Natura Impact Statement

Housing Development

Claremount, Oughterard

Co. Galway

Doherty Environmental Consultants Ltd.

16th December 2021

Housing Development

Claremount, Oughterard

Natura Impact Statement in support of Appropriate Assessment

Document Stage	Document Version	Prepared by
Final	1	Pat Doherty MSc, MCIEEM

Table of Contents

1.0 INTRODUCTION

Doherty Environmental Consultants (DEC) Ltd. has been commissioned by Galway County Council to prepare a Natura Impact Statement (NIS) for a proposed 4 no. single storey, 2 bed semi-detached residential dwelling at Claremount, Oughterard, Co. Galway. The location of the project site and the proposed development are shown on Figure 1.1 and 1.2 below.

This Natura Impact Statement provides a description of the results of an examination of the project, it potential to result in adverse impacts to European Sites and the mitigation measures required to ensure that such effects are avoided. A brief screening for Appropriate Assessment is provided in the following section in advance of the Natura Impact Statement examination.

2.0 SCREENING FOR APPROPRIATE ASSESSMENT

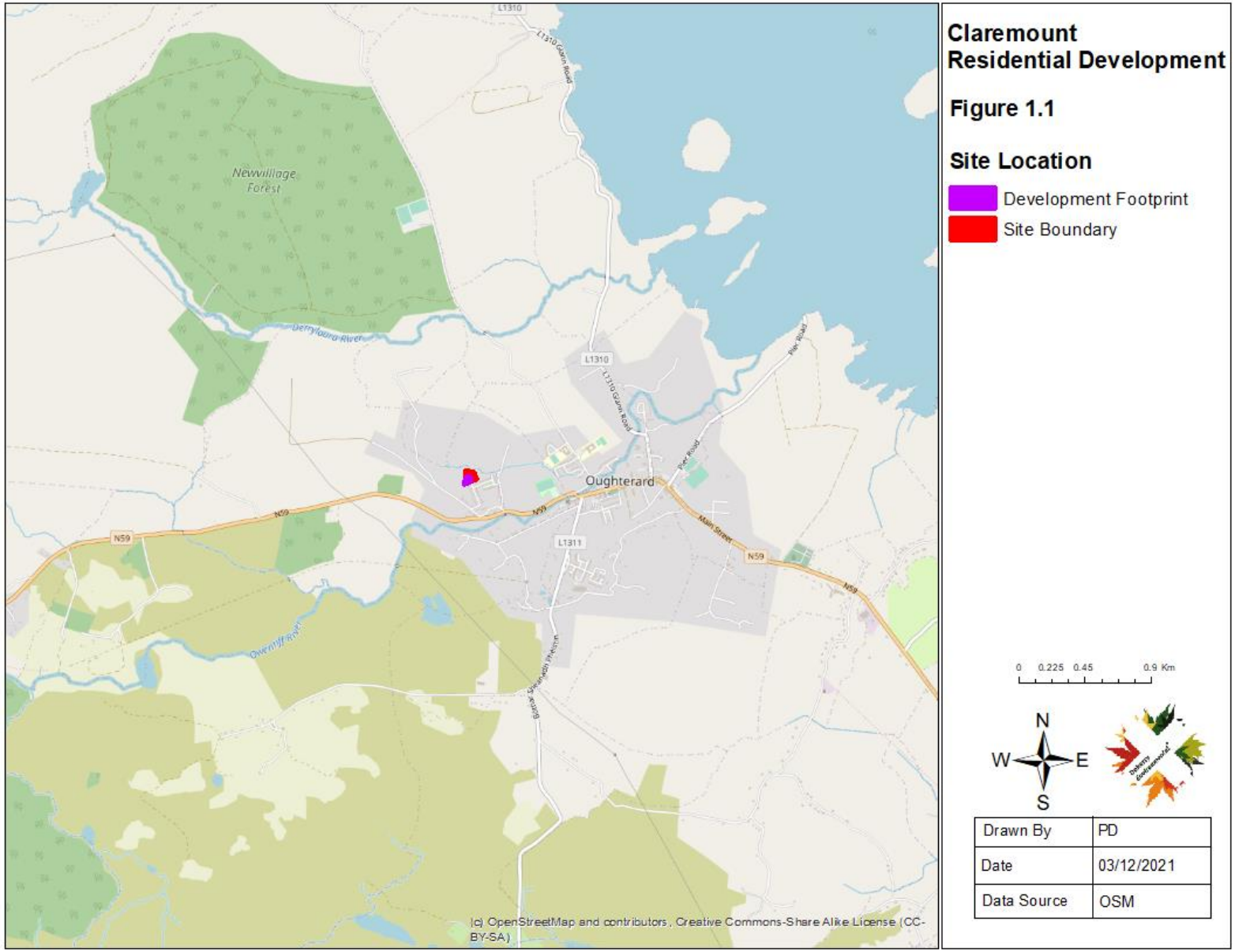
In accordance with Article 6(3) of the Habitats Directive, as transposed into Irish law by Regulation 42(1) and Part 5 of the European Communities (Birds and Natural Habitats) Regulations 2011 – 2015 (i.e. the "Habitats Regulations") and Part XAB of the Planning and Development Act, 2000 (as amended) (i.e. the "Planning and Development Act"), screening for Appropriate Assessment (AA) has been completed to examine whether it could or could not be ruled out, on the basis of objective information, that the project, either individually or in combination with other plans or projects, is likely to have a significant effect on any European Sites. The Screening for Appropriate Assessment was prepared by DEC Ltd. on behalf of Galway County Council and the results of the screening are described in this section.

The screening has relied upon the An Bord Pleanála Appropriate Assessment determination for a previous residential development that was proposed at the project site. In 2019 Galway County Council sought planning permission from ABP to undertake a housing scheme of 13 no. units at the project site. That project which was located which included the current project site as well as lands to the north and east was not located within any European Sites but was hydrologically connected to the Lough Corrib SAC by a stream, the Canrawer East Stream, that flows west to east along the northern boundary of the project site. The Lough Corrib SPA is also in proximity to the proposed works. A Natura Impact Statement (NIS) and application under Section 177AE was lodged by the Local Authority on the basis of the proposed development's likely significant effect on European sites. Planning permission was refused by An Bord Pleanála (ABP) on 12/08/2019 under planning reference P07.304339.

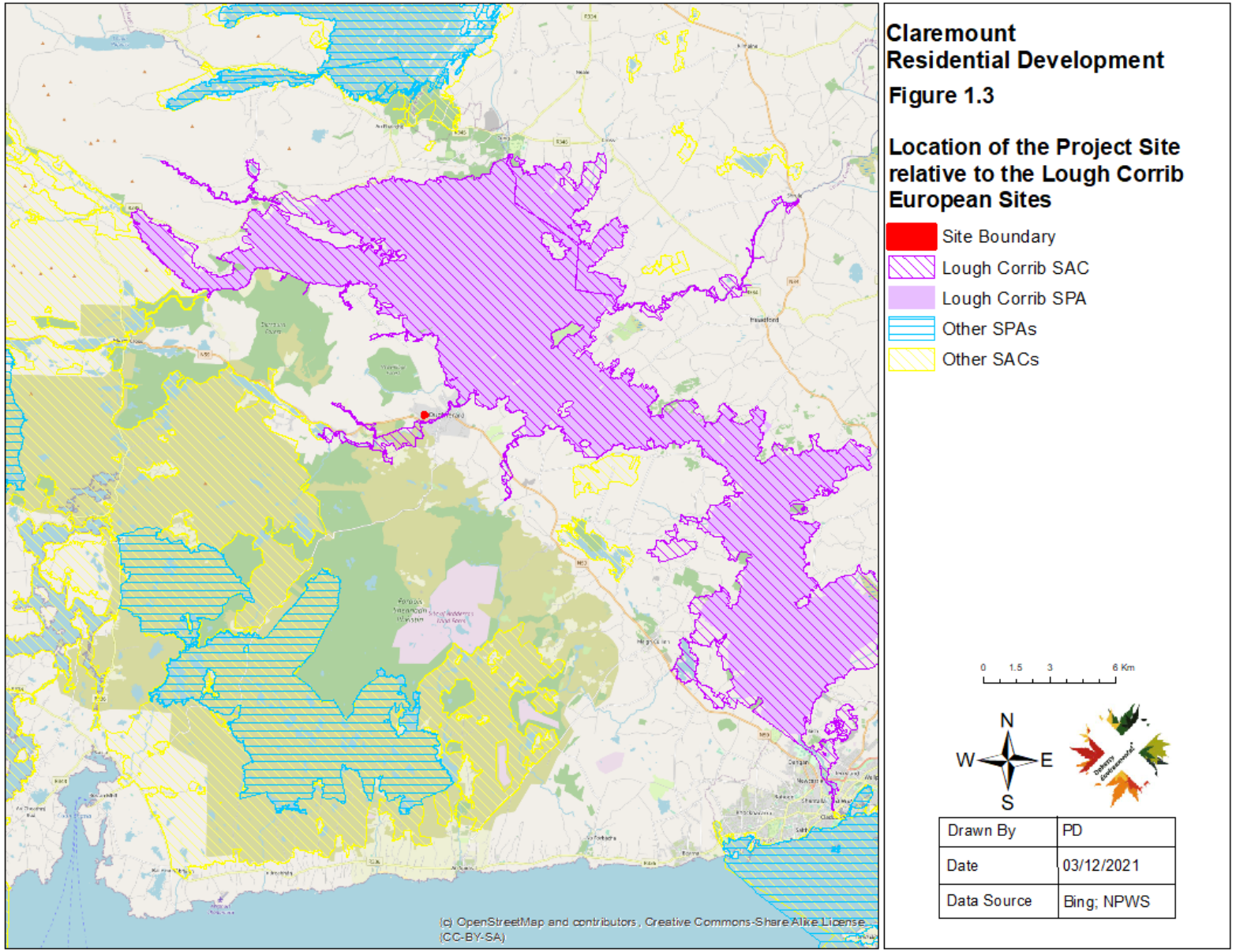
One reason for refusal of the previous planning application was that An Bord Pleanála was not satisfied that the Local Authority did not demonstrate that the proposal would not adversely affect the integrity of two European Sites, the Lough Corrib SAC (Site Code: 000297) and the Lough Corrib SPA (Site Code: 004042).

On the basis of the above concerns detailed by An Bord Pleanála for the previous planning application that comprised the existing project site as well as the proximity of the current project site to the Canrawer East Stream, which flows into the Owenriff River that is designated as part of the Lough Corrib SAC and which in turn flows into the Lough Corrib SPA, it is considered that likely significant effects to European Sites cannot be excluded at the screening stage.

On the basis of this conclusion, it is considered that AA is required in order to assess the implications of the project for those two European Sites listed above. In accordance with Section 177T of the Planning and Development Act a NIS of the project has been prepared in order to assist the competent authority in carrying out its Appropriate Assessment. This NIS provides an examination, analysis and evaluation of the likely impacts from the Project, both individually and in combination with other plans and projects, in view of best scientific knowledge and the conservation objectives of the European Sites concerned. It also prescribes appropriate mitigation to ensure that the Project will not adversely affect the integrity of those sites identified as being at risk of likely significant effects. Finally, it provides complete, precise and definitive findings, which are capable of removing all reasonable scientific doubt as to the absence of adverse effects on the integrity of the European sites concerned.


