thinly to thickly bedded, bioclastic limestone'. Weathered bedrock was also encountered with two boreholes at depths between 6.8m to 11.6m below ground level.

Groundwater:

Groundwater was not encountered in boreholes or trial pits at the time of fieldwork operations. It was noted that 'Groundwater inflows may occur in many areas during the completion of excavations and the rate of inflow will vary with the permeabilities of the soils and rock'.

Geotechnical review:

The water table was not encountered above the depths of recommended shallow foundations however the water table may be at ground level at times of flooding or excessive rainfall.

Map Legend

- Site Boundary
- Special Area of Conservation (SAC)

Drawing Title

Site layout

Project Title	Development at Droim na Gaoithe, Baile Chláir
Drawn By: AvdGM	Checked By: RW
Project No.: 210947	Drawing No.: Fig 2-1
Scale: 1:25000	Date: 12.05.23

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PROPOSED SITE LAYOUT
Scale 1:500

Site Area = 28,001m²/ 2.8Ha (6.9 acres)

Figure 2-2

LEGEND:

- Public Open Space
- Private Open Space
- Home Zone
- Restricted Area as per Galway Co. Development Plan 2017-2023
- Site Area
- Site Area belongs to another owner
- Bin Store
- Car Parking Space
- Bike Stand

UNIT TYPES

TYPE A (4 Bedrooms)
4 BEDS. HOUSE
2 Houses

TYPE B (3 Bedrooms)
3 BEDS. HOUSE
19 Houses

3 BEDS. APARTMENT
15 Apartments

TYPE C (2 Bedrooms)
2 BEDS. HOUSE
18 Houses

2 BEDS. APARTMENT
21 Apartments

TYPE D (1 Bedroom)
1 BED. APARTMENT
13 Apartments

TYPE E (Crèche)
CRÈCHE
1 Unit - 21 Children

88 PROPOSED UNITS + 01 CRÈCHE

NOTE: Landscape included as reference only and subject to Landscape Architect's design.

SITE STATISTICS:

(As required for Housing by Galway Co. Development Plan 2022-2028)

Overall Site Area *(Edged in RED)*:
27,110.04m² Approx. (6.70 acres approx.)

DENSITY
Required : *N/A*
Provided : 33 Units/Ha.

OPEN SPACE
Public:
Required : *15% (4,066.51m²)*
Provided : 26.8%(7,279.75m²)

Private Open Space for Housing is provided in the form of rear gardens of minimum 11m in depth (22m back to back between houses), in compliance with the recommended areas required by the current Galway Co. Development Plan 2022-2028.

New Car Parking calculation
(based on new Galway County Development Plan 2022-2028 requirements)

Houses and Apartments:
4 bedroom units = 2 per unit = 4 car parking spaces required.
1 to 3 bedroom units = 1.5 per unit = 86 x 1.5 = 129 car parking spaces required.

Crèche:
Total capacity = 6 babies (0 to 1 years old)
7 children (1 to 2 years old)
8 children (2 to 6 years old)
Total= 21 (babies & children).

Staff: (0 to 1 years old) 1 staff each 3 children = 2 staff required.
(1 to 2 years old) 1 staff each 5 children = 1 ~ 2 staff required.
(2 to 6 years old) 1 staff each 8 children = 1 staff required.
Total staff required = 5.

Crèche car parking spaces required = 1 space/staff = 5
1 space each 4 children = 5.25 ~ 6

Total = 11 car parking spaces required for the crèche.

Total car parking spaces required:
Dwelling Units = 133 spaces.
Crèche = 11 spaces.

Total overall required = 144 spaces.

Provided:
144 spaces (Total)
Including 6 Disabled parking spaces

BICYCLE STANDS
Required: 1 bicycle spaces per bed for residents, 1 each 2 dwellings for visitors & 1 each car space (Crèche) = 258 bicycle spaces

Provided: 260 Bicycle parking spaces

Comhairle Chontae na Gaillimhe
Galway County Council

Rialtas na hÉireann
Government of Ireland

Housing for All

N

Rev	Description	By	Date
-	-	-	-

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Client:	Galway County Council
Project:	Proposed Housing Development at Baile Chláir. Co. na Gaillimhe
Drawing Description:	Proposed Site Layout Plan
Scale:	1:500 @ A1
Status:	Planning
Drawing No:	210503-03-003
Rev:	
Date:	March 2023
Drawn by:	SF/ WS
Checked by:	BF

3. METHODOLOGY

The following sections describe the methodologies followed to establish the baseline ecological condition of the proposed development site and surrounding area. 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 existing in the absence of proposed activities (CIEEM, 2018, updated 2022).

3.1 Desk Study

A comprehensive desk study was undertaken to inform this ecological impact assessment. This study includes a thorough review of available information that is relevant to the ecology of the site of the proposed development. This information provides valuable existing data and also helps in the assessing the requirement for additional ecological surveys.

The following list describes the sources of data consulted:

- Review of online web-mappers: National Parks and Wildlife Service (NPWS), Environmental Protection Agency (EPA)
- Review of the publicly available National Biodiversity Data Centre web-mapper
- Review of specially requested records from the NPWS Rare and Protected Species Database for the hectad in which the Proposed Development is located.
- Review of NPWS Article 17 Metadata and GIS Database Files

3.1.1 Multi-disciplinary ecological walkover surveys

Multi-disciplinary ecological walkover surveys were undertaken on the 16th of February by Aran von der Geest Moroney (B.Sc., QCIEEM) of MKO and assisted by Kieran Sugrue who was on work placement with MKO, in accordance with NRA *Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes* (NRA, 2009). The study area for the walkover survey included the proposed development site. 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 multi-disciplinary ecological walkover survey comprehensively covered the entire study area.

Habitats were classified 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 suitable habitat for a range of protected faunal species that may occur in the vicinity of the proposed development.

A badger survey was conducted to determine the presence or absence of badger signs within and outside (areas of identified suitable habitat) the *Proposed Development* footprint and study area. This involved a search for all potential badger signs as per NRA (2009) (latrines, badger paths and setts). If encountered, setts would be classified as per the convention set out in NRA (2009) (i.e. Main, Annex, Subsidiary, Outlier).

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).

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

During the multidisciplinary walkover survey, the trees within the proposed development site boundary were assessed for their suitability for bats according to Collins, J. (ed.) (2016) which provides a grading protocol for roosting habitats and for commuting and foraging areas. Suitability categories are divided into *High, Moderate, Low* and *Negligible*.

3.1.2 Bat Survey

3.1.2.1 Ecological Appraisal

During the multidisciplinary walkover surveys, 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*.

3.1.2.2 Daytime Walkover and Roost Assessment

A daytime walkover of the site and a search for roosts was undertaken within the boundary of the proposed development by a licenced ecologist on the 28th of July 2022. The aim was to determine the presence of suitable foraging and commuting habitat, potential roosting locations and the need for further survey work or mitigation.

A walkover was carried out and a detailed inspection of trees and other habitat features was undertaken during daylight hours on the 28th of July 2022. The search comprised a detailed inspection of potential roosting features (PRFs) such as walls and trees to look for evidence of bat use, including live and dead specimens, droppings, feeding remains, urine splashes, fur oil staining and noises (Collins, 2016). Walls were inspected first from ground level and included all cracks, gaps and fractures. Searches were carried out with the aid of torches.

Trees within the site were visually assessed from ground level, for natural features of high value to roosting bats, including knot holes, trunk hollows, splits/cracks in branches and areas of flaking bark and also for signs indicating possible bat use including droppings, staining and scratching of bark and any other potential roost features (i.e. PRFs) identified by Andrews (2018).

3.1.2.3 Dusk Activity Survey

A dusk activity survey was carried out on the 28th of July 2022. Two surveyors were equipped with an active full spectrum bat detector - a Batlogger M (Elekon, Lucerne, Switzerland). The aim of the survey was to observe, listen for and record any bats exiting or entering potential roost sites identified during the daytime inspection, to identify if there were bats present elsewhere within the proposed development site, what bat species were present and to gather any information on bat roosting, foraging and commuting behaviour.

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 dusk survey commenced 10 minutes before sunset and was completed for 2 hours after sunset. Conditions were suitable for bat survey as per Collins (2016) (Table 3-1 below).

July is 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.

Table 3-1 Bat Activity Survey Effort

Date	Surveyor	Type	Sunrise/ Sunset	Weather
28th July 2022	Aran von der Geest Moroney & Kieran Sugrue	Dusk	21:38	17^{0}C, Dry, light air (Beaufort Scale Force 1), no visible moon, 100% Cloud cover

3.1.2.4 Static Detector Survey

One full spectrum bat detector (Song Meter Mini Bat, Wildlife Acoustics, Maynard, MA, USA), was deployed to record bat activity over an extended period. The detector was deployed at a fixed location for 18 nights, between 28th of July and 15th of August 2022. The detector location can be found in Section 5.2.1 and Figure 5-2.

The location of the static detector was selected to record bat activity along potential bat habitats. 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.

All recordings were later analysed using bat call analysis software Kaleidoscope Pro v.5.4.8 (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.

3.2 Methodology for Assessment of Impacts and Effects

3.2.1 Determining Importance of Ecological Receptors

The importance of the ecological features identified within the study area was determined with reference to a defined geographical context. This was undertaken following a methodology that is set out in Chapter 3 of the 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' (NRA, 2009). These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The guidelines provide a basis for determination of whether any particular receptor is of importance on the following scales:

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

The Guidelines clearly set out the criteria by which each geographic level of importance can be assigned. Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and of any importance only in the local area. Internationally Important sites are either 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. Specific criteria

for assigning each of the other levels of importance are set out in the guidelines and have been followed in this assessment. Where appropriate, the geographic frame of reference set out above was adapted to suit local circumstances. In addition, and where appropriate, the conservation status of habitats and species is considered when determining the significance of ecological receptors.

Any ecological receptors that are determined to be of Local Importance (Higher Value), County, National or International importance following the criteria set out in NRA (2009) are considered to be Key Ecological Receptors (KERs) for the purposes of ecological impact assessment if there is a pathway for effects thereon. Any receptors that are determined to be of Local Importance (Lower Value) are not considered to be Key Ecological Receptors.

3.2.2 Characterisation of Impacts and Effects

The proposed development will result in a number of impacts. The ecological effects of these impacts are characterised as per the CIEEM 'Guidelines for Ecological Impact Assessment in the UK and Ireland (2018). The headings under which the impacts are characterised follow those listed in the guidance document and are applied where relevant. A summary of the impact characteristics considered in the assessment is provided below:

- **Positive or Negative.** Assessment of whether the proposed development result in a positive or negative effect on the ecological receptor.
- **Extent.** Description of the spatial area over which the effect has the potential to occur.
- **Magnitude** 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** is defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. For example, five years, which might seem short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species.
- **Frequency and Timing.** This relates to the number of times that an impact occurs and its frequency. A small-scale impact can have a significant effect if it is repeated on numerous occasions over a long period.
- **Reversibility.** This is a consideration of whether an effect is reversible within a 'reasonable' timescale. What is considered to be a reasonable timescale can vary between receptors and is justified where appropriate in the impact assessment section of this report.

3.2.3 Determining the Significance of Effects

The ecological significance of the effects of the proposed development are determined following the precautionary principle and in accordance with the methodology set out in Section 5 of CIEEM (2018).

For the purpose of EcIA, 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local (CIEEM, 2018).

When determining significance, consideration is given to whether:

- Any processes or key characteristics of key ecological receptors will be removed or changed
- There will be an effect on the nature, extent, structure and function of important ecological features
- There is an effect on the average population size and viability of ecologically important species.
- There is an effect on the conservation status of important ecological habitats and species.

The EPA draft guidelines on information to be included in Environmental Impact Statements (EPA, 2017) and the *Guidelines for assessment of Ecological Impacts of National Road Schemes*, (NRA, 2009) were also considered when determining significance and the assessment is in accordance with those guidelines.

The terminology used in the determination of significance follows the suggested language set out in the Draft EPA Guidelines (2017) as shown in Table 3-1 below.

Table 3- 1 Criteria for determining significance of effect, based on (EPA, 2017) guidelines

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 (2019) best practice guidelines the following key elements should also be examined when determining the significance of effects:

1. 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)
2. A 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives (CIEEM, 2019)

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.

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 (2019) 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).

4. DESK STUDY

4.1 Designated Sites

The potential for the proposed development to impact on sites that are designated for nature conservation was considered in this Ecological Impact Assessment.

Special Areas of Conservation (SACs) and Special Protection Areas for Birds (SPAs) are designated under EU Habitats Directive and are collectively known as 'European Sites'. The potential for effects on European Sites is fully considered in the AA Screening Report and Natura Impact Statement that accompanies this application. The European Sites that are within the Zone of Likely Impact are listed in the AASR and are not repeated in this document. The Article 6(3) Appropriate Assessment Screening report identified the potential for the proposed development to result in significant effects on the following European Sites:

- Lough Corrib SAC [000297]
- Lough Corrib SPA [004042]

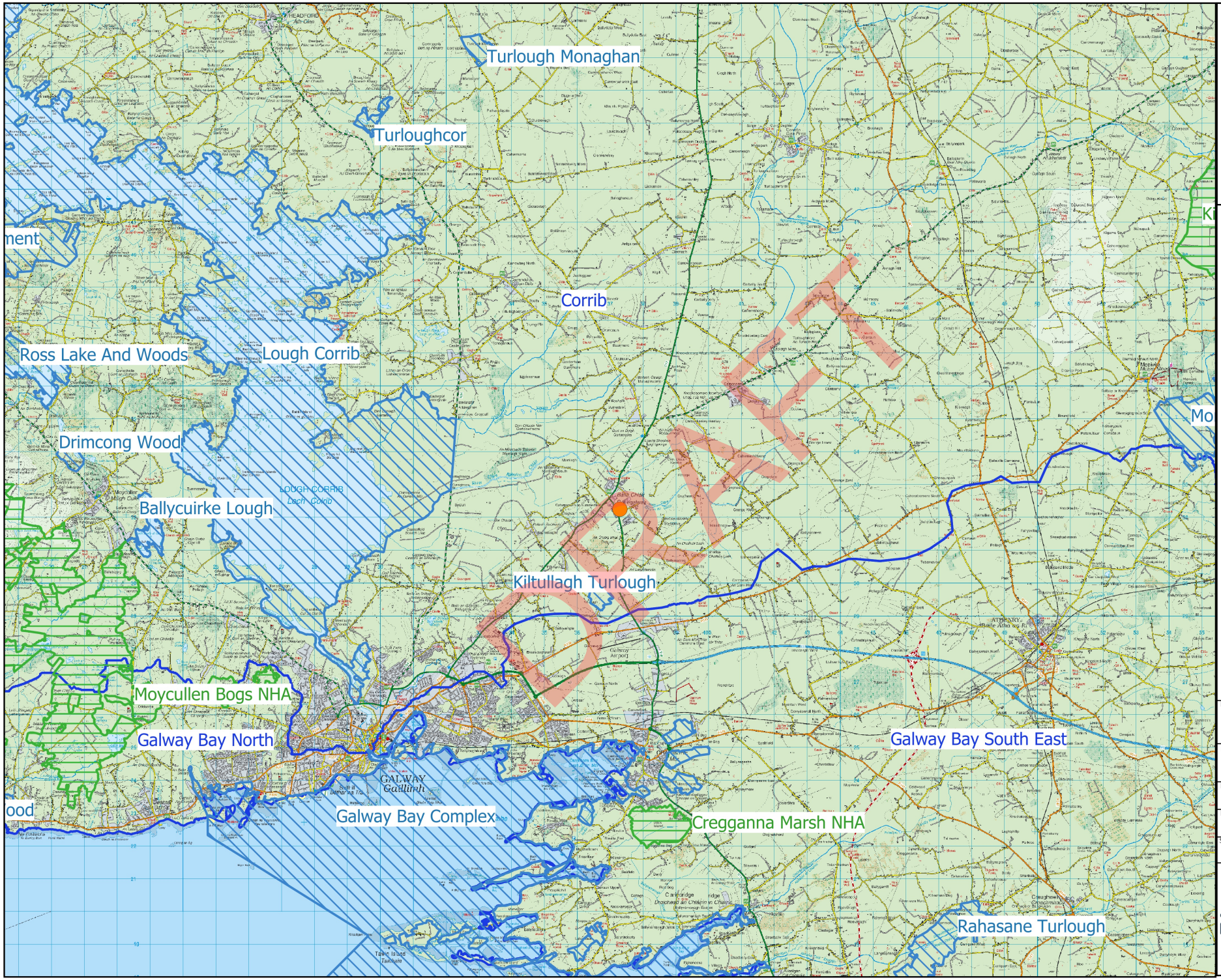
Section 6.4.1 of this EcIA provides a summary of the key assessment findings with regard to European Designated Sites.

Natural Heritage Areas (NHAs) are designated under the Wildlife (Amendment) Act 2000 and their management and protection is provided for by this legislation and planning policy. The potential for effects on these designated sites is fully considered in this EcIA.

Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, the potential for effects on these designated sites is fully considered in Section 6.4.2 of this EcIA.

The following methodology was used to establish which nationally designated sites have the potential to be impacted by the proposed development:

- Initially the most up to date GIS spatial datasets for all nationally designated sites and water catchments were downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie) on the 15/03/2022. The datasets were utilized to identify Designated Sites which could feasibly be affected by the proposed development.
- All Nationally Designated Sites that could potentially be affected were identified using a source-pathway - receptor model. To provide context for the assessment, Nationally Designated Sites surrounding the development site are shown on Figure 4-1. Sites that were further away from the proposed development were also considered.
- A map of all the Nationally Designated Sites around the Development Site is provided in Figure 4-1.
- Catchment mapping was used to establish or discount potential hydrological connectivity between the site of the proposed development and any Nationally Designated Sites. The hydrological catchments are also shown in Figure 4-1. Additionally, the groundwater bodies are shown Figure 4-2.
- Table 4-1 provides details of all relevant Nationally Designated Sites as identified in the preceding steps and assesses which, if any, are within the likely Zone of Impact.
- The site synopses for these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of preparing this report.



Map Legend

- Site Location
- Natural Heritage Area (NHA)
- proposed Natural Heritage Area (pNHA)
- WFD Catchments

Drawing Title
Site Location in Relation to Nationally Designated Sites

Project Title
Development at Droim na Gaoithe, Baile Chláir

Drawn By	Checked By
AvdGM	RW
Project No.	Drawing No.
210947	Fig 4-1
Scale	Date
1:150000	15.03.23

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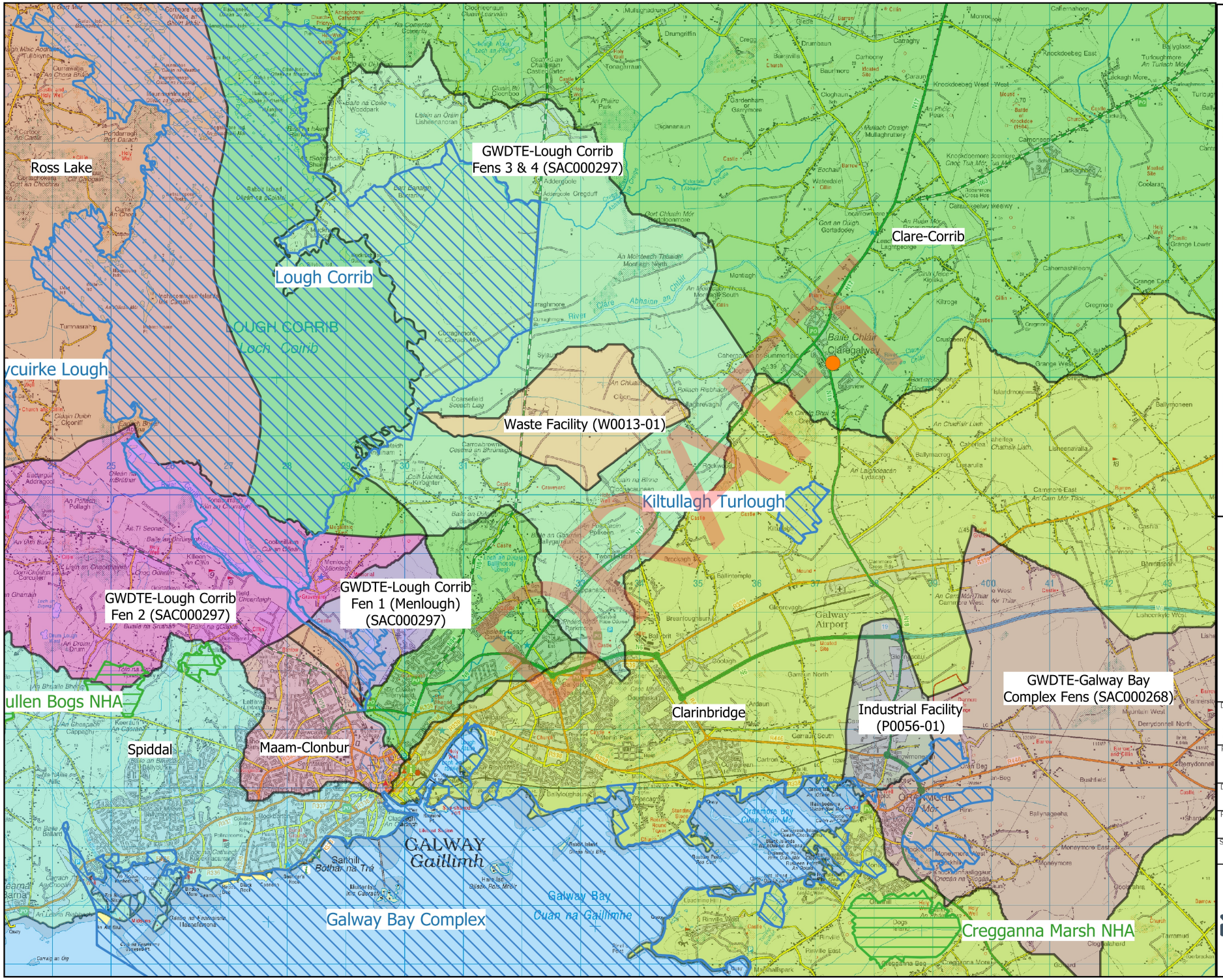

Map Legend

- Site Location
- Natural Heritage Area (NHA)
- Proposed Natural Heritage Area (pNHA)
- Clare-Corrib
- Clarinbridge
- GWDTE-Galway Bay Complex Fens (SAC000268)
- GWDTE-Lough Corrib Fen 1 (Menlough) (SAC000297)
- GWDTE-Lough Corrib Fen 2 (SAC000297)
- GWDTE-Lough Corrib Fens 3 & 4 (SAC000297)
- Industrial Facility (P0056-01)
- Maam-Clonbur
- Ross Lake
- Spiddal
- Waste Facility (W0013-01)

Drawing Title
Site Location in Relation to Nationally Designated Sites and Groundwater Bodies

Project Title
Development at Droim na Gaoithe, Baile Chláir

Drawn By	Checked By
AvdGM	RW
Project No.	Drawing No.
210947	Fig 4-2
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Table 4-1 Identification of Designated sites within the Likely Zone of Impact.

