Planning and Environmental Consultants

Ecological Impact Assessment

N59 Kentfield Road Safety Junction Improvement Scheme

DOCUMENT DETAILS

Client:	**Galway County Council**
Project Title:	**N59 Kentfield Road Safety Junction Improvement Scheme**
Project Number:	**220950**
Document Title:	**Ecological Impact Assessment Report**
Document File Name:	**EcIA-F–2024.03.04-220950**
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Rev	Status	Date	Author	Approved By
01	Draft	24/07/2023	POB/PD	KOD
02	Final	08/08/2023	PD	KOD
03	Final 1	04/03/2024	PD	KOD
04	Final 2	10/06/2024	PD	KOD

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1. INTRODUCTION

1.1 Background

MKO has been commissioned to conduct an Ecological Impact Assessment (EcIA) of proposed road improvement works to the N59 National Secondary Road at Kentfield, Co. Galway (Grid Reference: M 26518 28358).

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, minimise, or compensate for such effects.

1.2 Statement of Authority

A baseline ecological survey was undertaken on the 16th of May 2023 by Patrick O'Boyle (B.Sc., M.Sc.) and Keith Costello (B.Sc.) of MKO. This report has been prepared by Patrick O'Boyle and Pádraig Desmond (B.Sc.) and reviewed by Kate O'Donnell (B.Sc., ACIEEM). Patrick and Keith are experienced ecologists with sufficient consultancy experience while Pádraig and Kate have over 3 and 4-years' professional experience, respectively, in ecological consultancy. Both have extensive experience undertaking ecological surveys in a range of habitats and have worked on Appropriate Assessment and Ecological Impact Assessment for a wide range of projects.

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) (amended 2021);
- Revised guidelines on the information to be contained in Environmental Impact Statements (EPA, 2022);
- The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments, Unpublished NPWS report (NPWS, 2019);
- The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments, Unpublished NPWS report (NPWS, 2019);
- Ecological Surveying Techniques for Protected Flora and Fauna During the Planning of National Road Schemes, (NRA, 2008);
- Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub prior to, during and Post Construction of National Road Schemes, (NRA, 2008);
- Environmental Impact Assessment of National Road Schemes –A Practical Guide (NRA, 2009);
- Guidelines for assessment of Ecological Impacts of National Road Schemes, (NRA, 2009).
- Environmental Assessment and Construction Guidelines (NRA, 2006).

2. DESCRIPTION OF PROPOSED DEVELOPMENT

2.1 Site Location

The site of the Proposed Development incorporates elements of an approx. 245-metre stretch of the existing N59 National Secondary Road and 45m of the L-5381 Local Road, in the townland of Kentfield, Co. Galway, approx. 4.5 km from Galway City Centre and in close proximity to the Glenlo Abbey Hotel (Grid Reference: M 26518 28358).

The location of the site of the Proposed Development is shown in Figure 2-1.

2.2 Characteristics of the Proposed Development

2.2.1 Description of the Project

The works comprise alterations to the existing road alignment of the N59 and L-5381 at Kentfield Co. Galway. The following outlines the planned works required at N59 Kentfield:

- The N59 carriageway will be realigned and upgraded to a Type 2 single carriageway along the 245m section of the N59;
- On approach to the simple priority junction along the N59 a nearside passing of 2m will be provided at the junction;
- The L-5381 carriageway will be realigned and widened for approx. 45m to incorporate a carriageway width of 6m and a 2m footpath;
- Grass verges will be provided at 3m width along the western length of the N59 with existing hedgerow maintained and varying widths of grass verge between 8 – 12m along the eastern length of the N59 carriageway;
- A 2m footpath will be provided along the N59 on the south-western side of the scheme and extended westwards along the L-5381 for approximately 50m;
- 1 no. Domestic entrance on the N59 will be maintained and upgraded to current standards including resting walls and piers;
- 2 no. Field access will be maintained along the N59 and upgraded to current standards;
- 240m of stone wall will be constructed on the eastern side of the scheme, with approx. 60m stone wall to be constructed on the western side of the scheme;
- All existing land drainage and culverts will be maintained with new land drainage connected to the existing network;
- A sealed drainage system comprising of kerb and gully system, which discharges through a petrol interceptor and underground tank, where runoff is attenuated and treated before discharged to the local drainage network is proposed;
- 220m of vegetation clearance along the eastern side of the N59 and 50m of vegetation clearance will be required on the L-5381 to facilitate the works and to provide for visibility; and
- All ancillary works required to deliver the proposed scheme.

The road traffic will remain live with a traffic management plan implemented by the Contractor. The Contractor will be responsible for ensuring temporary traffic measures and signs for roadworks are in accordance with Guidance. The site compound will be located off the local road L-5381. Galway County Council will have identified an area suitable for a site compound to be used by the Contractor.

The layout of the Proposed Development is provided in Figure 2-2 below.

2.2.1.1 Drainage

The Proposed Development will result in increased hard standing surfaces and therefore, increased surface water drainage measures are to be implemented. The proposed drainage system will be a kerb and gully system connected to a proposed underground storage tank to control the quantity and quality of runoff into the wider environment. From attenuation, surface water will be discharged to a stream within Glenlo Abbey via an outfall point. A petrol interceptor will be installed upstream from the outfall and discharge rates will be limited to estimated greenfield flood runoff rates. These measures meet the requirements of Sustainable Urban Drainage Systems (SUDS).

Attenuation storage volume will be designed to cater for a minimum storm return period of 1 in 100 years. A climate change allowance of 20% will be added to all attenuation volumes. The proposed drainage system and underground storage tank are shown in Figure 2-3 below.

Proposed drainage is fully detailed in the Design Report prepared by Galway County Council (GCC) and is included in this application.

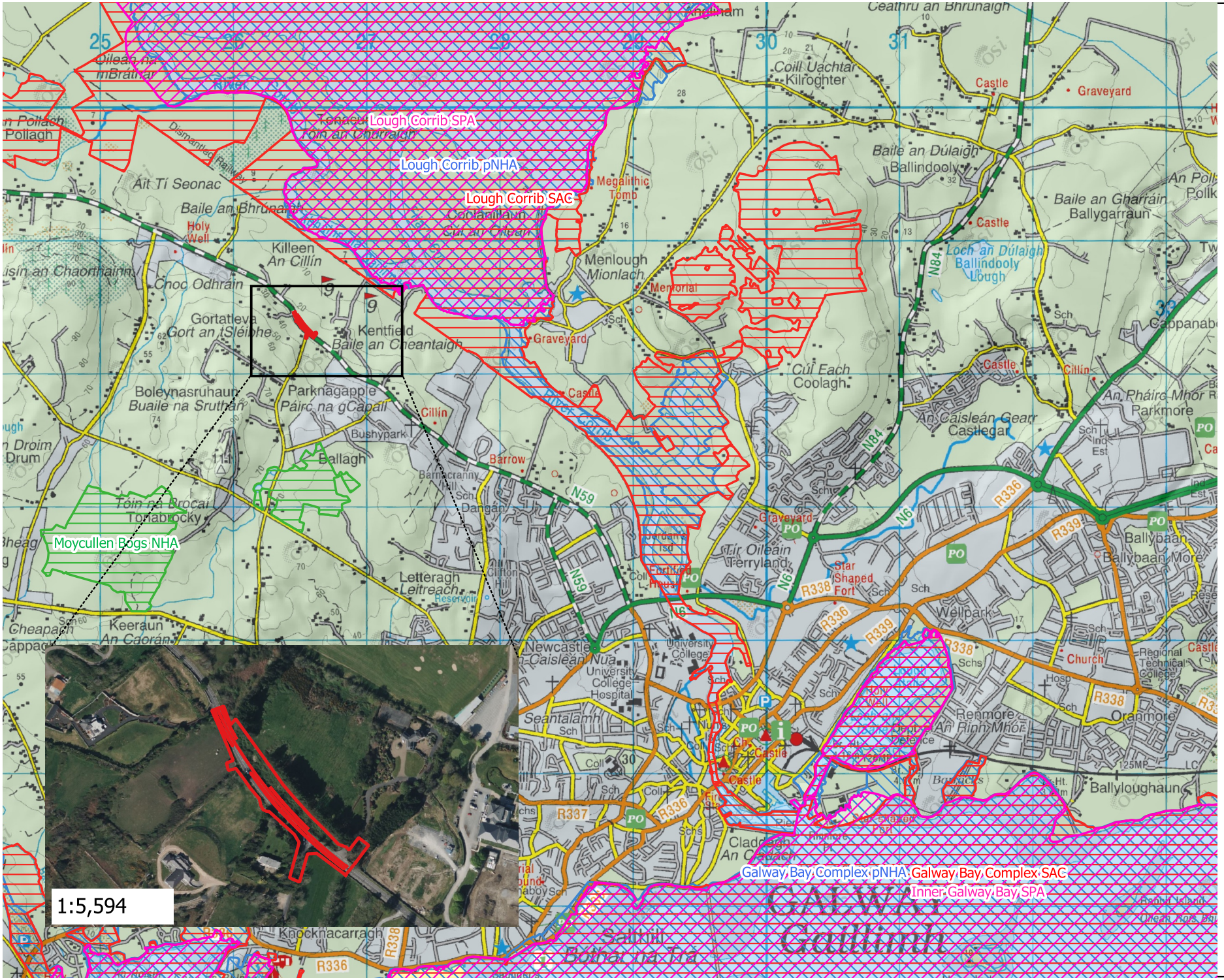
The principal objectives for the proposed road drainage system include:

- To ensure the speedy removal of surface water from the road pavement to provide safe driving conditions,
- To mimic, in as far as is practical, the existing road drainage regime, particularly in relation to runoff rates and watercourse outfalls,
- To ensure that the impact of the drainage outfalls on the receiving waters is negligible,
- To minimise the impact of runoff on the receiving environment, and
- To provide effective sub-surface drainage to maximise the longevity of the road pavement and associated earthworks.

The preliminary drainage proposals have been developed in accordance with the TII Design Manual for Roads and Bridges and in particular in accordance with the TII Drainage systems for National Roads.

As part of the SUDS requirements attenuation and flow control will be provided upstream of the outfall to limit the discharge to estimated greenfield flood runoff rates.

There is no historical flooding, as per the Operation of Public Works (OPW) mapping, within the Proposed Development site and therefore, flooding risk is minimal.



Map Legend

- Site Location
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Natural Heritage Area (NHA)
- Proposed Natural Heritage Area (pNHA)

Drawing Title

Site Location

Project Title

N59 Kentfield

Drawn By	Checked By
JS	KOD
Project No.	**Drawing No.**
220950	Figure 2.1
Scale	**Date**
1:37,101	19.06.2023

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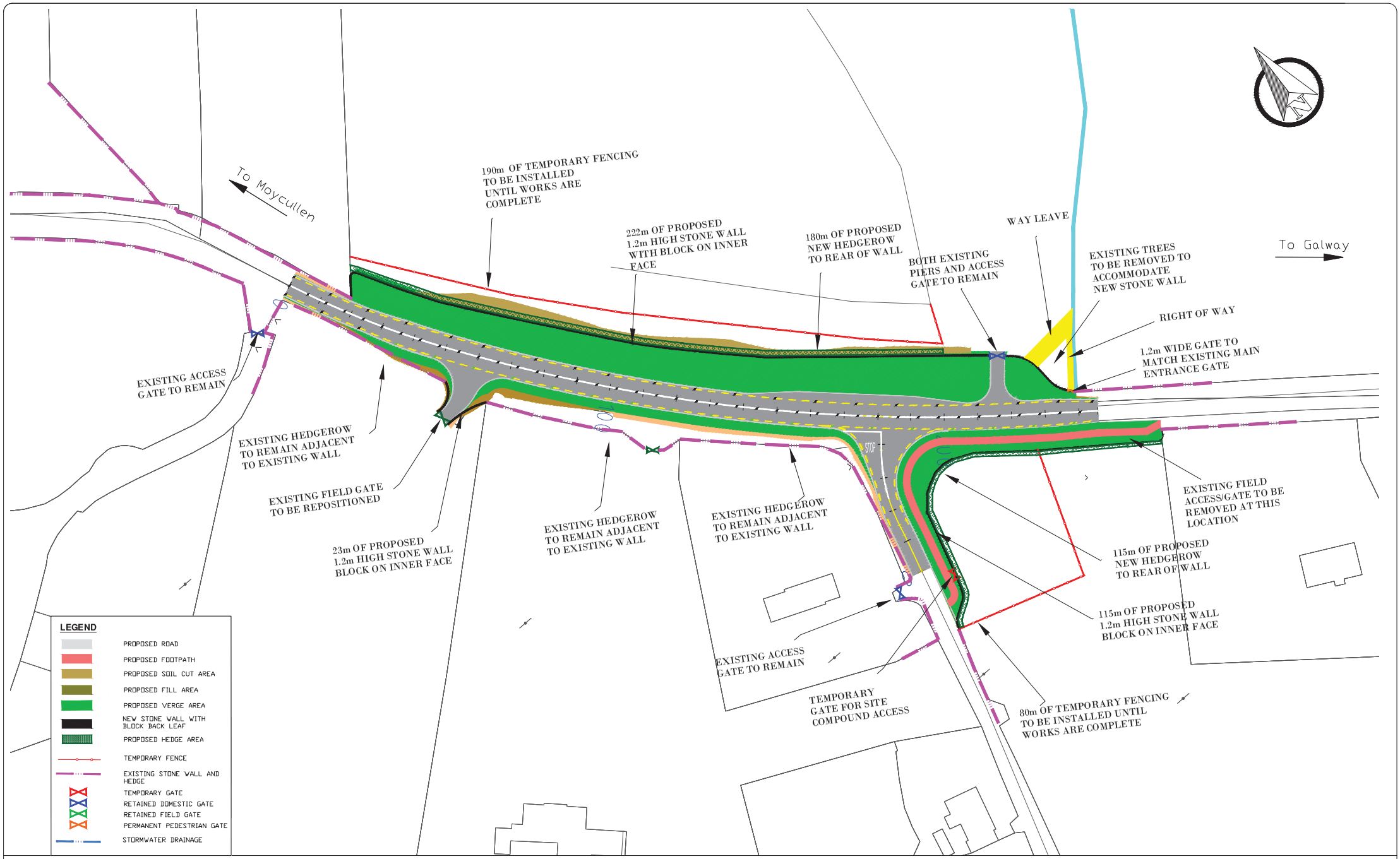

Project Ireland 2040 Building Ireland's Future

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Comhairle Chontae na Gaillimhe Galway County Council

National Roads Design Office,
Galway County Council,
Corporate House,
Ballybrit Business Park,
Galway.

REVISION:	MADE BY:	DATE:	
1	ID	31.01.2024	
2	ID	23.02.2024	
3	ID	27.02.2024	

PROJECT:	N59 Kentfield		
COMPONENT:	Design Drawings		
TITLE:	Accommodation Works		
DESIGNED BY:	S.B.	FILE NO.:	
DRAWN BY:	ID	SCALES: 1:500 @ A1	DRAWING NO.: DP-01-GC/19/18753
CHECKED BY:	S.B.	DATE: January 2024	

Project Ireland 2040 Building Ireland's Future

GALWAY NATIONAL ROADS PROJECT OFFICE

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National Roads Project Office,
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Galway.

REVISION:	MADE BY:	DATE:	
1	ET	25/05/23	
2	LD	31/01/2024	

PROJECT:	N59 Kentfield
COMPONENT:	Design Drawings
TITLE:	Proposed Drainage Layout
DESIGNED BY:	S.B.
DRAWN BY:	L.D.
CHECKED BY:	S.B.
FILE NO.:	
SCALES:	1:500 @ A1
DATE:	January 2024
DRAWING NO.:	DR-01-GC/19/18753

2.3 Construction methodologies and best practice measures

The construction of the development will involve earth moving and levelling operations which create the potential for pollution in various forms, i.e. the generation of suspended solids and the potential for spillage of fuels associated with the refuelling of excavation machinery. A culverted watercourse/stormwater sewer, which is hydrologically connected to Galway Bay downstream, runs in a north easterly direction along the southern boundary of the site of the Proposed Development. The site of the Proposed Development is within areas of both high and extreme groundwater vulnerability. In the absence of best practice, design, and mitigation, the Proposed Development has the potential to cause pollution to this watercourse, the downstream aquatic environment in the form of deterioration of water quality from surface-water runoff. The Proposed Development also has the potential to impact groundwater quality through percolation of pollutants through the bedrock underlying the site of the Proposed Development.

Small-scale excavations may be required to level the site. The following measures will be put in place to avoid potential negative effects as a result of the earthworks and will be adhered to by the contractor for the entirety of the project.

Best practice environmental control measures have been incorporated in the design of the development and are described in the following subsections.

Site Set-up

- As per the CEMP (**Appendix 1**), prior to the commencement of earthworks, silt fencing will be erected around the boundary of the Proposed Development site. This will be embedded into the ground adjacent to the perimeter boundary.
- The silt fence will comprise wooden posts with geotextile membrane buried approximately 250mm below ground level. This fence will be kept in good repair and will be routinely inspected.
- The silt fences will be left in place throughout construction until all exposed soil has revegetated.
- The appointed contactor will be fully briefed by an ecologist as to the sensitive nature of the site and the required mitigation measures.
- A site compound will be established within the site boundary. The exact location of the site compound will be established by the contractor and will be located a minimum of 15m from any watercourses or waterbodies. The compound will be used for storage of material, machinery, fuel, and workers facilities.
- In addition to the boundary of the Proposed Development, silt fencing will also be erected around the site compound.
- All construction materials and substances will be stored in the site compound.
- The Proposed Development site will be fenced off using heras fencing.

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.

Pollution Prevention

- Prior to the commencement of earthworks, silt fencing will be erected around the boundary of the Proposed Development site.

- Excavated spoil (if any) will be stockpiled and contained entirely within the confines of the site boundaries.
- During earthwork activities, the following mitigations will be adhered to:
    - Excavation depths will be kept to a minimum.
    - Material that is not re-used will be transported off site to a designated waste facility.
    - Suitable stone material will be imported to the site to be used as backfill.
    - Stockpiling of soil during construction, should it be required, will take place in designated areas within the site boundary away from any watercourses or waterbodies.
- All diesel or petrol pumps required onsite will be operated within bunded units.
- Exposed surfaces will be re-vegetated as soon as possible following construction.
- The minimum number of soil/subsoils and bedrock material will be removed from site. Soil may be reused for landscaping elsewhere on the site.
- Where possible, earthworks will not be carried out during periods of heavy rainfall.
- As construction advances there may be a requirement to collect and treat surface water within the site. This will be carried out using settlement tanks which will be monitored for hydrocarbons and suspended solids. If required water will be pumped from the settlement tanks into sediment bags prior to overland discharge allowing water to percolate naturally to ground;
- If ground water is encountered during excavations, waters will be pumped from excavation and discharged through a pipe with a silt bag attached on to an area of overland vegetation within the site boundary. Discharge to ground will be via a silt bag which will filter any remaining sediment from the pumped water;
- Daily monitoring and inspections of site drainage during construction will be completed by the appointed environmental officer;
- Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRlA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment.

Cement Based Products

- No batching of wet-cement products will occur on site.
- Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place.
- Where possible, pre-cast elements for concrete works will be used.
- 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 the construction phase drainage system or directly to any artificial drain or watercourse will be allowed.
- Use weather forecasting to plan dry days for pouring concrete.
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.

Refuelling, Fuel and Hazardous Materials Storage

- Storage/refuelling will be located in and carried out in a designated area of the proposed site, located a suitable distance from excavation works. Bunded tanks will be used, and these will be inspected for leaks regularly. Spill kits will be available on site and staff will be trained in their use and in spill control. All spills shall be diverted for collection.

- Fuels, lubricants and hydraulic fluids for equipment used on the site will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment.
- No hazardous substance shall be permitted to be left unattended at any time when taken outside the secured storage.
- Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Off-site refuelling will occur at a controlled fuelling station.
- On-site refuelling will take place by direct refuelling from the delivery truck or from fuel stored within a bunded fuel tank. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations.
- Vehicles will never be left unattended during refuelling. Only dedicated trained and competent personnel will carry out refuelling operations and plant refuelling procedures shall be detailed in the contractor's method statements.
- Storage bunds/trays, if required will be constructed of an impermeable membrane (HDPC Plastic) and will have the adequate capacity to contain the volume of the liquids contained therein, if a leak/spillage does occur from one of the storage vessels.
- All site plant will be inspected at the beginning of each day 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.
- Potential impacts caused by spillages etc. during the construction phase will be reduced by keeping spill kits and other appropriate equipment on-site.
- Spill kits will be used to deal with any accidental spillage in and outside the refuelling area. Spill control measures as outlined fully in the CEMP accompanying this application will be adhered to.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.