Claremount
Residential Development
Figure 1.1
Site Location
Development Footprint
Site Boundary
Newvillage Forest
Oughterard
L1310
L1311
N59
Main Street
Pier Road
0 0.225 0.45 0.9 Km
N
W
E
S
Drawn By PD
Date 03/12/2021
Data Source OSM
(c) OpenStreetMap and contributors, Creative Commons-Share Alike License (CC-BY-SA)


Claremount
Residential Development
Figure 1.2
Site Boundary
Development Footprint
Surface Water Drainage
Canrawer East Stream
0 0.005 0.01 0.02 Km
N
W
E
S
Drawn By PD
Date 03/12/2021
Data Source Bing


Claremount
Residential Development
Figure 1.3
Location of the Project Site relative to the Lough Corrib European Sites
Site Boundary
Lough Corrib SAC
Lough Corrib SPA
Other SPAs
Other SACs
0 1.5 3 6 Km
N
W
E
S
Drawn By PD
Date 03/12/2021
Data Source Bing; NPWS
(c) OpenStreetMap and contributors, Creative Commons-Share Alike License (CC-BY-SA)

2.1 GUIDANCE

This NIS has been undertaken in accordance with National and European guidance documents: Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities (DEHLG 2010) and *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites – Methodological Guidance of the Provisions of Article 6(3) and (4) of the Habitats directive 92/43/EEC.* The following guidance documents were also of relevance during this the preparation of this NIS:

- A guide for competent authorities. Environment and Heritage Service, Sept 2002. Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (2010). DEHLG.

- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – Methodological Guidance of the Provisions of Article 6(3) and (4) of the Habitats Directive 92/42/EED. European Commission (2021).

- Managing Natura 2000 Sites – The provisions of Article 6 of the Habitats directive 92/43/EEC. European commission (2018).

The information provided in this NIS is also guided by European and Irish case law guiding the approach to Stage 2 Appropriate Assessment. In particular it is noted that the consideration of impacts provided in Section 4 of this NIS has been undertaken in the absence of any regard to construction phase best practice measures and design measures that aim to safeguard the receiving environment and the Lough Corrib European Sites from potential adverse impacts.

2.1.1 Background to Habitats Directive Article 6 Assessments

The EC (2001) guidelines outline the stages involved in undertaking an assessment of a project under Article 6(3) and 6(4) of the Habitats Directive. The assessment process comprises the four stages outlined below. Stage 1 to 3 form part of the Article 6(3) process, while Stage 4 forms part of the Article 6(4) process. This NIS presents the findings of an examination, analysis and evaluation of the project to inform a Stage 2 Appropriate Assessment of the project.

- Stage 1 – Screening: This stage defines the proposed plan, establishes whether the proposed plan is necessary for the conservation management of the European Site and

assesses the likelihood of the plan to have a significant effect, alone or in combination with other plans or projects, upon a European Site.

- Stage 2 – Appropriate Assessment: If a plan or project is likely to have a significant affect an Appropriate Assessment must be undertaken. In this stage the impact of the plan or project to the Conservation Objectives of the European Site is assessed. The outcome of this assessment will establish whether the plan will have an adverse effect upon the integrity of the European Site.

- Stage 3 – Assessment of Alternative Solutions: If it is concluded that, subsequent to the implementation of mitigation measures, a plan has an adverse impact upon the integrity of a European Site it must be objectively concluded that no alternative solutions exist before the plan can proceed.

- Stage 4 – Where no alternative solutions exist and where adverse impacts remain but imperative reasons of overriding public interest (IROPI) exist for the implementation of a plan or project an assessment of compensatory measures that will effectively offset the damage to the European Site will be necessary.

2.1.1.1 Stage 2: Appropriate Assessment

The EC Guidance Assessment Criteria for a Stage Two Appropriate Assessment seeks the following information:

1. A description of the elements of the project that are likely to give rise to significant effects to European Sites;

2. The Setting out of the Conservation Objectives of the Site;

3. A description of how the project will affect key species and key habitats;

4. A description of how the integrity of the site (determined by structure and function and conservation objectives) is likely to be affected by the project (e.g. loss of habitat, disturbance, disruption, chemical changes, hydrological changes etc.);

5. A description of the mitigation measures that are to be introduced to avoid, reduce or remedy the adverse effects on the integrity of European Sites.

This NIS addresses each of these items, but prior to doing so the following sections provide a description of the project elements that require assessment as part of this NIS; a description of the lands at and surrounding the footprint of the elements of the project that require assessment as part of this NIS; and a brief description of the Lough Corrib European Sites.

2.2 SCIENTIFIC INVESTIGATIONS

A range of ecological field surveys have been completed to inform this Natura Impact Statement. These include:

Phase 1 Habitat Surveys, completed in accordance with the Heritage Councils *Best Practice Guidance for Habitat Survey and Mapping* (2010). The classification of habitats recorded during the field survey is based on the Heritage Council's *A Guide to Habitats in Ireland*.

Aquatic survey of the Canrawer East Stream. This involved the completion of a walked transect along the Canrawer East Stream between the project site and its confluence with the Owenriff River downstream. During the walkover survey the characteristics of the stream were recorded to provide an indication of the quality of the habitat, and thus its potential suitability, for salmonid fish such as a Atlantic salmon and brown trout. The descriptive terminology used in the survey is based on the Life Cycle Unit method (Kennedy, 1984) currently used by the Loughs Agency and DAERA Inland Fisheries (see also DANI advisory leaflet No 1). In summary, habitat type is recorded as:

Nursery (shallow rock/cobble riffle areas for juvenile fish - fry/parr);

Holding (deeper pools/runs for adult fish);

Spawning (shallow gravel areas for fish spawning);

Unclassified (unsuitable for fish – shallow bedrock areas or heavily modified sections of channel).

Each stretch of a particular habitat type is also graded 1 to 3, based on a series of criteria as set out in Annex 1 of the DANI advisory leaflet. In essence, this is similar to the 4-point habitat scale used by the cross-border Loughs Agency; three of fisheries interest (Nursery, Holding and Spawning) and one of non-fisheries interest (unclassified) which generally describes a substrate of fine silt, or extensive bridge invert, or engineered channel with solid bed and possibly constrained banks. This overall approach has been used by the authors for over 20

years. In addition to the above the stream bed was also searched for the presence of freshwater pearl mussels during the walked transect.

An otter survey of the Canrawer East Stream, encompassing the stretch of the stream 100m upstream of the project site and downstream to the culverted section of the Canrawer Stream to the north of Oughterard Rugby Club. A survey for field signs indicating the presence of otters or other protected non-volant mammal species such as Irish stoat and badgers was undertaken during the field surveys. This survey was undertaken during the daytime and particular attention was given to habitat features normally associated with otters. Any mammal field signs typical of otter activity were recorded during the surveys. These field signs, as described in Neal & Cheeseman (1) and Bang & Dahlstrom (2), include:

- mammal breeding and resting places, such as setts, holts, couches, lairs;
- pathways;
- prints;
- spraints and faecal deposits;
- latrines (and dung pits used as territorial markers);
- prey remains and feeding signs (snuffle holes);
- hair; and
- scratch marks.

A bat survey of the project site, encompassing static automatic monitoring at the project site for an extended period of time between the 2nd September 2021 and 10th September 2021. One

(1) Neal, E., & Cheeseman, C., (1996). 'Badgers'. Poyser Natural History, London.

(2) Bang, P., & Dahlstrom, P., 'Animal Tracks and Signs'. Oxford University Press, Oxford.

Song Meter SM4 Full Spectrum bat detector was deployed on site to monitoring bat activity continuously during the monitoring completed between these dates. The static bat detector was positioned along an existing hedgerow feature to maximise the bat activity detected during the monitoring survey. Figure 4.1 shows the location of the static bat detector. The static detector was mounted at a height of 3m above the ground along the field boundary and was set to recorded bat activity continuously throughout each night of the monitoring period, with recording commencing at 30 minutes prior to sunset and 30 minutes after sunrise.

Bat calls recorded by the SM4 Bat detectors during the automatic bat monitoring sessions were analysed using Kaleidoscope Pro (v. 5.4.1) software. Kaleidoscope automatic bat identification software was used to assign bat calls to species level. Bat calls assigned to Myotis species were grouped together under the Myotis genus.

3.0 PROJECT DESCRIPTION

The project comprises the construction of 4 no. single storey, semi-detached, 2 bed dwellings. The proposed works also include for car parking, hard and soft landscaping, site clearance works, roads, footways, public lighting, connections to existing services and all ancillary site development works.

3.1 ACCESS AND PARKING

Vehicular access to the site is provided by a single access point from the southern boundary which will ensure that the entrance is suitable for both vehicle and pedestrian users. Access to each bungalow retains the level nature for both footpath and driveway, and a minimum of one off road parking spaces are provided for each dwelling.

A turning head for commercial vehicles and refuse wagons is provided. Similarly, the end of the access road to the houses in the centre of the site also provides a potential turning point for vehicles.

3.2 FLOOD RISK ASSESSMENT

As part of the previous planning application, a Flood Risk Assessment Report was completed for the entirety of the site and concluded that the existing site is unlikely to experience flooding up to the 0.1% AEP. The proposed development would not reduce or remove storage capacity from the existing flood plain nor is it likely to increase potential flooding in any other section

of the catchment. The completed Flood Risk Assessment is included in Appendix D of the Planning Report.

3.3 FOUL DRAINAGE

The foul drainage for the development will be collected in the foul pipe network and will then discharge by gravity to the existing public foul sewer located to the south of the site in the Claremont estate. All of the pipe sizes and gradients are clearly indicated on the associated drawing 6501-JOD-XX-ZZ-DR-T-200-003 Rev D.01

A new wastewater treatment plant has been constructed on a green field site adjacent to the original wastewater treatment facility in Oughterard. The original wastewater treatment plant was first constructed in the early 1970's and catered for a population equivalent (PE) of 500. The new wastewater treatment plan has increased the current treatment capacity of the plant and facilitates for future growth in population and economic development in the area. The upgraded plant caters for a population equivalent (PE) of 2,400.

Irish Water have previously confirmed the feasibility of connection of both foul and watermain for the much larger development that was submitted for the previous planning application for 13 units.

3.4 STORM DRAINAGE

The storm water drainage system has been designed to cater for the development's hardstanding areas (including roofs, footways, roadways and car parking). The proposed storm network will discharge surface water run-off into the ground through a new soakaway. It is proposed that all storm water generated by the site will gravity flow to the proposed soakaway as shown on Drawing No. 6501-JOD-XX-ZZ-DR-T-200-003 Rev D.01.

The storm drainage for the entire development has been designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS).

The soakaway is proposed to discharge surface water run-off from the site directly into the ground.

The soakaway has been designed according to BRE Digest 365 and TII publications: Design of Soakaways.

A class 1 petrol/oil interceptor is required to be installed before the soakaway with a peak flowrate of 15l/s. A Klargester Full Retention Separator NSFA 015 or similar approved is recommended for the development.

3.5 SUDS PRINCIPLES

The key SuDS principles that influence the planning and design process, enabling SuDS to mimic natural drainage are:

- Storing runoff and releasing it slowly (soakaway)
- Harvesting and using the rain close to where it falls
- Allowing water to soak into the ground (infiltration)
- Slowly transporting (conveying) water on the surface
- Filtering out pollutants
- Allowing sediments to settle out by controlling the flow of the water

The proposed drainage scheme takes into account a number of the above listed principles through the following measures:

- The proposed soakaway stores runoff and release it slowly into the surrounding ground
- Providing public open space green areas allowing rainfall to naturally percolate into the ground
- Strategic placing of gullies to keep road surface gradients as gentle as possible to cater for the slow transporting of water on the surface
- Proposing a class 1 petrol/oil interceptor to remove pollutants from the system

Dry swales and filter drains were considered for the scheme, however, due to the size and of the development and the end use, both options were ruled out.

3.6 WATER SUPPLY

The water main has been designed in accordance with the Code of Practice for Water Infrastructure. A 50mm PE connection is to be made to the existing water main located in the

adjoining Claremont Estate as shown on drawing number 6501-JOD-XX-ZZ-DR-T-200-003 Rev D.01. A 25mm PE connection will be made to the building

Hydrants will be positioned within the site such that:

- The distance from the building is not less than 6m or more than 46m,
- The distance from a hydrant to a vehicle access road or hard-standing area for fire appliances is not more than 30m,
- They are provided on the same site as the building or are provided by a sanitary authority on a public roadway adjacent to the site.
- (as per Building Regulations 2006 Technical Guidance Document B)

The hydrants shall be capable of delivering a minimum of 35 litres per second through any single hydrant (as per Water UK – National Guidance Document on the Provision of Water for Fire Fighting), as shown on 6501-JOD-XX-ZZ-DR-T-200-003 Rev D.01.