Designated Sites and distance from proposed development	Likely Zone of Impact Determination
Natural Heritage Areas (NHA)	
Cregganna Marsh NHA (000253) **Distance:** 9.0km	This NHA is located 9.0km from the proposed development site. There is no potential for direct effect as the proposed development is outside of the NHA boundary. The site consists predominantly of agricultural grassland habitats and does not provide significant suitable habitat for Greenland white-fronted goose. Given the distance of the NHA from the proposed development and the absence of significant supporting habitat for the designated species, no potential for indirect effects in the form of ex-situ disturbance or displacement exists. Furthermore, the development site is located outside of the core foraging range for Greenland White-fronted Goose (5-8km, SNH 2016). **This site is not within the Likely Zone of Impact and no further assessment is required.**
Moycullen Bogs NHA (002364) **Distance:** 11.4km	The proposed development site is located completely outside of this NHA. Therefore, there is no potential for direct effects. There is no complete source-pathway-receptor chain for impact between the proposed development and this NHA. Given the nature and scale of the proposed works, the separation in distance between the proposed site and these designated sites and the terrestrial nature of the designated habitats, there is no potential for significant indirect effect. **These sites are not within the Likely Zone of Impact and no further assessment is required.**
Proposed Natural Heritage Areas (pNHA)	
Kiltullagh Turlough (000287) **Distance:** 1.9km	There will be no direct effects as the project footprint is located entirely outside this pNHA. The pNHA is designated for a dry turlough. There is no hydrological connectivity between the designated site and the development site as the development site is located within a separate groundwater body to the pNHA. There is no potential for indirect effects. **This site is not within the Likely Zone of Impact and no further assessment is required.**
Lough Corrib (000297) **Distance:** 5.1km	There will be no direct effects as the project footprint is located entirely outside this pNHA. The Clare-Corrib ground water body which the development site is located within has an EPA Ground Waterbodies Risk of "At risk". A potential pathway for effect on the pNHA was identified in the form of percolation of contaminated groundwater into the Clare-Corrib groundwater body which ultimately discharges into the River Clare and Lough Corrib. Therefore, taking a precautionary approach, the proposed works have the potential to cause deterioration in water quality during construction and operation, potentially affecting the pNHA.

Designated Sites and distance from proposed development	Likely Zone of Impact Determination
	This site is within the Likely Zone of Impact and further assessment is required.
Galway Bay Complex (000268) **Distance:** 6.6km	There will be no direct effects as the project footprint is located entirely outside this pNHA. Potential hydrological connectivity was identified between the proposed development and the pNHA via the Clare-Corrib groundwater body, River Clare, Lough Corrib and the River Corrib which discharges to the transitional and marine waters of Galway Bay Complex pNHA downstream of the development site. However, due to the attenuative and assimilative capacity of the River Clare, Lough Corrib and the River Corrib the potential for significant indirect effect on the pNHA is considered to be negligible. In addition, the development site and the pNHA are located within separate ground water bodies. **This site is not within the Likely Zone of Impact and no further assessment is required.**
Turloughcor (001788) **Distance:** 13.5km	There will be no direct effects as the project footprint is located entirely outside this pNHA. The development site is located within a separate subcatchment to the pNHA. In addition, while the proposed development and pNHA are located within the same groundwater body they are located on opposite sides of the Clare River. According to the 1st Draft Clare-Corrib GWB Description June 2004[1] groundwater within the Clare-Corrib groundwater body drains towards Lough Corrib and the Clare River. Therefore, there is no hydrological connectivity between the designated site and the development site There is no potential for indirect effects. **This site is not within the Likely Zone of Impact and no further assessment is required.**
Ballycuirke Lough (000228) **Distance:** 13.8km	There will be no direct effects as the project footprint is located entirely outside this pNHA. There is no hydrological connectivity between the designated site and the development site as the development site is located within a separate subcatchemnt to the pNHA. There is no potential for indirect effects. **This site is not within the Likely Zone of Impact and no further assessment is required.**
Turlough Monaghan (001322) **Distance:** 14.1km	There will be no direct effects as the project footprint is located entirely outside this pNHA. The development site is located within a separate subcatchment to the pNHA. In addition, while the proposed development and pNHA are located within the same groundwater body they are located on opposite sides of the Clare River. According to the 1st Draft Clare-Corrib GWB Description June 2004 groundwater within the Clare-Corrib groundwater body drains towards Lough

[1] *https://gsi.geodata.gov.ie/downloads/Groundwater/Reports/GWB/ClareCorribGWB.pdf*

Designated Sites and distance from proposed development	Likely Zone of Impact Determination
	Corrib and the Clare River. Therefore, there is no hydrological connectivity between the designated site and the development site There is no potential for indirect effects. **This site is not within the Likely Zone of Impact and no further assessment is required.**

4.2 New Flora Atlas

A search was made in the New Atlas of the British & Irish Flora (Preston et al., 2002) 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 square in which the study site is situated (M33), during the 1987-1999 atlas survey. The results of the search are included in the Table below

Table 4-2 Records of species listed under the Flora Protection Order 2015 or the Irish Red Data Book for Vascular Plants [M33].

Common Name	Scientific Name	Status
Wormwood	*Artemisia absinthium*	Red list (VU)
Greater Knapweed	*Centaurea scabiosa*	Red list (NT)
Spring gentian	*Gentiana verna*	Red list (NT)
Autumn gentian	*Gentianella amarella*	Red list (NT)
Corn Marigold	*Chrysanthemum segetum*	Red list (NT)
Northern Dead-nettle	*Lamium confertum*	Red list (NT)
Common Gromwell	*Lithospermum officinale*	Red list (NT)
Tubular Water-dropwort	*Oenanthe fistulosa*	Red list (NT)
Least bur-reed	*Sparganium natans*	Red list (NT)
Autumn lady's tresses	*Spiranthes spiralis*	Red list (NT)
Green Field-speedwell	*Veronica agrestis*	Red list (NT)

4.3 Biodiversity Ireland Database

The National Biodiversity Data centre database was accessed on 14/03/2022 and the following information was obtained. Table 4-3 lists the protected faunal species (excluding birds) recorded within the hectad which pertains to the current study area (M33). The database was also searched for records of Third Schedule non-native invasive species within the hectad. Table 4-4 lists the non-native invasive species recorded within the hectad. Table 4-5 lists all the protected bird species recorded within the hectad which pertains to the current study area.

Table 4-3 NBDC records for protected flora/ fauna records (excl. birds) for hectad M33.

Common Name	Scientific Name	Status
Otter	*Lutra lutra*	Annex II, Annex IV, Wildlife Acts
Pine Marten	*Martes martes*	Annex V, Wildlife Acts
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	Annex II, Annex IV, Wildlife Acts
Brown Long-eared Bat	*Plecotus auratus*	Annex IV, Wildlife Acts
Daubenton's Bat	*Myotis daubentoniid*	Annex IV, Wildlife Acts
Natterer's Bat	*Myotis natterei*	Annex IV, Wildlife Acts
Pipistrelle	*Pipistrellus pipistrellus*	Annex IV, Wildlife Acts
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Annex IV, Wildlife Acts
Lesser Noctule	*Nyctalus leisleri*	Annex IV, Wildlife Acts
Marsh Fritillary	*Euphydryas aurinia*	Annex II
Common Frog	*Rana temporaria*	Annex V Wildlife Acts
Smooth Newt	*Lissotriton vulgaris*	WA
Freshwater White-clawed Crayfish	*Austopotamobius pallipes*	Annex II, Annex V, Wildlife Acts
Badger	*Meles meles*	Wildlife Acts
Red Squirrel	*Sciurus vulgaris*	Wildlife Acts
Irish Hare	*Lepus timidus subsp. hibernicus*	Annex V Wildlife Acts
Irish Stoat	*Mustela erminea subsp. hibernica*	Wildlife Acts
Hedgehog	*Erinaceus europaeus*	Wildlife Acts
Large White-moss	*Leucobryum glaucum*	Annex IV

Annex II, Annex IV, Annex V – Of EU Habitats Directive, WA – Irish Wildlife Acts (1976-2017) FPO= Flora Protection Order.

Table 4-4 NBDC records for Invasive species for hectad M33.

Common Name	Scientific Name
Canadian waterweed	*Elodea canadensis*
Water Fern	*Azolla filiculoides*
Japanese knotweed	*Fallopia japonica*
Brown Rat	*Rattus norvegicus*

Table 4-5 NBDC Records for Birds for hectad M33.

Common Name	Scientific Name	Status
Little Egret	*Egretta garzetta*	Annex I EU Birds Directive
Peregrine Falcon	*Falco peregrinu*	
Corn Crake	*Crex crex*	Annex I EU Birds Directive Red List
Bewicks Sawn	*Cygnus columbianus subsp. bewickii*	
Golden Plover	*Pluvialis apricaria*	
Marsh Harrier	*Circus aeruginosus*	Annex I, EU Birds Directive, Amber List
Kingfisher	*Alcedo atthis*	
Merlin	*Falco columbarius*	
Hen Harrier	*Circus cyaneus*	
Short-eared Owl	*Asio flammeus*	
Common Kestrel	*Falco tinnunculus*	Red List
Redwing	*Turdus iliacus*	
Curlew	*Numenius arquata*	
Barn Owl	*Tyto alba*	
Mallard	*Anas platyrhynchos*	
Common Goldeneye	*Bucephala clangula*	
Dunlin	*Calidris alpine*	
Common Swift	*Apus apus*	
Pochard	*Aythya ferina*	
Common Snipe	*Gallinago gallinago*	
Meadow Pipit	*Anthus pratensis*	
Northern Lapwing	*Vanellus vanellus*	
Northern Shoveler	*Anas clypeata*	
Eurasian Woodcock	*Scolopax rusticola*	
Common Redshank	*Tringa tetanus*	
Grey Wagtail	*Motacilla cinerea*	
Stock Pigeon	*Columba oenas*	

Common Name	Scientific Name	Status
Red Grouse	*Lagopus lagopus*	
Yellowhammer	*Emberiza citronella*	
Garganey	*Anas strepera*	Amber List
Whooper Swan	*Cygnus cygnus*	
Willow Warbler	*Phylloscopus trochilus*	
Red-breasted Merganser	*Mergus serrator*	
Goldcrest	*Regulus regulus*	
Greater White-fronted Goose	*Anser albifrons*	
Herring Gull	*Larus argentatus*	
Lesser Black-backed Gull	*Larus fuscus*	
Great Cormorant	*Phalacrocorax carbo*	
Great Crested Grebe	*Podiceps cristatus*	
Mute Swan	*Cygnus olor*	
Black-headed Gull	*Larus ridibundus*	
Wigeon	*Anas penelope*	
Eurasian Teal	*Anas crecca*	
Common Tern	*Sterna hirundo*	
Common Sandpiper	*Actitis hypoleucos*	
Ringed Plover	*Charadrius hiaticula*	
Barn Swallow	*Hirundo rustica*	
Common Coot	*Fulica atra*	
Common Linnet	*Carduelis cannabina*	
Tree Sparrow	*Passer montanus*	
Gadwall	*Anas strepera*	
Common Starling	*Sturnus vulgaris*	
Northern Wheatear	*Oenanthe Oenanthe*	
Tufted Duck	*Aythya fuligul*	

Common Name	Scientific Name	Status
House Martin	*Delichon urbicum*	
Sand Martin	*Riparia riparia*	
House Sparrow	*Passer domesticus*	
Spotted Flycatcher	*Muscicapa striata*	
Sky Lark	*Alauda arvensis*	

Annex I – Of EU Birds Directive, Red List, Amber List – Birds of Conservation Concern in Ireland (Population for which the species is red, or amber listed in brackets).

4.4 NPWS Data

A data request was sent to the NPWS and data was received in relation to a 5km square surrounding the works area overlapping the grid squares M32, M33, M42 and M43. Table 4-6 lists the rare and protected species records obtained from the NPWS during this study. According to NPWS records, there are no records of Lesser Horseshoe bat roosts within 5km of the development site.

Table 4-6 Records for rare and protected species, NPWS.

Common Name	Scientific Name	Status	Hectad(s)
Otter	*Lutra lutra*	Annex II, IV	M33
Common Frog	*Rana temporaria*	WA, Annex V	M33, M43
Small-white Orchid	*Pseudorchis albida*	FPO, VU	M32, M42
Knotted Hedge-parsley	*Torilis nodosa*	NT	M32
Badger	*Meles meles*	WA	M42, M43
Henbane	*Hyoscyamus niger*	NT	M32
Fly Orchid	*Ophrys insectifera*	NT	M43
Irish Whitebeam	*Sorbus hibernica*	VU	M32
Gentianella amarella subsp. hibernica	*Gentianella amarella subsp. hibernica*	NT	M32
Yellow Horned-poppy	*Glaucium flavum*	NT	M32
Dwarf Mallow	*Malva neglecta*	NT	M32
Wood Bitter-vetch	*Vicia orobus*	FPO, VU	M42, M43
Irish Hare	*Lepus timidus subsp. hibernicus*	WA, Annex V	M32, M33, M42, M43

Common Name	Scientific Name	Status	Hectad(s)
West European Hedgehog	*Erinaceus europaeus*	WA	M32, M42

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].

4.5 National Bat Database of Ireland

The National Bat Database of Ireland was searched for records of bat activity and roosts within a 10km radius of the proposed development site (last search 22/11/2022). Hectads M32, M33, M42 and M43 lie within 10km of the Study Area. Seven of Ireland's nine resident bat species were recorded within 10km of the proposed works. The results of the database search are provided in Table 4-7.

Table 4-7 NBDC Bat Records within 10km of Proposed Development

Hectad	Species	Database	Designation
M32, M33, M42, M43	Lesser Noctule *(Nyctalus leisleri)*	National Bat Database of Ireland	HD Annex IV, WA
M32, M33, M42, M43	Common Pipistrelle *(Pipistrellus pipistrellus)*	National Bat Database of Ireland	HD Annex IV, WA
M32, M33, M42, M43	Soprano Pipistrelle *(Pipistrellus pygmaeus)*	National Bat Database of Ireland	HD Annex IV, WA
M32, M33, M42, M43	Brown Long-eared bat *(Plecotus auritus)*	National Bat Database of Ireland	HD Annex IV, WA
M42, M43	Daubenton's bat *(Myotis daubentonii)*	National Bat Database of Ireland	HD Annex IV, WA
M32, M33, M42	Lesser Horseshoe Bat (Rhinolophus hipposideros)	National Bat Database of Ireland	HD Annex II, HD Annex IV, WA
M33, M42, M43	Natterer's Bat (*Myotis nattereri)*	National Bat Database of Ireland	HD Annex IV, WA

4.6 Bat Species Range

The potential for negative impacts is likely to increase where there are high risk species at the edge of their range. Therefore, range maps presented in the 2019 Article 17 Reports (NWPS, 2019) were reviewed in relation to the location of the proposed development.

The proposed development site is located at the edge of the current known range for Nathusius' pipistrelle and within the known range of all other species.

A review of the NBDC bat landscape map provided a habitat suitability index of 28 (yellow). This indicates that the proposed development area has moderate habitat suitability for bat species.

4.7 Water Quality

4.7.1 EPA Water Quality Data

The EPA Envision map viewer was consulted on the 27th of March 2023 regarding the water quality status of watercourses surrounding the proposed development. The Biotic Index of Water Quality (BIWQ) was

developed in Ireland by the Environmental Protection Agency (EPA). Q-values are assigned using a combination of habitat characteristics and structure of the macro-invertebrate community within the waterbody. Individual macro-invertebrate families are classified according to their sensitivity to organic pollution and the Q-value is assessed based primarily on their relative abundance within a sample.

The proposed development site is located entirely within the Corrib Catchment, Hydrometric Area 30 and within Clare[Galway]_SC_070 sub-catchment and the CLARE (GALWAY)_090 sub-basin.

The Clare [Galway] River {EPA Code: 30C01] is located approx. 640m north east of the development site overland and is part of Lough Corrib SAC. The Clare [Galway] river flows in a westward direction into Lough Corrib, which is located approx. 7km west of the development site overland. While there is no surface water connectivity between the proposed works area and the Clare [Galway] River there is a shared groundwater catchment between the Clare [Galway] River and the proposed works area.

There are three EPA water quality stations along the Clare [Galway] River within the vicinity of the site (Table 4-8).

Table 4-8 Water quality status and Q-values of watercourse in close proximity to the proposed development.

Watercourse Name	Sampling Station	Location	Sampling Year	Q-Value & Water Quality Status
Clare [Galway] River [EPA Code: 30C01]	Cregmore Bridge	E141027.4, N232921.38	2021	Q3 - 4 - Moderate
	Claregalway Bridge	E137283.86, N233237.2	2006	Q4 -Good
	Curraghmore Bridge	E132173, 232847	2009	Q4 – 5 -High

The groundwater catchment, Clare-Corrib, within which the proposed development is located is 'at risk' under the Water Framework Directive.

4.7.2 Inland Fisheries Ireland (IFI)

Inland Fisheries Ireland undertook surveys in the Clare River and its sub-catchments between July 1st and 19th 2019 (IFI 2019). A total of 38 river sites were surveyed on the Clare River Catchment in 2019.

Eight fish species were recorded during the river surveys: Salmon was the most abundant fish species recorded followed by brown trout then stone loach and then three-spined stickleback. Roach, pike, European eel and lamprey species were also recorded.

Inland Fisheries Ireland undertook a fish stock survey of Lough Corrib in 2018 (Connor et al. 2018). Lough Corrib is known internationally for its brown trout fishing. The lake is also known to hold salmon, perch, roach, bream, roach x bream hybrids, eels, three-spined stickleback and pike.

A total of eight fish species and one type of hybrid were recorded on Upper Lough Corrib in June/July 2018. A total of 841 fish were captured. Perch was the most abundant fish species recorded, followed by roach x bream hybrids. Roach, brown trout, pike, salmon, bream, three-spined stickleback and eels were also recorded.

A total of eight fish species and one type of hybrid were recorded on Lower Lough Corrib in June 2018. A total of 567 fish were captured. Perch was the most abundant fish species recorded, followed by roach. Roach x bream hybrid, pike, brown trout, three-spined stickleback, salmon, stone loach and eels were also recorded.

Lough Corrib was also surveyed in 2008, 2011 and 2014 as part of the Water Framework Directive surveillance monitoring programme (Kelly et al., 2009, 2012a and 2015). During the 2014 survey, roach followed by perch were found to be the dominant species present in the lake. Brown trout, salmon, three-spined stickleback, nine-spined stickleback, pike, roach x bream hybrids, rudd, stoneloach and eels were also captured during the survey. Salmon were not recorded during the 2008 survey.

Roach is a non-native invasive fish which was first identified in Lower Lough Corrib in the early 1980s. The aquatic plant, curly waterweed (*Lagarosiphon major),* is an invasive plant identified in the lake in 2005 and has excluded native species from bays in which it has established. Zebra mussel (*Dreissena polymorpha)* is another invasive species which was first recorded in Lough Corrib in 2007.

Both Lower Lough Corrib and Upper Lough Corrib have been assigned an ecological status of 'Good' for 2018 based on the fish populations present (Connor et al. 2018). Lower Lough Corrib was assigned an ecological status of Poor in 2008 and Moderate in both 2011 and 2014. Upper Lough Corrib was assigned an ecological status of Poor in 2011 and Good for both 2008 and 2014.

4.8 Geological Survey Ireland (GSI)

The development site is located within a Regionally Important Aquifer - Karstified (conduit). The GSI groundwater vulnerability for the majority of the site is regarded as 'High' with the northeast of the regarded as 'Extreme' (Plate 4-1).

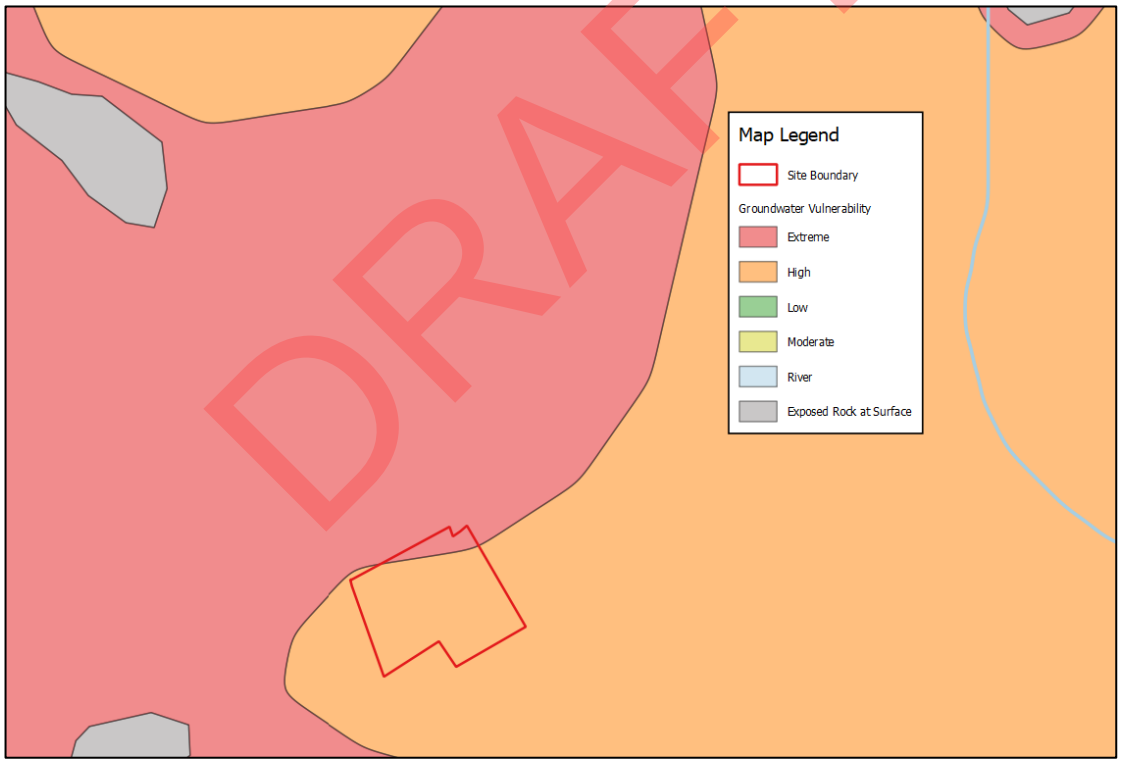

Plate 4-1 Groundwater vulnerability in the vicinity of the site as mapped by Geological Survey Ireland (GSI).

4.8.1 Freshwater Pearl Mussel

The Clare[Galway] River is not a priority Freshwater Pearl Mussel river listed under S.I. No. 296/2009 - The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. There are no NPWS records of Freshwater Pearl Mussel downstream of the development site.

5. FIELD STUDY

5.1 Habitats within the site

5.1.1 Description of the Baseline Ecological Environment

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 existing in the absence of proposed activities (CIEEM 2018, updated 2022).