Spill Control Measures

In the event of minor spills and leaks from road vehicles and the onsite machinery, the following steps provide the procedure to be followed in the event of any significant spill or leak.

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers.
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident.
- Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill.
- If possible, cover or bund off any vulnerable areas where appropriate such as drains or watercourses.
- If possible, clean up as much as possible using the spill control materials.
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited.
- Notify the applicant immediately giving information on the location, type and extent of the spill so that they can take appropriate action and further investigate the incident to ensure it has been contained adequately.
- External consultants will inspect the site and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.
- The applicant will notify the appropriate regulatory body such as Galway County Council if deemed necessary.

Waste Management

- All waste will be collected in skips and the site will be kept tidy and free of debris at all times.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or recycling.

- All construction waste materials will be stored within the confines of the site, prior to removal from the site to a permitted waste facility.

Wastewater Disposal

- A self-contained port-a-loo with an integrated waste holding tank will be used at the site compounds, maintained by the providing contractor, and removed from site on completion of the construction works; No foul water will be discharged on-site during the construction.

Disturbance Limitation Measures

- 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".
- Noisier plant will be positioned to optimize screening by other plant.
- Plant machinery will be turned off when not in use.
- Operating machinery will be restricted to the Proposed Development site boundary.

Applicable guidance to be followed

- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA) in particular;
- C532 Control of water pollution from construction sites: guidance for consultants and contractors (Masters-Williams et al, 2001); and
- SP156 Control of water pollution from construction sites - guide to good practice (Murnane et al, 2002).

3. METHODOLOGY

The following sections describe the methodologies followed to establish the baseline ecological condition of the site of the Proposed Development and the 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 as amended).

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 of 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 NPWS Article 17 Reports;
- New Atlas of the British & Irish Flora;
- 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 hectads which overlap with the study area.

3.2 Field Surveys

3.2.1 Multidisciplinary Ecological Walkover Surveys

A multidisciplinary ecological walkover survey was conducted on the 16th of May 2023 by Patrick O'Boyle and Keith Costello of MKO in line with NRA (2009) guidelines ('Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes'). This survey provided baseline data on the ecology of the study area and assessed whether further, more detailed habitat or species-specific ecological surveys were required. The multidisciplinary ecological walkover surveys comprehensively covered the entire study area.

Habitats were classified in accordance with the Heritage Council's 'A 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 any protected habitats or species, including any suitable habitat for protected species that may occur in the vicinity of the Proposed Development. Incidental sightings/observations of birds and additional fauna were noted during the site visit.

During the multidisciplinary surveys, a search for Invasive Alien Species (IAS), with a focus on those listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2011), was also conducted.

The survey was undertaken during the optimal time of year for habitat surveys, i.e., April to September (Smith *et al.*, 2011) and all habitats within the site were readily identifiable at the time of the site visit.

3.2.2 Faunal Surveys

During the multidisciplinary walkover survey, a search for signs of badger (*Meles meles*) was undertaken. The badger survey involved a search for all potential badger signs as per NRA (2009) standard best-practice guidance (latrines, badger paths and setts) and followed CIEEM best-practice competencies for species surveys (CIEEM, 2013). Badger surveys can be undertaken at any time of year and are most effective between November and April when vegetation cover is reduced (NRA, 2008). No limitations were identified and a full and comprehensive survey was achieved.

During the survey, a search for signs of other protected mammal species including Red Squirrel (*Sciurus vulgaris*), Otter (*Lutra lutra*), and Pine Marten (*Martes martes*) was also undertaken.

3.2.3 Bats

3.2.3.1 Bat Habitat Appraisal

As part of the ecological assessment, a daytime bat inspection survey was undertaken during daylight hours on the 16th and 30th of May 2022. Habitats within the Proposed Development site were assessed for their suitability to support roosting, foraging and commuting bats. Connectivity with the wider landscape was also considered. During the inspection survey, a search for roosts was also undertaken. The aim was to determine if roosting bats were present, and whether there was a requirement for further survey work or mitigation. Suitability was 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*.

3.2.3.2 Roost Surveys

During the habitat appraisal surveys, the trees within the site were visually assessed from ground level using binoculars, 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). No structures were identified within the site boundary.

3.2.3.3 Bat Activity Surveys

3.2.3.3.1 *Manual Surveys*

Manual activity surveys were undertaken in the form of emergence survey at suspected tree roosts followed by a walked transect on the 16th May 2023. Surveyors were equipped with active full spectrum bat detectors, the Batlogger M bat detector (Elekon AG, Lucerne, Switzerland) and all bat activity was recorded for subsequent analysis to confirm species identifications. Individual bats of the same species cannot be identified using this method: the number of bat passes recorded is used as a measure of activity within the area, although it might not reflect the number of individual bats present, as the same bat can be recorded multiple times.

May is within the suitable survey period for bat activity surveys and all surveys were carried out during weather conditions suitable for bat surveying (Collins, 2016). No limitations associated with weather conditions were recorded during the surveys at the Proposed Development site.

Details of the surveys are presented in Table 3-1 and described below.

Table 3-1 Manual Activity Surveys

Date	Surveyors	Survey Type	Sunset/ Sunrise	Start-End	Weather	Transect (km)
16th May 2023	KC, POB	Dusk Emergence and Transect	21:33	21:03 – 23:30	15- 12˚C; dry; calm	3.2

Dusk Emergence

The daylight inspection survey on the 16th of May 2023 was followed by a dusk emergence survey on the same date performed by two surveyors. The two surveyors were located along a treeline running along the proposed new road section (IG REFs: M 26575 28329, M 26539 28368).

Conditions were suitable for bat surveys on both survey nights (Table 3-2). Emergence surveys commenced approximately 30 minutes before sunset and concluded 1.5 hours after sunset and were followed by walked transect surveys. The purpose was to identify any bat species, numbers, access points and roosting locations within the site.

Walked Transect

A transect route was designed to cover the entirety of the Proposed Development site. The transect route followed the dusk emergence survey and concluded approximately 2 hours after sunset. The aim of the survey was to identify the bat species using the site and gather any information on bat behaviour and important features used by bats. The transect route was prepared with reference to the proposed layout, desktop, and walkover survey results as well as any health and safety considerations and access limitations. The transect route followed along the N59 Rd and existing paths and trails through the landowners properties. The transect route is presented in Figure 3-1.

3.2.3.3.2 *Ground-level Static Surveys*

One full spectrum SM4 bat detector (Wildlife Acoustics, Maynard, MA, USA), was deployed during static surveys to record bat activity for a 2-week period (IG REF: M 26566 28323). The detector was deployed on 16th May 2023 and collected on the 30th May 2023. The static location was selected to survey the trees and hedgerows that are proposed to be felled and removed from the Proposed Development site.

Settings used were those recommended by the manufacturer for bats, with minor adjustments in gain settings and band pass filters to reduce background noise when recording. Detectors were set to record from 30 minutes before sunset until 30 minutes after sunrise. The Song Meter automatically adjusts sunset and sunrise times using the Solar Calculation Method when provided with GPS coordinates. Static detector locations are shown in Figure 3-1.

3.2.3.3.3 *Analysis of Detector Results*

All recordings were later analysed using bat call analysis software Kaleidoscope Pro v.5.4.8 (Wildlife Acoustics, MA, USA). The aim of this was to identify, to a species or genus level, what bats were present at the Proposed Development site. Bat species were identified using established call parameters, to create site-specific custom classifiers. All identified calls were also manually verified.

Map Legend

- Site Boundary
- Dusk Transect 16.05.2023
- Static Detector Location

N

Drawing Title

Bat Survey Effort

Project Title

GCC N59 Kenfield

Drawn By	Checked By
KC	SF
Project No.	Drawing No.
220950	3.1
Scale	Date
1:3,200	24.07.2023

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3.3 Methodology for Assessment of Impacts and Effects

3.3.1 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.

3.3.2 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 as amended). 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.

3.3.3 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 as amended).

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), 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 as amended).

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 guidelines on information to be included in Environmental Impact Assessment Reports. (EPA, 2022) 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 EPA Guidelines (2022) as shown in Table 3-1 below.

Table 3-2: Criteria for Determining Significance of Effect, Based on EPA (2022) 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, 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).

3.4 Limitations

The information provided in this document accurately and comprehensively describes the baseline ecological environment, provides an accurate prediction of the likely ecological effects of the Proposed Development, prescribes mitigation as necessary, and describes the residual ecological impacts. The specialist studies, analysis, and reporting have been undertaken in accordance with the appropriate guidelines. The survey was undertaken within the optimal time of year for habitat surveys, i.e., April to September (Smith *et al.*, 2011), and all habitats within the site of the Proposed Development were readily identifiable at the time of the site visit.

4. DESK STUDY RESULTS

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 (SPAs) are designated under the EU Habitats Directive and are collectively known as 'European Sites'. The potential for effects on European Sites is fully considered in the Natura Impact Statement that accompanies this planning application and are discussed also in this EcIA. European Sites identified within the Likely Zone of Impact are:

- Lough Corrib SAC (000297)
- Lough Corrib SPA (004042)
- Galway Bay Complex SAC (000268)
- Inner Galway Bay SPA (004031)

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 this EcIA.

The following methodology was used to establish which sites that are designated for nature conservation have the potential to be impacted by the Proposed Development:

- Initially, the most up-to-date GIS spatial datasets for all Designated Sites and water catchments were downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie) on the 26/06/2023. The datasets were utilised to identify Designated Sites which could feasibly be affected by the Proposed Development;
- All Designated Sites that could potentially be affected were identified using a source-pathway-receptor model. To provide context for the assessment, all Designated Sites surrounding the Proposed Development site were considered. Information on these sites with regard to their features of interest is provided in Table 4-1. Sites that were further away from the Proposed Development were also considered but no complete source-pathway-receptor chain for significant effect was identified for any additional Designated Site;
- A map of all the Nationally Designated Sites surrounding the Proposed Development site is provided in Figure 4-1. A map of all the European Sites surrounding the Proposed Development site is provided in Figure 4-2;
- Catchment mapping was used to establish or discount potential hydrological connectivity between the site of the Proposed Development and any Designated Sites. The hydrological catchments are also shown in Figure 4-1 and Figure 4-2;
- Table 4-1 provides details of all relevant Nationally Designated Sites, as identified in the preceding steps, and assesses which are within the Likely Zone of Impact;
- The site synopses and conservation objectives of these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of preparing this report 26/06/2023;
- European Sites are fully considered in the AASR and NIS;
- Where potential pathways for Significant Effect are identified, the site is included within the Likely Zone of Impact and further assessment is required.

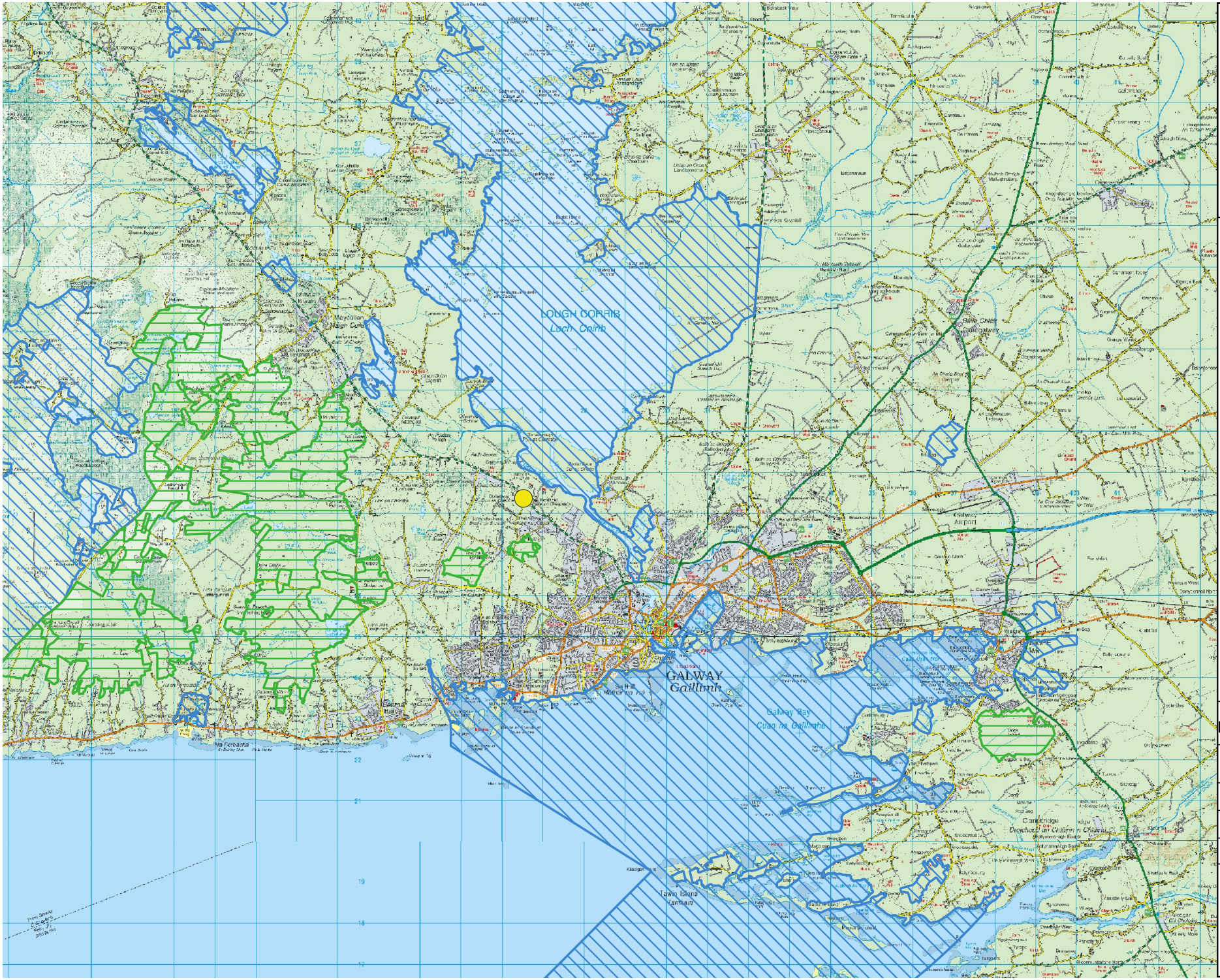
Table 4-1: Identification of Designated Sites Within the Likely Zone of Impact.

Designated Sites and Distance From Proposed Development	Features of Interest	Likely Zone of Impact Determination
Natural Heritage Area (NHA)		
Moycullen Bogs NHA (002364) **Distance:** approx. 0.9 km	› Peatlands [4]	There will be no direct effects on Moycullen Bogs NHA as the site of the Proposed Development is located entirely outside of this National Site. The Proposed Development site is located downgradient from this NHA. Although the NHA is partially located within the same hydrological and groundwater catchments as the Proposed Development site, considering the nature and scale of the Proposed Development and the terrestrial nature of the NHA, no potential pathway for significant impacts on this National Site has been identified. Therefore, Moycullen Bogs NHA is **not** considered to be within the Likely Zone of Impact for the Proposed Development and no further assessment is required.
Cregganna Marsh NHA (000253) **Distance**: approx. 12.3 km	› N/A	There will be no direct effects on Cregganna Marsh NHA as the site of the Proposed Development is located entirely outside of this National Site. No surface-water or groundwater connectivity was identified between the site of the Proposed Development and Cregganna Marsh NHA and the sites are located within separate surface and ground water catchments. Considering the nature and scale of the Proposed Development and the absence of connectivity, no potential pathway for significant impacts on the NHA have been identified. Therefore, Cregganna Marsh NHA is **not** considered to be within the Likely Zone of Impact for the Proposed Development and no further assessment is required.
Proposed Natural Heritage Area (pNHA)		
Lough Corrib pNHA (000297) **Distance:** approx. 0.62 km	› N/A	There will be no direct effects on Lough Corrib pNHA as the site of the Proposed Development is located entirely outside of this National Site.

Designated Sites and Distance From Proposed Development	Features of Interest	Likely Zone of Impact Determination
		This pNHA and the Proposed Development site are located within the same surface and ground water catchments. Furthermore, a culverted unmapped stream, the Knocknacarragh Stream, within the Proposed Development site discharges into this National Site approximately 650m to the northeast. Taking a precautionary approach and in the absence of best practice and mitigation, considering that hydrological connectivity exists between the Proposed Development and the pNHA, a potential pathway for indirect effects on the pNHA was identified via the deterioration of water quality arising from the runoff or percolation of pollutants into surface or ground waters during the construction and operational phases of the Proposed Development. **Therefore, Lough Corrib pNHA is within the likely Zone of Impact and further assessment is required.**
Galway Bay Complex pNHA (000268) **Distance:** approx. 4.5 km	› N/A	There will be no direct effects on Galway Bay Complex pNHA as the site of the Proposed Development is located entirely outside of this National Site. A culverted unmapped stream within the Proposed Development site discharges into the River Corrib approximately 650m to the northeast. The River Corrib in turn discharges into this pNHA approximately 5.4 km downstream creating hydrological connectivity between the Proposed Development site and the pNHA. Taking a precautionary approach and in the absence of best practice and mitigation, considering the hydrological connectivity exists between the Proposed Development and the pNHA, a potential pathway for indirect effects on the pNHA was identified via the deterioration of water quality arising from the runoff or percolation of pollutants into surface or ground waters during the construction and operational phases of the Proposed Development. **Therefore, Galway Bay Complex pNHA is within the likely Zone of Impact and further assessment is required.**
Ballycuirke Lough pNHA (000228) **Distance:** approx. 4.1 km	› N/A	There will be no direct effects on these pNHAs as the site of the Proposed Development is located entirely outside of these National Sites.

Designated Sites and Distance From Proposed Development	Features of Interest	Likely Zone of Impact Determination
Drimcong Wood pNHA (001260) **Distance:** approx. 7.6 km	› Deciduous Woodland › Lakes	No surface-water or groundwater connectivity was identified between the site of the Proposed Development and these National Sites, and they are located within a separate hydrological sub-catchment to the proposed works. Considering the nature and scale of the Proposed Development and the absence of connectivity, no potential pathway for significant impacts on the NHA have been identified. Therefore, these pNHAs are **not** considered to be within the Likely Zone of Impact for the Proposed Development and no further assessment is required.
Kiltullagh Turlough pNHA (000287) **Distance:** approx. 9.8 km	› Turlough	
Furbogh Wood pNHA (001267) **Distance:** approx. 9.2 km	› Oak Woodland	
Connemara Bog Complex pNHA (002034) **Distance:** approx. 9.3 km	› Peatlands [4]	
Ross Lake and Woods pNHA (001312) **Distance:** approx. 9.6 km	› N/A	
Killarainy Lodge, Moycullen pNHA (002083) **Distance:** approx. 6.6 km	› Natterer's Bat	There will be no direct effects on Killarainy Lodge, Moycullen pNHA as the site of the Proposed Development is located entirely outside of this Designated Site. Given the distance from the site of the Proposed Development to Killarainy Lodge, Moycullen pNHA, and the absence of significant suitable habitat for bat species within the site of the Proposed Development, no potential for impacts on Natterer's Bat was identified. Therefore, Killarainy Lodge, Moycullen pNHA is **not** considered to be within the Likely Zone of Impact for the Proposed Development and no further assessment is required.