In accordance with Irish Water standards a Water meter, Logging Device (Larson Type) and sluice valves are proposed at the connection into the proposed site. All water mains are to be commissioned and pressure tested to Irish Water Standards. The typical connection details and meter details are shown revision 4 of Irish Water standard details.

3.7 LIGHTING

A total of two 6m lighting columns will be provided at the south of the site along the proposed access road to the site. The lighting to be used will adhere to the best practice lighting standards provided in the Institute of Lighting Professionals (ILP) guidance document *Guidance Note 08/18 – Bats and Artificial Lighting in the UK (2018).*

3.8 LANDSCAPING

As part of the project it is provided to provide additional native woodland habitat on site. The existing hedgerow and scrub habitats occurring at the project site will be retained. The principal purpose of the new landscaping to be provided as part of the proposed development will be for biodiversity enhancement through the provision of foraging habitat for invertebrates, bats and birds. The existing hedgerow along the northern boundary of the project site will be augmented with additional woodland planting to the south of the existing hedgerow so that are larger

woodland polygon area is provided at the north of the site. A second east to west orientated linear woodland habitat will be provided to the north of the proposed development footprint and this will be connected to the northern boundary woodland habitat via new native hedgerows to be provided along the eastern and western boundary of the project site. The extent of the additional landscape planting, as well as the hedgerows and scrub to be retained, is shown on Figure 3.1 below. The landscape occurring between these woodland features will be managed as semi-natural grassland or scrub habitat. Once established this area of the site will represent an area of semi-natural habitat that will provide suitable habitat for a range of species including bats (and lesser horseshoe bats), birds, non-volant mammals and invertebrates.


Claremount
Residential Development
Figure 3.1
Biodiversity Landscaping
Biodiversity Hedgerows
Semi-Natural Habitat
Existing Hedgerows WL1
Existing Scrub WS1
Site Boundary
Development Footprint
0 0.004750.0095 0.019 Km
N
W
E
S
Drawn By PD
Date 03/12/2021
Data Source Bing

4.0 BASELINE DESCRIPTIONS

4.1 OVERVIEW OF THE PROJECT SITE

The site area is 0.622 hectares and is located within the settlement boundary of Oughterard. The general site location is identified in Figure 1.1 above and an aerial image of the site is provided as Figure 1.2**.** The ITM co-ordinates of the site are 511080, 742882.

Levels fall across the site from south-west to north east by approximately 8.5m over a distance of 100m. There is an existing agricultural gate and access track which traverses the site from the southern boundary to the north of the site where there is a stream that lies immediately to the north.

The site is bounded to the north, west and east by agricultural lands, while existing residential dwelling are located immediately to the south of the project site.

The project site is located within the Corrib Catchment Hydrometric Area 30 and the Owenriff (Corrib)_020_sub-catchment. Water quality of the Owenriff River is monitored by the EPA at four monitoring points within and in the vicinity of Oughterard. The water quality result from this monitoring in 2018 and 2019 indicate that the water quality of the Owenriff River is good to high Q4 – Q4-5. The Owenriff (Corrib)_020_sub-catchment is classified as "at risk" under the Water Framework Directive.

The project site is located within the Maam-Clonbur groundwater catchment. This groundwater body is classified as "not at risk" under the Water Framework Directive.

The project site is underlain by Dolomitic limestone and shale bedrock while the quaternary sediments are comprised of till derived from granites. Groundwater vulnerability is classed as Extreme E. The Maam Clonbur groundwater body report notes that groundwater flow paths are likely to be short (30 – 300m) with groundwater discharging rapidly to nearby streams and small springs.

4.2 HABITATS OCCURRING WITHIN THE PROJECT SITE

The habitats occurring within the project site are shown on Figure 4.1 Habitat Map. The site is dominated by a mosaic of dense bracken and bramble scrub that occur to the west and east of a grassy verge access path that leads to the north of the project site. A stand of lesser knotweed (*Persicaria campanulata*) occurs in the stand of dense bracken towards the southwest of the project site. the indicative location of this stand is shown on Figure 4.1. Lesser knotweed is a

non-native species, that is endemic to the Himalayan region of Asia. Unlike other non-native "knotweed" species, Lesser Knotweed currently is not listed as an invasive species in Ireland. However it has been identified as an invasive species in Connemara National Park However where it establishes it dominates the cover and excludes other native species from the sward. The stand occurring at the project site is an example of this. It has been identified as a pest/weed in other jurisdictions. Like Japanese Knotweed, Lesser knotweed spreads rhizomously and can become a vigorous coloniser, forming dense patches and suppressing other native plant species.

The scrub habitat occurring within the project site is dominated by small stands of immature willows and individual willow trees such as the patch of scrub to the east of the grassy verge access track. Hedgerows occur along the southern and northern boundary of the project site. These include willows, hazel, hawthorn and blackthorn. Ash is also present in the hedgerows. A conifer treeline occurs along the eastern boundary of the project site

There are no structures or trees occurring within the project site that have potential to function as roost sites for bats. There is only one tree occurring within the proposed development footprint. This is a willow tree with no potential to function as a roost site for bats.

The habitats occurring within the project site are all representative of habitats of low to local nature conservation value.

4.3 CANRAWER EAST STREAM

This small stream is sourced from a short distance to the north of the project site. The channel of the upper stream is narrow (<1m). Adjacent to and immediately downstream of the project site the stream is at its widest as it falls over relatively flat ground with shallow banks to the north and south. Here the width is approximately 1.5m. The stream's substrate is mainly comprised of bedrock, cobble and gravels. Patches of clay and fine sandy sediment occur downstream, but these are isolated with the former substrate of bedrock, cobble and gravels dominating. There is unrestricted livestock access to the stream at a number of points along the stream and signs of cattle access and poaching along the stream bank was noted. There are no steep falls along the section of the stream downstream of the project site to a culvert that is located to the north of Oughterard Rugby club. There are impediment to water flow along the section of the stream upstream of the culvert. This includes a wire fence crossing the stream that is holding back vegetation and leading to the build-up of debris upstream of the fence. Further upstream there are some localised artificial channelised section occurring along the stream that may be associated with historical uses of the stream waters. The culvert is situated

at ITM grid reference 511629 742928. The EPA national rivers and streams shapefile shows the stream flowing to the south/southeast of this grid reference. However it is not the case on the ground and the stream enters the culvert at the above point and flows into the culvert heading in an east/north-easterly direction towards Carrowmanagh. A ditch is located to the south/southeast of the stream culvert, along the EPA route of the watercourse, but this did not convey the stream during field surveys completed during September and November 2021. The Canrawer East Stream merges with the Owenriff River to the east of Carrowmanagh Park. The verges of the public road leading north from the Owenriff River to Carrowmanagh Park as well as the verges of the public residential estate roads were searched for the culvert outfall of the Canrawer East Stream upstream of the Owenriff River, but no such outfall was identified on the ground in the vicinity of these roads. Based on this it is considered that a long culverted section occurs along downstream section of the Canrawer East Stream between the above grid reference and its outfall into the Owenriff River.

Along the majority of the section of the stream downstream from the project site the stream depths range from 50mm to 25mm and a shallow gradient of <8% occurs along this stretch of the stream. The substrate as noted above is dominated by stable cobble with high proportion of the channel substrate comprised of bedrock. These features are indicative of Grade 1 nursery habitat which is representative of good nursery habitat.

Overall, this stream has good habitat potential to support resident salmonids. The presence of a culverted section of the stream under Carrowmanagh may detract from the overall good habitat potential provided along the stream.

During the walkover no freshwater pearl mussels were observed along the stream.

4.4 OTTER & NON-VOLANT MAMMAL SURVEY RESULTS

No field signs indicating the presence of otters were recorded during the walked transect along the Canrawer Stream from approximately 100m upstream of the project site to the culvert downstream at Carrowmanagh. No holts or couches were observed along this stretch of the stream. It is likely that the small culvert into which the stream flows at Carrowmanagh limits the use of the stream as a foraging habitat and commuting corridor by otters.

No breeding or resting places for badgers occur within the project site and no field signs indicating the presence of badgers or other protected non-volant mammal species were recorded at the project site.

4.5 BAT SURVEY RESULTS

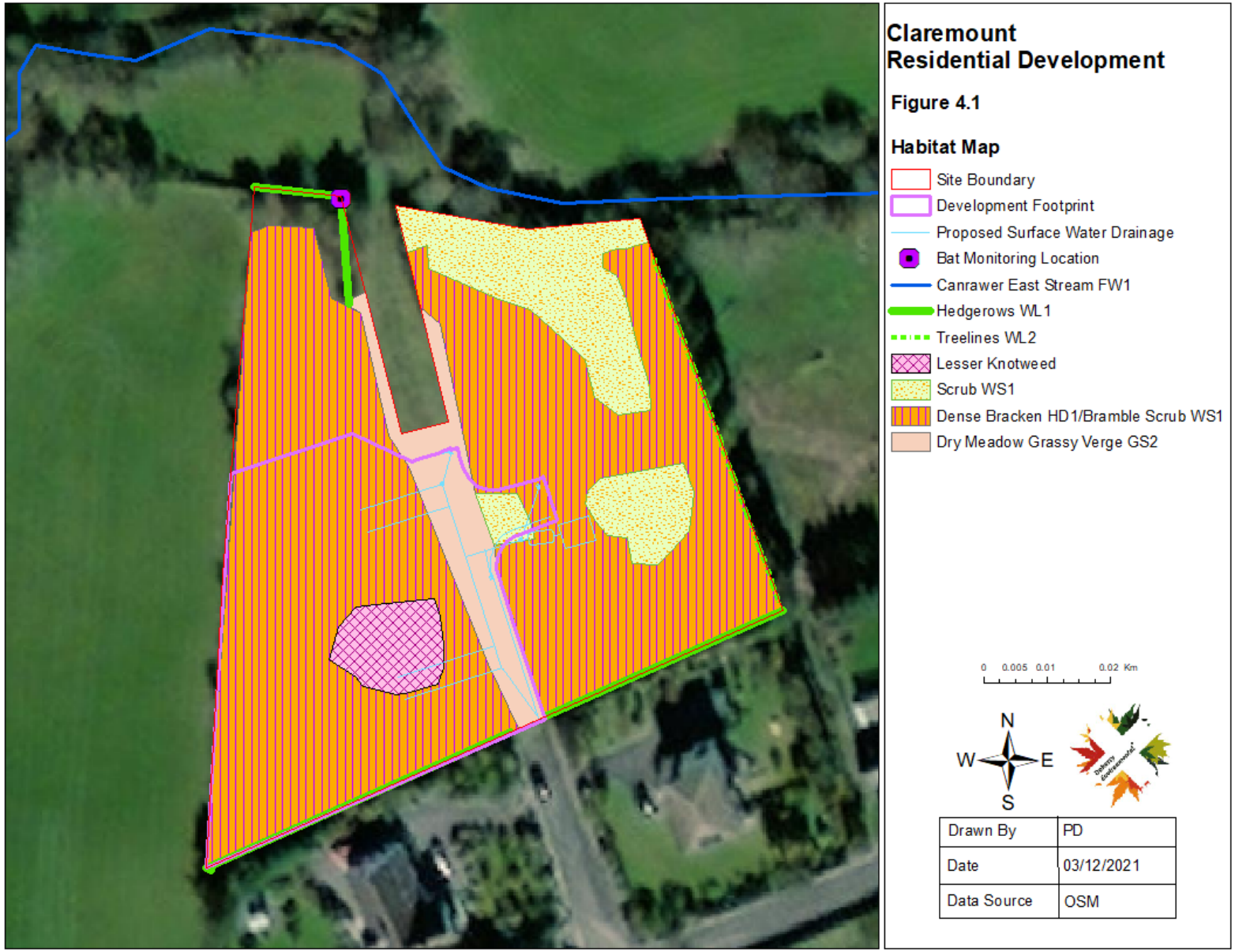
A total of six species of bats were recorded during the bat monitoring completed at the project site. These are Myotis species, Leisler's bat, Common pipistrelle, Soprano pipistrelle, brown long-eared bat and lesser horseshoe bats. The results of the bat monitoring is provided below as Table 4.1. Myotis species, Leisler's bat, brown long-eared bat and lesser horseshoe bats were all recorded in very low numbers while Common pipistrelle was also recorded overall in low numbers. Activity during the monitoring was overwhelmingly dominated by Soprano pipistrelle.