A multidisciplinary ecological walkover survey of the site was conducted on the 16th of February 2022 in line with NRA (2009) guidelines (Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes) by Aran von der Geest Moroney (B.Sc., QCIEEM) and Cillian Burke (B.Sc.). All habitats were readily identifiable during the time of the walkover survey.

The proposed development site consists predominantly of grassland habitat classified as Improved agricultural grassland **(GA1)** (Plate 5-1). The areas of Improved agricultural grassland were dominated by perennial rye grass (*Lollium perenne*) with broad leaved dock (*Rumex obtusifolius*), clover (*Trifolium repens*), creeping buttercup (*Ranunculus repens*), daisy (*Bellis perennis*), dandelion (Taraxacum *officinale agg*.) and *Rhytidiadelphus squarrosus* occurring throughout. The grassland was heavily poached and at times wet underfoot.

The site is bordered to the west and partially to the south by stone walls classified as Stone walls and other stonework **(BL1)** (Plate 5-2), with a scattered mature ash dominated treeline **(WL2)** comprising the remainder of the southern boundary (Plate 5-3). The site is bordered to the north by a combination of concrete block wall classified as Buildings and artificial surfaces **(BL3)** and a bramble (*Rubus fruticosus*), blackthorn (*Prunus spinosa*) and hawthorn (*Crataegus monogyna*) dominated hedgerow **(WL1)** (Plate 5-4). The site is bordered to the east by an ivy (Hedera spp.), bramble, blackthorn and hawthorn dominated hedgerow **(WL1)** with occasional mature ash trees (*Fraxinus excelsior*) (Plate 5-5).

A blackthorn and hawthorn tall hedgerow **(WL1)** runs in a south easterly direction from the northern boundary and partially bisects the site (Plate 5-6). There are two areas of recolonising gravel classified as recolonising bare ground **(ED3)** located within the site boundary (Plate 5-7).

There were no drains located within the site or leading off the site.

The site is bordered by the R381 to the west (Plate 5-8), lakeview road and an area of land with a mosaic of grassland, scrub and artificial habitats to the south (Plate 5-9), a residential area to the north and GAA sports pitches to the east.

No species listed as a Third Schedule Invasive Alien Species (IAS) of the European Communities Regulations 2011 (S.I. 477 of 2015) was recorded within the development site boundary.

There were no Annex I habitats or Annex II fauna associated with the Lough Corrib SAC or SCI species of the Lough Corrib SPA recorded during the site visit

Plate 5-1 Improved agricultural grassland (GA1) heavily poached in areas.

Plate 5-2 Stone wall boundary to the south of the site classified as Stone walls and other stonework (BL1).

Plate 5-3 Scattered mature ash dominated treeline (WL2) at south eastern boundary of site.

Plate 5-4 Combination of concrete block wall classified as Buildings and artificial surfaces (BL3) and a bramble, blackthorn and hawthorn dominated hedgerow (WL1) located at the north of the site.

Plate 5-5 Ivy, bramble, blackthorn and hawthorn dominated hedgerow (WL1) with occasional mature ash trees in the background with heavily poached agricultural grassland in the foreground.

Plate 5-6 Blackthorn and hawthorn tall hedgerow (WL1) which partially bisects the site.

Plate 5-7 Area of recolonising gravel classified as recolonising bare ground (ED3) located in the north western corner of the site

Plate 5-8 R381 located west of the site.

Plate 5-9 Lakeview Road and area of land with a mosaic of grassland, scrub and artificial habitats located south of the site.

Map Legend

- Site Boundary
- Buildings and Artificial Surfac
- Hedgerows (WL1)
- Treelines (WL2)
- Stone Walls and Other Stone
- Recolonising bare ground
- Improved agricultural grassla

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Drawing Title

Habitat Map

Project Title	
Development at Droim na Gaoithe, Baile Chláir	
Drawn By: AvdGM	Checked By: RW
Project No.: 210947	Drawing No.: Fig 5-1
Scale: 1:1500	Date: 23.05.22

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5.2 Fauna

5.2.1 Bats

5.2.1.1 Bat Habitat Appraisal

The proposed development site was surveyed for its suitability for bats species in order to determine the extent of suitable roosting, commuting and foraging habitat available to bats within the site.

The Treeline (WL2) that makes up the south western boundary is outside of the proposed development and will be retained. Hedgerows (WL1) make up the eastern and northern site boundaries and partially bisect the development in a south easterly direction. The hedgerow with mature ash trees located along the eastern boundary of the proposed development site will be retained. These hedgerows contain predominantly tall hawthorn (*Crataegus monogyna),* blackthorn (*Prunus spinosa),* bramble (*Rubus fructicosus*) and include occasional mature ash trees (*Fraxinus excelsior).* Several ash trees within these hedgerows and within a treeline at the southwest of the site are covered with ivy (*Hedera hibernica).* Hedgerows and treelines within the site boundary provide connectivity throughout the site and to the wider area. As such they are considered to have *Moderate* suitability for commuting and foraging bats.

There is a block wall located at the northern boundary classified as Buildings and artificial surfaces (BL3). This wall provides a linear feature at the north of the site suitable for commuting and foraging bats in conjunction with a hedgerow. It is therefore considered to have *Moderate* suitability.

Low level Stone walls and other stonework (BL1) border the west and south of the proposed development site. They are considered to have *Moderate* suitability for commuting and foraging due their linear nature and connectivity to the treelines in the wider area.

All other habitats present were assigned a *Negligible* value for commuting and foraging bats.

5.2.1.2 Daytime Roost Inspection Survey

A search for roosts was undertaken within the boundary of the proposed development by a licenced ecologist. The aim was to determine the presence of roosting bats, potential access points, roosting locations and the need for further survey work or mitigation.

A walkover was carried out and detailed inspections of potential roosting features (PRF's) (Andrews, 2018) was undertaken during daylight hours on the 28th of July 2022. The search comprised a detailed inspection of walls and trees to look for evidence of bat use.

Trees within the proposed development site were visually assessed from ground level, for natural features of high value to roosting bats including knot holes, trunk hollows, splits/cracks in branches and areas of flaking bark and for signs indicating possible bat use including droppings, staining and scratching of bark and any other PRFs identified by Andrews (2018). Trees within the site were comprised predominantly of hawthorn and blackthorn hedgerows with scattered ash trees to the south. The hawthorn and blackthorn trees did not provide any suitable gaps, crevices or cracks in which bats may roost. As such, they were assessed as having *Negligible* roosting potential. Some ash trees contained dense ivy cover which could be used by roosting bats (Plate 5-10 and 5-11). As such, mature ash trees within the site containing ivy cover were assessed as having *Moderate* suitability for roosting bats (Collins 2016).

The concrete brick walls within the site contained some small gaps with potential for roosting bats (Plate 5-12). Following an inspection, no evidence of roosting bats was observed. However, the gaps in the concrete block wall may be used opportunistically by roosting bats. The low-level stone walls located in

the southern portion of the proposed development site did not provide suitable roosting opportunities and were thus assessed as having Negligible roosting potential.

All other habitats located within the proposed development site were considered to have *Negligible* suitability for roosting bats.

Plate 5-10 Treeline and low stone wall at the southwest of the development site with ivy cover (Hedera hibernica).

Plate 5-11 Ash (Fraxinus excelsior) with ivy cover (Hedera hibernica).

Plate 5-12 Concrete block wall located to the north of the development site with some visible gaps.

5.2.1.1 Dusk Activity Survey

A walked dusk activity survey was conducted on the 28th July 2022. Bats were observed commuting and foraging in the area with activity was concentrated along hedgerows and treelines. Overall bat activity was dominated by Soprano pipistrelle (n=24). Common pipistrelle (*Pipistrellus pipistrellus*) (n=13) and Leisler's bat (*Nyctalus leisleri*) (n=9) were also recorded on site. Activity on the site was generally low, with no bats observed emerging or re-entering any of the trees or walls within the site.

5.2.1.2 Static Detector Survey Results

One full spectrum bat detector (Song Meter Mini Bat, Wildlife Acoustics, Maynard, MA, USA), was deployed to record bat activity. The detector was deployed at a fixed location (Figure 5-2) for 18 nights, between 28th of July and 15th of August 2022. The bat detector allowed a specified look into species composition, commuting and foraging activities within the site.

In total, 963 bat passes were recorded. Analysis of the detector recordings positively identified four bats to species. Instances of *Myotis spp.* are classified to genus level due to the difficulty in distinguishing between individual species using sonograms. Activity was dominated by Soprano pipistrelle (*Pipistrellus pygmaeus)* (n=619). This was followed by Leisler's bat *(Nyctalus leisleri)* (n=165) and Common pipistrelle *(Pipistrellus pipistrellus)* (n=159). Instances of *Myotis* spp. (n=13) and Brown long-eared bat (*Plecotus auratus)* (n=7) were recorded less frequently. The species composition recorded is shown in Plate 5-13 along with bat passes per night in Plate 5-14.

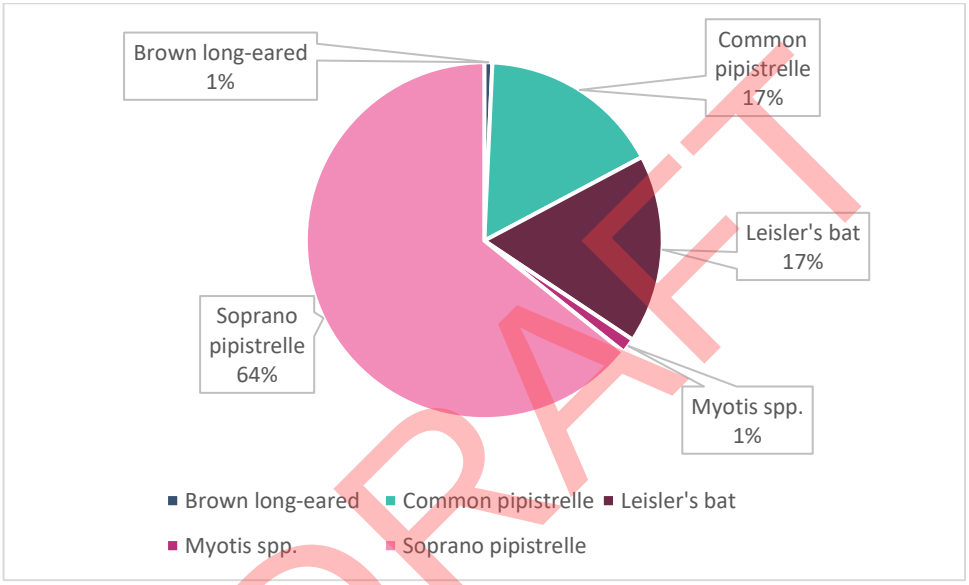

Plate 5-13 Static Detector Species Composition

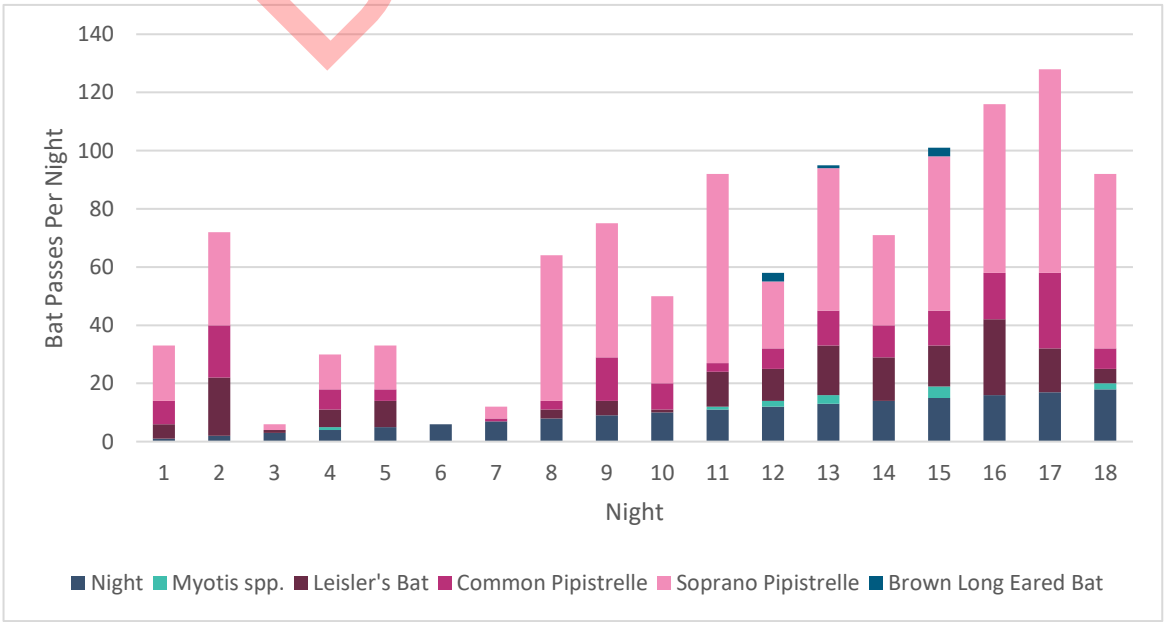

Plate 5-14 Static Detector Survey – Total Bat Passes Per Night

Map Legend

- Site Boundary
- Bat Detector Location
- Dusk Transect Route
- Leisler's bat
- Common pipistrelle
- Soprano pipistrelle

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Drawing Title
Bat Activity and Bat Detector Location

Project Title
Development at Droim na Gaoithe, Baile Chláir

Drawn By	Checked By
AvdGM	RW
Project No.	Drawing No.
210947	Fig 5-2
Scale	Date
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5.2.2 Birds

No bird species associated with any European Sites were recorded within the proposed development site during the site survey.

Birds recorded within the site included an assemblage of widespread species including blackbird (*Turdus merula*), pied wagtail (*Motacilla alba yarrellii*), starling (*sturnus vulgaris*), hooded crow (*Corvus cornix*), jackdaw (*Corvus monedula),* rook (*Corvus frugilegus*), and great tit (*Parus major*).

5.2.3 Mammals

The development site was comprehensively surveyed for mammals. A mammal trail was observed along the eastern boundary of the development site however no other mammal signs were observed within the development area. No evidence of badger was found within the proposed development site boundary, i.e., there were no setts, mammal tracks, snuffle holes or latrines recorded. There are no drains or other watercourses within the development site and no suitable habitat for otter, however, otter are known to occur within the Clare River located approx. 660m from the development site.

5.2.4 Other Faunal Taxa

The desk study identified records for the Annex II species marsh fritillary (*Euphydryas aurinia*) in the 10km hectad, M33, within which the proposed development is located. The site was assessed for suitable marsh fritillary habitat during the ecological walkover surveys. 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.

Freshwater Pearl Mussel (*Margaritifera margaritifera)* is not known to occur within the Clare [Galway] River. There are no NPWS records for the species downstream of the development site.

No evidence of any other protected faunal taxa was recorded within the site of the proposed development. The habitats within the site are typical of grazing and poaching by horses.

5.3 Importance of Ecological Receptors

Table 5-1 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, species and designated sites that are Key Ecological Receptors.

Table 5-1 Importance of Ecological Receptors.

Habitat and Geographic Importance	KER Y/N	Rationale
Habitats		
The River Clare (Depositing/ Lowland River FW2) **International Importance**	**Yes**	Groundwater flows from the development site likely drain into the Clare River providing potential connectivity between the development site and the River Clare. Therefore, potential for indirect effects on this designated site as a result of water pollution arising from the construction and operational phases of the development was identified. The River Clare is considered of international importance due to its designation as an SAC. The River Clare is therefore considered as a KER and will be considered under Lough Corrib SAC.
Hedgerow (WL1) **Local importance (higher value)**	**Yes**	This habitat provide potential connectivity and ecological corridors between features of higher ecological value in the surrounding environment, and potential nesting/roosting and commuting or foraging habitat for bird and bat species. The hedgerow to the north of the development site and partially bisecting the site, totalling to 211m, will be removed while the hedgerow present to the east of the development site will be retained. Hedgerow habitat is therefore included as a KER.
Treelines (WL2) **Local importance (higher value)**	No	This habitat provide potential connectivity and ecological corridors between features of higher ecological value in the surrounding environment, and potential nesting/roosting and commuting or foraging habitat for bird and bat species. Treeline located to the south west of the development site as well as mature trees located to the south east of the development site will be retained. There will be no loss of Treeline as a result of the proposed development. Therefore, treeline habitat is not included as a KER.
Habitats of Local importance (lower value):	No	These habitats are classified as of *Local Importance (Lower value)* as they are highly modified and/or are common and widespread in a local, national and international context. These habitats are therefore not included as KERs.

› Improved agricultural grassland (GA1) › Stone Walls and Other Stonework (BL1) › Buildings and Artificial surfaces (BL3) › Recolonising Bare Ground (ED3)		
Fauna		
Bats **Local importance (higher value)**	**Yes**	The results of the bat survey, carried out on 28th July 2022, indicates that the proposed development site does not provide significant suitable habitat for a roosting bat population of ecological significance. No roosting bats were identified during the surveys. However, a number of ash trees located to the southwest and south east of the site were identified as having *Low - Moderate* roosting potential. These trees will be retained as part of the proposed development. Treelines and hedgerows within the site provide connectivity to the wider environment and are considered to be of *Moderate* suitability for commuting and foraging bat species (Collins, 2016). The hedgerows located to the north of the site and partially bisecting the site are to be removed, resulting in a reduction of 211m of hedgerow. Bats as an Ecological Receptor have been assigned Local Importance (Higher value) on the basis that the habitats within the proposed development site are utilized by a regularly occurring bat population of Local Importance. Furthermore, habitats within and adjacent to the proposed development site may be used by foraging and commuting bats. All bat species in Ireland are protected under the Bonn Convention (1992), Bern Convention (1982) and the EU Habitats Directive (92/43/EEC). Additionally, in Ireland bat species are afforded further protection under the Birds and Natural Habitats Regulations (2011) and the Wildlife Acts 1976-2022. Bats are therefore included as KERs.
Birds **Local importance (higher value)**	**Yes**	The proposed development will result in the removal of 211m of hedgerow from the development site. This will reduce available nesting and foraging habitat for local birds in the area. Therefore, Birds are considered as a KER due to the potential for loss of foraging and nesting habitat.
European Designated Sites		

› **Lough Corrib SAC** › **Lough Corrib SPA** **International Importance**	**Yes**	There is potential groundwater connectivity between the proposed development site and these European Sites and therefore potential for indirect effects on these designated sites as a result of water pollution arising from the construction and operational phases of the development was identified. Therefore, these European Sites are included as a KER.
Nationally Designated Sites		
Lough Corrib pNHA **National Importance**	**Yes**	There is potential groundwater connectivity between the proposed development site and this pNHA and therefore potential for indirect effects on this designated site as a result of water pollution arising from the construction and operational phases of the development was identified. Therefore, this pNHA is included as a KER and will be considered under Lough Corrib SAC and Lough Corrib SPA.

6. ECOLOGICAL IMPACT ASSESSMENT

6.1 Do Nothing Impact

The site of the proposed development consists predominantly of agricultural grassland habitats with a hedgerow partially bisecting the site and hedgerows and treelines bordering the site boundaries. If the proposed development were not to go ahead, it is likely that the development site would remain under its current grazing regime.

6.2 Impacts during Construction

6.2.1 Habitats

6.2.1.1 Loss of Habitat

6.2.1.1.1 *Habitats of Local Importance Lower Value*

The development footprint will result in the permanent loss of approx. 0.03 ha of recolonising bare ground (ED3), and approximately 2.6 ha of agricultural grassland (GA1).

These are common habitat types in a local and national context and have been assigned Local importance (lower value).

The loss of habitats of local importance (lower value) is not significant at any geographical scale.

6.2.1.1.2 *Habitats of Local Importance Higher Value*

The treeline (WL2) to the south west of the development site and hedgerow (WL1) habitats within and adjacent to the site are considered to be of local importance (higher value).

The proposed development will result in the permanent loss of approx. 211m of hedgerow (WL1). This hedgerow contributes to the biodiversity of the site and to ecological and habitat connectivity throughout the site and with the wider area. In the absence of mitigation, the loss of a 211m of hedgerow is considered to be a permanent moderate negative effect at the local scale.

A site specific landscape plan has been developed for the proposed development site and can be found in Appendix III of this report.

The below mitigation measures are in place:

Mitigation

- A linear open space consisting of grass, trees and clipped hedgerow will be implemented along the existing and to be retained stone wall adjacent to the R381 at the east of the proposed development site.
- Linear sections of trimmed hedging and trees are proposed throughout the site establishing connectivity within the site.
- Clipped hedging and trees will be planted along the southern boundary of the proposed development site within the retained stone wall and will further add to the connectivity of the site and the surrounding lands.
- In total approximately 222m of linear vegetation is proposed along the southern and western boundaries of the proposed development site. This will enhance connectivity with the neighbouring residential development and the lands to the south.

- Planting throughout the proposed development site has been designed among other factors to use biodiverse plants to increase the biodiversity of the site as well as contribute to local biodiversity.
- Within the north eastern portion of the site there will be an area of mixed native woodland and mixed wildflower and bulb planting which will aid in the biodiversity of the proposed development site and in keeping with the All Ireland Pollinator Plan.
- Open green space, mixed native woodland and pollinator friendly meadows proposed within the northeast of the site covers approximately 0.3ha of the proposed site boundary.

Residual Impact

Following the implementation of the mitigation as described above, the impact on habitats of local importance (higher value) is reduced to a short-term slight effect. Significant effects are not anticipated at any geographic scale.

6.2.2 Impacts on Fauna

6.2.2.1 Faunal Habitat Loss

The construction phase of the proposal has the potential for some localised habitat loss to local faunal species.

Deterioration of water quality via percolation of contaminated water to the Clare-Corrib groundwater body which discharges to the River Clare and Lough Corrib and which could result in degradation of faunal habitat is considered in Section 6.2.3; 'Deterioration of Water Quality' below.

No Otter habitat exists within or adjacent to the proposed development site and so no loss of suitable habitat for Otter will occur.

No evidence of badger activity was observed during the general site walkover survey.

Treeline located to the south west of the site and mature trees with ivy cover located to the south east of the site have *low-moderate* roosting suitability for bats. However these mature trees will be retained and are considered outside the site boundary. As such no potential roosting habitat for bat species will be lost as a result of the proposed development.

Hedgerow habitat throughout the site is assessed as having *Moderate* suitability for commuting and foraging bat species and provides refuges for birds. There will be a loss of approximately 211m of hedgerow within the site to facilitate the proposed development. In the absence of mitigation, loss of hedgerow habitat will result in the loss of potential foraging and commuting habitat for bat species as well as refuges for birds and other small mammals.

In the absence of best practice/mitigation the loss of faunal habitat is considered to be a long term moderate negative effect at the local scale.

Mitigation

- A landscape plan, accompanying this application, has been prepared for the proposed development and has been designed to include the planting of approximately 222m of linear vegetation to improve habitat connectivity within the proposed development, along with connectivity to habitats outside the project footprint.

- By incorporating a carefully designed mix of native and non-native trees, semi mature street tree planting and a rich diversity of integrated shrub planting, the design and development will enhance existing habitats and provide additional new suitable habitats for commuting and foraging bats.
- Vegetation clearance will be conducted in accordance with the provisions of the Wildlife Act 1976-2022.