Designated Sites and Distance From Proposed Development	Features of Interest	Likely Zone of Impact Determination
Ramsar Site		
Inner Galway Bay **Site no.** 838. **Distance:** approx. 4.5 km	The shallow sheltered part of a large sea bay with numerous intertidal inlets and small low islands composed of glacial deposits. The area provides important habitat for marine life along Ireland's west coast. The site supports the richest seaweed flora on the Irish Coast (500+ species) and 65% of the Irish marine algal flora occur in the area. The site supports internationally and nationally important numbers of numerous species of waterbirds. There is a large cormorant colony on Teer Island. Human activities include aquaculture.	There will be no direct effects on Inner Galway Bay as the site of the Proposed Development is located entirely outside of this Designated Site. A culverted unmapped stream within the Proposed Development site discharges into the River Corrib approximately 650m to the northeast. The River Corrib in turn discharges into this International Site approximately 5.4 km downstream creating hydrological connectivity between the Proposed Development site and the RAMSAR Site. Taking a precautionary approach and in the absence of best practice and mitigation, considering the hydrological connectivity exists between the Proposed Development and the RAMSAR Site, a potential pathway for indirect effects on the pNHA was identified via the deterioration of water quality arising from the runoff or percolation of pollutants into surface or ground waters during the construction and operational phases of the Proposed Development. **Therefore, Inner Galway Bay RAMSAR Site is within the likely Zone of Impact and further assessment is required.**



Map Legend

Site Location

National Heritage Area (NHA)

Proposed National Heritage Area (pNHA)

N

Drawing Title

Nationally Designated Sites

Project Title

N59 Kentfield

Drawn By	Checked By
JS	KOD
Project No.	Drawing No.
220950	Figure 4.1
Scale	Date
1:120,220	21.06.2023

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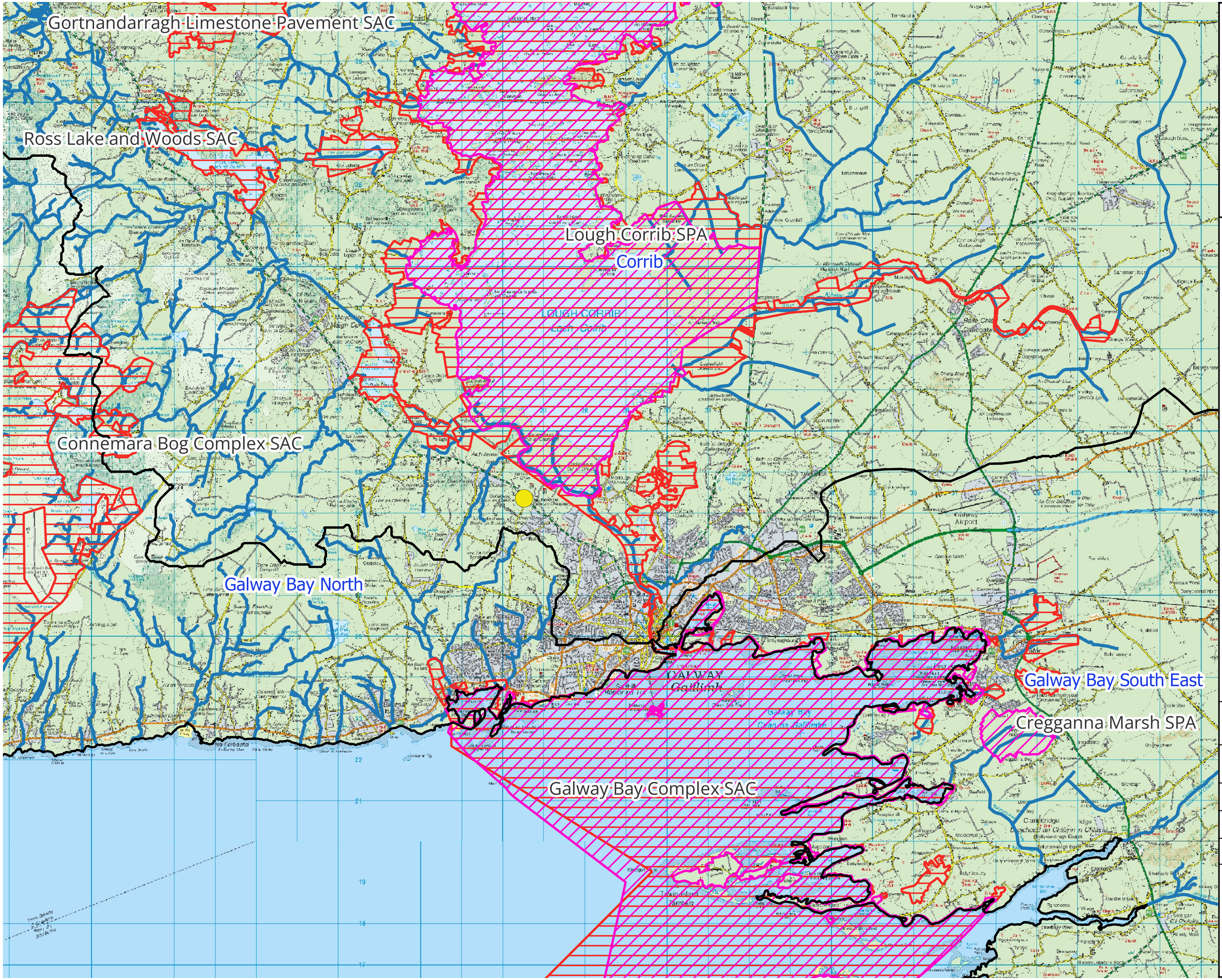

Map Legend

- Site Location
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Water Catchments
- Waterways

Drawing Title: European Designated Sites	
Project Title: N59 Kentfield	
Drawn By: JS	Checked By: KOD
Project No.: 220950	Drawing No.: Figure 3.1
Scale: 1:120,220	Date: 21.06.2023

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4.2 New Flora Atlas

A search was made in the Plant Atlas 2020: Mapping Changes in the Distribution of the British and Irish Flora (Stroh *et al.*, 2020) to investigate whether any rare or unusual plant species listed under Annex II of the Habitats Directive, listed as rare on the Ireland Red List no. 10: Vascular Plants (Wyse Jackson *et al.* 2016) or protected under the Flora (Protection) Order (2022) had been recorded in the relevant 10 km squares in which the study site is situated (M22), during the 1987-1999 atlas survey. Those of note are given in Table 4-2 below.

There are no records from hectad M22 of any species listed under Annex II or IV of the EU Habitats Directive. Eleven species listed in the Irish Red Data Book (Vascular Plants), or the Flora (Protection) Order have been recorded within the hectad M22 and are listed in Table 4-2.

Table 4-2 Plant species of conservation concern recorded within hectad M22.

Common Name	Scientific Name	Status
Autumn Gentian	*Gentianella amarella*	Red List (Near Threatened)
Chives	*Allium schoenoprasum*	Red List (Vulnerable), Flora Protection Order
Cornish Heath	*Erica vagans*	Red List (Critically Endangered)
Greater Knapweed	*Centaurea scabiosa*	Red List (Near Threatened)
Green Field-speedwell	*Veronica agrestis*	Red List (Near Threatened)
Irish Whitebeam	*Sorbus hibernica*	Red List (Vulnerable)
Pipewort	*Eriocaulon aquaticum*	Red List (Near Threatened)
Slender Cottongrass	*Eriophorum gracile*	Red List (Vulnerable), Flora Protection Order
Strawberry-tree	*Arbutus unedo*	Red List (Near Threatened)
Spring Gentian	*Gentiana verna*	Red List (Near Threatened)
Tubular Water Dropwort	*Oenanthe fistulosa*	Red List (Vulnerable)

4.3 NPWS Records

A data request was sent to the NPWS for any rare or protected species of flora or fauna within proximity to the study area. Data was received for the 10 km grid square, M22, on the 12/07/2023. Table 4-3 lists the rare and protected species records within M22 obtained from the NPWS during this study.

Table 4-3: Records for Rare and Protected Species, NPWS.

Common Name	Scientific Name	Protective Status
Barn Owl	*Tyto alba*	BoCCI Red List
Common Frog	*Rana temporaria*	HD Annex V, WA
Eurasian Otter	*Lutra lutra*	HD Annex II IV, WA
Common Dolphin	*Delphinus delphis*	HD Annex IV, WA
Common Porpoise	*Phocoena phocoena*	HD Annex II, Annex IV, WA
Eurasian Badger	*Meles meles*	WA
Harbour Seal	*Phoca vitulina*	HD Annex II and V, WA
Sea Lamprey	*Petromyzon marinus*	HD Annex II
Henbane	*Hyoscyamus niger*	Red List (Near Threatened)
Smooth Newt	*Lissotriton vulgaris*	WA
Common lizard	*Zootoca vivipara*	WA
Irish Hare	*Lepus timidus subsp. hibernicus*	HD Annex V, WA
Eurasian pygmy shrew	*Sorex minutus*	WA
Irish Stoat	*Mustela erminea subsp. hibernica*	WA
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	HD Annex II, IV, WA
Small-white Orchid	*Pseudorchis albida*	Red List (Vulnerable), FPO
Spiked Sedge	*Carex spicata*	Red List (Near Threatened)
West European Hedgehog	*Erinaceus europaeus*	WA

Common Name	Scientific Name	Protective Status
Yellow Horned-poppy	*Glaucium flavum*	Red List (Near Threatened)
European Shag	*Phalacrocorax aristotelis*	WA

HD Annex II, Annex IV, Annex V – Of EU Habitats Directive, WA – Irish Wildlife Acts (1976-2022), Ireland Red List no 10 Vascular Plants (Wyse Jackson et al., 2016), BoCCI Red List – Birds of Conservation Concern Ireland.

4.4 Biodiversity Ireland Database

The National Biodiversity Data Centre database was accessed on 14/07/2023 and the following information was obtained. Table 4-4, Table 4-5, and Table 4-6 list the protected faunal species (excl. birds), Third Schedule non-native invasive species, and all protected bird species recorded within the hectad, M22, respectively, which pertains to the current study area.

Table 4-4: NBDC Records for Protected Fauna (Excl. Birds).

Common Name	Scientific Name	Status
Sea Lamprey	*Petromyzon marinus*	Annex II
Hedgehog	*Erinaceus europaeus*	WA
Eurasian Badger	*Meles meles*	WA
Irish Stoat	*Mustela erminea* subsp. *hibernica*	WA
Irish Hare	*Lepus timidus* subsp. *hibernicus*	Annex V, WA
Bottle-nosed Dolphin	*Tursiops truncatus*	Annex II, Annex IV, WA
Striped Dolphin	*Stenella coeruleoalba*	Annex IV, WA
Common Porpoise	*Phocoena phocoena*	Annex II, Annex IV, WA, OSPAR
Common Seal	*Phoca vitulina*	Annex II, Annex V, WA
Grey Seal	*Halichoerus grypus*	Annex II, Annex V, WA
Long-finned Pilot Whale	*Globicephala melas*	Annex IV, WA
Minke Whale	*Balaenoptera acutorostrata*	Annex IV, WA
Pygmy Sperm Whale	*Kogia breviceps*	Annex IV, WA
Cuvier's Beaked Whale	*Ziphius cavirostris*	Annex IV, WA
Common Dolphin	*Delphinus delphis*	Annex IV, WA
Natterer's Bat	*Myotis nattereri*	Annex IV, WA
Common Frog	*Rana temporaria*	Annex V, WA
Smooth Newt	*Lissotriton vulgaris*	WA
Marsh Fritillary	*Euphydryas aurinia*	Annex II
Common Lizard	*Zootoca vivipara*	WA
Leathery Turtle	*Dermochelys coriacea*	Annex IV, WA, OSPAR
Brown Long-eared Bat	*Plecotus auritus*	Annex IV, WA
Daubenton's Bat	*Myotis daubentonii*	Annex IV, WA
Pygmy Shrew	*Sorex minutus*	WA
Eurasian Red Squirrel	*Sciurus vulgaris*	WA
European Otter	*Lutra lutra*	Annex II, Annex IV, WA
Lesser Noctule	*Nyctalus leisleri*	Annex IV, WA
Pine Marten	*Martes martes*	Annex V, WA
Pipistrelle	*Pipistrellus pipistrellus sensu lato*	Annex IV, WA
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Annex IV, WA

Annex II, Annex IV, Annex V – Of EU Habitats Directive, WA – Irish Wildlife Acts (1976-2022).

Table 4-5: NBDC Records for Third Schedule Invasive Species.

Common Name	Scientific Name
Wireweed	*Sargassum muticum*
Ruddy Duck	*Oxyura jamaicensis*
Roach	*Rutilus rutilus*
Water Fern	*Azolla filiculoides*

Canadian Waterweed	*Elodea canadensis*
Japanese Knotweed	*Fallopia japonica*
Rhododendron	*Rhododendron ponticum*
Giant Rhubarb	*Gunnera tinctoria*
Himalayan Knotweed	*Persicaria wallichii*
American Mink	*Mustela vison*
Giant Knotweed	*Fallopia sachalinensis*
Indian Balsam	*Impatiens glandulifera*
Zebra Mussel	*Dreissena (Dreissena) polymorpha*
Spanish Bluebell	*Hyacinthoides hispanica*
Three-cornered Garlic	*Allium triquetrum*
Brown Rat	*Rattus norvegicus*
Bohemian Knotweed	*Fallopia japonica x sachalinensis = F. x bohemica*

Table 4-6: NBDC Records for Birds.

Common Name	Scientific Name	Status
Arctic Tern	*Sterna paradisaea*	Annex I
Wood Sandpiper	*Tringa erythropus*	Annex 1
Turtle Dove	*Streptopelia turtur*	BoCCI Red List [Passage]
Slavonian Grebe	*Podiceps auritus*	Annex 1, BoCCI Red List [Wintering]
Grey Plover	*Pluvialis squatarola*	BoCCI Red List [Wintering]
Grey Wagtail	*Motacilla cinerea*	BoCCI Red List [Breeding]
Curlew Sandpiper	*Calidris ferruginea*	BoCCI Red List [Passage]
Purple Sandpiper	*Calidris maritima*	BoCCI Red List [Wintering]
Oystercatcher	*Haematopus astralegus*	BoCCI Red List [Breeding & Wintering]
Barn Owl	*Tyto alba*	BoCCI Red List [Breeding]
Goldeneye	*Bucephala clangula*	BoCCI Red List [Wintering]
Stock Dove	*Columba oenas*	BoCCI Red List [Breeding]
Bar-tailed Godwit	*Limosa lapponica*	Annex I, BoCCI Red List [Wintering]
Black-throated Diver	*Gavia arctica*	Annex I
Common Kingfisher	*Alcedo atthis*	Annex I
Common Redshank	*Tringa totanus*	BoCCI Red List (Breeding & Wintering)
Common Scoter	*Melanitta nigra*	BoCCI Red List [Breeding & Wintering]
Common Tern	*Sterna hirundo*	Annex I
Corn Crake	*Crex crex*	Annex I, BoCCI Red List [Breeding]
Dunlin	*Calidris alpina*	Annex I, BoCCI Red List [Breeding & Wintering]
Knot	*Calidris canutus*	BoCCI Red List [Wintering]
Eurasian Curlew	*Numenius arquata*	BoCCI Red List [Breeding & Wintering]
Eurasian Woodcock	*Scolopax rusticola*	BoCCI Red List [Breeding]
European Golden Plover	*Pluvialis apricaria*	Annex I, BoCCI Red List (Breeding & Wintering)
Great Northern Diver	*Gavia immer*	Annex I
Grey Partridge	*Perdix perdix*	BoCCI Red List [Breeding]
Hen Harrier	*Circus cyaneus*	Annex I
Little Egret	*Egretta garzetta*	Annex I
Little Gull	*Larus minutus*	Annex I
Little Tern	*Sternula albifrons*	Annex I
Meadow Pipit	*Anthus pratensis*	BoCCI Red List [Breeding]
Mediterranean Gull	*Larus melanocephalus*	Annex I
Swift	*Apus apus*	BoCCI Red List [Breeding]
Merlin	*Falco columbarius*	Annex I
Northern Lapwing	*Vanellus vanellus*	BoCCI Red List (Breeding & Wintering)
Peregrine Falcon	*Falco peregrinus*	Annex I
Razorbill	*Alca torda*	BoCCI Red List [Breeding]
Red Grouse	*Lagopus lagopus*	BoCCI Red List [Breeding]
Red Wing	*Turdus iliacus*	BoCCI Red List [Wintering]
Red-throated Diver	*Gavia stellate*	Annex I
Long-tailed Duck	*Clangula hyemalis*	BoCCI Red List [Wintering]
Scaup	*Aythya marila*	BoCCI Red List [Wintering]
Sandwich Tern	*Sterna sandvicensis*	Annex I
Whooper Swan	*Cygnus cygnus*	Annex I
Snipe	*Gallinago gallinago*	BoCCI Red List [Breeding & Wintering]
Kittiwake	*Rissa tridactyla*	BoCCI Red List [Breeding]
Kestrel	*Falco tinnunculus*	BoCCI Red List [Breeding]
Yellowhammer	*Emberiza citronella*	BoCCI Red List [Breeding]

Annex I – Of EU Birds Directive, Red List – Birds of Conservation Concern in Ireland (Population for Which the Species is Red Listed in Brackets).

4.5 Water Quality

4.5.1 EPA Catchment and Water-Quality Data

The EPA web-mapper (http://gis.epa.ie/EPAMaps/) was consulted on the 22nd of May 2023 regarding the water quality and status of watercourses in the vicinity of the site of the Proposed Development with connectivity to European Sites. 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 primarily on their relative abundance with a sample.

The Knocknacarragh Stream is assessed as part of the Knocknacarragh_010 WFD River Sub-Basin. The nearest water-monitoring station, Knocknacarragh – Interstitial, 1st Br u/s from coast (Station ID: RS31K160960), is located approx. 3 km downstream from the site of the Proposed Development. However, no records of water quality have been recorded from this water-monitoring station. Furthermore, no upstream records of water quality are available.

The site of the Proposed Development is located within the Spiddal Groundwater Body (GWB). The WFD Groundwater Monitoring Programme (2016-2021) assigned the Spiddal GWB a 'Good' status.

The site of the Proposed Development is located in areas of 'High' and 'Extreme' groundwater vulnerability.

4.6 NPWS Article 17 Reporting

A review of the Irish Reports for Article 17 of the Habitats Directive (92/42/EEC), including the Heath, Bog and Mires, Irish Semi-Natural Grassland Survey datasets, National Survey of Native Woodlands and Ancient Long-Established Woodland datasets were conducted prior to undertaking the multidisciplinary ecological walkover survey.

The closest mapped Annex I habitats are [1140] Mudflats and sandflats not covered by seawater at low tide and [1170] Reefs, located approx. 2.4 km south of the site of the Proposed Development. Additionally, [1160] Large shallow inlets and bays and [1150] Coastal lagoons [1160] habitats are located 2.5 km south and 3.3 km east of the site of the Proposed Development, respectively. There are no Annex I habitats present within the site of the Proposed Development.

5. FIELD STUDY RESULTS

5.1 Habitats Present on the Site and Surrounding Area

A dedicated habitat survey of the area within and in the vicinity of the site of the Proposed Development was undertaken on the 16th of May 2023 by Patrick O'Boyle and Keith Costello of MKO in line with NRA (2009) guidelines 'Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes'. The habitats recorded during the site visit are listed in Table 5-1 and described below. A habitat map is provided in Figure 5-1.

Table 5-1: Habitats Recorded Within the Site of the Proposed Development.

Habitat	Code
Buildings and artificial surfaces	BL3
Dry meadows and grassy verges	GS2
Scrub	WS1
Hedgerows	WL1
Treelines	WL2
Stone walls and other stonework	BL1
Upland eroding River	FW1

The site of the Proposed Development consists predominantly of a 120-m stretch of the N59 National Secondary Road, incorporating elements of the Gortacleva Road and Gortacleva Junction, all categorised as ***Buildings and artificial surfaces (BL3)*** (Plate 5-1).

The existing road was predominantly delineated by various sections of verge and boundary habitats including ***Dry meadows and grassy verges (GS2)*** (Plate 5-2) and ivy (*Hedera helix*) covered ***Stone walls and other stonework (BL1)***. The stone wall was often recorded in combination with Hedgerow (WL1) and or Treeline (WL2) of ash (*Fraxinus excelsior*) (Plate 5-3). Minor damage to small stretches of these grassy verges was evident, resultant from vehicle trampling. Reduced grassy verges were present along the Gortacleva Road. Species recorded in these verges included Perennial Ryegrass (*Lolium perenne*), Creeping Buttercup (*Ranunculus repens*), Common Dandelion (*Taraxacum officinale*), Great Hairy Willow-herb (*Epilobium hirsutum*), Bush Vetch (*Vicia sepium*), Silverweed (*Argentina anserina*), Meadow Dock (*Rumex × pratensis*), Plantain (*Plantago monosperma*), Yorkshire Fog (*Holcus lanatus*), Herb-Robert (*Geranium purpureum*), Wildflower Cleavers (*Galium aparine*), Daisy (*Bellis perennis*), Meadow Foxtail (*Alopecurus pratensis*), Maidenhair Spleenwort (*Asplenium trichomanes*), and Adria Bellflower (*Capanula portenschlagiana*). Encroachment on these grassy verges from species associated with the stone walls, including Bramble (*Rubus fruticosus* agg.), Bracken (*Pteridium* spp.), and Persian Ivy (*Hedera colchica*) was evident.