The results of the bat survey completed at the project site are similar to those recently completed in the spring of 2021 for proposed development site to the east of the school at Carrowmanagh (Planning Ref. No. 211530). During surveys completed at this site Soprano pipistrelle were the overwhelming dominant species, while lesser horseshoe bats were not found to be reliant on the area (again with only 1 pass for lesser horseshoe bats recorded during 10 consecutive nights of monitoring.

The results of the surveys at the project site and those from the site to the east of the project site in the spring of 2021 indicate that lesser horseshoe bats do not rely on the project site or the area surrounding the project site and that Soprano pipistrelle is the dominant species occurring at and surrounding the project site.

Table 4.1: Results of Bat Monitoring at the Project Site

Date	MyoSpp	NYCELI	PIPPIP	PIPPYG	PLEAUR	RHIHIP	Total/Night
20210902	0	0	0	0	0	0	0
20210903	0	0	0	4	2	0	6
20210904	0	0	0	0	0	0	0
20210905	0	1	38	420	2	0	461
20210906	0	0	8	237	0	0	245
20210907	2	0	0	24	0	1	27
20210908	3	0	19	207	4	0	233
20210909	0	0	7	193	0	0	200
20210910	0	0	0	2	0	0	2
Total/Species	5	1	72	1087	8	1	


Claremount
Residential Development
Figure 4.1
Habitat Map
Site Boundary
Development Footprint
Proposed Surface Water Drainage
Bat Monitoring Location
Canrawer East Stream FW1
Hedgerows WL1
Treelines WL2
Lesser Knotweed
Scrub WS1
Dense Bracken HD1/Bramble Scrub WS1
Dry Meadow Grassy Verge GS2
0 0.005 0.01 0.02 Km
N
W
E
S
Drawn By PD
Date 03/12/2021
Data Source OSM

4.5.1 Non-native invasive species

As noted above an infestation of lesser knotweed has been identified on site in an area indicated on Figure 4.1 above.

4.6 DESCRIPTION OF THE LOUGH CORRIB EUROPEAN SITES

4.6.1 Lough Corrib SAC

4.6.1.1 Qualifying Features of Interest

The Lough Corrib SAC is designated for a range of Annex 1 habitats that include lotic, lacustrine, woodland, grassland and peatland habitats, as well as freshwater Annex 2 species. The qualifying features of interest of this SAC are outlined in Table 4.1 and those qualifying features of interest that were identified as occurring within the zone of influence of the project during the screening exercise are also identified in Table 4.1. The identification of features of interest of the SAC within the zone of influence of the project is informed by the site-specific conservation objectives published for the SAC and particularly the distribution maps for these features. The Article 17 mapping datasets for these qualifying features of interest have also been reviewed to identify the presence or absence of these features of interest downstream from the project site.

Table 4.2: Qualifying Features of Interest of the Lough Corrib SAC

Qualifying habitats/Qualifying Species Type	Qualifying feature of interest	Within/Outside the zone of influence of the project
Lacustrine	Oligotrophic Isoetid lake habitat 3110	This habitat is not mapped as occurring downstream from the project site by the NPWS site-specific conservation objectives publication for the Lough Corrib SAC. Nor is it mapped as occurring at Lough Corrib downstream from the project site as part of the Article 17 Report mapping of this habitat. As such it is not considered to occur within the zone of influence of the project and is not considered further as part of this Natura Impact Statement.
	Mixed Najas lake habitat 3130	This habitat occurs at Lough Corrib downstream from the project site. There is a hydrological pathway connecting the project site to this lake habitat. As such it is considered to occur within the zone of influence of the project.
	Hardwater lakes 3140	This habitat occurs at Lough Corrib downstream from the project site. There is a hydrological pathway connecting the project site to this lake habitat. As such it is considered to occur within the zone of influence of the project.

Qualifying habitats/Qualifying Species Type	Qualifying feature of interest	Within/Outside the zone of influence of the project
Lotic	Vegetation of flowing waters 3260	The extent of this habitat is not mapped as part of the site-specific conservation objective for the Lough Corrib SAC and the Owenriff River downstream of the project site has the potential to support examples of this habitat. Given the hydrological pathway between the project site and the Owenriff River this habitat is considered to occur within the zone of influence of the project.
Grassland	Molinia meadows 6410	No examples of this habitat occur within the vicinity of the project site and there are no pathways connecting the project site to this qualifying habitat. It is considered to lie outside the zone of influence of the project.
	Orchid-rich grassland 6210	
Peatland	Active raised bog 7110	No examples of this habitat occur within the vicinity of the project site and there are no pathways connecting the project site to this qualifying habitat. It is considered to lie outside the zone of influence of the project.
	Degraded raised bog 7120	No examples of this habitat occur within the vicinity of the project site and there are no pathways connecting the project site to this qualifying habitat. It is considered to lie outside the zone of influence of the project.
	Calcareous fen 7210	No examples of this habitat occur within the vicinity of the project site and there are no pathways connecting the project site to this qualifying habitat. It is considered to lie outside the zone of influence of the project.
	Alkaline fen 7230	No examples of this habitat occur within the vicinity of the project site and there are no pathways connecting the project site to this qualifying habitat. It is considered to lie outside the zone of influence of the project.
Woodland	Bog woodland 91D0	No examples of this habitat occur within the vicinity of the project site and there are no pathways connecting the project site to this qualifying habitat. It is considered to lie outside the zone of influence of the project.
	Old oak woodland 91A0	No examples of this habitat occur within the vicinity of the project site and there are no pathways connecting the project site to this qualifying habitat. It is considered to lie outside the zone of influence of the project.
Exposed Rock	Limestone pavement	No examples of this habitat occur within the vicinity of the project site and there are no pathways connecting the project site to this qualifying habitat. It is considered to lie outside the zone of influence of the project.

Qualifying habitats/Qualifying Species Type	Qualifying feature of interest	Within/Outside the zone of influence of the project
Groundwater	Petrifying springs with tufa formation (Cratoneurion)	This qualifying habitat was identified as lying outside the zone of influence of the project and was screened out during the screening exercise
Freshwater & Terrestrial Species	Margaritifera durrovensis	The results of the walked transect survey along the Canrawer East Stream to the north of the project site and downstream to the culvert at Carrowmanagh did not indicate the presence of freshwater pearl mussel along this stream. However the section of the Owenriff River at its confluence with the Canrawer East Stream supports populations of freshwater pearl mussel. As such there is a hydrological pathway between the project site and populations of this species and it is considered to occur within the zone of influence of the project.
	Austropotamobius pallipes (White-clawed Crayfish)	Lough Corrib is known to support populations of white-clawed crayfish. While the nearest mapped location for this species is located at a remote distance from the project site, circa 12.5km to the east, the presence of suitable habitat downstream within Lough Corrib and the presence of a hydrological pathway connecting the project site to such suitable habitat, this species is considered to occur within the zone of influence of the project.
	Petromyzon marinus (Sea Lamprey)	The Canrawer East Stream support suitable spawning habitat for sea lamprey. In light of this and the presence of a hydrological pathway between the project site and the Owenriff River and Lough Corrib, both of which support populations of sea Lamprey this species is considered to occur within the zone of influence of the project.
	Lampetra planeri (Brook Lamprey)	The Canrawer East Stream support suitable habitat for brook lamprey. In light of this and the presence of a hydrological pathway between the project site and the Owenriff River and Lough Corrib, both of which support populations of Brook Lamprey this species is considered to occur within the zone of influence of the project.
	Salmo salar (Salmon)	The Canrawer East Stream support suitable nursery habitat for salmonids including Atlantic salmon. In light of this and the presence of a hydrological pathway between the project site and the Owenriff River and Lough Corrib, both of which support populations of Atlantic salmon this species is considered to occur within the zone of influence of the project.
	Lutra (Otter)	While not otters were found to rely on the Canrawer East Stream that flows to the north of the project site and the proposed development footprint, this species is known to rely upon the Owenriff River and Lough Corrib downstream of the project site for foraging, breeding and resting. Given the presence of a hydrological pathway connecting the project site to this species, it is considered to occur within the zone of influence of the project.
	Lesser horseshoe bats	The project site is not located within the 2.5km core sustenance zone of the lesser horseshoe bat roosts that have been designated as part of this SAC. These roost sites are located over 10km from the project site.

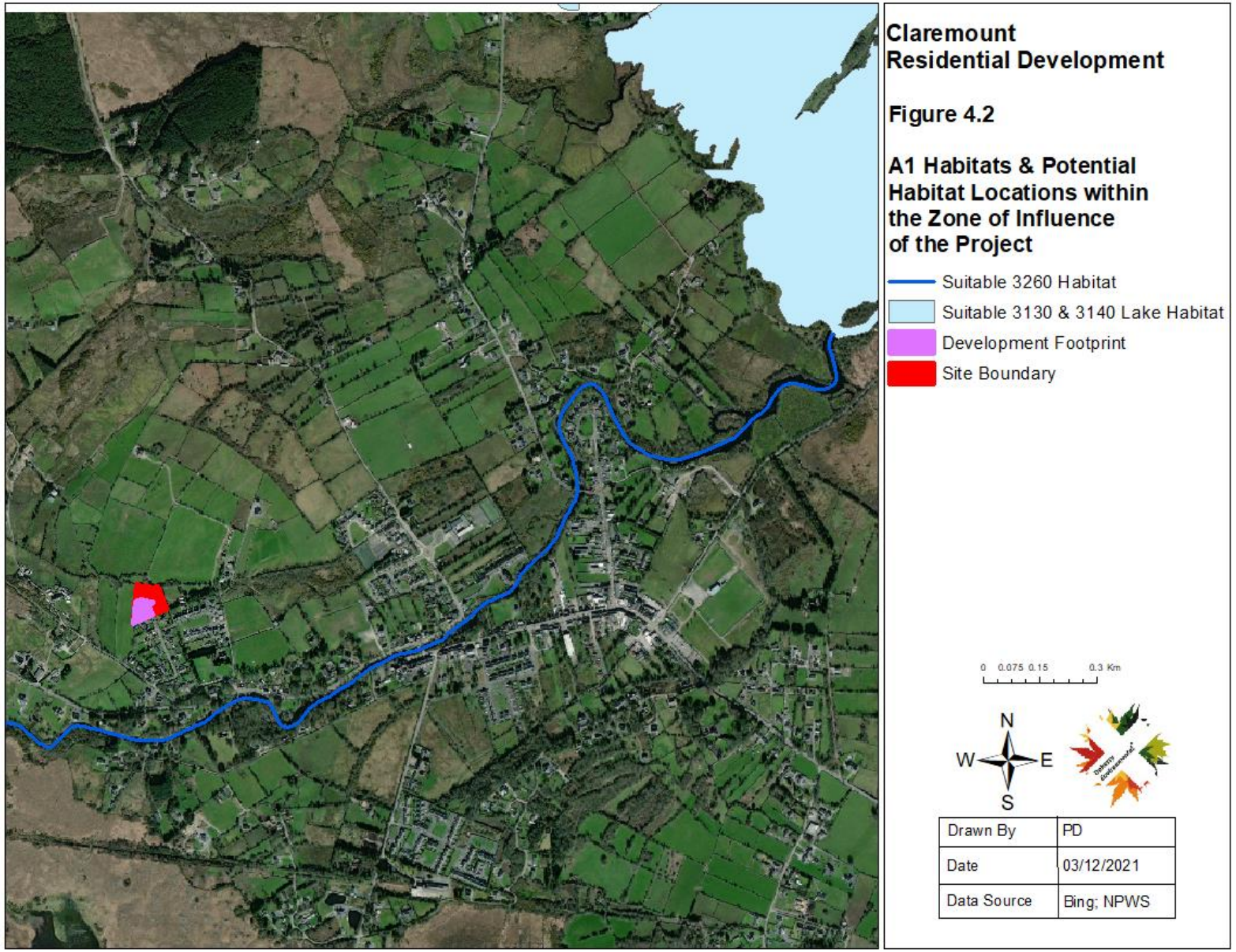
Qualifying habitats/Qualifying Species Type	Qualifying feature of interest	Within/Outside the zone of influence of the project
		Nevertheless the project site is located within the known distribution range for this species and in the event that this species was to rely upon the project site it would then occur within the zone of influence of the project. The baseline surveys completed at the project site have shown that lesser horseshoe bats do not rely on the project site, with only one call of lesser horseshoe bat recorded during monitoring over 8 consecutive nights in September. Similar results were also gathered for lesser horseshoe bats during field surveys for a separate planning application (Planning Reference no. 211530) at a site located approximately 900m to the east of the project site. These results indicate that lesser horseshoe bats do not rely on the lands at the project site and surround the wider Carrowmanagh area to the east of the project site. The project site does not provide any potential roost habitat for lesser horseshoe bats and lands occurring within the proposed development footprint do not provide optimum foraging habitat for this species, which relies mainly upon deciduous woodland and wetland habitats for foraging. The project will result in the provision of two lighting columns. The lighting to be provided for these columns will be designed to the specifications outlined in the ILP 2018 guidelines as noted in Section 3.7 above. The lighting will not result in the spill of lighting onto any habitats that are traditionally used by lesser horseshoe bats (e.g. woodland habitats). Furthermore given the absence of any reliance on the project site by this species the proposed lighting will not have the potential to result in disturbance to lesser horseshoe bats. Given the absence of reliance of this species on the project site for foraging; the absence of optimum foraging habitat within the proposed development footprint; the absence of any potential roosting habitat for lesser horseshoe bats within the project site; the location of the project site well outside the core sustenance zone of the lesser horseshoe bat roosts that are the primary reason for the inclusion of this species as a qualifying feature of interest of the SAC; it is considered that the project will not have the potential to influence the conservation status of the populations of lesser horseshoe bats supported by this SAC and as such this qualifying species lies outside the zone of influence of the project. It is also noted that the biodiversity enhancement landscape planting that will be implemented to provide woodland habitats on site will, once established provide suitable foraging habitat for lesser horseshoe bats and will have the potential to result in positive impacts for this species by increasing the extent of suitable foraging habitat within its national distribution range.