Residual Impact

There will be a temporary loss of commuting and foraging habitat during the construction stage of the proposed project, however, with the implementation of the mitigation measures listed above, impacts on bats or other fauna via habitat loss are reduced to a short-term slight effect.

6.2.2.2 Displacement and/or Disturbance to Fauna

Construction of the proposed development will result in increased human activity, noise and lighting. Therefore, the potential for disturbance to bats requires consideration.

However, the proposed development is located adjacent to residential housing estates, as well as busy local roads. It is likely that bat species in the area are accustomed to some levels of disturbance. In the absence of appropriate design, the proposed development has the potential to disturb bats by illumination of commuting and foraging areas.

The potential for displacement/disturbance of nesting birds via hedgerow clearance is also considered.

In the absence of best practice/mitigation disturbance and displacement to fauna during construction is considered to be a short term slight negative effect at the local scale.

Mitigation

- Vegetation clearance will be conducted in accordance with the provisions of the Wildlife Act 1976-2019.
- All plant and equipment for use will comply with Statutory Instrument No 359 of 1996 "European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1996".
- Plant machinery will be turned off when not in use.
- Operating machinery will be restricted to the proposed works site area.
- Construction works will be carried out during normal daylight hours, therefore, artificial lighting to facilitate works will be limited. If required, such lighting will be downward-pointing and of low intensity and will be shut-off after normal work hours.
- Where lighting is unavoidable during construction, exterior lighting will 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/treelines around the periphery of the site boundary to minimize disturbance to bats. Directional accessories will be used to direct light away from these features, e.g. through the use of light shields (Stone, 2013).

Residual Impact

Once mitigation measures are implemented, disturbance effects are considered a short-term non-significant effect. Significant effects via disturbance to fauna are not anticipated.

6.2.3 Deterioration of Water Quality

There are no surface water features in the vicinity of the development site. The closest surface water feature is the River Clare located approx. 660m north west of the proposed development site.

The proposed development is located predominantly within high groundwater vulnerability with the north eastern portion of the proposed development located within extreme groundwater vulnerability. Therefore, in the absence of mitigation the potential for deterioration of groundwater quality was identified in the form of percolation of contaminated water to ground during construction activities. In conjunction with best practice construction measures, the proposed mitigation measures for prevention of deterioration of groundwater quality are listed below:

Mitigation

Standard best practice environmental control measures have been incorporated in the design of the development and are outlined in the following subsections.

Site Set up

- The contractor will employ a suitably qualified ecologist to undertake the role of Ecological Clerk of Works (ECoW) for the duration of the construction phase.
- The appointed contractor will be fully briefed by an ecologist as to the sensitive nature of the site, and the required mitigation measures.
- At the outset of the works, 2.4m high hoarding will be erected around the boundaries of the development site. All works will be located within the confines of this fencing.
- A designated section of the site will be fenced off as the construction compound. The exact location will be established by the contractor. The ground will be covered with a layer of Terram and covered with a 300mm layer of stone. The compound will be secured with a 2-meter Tensil fence and double security gate. A 1.2-meter silt fence will be placed around the compound.
- An ecologist will visit the construction site during the works to ensure that mitigation measures are being implemented.

Groundwater mitigation measures

- Access routes will be clearly marked / identified. Access during construction to any working areas will be restricted to land within the outlined works area.
- Plant will travel slowly across bare ground at a maximum of 5 kilometres per hour (km/hr).
- The site will be continuously monitored by the Site Manager for signs of run-off such as silt in surrounding vegetation, and measures will be put in place to prevent this where necessary.
- Excavations will be carried out using a suitably sized excavator and, in all circumstances, excavation depths and volumes will be minimised.
- The FRA concluded that the Clare Flood Relief Scheme has mitigated flood risk at the site. As a precautionary measure, any stockpiling at the site will be located outside of OPW-mapped floodable areas and will be surrounded by silt fencing. Stockpiles will be removed on a regular basis to avoid potential sediment-laden run-off escaping the site.
- Earthworks will take place during periods of low rainfall to reduce influx of sediment laden waters to groundwater and to reduce the need for groundwater pumping out of excavations.
- Due to the high to extreme groundwater vulnerability within the site, long-range and short-range weather forecasting will be used and works will be postponed if heavy rain is forecast. Details on rain levels provided in 'Environmental Monitoring' section below.
- Good construction practices such as dust suppression on site roads, and regular plant maintenance will ensure minimal risk.
- If groundwater is encountered during excavations, discharge of pumped water to ground will be via a silt bag which will filter remaining sediment from the pumped water to a designated area within the site. The entire discharge area from silt bags will be enclosed by a perimeter of silt fencing. Alternatively, it will be pumped to a sealed clean tanker and

removed from the site for appropriate treatment and discharge. No construction water will be discharged directly to groundwater.

- The Construction Industry Research and Information Association (CIRIA) guidance document, Guidance on the Control and Management of Water Pollution from Construction Sites (CIRIA, 2001) provides additional water protection measures to be considered throughout construction.

Cement-based Products Control Measures

- No batching of wet-cement products will occur on site.
- Ready-mixed supply of wet concrete products will be used where needed.
- 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 chute cleaning will be permitted, using the smallest volume of water possible. No discharge of cement contaminated waters to groundwater will be allowed.
- The weather forecast will be checked prior to the pouring of concrete and no such works will be undertaken when bad weather is forecast (i.e. Heavy Rain, see below Environmental Monitoring Section). Concrete will not be poured at times when rain is predicted as this may lead to run off and over spillage of the formwork.
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.
- Concrete (including waste and wash down) will be contained and managed appropriately to prevent pollution of groundwater.

Dust control

- Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- Public roads outside the site and along the main access route to the site will be regularly inspected by the Site Manager for cleanliness, most notably before and after plant and machinery deliveries to site.
- Material handling systems and material storage areas will be designed and laid out to minimise exposure to wind.
- Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- Water misting or bowsers will operate on-site as required to mitigate dust in dry weather conditions.
- If transport of soils or other material off site is required, which has significant potential to generate dust, this will be undertaken in tarpaulin-covered vehicles where necessary.
- Daily inspection of site to examine dust measures and their effectiveness.

Refuelling, fuel and hazardous materials storage

- All plant will be inspected prior to use. Defective plant shall not be used until the defect is satisfactorily fixed. All major repair and maintenance operations will take place off site.
- Minimal refuelling or maintenance of vehicles or plant will take place on site. Off-site refuelling will occur at a controlled fuelling station.
- Vehicles will never be left unattended during refuelling. Only dedicated, trained, and competent personnel will carry out refuelling operations. Plant refuelling procedures shall be detailed in the contractor's method statements.
- Fuels, lubricants and hydraulic fluids for equipment used will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment.
- Refuelling will be completed in a controlled manner using drip trays at all times.

- Fuels volumes stored on site will be minimised. Any fuel storage areas will be bunded appropriately for the fuel storage volume for the time period of the works and fitted with a storm drainage system and an appropriate oil interceptor.
- Mobile storage tanks such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked.
- All pipework from containers to pump nozzles will have anti siphon valves fitted.
- The plant refuelling procedures shall be detailed in the contractor's method statements, including an emergency plan to deal with accidental spillages.
- The plant used will be regularly inspected for leaks and fitness for purpose.

Potential release of hydrocarbons

- Mobile storage tanks such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked.
- All plant refuelling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refuelling operations. A spill kit and drip tray shall be on site at all times and available for all refuelling operations. Equipment shall not be left unattended during refuelling. All pipework from containers to pump nozzles will have anti siphon valves fitted. The plant refuelling procedures shall be detailed in the contractor's method statements.
- Spill kits shall be available in each item of plant required.
- Oil booms and oil soakage pads, spill kits and other appropriate equipment will be kept on site to deal with any accidental spillage.

Biosecurity Measures

- No invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations (S.I. 477 of 2011) were recorded within the proposed works area.
- Good construction site hygiene will be employed to prevent the introduction of problematic invasive alien plants by thoroughly washing vehicles prior to entering the site.

Environmental Monitoring

- The contractor will assign a member of the site staff as the environmental officer with the responsibility for ensuring the environmental measures prescribed in this document are adhered to. Any environmental incidents or non-compliance issues will immediately be reported to the project team.
- Works will be periodically supervised by an ECoW.
- A written record will be maintained or available on-site of all monitoring undertaken.
- Event based inspections by the Site Manager as follows:
    - Rainfall >10 mm/hr (i.e. high intensity localised rainfall event)
    - Rainfall >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or,
    - Rainfall total greater than monthly average recorded in 7 consecutive days (prolonged heavy rainfall over a week).

Construction works will be undertaken in accordance with the following:

- CIRIA (Construction Industry Research and Information Association) Guidance Documents
    - Control of water pollution from construction sites (C532)

- Control of water pollution from linear construction projects: Technical Guidance (C648)
- Control of water pollution from linear construction projects: Site Guide (C649)
- Environmental Good Practice on Site (C692)

- NRA Guidance Documents
  - Guidelines for the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads
  - Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, during and Post Construction of National Road Schemes.

Residual Impact

Once mitigation measures are implemented, there is no potential for any significant effect at any scale or timeframe as a result of deterioration of water quality.

6.3 Operational Phase

6.3.1 Impacts on Habitats

There will be no additional habitat loss associated with the operational phase of the proposed development. No signficant effects are anticipated.

6.3.2 Impacts on Fauna

6.3.2.1 Faunal Habitat Loss

There will be no additional loss of faunal habitat associated with the operational phase of the proposed development. No signficant effects are anticipated.

6.3.2.2 Displacement and/or Disturbance to Fauna

The operational phase of the proposed development will be permanent. This will result in increased activity including increased lighting and noise. The proposed development is bordered by existing residential developments and busy local roads and is within a lit-up area due to adjacent street lighting. It is likely that faunal species including bats in the area are habituated to human activity. However, the lighting associated with the proposed development has the potential to cause disruption and create possible barrier effects on bats.

In the absence of mitigation, the potential disturbance impact on bats during the operational stage of the development is a permanent slight negative effect.

Mitigation

The lighting plan for the operational phase of the proposed development, has been designed in accordance with Bat Conservation Ireland (*Bats and Lighting: Guidance Notes for Planners, Engineers, Architects and Developers*, BCI, 2010) and the Bat Conservation Trust (*Guidance Note 08/18 Bats and Artificial Lighting in the UK* (BCT, 2018), to direct light away from important habitat features and minimise light spillage, thus reducing any potential disturbance to bats.

The proposed light fitting/scheme has been designed to help mitigate the effect of the artificial lighting on the local bat populations by incorporating:

- The Upward Light Output Ratio (ULOR) will be 0%. Lighting fixtures will have a 0-degree tilt and will be fitted with back-louvers on the columns to reduce light spill.
- The proposed lighting consists of 'Veelite Metro Streetlight 27w LED Street Optic' and 'Veelite Metro Streetlight 27w LED Forward Throw A Optic' and will be of the LED colour temperature - Warm White (3000K).
- All LED streetlights will be mounted on 6m poles.
- Minimal lighting (<1lux) surrounding the public area in the northern section of the proposed development site to allow for commuting/foraging. Additionally, light spillage on the treeline along the western boundary has been designed with minimum lux levels <2lux in most areas.

Residual Impact

With the implementation of the above best practice measures, the impact on fauna is reduced to a permanent non-significant negative effect.

6.3.3 Impacts on Water Quality

The operational phase of the proposed project will result in the production of foul water and an increase in surface water run-off due to roofs and paved areas. The site has been identified as being at risk due to groundwater and pluvial flooding. However, the FRA has concluded that although the CFRAM mapping shows a groundwater flood risk at the site, the Clare River Flood Relief Scheme has since mitigated the risk of flooding at the proposed development site. In the absence of appropriate design, there exists a potential for indirect effect on groundwater quality.

6.3.3.1.1 *Foul Water Management*

A pre-commencement connection enquiry has been submitted to Irish Water to establish whether a wastewater connection to Irish Water infrastructure is possible. The letter confirming feasibility of connection is provided in Appendix D of the Civil Works Design Report submitted alongside this report.

The proposed wastewater drainage system for the proposed residential development will consist of a combination of gravity and pumped discharge to an existing local gravity foul sewer situated in the R381 regional road. All gravity sewers shall be laid under roads and open spaces. The proposed layout of the development site drainage can be seen in Appendix I.

Due to the topography of the proposed development site, a pumping station is required to service a portion of the proposed development. This pumping station will be located in the north of the proposed development site and will provide 24-hours storage for approx. 54 no. residential units and 1 no. creche and will comply with the requirements of the IW Code of Practice for Wastewater Infrastructure. Wastewater will be pumped from the pumping station via a proposed 110mm HDPE rising main to a newly constructed discharge manhole and then via gravity will be discharged to the proposed 150mm foul sewer line. Wastewater generated in the remaining 34 no. residential developments will discharge to the same proposed 150mm foul sewer line. All wastewater generated from the proposed development will ultimately discharge to the existing manhole and 300mm foul sewer line which runs parallel to the R381 across from the proposed development entrance via the proposed 150mm foul sewer line. The foul sewer network within the proposed development site was designed to cater for 90 no. units.

The pumping station will be located 13m from the boundary of the nearest dwelling. The pumping station will allow for a 4m space in front of it (in accordance with Irish Water Standard Detail STD-WW-26) to allow for an occasional tanker or service vehicle to be parked outside. Tanker movements to the pumping station are expected to be minimal and subject to the operational efficiencies of the pumping station. It is anticipated that no more than 2-4 tanker visits would be required per annum.

The foul drainage system for the proposed development will be designed in accordance with EPA Guidelines.

6.3.3.1.2 *Surface Water Management*

The proposed development will result in a necessity for surface water management due to the presence of roofs and paved areas.

The proposed storm water drainage system for the proposed development has been designed to cater for all surface water runoff from all hard surfaces within the proposed development i.e. roadways, roofs,

parking areas etc. Precast concrete gullies including lockable cast iron grating and frame connected to a piped system will be provided to collect run-off from these areas.

It is proposed that the storm water drainage generated within the proposed development site will flow by gravity and discharge via an Oil/ petrol interceptor to 2 no. soakaway units located strategically throughout the development as shown in Appendix I. The soakaway units within the proposed development site will be of cellular storage providing 95% void ratio. All soakaways within the proposed development site are designed to accommodate a 1 in 100 year storm event + 20% for climate change.

6.3.3.1.3 *Ground Water Flood Risk Management*

As in Section 2.2.3 mitigation measures outlined within the FRA prepared by JBA Consulting include the following:

- A surface water drainage system that replicates existing greenfield conditions and that is in accordance to the GDSDS has been considered.
- Finished Floor levels for the development will be set to 1% AEP event levels, including freeboard of 300mm.

The FRA has concluded that although the CFRAM mapping shows a groundwater flood risk at the site, the Clare River Flood Relief Scheme has since mitigated the risk of groundwater flooding at the proposed development site.

According to the FRA (Appendix II) and as in Section 2.2.3, the Clare River Flood Relief scheme was undertaken in order to provide flood relief in the Claregalway and surrounding area. A 1.65km pipeline was constructed and completed in 2018 to reduce the impacts of flooding in regions impacted by groundwater flooding. This pipeline runs along the eastern boundary of the development site with the outfall to the Clare River located c. 60m upstream of the bridge. This pipeline is shown as a green line within Plate 2-1. This scheme provides a level of flood relief of 1% AEP with an additional 20% allowance for climate change.

6.3.3.1.4 *Residual Effects*

There will be no residual impacts on water quality as a result of the operation of the development once the above design measures are in place.

6.3.3.2 Decommissioning

The proposed project is considered to be permanent. Therefore, no effects with regard to decommissioning are anticipated.

6.4 Impacts on Designated Sites

6.4.1 Impacts on European Sites

The EPA Guidance 2022 states:

"A biodiversity section of an EIAR, for example, should not repeat the detailed assessment of potential effects on European sites contained in documentation prepared as part of the Appropriate Assessment process, but it should refer to the findings of that separate assessment in the context of likely significant effects on the environment, as required by the EIA Directive"

This section provides a summary of the key assessment findings with regard to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

Potential indirect impacts on European Designated sites (SACs and SPAs) has been fully assessed within a separate Screening for Appropriate Assessment (AA) report and Natura Impact Statement (NIS). There were two European sites found to be within the zone of influence of the proposed development:

- Lough Corrib SAC [000297]
- Lough Corrib SPA [004042]

The Natura Impact Statement concluded that:

'This NIS has provided an assessment of all potential direct or indirect adverse effects on European Sites.

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 proposed works do not adversely affect the integrity of European sites.

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.'

6.4.2 Impacts on Nationally Designated Sites

Impacts on nationally designated sites including NHAs and pNHAs are considered in this section of the report. Where there are pathways for effect on Nationally designated sites a full ecological impact assessment is provided below.

The proposed development is located approx. 5.1km from Lough Corrib pNHA. A potential pathway for impact on Lough Corrib pNHA in the form of deterioration of water quality resulting from pollution associated with the construction and operational phases of the development was identified. Taking a precautionary approach there exists potential for pollution to groundwaters via the percolation of polluting materials through the bedrock underlying the site into the Clare-Corrib groundwater body. The Clare-Corrib groundwater body discharges to the Clare [Galway] river which flows into Lough Corrib. Pollution of groundwater may result in adverse impacts of Lough Corrib pNHA in the absence of mitigation.

However, taking into account mitigations outlined in sections 6.2.3 and 6.3.3 of this report, this pathway has been robustly blocked and no potential for significant effect on Lough Corrib pNHA exists post implementation of appropriate mitigation.

No significant effects on nationally designated sites are anticipated.

6.5 Impacts of the Decommissioning phase

The proposal is considered to be permanent and thus there will be no decommissioning works associated with the proposal.

7. CUMULATIVE IMPACT ASSESSMENT

A search and review in relation to plans and projects that may have the potential to result in cumulative and/or in-combination impacts on the ecology of the site was conducted. This assessment focuses on the potential for cumulative in-combination effects on the existing habitats where potential for significant effects was identified. This included a review of online Planning Registers, development plans and other available information and served to identify past and future plans and projects, their activities and their predicted environmental effects.

7.1 Other Projects

The online planning system for Galway County Council was consulted on the 14/03/2022. Projects identified within Claregalway and the wider area within the last 5 years include:

- Permission to convert attic to habitable space. Gross floor space of proposed works: 38.5 sqm. (Pl. Ref: 21297).
- Permission for amendments to that granted on foot of planning permission [ref no]17505 including amendments to site layout plan, road levels and boundary finishes, gate access to the North of the site, repositioning of wall with gate access to the West adjoining site, provision of new wall and connecting footpath to East adjoining site, amendments to the Day Care and Community House building elevations, provisions of an external storage shed and polytunnel together with all ancillary site works and services. Gross floor space of proposed works: 734 & 332 msq. (Pl. Ref: 21292).
- Permission for a 258 sqm house, 60 sqm garage and associated site works and services. Gross floor space of proposed works: 318 sqm. Gross floor space of any demolition: 12 sqm (part shed). (Pl. Ref: 210900).
- Permission to carry out works to an existing warehouse unit. This will include the construction of a mezzanine floor to provide office space and staff services. Permission is also sought to provide windows in the front elevation. Gross floor space of proposed works: 71.4 sqm. (Pl. Ref: 201749).
- Retention of dwelling granted under ref: 97/602 on revised boundaries, along with all associate site works (Pl. Ref: 201351).
- Permission for development consisting of the construction of a revised house type of 260.75 sqm and in a revised position on site from that granted by P.L. Ref. 19/134, together with construction of a domestic garage and all necessary site works on an enlarged site. Gross floor space of proposed works: 260.75 sqm. (Pl. Ref: 201250).
- Permission application; le haghaidh athbhreithnithe ar phleanáil atá ann cheana a deonaíodh faoi 19/1581 le haghaidh forbartha ar thailte CLG atá ann cheana. Is éard a bheidh san fhorbairt agus sna hathbhreithnithne; 1. Conair siúil Blueway nua a sholáthar go dtí imlíne na páirce. 2. Athruithe ar fhoirgneamh an Ionaid Pobail atá ann cheana lena n-áirtear sineadh ar na seomraí feistis atá ann cheana ar an mbunurlár ag ionchorprú síneadh ar an seomra pobail atá ann ar an gcéad urlár, lena n-áiritear mionathrú ar na aghaidheanna atá ann cheana. 3. Tógáil do limistéar féachana nua do lucht féachana faoi chumhdach, agus balcóin tadhlach le chéile agus ionad pobail. 4. Athbhreithnithe ar mhéid agus leibhéil na páirce atá ann cheana chun freastal ar athbhreithnithe. 5. Naisc le seirbhisí atá ann cheana agus gach obair laithreáin lena mbaineann, soilsiú, fálú, gineadóir, clós súgartha, dugouts srl mar phleanáil cheadaithe roimhe seo. Spás urláir comhlán na n-oibreacha; 246.5sqm. (Pl. Ref: 201069).
- Permission for the construction of an extension to existing warehouse, to include associated office space, along with site works with connection to existing services. Gross floor space of proposed works: 245.3 sqm. (Pl. Ref: 201866).
- Permission for the demolition of an existing domestic garage and for the construction of a new dwellinghouse and associated services. Gross floor space of proposed works: 171.6 sqm. (Pl. Ref: 20523).