The remainder of the site of the Proposed Development is comprised of a stretch of land set back from the eastern boundary of the N59, dominated by dense stands of Bramble encroaching on grassland, and categorised for the purpose of this assessment as ***Scrub (WS1)*** (Plate 5-4). In addition to the bramble, species recorded here included Bracken (*Pteridium* spp.), Wildflower Cleavers (*Galium aparine*), Germander Speedwell (*Veronica chamaedrys*), Pignut (*Conopodium majus*), regenerating Pedunculate Oak (*Quercus robur*), Plantain (*Plantago monosperma*), Yorkshire Fog (*Holcus lanatus*), Herb-Robert (*Geranium purpureum*), and Bush Vetch (*Vicia sepium*).

Plate 5-1 Paved surfaces at the junction of the N59 and L5381 roads, categorised as Buildings and artificial surfaces (BL3).

Plate 5-2: Roadside verge present along the western boundary of the N59 road, categorised as Dry meadows and grassy verges (GS2).

Plate 5-3 Typical section of road verge showing ivy covered stone wall, treeline, and hedgerow.

Plate 5-4 large section of Scrub recorded set back from the existing N59.

A small unmapped watercourse, referred to for the purposes of this report as the Knocknacarragh Stream, drains northeast across the N59, along the southern boundary of the site of the Proposed Development. This watercourse was classified as an ***Upland/eroding stream (FW1).*** This watercourse was culverted under the existing road and adjacent Glenlo driving range and rose again to the northeast of the Proposed Development site. This watercourse drains into the Corrib River.

No Annex I listed habitats, significant supporting habitat for Annex II species, Red Listed vascular plants or Flora Protection Order species were identified on-site during the site visit.

No species listed on the Third schedule of the European Communities Regulations 2011 (S.I. 477 of 2011) were identified on-site during the site visit.

Map Legend

- Site Boundary
- Eroding/Upland Rivers (FW1)
- Hedgerows (WL1)
- Treelines (WL2)
- Buildings and artificial surfaces (BL3)
- Dry meadows and grassy verges (GS2)
- (Mixed) broadleaved woodland (WD1)
- Scrub (WS1)

Drawing Title

Habitat Map

Project Title

N59 Kentfield Road Realignment

Drawn By	Checked By
PD	KOD
Project No.	Drawing No.
220950	Figure 5.1
Scale	Date
1:1,200	19.06.2023

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5.2 Fauna

5.2.1 Non-Volant Mammals

A thorough survey of the site of the Proposed Development was undertaken for mammals and no evidence of species of conservation concern, such as otter or badger, was recorded.

The site of the Proposed Development primarily consists of Buildings and artificial surfaces (BL3), in the form of the paved areas. This habitat does not provide significant suitable habitat for any protected species, including those listed under Annex II of the Habitats Directive or any species associated with nearby European Sites.

5.2.2 Birds

Bird species recorded within the boundaries of the site of the Proposed Development during the site visit were an assemblage of common birds that are typical of the grassland and urban habitats in the wider area. No evidence of any Special Conservation Interest (SCI) bird species associated with any SPA was recorded within the site boundaries and the site did not support significant supporting habitat for any protected bird species.

5.2.3 Bats

5.2.3.1.1 *Bat Habitat Appraisal*

Dedicated bat surveys were undertaken at the site on the 16th and the 30th of May 2023. Features within the Proposed Development site were assessed for their suitability to support bats. Particular attention was given trees and hedgerows to be felled.

Table 3.2 – Habitats present within the Proposed Development site

Habitat	Code
Buildings and artificial surfaces	BL3
Dry meadows and grassy verges	GS2
Scrub	WS1
Hedgerows	WL1
Treelines	WL2
Stone walls and other stonework	BL1
Upland eroding River	FW1

With regard to foraging and commuting bats, Buildings and artificial surfaces (BL3), Stone walls and other stonework (BL1), Dry meadows and grassy verges (GS2) and Upland eroding River (FW1) were considered Negligible suitability, i.e., habitat that could be used by no or small numbers of commuting or foraging bats (Collins, 2016). Treelines (WL2) and Hedgerows (WL1) located along the N59 road provided good foraging habitat for species and therefore were assessed as Moderate suitability for foraging and commuting bats. Scrub (WS1) habitats were located in scattered pockets adjacent to the grasslands and stone walls and were dominated by Bramble, this habitat given its size and location was assessed as having *Negligible* suitability for commuting and foraging bats (Collins, 2016).

The daylight inspection survey was followed by a dusk emergence survey.

5.2.3.1.2 Roost Assessment

Searches for Potential Roosting Features (PRFs) were conducted within the site on 16th May 2023 and 30th May 2023. No structures were present within the Proposed Development site.

Trees

The site was also checked for potential tree roosts. A linear feature of Ash trees covered sparsely in Ivy were identified to the northeast (IG REF: M 26560 28368). The trees displayed signs of Ash dieback, but no crevices or knots were identified during the inspection of the trees and with the small amount of ivy cover present on the trees these features were assigned a *Negligible* roosting potential (Plate 5-5).

Six standalone ash trees were identified adjacent to the N59 road (IG REF: M 26559 28328). These trees were suffering from ash dieback and were heavily covered in ivy. Due to health and safety the trees were only available for inspection on the northeast aspect. No evidence of bats was found, no knots or crevices were located during the search. These trees were assigned a value of *Low* roosting suitability based on the amount of ivy cover present (Plates 5-6 & 5-7).

Plate 5-5 Linear feature of Ash trees located adjacent to the sit boundary.

Plate 5-6 Individual Ash trees along the road to be felled (Low roosting potential)

Plate 5-7 Ash tree to be felled.

5.2.3.1.3 Dusk Emergence Survey

An emergence survey was carried out on 16th May 2023 by two surveyors. Surveyors were positioned at different locations for approximately 1.5 hours to look for bats emerging from the trees.

No bats were observed emerging from the trees. The first bat recorded was a Soprano Pipistrelle and was recorded commuting from the northwest of the Proposed Development site and began feeding on the linear feature of ash trees.

5.2.3.1.4 Dusk Transect

Following the emergence surveys, the two surveyors performed a transect survey around the Proposed Development site. On May 16th, surveyors covered the portion of the N59 that was present within the site boundary as well as the treelines and grassland present northeast of the road. Where areas were deemed inaccessible for safety reasons stationary transects were employed as close to these areas as possible to pick up commuting bats.

Limited foraging and commuting bats were recorded during the dusk bat activity surveys. In total, 258 bat passes were recorded. Activity was dominated by soprano pipistrelle (*Pipistrellus pygmaeus;* n=144). This was followed by common pipistrelle (*Pipistrellus pipistrellus;* n=60) and Leisler's bat (*Nyctalus leisleri;* n=51). Three brown long-eared bat passes (*Plecotus auritus*) were also recorded. These species are common and widespread across Ireland. Activity levels were concentrated along the treeline edge habitats. Only Leisler's bats were recorded in more open areas of grassland within the site. Plate 5-9 shows total bat species composition recorded during the dusk surveys. Results of the transect are presented in Figure 5-2.

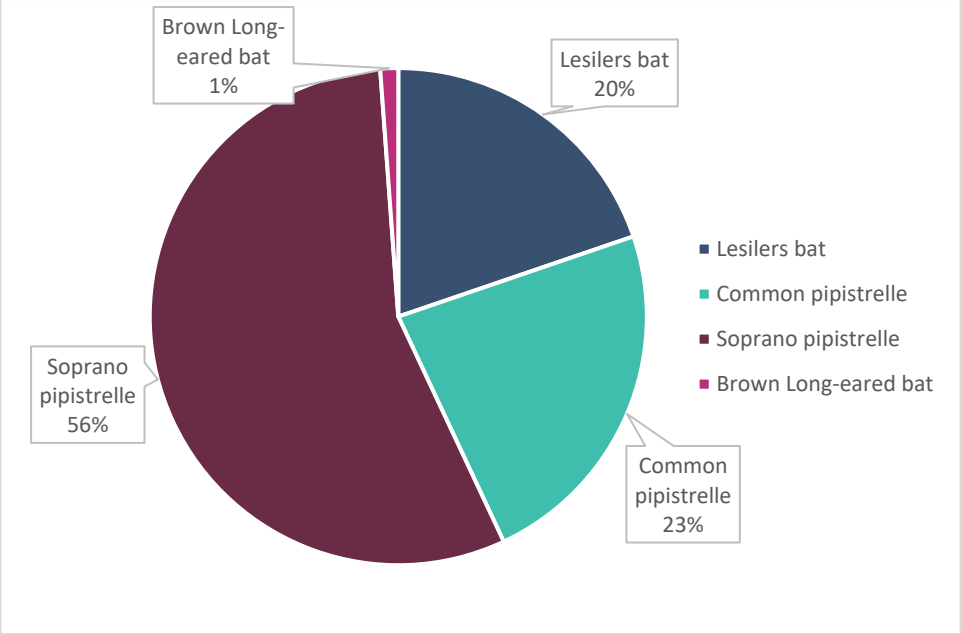

Plate 5-8 Bat passes composition.

5.2.3.1.5 Ground Level Static Surveys

One static detector was deployed on the site for 14 nights during May 2023. The detector was deployed to the west of the Proposed Development site along a hedgerow and standalone trees to be felled. The detector allowed recording of bat activity along the trees and hedgerows to be felled in order to assess the species and number of bat passes occurring along these habitats.

All recordings were later analysed using bat call analysis software Kaleidoscope Pro v.5.4.9 (Wildlife Acoustics, MA, USA). Bat species were identified using established call parameters, to create site-specific custom classifiers. All identified calls were also manually verified. In total, 9,545 bat passes were recorded. The overall activity for the 15 nights was *Moderate*. The detector was placed along a linear feature which is a favourable habitat for commuting and foraging bats, the bats recorded along this habitat were common and are known to occur within the hectad M32.

Analysis of the detector recordings positively identified three bat species present. Bat species included: Soprano pipistrelle *(Pipistrellus pygmaeus)* (n=5,841), Common pipistrelle *(Pipistrellus pipistrellus)* (n=3,178), Leisler's bat *(Nyctalus leisleri)* (n=415), Brown long-eared bat (*Plecotus auratus)* (n=49), *Myotis spp.* (n=42) and Nathusius pipistrelle (*Pipistrellus nathusii)* (n=12). Lesser horseshoe bat (*Rhinolophus hipposideros)* (n=8) were also recorded by the static detector.

The species composition recorded is shown in Plate 5-10, with passes per night shown in Plate 5-11.

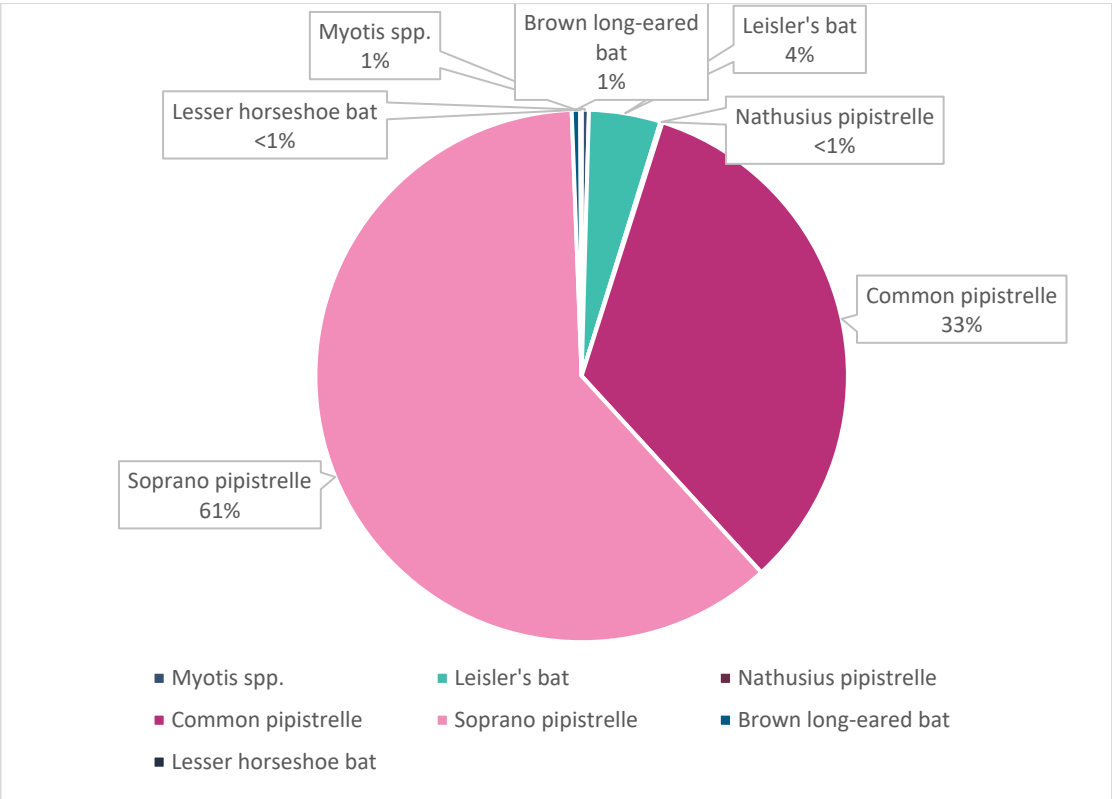

Plate 5-9 Static Species Composition

Species that were recorded in low numbers were occurring most nights, and from the analysis there was no significant changes in bat species composition over the survey period. All species recorded appear to use the site regularly, with pipistrelle species making up the vast majority of activity recorded every night. Lesser horseshoe bats were mostly recorded as single passes across the deployment, with a maximum of two passes recorded on Night 7.

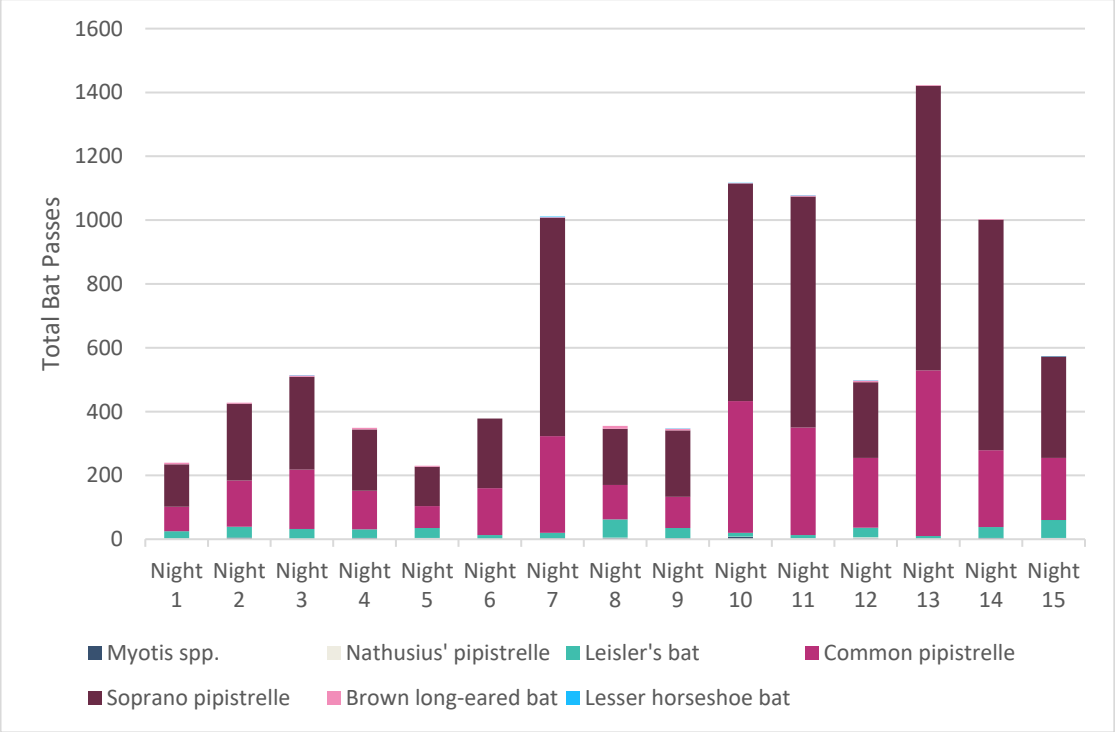

Plate 5-10 Bat Passes per night.

Map Legend

- Site Boundary
- Dusk Transect Route 16.05.2023

Bat Species

- Leisler's Bat
- Common Pipistrelle
- Soprano Pipistrelle
- Brown Long-eared Bat

N

Drawing Title

Manual Survey Results

Project Title

GCC N59 Kenfield

Drawn By	Checked By
KC	SF
Project No.	Drawing No.
220950	5-2
Scale	Date
1:1,200	28.07.2023

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5.3 Importance of Ecological Receptors

Table 5-2 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 and species that are Key Ecological Receptors (KERs).

Table 5-2: Importance of Ecological Receptors.

Ecological Receptors and Geographic Importance	KER Y/N	Rationale
European Sites: › Lough Corrib SAC (000297) › Lough Corrib SPA (004042) › Galway Bay Complex SAC (000268) › Inner Galway Bay SPA (004031) *International Importance*	Yes	These designated sites have been assigned International Importance as they are European Sites including Special Areas of Conservation (SAC) and a Special Protection Area (SPA). A potential pathway for indirect effects on these European Sites, via the deterioration of water quality resulting from both surface-water runoff and the percolation of pollutants to groundwater during the construction and operational phases of the Proposed Development, was identified. **Therefore, these European Sites are included as KERs.**
Ramsar Sites: Inner Galway Bay Ramsar Site (Site No. 838) *International Importance*	Yes	This designated site has been assigned International Importance as it is an internationally important waterfowl site and is designated from the Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971. A potential pathway for indirect effects on these Ramsar Sites, via the deterioration of water quality resulting from both surface-water runoff and the percolation of pollutants to groundwater during the construction and operational phases of the Proposed Development, was identified. **Therefore, these Ramsar Sites are included as KERs.**
National Sites › Lough Corrib pNHA (000297) › Galway Bay Complex pNHA (000208) *National Importance*	Yes	These designated sites have been assigned National Importance as they are sites which have been proposed as a Natural Heritage Area (NHA). A potential pathway for indirect effects on these National Sites, via the deterioration of water quality resulting from both surface-water runoff and the percolation of pollutants to groundwater during the construction and operational phases of the Proposed Development, was identified. **Therefore, these National Sites are included as a KER.**
Watercourses › Upland eroding river (FW1) *Local Importance – Higher Value* › Lowland depositing river (FW2) *International Importance*	Yes	There are no mapped surface water features that drain the Proposed Development site. However, a culverted unmapped stream which rises to the northeast of the Proposed Development site was identified to drain into the River Corrib 0.6 km from the site. As the River Corrib forms part of the Lough Corrib SAC (000297) and Lough Corrib SPA (004042), this watercourse has been assigned *International Importance* while the unmapped stream within the site has been assigned as *Local Importance (Higher Value).*

		Taking a precautionary approach, there is potential for runoff or percolation of pollutants into the unmapped stream (the Knocknacarragh stream) River Corrib via surface and/or ground water systems during the construction and operational phases of the Proposed Development. **Therefore, the River Corrib is included as a KER.**
Habitats › Hedgerows [WL1] › Treelines (WL2) *Local Importance – Higher Value*	Yes	These habitats have been assigned as of Local Importance (*higher value*) as they help maintain links and ecological corridors between features of higher ecological value and is likely to be utilised by commuting and foraging bats, breeding birds and other faunal species. The Proposed Development will require the loss of sections of hedgerow and treeline habitat delineating the existing N59. **Therefore, hedgerow and treeline habitat is included as a KER.**
Habitats › Stone Walls [BL1] › Dry meadows and grassy verges (GS2) › Buildings and artificial surfaces (BL3) › Scrub [WS1] *Local Importance – Lower Value*	No	These habitats, although some containing small areas of semi-natural habitat that are of some local importance for wildlife, are common and widespread in the local and wider landscape and are highly modified. Although there will be some loss of these habitats, these habitats are **not** included as KERs.
Other faunal species *Local importance* (*Lower value*).	No	No additional species of conservation concern or protected under Annexes of the EU Habitats Directive were recorded. Although other common species may occur within the site, at least on occasion, no potential for significant effect has been identified on any other faunal species. Therefore, other faunal species are **not** included as KERs.
Bats *Local importance (Higher value)*	Yes	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. The site was found to be of moderate suitability for roosting bats. However, treeline, hedgerow and woodland habitat within the development site provide connectivity to the wider landscape and are likely to be utilised by a bat population of Local Importance (*higher value*) for commuting and foraging. There is potential for indirect effects on bat commuting and foraging habitat due to the loss of hedgerow and treeline habitat within the Proposed Development site. **Therefore, bats are included as a KER.**
Birds *Local importance (Higher value)*	Yes	The site does not provide significant supporting habitat for bird species listed on Annex I of the EU Birds Directive or on the

		BOCCI red list. However, treeline and hedgerow within the site provides suitable nesting and foraging habitat for a range of common bird species. As there will be loss of these habitats, **birds are included as a KER**.