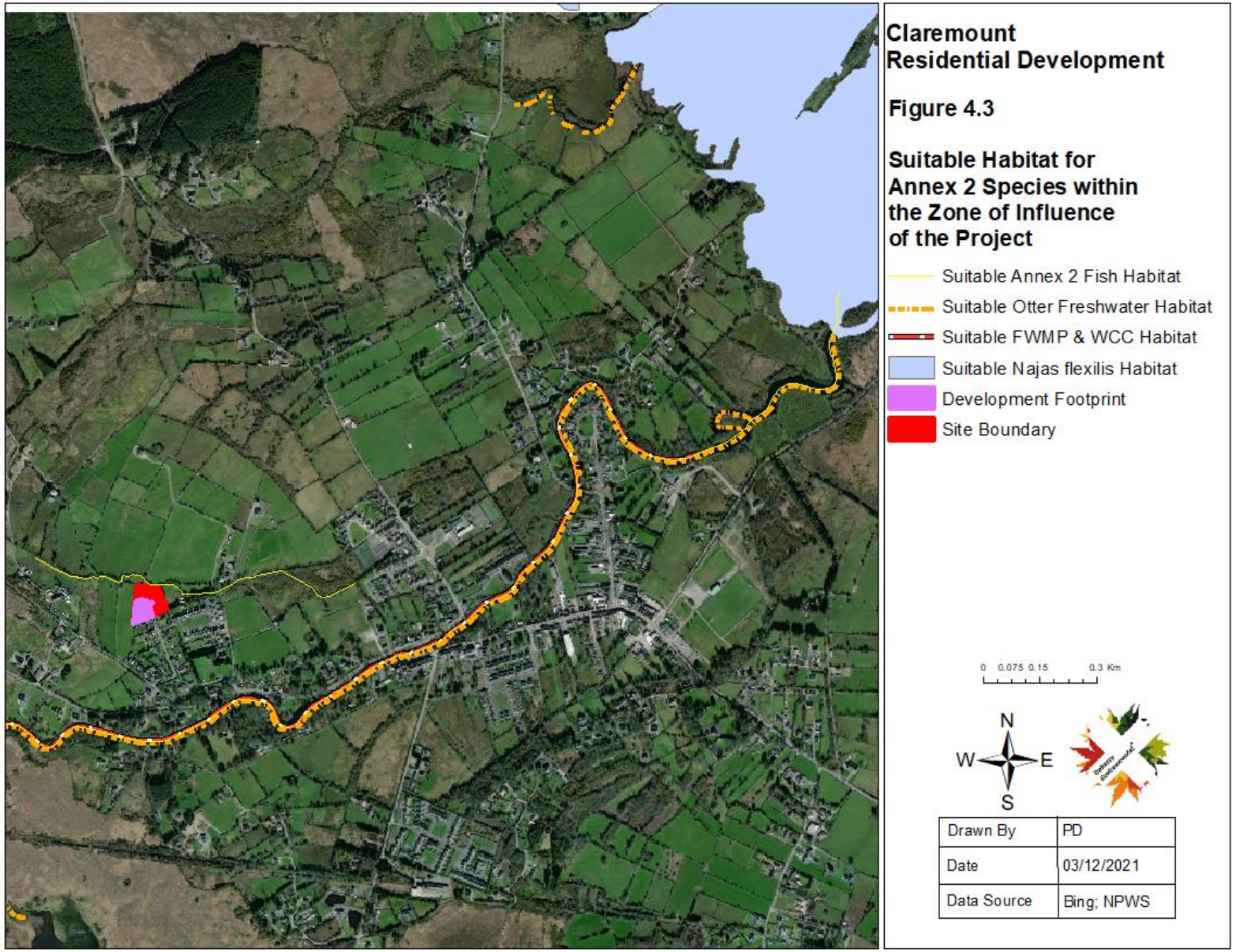
Qualifying habitats/Qualifying Species Type	Qualifying feature of interest	Within/Outside the zone of influence of the project
	Najas flexilis	This qualifying species was identified as occurring within the zone of influence of the project and was screened in during the screening exercise
	Hamatocaulis vernicosus	There are no habitats with potential to support this species within or in the wider vicinity of the project and there are no pathways connecting the project to habitats with potential to support this species. The location of the known area that supports this species is remote from the project site, circa 12.5km to the east of the project site. In light of the above this species is considered to lie outside the zone of influence of the project.

Following on from Table 4.2 above the following qualifying features of interest of the Lough Corrib SAC have been identified as occurring within the zone of influence of the project:

- Mixed Najas lake habitat;
- Hardwater lake habitat
- Vegetation of flowing waters
- Freshwater pearl mussel
- White-clawed crayfish
- Sea lamprey
- Brook lamprey
- Atlantic salmon
- Otter; and
- Najas flexilis

Figure 4.2 below shows the location of the two lake habitats listed above with respect to the project site. The location of potential vegetation of flowing waters along the Owenriff River, as considered for this Natura Impact Statement, is also shown on Figure 4.2. The location of suitable habitat for the Annex 2 species listed above are shown on Figure 4.3.


Claremount
Residential Development
Figure 4.2
A1 Habitats & Potential Habitat Locations within the Zone of Influence of the Project
Suitable 3260 Habitat
Suitable 3130 & 3140 Lake Habitat
Development Footprint
Site Boundary
0 0.075 0.15 0.3 Km
N
W
E
S
Drawn By PD
Date 03/12/2021
Data Source Bing; NPWS


Claremount
Residential Development
Figure 4.3
Suitable Habitat for
Annex 2 Species within
the Zone of Influence
of the Project
Suitable Annex 2 Fish Habitat
Suitable Otter Freshwater Habitat
Suitable FWMP & WCC Habitat
Suitable Najas flexilis Habitat
Development Footprint
Site Boundary
0 0.075 0.15 0.3 Km
N
W
E
S
Drawn By PD
Date 03/12/2021
Data Source Bing; NPWS

4.6.1.2 Threats & Pressures

The following site-specific threats and pressures for the Lough Corrib SAC have been identified by the NPWS in their Natura 2000 Data Return form for the SAC:

Fertilisation

Diffuse pollution to surface water s due to household sewage and wastewaters

Infilling of ditches, dykes, ponds, marshes, or pits

Forest planting on open ground

Dispersed habitation

Other human induced changes in hydraulic condition

Removal of hedges and copses or scrub

Agricultural intensification

Disposal of household/recreational facility waste

Sand and gravel extraction

Other human intrusions and disturbances

Roads, paths and railroads

Piers/tourist harbours or recreational piers

Mechanical removal of peat

Continuous urbanisation

Invasive non-native species

Abandonment of pastoral systems, lack of grazing.

4.6.2 Lough Corrib SPA

Lough Corrib SPA is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species:

Greenland White-fronted Goose,

Gadwall,

Shoveler,

Pochard,

Tufted Duck,

Common Scoter,

Hen Harrier,

Coot,

Golden Plover,

Black-Headed Gull,

Common Gull,

Common Tern;

Arctic Tern.

The site is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetlands & Waterbirds.

The project site does not provide suitable habitat for any of the special conservation interest wetland bird species listed above (these include all species listed above with the exception of hen harrier). The SPA is designated for its role in supporting a winter roost site for hen harrier. The project site does not provide any suitable habitat for winter roosting hen harrier and also provides no suitable habitat for breeding hen harrier.

While the project site does not have the potential to support the special conservation interest bird species of the SPA there is a hydrological pathway between the project site and the wetland habitats of Lough Corrib SPA that support the wetland bird species listed above. As such these wetland bird species and their associated wetland habitats, as well as other waterbirds are considered to lie within the zone of influence of the project.

4.6.2.1 Threats & Pressures

The following site-specific threats and pressures for the Lough Corrib SPA have been identified by the NPWS in their Natura 2000 Data Return form for the SPA:

Urbanised areas, human habitation

Leisure fishing

Nautical sports

Grazing

Fertilisation

Sylviculture, forestry

Hunting

4.7 CONSERVATION OBJECTIVES

4.7.1 Generic Conservation Objectives

Generic conservation objectives have been published for the Lough Corrib European Sites. The generic conservation objectives for these European Sites is to maintain and/or restore the favourable conservation condition of the qualifying habitats and qualifying species for which these sites have been designated.

Favourable conservation status of wetland habitats is achieved when:

- its natural range, and area it covers within that range, are stable or increasing
- the conservation status of its typical species is favourable

The favourable conservation status of these species will be achieved 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 populations on a long-term basis

The generic conservation objectives for Lough Corrib SAC seek to **maintain** favourable conservation condition of vegetation of flowing waters; white-clawed crayfish; otter; Atlantic salmon; and brook lamprey; and **restore** the favourable conservation condition of mixed Najas lake habitat; hardwater lake habitat; freshwater pearl mussel, sea lamprey and Najas flexilis.

The generic conservation objectives for Lough Corrib SPA seek to **maintain or restore** the favourable conservation condition of the bird species listed as special conservation interests for this SPA.

4.7.2 Site-Specific Conservation Objectives

Site-specific Conservation Objectives (SSCOs) have been published by the NPWS for the Lough Corrib SAC (NPWS, 2017). The SSCOs for the qualifying features of interest of the Lough Corrib SAC occurring within the zone of influence of the project are outlined in Table 4.3 below.

No SSCOs have been published for the Lough Corrib SAC. In order to assess the project against detailed Conservation Objectives, the published Conservation Objectives for other wetland bird species, wintering and breeding in Ireland were used. Conservation Objectives for Cork Harbour SPA were selected to be used as part of this assessment. These conservation objectives were selected as this SPA is also designated for a range of overwintering wetland bird species as well as breeding tern species. These conservation objectives are listed in Table 4.3 below.