- Permission for the following: 1. Provision of new access driveway from L-62008 in Summerfield Estate to serve existing dwellinghouse. 2. Re-location of services to serve existing dwellinghouse. 3. Retention permission is sought for the existing dwellinghouse on revised site boundaries. Previous permission 96/2801 refers. Gross floor space of work to be retained: 231.6 sqm. (Pl. Ref: 20505).
- Permission for the construction of a single dwellinghouse, domestic garage, proprietary effluent treatment system, percolation area and all associated site services. Gross floor space of proposed works: Dwelling & Garage = 345.50 sqm. (Pl. Ref: 20200).
- Retention of dwelling granted under ref: 3338 on revised boundaries, along with revisions to dwelling to include, attic conversion, extension to rear with minor variations to elevations with all associated site works & connection to existing septic tank. Gross floor space of work to be retained: 72.50 sqm. (Pl. Ref: 203).
- Permission for extension and alterations to dwelling house, for a domestic garage/ fuel store and all associated site works. Gross floor space of proposed works: 104.88 sqm (Extensions - 78.85 sqm & Garage - 26.03 sqm). (Pl. Ref: 191818).
- Permission for development at Coláiste Bhaile Chláir. The development will consist of (A) New external bin store (10 sq.M) & (B) 3no Flagpoles to Claregalway Educate Together National School (RN20211B). Gross floor space of proposed works: 10 sqm. (Pl. Ref: 19832).
- Retention for change of use of part of Unit 9 from office space to light industrial as constructed (area 117m2) pervious permission 181547. Gross floor space of work to be retained: 117 sqm. (Pl. Ref: 191667).
- Retention of minor variations to an existing 2-storey dwelling house as constructed, and all associated site development works, previous planning reference no. 04/1054 and no. 09/604 at Site No. 8, Sli na Bhradain. Gross floor space of work to be retained: 35.4 sqm. (Pl. Ref: 191666).
- Permission for a development comprised of the following: Upgrading the existing grass playing fieldsto an artificial all weather pitch. Upgrading the existing floodlights to 8 no. floodlight columns with lighting of circa 500lux. Proposed play area for children. Development involves works on existing lands to incorporate the following: the associated site works and the perimeter surrounding the playing field, and new saving nets behind the new goals. (Pl. Ref: 191581).
- Permission to construct a serviced dwelling house and domestic garage. Gross floor space of proposed works: 195.2 sqm (House), 40 sqm (Garage). (Pl. Ref: 191573).
- Permission to construct extension to existing dwelling house and associated siteworks at 52 River Oaks. Gross floor space of proposed works: 34.00 sqm. (Pl. Ref: 191331).
- Permission for (a) the construction of a new dwelling house to include construction of a new site entrance gateway to serve new development, (b) subdivision of existing site approved under pl. ref. no. 96-2681, (c) connection to all existing services and (d) for all associated site development works. Gross floor space of proposed works: 170 sqm. (Pl. Ref: 19837).
- Permission to construct a mezzanine floor and to retain changes to elevations at Unit 25A. Gross floor space of proposed works: 163.1 sqm. (Pl. Ref: 19528).
- Permission to provide a new entrance door at the front of property at 79A Riveroaks. (Pl. Ref: 19447).
- Permission for the subdivision of existing site approved under Pl Ref: 97/1328 and the construction of a two-storey dwelling house, vehicular access and all associated siteworks and services. Gross floor space of proposed works 225.73 sqm. (Pl. Ref: 19134).
- Retention of 79 and 79A Riveroaks, Claregalway as two individual dwelling houses. Gross floor space of work to be retained: 68 sqm. (Pl. Ref: 181701).
- Permission for the construction of a dwellinghouse, garage, waste water effluent treatment unit, percolation area and all associated site services. Gross floor space of proposed works: (Dwelling) 231 sqm, (Garage) 60 sqm. (Pl. Ref: 181662).
- Retention of change of use for Unit 8 from Light Industrial to office space as constructed. Permission is also sought for change of use of Unit 9 from Light Industrial to office space to include any associated site development works and services as required. Gross floor

space of proposed works 744 sqm. Gross floor space of work to be retained 418 sqm. (Pl. Ref: 181547).

- Retention of an attic conversion at 5 Slí an Bhraidain. Gross floor space of work to be retained 34.5 sqm. (Pl. Ref: 181387).
- Permission for a new terrace and associated elevational changes including new entrance, access steps and ramp modifications, and all associated site works at the Claregalway Hotel. (Pl. Ref: 181349).
- Permission for a ground floor side extension (29 sqm.) and new glazed shelter to adjoining terrace including associated elevational changes and associated site works. Gross floor space of proposed works 29 sqm. (Pl. Ref 181116).
- Extension of duration to the grant of outline permission (Pl. Ref. No. 10/791) is sought to construct a dwelling house, domestic garage, septic tank with ancillary effluent treatment plant and all associated site services (Gross floor space 163.62sqm house; 60sqm garage). Previous Planning Ref. No. 13/870. (Pl. Ref: 181053).
- Permission for the following: (1) Construction of 39 no. residential units comprising: 1 No. Type 'A' - 4 Bed Semi-Detached (2 storey), - 1 no. Type 'A1' - 4 Bed Semi Detached (2 Storey), 17 no. Type 'B' - 3 Bed Semi-Detached (2 storey), 5 no. Type 'B1' - 3 Bed Semi-Detached (2 Storey), 3 No. Type 'B2' - 3 Bed Terrace (2 storey), 6 no. Type 'C' - 2 bed End Terrace (2 Storey), 6 no. Type 'C1'- 2 bed Mid-Terrace (2 Storey). 2. Provision of shared communal and private open space and site landscaping; (3) Onsite and visitor car parking; (4) Vehicular and pedestrian access from the existing River Oaks estate; and (5) All associated site development works. A Natura Impact Statement (NIS) has been prepared in respect of the proposed development. Gross floor space of proposed works 4,158.4sqm. (Pl. Ref: 181015).
- Permission for a second floor fourteen bedroom side extension including associated elevational changes and associated site works to existing hotel. Gross floor space of proposed works 464 sqm. (Pl. Ref: 18916).
- Permission to convert attic to habitable space. Gross floor space of proposed works 20.38 sqm. (Pl. Ref: 18859).
- Retention of early learning centre. Gross floor space of work to be retained 73.2 sqm. (Pl. Ref: 18578).
- Permission for the erection of 5 no. 49 sqm. pre-fabricated temporary classroom buildings with connections to services and all other associated site works. Gross floor space of proposed works 245 sqm. (Pl. Ref: 18520).
- Permission for an extension to the rear of existing dwelling. Gross floor space of proposed works 23sqm. (Pl. Ref: 18429).
- Permission to construct dwelling house, domestic garage and fuel store, wastewater treatment system and percolation area. Gross floor space 243sqm. (Pl. Ref: 171661).
- Permission to construct a single storey 6 Classroom standalone block with ancillary SET rooms to the northern end of existing school property with connections to services and all other associated site works. Gross floor space of proposed works 685sqm. (Pl. Ref: 171059).
- Permission to develop (A) a new 2 storey 3,889sqm extension to the existing Post-Primary School, Coláiste Bhaile Chláir (RN76233C) including a 2 classroom special needs unit and sports hall with all ancillary pupil and staff facilities and (B) a new Claregalway Educate Together National School (RN20211B) consisting of a new 2 Storey, 16 classroom 3,064sq.m Primary School with a 2 Classroom special needs unit including all ancillary pupil and staff facilities: GP hall, and (C) all associated site works with 57 number additional car parking spaces (32 new spaces for Primary and 24 additional spaces for Post Primary) including all landscaping, ball courts and hard and soft play areas. Gross floor space of proposed works 3,889sqm. (Pl. Ref: 171038).
- Retention of an external bin store with timber fence screening, which is located to the rear of commercial and residential units. (Pl. Ref: 17985).
- Permission for the construction of 14 single storey Sheltered Housing Units (first floor of 81.58sqm per unit) and for the construction of a single storey Day Care Centre (floor area of 296.38sqm) including access road, car parking facilities, connection to public waste water

treatment system and all associated site works and ancillary services. Gross floor space of proposed works: 1438.50sqm. (Pl. Ref: 17672).

- Permission for the construction of four residential units (comprising of two detached houses and one duplex consisting of a 2 bed and a 4 bed unit), one residential community house for the Brothers of Charity Services (337sqm) and one day care facility with ancillary offices for the Brothers of Charity Services (734sqm) with parking and all associated site services. (Pl. Ref: 17505).
- Permission for development at Coláiste Bhaile Chláir, Baile Chláir, Co. na Gaillilmhe, roll number 76233C. The Development will consist of a new temporary single storey 6-classroom 307 sqm. Post Primary School building including all associated site works and landscaping in the location of the existing school building ball courts. (Gross floor space of proposed works: 307 sqm.). (Pl. Ref: 17472).
- Permission Consequent to construct a dwellinghouse & Proprietary Treatment System. (Gross floor space: 200 sqm., 60 sqm. Garage). (Pl. Ref: 17274).

7.1.1 Conclusion of Cumulative Assessment

In the review of the projects that was undertaken, no connection, 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 proposed development.

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.

8. DEVELOPMENT CONTEXT - ECOLOGICAL PLANS AND POLICIES

The following relevant plans have been considered in the context of the proposed development during this assessment:

- Galway County Development Plan 2022 – 2028
- Regional Spatial and Economic Strategy 2020 – 2032
- National Biodiversity Action Plan 2017 – 2021
- Galway County Heritage and Biodiversity Plan 2017 – 2022

8.1 Galway County Development Plan 2022 – 2028

Table 8-1 Draft Galway County Development Plan 2022 – 2028.

Objective or Policy	Context of Proposed Development
NHB 1 - Natural Heritage and Biodiversity of Designated Sites, Habitats and Species Protect and where possible enhance the natural heritage sites designated under EU Legislation and National Legislation (Habitats Directive, Birds Directive, European Communities (Birds and Natural Habitats) Regulations 2011 and Wildlife Acts) and extend to any additions or alterations to sites that may occur during the lifetime of this plan. Protect and, where possible, enhance the plant and animal species and their habitats that have been identified under European legislation (Habitats and Birds Directive) and protected under national Legislation (European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011), Wildlife Acts 1976-2010 and the Flora Protection Order (SI 94 of 1999). Support the protection, conservation and enhancement of natural heritage and biodiversity, including the protection of the integrity of European sites, that form part of the Natura 2000 network, the protection of Natural Heritage Areas, proposed Natural Heritage Areas, Ramsar Sites, Nature Reserves, Wild Fowl Sanctuaries (and other designated sites including any future designations) and the promotion of the development of a green/ ecological network.	There will be no impacts on any European or Nationally designated sites as a result of the proposed development. Appropriate mitigation will be in place to ensure that there is no deterioration of water quality as result of the proposed development, which could indirectly affect Lough Corrib SAC, Lough Corrib SPA and Lough Corrib pNHA. The landscaping plan will provide for replanting of linear vegetation, a mixed native woodland as well as replanting of native shrubs and trees within the proposed green open space. No significant effects have been identified as a result of the proposed project.
NHB 2 - European Sites and Appropriate Assessment To implement Article 6 of the Habitats Directive and to ensure that Appropriate Assessment is carried out in relation to works, plans and projects likely to impact on European sites (SACs and SPAs), whether directly or indirectly or in combination with any other plan(s) or project(s). All assessments must be in compliance with the	There will be no impacts on any European or Nationally designated sites as a result of the proposed development. Appropriate mitigation will be in place to ensure that there is no deterioration of water quality as result of the proposed development, which could indirectly affect Lough Corrib SAC, Lough Corrib SPA and Lough Corrib pNHA.

European Communities (Birds and Natural Habitats) Regulations 2011. All such projects and plans will also be required to comply with statutory Environmental Impact Assessment requirements where relevant.	The landscaping plan will provide for replanting of linear vegetation, a mixed native woodland as well as replanting of native shrubs and trees within the proposed green open space. No significant effects have been identified as a result of the proposed project.
NHB 3 - Protection of European Sites No plans, programmes, or projects etc. giving rise to significant cumulative, direct, indirect or secondary impacts on European sites arising from their size or scale, land take, proximity, resource requirements, emissions (disposal to land, water or air), transportation requirements, duration of construction, operation, decommissioning or from any other effects shall be permitted on the basis of this Plan (either individually or in combination with other plans, programmes, etc. or projects.*	There will be no impacts on any European designated sites as a result of the proposed development. Appropriate mitigation will be in place to ensure that there is no deterioration of groundwater quality as result of the proposed development, which could indirectly affect Lough Corrib SAC and Lough Corrib SPA. No significant effects have been identified as a result of the proposed project.
NHB 4 - Ecological Appraisal of Biodiversity Ensure, where appropriate, the protection and conservation of areas, sites, species and ecological/networks of biodiversity value outside designated sites. Where appropriate require an ecological appraisal, for development not directly connected with or necessary to the management of European Sites, or a proposed European Site and which are likely to have significant effects on that site either individually or cumulatively.	Mature trees to the south west of the proposed development site will be retained as well as the hedgerow with mature trees to the east of the proposed development site. The landscaping plan will provide for replanting of linear vegetation, a mixed native woodland as well as replanting of native shrubs and trees within the proposed green open space. There were no invasive species identified on the site during the ecological surveys. No significant effects have been identified as a result of the proposed project.
NHB 5 - Ecological Connectivity and Corridors Support the protection and enhancement of biodiversity and ecological connectivity in non-designated sites, including woodlands, trees, hedgerows, semi-natural grasslands, rivers, streams, natural springs, wetlands, stonewalls, geological and geo-morphological systems, other landscape features and associated wildlife areas where these form part of the ecological network and/or may be considered as ecological corridors in the context of Article 10 of the Habitats Directive.	Mature trees to the south west of the proposed development site will be retained as well as the hedgerow with mature trees to the east of the proposed development site. The landscaping plan will provide for replanting of linear vegetation, a mixed native woodland as well as replanting of native shrubs and trees within the proposed green open space. No significant effects have been identified as a result of the proposed project.
NHB 6 - Implementation of Plans and Strategies Support the implementation of any relevant recommendations contained in the National Heritage Plan 2030, the National Biodiversity	

Plan, the All Ireland Pollinator Plan and the National Peatlands Strategy and any such plans and strategies during the lifetime of this plan.	
NHB 7 - Mitigation Measures Require mitigating measures in certain cases where it is evident that biodiversity is likely to be affected. These measures may, in association with other specified requirements, include establishment of wildlife areas/corridors/parks, hedgerow, tree planting, wildflower meadows/marshes and other areas. With regard to residential development, in certain cases, these measures may be carried out in conjunction with the provision of open space and/or play areas.	The landscaping plan will provide for replanting of linear vegetation, a mixed native woodland as well as replanting of native shrubs and trees within the proposed green open space.
NHB 9 - Protection of Bats and Bats Habitats Seek to protect bats and their roosts, their feeding areas, flight paths and commuting routes. Ensure that development proposals in areas which are potentially important for bats, including areas of woodland, linear features such as hedgerows, stonewalls, watercourses and associated riparian vegetation which may provide migratory/foraging uses shall be subject to suitable assessment for potential impacts on bats. This will include an assessment of the cumulative loss of habitat or the impact on bat populations and activity in the area and may include a specific bat survey. Assessments shall be carried out by a suitably qualified professional and where development is likely to result in significant adverse effects on bat populations or activity in the area, development will be prohibited or require mitigation and/or compensatory measures, as appropriate. The impact of lighting on bats and their roosts and the lighting up of objects of cultural heritage must be adequately assessed in relation to new developments and the upgrading of existing lighting systems.	Hedgerow along the northern bondary and bisecting the proposed development site to be removed is considered to have negligible bat roosting potential. Trees with bat roosting potential such as those south west of the proposed development site will be retained where possible and appropriate mitigations as regards disturbance/displacement of bats have been proposed. The proposed landscaping plan provides for additional linear vegetation planting around the development site to preserve ecological connectivity across the site. The Upward Light Output Ratio (ULOR) will be 0%. Lighting fixtures will have a 0-degree tilt and will be fitted with back-louvers on the columns to reduce light spill. The proposed lighting will be of the LED colour temperature - Warm White (3000K). All LED streetlights will be mounted on 6m poles. There will be minimal lighting (<1lux) surrounding the public area and mixed native woodland in the northern section of the proposed development site to allow for commuting/foraging. Additionally, light spillage on the treeline along the western boundary has been designed with minimum lux levels <2lux in most areas. No significant effects have been identified as a result of the proposed project.
NHB 10 - NPWS & Integrated Management Plans Article 6(1) of the Habitats Directive requires that Member States establish the necessary conservation measures for European sites involving, if need be, appropriate management plans specifically designed for the sites or integrated into other development plans. The NPWS's current priority is to identify site specific conservation objectives; management plans may	No Annex I habitats, Annex II or FPO species, or birds designated for any nearby SPA were recorded during the ecological surveys. The proposed mitigation measures for the proposed development are such that significant effect to downstream habitats and species will be avoided.

be considered after this is done. Where Integrated Management Plans are being prepared by the NPWS for European sites (or parts thereof), the NPWS shall be engaged with in order to ensure that plans are fully integrated with the Plan and other plans and programmes, with the intention that such plans are practical, achievable and sustainable and have regard to all relevant ecological, cultural, social and economic considerations, including those of local communities.	
WR 1 - Water Resources Protect the water resources in the plan area, including rivers, streams, lakes, wetlands, springs, turloughs, surface water and groundwater quality, as well as surface waters, aquatic and wetland habitats and freshwater and water dependant species in accordance with the requirements and guidance in the EU Water Framework Directive 2000 (2000/60/EC), the European Union (Water Policy) Regulations 2003 (as amended), the River Basin District Management Plan 2018 – 2021 and other relevant EU Directives, including associated national legislation and policy guidance (including any superseding versions of same) and also have regard to the Freshwater Pearl Mussel Sub-Basin Management Plans.	The potential for groundwater contamination was investigated within the Flood Risk Assessment Report by JBA Consulting (Appendix II). No significant effects have been identified as a result of the proposed project.
WR 2 - River Basin Management Plans It is a policy objective of the Council to implement the programme of measures developed by the River Basin District Projects under the Water Framework Directive in relation to: Surface and groundwater interaction, Dangerous substances, Hydro-morphology, Forestry, On site wastewater treatment systems, Municipal and industrial discharges, Urban pressures, Abstractions.	
WTWF 1 - Wetland Sites Protect and conserve the ecological and biodiversity heritage of the wetland sites in the County. Ensure that an appropriate level of assessment is completed in relation to wetland habitats that are subject to proposals which would involve drainage or reclamation that might destroy, fragment or degrade any wetland in the county. This includes lakes and ponds, turloughs, watercourses, springs and swamps, marshes, fens, heath, peatlands, some woodlands as well as some coastal and marine habitats. Protect Ramsar sites under The Convention on Wetlands of International Importance (especially as Waterfowl Habitat).	There will be no impacts on any European or Nationally designated sites as a result of the proposed development. Appropriate mitigation will be in place to ensure that there is no deterioration of water quality as result of the proposed development, which could indirectly affect Lough Corrib SAC, Lough Corrib SPA and Lough Corrib pNHA. The landscaping plan will provide for replanting of linear vegetation, a mixed native woodland as well as replanting of native shrubs and trees within the proposed green open space. No significant effects have been identified as a result of the proposed project.

P 1 - Protection of Peatlands Ensure that peatland areas which are designated (or proposed for designation) as NHAs, SACs or SPAs are conserved for their ecological, climate regulation, education and culture, archaeological potential including any ancient walkways (toghers) through bogs.	There will be no impacts on any European or Nationally designated sites as a result of the proposed development. Appropriate mitigation will be in place to ensure that there is no deterioration of water quality as result of the proposed development, which could indirectly affect Lough Corrib SAC, Lough Corrib SPA and Lough Corrib pNHA. No significant effects have been identified as a result of the proposed project.
IS 1 - Control of Invasive and Alien Invasive Species It is a policy objective of the Council to support measures for the prevention and eradication of invasive species.	There were no invasive species identified on the site during the ecological surveys. The proposed landscaping plan for the development includes predominantly native species, and no planting of alien invasive species is proposed. No significant effects have been identified as a result of the proposed project.
IS 2 - Invasive Species Management Plan Ensure that proposals for development do not lead to the spread or introduction of invasive species. If developments are proposed on sites where invasive species are currently or were previously present, an invasive species management plan will be required. A landscaping plan will be required for developments near water bodies and such plans must not include alien invasive species.	
PO 1 - Delivery of All Ireland Pollinator Plan To facilitate the delivery of the All Ireland Pollinator Plan where possible.	The proposed landscaping plan for the development includes predominantly native species, and no planting of alien invasive species is proposed. The area of mixed native woodland and mixed wildflower and bulb planting will aid in the biodiversity of the proposed development site and align with the All Ireland Pollinator Plan.
TWHS 1 - Trees, Hedgerows, Natural Boundaries and Stone Walls Protect and seek to retain important trees, tree clusters and tree boundaries, ancient woodland, natural boundaries including stonewalls, existing hedgerows particularly species rich roadside and townland boundary hedgerows, where possible and replace with a boundary type similar to the existing boundary. Ensure that new development proposals take cognisance of significant trees/tree stands and that all planting schemes developed are suitable for the specific site and use suitable native variety of trees of Irish provenance and hedgerows of native species. Seek Tree Management Plans to ensure that trees are adequately protected during development and	Mature trees to the south west of the proposed development site will be retained as well as the hedgerow with mature trees to the east of the proposed development site. The landscaping plan will provide for replanting of linear vegetation, a mixed native woodland as well as replanting of native shrubs and trees within the proposed green open space. No significant effects have been identified as a result of the proposed project.

incorporated into the design of new developments.	
IW 1 - Inland Waterways (a) Protect and conserve the quality, character and features of inland waterways by controlling developments close to navigable and non-navigable waterways in accordance with best practice guidelines. (b) Preserve, protect and enhance Galway's inland lakes and waterways for their amenity and recreational resource amenity. (c) Protect the riparian zones of watercourse systems throughout the County, recognising the benefits they provide in relation to flood risk management and their protection of the ecological integrity of watercourse systems and ensure they are considered in the land use zoning in Local Area Plans. (d) The Council will support in principal the development and upgrading of the Inland Waterways and their associated facilities in accordance with legislation, best practice and relevant management strategies, key stakeholders and bodies including Waterways Ireland. (e) Ensure all abstractions of water will be subject to assessment for compliance with the requirements of Article 6 of the Habitats Directive. (f) Seek to provide additional accesses to lake shores and rivers for public rights of way, parking and layby facilities, where appropriate. (g) Developments shall ensure that adequate soil protection measures are undertaken, where appropriate, including investigations into the nature and extent of any soil/groundwater contamination.	Appropriate mitigation will be in place to ensure that there is no deterioration of water quality as result of the proposed development, which could indirectly affect the Clare-Corrib groundwater body, River Clare, Lough Corrib and subsequent downstream waters. No significant effects have been identified as a result of the proposed project.

8.2 Regional Spatial and Economic Strategy 2020 – 2032

Table 8-2 Regional Spatial and Economic Strategy 2020 – 2032.

Objective or Policy	Context of Proposed Development
RPO 5.4 - Encourage the prioritisation of Site-Specific Conservation	The site-specific conservation objectives for Lough Corrib SAC and Lough Corrib SPA were comprehensively reviewed in undertaking this assessment.

Objectives (SSCO) for all sites of Conservation Value, designated in EU Directive (i.e. SACs, SPAs) to integrate with the development objectives of this Strategy.	The surveys undertaken in the preparation of this application, the design of the development and the proposed mitigations in place, demonstrate that the proposed project will not adversely affect the Qualifying Interests/Special Conservation Interests associated with Lough Corrib SAC or Lough Corrib SPA.
RPO 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.	
RPO 5.6 - Develop awareness and create a greater appreciation of the benefits of our natural heritage, including on the health, wealth and well-being of the region's ecosystem services.	
RPO 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.	
RPO 5.22 - To protect and conserve our designated peatlands and bogs for reasons of biodiversity, ecosystem services, carbon sinks, areas of habitat importance, amenity and landscape value.	

8.3 National Biodiversity Action Plan 2017 - 2021

Table 8-3 National Biodiversity Action Plan 2017 - 2021.

Objective or Policy	Context of Proposed Development
Target 6.2: Sufficiency, coherence, connectivity, and resilience of the protected areas network substantially enhanced by 2020.	A range of mitigation measures have been proposed which will protect nearby EU Designated Sites from significant effects as a result of the proposed development. No significant effects on the Natura 2000 network have been identified as a result of the proposed development.

8.4 Galway County Heritage and Biodiversity Plan 2017 - 2022

Table 8-4 Galway County Heritage and Biodiversity Plan 2017 - 2022.