6. ECOLOGICAL IMPACT ASSESSMENT

6.1 Do Nothing Impact

The site of the Proposed Development consists predominantly of Buildings and artificial surfaces (BL3), in association with Dry meadows and grassy verges (GS2), Hedgerows (WL1), Treelines (WL2), Stone walls and other stonework (BL1), and Scrub (WS1). If the Proposed Development were to not go ahead, it is likely that these habitats would remain.

6.2 Construction Phase

6.2.1 Impacts on Habitats

The Proposed Development will result in the permanent loss of Dry meadows and grassy verges (GS2) and Stone walls and other stonework (BL1) habitat. The loss of these habitats is not significant at any geographic scale as they have a relatively low biodiversity value and are widespread in the local and wider area. The Proposed Development will also result in the loss of *Hedgerows (WL1)*, *Treelines (WL2)*, and *Scrub (WS1)* habitat, which are considered to be habitats of *Local Importance (Higher Value)*. Therefore, these habitats have been identified as Key Ecological Receptors (KERs). The following subsection considers the potential impact on these habitats during the construction phase of the Proposed Development.

6.2.1.1 Assessment of Potential Effects on rivers, streams and Sensitive Aquatic Faunal Species

Table 6-1 Potential for impact on rivers, streams and Sensitive Aquatic Species

Description of Effect	**This section assesses the potential for likely significant effects on aquatic receptors including aquatic habitats (i.e., watercourses), salmonids, lamprey, coarse fish, European eel, aquatic invertebrates, molluscs and other aquatic species identified during the desk study and field surveys, and which are likely to occur downstream of the Proposed Development.** A culverted unmapped stream was identified within the southern section of the Proposed Development site drains northeasterly and discharges into the River Corrib approximately 650m to the northeast. Additionally, the Proposed Development site is underlain by the Lough Corrib Fen 2 groundwater catchment and in an area of extreme vulnerability for surface to ground water connectivity. The construction phase of the development will involve earth moving and levelling operations which create the potential for pollution in various forms to run off the site and enter the surrounding environment. Taking a precautionary approach and in the absence of best practice and mitigation, there is potential for impacts on the Knocknacarragh stream and the River Corrib and associated aquatic receptors via the deterioration of water quality arising from the runoff or percolation of pollutants into surface and/or ground waters during the construction phase of the Proposed Development. **Note: Whilst this impact assessment is in the habitats section, it also assesses the impact of the Proposed Development on aquatic species listed above.**
Characterisation of unmitigated effect	In the absence of mitigation, the indirect effect on watercourses and associated aquatic receptors during construction has the potential to be a short-term, moderate, reversible impact on aquatic habitats and the aquatic fauna they support.

Assessment of Significance prior to mitigation	In the absence of mitigation and following the precautionary principle, there is potential for the Proposed Development to result in significant indirect effects on aquatic habitats and associated aquatic species of local, National, and International importance in the form of pollution during the construction phase of the Proposed Development.
Mitigation	The construction methodologies and best practice measures, as described in Section 2.3 of this document, sets out the environmental measures that will be adhered to during the proposed works. It incorporates mitigating principles to ensure that the work is carried out in a manner which blocks all potential pathways for impact on aquatic receptors. A Construction Environmental Management Plan (CEMP) has also been prepared (**Appendix 1**) which further details measures set out to block potential pathways for impact on aquatic receptors. Post implementation of construction methodology and best practice as described in Section 2.3 and in the CEMP, there is no potential for significant impacts on water quality.
Residual Effect following Mitigation	Following the implementation of the mitigation measures as described above, there will be no significant residual effect on aquatic habitats or species as a result of the Proposed Development. The Proposed Development will not cause any waterbodies to deteriorate, irrespective of their current condition, and will not in any way prevent any waterbodies from meeting the biological and chemical characteristics for good ecological status.

6.2.1.2 Assessment of the Potential Impacts on Linear Habitats: Hedgerows (WL1) and Treeline (WL2)

Table 6-2: Loss of Linear habitats: Hedgerows (WL1) and Treelines (WL2).

Description of Effect	The Proposed Development will result in the loss of approx. 130 m of Hedgerow habitat formed around existing stone walls and approx. 70 m of Treeline habitat comprising of ash (*Fraxinus excelsior*) will be lost to facilitate the Proposed Development. These habitats currently forming the eastern margin of the existing N59.
Characterisation of Unmitigated Effect	These habitats are of a high biodiversity value in the local context and provide important connectivity to the wider landscape. Taking the abundance of these habitats in the wider environment, in the absence of mitigation, the loss of approx. 200m of linear habitats (hedgerow and treelines) has potential to result in a significant permanent negative effect at the local scale. This effect would be irreversible as these habitats are located within the Proposed Development footprint.
Assessment of Significance Prior to Mitigation	The permanent loss of approx. 130m of hedgerow habitat and approx. 70m of treeline habitat, in the absence of mitigation, would constitute a significant negative effect on receptors of Local Importance (higher value).
Mitigation	A stone wall will be erected on the eastern boundary of the new road in place of the hedgerow and treeline habitats to be lost, which will be set back. The set back will be planted with grass seed and 200m of native hedgerow will be planted adjacent to this new wall. This proposed hedgerow will offset the approx. 200m loss of hedgerow and treeline associated with the Proposed Development.
Residual Effect following Mitigation	Following the implementation of the replanting of approx. 200m of hedgerow, as described above, there will be no significant impacts on linear habitats as a result of the Proposed Development. There will be no significant residual effect on linear habitats at any geographical scale, as result of the Proposed Development.

6.2.2 Impacts on Fauna

The effects of habitat loss and disturbance to faunal KER species during the construction phase of the development is considered in this section. Species identified as KERs include bats and birds. The surveys undertaken did not identify the site of the Proposed Development as providing significant habitat for any other protected faunal species.

6.2.2.1 Assessment of the Potential Impacts on Bats

6.2.2.1.1 *Loss of Roosting Habitat*

Table 6-3 Potential impacts on roosting bats during the construction phase of the Proposed Development

Description of Effect	While the majority of trees present within the Proposed Development site were assessed as having *Negligible* roosting potential, a small number of ash trees were assessed as *Low* and might be used opportunistically by bats. No evidence of roosting was identified during the inspections and dusk emergence surveys carried out. On a precautionary basis, a potential for effects was identified on roosting bats as a result of the proposed felling works. A loss of opportunistic roosting habitat and potential direct bat mortality were identified as potential effects.
Characterisation of unmitigated effect	On a precautionary basis, the loss of opportunistic roosting habitat and the potential direct mortality effects as a result of the proposed felling were assessed as Permanent Negative effect prior to mitigation.
Assessment of Significance prior to mitigation	This is an effect on a receptor of *Local Importance (Higher Value).* The loss of a small number of potential roosting features within the site is not significant at a county, national or international scale. The potential direct mortality of roosting bats was assessed as Moderate.
Mitigation	Felling operations will be carried out outside of the bat activity season (May – October) to limit the potential for direct bat mortality.
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant residual effects are predicted.

6.2.2.1.2 *Loss of Foraging and Commuting Habitat*

Table 6-4 Potential impacts on commuting/foraging bats during the construction phase of the Proposed Development

Description of Effect	**Habitat Loss/Degradation** Treelines and hedgerows located within the Proposed Development area were assessed as having a Moderate suitability for commuting and foraging bats. The treeline located adjacent to the N59 road was seen during the dusk survey on the 15th May to be used by commuting and foraging bats who used these habitats to get to the more favourable hedgerow located outside the site boundary. These habitats provide a connectivity route for bat species who commute from areas outside the site boundary. The removal of the treeline and hedgerow along the current N59 road is necessary to facilitate the widening of the road. The treeline adjacent to the Proposed Development site

	which saw a large amount of bat species feeding will not be effected as a result of the Proposed Development site.
	Disturbance The construction phase Proposed Development will result in increased human activity, noise and lighting within the Proposed Development site. Therefore, the potential for disturbance to bats requires consideration.
Characterisation of unmitigated effect	**Habitat Loss/Degradation** The loss of linear habitat features would constitute a permanent effect on commuting and foraging bats. The trees and hedgerows provide an evident commuting and foraging route for bat species who use the feature to access feeding grounds east of the Proposed Development site.
	Disturbance In the absence of appropriate design, the Proposed Development has the potential to disturb bats by illumination of commuting and foraging areas. This is assessed as a short-term slight effect.
Assessment of Significance prior to mitigation	**Habitat Loss/Degradation** This is a slight effect on a receptor of *Local Importance (Higher Value).* The loss of a small number of trees within the site is not significant at a county, national or international scale. Treelines and habitat connectivity within the site will be largely retained.
	Disturbance This is assessed as a short-term slight effect on a receptor of *Local Importance (Higher Value).*
Mitigation	**Habitat Loss/Degradation** As part of the Proposed Development, approx. 200m of hedgerow will be planted on the eastern margin of the proposed new road layout. See Figure 2-2. This proposed hedgerow will offset the approx. 200m loss of hedgerow and treeline associated with the Proposed Development resulting in no permanent loss of foraging or commuting habitat for bats.
	Disturbance › Operations during construction is deemed to take place during the daylight hours of 07:00-19:00, however depending on the time of year works during these hours may require lighting. › Where lighting is unavoidable during construction, low-intensity lighting and motion sensors will be used to limit illumination. › Exterior lighting, during construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the Proposed Development, and consequently on bats i.e. Lighting will be directed away from mature trees/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). The luminaries will be of the type that prevent upward spillage of light and minimize horizontal spillage away from the intended lands. › Existing trees and hedgerows will be protected throughout the construction period of the development in accordance with industry best practice.

Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant residual effects on foraging and commuting bats are predicted.

6.2.2.2 Assessment of the Potential Impacts on Birds

Table 6-5: Assessment of Potential Impacts on Birds

Description of Effect	**Habitat Loss/ Degradation** The footprint of the Proposed Development will result in the loss of approx. 130m of hedgerow habitat formed around existing stone walls and approx. 70m of treeline habitat comprising of ash (*Fraxinus excelsior*) and hawthorn (*Crataegus monogyna*) which provide suitable habitat for a range of common bird species. The construction phase of the Proposed Development will result in habitat loss for local bird species, potentially leading to avoidance of the area.
	Disturbance During construction of the Proposed Development site there will be use of heavy machinery and increased noise/anthropogenic activities potentially resulting in disturbance to local bird species. Additionally, if site clearance is undertaken during the bird nesting season, it could potentially lead to the destruction of nests, potentially resulting in mortality to juvenile birds in the nest.
Characterisation of unmitigated effect	**Habitat Loss/ Degradation** Considering the abundance of these habitats in the wider environment, in the absence of mitigation, the loss of approx. 200m of bird nesting habitat constitutes a permanent moderate negative effect at a local scale.
	Disturbance In the absence of mitigation, there is potential for a temporary, slight, negative effects on bird species as a result of disturbance associated with the construction phase of the Proposed Development. The magnitude of this impact has the potential to be moderate if the works result in mortality of young birds in the nest.
Assessment of Significance prior to mitigation	**Habitat Loss/ Degradation** In the absence of mitigation, there is potential for significant impacts on birds as a result of habitat loss.
	Disturbance In the absence of mitigation, there is potential for significant impacts on birds as a result of disturbance/mortality.
Mitigation	**Habitat Loss/ Degradation** As part of the Proposed Development, approx. 200m of native hedgerow habitat will be planted on the eastern boundary of the Proposed Development site. This planting will mitigate the loss of the potential nesting and foraging habitat resulting from the removal of approx. 200m of hedgerow and treeline.

	Disturbance Site clearance to facilitate the construction phase of the Proposed Development will be undertaken outside of the nesting bird season (1st March – 31st August) to ensure compliance with the Wildlife Act. If vegetation clearance is required during the nesting bird season, this will be preceded by a nesting bird survey and all clearance works supervised by an appropriately qualified ecologist.
Residual Effect following Mitigation	With the implementation of the above mitigations and best practice procedures no residual effects on bird species are anticipated due to habitat loss or disturbance, as a result of the Proposed Development.

6.3 Operational Phase

6.3.1 Potential Impacts on Habitats

There will be no additional loss or degradation of terrestrial habitats associated with the operational phase of the development. There is potential for the operational phase of the development to result in impacts on aquatic habitats via the degradation of water quality which are discussed below.

6.3.1.1 Assessment of Potential Effects on rivers, streams, lakes, and Sensitive Aquatic Faunal Species

6.3.1.1.1 *Surface water run-off*

The Proposed Development will result in increased hard surfaces within the Proposed Development site which has the potential to result in indirect impacts on aquatic ecological receptors as a result of deterioration in water quality arising from the run-off of pollutants, if surface water run-off is not adequately treated, during the operational of the development.

Mitigation

Specific measures to offset potential impacts relating to surface water runoff during the operation of the road, have been incorporated into the design of the Proposed Development. These include the use of attenuation systems and hydrocarbon interceptors. Full details of these are provided in Section 2.2.1 of this report and again in the Galway County Council Preliminary Design Report included in this application.

Residual Effect

Given the proposed treatment of surface water, significant negative effects on water quality are not anticipated and there will be no residual impacts as a result of the operational phase of the Proposed Development.

6.3.2 Potential Impacts on Fauna

There will be no additional loss or fragmentation of suitable faunal habitats associated with the operational phase of the Proposed Development. Additionally, no increased impacts for disturbance to faunal species are anticipated as a result of the Proposed Development, as there is currently an existing road and there will be no increase to traffic. No lighting is proposed as part of the Proposed Development.

6.3.2.1 Bats

No impacts associated with the operational phase of the Proposed Development are expected on the local bat population. No additional lighting is proposed for the Proposed Development.

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 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).

None of the elements of the Proposed Development are located within the boundaries of any European designated sites. There will be no direct effects on any designated site as a result of the construction or operation of the Proposed Development.

Potential for indirect effects resulting from the construction and operational phases of the Proposed Development have been identified on the following European Sites:

- Lough Corrib SAC (000297)
- Lough Corrib SPA (004042)
- Galway Bay Complex SAC (000268)
- Inner Galway Bay SPA (004031)

Following the precautionary principle and in the absence of best practice and mitigation, a potential pathway for indirect effects on these sites has been identified via the deterioration of water quality arising from the runoff or percolation of pollutants to surface and/or ground water during the construction phase and operational phases.

A NIS has been prepared with this application, which fully assess the potential impacts on European designated sites, providing the competent authorities with the information necessary to undertake an Appropriate Assessment.

The NIS concludes as follows:

> *"Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction and operation of the Proposed Development does 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 such sites are also designated as SACs or SPAs (European Sites) they have been assessed and considered under that designation.

Two pNHAs were identified as being in the likely zone of impact in the desk study. The pNHAs identified as being within the likely zone of impact include are:

- Lough Corrib pNHA
- Galway Bay Complex pNHA

These sites lie within the boundaries of the designated European Sites Lough Corrib SAC and Galway Bay Complex SAC and have been assessed and considered under that designation in the accompanying NIS. A summary of the results of the NIS is provided in Section 6.4.1 above.

6.4.3 International Designations

Impacts on internationally designated sites including Ramsar sites are considered in this section of the report. Galway Bay is designated as part of the Inner Galway Bay Ramsar site, the boundary of which is located entirely within with Galway Bay Complex SAC. This site has been assessed and considered under that designation in the accompanying NIS. A summary of the conclusions of the NIS is provided in Section 6.4.1 above.

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 Review of Other Projects

The online National Planning Application Map viewer was consulted on the 25th of July 2023 for the area surrounding the site of the Proposed Development. Additional projects identified in the area include:

- **Planning Ref 22526**: Permission for the following at the existing Glenlo Abbey Hotel (Protected Structures no. 3441 and 3952). Amendments to the development permitted under Ref 21/1313 as follows: - Change of design to the reception/store building (associated with the holiday lodges permitted under Ref 20/1242) resulting in an increase of overall floor area from 60.5 sqm to 101 sqm. - Weather protective canopy to the side. - Provision of solar PV panel array to roof. - All associated site works. Gross floor space of proposed works: 101 sqm;
- **Planning Ref. 22623**: Permission for the following at the existing Glenlo Abbey Hotel (Protected Structures no. 3441 and 3952). Demolition of the existing walls storage shed and associated yard area north of the existing Pullman (train) Restaurant. Change of use of the existing kitchen area within the Pullman (train) Carriage to a dining carriage and construction of a new single storey commercial kitchen of circa 115sqm, linked to the existing Pullman (train) Restaurant, together with all associated plant/services and ancillary works. A Natura Impact Statement (NIS) will be submitted to the planning authority with this application;
- **Planning Ref. 22992**: Permission for the following at the existing Glenlo Abbey Hotel (Protected Structures no. 3441 and 3952). Demolition of the existing driving range building and associated 22 No. driving range bays. Construction of new single storey Golf Academy to include 30 No. covered Driving Range Bays, Pro Golf Shop, Changing Facilities, High Performance Golf Training Facility, Restaurant, Retail Store, Kitchens, along with Hotel Administration Offices, Staff Canteen and Ancillary Accommodation, together with all associated services and ancillary site works, including alteration and extension of the adjacent carpark. A Natura Impact Statement (NIS) will be submitted to the planning authority with this application. Gross floor space of proposed works: 1102 sqm;
- **Planning Ref. 21411**: Permission for the construction of a single storey granny flat extension to the side/rear of our dwelling (85 sqm) and to include all associated site works. Gross floor space of proposed works: 85 sqm;
- **Planning Ref. 191373**: Permission for the construction of a domestic garage with all associated services and site works. Gross floor space of proposed works: Garage = 52 sqm;
- **Planning Ref. 2260140**: Permission for a Dwelling house, garage and private wastewater treatment system with all associated works and ancillary services. Gross floor space of proposed works 290sqm;
- **Planning Ref. 19191**: Outline Permission is sought for a single storey over basement dwelling house and shed, and wastewater treatment system and associated polishing filter bed, including new access road and all associated site services and landscaping works, to lands;
- **Planning Ref. 21317**: Permission for development which will consist of the change of house design (from previously granted outline permission Ref. 19/191 and consequent permission Ref 21/47) of new dwelling house (206m2) and shed (32m2), new wastewater treatment system and associated polishing filter bed, including new access road and all associated site services and landscaping works, includes minor façade and fenestration revisions to front, side and rear elevations, replacing roof with monopitch roof solution, addition of 3m2 to rear service block;

- **Planning Ref. 2147**: Permission Consequent on the of outline permission for development (previously granted outline permission 19/191) which will consist of a new Dwelling house (203sqm) and Shed (32sqm);
- **Planning Ref. 20354**: Outline Permission for development which will consist of for a new dwelling house, garage and new wastewater treatment system and associated site works;
- **Planning Ref. 2182**: Permission for development which will consist of construction of a new dwelling house, new domestic garage, new waste water treatment, new percolation area and associated site works;
- **Planning Ref. 2217**: Permission for development which will consist of renovations, upgrades and extensions to an existing dwelling. The development will include 1). Partial demolition and reconstruction of the existing substandard lower ground floor level, flat roof terrace and balustrades to the rear of the dwelling 2). Construction of a new natural stone wall and 4 no. bay windows along the perimeter of the new reconstructed lower ground floor level 3). Partial demolition of the substandard western pitched roof, followed by its reconstruction and rise to meet existing adjacent pitched roof profile 4). Modifications of 2 no. chimneys and demolition of 1 no. chimney 5). Extension to the side elevation of the small porch and pantry (9.5 sqm) 6). Construction of a new open porch along with alterations to the existing roof to the front of the dwelling 7). Glass conservatory type extension to the rear of the ground floor (19sqm) 8). Conversion of an existing fuel store into a carport, including an extension (16.6 sqm) and roof replacement 9). Construction of a new garage at the south-westerly part of the site 10). External wall insultation to all remaining external walls 11). Modification and alterations of overall fenestration openings throughout with the removal and replacement of all windows, roof windows and doors including additional windows, roof windows and doors 12). Existing concrete roof titles to be removed throughout existing roof finish to be replaced with natural slate titles and zinc 13). Modifications of all balustrades and external columns to the rear of the dwelling 14). Decommissioning of existing septic tank and addition of a new wastewater treatment and disposal systems 15). Refurbishment of existing site entrance gate way 16). All ancillary site works, services and landscaping to facilitate the development;
- **Planning Ref. 2297**: Permission for development which will consist of the construction of a 3 bedroom dwelling house, ancillary garage and all associated site works including a new entrance and treatment plant system;
- **Planning Ref. 2043**: Planning permission is sought for the construction of a new replacement roof with a steeper pitch including dormer windows to the front and side of the main roof, flat roof windows to the rear and side, new window in the first floor gable end which would change this existing detached single storey house to a detached storey and a half dormer house plus all associated works and internal modifications.
- **Planning Ref. 23141:** New Application for permission for development which consists of a 11,134 sqm school comprising classrooms, specialist room accommodation, PE Hall/ Multi-Purpose Hall, a 2 classroom Special Needs Unit, ancillary accommodation, five external Ball Courts, 79 car parking spaces, bicycle storage, hard and soft landscaping, water attenuation system and all necessary pathways. The building comprises a central part three-storey part four-storey central East-West block with P.V panels on the roof with two part three-storey part two-storey lateral peninsula blocks each with ball courts on the roof; ESB substation, creation of a centrally located tiered amphitheatre space, courtyard gardens with extensive hard and soft landscaping; An LPG Gas Store and attenuation area to the North West of the site, A new signalised junction, access road and dedicated cycle lane providing entry from the N59 at the junction at Circular Road enclosing the development and terminating on Saint Annes Road with a North-South fire path enclosing the Eastern boundary and with pedestrian access from the N59 all comprising new drainage and ancillary works: new boundary treatment to the N59. A Natura impact statement and an ecological impact assessment will be submitted to the planning authority with the application.
- **Planning Ref. ABP Case No. MA07.302885:** Permission for the N6 Galway City Ring Road Motorway Scheme 2018 and Protected Road Scheme 2018 and Compulsory Purchase Order (ABP Case No. MA07.302885)

7.2 Review of Ecological Plans and Policies

The following plans have been reviewed and taken into consideration as part of this assessment:

- Galway County Council Development Plan 2022 - 2028
- Galway City Council Development Plan 2023 - 2029 (included due to proximity of city boundaries)
- Northern and Western Regional Assembly – Regional Spatial and Economic Strategy 2020 – 2032
- Irelands 4th National Biodiversity Action Plan 2023 - 2030

The review focused on policies and objectives that relate to Biodiversity and natural heritage. Policies and objectives relating to sustainable land use were also reviewed.