Table 4.3: Site-Specific Conservation Objectives for the Lough Corrib SAC Qualifying Species occurring within the Zone of Influence of the Project

Qualifying Feature	Attribute	Target
Freshwater pearl mussels	Distribution	Maintain at 15.5km
	Population size	Restore to 5,000 adult mussels
	Population structure: recruitment	Restore to least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length.
	Population structure: adult mortality	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution.
	Habitat extent	Restore suitable habitat in more than 15.5km and any additional stretches necessary for salmonid spawning
	Water quality: macroinvertebrate and phytobenthos (diatoms)	Restore water quality- macroinvertebrates: EQR greater than 0.90; phytobenthos: EQR greater than 0.93.
	Substratum quality: filamentous algae (macroalgae), macrophytes (rooted higher plants)	Restore substratum quality- filamentous algae: absent or trace (<5%); macrophytes: absent or trace (<5%).
	Substratum quality: sediment	Restore substratum quality- stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment.
	Substratum quality: oxygen availability	Restore to no more than 20% decline from water column to 5cm depth in substrate.
	Hydrological regime: flow variability	Restore appropriate hydrological regimes.
	Host fish	Maintain sufficient juvenile salmonids to host glochidial larvae.
Lamprey species	Distribution (extent of anadromy for sea lamprey) &/or barriers to movement	Access to all watercourses down to first order streams for river lamprey. Greater than 75% of main stem length of rivers accessible from the estuary.
	Population structure of juveniles	At least three age/size groups present
	Juvenile density in fine sediment	Mean catchment juvenile density of at least $2/m^2$ for brook lamprey and $1/m^2$ for sea lamprey
	Extent and distribution of spawning habitat	No decline in distribution and extent of spawning beds.
	Availability of juvenile habitat	More than 50% of sample sites positive
White-clawed crayfish	Distribution: rivers	No reduction from baseline.
	Distribution: Lough Gill	No reduction from baseline.
	Population structure: recruitment	Juveniles and/or females with eggs in all occupied tributaries and occupied parts of Lough Gill and associated waterbodies
	Negative indicator species	No alien crayfish species
	Disease	No instances of disease
	Water quality	At least Q3-4 at all sites sampled by EPA
	Habitat quality: heterogeneity	No decline in habitat heterogeneity or habitat quality
Atlantic salmon	Distribution (extent of anadromy	100% of river channels down to second order from the estuary.
	Adult spawning fish	Conservation limit consistently exceeded

Qualifying Feature	Attribute	Target
	Salmon fry abundance	Maintain or exceed 0+ fry mean catchment wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling.
	Out-migrating smolt abundance	No significant decline
	Number and distribution of redds	No decline in numbers or distribution
	Water quality	At least Q4
Najas flexilis	Population extent	Restore the spatial extent of Najas flexilis within the lake, subject to natural processes
	Population depth	Restore the depth range of Najas flexilis within the lake, subject to natural processes
	Population viability	Restore plant fitness, subject to natural processes
	Population abundant	Restore the cover abundance of Najas flexilis, subject to natural processes
	Species distribution	Restore to at least the north-western bay, subject to natural processes
	Habitat extent	Restore, subject to natural processes
	Hydrological regime: water level fluctuation	Maintain appropriate natural hydrological regime necessary to support the habitat for the species
	Lake substratum quality	Restore appropriate substratum type, extent and chemistry to support the population of the species
	Water quality	Restore appropriate water quality to support the population of the species
	Acidification status	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the population of Najas flexilis, subject to natural processes
	Water colour	Restore/maintain appropriate water colour to support the population of Najas flexilis
	Associated species	Restore appropriate associated species and vegetation communities to support the population of Najas flexilis
	Fringing habitat: area and condition	Maintain the area and condition of fringing habitats necessary to support the population of Najas flexilis
Otters	Distribution	No significant decline
	Extent of terrestrial habitat	No significant decline
	Extent of marine habitat	No significant decline
	Extent of freshwater habitat (river)	No significant decline
	Extent of freshwater habitat (lakes)	No significant decline
	Couching sites and holts	No significant decline
	Fish biomass	No significant decline
	Barriers to connectivity	No significant increase
Vegetation of Flowing Waters	Habitat area	Area stable or increasing, subject to natural processes
	Habitat distribution	No decline, subject to natural processes.
	Hydrological regime: river flow	Maintain appropriate hydrological regimes
	Hydrological regime: groundwater discharge	Maintain natural tidal regime
	Substratum composition: particle size range	The substratum should be dominated by the particle size ranges, appropriate to the habitat sub-type (frequently sands, gravels and cobbles)
	Water quality	Maintain appropriate water quality to support the natural structure and functioning of the habitat

Qualifying Feature	Attribute	Target
	Typical species	Typical species of the relevant habitat sub-type should be present and in good condition
	Floodplain connectivity	The area of active floodplain at, and upstream of, the habitat, necessary to support all sub-types of the habitat, should be maintained.
	Fringing habitat: hectares and condition	Maintain the area and condition of fringing habitats necessary to support the habitat and its sub-types
Mixed Najas lake habitat & hardwater lake habitat	Habitat distribution	Area stable or increasing, subject to natural processes
	Habitat area	No decline, subject to natural processes.
	Typical Species	Typical species present, in good condition, and demonstrating typical abundances and distribution
	Vegetation composition: characteristic zonation	All characteristic zones should be present, correctly distributed and in good condition
	Vegetation distribution: maximum depth	Maintain maximum depth of vegetation, subject to natural processes
	Hydrological regime: water level fluctuations	Maintain appropriate natural hydrological regime necessary to support the habitat
	Lake substratum quality	Maintain appropriate substratum type, extent and chemistry to support the vegetation
	Water quality – transparency	Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency
	Water quality - nutrients	Maintain the concentration of nutrients in the water column at sufficiently low levels to support the habitat and its typical species
	Water quality – Phytoplankton biomass	Maintain appropriate water quality to support the habitat, including good chlorophyll a status
	Water quality: phytoplankton composition	Maintain appropriate water quality to support the habitat, including good phytoplankton composition status
	Water quality: attached algal biomass	Maintain trace/absent attached algal biomass (<5% cover) and good phytobenthos status
	Water quality: macrophyte status	Maintain good macrophyte status
	Acidification status	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes
	Water colour	Maintain appropriate water colour to support the habitat
	Dissolved organic carbon (DOC)	Maintain appropriate organic carbon levels to support the habitat
	Turbidity	Maintain appropriate turbidity to support the habitat
	Fringing habitat: area and condition	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of the lake habitat

These site-specific conservation objectives for the qualifying features of interest of the SAC and SPA are used in Section 5 below to facilitate an examination of the project's potential to

undermine these objectives and thereby result in adverse effects to the conservation objectives of the SAC and SPA.

5.0 CONSIDERATION OF POTENTIAL IMPACTS TO EUROPEAN SITES

5.1 WATER RUNOFF

The potential impacts that may arise as a result of the project relate to the discharge of contaminated surface water from the project site during the construction phase to the Canrawer East Stream or the sub-surface groundwater flow paths that in turn discharge to the Canrawer East Stream[3] and downstream to the Owenriff River, Lough Corrib and the SAC and SPA.

Earthworks associated with the construction phase of the project will require the denuding of surface vegetation within the of the proposed development. In the absence of an appropriate design and mitigation measures such activities will have the potential to generate silt-laden runoff from the works area and for this runoff to be discharged via the Canrawer East Stream to the Owenriff River downstream.

During the operational phase surface water will be generated at the project site. In the absence of appropriate design measures potential will exist for surface water runoff from car parking areas to be contaminated in the event of fuel leaks or accidental spills. Any untreated discharge of contaminated surface water runoff from the project site to the Canrawer East Stream could result in water quality pressures to this waterbody, and the conveyance of such contaminants downstream to the Owenriff River.

It is noted that given the small scale size of the proposed development site in the context of the local Canrawer East sub-catchment and the wider Owenriff River catchment along with the pollution risk from residential parking areas which is considered to be low (as per CIRIA C753 Simple Index Approach) the likelihood of the operation phase of the project resulting in perturbations to water quality is considered to be low. Notwithstanding this any deposition of contaminants such as hydrocarbons or cement material to the Owenriff River and the Lough Corrib SAC could conceivably result in the contamination of benthic fauna and epifauna

[3] Based on the Maam Clonbur Groundwater Body report it is considered that any groundwater flow paths under and in the vicinity of the project site will discharge to the Canrawer East Stream

including freshwater pearl mussel, white-clawed crayfish and prey species of Atlantic salmon, lamprey species and otters. In addition, the discharge of such contaminants will also have potential to undermine the suitable condition of habitats within the Canrawer East Stream and downstream along the Owenriff River to support spawning and juvenile qualifying freshwater fish species. The toxic effect of such contaminants, particularly hydrocarbons, on feeding, growth, development and reproduction are known to cascade and bioaccumulate throughout the food chain affecting benthic fauna, fish, birds and mammals (Ferrando, 2015).

The significance of the impact of the uncontrolled release of contaminants from the project site to Canrawer East Stream and downstream to the Owenriff River and the Lough Corrib SAC, will depend upon the frequency of the release and the concentration of contaminating materials in surface water discharging from the site. In a worst-case scenario the ongoing discharge of waters with high concentrations of contaminating substances could over time lead to the deposition of such contaminants to these receiving waters. Revitt et al. (2014) demonstrated the potential of car parking areas to result in a build-up of diffuse pollution loads on their surfaces with subsequent mobilization and direct discharge to receiving waters. In the absence of appropriate design safeguards (such as the inclusion of hydrocarbon interceptors) the discharge of such contaminated surface water from the basement car parking area during the operation phase could represent a source of ongoing contamination to surface drainage waters being discharged to Lough Mahon. Accidental spillages of contaminating materials during the construction phase and/or operation phase could also represent sources of acute pollution to the Canrawer East Stream and its conveyance downstream to the Owenriff River.

The exposure of benthic freshwater fauna, such as freshwater pearl mussel and white-clawed crayfish, as well as qualifying freshwater fish species to such contaminants can result in disturbance and stress effects. Upon detection of such contaminants mobile species may simply move away from the affected area, with the potential to result in a decline in the distribution of these species within the SAC. For sessile benthic fauna, such as freshwater pearl mussel, there will be no potential for escape and their exposure to contaminants may result in biological changes designed to aid survival. In some cases these benthic species may acclimatise to contaminated conditions, while in others the contaminants may lead to mortality and decreases in population density. Such an effect would have the potential to undermine the conservation status of the Lough Corrib SAC. Similar impacts could conceivably arise for wetland birds of the SPA that rely upon good water quality downstream along the Owenriff River and Lough Corrib.

5.2 WASTEWATER

Inappropriate discharge of wastewater from the project site and its release to the Canrawer East Stream will have the potential to result in significant negative impacts to the water quality of this stream and the water quality status of the Owenriff River downstream. The qualifying species of the SAC that occur within the zone of influence of the project are all mostly highly sensitive to changes in nutrient status and any increases in the nutrient status of waters downstream of the project site will have the potential to undermine the favourable conservation status of these qualifying species and particularly freshwater pearl mussel, Atlantic salmon and lamprey species.

5.3 SPREAD OF NON-NATIVE INVASIVE PLANT SPECIES

Lesser knotweed has been identified as occurring within the project site. This species is a non-native aggressive coloniser that can lead to infestations and the eradication of native species and changes in native vegetation communities. Any construction phase works undertaken without due consideration to avoid the spread of this species will have the potential to result in is spread. The Canrawer East Stream could in turn function as a pathway for this spread of this species. The establishment of this species downstream along the banks of the Owenriff River or the fringing habitats of Lough Corrib SAC will have the potential to undermine the conservation objectives targets for the SAC and particularly the SACs lacustrine habitats occurring downstream from the project site.