Objective or Policy	Context of Proposed Development
NH 4.2 - Policy: Ensure biodiversity and natural heritage are considered at earliest stages in the development of new plans and strategy documents.	Mature trees southwest of the site will be retained as well as hedgerow and mature trees located east of the site. The landscaping plan will provide for replanting of linear vegetation, a mixed native woodland as well as replanting of native shrubs and trees within the proposed green open space.
NH 4.3 - Projects: Promote the integration of biodiversity into work plans and developments at earliest (design) stage of projects.	No significant effects have been identified as a result of the proposed project.
NH 4.8 - Galway County Council to take a proactive role in implementing legislative requirements and national strategies for heritage/biodiversity such as: National Pollinator Plan,	

National habitat and species management plans and the National Biodiversity Plan. **NH 4.9** - Implement the Galway County Invasive Species Strategy. **NH 4.10** - Promote biodiversity led management of parks and green spaces including verges and hedgerows, drains, ditches and rivers. (Participate in Green Parks scheme). **NH 4.12** - Use sustainable and environmentally friendly materials in publications, developments and events.	

9. CONCLUSION

Following consideration of the residual effects (post incorporation of best practice measures) it is concluded that there will be no significant impacts on biodiversity given the nature, scale and design of the proposal.

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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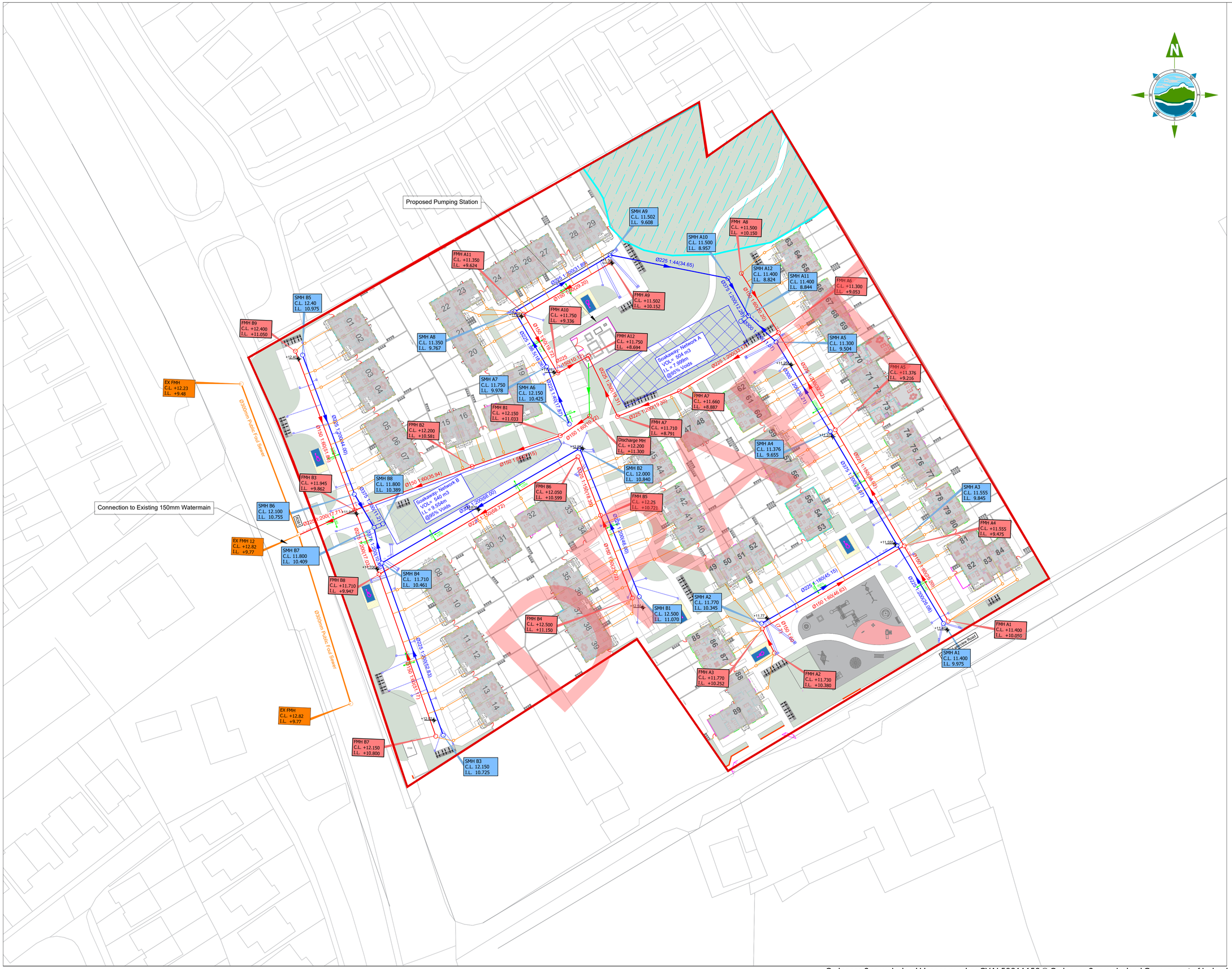
APPENDIX I

PROPOSED DRAINAGE LAYOUT DRAWINGS



THE INFORMATION ON THIS DRAWING IS TO THE ORDNANCE SURVEY IRELAND ITM COORDINATE SYSTEM

Legend

- Site Boundary
- Proposed Foul Gravity Sewer
- Proposed Storm Gravity Sewer
- Existing Foul Gravity Sewer
- Proposed Foul Manhole
- Proposed Storm Manhole
- Existing Foul Manhole
- Proposed Raising Main
- Proposed Gully
- Proposed Gully Connection
- Proposed Petrol Interceptor
- Proposed Wastewater Pump Station
- Proposed Soakaway
- Potential area to flood

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE.
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES.
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES.
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD.

P01	27/02/2023	Issue for Planning	RM	RB
Rev	Date	Description	By	Chkd.

Client: Galway County Council

Project: Proposed Residential Development
Baile an Chlair
Claregalway

Title: Proposed Drainage Layout

Scale @ A1: 1:500 / @A3 1:1000

Prepared by:	Checked:	Date:
RM	BH	Feb 2023

Project Director: Brian Carroll

Drawing Status: Planning

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Drawing No.: 11171-2002 Revision: P01

APPENDIX II

FLOOD RISK ASSESSMENT REPORT

Claregalway, Co. Galway
Flood Risk Assessment

Draft Report

March 2020

Galway County Council

County Hall

Prospect Hill

GALWAY

JBA Project Manager

Elizabeth Russell
24 Grove Island
Corbally
Limerick
Ireland

Revision History

Revision Ref / Date Issued	Amendments	Issued to
V1 / March 2020	Initial Issue	Galway County Council

Contract

This report describes work commissioned by Galway County Council and their representative for the contract was Daithi Flood. Fiona Byrne of JBA Consulting carried out this work.

Prepared by ..... Fiona Byrne BSc (Hons) MSc
Analyst

Reviewed by ..... Elizabeth Russell BSc MSc CEnv MCIWEM C.WEM
Associate Director

Purpose

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JBA is aiming to reduce its per capita carbon emissions.

Contents

List of Figures

Abbreviations

AEP	Annual Exceedance Probability
CFRAM	Catchment Flood Risk Assessment and Management
DoEHLG	Department of the Environment, Heritage and Local Government
EPA	Environmental Protection Agency
FRA	Flood Risk Assessment
GSI	Geological Survey of Ireland
ICPSS	Irish Coastal Protection Strategy Study
mbgl	Metres below ground level
mOD	Meters above Ordnance Datum
OPW	Office of Public Works
PFRA	Preliminary Flood Risk Assessment
SFRA	Strategic Flood Risk Assessment
SI	Site Investigation

1 Introduction

Under the Planning System and Flood Risk Management Guidelines for Planning Authorities (DoEHLG & OPW, 2009) the proposed development must undergo a Flood Risk Assessment to ensure sustainability and effective management of flood risk.

1.1 Terms of Reference

JBA Consulting was appointed by Galway County Council to prepare a Flood Risk Assessment (FRA) for the proposed development of a site located at Claregalway, Co. Galway. The report was prepared in response to a request by Daithi Flood of Galway County Council.

1.2 Flood Risk Assessment Aims and Objectives

This study is being completed to inform the future development of the site as it relates to flood risk. It aims to identify, quantify and communicate to Planning Authority officials and other stakeholders the risk of flooding to land, property and people and the measures that would be recommended to manage the risk.

The objectives of this FRA are to:

- Identify potential sources of flood risk;
- Confirm the level of flood risk and identify key hydraulic features;
- Assess the impact that the proposed development has on flood risk;
- Develop appropriate flood risk mitigation and management measures which will allow for the long-term development of the site.

Recommendations for development have been provided in the context of the OPW / DECLG planning guidance, "The Planning System and Flood Risk Management". A review of the likely effects of climate change, and the long term impacts this may have on any development has also been undertaken.

For general information on flooding, the definition of flood risk, flood zones and other terms see 'Understanding Flood Risk' in Appendix A.

1.3 Development Proposal

The proposed development is located in Claregalway Village and will comprise of a residential housing estate.

1.4 Report Structure

Section 2 of this report gives an overview of the study location and associated watercourses. Section 3 contains background information and initial assessment of flood risk. Site-specific mitigation measures are outlined in Section 4, while conclusions are provided in Section 5.

2 Site Background

This section describes the proposed residential development site in Claregalway, including watercourses, geology and wider geographical area. A site visit was carried out on 20 March 2020 to allow a greater understanding of the site in the context of its development potential and flood risk.

2.1 Location

The proposed development site is located in Claregalway Village, Co. Galway, refer to Figure 2-1. The site is bounded by the residential area Cuairt Na hAbhainn to the north, a GAA pitch to the east and the R381 and further residential areas to the west. It is approximately 500m from the main village of Claregalway and is currently an undeveloped greenfield site.

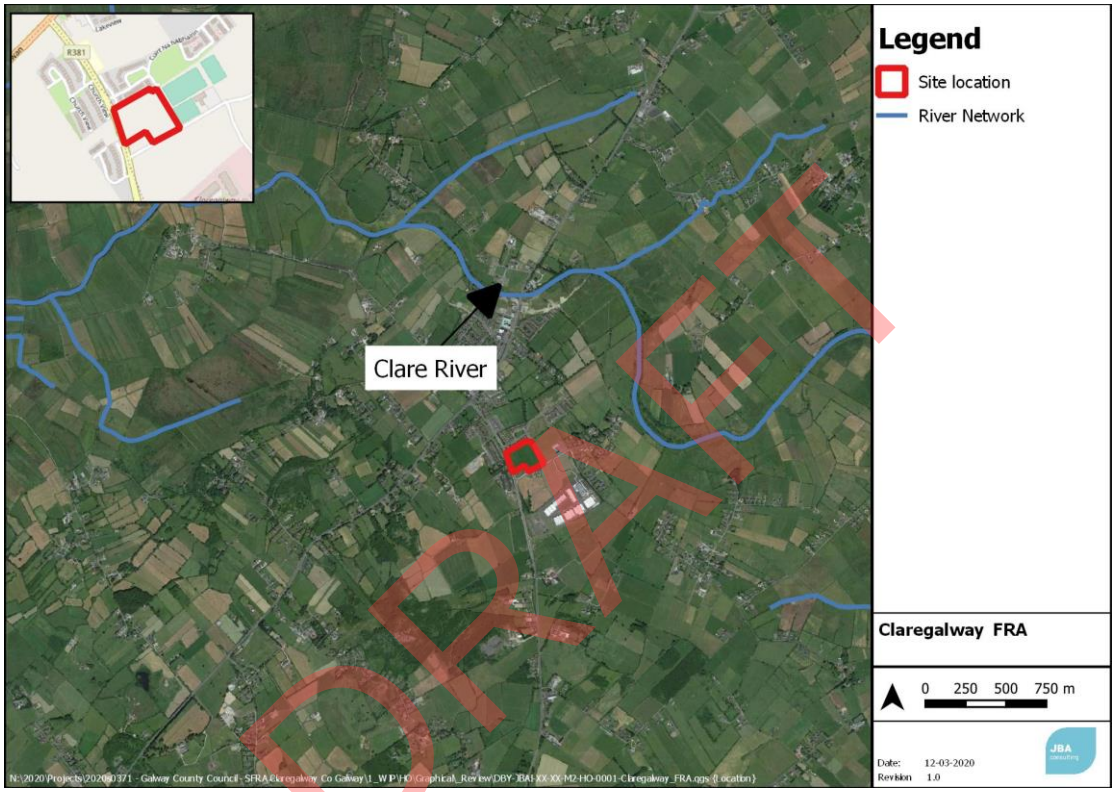


Figure 2-1: Site Location

2.2 Watercourses

The main hydrological feature located near the site is the Clare River located approximately 700m to the west of the site.

2.3 Topology

The site varies in height with high points of up to 12.66mOD at the road frontage and in a localised high point around the centre of the site (see Figure 2-2). There is a general fall from west to east, with the lowest elevation being approximately 10.5mOD at the north east corner of the site. The site covers an area of c. 2.81ha and is currently a greenfield used for cattle grazing.

Figure 2-2 - Site topography - taken from LIDAR DTM

2.4 Site Geology

The groundwater and geological maps of the site, provided by the Geological Survey of Ireland (GSI), have been studied and an extract of the geological map is presented in Figure 2-3. The subsoil is BminDW described as deep well drained mineral (mainly basic).

The underlying bedrock is classified as carboniferous limestone, Burren formation which is described as pale grey clean skeletal limestone.

The associated groundwater vulnerability, which indicates the risk to the underlying groundwater body for the site, is classified as 'High' for the majority of the site, the permeability of the subsoil in the same area is classed as 'Medium'. This implies a depth to bedrock of between 3 and 10m. There is a small section of the which is categorised as "Extreme" vulnerability. This means the depth to bedrock is only between 0 and 3m deep, refer to Figure 2-4.

The GSI maps do not show any karst features in the vicinity of the site, with the nearest karst features being a turlough over 2km to the east and a spring over 2km to the north. There is a borehole or well shown at the property to the southern corner of the site boundary.

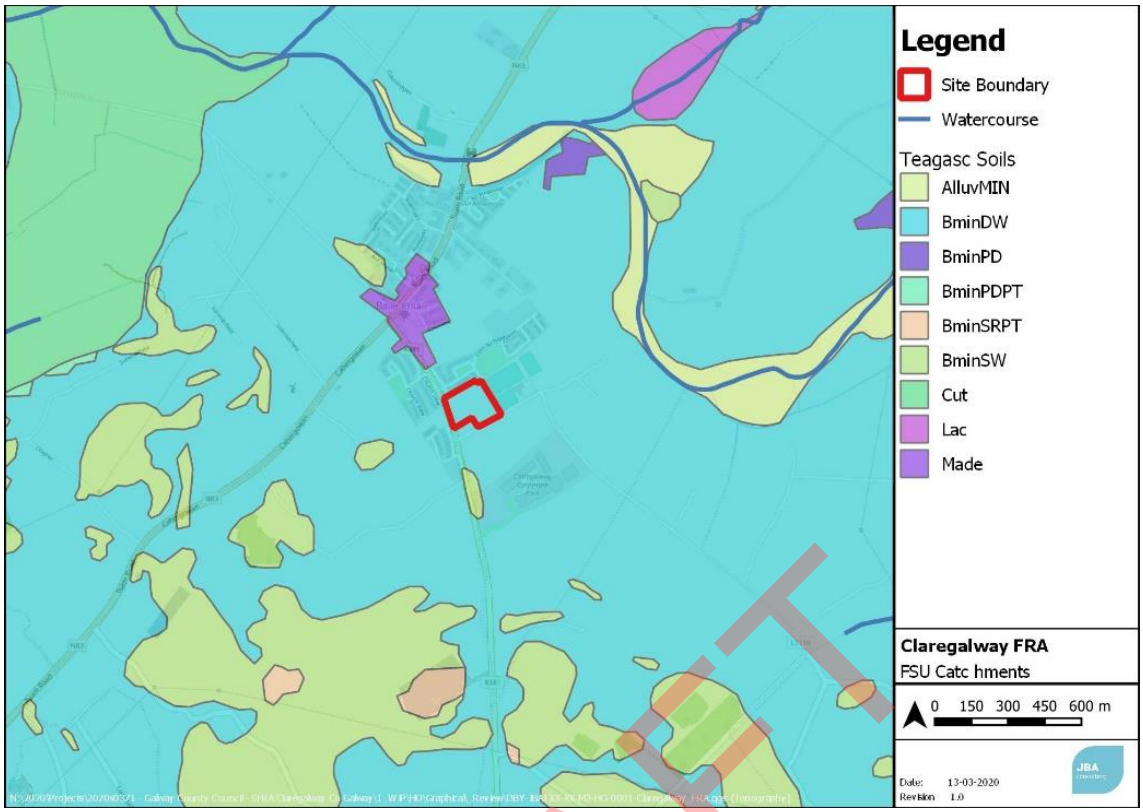


Figure 2-3: Subsoils

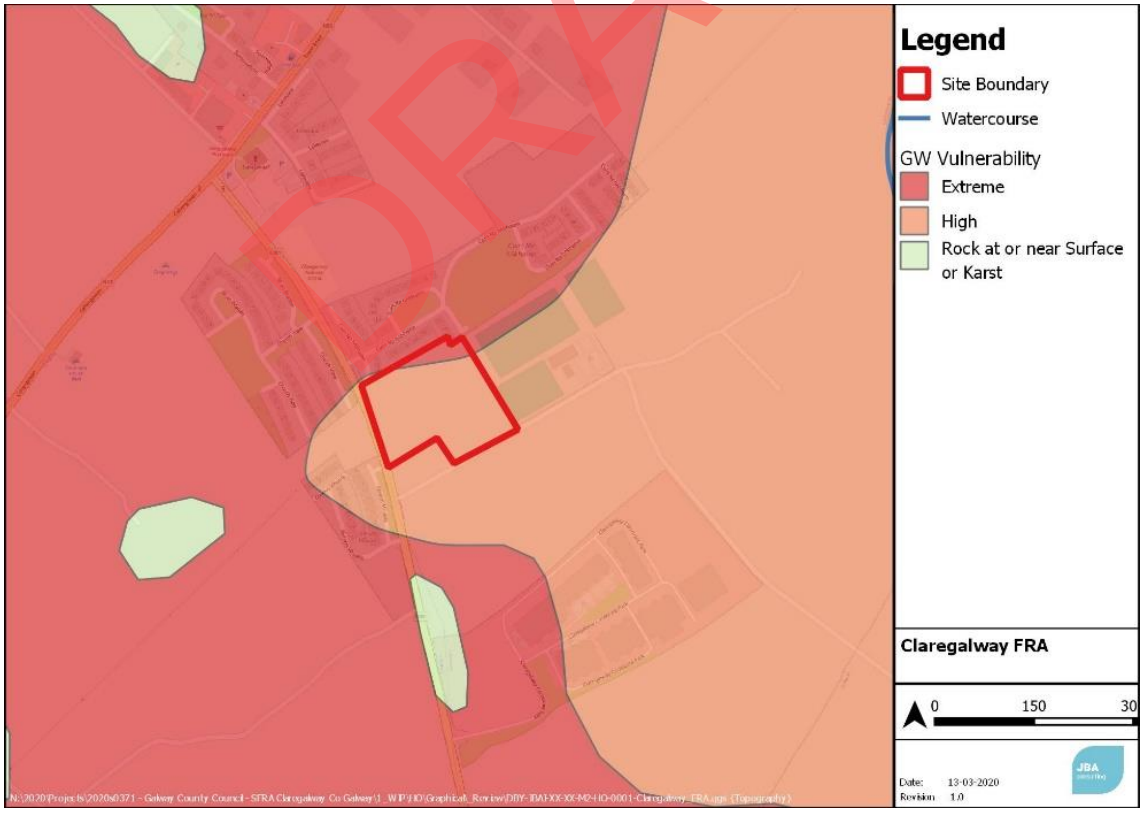


Figure 2-4 Groundwater Vulnerability

From site entrance at R381, looking north

Hedge line across centre of site

Looking north-east towards lowest part of site

Looking south-east, with depression indicated

Eastern site boundary with GAA; access shown is from Cuairt Na hAbhainn to GAA

Looking north-east along route of culverted pipe in Cuairt Na hAbhainn

Figure 2-5 Site photographs

3 Flood Risk Identification

An assessment of the potential for and scale of flood risk at the site is conducted using historical and predictive information. This identifies any sources of potential flood risk to the site and reviews historic flood information. The findings from the flood risk identification stage of the assessment are provided in the following sections.

3.1 Flood History

A number of sources of flood information were reviewed to establish any recorded flood history at, or near the site. This includes the OPW's website, www.floodmaps.ie and general internet searches.

3.1.1 Floodmaps.ie

The OPW host a National Flood hazard mapping website, www.floodmaps.ie, which highlights areas at risk of flooding through the collection of recorded data and observed flood events. See Figure 3-1 for historic flood events in the area.

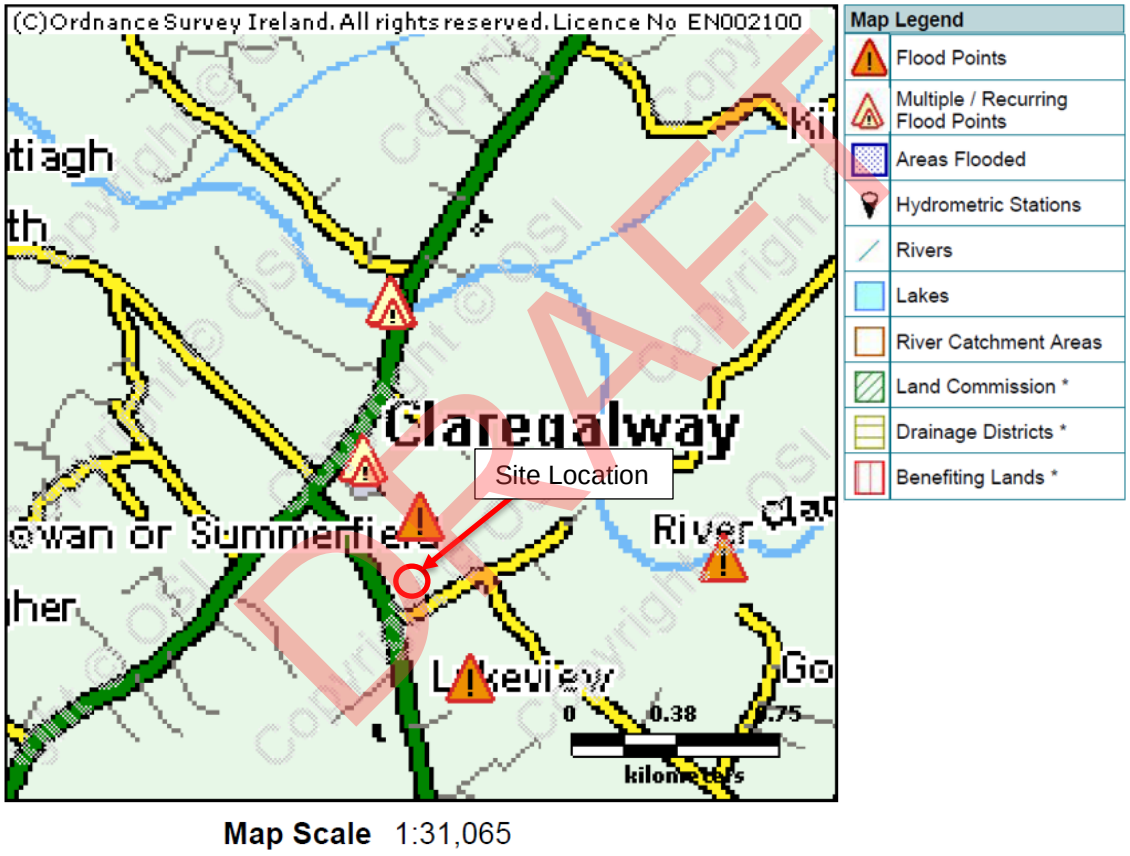


Figure 3-1: Floodmaps.ie

As can be seen in Figure 3-1, several flood events took place in the Claregalway area.