Table 7-1: Review of Plans.

Plans	Key Policies/Issues/Objectives Directly Related to European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
Galway County Council Development Plan 2022-2028	**Policy Objective 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.	The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity and other natural heritage interests. The Proposed Development has been designed in order to avoid likely significant effect on areas of ecological importance. Where the potential for adverse effect on areas of ecological importance has been identified mitigation will be implemented. No potential for cumulative impacts when considered in conjunction with the current proposal were identified.
Galway City Council Development Plan 2023-2029	**Policy 5.1 Green Network and Biodiversity** › Support sustainable use and management of areas of ecological importance, parks and recreation amenity areas and facilities through an integrated green network policy approach in line with the Galway City Recreation and Amenity Needs Study and where it can be demonstrated that there will be no adverse impacts on the integrity of European Sites. › Support the implementation of the National Biodiversity Action Plan (NBAP) 2017- 2021 (and any subsequent NBAP) and the All-Ireland Pollinator Plan (2021-2025) and support the actions of the City Council's Heritage Plan 2016-2021 and	The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity and other natural heritage interests. The proposed development has been designed in order to avoid likely significant effect on areas of ecological importance. Where the potential for adverse effect on areas of ecological importance has been identified mitigation will be implemented.

	Biodiversity Action Plan 2014-2024 and updates relating to the promotion of ecological awareness, biodiversity and best practices. › Ensure that all passive and active recreational proposals are considered in the context of potential impact on the environment, sites of ecological and biodiversity importance and general amenity. **Policy 5.2 Protected Spaces: Sites of European, National and Local Ecological Importance** 1. Protect European sites that form part of the Natura 2000 network (including Special Protection Areas and Special Areas of Conservation) in accordance with the requirements in the EU Habitats Directive (92/43/EEC), EU Birds Directive (2009/147/EC) and associated national legislation. 2. Ensure that all plans or projects within the Plan area will only be authorised and / or supported after the competent authority has ascertained based on scientific evidence, screening for appropriate assessment and /or a Habitats Directive Assessment that: › The plan or project will not give rise to an adverse direct, indirect or secondary effect on the integrity of any European site (either individually or in combination with other plans or projects); or › The plan or project will have an adverse effect on the integrity of any European site (that does not host a priority natural habitat type/and or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000; or › The plan or project will have an adverse effect on the integrity of any European site (that hosts a natural habitat type and/or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons for overriding public interest, restricted to reasons of human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory	No potential for cumulative impacts when considered in conjunction with the current proposal were identified.

	measures necessary to ensure the protection of the overall coherence of Natura 2000. 4. Protect, conserve and support the development of an ecological network throughout the city which will improve the ecological coherence of the Natura 2000 network in accordance with Article 10 of the Habitats Directive. 10. Protect and conserve rare and threatened habitats and their key habitats, (wherever they occur) listed on Annex I and Annex IV of the EU Habitats Directive (92/43EEC) and listed for protection under the Wildlife Acts 1976-2000. 11. Ensure that plans and projects with the potential to have a significant impact on European sites (SAC or SPA) whether directly, indirectly or in combination with other plans or projects are subject to Appropriate Assessment, under Article 6 of the Habitats Directive (92/43EEC) and associated legislation and guidelines, to inform decision making. 14. Support and implement measures to control and manage alien/invasive species, where appropriate. 15. Protect the ecological integrity of statutory Nature Reserves, refuges for fauna and Annex 1 Habitat **Policy 5.4 Green Spaces: Urban Woodlands and Trees** › Manage and develop woodlands in the ownership of Galway City Council for natural heritage, recreation and amenity use. Integrate existing trees and hedgerows on development sites where appropriate and require tree planting, as part of landscaping schemes for new developments.	
Northern and Western Regional Assembly – Regional Spatial and Economic Strategy 2020 – 2032	**Regional Policy Objective 5.5 –** Ensure efficient and sustainable use of all our natural resources, including inland waterways, peatlands, and forests in a manner which ensures a healthy society a clean environment and there is no net contribution to biodiversity loss arising from development supported in this strategy. Conserve and protect designated areas and natural heritage areas.	The strategy was reviewed, with particular reference to Policies and Objectives that relate to biodiversity. No potential for cumulative impacts when considered in conjunction with the current proposal were identified. There will be significant impacts on designated sites or biodiversity as a result of the Proposed Development.

	Regional Policy Objective 5.7 - Ensure that all plans, projects and activities requiring consent arising from the RSES are subject to the relevant environmental assessment requirements including SEA, EIA and AA as appropriate	The Proposed Development will not impact on connectivity within the wider area.
Irelands 4th National Biodiversity Action Plan 2023-2030	› **Objective 1: Adopt a Whole-of Government, Whole of-Society Approach to Biodiversity.** Proposed actions include capacity and resource reviews across Government; determining responsibilities for the expanding biodiversity agenda providing support for communities, citizen scientists and business; and mechanisms for the governance and review of this National Biodiversity Action Plan. › **Objective 2: Meet Urgent Conservation and Restoration Needs.** Supporting actions will build on existing conservation measures. Efforts to tackle Invasive Alien Species will be elevated. The protected area network will be expanded to include the Marine Protected Areas. The ambition of the EU Biodiversity Strategy will be considered as part of an evolving work programme across Government. › **Objective 3: Secure Nature's Contribution to People.** Actions highlight the relationship between nature and people in Ireland. These include recognising the tangible and intangible values of biodiversity, promoting nature's importance to our culture and heritage and recognising how biodiversity supports our society and our economy. › **Objective 4: Enhance the Evidence Base for Action on Biodiversity.** This objective focuses on biodiversity research needs, as well as the development and strengthening of long-term monitoring programmes that will underpin and strengthen future decision-making. Action will also focus on collaboration to advance ecosystem accounting that will contribute towards natural capital accounts. › **Objective 5: Strengthen Ireland's Contribution to International Biodiversity Initiatives.**. Collaboration with other countries and across the island of Ireland will play a key role in the realisation of this Objective. Ireland will strengthen its contribution to international biodiversity initiatives and international governance processes, such as the United Nations Convention on Biological Diversity.	The Plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites. The Proposed Development has been designed in order to avoid any potential fragmentation of habitats or commuting corridors. There will be significant impacts on designated sites or biodiversity as a result of the Proposed Development. The Proposed Development will not impact on connectivity within the wider area. No Invasive species were present within Proposed Development site, and the Proposed Development will not contribute to the spread of invasive species.

7.2.1 Conclusion of Cumulative Assessment

Following the detailed assessment provided in the preceding sections, it is concluded that the Proposed Development will not result in any residual adverse effects on the biodiversity, flora, and fauna of the existing environment, when considered on its own. There is therefore no potential for the Proposed Development to contribute to any cumulative adverse effects on any European Site when considered in-combination with other plans and projects.

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 with regard to the biodiversity, flora, and fauna of the existing environment.

8. CONCLUSION

Following consideration of the residual effects (post incorporation of best practice measures) it is noted that the Proposed Development will not result in any significant effects on the biodiversity, flora and fauna of the existing environment.

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 and best practice that is described within this report, significant effects on biodiversity are not anticipated at any geographical scale.

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APPENDIX 1

CONSTRUCTION ENVIRONMENT MANAGEMENT PLAN

Bonneagar Iompair Éireann
Transport Infrastructure Ireland

Construction Environmental Management Plan for Galway County Council

N59 Kentfield

Road Safety Junction Improvement Scheme

GC/19/18753

Comhairle Chontae na Gaillimhe
Galway County Council

GALWAY NATIONAL ROADS PROJECT OFFICE

Project Ireland 2040
Building Ireland's Future

Bonneagar Iompair Éireann

Date: 13/07/2023

Document Control Sheet

Client:	Galway County Council
Project Title:	N59 Kentfield Road Safety Junction Improvement
Document Title:	N59 Kentfield Construction Environmental Management Plan
Document No:	GNRPO-N59-CEMP-0001

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Revision History

Revision	Date	Comments
0	13/07/2023	*Construction Environmental Management Plan*
1	29/02/2024	*Updated Figures*

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1 Introduction

1.1 Project Overview

Galway County Council are undertaking the realignment of a section of the N59 National Road and upgrade of the existing N59/L-5381 Junction. This Construction Environmental Management Plan (CEMP) has been prepared as supporting documentation for the Planning Application to An Bord Pleanála under section 177AE of the Planning and Development Act 2000, as amended. The section of the N59 and its intersection with local road L-5381 to be improved is located at a bend which contains a hidden dip along the road. The existing road conditions falls well below the standard of the TII Publications (Standards) in terms of horizontal and vertical alignment, visibility, cross-section, and safety on the route is compromised as a result. In addition, the existing N59/L-5381 priority T junction is particularly a contributing factor to the high number of rear end collisions at this location. The existing road on this section of the N59 has a restricted capacity due to its limited cross section and sub-standard alignment. There are also a multitude of hazards within the clear zone of the road resulting in unforgiving roadsides that can significantly increase the level of injury severity should a vehicle leave the road. The section has been assessed under the AM-STY-06044 Road Safety Inspection and was identified as a site having road safety problems needing further assessment to identify if there is a treatable engineering solution. The provision of an improved section of road, designed to contemporary standards and providing safe stopping sight distances, will increase the overall consistency and efficiency of the route and provide safer journeys as well as more reliable and reduced journey times. Access, in terms of Vulnerable Road Users such as pedestrians and cyclists is quite limited, due to the existing road cross section, with little or no verges and no hard shoulders. The provision of an improved section of road, designed to contemporary standards will provide safer access for Vulnerable Road Users (VRUs). In the interest of road safety, the improvement works to the N59/L-5381 Junction at Kentfield are necessary.

1.2 Purpose of this Outline Construction Environmental Management Plan

The purpose of this CEMP is to document and describe the main activities that will be undertaken to facilitate the project and to provide a framework of environmental protection measures that will be implemented prior to commencement of, and throughout the duration of, the proposed road improvement works.

The proposed realignment and upgrade work at N59 / L-5381 Junction will be undertaken by a Contractor appointed by Galway County Council. This CEMP will be provided to the appointed Contractor prior to the commencement of works and will form the basis of the Contractor's CEMP and Method Statements, which the appointed Contractor will be required to develop and prepare for approval by Galway County Council prior to commencement of

any works. The Contractor's CEMP and Method Statements will set out the approach and methodology which they will follow in scheduling and undertaking the work. This CEMP outlines the control measures in relation to environmental protection associated with the activities and disturbance to road users. It is the responsibility of Galway County Council to ensure that the requirements of this CEMP and any requirements associated with the Contractor's Method Statements and CEMP are implemented in full.

1.3 Legislation and Other Requirements

The CEMP summaries the requirements from legislation and Codes of Practice which apply to the works being undertaken. An example non-exhaustive list of such requirements is provided below:

- Safety, Health, and Welfare at Work Act, 2005
- Safety, Health, and Welfare at Work (Construction) Regulations, 2013
- Safety, Health, and Welfare at Work (General Application) Regulations 2007 – 2016, SI No. 229
- Safety, Health, and Welfare at Work (Confined Spaces) Regulations, 2001
- European Union (Drinking Water) Regulations 2014
- European Communities (Surface water) Regulations, 2009 (as amended)
- European Communities (Groundwater) Regulations, 2010 (as amended)
- European Communities (Good Agricultural Practice for Protection of Waters) (Amendment) Regulations, 2011
- European Communities (Good Agricultural Practice for Protection of Waters) (Amendment) Regulations, 2014
- Local Government (Water Pollution) Act, 1977 and associated Regulations
- European Communities (Birds and Natural Habitats) Regulations 2011
- Wildlife Act 1976 - 2021
- Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (DoEHLG, July 2006)
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI, 2016)
- CIRIA C648 Control of water pollution from linear construction projects Technical Guidance (CIRIA 2006)

1.4 Roles and Responsibilities

This initial issue of the CEMP identifies the key roles for the construction works. The appointed contractor will update the CEMP ad will set out detailed roles and responsibilities (including named individuals) and an organogram of the team structure.

1.4.1 Galway County Council (Employer)

Galway County Council National Roads Project Office are the Employer for the proposed development and have the following responsibilities following the submission of the Planning Application to An Bord Pleanála:

- Post consent management: manage the process towards construction including liaison with key environmental agencies and stakeholders and the public.
- Engineering function: Ensures that the design is delivered as per the planning drawings and that the delivery of the proposed development meets the required design standards.
- Communication: Continued liaison with the public and local residents on the progress of the proposed development.

1.4.2 Contractor

A Contractor will be appointed following a tendering process and will be responsible for the implementation of all mitigation as set out in Section 4 and the completion of the works to the satisfaction of the Employer.

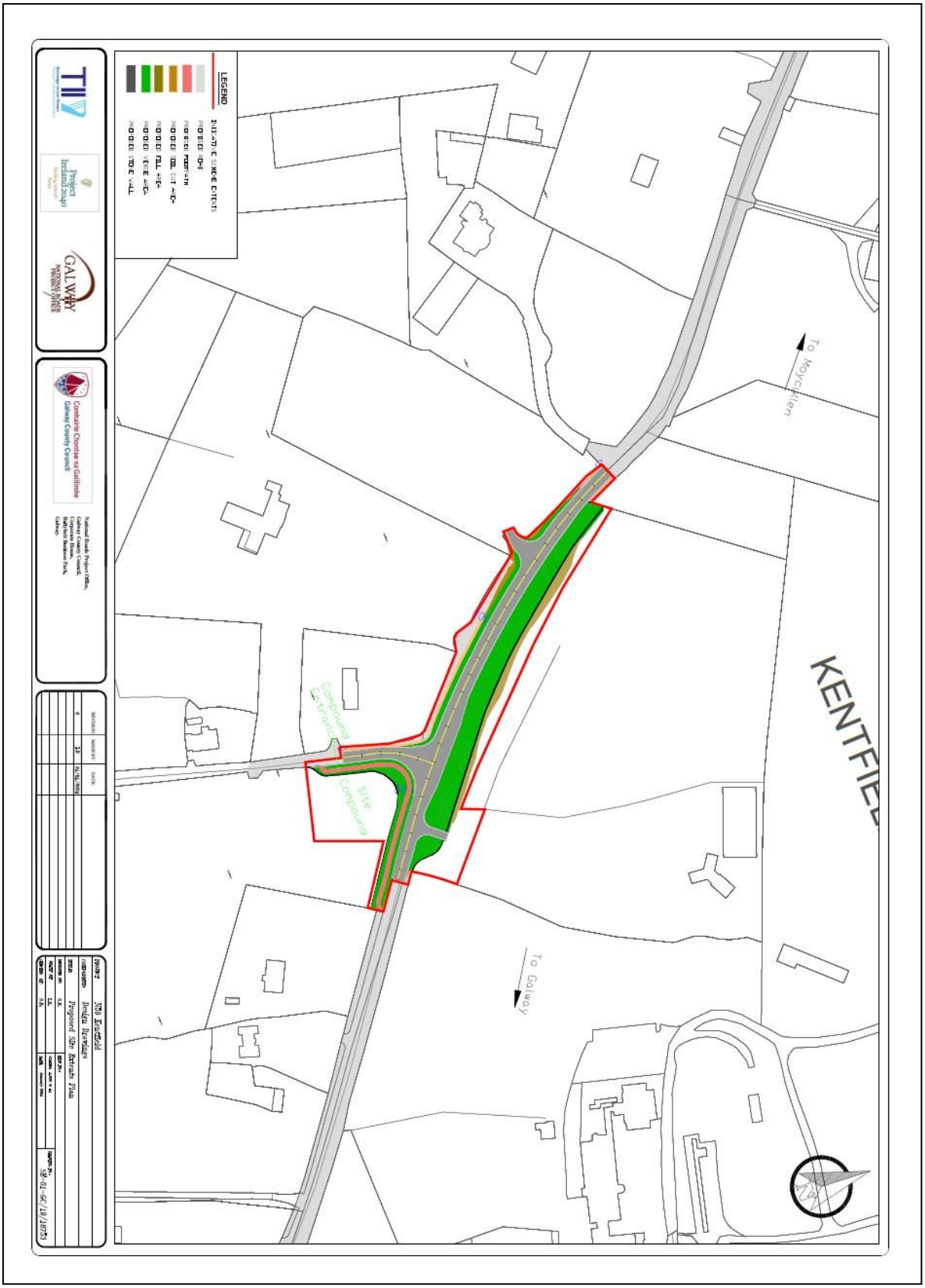
1.4.3 Site Manager

The Site Manager will be responsible for the day to day running of the site and will direct and oversee the activities of contractor staff and any subcontractors under the Contractor's control throughout the works. The Site Manager will be responsible for programming of the works and will consult regularly with the Employer and will maintain site safety.

1.4.4 Contractors Environmental Clerk of Works

The Contractor's Environmental Clerk of Works (EnCoW) will have suitable environmental qualifications and the necessary experience and knowledge appropriate to the role. The EnCoW will be delegated sufficient powers under the construction contract so that they will be able to instruct works to stop and to direct the carrying out of emergency mitigation / clean-up operations. The EnCoW will also manage consultation with environmental bodies/stakeholders. The EnCoW will be responsible for ensuring that all control measures in Section 4 of this report and those within the Contractor's CEMP are fulfilled and are in adherence with applicable standards and legislation.