In addition to the already existing presence of Lesser Knotweed on site, the project could result in the introduction of non-native invasive species at the project site that could in turn spread to lake habitats downstream as a result of conveyance by the Canrawer East Stream and the Owenriff River. With regard to the introduction of new non-native invasive plant species during the construction phase, such introductions could be mediated by the transport of machinery on site and the movement of site operatives. It is noted that the likelihood of such introductions occurring are low, especially in light of the scale of project works, the low number of transport requirements, plant and machinery and site operative required to undertake the works.

5.4 IMPLICATIONS FOR QUALIFYING FEATURES OF INTEREST

5.4.1 Qualifying Fish Species

The discharge of contaminated surface water runoff to the Canrawer East Stream sub-catchment and downstream to the Owenriff River and Lough Corrib will have the potential to result in

negative impacts to invertebrates, plant life and on all life stages of salmonid fish and lamprey species. The adverse effects of contaminated runoff to fish species including salmon and lamprey include:

- The settlement of silt on spawning redds resulting in the infilling of intra-gravel voids and the smothering of eggs and newly hatched fish.
- The settlement of silt on river beds can smother and displace macroinvertebrates, reducing the prey resource for fish species.
- Suspended solids can settle in pool and riffle habitats resulting in a reduction in the availability and quality of rearing habitat for fish.
- Silt-laden runoff can result in a reduction in transparency, impairing the ability of fish and otters to find food.
- Suspended solids can abrade or clog salmonid fish gills. Whilst high concentrations of suspended solids are required to clog fish gills, small concentrations can result in abrasion to gills, which can in turn create the potential for infection.

5.4.2 Freshwater Pearl Mussel

Pearl mussels require specific habitat conditions for the survival of viable populations. The principal habitat requirements are oligotrophic, well-oxygenated waters of high-water quality with low levels of sedimentation and a firm substrate of gravels and sand. Pearl mussels also require a healthy stock of juvenile salmonids to host glochidia during the larval stage of their life-cycle. Pearl mussels are very sensitive to any changes or perturbations to these habitat requirements. Mussels use their gills for feeding and respiration and high levels of suspended solids within watercourses can significantly affect mussel respiration and feeding by clogging gills. Persistent exposure to high levels of suspended solids can result in starvation or respiratory stress resulting in asphyxiation.

Silt accumulation on river-beds also significantly affects recruitment and the viability of a population. During the juvenile stage mussels will spend several years buried beneath the coarse river-bed. A constant flow of oxygen through the riverbed to the juvenile mussels is required for survival. The deposition of silt material over mussel beds will clog the interstice and reduce or prevent the penetration of oxygen to juveniles resulting in death.

The growth of instream vegetation including algae and macrophytes can also affect mussels by increasing the biological oxygen demand within the watercourse, thereby reduces the levels of oxygen available for mussel respiration. Macrophytes can also entrain sediment and lead to the build-up of silt.

The ingress of silt-laden waters to watercourses can lead to the alteration of physical, chemical and biological properties of a waterbody (Bilotta & Brazier, 2008). Physical alterations caused by sedimentation include reduced penetration of light, temperature changes and infilling of channels when solids are deposited. This latter effect is particularly relevant for juvenile pearl mussels and their survival, as the infilling of substrate interstices will reduce the availability of oxygen for juvenile mussels and eventually undermine recruitment to the population. Chemical alterations caused by sedimentation include the release of contaminants such as heavy metals and pesticides (Kronvang *et al.*, 2003; Miller, 1997), and nutrients such as phosphorous (Harrod & Theurer, 2002; Haygarth *et al.* 2006) into the waterbody from adsorption sites on the sediment. The biological effects of sedimentation vary between organisms. Impacts to invertebrates include increased rates of drift, reductions in density and population size, and reductions in abundance and species richness. Impacts to fish and salmonids, the host fish of the pearl mussel larval stage, include damage to gills leading to increased susceptibility to disease; reduction in foraging activity, degradation of redds and reduced survival rates for early stage life cycles.

Any migration of excessive silt-laden water and suspended solids from the project site to the Canrawer East Stream sub-catchment and the Owenriff River and Lough Corrib downstream could exacerbate the already critically endangered conditions for this species.

Sedimentation resulting from such effects could also change the status of the Owenriff River itself to support pearl mussels. Such an effect would undermine the conservation objective for freshwater pearl mussels, which is to "restore" this population to favourable conservation condition.

5.4.3 White-clawed Crayfish

The threats and pressures to white-clawed crayfish in Ireland relate to the spread of pathogens and invasive crayfish species (NPWS, 2019b). The NPWS (2019b) do not list negative impacts to water quality of freshwater bodies as a pressure or threat to this species, however they do include water quality as an attribute defining the favourable conservation status of this species and have set a biological water quality target of a minimum of Q3-4 for the white-clawed

crayfish population of the Lough Corrib SAC. Demers & Reynolds (2002) suggested that white-clawed crayfish can occur in water that is rated as moderately polluted, while Holdich (2003) pointed to poor water quality as a limiting factor in achieving the favourable conservation status of this species. Overall it is considered that any perturbations to water quality as a result of the project will have the potential to undermine the favourable conservation condition of crayfish within the SAC.

5.4.4 Najas flexilis

This is a fragile, annual plant that grows in clear-water, lowland lakes with exacting environmental requirements, most notably high-water clarity/transparency and deep euphotic zones. It occurs in lakes with some base-rich influences in otherwise peatland-dominated catchments. In Ireland, the lakes typically overlie calcareous sand, marble or sometimes limestone. The plant grows permanently submerged, commonly in deep water on flat to gently sloping areas of the lake bed with soft substrata of mud, silt or fine sand. The species is threatened by enrichment (eutrophication), acidification and peatland damage.

5.4.5 Otters

The main pressure affecting this species in Ireland is pollution, particularly from organic pollution resulting in fish kills and accidental deaths as a result of road traffic and fishing gear (NPWS, 2019b). The NPWS also list diffuse and point source pollution of freshwaters as a likely indirect impact to otters through changes in prey abundance. However, the NPWS conclude that these threats are considered to produce local impacts only and are not of significance for the national otter population. Nevertheless, such impacts have the potential to be of local significance in the context of a population supported by an SAC river catchment. As such in the event of pollution, arising from construction activities to suitable otter foraging habitat downstream of the project, the potential will exist for indirect impacts to the conservation status of otters within the SAC, by way of reductions in the abundance of prey species.

No otter breeding sites are located in the vicinity of the project and as such there will be no potential for significant disturbance to otters and their breeding and resting sites during this element of the project.

5.4.6 Lake Habitats

The lake habitats of the SAC occurring downstream of the project site are under significant pressure from drainage, agriculture, peat extraction, forestry and wastewaters (NPWS, 2019a). Any inappropriate wastewater discharges from the project site to the Canrawer East Stream and downstream to the Owenriff River will have the potential to exacerbate the adverse impacts of wastewater discharges to these lake habitats.

5.4.7 Vegetation of Flowing Waters

This habitat is sensitive to changes in hydrological and morphological conditions, eutrophication and other water pollution. Forestry activities that have the potential to generate pollution of surface waters are listed by the NPWS (2019a) as a threat to the favourable conservation condition of this habitat.

5.5 IN-COMBINATION EFFECTS

The potential exists for the project to overlap with other construction projects within the surrounding area. Other recently approved and/or live planning application in the vicinity of the project site and the hydrological pathway downstream to the Lough Corrib European Sites include a number of small scale planning applications for extensions to existing dwellings and the development of single dwelling. A number of these are located within the Sruthan An Chlair and Carrowmanagh residential estates. These are small scale projects that will not result in land use activities with potential to combine with the current project to result in cumulative adverse effects to the Lough Corrib European Sites.

Other larger planning application in the vicinity of the project site include:

Planning Application Reference No. 19/1781. This planning application was withdrawn and therefore there will be no potential for the project to combine with this project to result in cumulative adverse effects to the Lough Corrib European Sites.

Planning Application Reference No. 21/1530. This planning application has been refused planning permission by Galway County Council and therefore there will be no potential for the project to combine with this project to result in cumulative adverse effects to the Lough Corrib European Sites.

6.0 DESCRIPTION OF HOW THE PROJECT COULD AFFECT KEY HABITATS & SPECIES

A NIS is required to assess the potential for impacts to the integrity of a European Site, with respect to the site's structure and function and its Conservation Objectives. The structural and functional elements of a European Site to maintain the favourable conservation status of qualifying features of interest are embedded into the list of detailed SSCOs for each of the site's interest features. As such a European Sites' SSCOs represent the parameters against which a project's potential to adversely affect the integrity of a European Sites should be considered.

Table 5.1 lists the Conservation Objectives attributes and targets for each of qualifying features of interest of the Lough Corrib SAC and the Lough Corrib SPA occurring within the zone of influence of the project and examines how the project, in the absence of mitigation, will have the potential to result in adverse effects to these attributes and targets.

Table 6.1: **Consideration of Potential Impact to the SSCOS of Qualifying Features of Interest occurring within the Zone of Influence of the Project**

Attribute No.	Attribute	Target	Consideration of likely significant effects
Lamprey Species			
1	Distribution (extent of anadromy for sea lamprey) &/or barriers to movement	Access to all watercourses down to first order streams for brook lamprey. Greater than 75% of main stem length of rivers accessible from the estuary.	Activities associated with the construction phase of the project will not have the potential to undermine this attribute. The project will not result any barriers to the movement of lampreys throughout the Owenriff catchment. Given the absence of any physical interactions with watercourses of this catchment there will be no potential for the project to result in a reduction in the distribution of lamprey species within the Owenriff catchment and the Lough Corrib SAC.
2	Population structure of juveniles	At least three age/size groups present	The preferred spawning habitat for lamprey is gravel-dominated substratum typical of eroding watercourses in the upper reaches of catchments. After hatching the larvae swim or are washed downstream and settle in areas of preferred juvenile habitat. The juvenile stage of the lifecycle of lamprey species is generally restricted to depositing freshwater and estuarine environments where the substratum supports areas of sandy silt. Suitable spawning habitat for lamprey species occurs downstream of the project site along the Canrawer East Stream and the Owenriff River. In the event of negative impacts to lamprey spawning habitat downstream as a result siltation or elevated nutrient-related effects, the potential will exist for indirect impacts to the later life-cycle juvenile stage of this species.
3	Juvenile density in fine sediment	Mean catchment juvenile density of at least $2/m^2$ for brook lamprey and $1/m^2$ for sea lamprey	As set out for attribute no. 2 above in the event of negative impacts to lamprey spawning habitat, the potential will exist for an indirect and temporally delayed impact to the density of juveniles occurring within suitable juvenile habitat downstream. Such an impact will be derived from a reduction in suitable spawning habitat and lamprey larvae moving downstream to juvenile habitats.
4	Extent and distribution of spawning habitat	No decline in distribution and extent of spawning beds.	The discharge of any silt-laden or nutrient laden waters as a result of for example construction phase runoff or inappropriate wastewater emissions during the operation phase such waters to the Canrawer East Stream and the Owenriff sub-catchment could have the potential to undermine the condition of lamprey spawning habitat in these watercourses. Lamprey species show a preference for gravel-dominated substratum for spawning and the release of silt to such habitat will clog pore spaces and undermine the status of such habitat to support spawning lamprey.