These events include:

Location	Date
Lakeview Estate Claregalway	Recurring
Corrib-Clare Claregalway Galway	01/Feb/1990
Clare Claregalway	29/Nov/1999
Clare River Lissarulla Claregalway	08/Jan/2005
Clare River Lakeview Claregalway	08/Jan/2005
Lakeview	Recurring
Clare River Claregalway Bridge	08/Jan/2005
Flooding at Claregalway	18/Nov/2009

Location	Date
Claregalway area Galway	01/Jan/1991
Clare-Corrib Claregalway	Recurring
Clare Montiagh	Recurring

The events most relevant to the site involve flooding in the Lakeview area. The picture below, provided in a report on floodmaps.ie from the Lakeview residents association, shows the site, which has been added in red, with flooding occurring to the northeast of the site. This can also be seen in Figure 3-3 which shows the northeast corner of the site and the west part of the Cuairt na hAbhainn estate inundated in 2005 as a result of groundwater flooding due to turloughs.

Figure 3-2 Lakeview flooding December 2006

Figure 3-3 Lakeview flooding, 2005

3.1.2 Internet Search and Anecdotal Evidence

An internet search was conducted to gather information about whether the site was affected by flooding previously. No flooding incidents were recorded at the site the itself, however several

records of flooding in Claregalway due to the Clare river, and past ground water flooding due to turloughs exist. The residents of Cuirt na hAlbhainn housing estate directly to the northwest of the site recorded flood levels to come within 100mm of FFLs in 2009. Residents of Lakeview estate also reported high levels of water in the area and have photographic records since 1990. Images found via internet searches were included as part of reports found on floodinfo.ie and shown in the previous section.

3.2 Predictive Flood Mapping

The area has been a subject to two predicative flood mapping or modelling studies and other related studies:

- OPW Preliminary Flood Risk Analysis;
- Catchment Flood Risk Assessment and Management Study (CFRAM);
- Clare River Flood Relief Scheme

The level of detail presented by each method varies according to the quality of the information used and the approaches involved. The Western CFRAM is the most detailed assessment of flood extent and supersedes the fluvial flood outlines presented by the OPW PRFA study.

3.2.1 OPW Preliminary Flood Risk Analysis

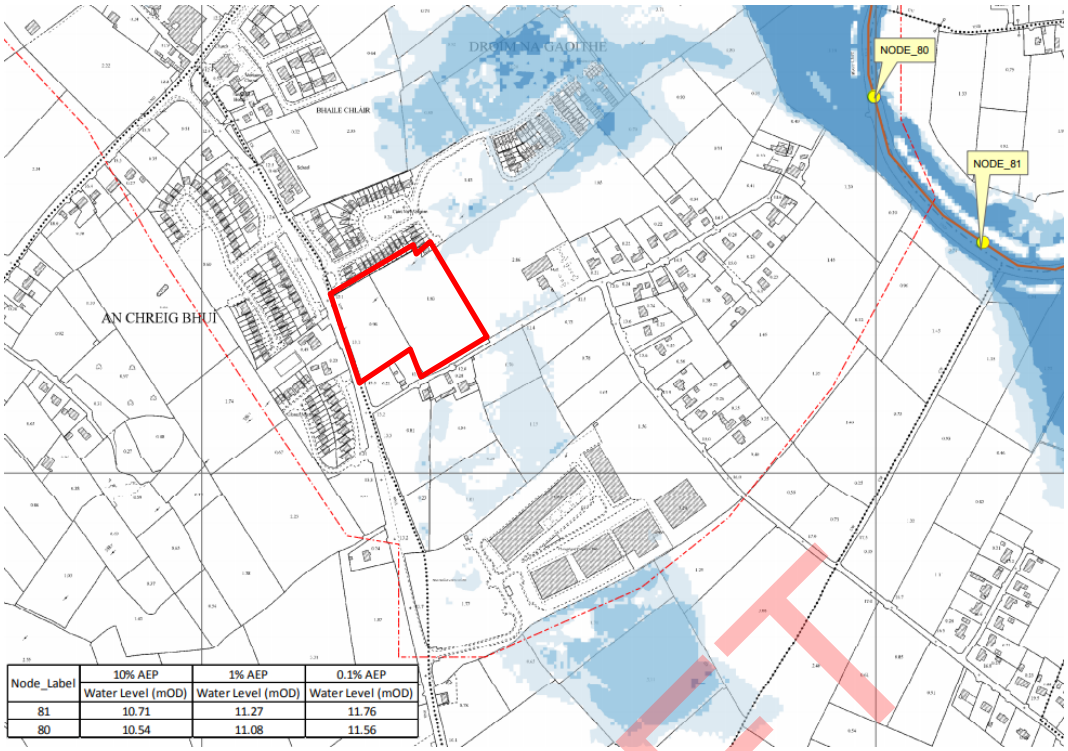
The preliminary Flood Risk Assessment (PFRA) is a requirement of the EU Flood Directive (2007/60/EC). One of the PFRA deliverables is flood probability mapping for various sources: fluvial and tidal. The PFRA is a preliminary or 'indicative' assessment and analysis has been undertaken to identify areas potentially prone to flooding. The OPW PFRA study has largely been superseded by the CFRAM programme.

Review of the OPW PFRA study highlights fluvial risk at the proposed site.

3.2.2 Western Catchment-based Flood Risk Assessment and Management Study

The primary source of data with which to identify fluvial flood risk is the Eastern Catchment Flood Risk Assessment and Management Study (CFRAM). This study involved detailed hydraulic modelling of the Corrib and the River Clare catchment and its tributaries.

Due to the distance of the site from the coast, tidal flooding from this source has been scoped out. The Western CFRAM identifies the site as being predominantly in Flood Zone C and at low risk of fluvial. There is a small part of the site to the north in Flood Zone B. An extract from the CFRAM mapping can be seen in Figure 3 5. The low point at the northwest of the site correlates with the area of inundation as seen in the mapping below. The topology at the site goes as low as 10.15mOD in this area, with a flood level of 11.76mOD predicted at node 80.



Node_Label	10% AEP Water Level (mOD)	1% AEP Water Level (mOD)	0.1% AEP Water Level (mOD)
81	10.71	11.27	11.76
80	10.54	11.08	11.56

Figure 3-4 Extract from Western CFRAM mapping

3.2.3 Clare Rive Flood Relief Scheme

Due to recurring flood events on the Clare River and its tributary the Abbert River, a study was commissioned to identify measures to provide flood relief in the Claregalway and surrounding areas. The study included development of a hydraulic model and analysis of previous flood events in the area. The study discusses flooding in the Lakeview area and the impact more recent developments had on the area. The contribution of recent developments to flooding in the Lakeview area and throughout the catchment in general was considered to be outside of the scope of the study, however the catchment was examined and measures proposed to alleviate the effects of flooding in the area. Modelled flood levels relevant to the site are shown in Table 3-1.

The report also states that in the Lakeview area flooding appears to be related to turloughs and not from river channel. The Cuirt na hAbhainn housing estate road varies from 10.55mOD to 10.8mOD. Flooding is known to occur in this area during the winter months, particularly when water levels are high in the river. It would appear from the aerial photographs taken in 2009 that the flooding in this area occurs in two separate turloughs, one in the vicinity of the Corporate Park and one in the vicinity of the Cuirt na hAbhainn housing development northwest of the site, refer to Figure 3 5 and Figure 3 6 for labelled image of turloughs close to the site in 2005 and 2009 respectively.

It was ascertained that the turlough at the corporate park, south of the development site, is higher than the turlough closer to the village to the northwest of the site. The higher turlough drains to the lower turlough via a narrow neck located at the GAA pitch. A topographical survey of the area taken for the study suggests that the water level on the 23 November 2009 in the vicinity of the corporate park was c. 11.3mOD, whereas the flood level in the lower turlough was at c. 11.10mOD. The corresponding peak water level in the Clare River at the time is predicted by the model at 11.16mOD at the upstream end of the relevant section and 10.8mOD at the downstream end of the reach. There is no surface water link between the ground water flooding and the river water flooding seen in any photographic evidence.

It can be seen from the images below that the site was partially inundated during both the 2005 and 2009 events. A map of the affected areas in 2009 is shown in Figure 3-6.

Further details of the scheme, which is largely complete, are provided in Section 4.2.

Table 3-1 Modelled flood levels

Location	Scenario	Mean annual flood mOD	Nov 2009 Flood mOD	100 year flood mOD	100 year Flood with CC mOD
Lakeview, Cuirt na hAbhainn	Existing	10.22	11.02	11.36	11.85
Lakeview, Cuirt na hAbhainn	Channel Widening	9.70	10.29	10.51	10.91

Figure 3-5 Lakeview Turloughs 2005

Figure 3-6 Lakeview Turloughs 2009

Figure 3-7 Extract of flood map (Source: Clare River Flood Relief Study)

3.3 Sources of Flooding

The initial stage of a Flood Risk Assessment requires the identification and consideration of probable sources of flooding. Following the initial phase of this Flood Risk Assessment, it is possible to summarise the level of potential risk posed by each source of flooding. The flood sources are described below.

3.3.1 Fluvial

The CFRAM modelling suggests that the site is predominantly in Flood Zone C with a small area in the northwest of the site located in Flood Zone B. The Clare River Flood Relief Study also suggests that the risk of flooding by fluvial sources is low.

3.3.2 Pluvial

Pluvial, or surface water, flooding is the result of rainfall-generated flows that arise before run-off can enter a watercourse or sewer. The OPW PFRA mapping shows the central, low-lying, part of the site may act as a collection point for rainfall.

Pluvial flooding could be a risk to the site combined with groundwater flooding due to hardstanding ground lain over turloughs to the south and northwest of the site. Increased hard standing ground can pose a risk of pluvial flooding at the site.

3.3.3 Groundwater

Groundwater flooding results from high sub-surface water levels that impact upper levels of the soil strata and overland areas that are usually dry. Groundwater flooding has been identified as the primary risk to the site. The site is located at an area with high groundwater vulnerability which implies a depth to bedrock of between 3 and 10m. Directly north of the site the groundwater vulnerability is classed as extreme which implies a depth to bedrock of less than 3m. Low depths to bedrock can increase the risk of high groundwater levels and flooding. Previous flooding at the site

has been identified as groundwater flooding due to turloughs located to the northwest and south of the site.

4 Flood Risk and Mitigation

4.1 Flood Risk

From reviewing the available sources of flooding history outlined in Section 3, there is historic evidence of groundwater flooding at the site, but no historic evidence of fluvial risk. Following review of the available information, the site is classified as predominantly located in Flood Zone C therefore, the proposed works to the site are in agreement with "The Planning System and Flood Risk Management" guidance. The Flood Zones do not include the effects of other forms of flooding such as from groundwater or artificial drainage systems.

Floodmaps.ie and the Clare River Flood Relief Study identify a risk to the site in the form of groundwater flooding at the proposed development. Measures were undertaken as part of the Clare River Flood Relief Study to alleviate groundwater flood levels in the area and are discussed in the following sections. Potential residual flood risk will also be discussed further in the following sections.

4.2 Mitigation

4.2.1 River Clare Flood Relief Scheme

Given the risk of groundwater flooding to the site, careful consideration of inundation depths and the design of mitigation to the development is required. A key factor governing the future operation of the site is that the Clare River FRS will provide flood mitigation to the site. It is noted that no existing or residual fluvial flood risk is present to the site, therefore mitigation measures will focus on potential pluvial and groundwater flooding. Groundwater Flood Risk\Surface Water Flood Risk (Clare River Flood Relief Scheme).

Historic groundwater flooding was recorded at the site on floodmaps.ie and in the Clare Flood Relief Study. There are turloughs present to the northwest and the south of the site at Cuirt na hAbhainn and the Corporate Park respectively. These turloughs tend to fill at time of high rainfall and when water levels on the Clare River are high. An indicative route for flood relief measure 6a is shown in Figure 4 1. Measure 6a relates to the provision of a 1.65km surface water outfall pipeline between Claregalway Corporate Park and the Clare River, upstream of the Claregalway Bridge. This was designed to reduce the impact of flooding in areas affected by groundwater flooding. In relation to measure 6a some changes were made from the original proposals outlined in the image below.

- The outfall to the Clare River was originally planned downstream of the bridge but is now located c. 60m upstream of the bridge.
- The original report proposed a combination of piping and open channel, whereas the scheme resulted in a predominately piped system with a maximum pipe diameter of 1.5m.

Despite changes to the scheme, it provides the same level of flood relief as the original report, of 1% AEP and an additional allowance of 20% for climate change.

Measures 4a and 4b relate to widening of the channel and the addition of a flood eye to the bridge in Claregalway. These measures should also benefit surface water drainage in the Lakeview and surrounding areas due to outfalls to the Clare River being able to discharge due to lower water levels.

All elements of the scheme relevant to the function of flood defence in Claregalway have been completed at the time of writing this report, with the Lakeview pipeline completed in about 2018.

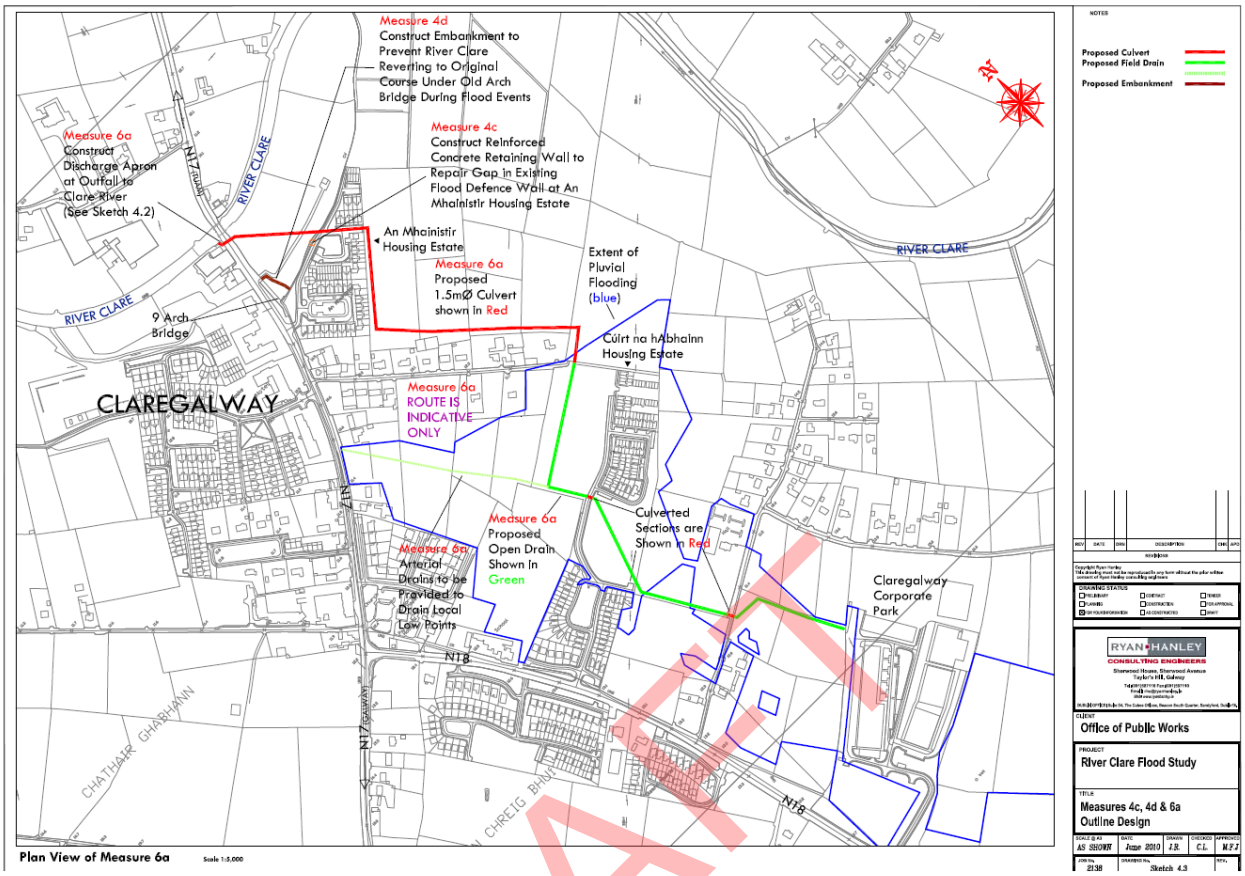


Figure 4-1 Indicative route measure 6a (pre-exhibition)

4.2.2 Surface Water Drainage

The site should have a surface water drainage system that replicates existing greenfield conditions, and should be designed according to the GDSDS.

Although it is not a requirement of the Planning Guidelines that compensatory storage is provided for loss of areas which natural capture surface water ponding, areas of greenspace can be shaped to provide rain water attenuation, mimicking the ponding that occurs currently.

4.2.3 Finished Floor Levels

Finished Floor Levels for the site should be set to 1% AEP event levels, including a freeboard of 300mm. The design FFL has been recommended as 11.38m OD and represents a freeboard of 300mm above the Western CFRAM 1% AEP flood level of 11.08mOD on the Clare River. Climate Change has not been a direct consideration when setting the FFL, this is because the site will be protected under the Clare River flood relief scheme.

The recommended FFL also lies above water levels as estimated at the Corporate Park during the 2009 event relating to groundwater flooding therefore providing protection against both fluvial and groundwater flood risks. This would require some infilling across the northwest section of the site and in some localised areas, but most of the site is already above this level.

4.3 Residual Risk

Residual risks are defined as risks that remain after all risk avoidance, substitution and mitigation measures have been taken. The flood risk assessment identifies two main sources of residual risk to the proposed development which are as follows:

- Failure of designed stormwater system (pluvial flooding risk)
- Failure of Lakeview pipeline

The primary residual risk to the site since the flood relief scheme has been completed will be failure of the Lakeview pipeline, either through blockage of exceedance flows. The pipeline is

predominantly culverted and there are no open channels at the site so risk of overflow to the site itself is low. In the case of failure at the Corporate Park, the risk is managed by suitably high FFLs.

The widening of the channel reduces risk of fluvial flooding and surface water flooding in that routes to outfalls to the Clare River do not get backed up in times of high rainfall. The risk of outfalls blocking or backing up, is again managed by the suitably high finished floor levels

4.4 Proposed Development and Impact on Flood Risk

The proposed development will result in a small loss of available floodplain as the footprint of the proposed development will cover some previous areas of flooding. However, the impacts of any loss of floodplain has been negated by the construction of the flood relief scheme for Clare River.

5 Conclusion

JBA Consulting has undertaken a flood risk assessment for the proposed residential development at Claregalway, Co. Galway. The site is within Flood Zone C for fluvial and tidal influences, but at risk of flooding due to groundwater sources.

The land is zoned for residential under the current Galway County Development Plan 2015-2021. A factor governing the future operation of the site is that the Clare River Flood Relief Scheme will directly protect the site from ground water flooding.

A number of factors have been drawn together and used to establish a design strategy for flood risk management:

The design FFL has been recommended as 11.38mOD and represents a freeboard of 300mm above the Western CFRAM 1% AEP flood level on the Clare River. Furthermore, the proposed development will not significantly increase risk to the surrounding area.

The site mitigation and management measures presented in this FRA have considered both the existing risk status and the future defended status and has presented measures that are flexible and robust enough to deal with uncertainty and risk both pre and post- flood relief scheme.

It is concluded that the site is in compliance with the core principles of the Planning System and Flood Risk Management Guidelines and has been subject to a commensurate assessment of risk.

Appendices

A Understanding Flood Risk

Flood risk is generally accepted to be a combination of the likelihood (or probability) of flooding and the potential consequences arising. Flood risk can be expressed in terms of the following relationship:

Flood Risk = Probability of Flooding x Consequences of Flooding

A.1 Probability of Flooding

The likelihood or probability of a flood event (whether tidal or fluvial) is classified by its Annual Exceedance Probability (AEP) or return period (in years). A 1% AEP flood has a 1 in 100 chance of occurring in any given year.

In this report, flood frequency will primarily be expressed in terms of AEP, which is the inverse of the return period, as shown in the table below and explained above. This can be helpful when presenting results to members of the public who may associate the concept of return period with a regular occurrence rather than an average recurrence interval, and is the terminology which will be used throughout this report.

Return period (years)	Annual exceedance probability (%)
2	50
10	10
50	2
100	1
200	0.5
1000	0.1

Table: Conversion between return periods and annual exceedance probabilities

A.2 Flood Zones

Flood Zones are geographical areas illustrating the probability of flooding. For the purposes of the Planning Guidelines, there are 3 types or levels of flood zones, A, B and C.

Zone	Description
Flood Zone A	Where the probability of flooding is highest; greater than 1% (1 in 100) from river flooding or 0.5% (1 in 200) for coastal/tidal flooding.
Flood Zone B	Moderate probability of flooding; between 1% and 0.1% from rivers and between 0.5% and 0.1% from coastal/tidal.
Flood Zone C	Lowest probability of flooding; less than 0.1% from both rivers and coastal/tidal.

It is important to note that the definition of the flood zones is based on an undefended scenario and does not take into account the presence of flood protection structures such as flood walls or embankments. This is to allow for the fact that there is a residual risk of flooding behind the defences due to overtopping or breach and that there may be no guarantee that the defences will be maintained in perpetuity.

Indicative Flood Zones (OPW & DoEHLG 2009)

A.3 Consequence of Flooding

Consequences of flooding depend on the hazards caused by flooding (depth of water, speed of flow, rate of onset, duration, wave-action effects, water quality) and the vulnerability of receptors (type of development, nature, e.g. age-structure, of the population, presence and reliability of mitigation measures etc.).

The 'Planning System and Flood Risk Management' provides three vulnerability categories, based on the type of development, which are detailed in Table 3.1 of the Guidelines, and are summarised as:

- Highly vulnerable, including residential properties, essential infrastructure and emergency service facilities;
- Less vulnerable, such as retail and commercial and local transport infrastructure;
- Water compatible, including open space, outdoor recreation and associated essential infrastructure, such as changing rooms.