Figure 1.1: Proposed Scheme



2 Project Description

2.1 Project Description

The works comprise alterations to the existing road alignment of the N59 and L-5381 at Kentfield Co. Galway. There will be no change in traffic levels as a result of the proposed development or other operational phase impacts. The following outlines the planned works required at N59 Kentfield:

- The N59 carriageway will be realigned and upgraded to a Type 2 single carriageway along the 245m section of the N59;
- On approach to the simple priority junction along the N59 a nearside passing of 2m will be provided at the junction.
- The L-5381 carriageway will be realigned and widened for approx. 45m to incorporate a carriageway width of 6.0m and a 2m wide footpath;
- Grass verges will be provided at 3m width along the western length of the N59 with existing hedgerow maintained and varying widths of grass verge between 8 – 12m along the eastern length of the N59 carriageway;
- A 2m wide footpath will be provided along the N59 on the south-western side of the scheme and extended westwards along the L-5381 for approximately 123m
- 1no. Domestic entrance on the N59 will be maintained and upgraded to current standards including resting walls and piers;
- 2no. Field access will be maintained along the N59 and upgraded to current standards.
- 240m of stone wall will be constructed on the eastern side of the scheme, with approx. 60m stone wall to be constructed on the western side of the scheme.
- All existing land drainage and culverts will be maintained with new land drainage connected to existing network;
- Proposed sealed drainage system comprising of kerb and gully system, which discharges through a petrol interceptor and underground tank, where runoff is attenuated and treated before discharged to the local drainage network;
- 220m of vegetation clearance along the eastern side of the N59 and 50m of vegetation clearance will be required on the L-5381 to facilitate the works and to provide for visibility;
- All ancillary works required to deliver the proposed scheme.

The road traffic will remain live with a traffic management plan implemented by the contractor. The Contractor will be responsibly to ensure temporary traffic measures and signs for roadworks are in accordance with chapter 8. The Site compound will be located off the local road L-5381. Galway County Council will have identified an area suitable for a site compound to be used by the Contractor.

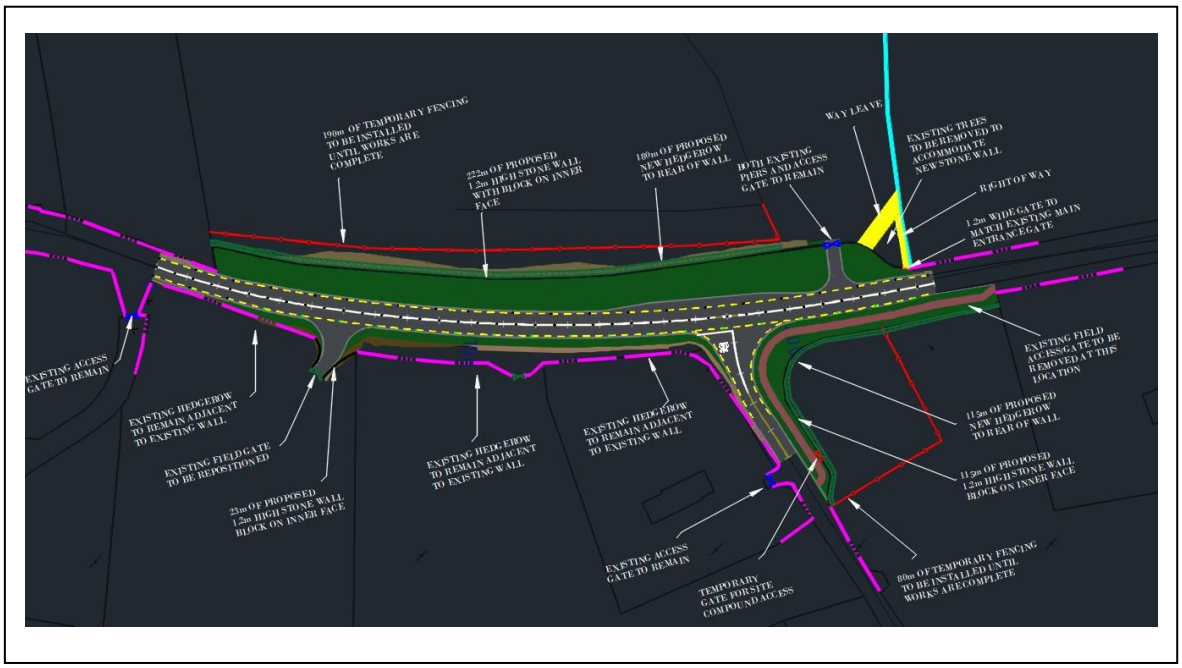
Figure 2.1: Proposed Scheme Looking in Direction of Galway City/East

- Start of the Scheme N59 at Ch 0m.
- Chainage Ch 0m – Ch 245m along N59.
- Local road L-5381 Approx. 45m in length.
- 1No Residential Entrance.
- 2No. Agricultural Accesses.
- Black lines indicate existing boundaries.
- Grey lines indicate proposed walls.

Figure 2.2: Proposed Scheme Looking in Direction of Moycullen/West

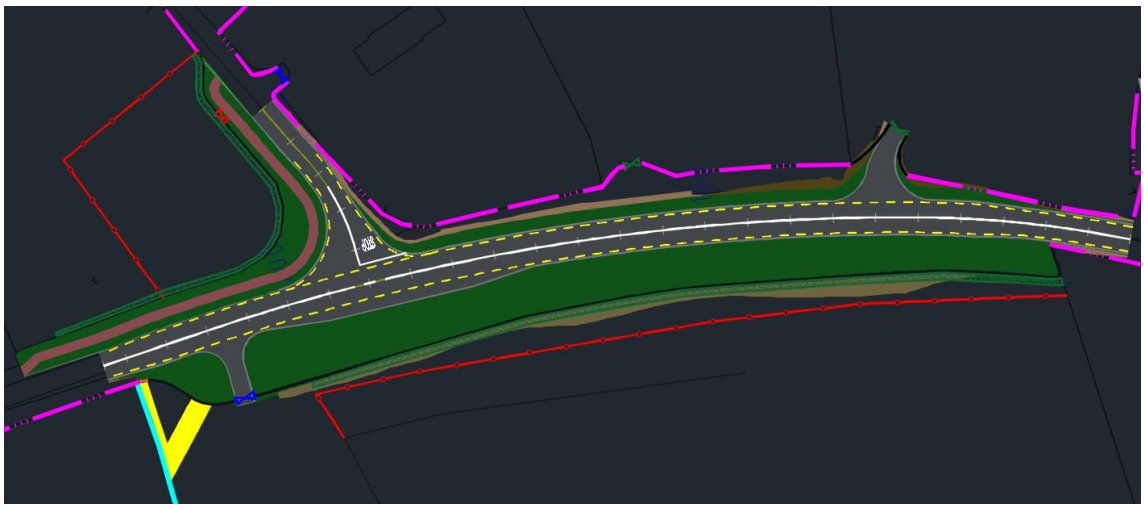
- End of Scheme on N59 at Ch245m
- Chainage Ch 0m – Ch 245m along N59
- Local road L-5381 Approx. 45m in length.
- 1No Residential Entrance.
- 2No. Agricultural Accesses.
- Black lines indicate existing boundaries.
- Grey lines indicate proposed walls.

Figure 2.3: Proposed Scheme Looking North



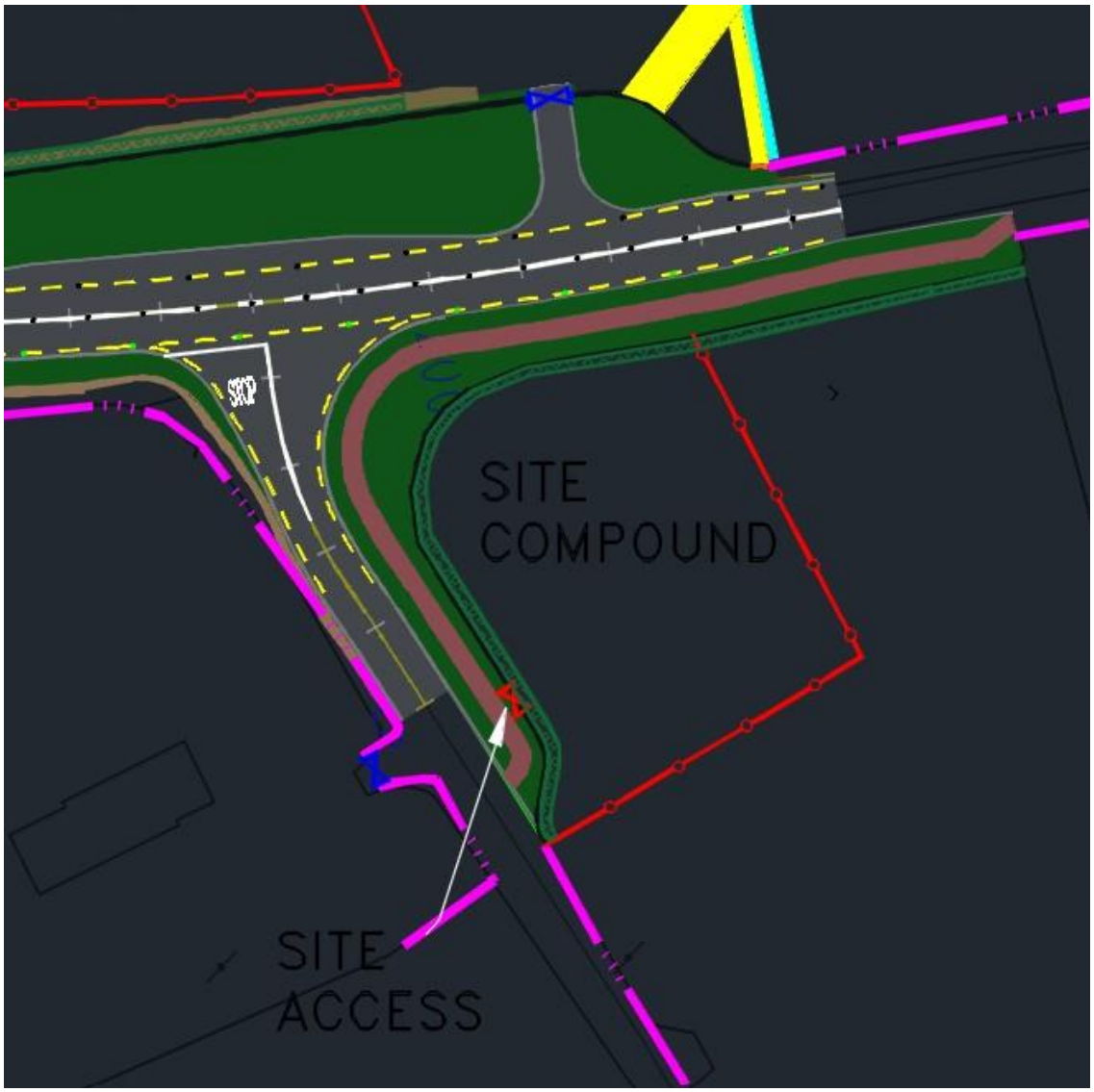
- Extents of the proposed scheme looking North towards the Lough Corrib.
- Red Blocks indicate Residential Buildings/Golf Building

Figure 2.4: Proposed Scheme Looking South



- Extents of the proposed scheme looking South towards Barna.
- Red Blocks indicate Residential Buildings.

Figure 2.5: Proposed Site Compound & Access



- Site Compound located off Local Road L-5381.

3 Proposed Activities

3.1 Construction Programme

The commencement date is subject to approval by Galway County Council and any changes which may occur following resolution by An Bord Pleanála to vary or modify the planning application. The proposed construction works are anticipated to commence in Q3 2024. Table 3.1 details the stages of the 10-week construction programme which is based on experience of similar projects and is meant to be indicative rather than a definitive programme.

Table 3.1: Indicative Construction Programme

Construction Stage	Duration	Description
1 – Site Establishment	1 week	Install site office, Canteen, Welfare/Hygiene facilities, Car Park, Signage, Survey area, Identify Services, Mobilisation of Plant, Temporary Traffic Management
2 - Site Clearance	1 week	Removal of trees, hedgerow and vegetation required for road realignment
3 - Earthworks	4 weeks	Striping Topsoil, Cut & Fill Material, Road Formation Verges, Land Drainage
4 – Pavement Foundation	3 weeks	Compact Subgrade, Subbase Course, Base Course, Binder Course, Surface Course, Kerbing
5 – Accommodation Works	7 weeks	Foundations, Stone wall construction.
6 - Drainage	2 weeks	Excavate trench, lay gully pots & pipes, petrol interceptor, underground tank, pipes, Out fall pipe, Culvert upgrade & Headwall
7 – Ancillary Works	1 week	Road markings, Signage, Construct Footpath

The construction working hours will be restricted to the following:

- Monday to Friday: 07:00 – 19:00
- Saturday: 08:00 – 14:00
- Sunday or Bank Holiday: No construction works programmed

3.2 Site Establishment

The site will be accessed off the existing local road L-5381. Prior to the commencement of any works the site entrance will need to be fully established with all security gates and the provision of a parking for construction worker's vehicles. For the duration of the project all vehicles will be parked within the confines of the site.

An excavator operator will strip the topsoil from the area of ground where the compound will sit. This topsoil will be stockpiled for reuse on site. Terram will be rolled out and rock fill placed and tracked in to provide a sound base for the compound and vehicular traffic within it.

The Contractor shall commence mobilisation of the offices and stores which are to be located onsite and transported by a licensed haulage contractor. The Contractor shall then start positioning the pedestrian fencing to establish safe routes between offices to segregate staff from vehicular traffic. In addition, the Contractor shall delineate designated parking areas for staff vehicles and site works vehicles.

The Contractor shall install an enclosed wastewater storage tank adjacent the toilet facilities which will be emptied on a regular basis. The tank will be decommissioned and removed at the end of the contract. The Contractor shall ensure that water discharge from the office/welfare sinks is discharged separately into a surface water discharge point.

An Electrician shall complete the electrical connections for the compound upon mobilization of the site-based generator; the double bunded generator shall be positioned on an appropriate drip tray for environmental concerns.

Perimeter security fencing will be placed at areas of particular importance around the site as the development progresses, as a barrier to unauthorised public access. The fencing will be well maintained, and appropriate signage will also be put in place to alert drivers of the works

3.3 Site Clearance and Preparation

Tree hedgerow and vegetation removal will be limited to only essential areas. The trees and hedgerow are programmed to be felled outside the bird nesting season (in accordance with the Wildlife Act 1976, as amended). If a change occurs to the planned construction schedule and works occur during the bird nesting season, 1st March to 31st August inclusive, then a bird nesting survey will be required for any trees identified for felling.

Evidence of invasive species listed within Part 1 of the Third Schedule of S.I No. 477 of 2011, European Communities (Birds and Natural Habitats) Regulations 2011 was included in an ecological survey completed In May 2023 by MKO Ecologists. No invasive species were identified. It is considered that the establishment of invasive species is unlikely to occur before the commencement of these works and no pre-construction confirmatory invasive species survey is required (where construction works are not subject to significant delay).

3.4 Construction Works Phasing

3.4.1 Earthworks

Soil Stripping and temporary stockpiling of soils and subsoils will be required around the site as the proposed development progresses. While these works occur, the following will apply:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies i.e., ESB Networks, Eir, Irish Water, Galway County Council etc. will be contacted and all drawings for all existing services sought.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- All plant operators and general operatives will be inducted and informed as to the identification of invasive species.
- A tracked 360-degree excavator will be used to strip the topsoil, and a dumper will be used to move the excavated materials to the temporary stockpile location.
- All excavated material will be reused for future landscaping works or for backfill of excavations.
- All stockpiles will be damped down or covered in a sheet of polythene, as required, which will prevent the creation of nuisance dust, and will also prevent sediment runoff in times of heavy precipitation.
- A silt filtration system will be used as appropriate to prevent contamination of any watercourse

3.4.2 Pavement Foundation

The strength of the foundation layer is dependent upon the three factors applicable to all pavement engineering design.

- The support provided by the underlying material, in this case the subgrade.
- The strength of the foundation material itself.
- The thickness of the layer.

A detailed pre-construction geotechnical site investigation will be carried out in order to assess a number of design issues, in particular the stiffness (CBR) of the material, its moisture sensitivity and if necessary, its suitability for earthworks and stabilisation to form capping layer, sub-base or road base material.

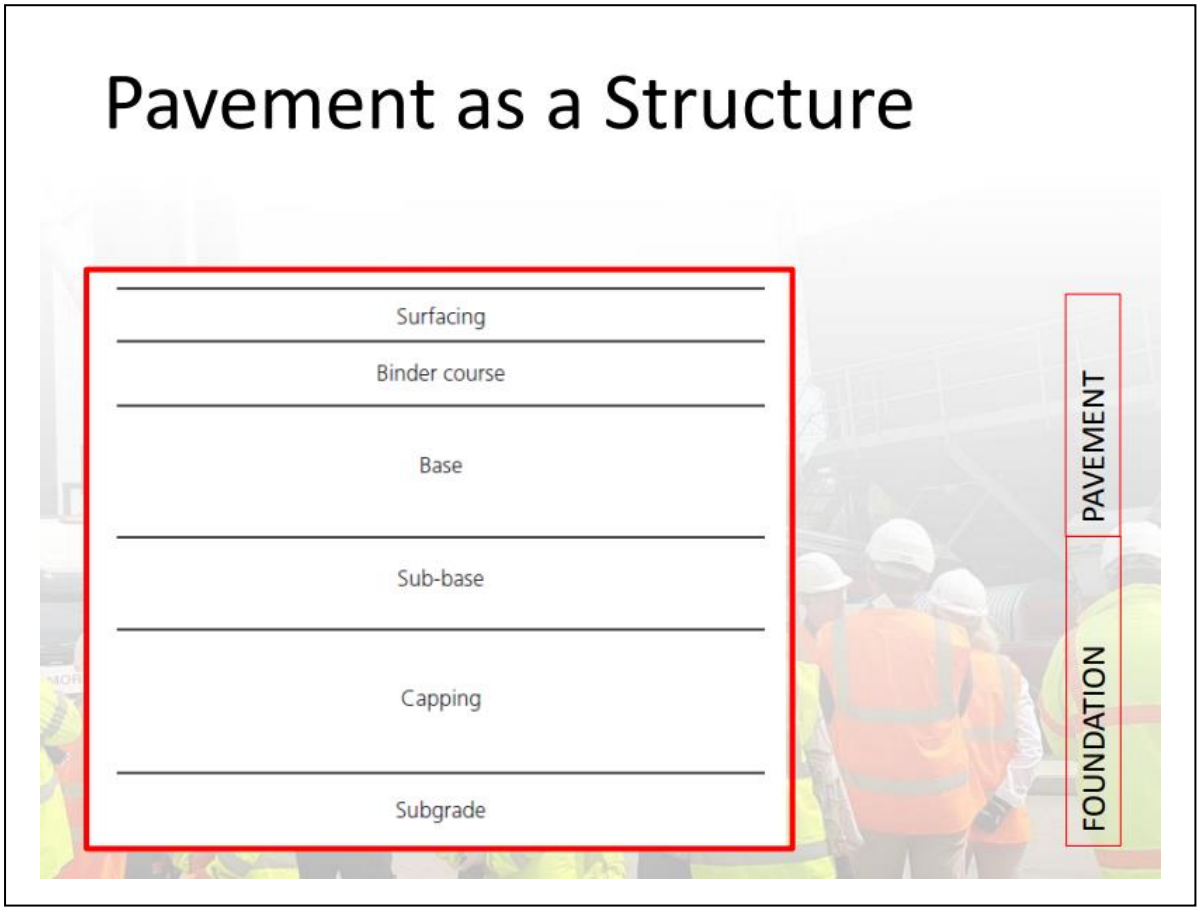
The pavement foundation will be constructed along the realigned section of the N59 for 245m. The extent of the foundation design will be in accordance with a Type 2 Single Carriageway. The Local Road L-5381 will be constructed for approx. 45m in accordance with a Type 3 Single Carriageway.

The Pavement Foundation will consist of the following:

- Subgrade
- Capping
- Sub-base
- Base

- Binder course
- Surfacing

Figure 2.6: Cross Section of Pavement Structure



The N59 Kentfield road safety junction improvement scheme will rely on heavy-duty machinery to successful deliver the project such as:

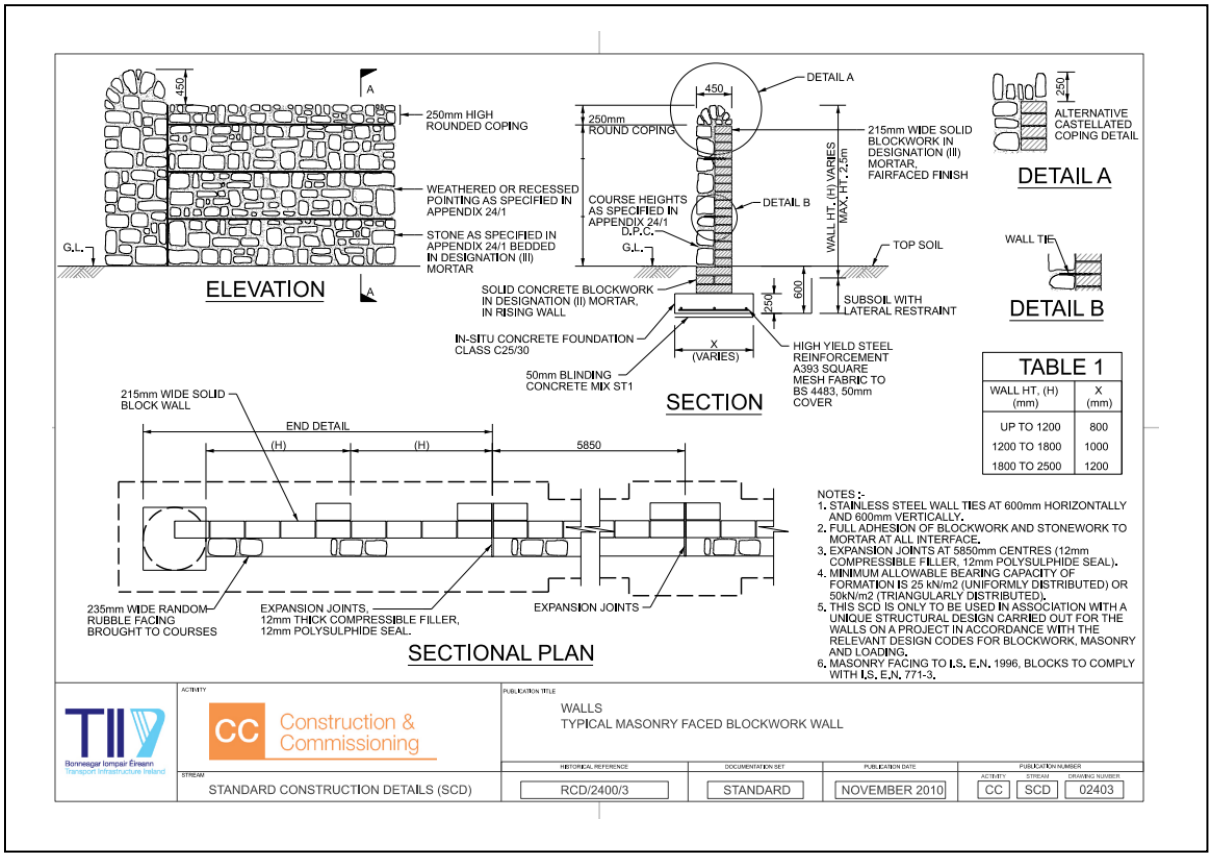
- 360-degree excavators
- Dump trucks
- Rollers
- Pavers

3.4.3 Accommodation Works

Accommodation works to be provided for the scheme:

- Single sided stone wall on the northern section along the N59, consisting of approx. 212.
- Single sided stone wall of approx. 58m connecting the N59 and L-5381

Figure 2.7: Single Sided Stone Wall Detail



3.4.4 Drainage

The proposed carriageway drainage system will consist of a gully and pipe system which will be installed as part of the works. All carriageway runoff is collected along the full proposed scheme from Ch 0m – Ch 245m. The carriageway drainage is kept separate from the land drainage. The carriageway runoff flows through a petrol interceptor before entering an underground storage tank, which allows the runoff to attenuate over a period of time before been discharged to an outfall stream at Ch 245m.

3.4.5 Ancillary Works

Other works to complete the improvement scheme include:

- New footpath on L-5381 to connect with existing N59 footpath.
- Road lining over the new realigned section of road to facilitate the safe passage of vehicles through the realignment scheme.
- Installation new road signage.
- Prior to completion of works on the development site, the landscaping works will be carried out. These works will involve the use of plant and machinery in order to carry out tasks such as earth moving. Materials which have been stockpiled for the task will be used as much as possible, and material will only be imported where it is required. During site preparation works, where topsoil is stripped prior to excavation, this material will be retained on site for use in landscaping

4 Control Measures

4.1 Introduction

The following sections detail the minimum control measures that will be implemented prior to commencement and throughout the duration of the proposed works.

4.2 General Environmental Rules during Construction

- Report any signs of pollution or environmental damage to the site foreman no matter how small;
- Report any spills, incidents or near misses that occur on site immediately to the site foreman;
- Refuel only in designated areas with spill kits available;
- All waste must be stored in the designated site waste management areas;
- Do not throw litter, all waste must be sent to site waste management contractor;
- Do not divert plant or machinery outside the authorised working boundaries of the site;
- The Contractor will ensure ongoing compliance with the recognised Environmental Management System Standard to which it is registered (e.g. EN ISO 14001 or equivalent European Standards);
- The Contractor will develop Environmental Procedures to control the potential impacts from the construction phase of the development. These procedures will be made available in the main site office and at the main Environment, Health and Safety information points on site;
- All personnel will be familiar with the Environmental Policy which will be made available in the main Contractor office;
- An emergency contact list will be prepared and made available to all construction staff employed. The contact list will be displayed prominently on site as well as at suitable locations where construction activity is being carried out around working areas. The contact list will include key environmental representatives that may need to be contacted in the event of an incident. A 24-hour emergency phone number will be maintained for the duration of the construction works. This number will be noted on temporary signage at each works area for cable works, and at the site entrance, at a minimum.

4.3 Vegetation Clearance

Only essential areas of vegetation removal, hedgerow and tree clearance will be actioned as required to carry out the realignment and junction improvement works. All verges will be landscaped, and areas grass seeded on completion of programmed site works.

4.4 Pollution Control

4.4.1 General

Pollution control measures to prevent impacts to surface waters (the Skanagore stream runs beneath the R605 and is a tributary of the River Bandon) will be designed, installed, and maintained in accordance with CIRIA guidance for 'Environmental Good Practice on Site' (C741) and 'Control of water pollution from linear construction projects. Technical guidance' (C648) and as per the IFI guidance (2016) 'Guidelines on protection of Fisheries During Construction Works in and Adjacent to Waters'. General pollution control measures also including the scheduling of works for dry conditions to reduce the risk of run off. In the event of adverse weather events work will be halted.

Hydrocarbons

All mobile equipment required for the works (e.g. generators), will be housed in the Contractor's compound in a suitably sized bund / plant nappy so that any leaks / spills are contained. Bund specification will conform to the current best practice for oil storage such as 'Best Practice Guide BPGCS005 Oil Storage Guidelines' Enterprise Ireland.

Drip trays will be placed beneath any standing machinery to prevent discharge of oils and fuel. All waste fuels / oils, and other hazardous wastes will be disposed of in accordance with the requirements of the Waste Management Acts 1996, as amended. Spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment. Any contaminated material used to clean a spill will be correctly disposed of as a hazardous waste and brought to a licenced waste handing site by a licenced waste contractor. Welfare / hygiene facilities will be located at the Contractor's compound only. All water from wheel washes will be removed from site and disposed of in line with Waste Legislation.

Bitumen and concrete materials

A description of how bitumen and concrete will be utilised for the proposed development to prevent run-off are summarised below (concrete culvert will be a pre-cast structure delivered to site);

- No on-site batching will be permitted at the proposed works areas. Concrete will be transported to the site by concrete truck.
- Quick setting concrete mixes will be used to reduce the risk of contaminated run-off to the watercourse.
- Concrete trucks will only be washed down in a sealed mortar bin / skip which has been examined in advance for any defects. This requirement will be communicated to each concrete truck driver prior to entering into the works area.
- Where concrete pours are to take place instream (e.g., for blinding for the culvert) they will only take place within an isolated, dry, works area.

- Where the isolated working area requires constant pumping to maintain a dry works area, pumps shall be turned off during the pour, and remain off until concrete has hardening negating a run-off risk; and such that the discharge will not result in a change in pH of +/-0.5 units. This can only take place where it is confirmed that there is no flow of water through the location of the pour, and out into the watercourse downstream
- Where concrete pours are required within the watercourse, the EnCoW will regularly monitor the pH of the watercourse during concrete works. Should any change in pH +/-0.5 be detected concrete works shall immediately be ceased (handheld monitors will have maximum variance of +/- 0.1). The entry point to the watercourse will then be identified and implement appropriate measures to prevent further escape to the environment.
- It will be ensured that covers are available for freshly poured concrete to avoid wash off in the event of rain.
- Waste concrete slurry will be allowed to dry and taken to a licensed waste depot for disposal.
- Concrete works will be scheduled during dry weather conditions to reduce the elevated risk of runoff.
- NPWS and IFI will be notified immediately of any concrete spills into watercourses.

Sediment

- Prior to the works commencing, the measures prescribed in this section shall be installed to prevent the downstream transportation of surface water run off associated with vegetation clearance. This may be through the use of features like straw bales or silt booms. Monitoring of these measures to ensure their continued effectiveness will take place on an on-going basis while the works are proceeding.
- The clearance of riparian vegetation will be kept to the minimum required for the facilitation of the works such that no unnecessary exposure of riverbanks occurs.
- Works to clear vegetation to facilitate the culvert shall take place from the bank with vegetation pulled back towards the land. The vegetation removed shall be transported off site and disposed of appropriately.
- Following the vegetation clearance, a dry works area to allow for the culvert placement shall be established. The measures required to achieve this must be appropriate for the size and flow associated with the watercourse and consider the potential for increased flow due to rainfall events.
- The dry works area may be achieved by isolating the entire watercourse and over pumping the flow.
- Should pumping out of the isolated area be required to maintain the dry works area, it shall be ensured that any discharge is treated appropriately prior to entering the watercourse. This may be achieved by discharging to a treatment system such as a silt buster or similar, discharge to a silt bag, or discharging to an area of the watercourse that is protected by a silt boom. These measures shall be used in combination where ground conditions are such that just one measure is not achieving sufficient

protection. The success of these measures shall be monitored regularly by the Contractor's EnCoW as works proceed.

- Where the implementation of these measures fails, or are found to be inadequate, the Contractor will implement adapted measures (for example replacement sediment treatment system) in agreement with the Contractor's EnCoW and the Employers Representative Team.
- Any diversion or over pumping of watercourses shall be sized such that they will accommodate a 1% AEP flood event over the period in question, so as to prevent the overtopping of work areas.
- Silt fences will be placed along the banks of the stream to prevent surface-water runoff from entering the watercourse

Dust

The proposed works will result in a short-term increase in dust. The following measures will be employed in order to minimise the levels of dust on the site and its potential dispersion:

- Site roads with the potential to give rise to dust as a result of the works will be regularly watered as appropriate.
- All water used for damping of dust will be brought on to site in a tank.
- Material handling systems and material storage areas will be designed to reduce exposure to wind, which will include appropriate placing of hoarding and covering of material.
- Transport of materials with the potential to generate dust will be undertaken in tarpaulin covered vehicles.

4.5 Pollution Control

In advance of enabling works, the Contractor's ECoW will complete pre-construction confirmatory surveys of the following protected species:

1. Otter - A confirmatory otter survey will be undertaken in advance of the commencement of any works. This will incorporate an area within 150m of the works areas as per "Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes". This will allow for the identification of any holts have been established prior to commencement of works.
2. Badger - Surveys will be conducted having regard to Surveying Badgers (Harris et al.1989) and record signs of badgers including tracks, hair, latrines and setts. The extent of survey area will be defined with regard to "Guidelines for the Treatment of Badgers during the Construction of National Road Schemes" (NRA, 2006) as 150m beyond all works areas within suitable habitat.
3. Bats - Prior to felling of any trees, a confirmatory bat survey of trees to be felled will be undertaken, by a licensed qualified specialist, to assess the suitability of the tree to contain bat roosts as per "Bat Surveys for Professional Ecologists: Good Practice Guidelines2.

4. Red Squirrel - Prior to works commencing in areas of suitable habitat (woodland and scrub habitat) a targeted survey for the species will be carried out prior to any works taking place. Surveys may include observation surveys, drey counts and feeding remain searches.
5. Breeding Birds - Pre-construction confirmatory surveys will be carried out for kingfisher and other riparian breeding bird species including dipper and yellow wagtail. These will incorporate a survey area of approximately 100m upstream and downstream of the works where suitable habitat exists, which is an extensive enough survey area to include the possible zone of influence of the project. Features likely to be of note to kingfisher and other breeding riparian bird species will be recorded and watches of suitable nest areas undertaken. If actual nest sites (i.e. confirmed or presumed) are present at the culvert, the NPWS will be consulted regarding the potential requirement to stop works.

Subsequent to the pre-construction confirmatory surveys the protection measures listed in Table 4.1, where applicable, will require to be adhered too.

Table 4.1: Protected Species Protection Measures

Protected Species	Protection Measures
Otter	Should holts be identified within 150m of the proposed development the following will, at a minimum, be employed, unless otherwise agreed with the NPWS: • No works will be undertaken within 150m of holts where breeding females or cubs are present. • Works within 150m of such a holt can only take place following consultation and in agreement with the NPWS • No wheeled or tracked vehicles of any kind will be used within 20m of active but nonbreeding holts • No light work such as digging by hand or scrub will take place within 15m of such holts except under license from NPWS • The identified exclusion zones will be fenced and clearly marked on site prior to any invasive works. • All contractors on site will be made fully aware or the procedures in relation to the holts by the EnCoW
Badger	a. Prior to works commencing, sett activity at any identified setts within 150m will be confirmed. This may be confirmed through the use of camera monitoring, setting of footprint traps, soft blocking of the sett entrance or similar. Any risk of disturbance to badger will be subject to disturbance license requirements. b. A description of the setts i.e. main sett, annex sett, or outlier sett will be provided by the ECoW along with the level of activity at the sett. This will allow for an understanding of the

Badger	importance of the setts in the wider context of the local population. c. As per the Guidelines for the Treatment of Badgers during the Construction of National Road Schemes (NRA, 2006), where setts have been confirmed, no heavy machinery will be used within 30m of badger setts (unless carried out under licence from the NPWS). Lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances. d. Unless otherwise agreed, and under license from the NPWS, during the breeding season (December to June inclusive), none of the above works will be undertaken within 50m of active setts nor blasting or pile driving within 150m of active setts. An assumption that the sett is active will apply unless proven otherwise during the course of investigation. e. All identified exclusion zones as outlined above will be clearly marked out on site and communicated to all site staff prior to works commencing.
Bat	a. Trees with suitability for roosting bats will not be felled in advance of surveying for bats, unless in agreement with the ECoW, and NPWS as relevant. Trees identified with potential roost features of a Moderate to High value will be thoroughly examined, under licence from the NPWS, to ascertain the presence or absence of roosting bats. This will be conducted by an experienced bat expert. The trees will be examined for the presence or absence of bats / bat roosts immediately prior to felling. Where timing facilitates it (i.e. when felling is being undertaken during the active season for bats), emergence surveys may be carried out to confirm presence or absence of roosting bats. Where felling does not occur within one day of the examination, the trees will be re-assessed b. Where evidence of a roost, or roosting bats has been determined, a license for destruction of a roost and/or exclusion of bats will be required from the NPWS. The procedures for the exclusion of bats and destruction of roost as detailed in the license document will be obeyed, at all times, by the Contractor. c. Where bat exclusions are required, they will be undertaken in accordance with the requirements of the bat specialist. They will not be carried out unless under license from the NPWS. Where the felling of trees found to be suitable as bat roosts cannot be avoided, appropriate mitigation will be agreed with the NPWS and put in place at least one month in advance of any felling or disturbance.

Red Squirrel	• Any dreys not confirmed or likely (given sightings) to be those of red squirrel will be removed under license from NPWS. These dreys will be replaced using artificial dreys. Any additional measures outlined by the NPWS under the terms of their license will also be incorporated.
Breeding Birds	• In accordance with Section 40 of the Wildlife Acts, the removal of scrubs and trees, which may be used as nesting sites by breeding birds, will be cleared outside of the birds nesting season (1st March to 31st August inclusive).

4.6 Noise Control Measures

There will be a short-term increase in noise during the construction phase of the proposed works. The immediate area surrounding the proposed works area is considered to be agricultural grassland, however, a number of residential dwellings occur in proximity to proposed development. Noise reduction measures will be implemented during construction. These measures will comply with British Standard 5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites, which include but are not limited to:

- Construction works will be restricted to those permissible under planning consent;
- Revving of engines will be avoided and equipment will be switched off when not in use;
- Use of effective exhaust silence systems or acoustic engine covers as appropriate;
- Plant will always be used in accordance with manufacturers' instructions. Care will be taken to site equipment away from noise-sensitive areas. Where possible, loading and unloading will also be carried out away from such areas;
- Regular and effective maintenance by trained personnel will be undertaken to keep plant and equipment working to manufacturers specifications.
- Local screening will be provided where considered necessary;
- Noisy plant will be located as far as possible from noise sensitive receptors;
- Adjacent neighbours will be kept informed on the expected construction works programme;
- A person will be appointed with responsibility for maintaining noise levels within acceptable limits investigating any complaints arising and liaison with the local authority, as appropriate, in relation to noise related issues, and
- Noisy construction works will be limited and will not be undertaken outside of normal working hours.

4.7 Traffic

A Traffic Management Plan will be prepared by the appointed Contractor which conforms fully to Article 9(1) (a) (iii) and (xi) of the Planning and Development Regulations, 2001, as amended.

The Traffic Management Plan will be prepared in consultation with Galway County Council Roads Department and will provide a temporary traffic management system to maintain live traffic during road construction and identify possible road closures with traffic diversions required only for short durations during off peak hours to complete road construction tie ins as required to complete the project.

4.8 Environmental Emergency Preparedness and Response Plan

An Environmental Emergency and Response Plan (EERP) will be completed by the Contractor for inclusion in the Contractor's Method Statement which will outline details of the appropriate prevention and control measures relating to potential accidents or emergency situations. These measures will be conveyed to all staff on site during inductions, toolbox talks and method statement briefings.

These plans will detail the key personnel responsible for responding to an incident so that the relevant parties can be informed in the event of one occurring. The Environmental Incident Register will be updated by the Contractor following any incident or near miss on site and discussed with the Employers Representative at any team meetings.

The Environmental Emergency and Response Plan will address the following:

- Containment measures;
- Emergency discharge routes;
- List of appropriate equipment and clean-up materials;
- Maintenance schedule for equipment;
- Details of trained staff, location, and provision for 24-hour cover;
- Details of staff responsibilities;
- Notification procedures to inform the Employer, Environmental Protection Agency (EPA) or Environmental Department of Cork County Council;
- Audit and review schedule;
- Telephone numbers of statutory water consultees; and
- List of specialist pollution clean-up companies and their telephone numbers.

4.9 Training and Environmental Awareness Induction

The Contractor's Method Statement will detail the environmental awareness training and induction which is required to be undertaken by all staff, including sub-contractors. This will ensure that they are acutely aware of their responsibilities detailed within the CEMP and the associated sub-plans, as well as the Environmental Control Measures in place to ensure that the commitments / requirements are met throughout construction. This will ensure that during construction all personnel will exercise due diligence regarding environmental matters.

- Training of all site staff and personnel will include as a minimum;
- Induction training including environmental requirements of all operatives and subcontractors;
- More detailed training for staff or sub-contractors with specific environmental responsibilities;
- Toolbox talks will reflect the type of works being undertaken and the environmental impacts that may result from these activities e.g., training on water pollution prevention before works near watercourses. Training to be given will include the contents of this CEMP incorporating the following as appropriate:

    - Protected species/habitats;
    - Invasive species;
    - Environmental incidents;
    - Water pollution prevention;
    - Spill control and spill kits;
    - Dust and air quality;
    - Noise;
    - Erosion and sediment control; and
    - Storage and use of petrol, diesel and oils.

- Any contract specific information will be briefed to all staff and displayed on notice boards. Training records regarding any environmental training will be provided on site by the Contractor.
- Any works which require a site-specific method statement will require a toolbox talk to be provided to all personnel involved. This is to ensure that the Environmental Control Measures in place are understood and practiced.

5 Conclusion

5.1 Conclusion

This Construction Environmental Management Plan has been developed to outline the environmental principles to be adopted to ensure that potential environmental impacts associated with the construction processes are effectively prevented, managed, minimised and / or eliminated based on the information available.

This CEMP will be developed and updated by the appointed Contractor prior to the commencement of the works and in agreement with Galway County Council.

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