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Registration number 444752

APPENDIX III

PROPOSED LANDSCAPE PLAN

LANDSCAPE MASTERPLAN

LEGEND

- Large Native Tree Species
- Medium Native Tree Species
- Ornamental Tree Species
- Street/Front Garden Tree Species
- Amenity grass
- Wildflower meadow grass
- Perennials & Seasonal Bulbs
- Low Height Ornamental Shrub Mix
- Medium Height Buffer Planting Ornamental Shrub Mix
- Clipped Hedge
- Feature bench
- Native woodland
- Rubbercrump play surface
- Concrete paving setts
- Brushed concrete paths
- Tarmac Roadways
- Parking Spaces
- Reinforced Grass Access Road


Typical Playground Fence


Indicative Medium Height Planting Mix


Woodland


Tilia cordata


Ilex aquifolium


Typical Toddler Play Equipment

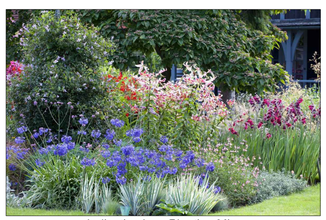

Typical Bench Seating


Malus Rudolph


Typical Play Equipment 7+


Typical Toddler Play Equipment


Carpinus betulus 'Fastigiata'


Indicative Low Planting Mix

INDICATIVE PLANTING SCHEDULE

	Parkland, Open Space and Feature Trees	
T1	*Acer pseudoplatanus 'Atropurpureum'*	14-16 cm.g, 4m+ h., 2 m clear stem. RB/CG
T2	*Quercus petrea*	14-16 cm.g, 4m+ h., 2 m clear stem. RB/CG
T3	Fagus sylvatica	14-16 cm.g, 4m+ h., 2 m clear stem. RB/CG
T4	*Sorbus aria 'Lutescens'*	14-16 cm.g, 4m+ h., 2 m clear stem. RB/CG
T5	*Sorbus aucuparia*	14-16 cm.g, 4m+ h., 2 m clear stem. RB/CG
T6	*Pyrus 'Chanyicleer'*	14-16 cm.g, 4m+ h., 2 m clear stem. RB/CG
T7	*Ilex aquifolium*	1 - 1.25m h RB/CG
T8	*Quercus ilex*	10-12 cm. g, 3m+ h., 2m clear stem RB/CG
	Front Garden Trees / Street Trees	
T9	*Tilia cordata* 'Greenspire'	12-14 cm.g, 4m+ h., 2 m clear stem. RB/CG
T10	*Acer campetre* 'Elsrijk'	12-14 cm.g, 4m+ h., 2 m clear stem. RB/CG
T11	*Sorbus aucuparia 'Streetwise'*	M/S, 3brks, 400/450cm ht, RB/CG
T12	*Malus* 'Evereste'	12-14 cm.g, 4m+ h., 2 m clear stem. RB/CG
T13	*Malus Rudolph*	12-14 cm.g, 4m+ h., 2 m clear stem. RB/CG
T14	*Pyrus 'Chanyicleer'*	12-14 cm.g, 4m+ h., 2 m clear stem. RB/CG
T15	*Malus floribunda*	12-14 cm.g, 4m+ h., 2 m clear stem. RB/CG
T16	*Carpinus betulus* 'Fastigiata'	12-14 cm.g, 4m+ h., 2 m clear stem. RB/CG
NH	**Native Woodland Mix 0 m²**	
	Alnus glutinosa	8-10 cm.g, 2m+ h . RB/CG
	Populus tremula	8-10 cm.g, 2m+ h . RB/CG
	Betula pubescens	8-10 cm.g, 2m+ h . RB/CG
	Salix spp.	8-10 cm.g, 2m+ h . RB/CG
	Prunus padus	8-10 cm.g, 2m+ h . RB/CG
	Pinus sylvestris	8-10 cm.g, 2m+ h . RB/CG
	Corylus avellana	8-10 cm.g, 2m+ h . RB/CG
	Quercus petraea	8-10 cm.g, 2m+ h . RB/CG
	Ilex aquifolium	8-10 cm.g, 2m+ h . RB/CG
	Sorbus spp.	8-10 cm.g, 2m+ h . RB/CG
	Crataegus monogyna	8-10 cm.g, 2m+ h . RB/CG
GH	**Garden Hedging /Shrub Planting**	
	Erica carnes 'Vivellii' 0 l/m	2lt c.g. @ 3 lm
	Lavandula angustifolia "Blue Cushion" 0 l/m	3lt c.g. 30-40cm Ht/Sprd @ 4 lm
	Hebe buxifolia 'nana" 0 l/m	2lt c.g. @ 4 lm
	Prunus laurocerasus 'Otto Luyken" 0 l/m	2lt c.g. @ 3 lm
CH	**Clipped Hedging**	
	Fagus sylvatica" 0 l/m	1+2 60-80cm h, BR/CG @ 6 l/m
	Ligustrum vulgare" 0 l/m	1+1 60-80cm h, BR/CG @ 6 l/m
SM1	**Low Ornamental Planting Mix - Mix 0 m²**	
An	*Aster novi-beigii 'Rosenwichtel'*	2lt c.g. @ 3 m²
Ba	*Berberis 'Amstelveen'*	2lt c.g. @ 1 m²
Cp	*Carex pendula*	2lt c.g. @ 1 m²
Cbm	*Ceanothus 'Blue Mound'*	2lt c.g. @ 1 m²
Cm	*Centaurea montana*	2lt c.g. @ 2 m²
Es	*Erica spp.*	2lt c.g. @ 3 m²
Gm	*Geranium m. 'Czakor'*	2lt c.g. @ 3 m²
Ct	*Choisya ternata*	5lt c.g. 40-60cm Ht/Sprd @ 1 m²
La	*Lavandula angustifolia 'Blue Cushion'*	2lt c.g. @ 5 m²
Ps	*Potentilla spp.*	5lt c.g. 40-60cm Ht/Sprd @ 1 m²
Rg	*Rudbeckia 'Goldstrum'*	2lt c.g. @ 3 m²
Sj	*Spirea japonica 'Firelight*	2lt c.g. @ 1 m²
St	*Stipa tenuissima*	2lt c.g. @ 3 m²
Ku	*Kniphofia uvaria Flamenco*	2lt c.g. @ 3 m²
Hs	*Heuchera sp.*	2lt c.g. @ 3 m²
Cag	*Cytissus 'All Gold'*	5lt c.g. 40-60cm Ht/Sprd @ 1 m²
Cxc	*Crocosmia × crocosmiiflora 'Emily McKenzie*	2lt c.g. @ 3 m²
SM2	**Medium to High Ornamental Planting Mix 0 m²**	
Hh	*Hypericum hidcote*	2lt c.g. @ 3 m²
Ee	*Eleagnus ebbingei*	2lt c.g. @ 4 m²
Ep	*Eleagnus pungens*	2lt c.g. @ 2 m²
MaA	*Mahonia aquifolium 'Apollo'*	2lt c.g. @ 4 m²
Rfc	*Rosa 'Flower Carpet'*	2lt c.g. @ 3 m²
Vd	*Viburnum davidii*	2lt c.g. @ 3 m²
Bt	*Berberis thunbergii*	2lt c.g. @ 3 m²
Hv	*Hebe (Various)*	2lt c.g. @ 3 m²
Ho	*Kniphofia 'Royal Castle'*	2lt c.g. @ 3 m²
Pt	*Pittosporum tenufolium 'Irene Paterson'*	2lt c.g. @ 1 m²
Hq	*Hydrangea quercifolia 'Snow Queen'*	2lt c.g. @ 1 m²
Hcc	*Viburnum tinus 'Eve Price'*	2lt c.g. @ 3 m²
Hf	*Rosa 'Munstead Wood'*	2lt c.g. @ 3 m²
BP	**Bulb Planting Mix 0 m²**	
	Crocus vernus 'Remembrance'	@ 50 m²
	Narcissus 'Toto'	@ 10 m²
	Narcissus 'Tete a Tete'	@ 10 m²
	Galanthus 'nivalis'	@ 50 m²

REV	DATE	AMENDMENT

CUNNANE STRATTON REYNOLDS

LAND PLANNING & DESIGN

GALWAY OFFICE
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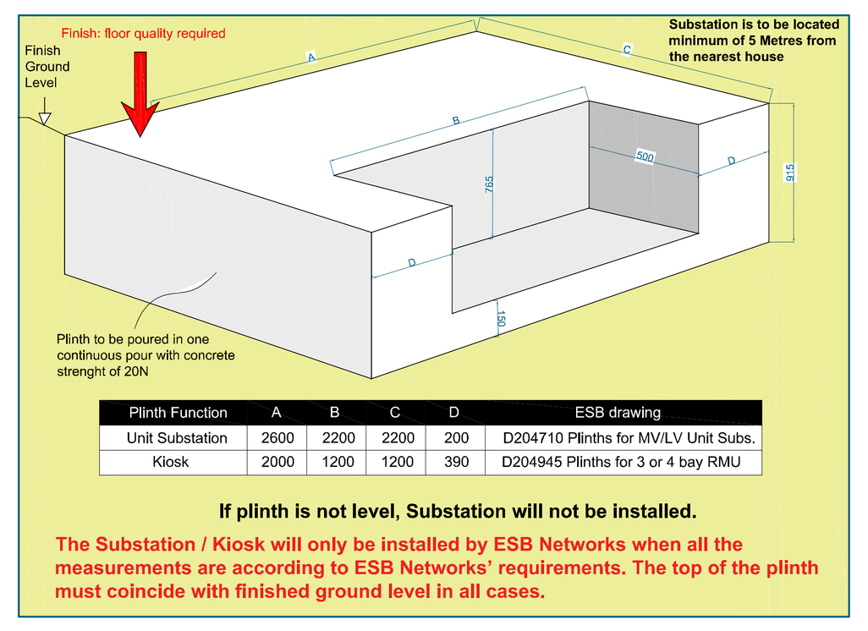
PROJECT: **Cluain na Gaoithe Claregalway, Co. GALWAY**	DATE: July 2022
	SCALE: 1:500@A1
DRAWING: **LANDSCAPE PLAN**	DRAWN: RH CHECKED: KM
	DRAWING NO: **22242_1_100**

CAD REFERENCE: S:\CSR GALWAY\Landscape\PROJECT FOLDERS\2022\22242_Cluain na Gaoithe Claregalway\CSR\22242_1_100RH.dwg

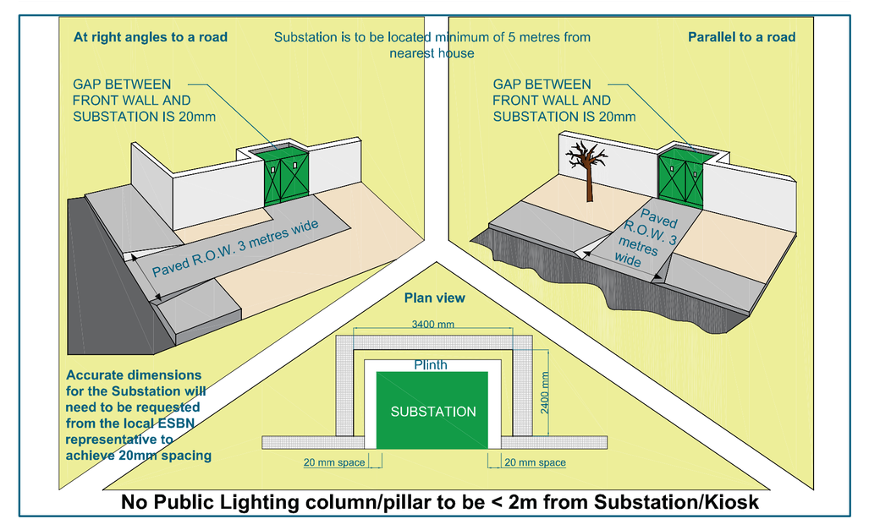
APPENDIX IV

PROPOSED PUBLIC LIGHTING LAYOUT AND REALITY LIGHTING CONTOURS DRAWINGS

SUBSTATION KIOSK FOUNDATION PLINTH

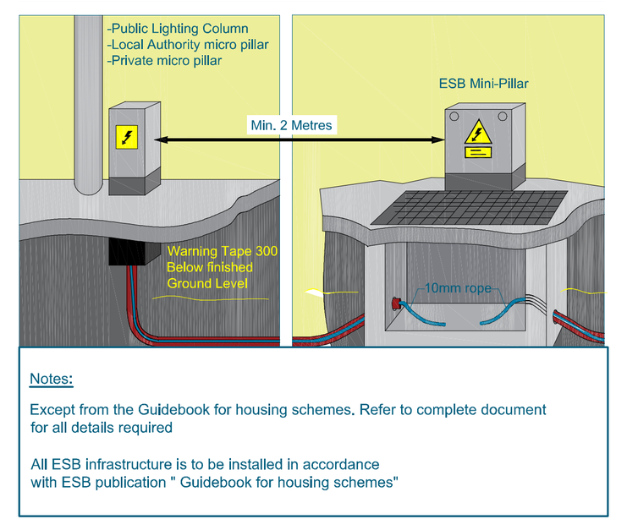


SUBSTATION KIOSK SITE

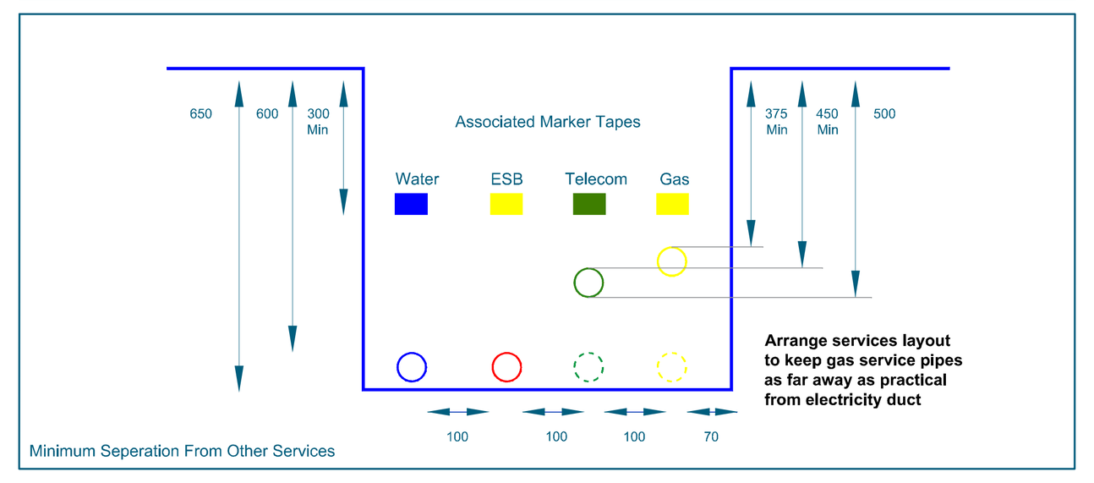


No Public Lighting column/pillar to be < 2m from Substation/Kiosk

PUBLIC LIGHTING



Cross-Section of Utility Services Trench within House owners Property showing minimum depth and minimum spacing requirements



Notes:
1. Do **NOT** scale from this drawing.
2. The actual results achieved may vary from predicted values due to normal deviation in luminaire installation, electrical supply, equipment tolerances, obstructions including poles, brackets and mounting arms, reflectances etc.
3. This design is based on a preliminary assessment only and will be developed during the detailed design stage.

Calculation Summary

Description	E_{av}	E_{min}	E_{max}	E_{min}/E_{max}	E_{min}/E_{av}	E_{max}/E_{av}
Road / Path 1	6.29	1.23	23.04	0.05	0.20	3.66
Road / Path 2	7.04	1.38	23.15	0.06	0.20	3.29
Road / Path 3	7.46	1.46	23.24	0.06	0.20	3.12
Road / Path 4	6.47	1.26	23.04	0.05	0.19	3.56
Road / Path 5	7.40	1.30	23.05	0.06	0.18	3.12

Luminaire Schedule

Symbol	Type	Lamp(s)	MF	Quantity
(red)	Veelite Metro Streetlight 27w LED Street Optic R03	12; 3000K	0.80	11
(green)	Veelite Metro Streetlight 27w LED Forward Throw A Optic	12; 3000K	0.80	18

Legend

Symbol	Description
(red)	Luminaire A Column
(green)	Luminaire B Column
○	Beam Aiming Target
□	Photometric Centre

Veelite Metro Streetlight on 6m Pole
By Electrical Contractor

Rev	Description	Date	Ckd
P3	Revised Site Layout	21.04.23	RK
P2	Revised Site Layout	05.08.22	RK
P1	Preliminary Issue	11.04.22	RK

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Client: Galway County Council

Site: House Development at Cluain na Gaoithe, Baile an Chláir,Co.na Gaillimhe

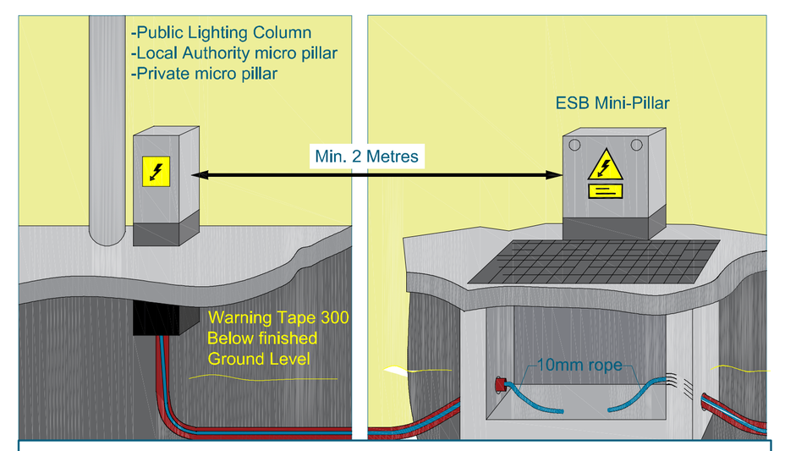
Title: Builders Work
Public Lighting Layout

Job no: 5236

Drawing no.: BLD-100

Approved: BC Checked: RK Drawn: IV
Scale: 1:250
Size: A0

PUBLIC LIGHTING

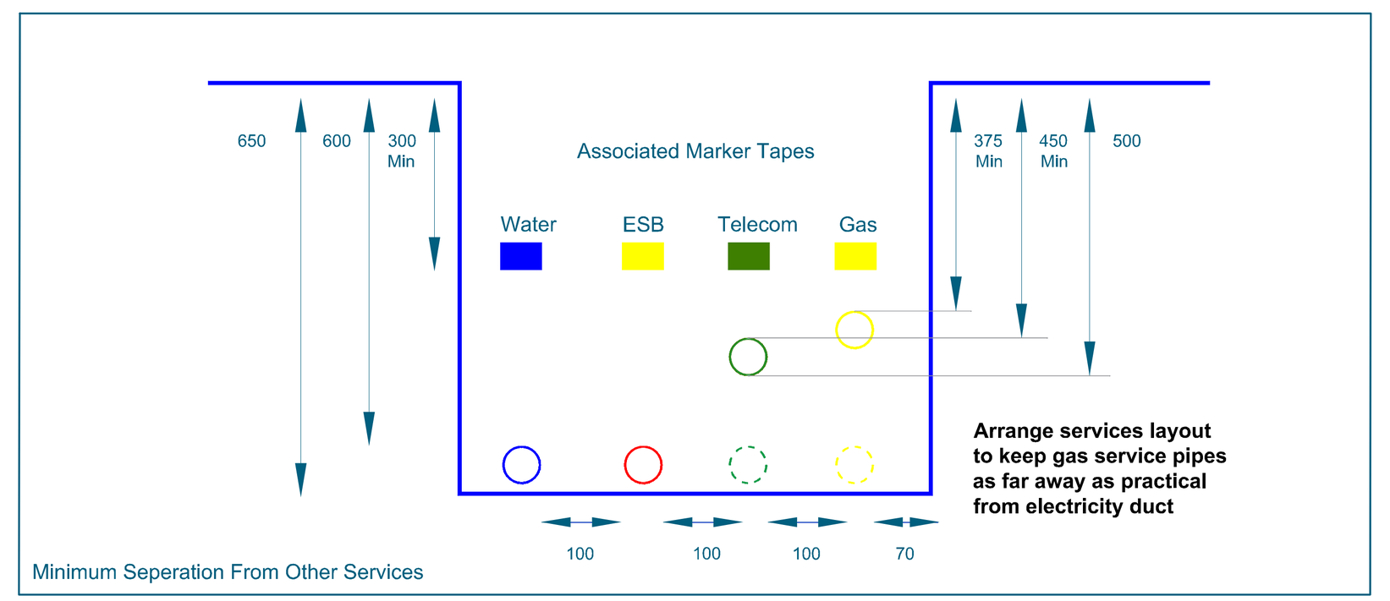


Notes:

Except from the Guidebook for housing schemes. Refer to complete document for all details required

All ESB infrastructure is to be installed in accordance with ESB publication " Guidebook for housing schemes"

Cross-Section of Utility Services Trench within House owners Property showing minimum depth and minimum spacing requirements



Notes:
1. Do **NOT** scale from this drawing.
2. The actual results achieved may vary from predicted values due to normal deviation in luminaire installation, electrical supply, equipment tolerances, obstructions including poles, brackets and mounting arms, reflectances etc.
3. This design is based on a preliminary assessment only and will be developed during the detailed design stage.

Calculation Summary

Description	E_{av}	E_{min}	E_{max}	E_{min}/E_{max}	E_{min}/E_{av}	E_{max}/E_{av}
Road / Path 1	6.29	1.23	23.04	0.05	0.20	3.66
Road / Path 2	7.04	1.38	23.15	0.06	0.20	3.29
Road / Path 3	7.46	1.46	23.24	0.06	0.20	3.12
Road / Path 4	6.47	1.26	23.04	0.05	0.19	3.56
Road / Path 5	7.40	1.30	23.05	0.06	0.18	3.12

Luminaire Schedule

Symbol	Type	Lamp(s)	MF	Quantity
Red circle	Veelite Metro Streetlight 27w LED Street Optic R03	12; 3000K	0.80	11
Green circle	Veelite Metro Streetlight 27w LED Forward Throw A Optic	12; 3000K	0.80	18

Legend

Symbol	Description
Red circle	Luminaire A Column
Green circle	Luminaire B Column
○	Beam Aiming Target
□	Photometric Centre

Veelite Metro Streetlight on 6m Pole
By Electrical Contractor

Rev	Description	Date	Ckd
P3	Revised Site Layout	21.04.23	RK
P2	Revised Site Layout	05.08.22	RK
P1	Preliminary Issue	11.04.22	RK

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Client: Galway County Council

Site: House Development at Cluain na Gaoithe, Baile an Chláir,Co.na Gaillimhe

Title: Builders Work
Reality Lighting Contours

Job no: 5236

Drawing no.: BLD-101

Approved: BC Checked: RK Drawn: IV
Scale: 1:250
Size: A0