Attribute No.	Attribute	Target	Consideration of likely significant effects
5	Availability of juvenile habitat	More than 50% of sample sites positive	Suitable juvenile habitat is likely to occur downstream at the Owenriff outfall to Lough Corrib and any deleterious inputs to watercourse draining to the lake could have adverse implications for the status of juvenile habitats.
White-clawed crayfish			
6	Distribution	No reduction from baseline.	In the event that the project causes pollution to the Canrawer East Stream and the Owenriff River sub-catchment and Lough Corrib downstream, it could undermine the status of these waterbodies to support crayfish.
8	Population structure: recruitment	Juveniles and/or females with eggs in all occupied tributaries.	In the event that the construction phase of the project causes pollution to the Owenriff River sub-catchment and Lough Corrib downstream it will have the potential to undermine the population structure of crayfish occurring within these waterbodies downstream.
9	Negative indicator species	No alien crayfish species.	The project will not have the potential to result in the introduction of alien crayfish species. The project will not result in any instream works or the use of any machinery watercraft etc instream that could result in the spread of these non-native invasive species.
10	Disease	No instances of disease.	As per attribute no. 9 the project is not predicted to have the potential to result in the spread of crayfish disease within the catchment.
11	Water quality	At least Q3-4 at all sites sampled by EPA.	In the event that the project causes pollution to the Owenriff River sub-catchment and Lough Corrib downstream, it will have the potential to adversely affect water quality downstream.
12	Habitat quality: heterogeneity	No decline in habitat heterogeneity or habitat quality.	In the event that the construction phase of the project results in the discharge of silt-laden surface water downstream to the Owenriff River sub-catchment or Lough Corrib downstream, it will have the potential to undermine crayfish habitat heterogeneity.
Atlantic Salmon			
13	Distribution (extent of anadromy	100% of river channels down to second order from the estuary.	Activities associated with the construction phase of the project will not have the potential to undermine this attribute. The project will not result any barriers to the movement of Atlantic salmon throughout the Owenriff River catchment. Given the absence of any physical interactions with watercourses of this catchment there will be no potential for the project to result in a reduction in the distribution of this species within the SAC.
14	Adult spawning fish	Conservation limit consistently exceeded	The project will not result in any barriers to the movement of adult spawning fish and will not have the potential to undermine the number of adult spawning fish in the Owenriff River catchment.
15	Salmon fry abundance	Maintain or exceed 0+ fry mean catchment wide abundance threshold value. Currently set at 17	The project's potential to undermine the targets for this attribute will be mediated by construction generated pollution impacts on spawning success and survival of juvenile salmon within the Canrawer East Stream and Owenriff River sub-catchment.

Attribute No.	Attribute	Target	Consideration of likely significant effects
		salmon fry/5 min sampling.	
16	Out-migrating smolt abundance	No significant decline	The project's potential to undermine the targets for this attribute will be mediated by construction generated pollution impacts on spawning success and survival of juvenile salmon within the Canrawer East Stream and the Owenriff River catchment.
17	Number and distribution of redds	No decline in numbers or distribution	The project's potential to undermine the targets for this attribute will be mediated by construction generated pollution impacts, particularly the potential release of silt-laden runoff, to the Canrawer East Stream and the Owenriff River. Salmon redds require high levels of dissolved oxygen and low levels of siltation. Excess silt on the river bed will reduce oxygen levels in redds and decrease the suitability of river beds to support spawn.
18	Water quality	At least Q4	In the event that the project causes pollution to the Canrawer East Stream and the Owenriff River, it will have the potential to adversely affect water quality of these waterbodies.
Najas flexilis			
19	Population extent	Restore the spatial extent of Najas flexilis within the lake, subject to natural processes	The area of Lough Corrib SAC that is known to support Najas flexilis is located at the northwestern extreme of the SAC approximately 10km (overland) from the project site. Given the distances between the project site and this area there will be no potential for the project to result in negative impacts to the extent of the Najas flexilis population supported by this area of the SAC. Potential suitable habitat for Najas flexilis has been identified downstream of the project site at the Owenriff River outfall to Lough Corrib. In the event that the project results in the release of deleterious water emissions such as silt-laden or hydrocarbon laden waters during the construction phase or wastewater emissions during the operation phase there will be potential for the project to undermine the suitability of this habitat downstream at the Owenriff River outfall to the lake to support Najas flexilis. The release of silt-laden or nutrient enriched water emissions to Lough Corrib represents a threat to this species as such emissions have been identified as the principal threats to the conservation status of Najas flexilis.
20	Population depth	Restore the depth range of Najas flexilis within the lake, subject to natural processes	The project is small in scale and will not have the potential to result in changes to hydrological regimes that could in turn result in changes to lake depth ranges.
21	Population viability	Restore plant fitness, subject to natural processes	For the reasons outlined under attribute no. 19 above the project will have the potential to undermine plant fitness should it occur in suitable habitat at Lough Corrib in the vicinity of the Owenriff River outfall to the lake.

Attribute No.	Attribute	Target	Consideration of likely significant effects
22	Population abundant	Restore the cover abundance of Najas flexilis, subject to natural processes	For the reasons outlined under attribute no. 19 above the project will have the potential to undermine the population abundance of this species in suitable habitat at Lough Corrib in the vicinity of the Owenriff River outfall to the lake.
23	Species distribution	Restore to at least the north-western bay, subject to natural processes	For the reasons outlined under attribute no. 19 above the project will not have the potential to undermine the distribution of this species in the northwestern bay area of the Lough Corrib SAC. However as per attribute no. 19 above the emissions of deleterious to Lough Corrib as a result of the project will have the potential to undermine the restoration of this species in suitable lake habitat in the vicinity of the Owenriff River outfall to the lake.
24	Habitat extent	Restore, subject to natural processes	For reasons outlined under attribute no. 19 and 23 above the project will have the potential to undermine this conservation objective.
25	Hydrological regime: water level fluctuation	Maintain appropriate natural hydrological regime necessary to support the habitat for the species	For reasons outlined under attribute no. 20 above the project will not have the potential to result in changes to the hydrological regime underpinning suitable habitat conditions for this species.
26	Lake substratum quality	Restore appropriate substratum type, extent, and chemistry to support the population of the species	For reasons outlined for attribute no. 19 above, in the event that the project results in the emissions of deleterious water emissions to the lake via the Owenriff River catchment there will be potential for it to undermine the suitability of lake substratum to support this species in the vicinity of the Owenriff River outfall to the lake.
27	Water quality	Restore appropriate water quality to support the population of the species	For reasons outlined for attribute 19 above the project will have the potential to contribute to undermining water quality at Lough Corrib in the vicinity of the Owenriff River outfall to the lake.
28	Acidification status	Maintain appropriate water and sediment pH, alkalinity, and cation concentrations to support the population of Najas flexilis, subject to natural processes	The emissions of deleterious water emissions from the project site to Lough Corrib via the Owenriff River catchment could contribute to changes in the acidification status of the lake with consequential adverse effects for this area of the lake to function as suitable habitat for Najas flexilis.

Attribute No.	Attribute	Target	Consideration of likely significant effects
29	Water colour	Restore/maintain appropriate water colour to support the population of Najas flexilis	For reasons outlined for attribute no. 19 above and particularly relating to any emissions of silt lade waters, the project could contribute to a decrease in water colour in the vicinity of the Owenriff River outfall to the lake, thereby undermining the potential suitability of this area of the lake to support Najas flexilis.
30	Associated species	Restore appropriate associated species and vegetation communities to support the population of Najas flexilis	For reasons outlined under attribute no. 19 above the project could undermine attempts to restore appropriate vegetation communities in the vicinity of the Owenriff River outfall to the Lough Corrib.
31	Fringing habitat: area and condition	Maintain the area and condition of fringing habitats necessary to support the population of Najas flexilis	Lesser knotweed has been identified as occurring at the project site. The spread of this species within the Owenriff River catchment and downstream to fringing lake habitats could result in changes to the vegetation communities fringing the lake and thereby undermine the targets for this conservation objective attribute.
Otter			
24	Distribution	No significant decline	Negative effects to water quality as a result of project activities will have the potential to affect the otter foraging resource of the Owenriff River downstream of the project site, which in turn will have the potential to negatively affect the distribution of otters within the SAC.
25	Extent of terrestrial habitat	No significant decline	The project will not result in the loss of any terrestrial habitat used by otters.
26	Extent of marine habitat	No significant decline	As per attribute no. 19 above negative impacts to water quality will have the potential to undermine the potential for waterbodies downstream of the project site to support otters.
27	Extent of freshwater habitat (river)	No significant decline	As per attribute no. 19 above negative impacts to the water quality of Owenriff River sub-catchment and downstream at Lough Corrib will have the potential to undermine its potential to support otters.
28	Couching sites and holts	No significant decline	No suitable breeding or resting habitat for otters occurs in the vicinity of the project site. As such the project will not have the potential to undermine this target.
29	Fish biomass	No significant decline	As per attribute no. 19 above the project will have the potential to undermine water quality downstream and within waterbodies likely to be used by the SAC's otter population. Any adverse impacts to these waterbodies could result in a decrease in fish biomass (i.e. through mortalities resulting from a pollution event) and undermine the target for this attribute.

Attribute No.	Attribute	Target	Consideration of likely significant effects
30	Barriers to connectivity	No significant increase	The project will not have the potential to undermine this attribute..
Freshwater pearl mussel			
31	Distribution	Maintain at 15.5km	The emission of pollutants, such as silts, cement based-products and hydrocarbons to the Canrawer East Stream and downstream to the Owenriff River, during construction works will have the potential to adversely affect the distribution of freshwater pearl mussels within the Owenriff River. The inadvertent discharge of wastewater generated during the project to the Owenriff River catchment will also have the potential to undermine the conditions with this river and over time the distribution of freshwater pearl mussel populations downstream of the project.
32	Population size	Restore to 5,000 adult mussels	The emission of such pollutant will have the potential to undermine recruitment within the Owenriff River with consequent negative implications for the achievement of this target.
33	Population structure: recruitment	Restore to least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length.	As outlined for Attribute No. 32 above the emission of pollutants will have the potential to undermine recruitment within the Owenriff River with consequent negative implications for the achievement of this target.
34	Population structure: adult mortality	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution.	In the event of the emission of pollutants to the Owenriff River the potential will exist for the project to result in the mortality of live adults occurring along the stretch of the Owenriff River downstream of the project.
35	Habitat extent	Restore suitable habitat in more than 15.5km and any additional stretches necessary for salmonid spawning	In the event of the emission of pollutants to the Owenriff River the potential will exist for the project to result in a reduction of suitable habitat for freshwater pearl mussel within the SAC.
36	Water quality: macroinvertebrate and	Restore water quality-macroinvertebrates: EQR greater than 0.90;	Any emission of pollutants to the Owenriff River will have the potential to undermine water quality and compromise the achievements of the targets set out for this attribute.

Attribute No.	Attribute	Target	Consideration of likely significant effects
	phytobenthos (diatoms)	phytobenthos: EQR greater than 0.93.	
37	Substratum quality: filamentous algae (macroalgae), macrophytes (rooted higher plants)	Restore substratum quality- filamentous algae: absent or trace (<5%); macrophytes: absent or trace (<5%).	In the event that works associated with the construction phase of the project leads to the discharge of silts to the bed of the Owenriff River, conditions within the river could be enhanced for the growth of macrophytes. For instance the NPWS (NPWS, 2019b) have reported an increase in the abundance of water crowfoot in rivers as a result of the input of fine sediments to river beds which provide a suitable rooting medium for macrophytes such as water crowfoot. An increase in macrophytes will in turn have the potential to result in increases in sedimentation through the trapping of fines in macrophytes and settling in the river bed.
38	Substratum quality: sediment	Restore substratum quality- stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment.	For the reasons outlined for Attribute no. 37 above, the project will have the potential to compromise the targets for this attribute.
39	Substratum quality: oxygen availability	Restore to no more than 20% decline from water column to 5cm depth in substrate.	The emission of silt-laden runoff to the bed of the Owenriff River will have the potential to clog pore spaces and lead to a reduction in oxygen levels in substrates which will in turn have negative effects for juveniles and mussel recruitment.
40	Hydrological regime: flow variability	Restore appropriate hydrological regimes.	The project will not have the potential to result in changes to the hydrological regime of the Owenriff River or any watercourses within the catchment.
41	Host fish	Maintain sufficient juvenile salmonids to host glochidial larvae.	Adverse effects to water quality will have the potential to reduce the density of host fish along the Owenriff River. Such reductions will have the potential to undermine this target.
Vegetation of Flowing Waters			

Attribute No.	Attribute	Target	Consideration of likely significant effects
42	Habitat area	Area stable or increasing, subject to natural processes	Any adverse effects to the water quality of the Canrawer East Stream and the Owenriff River catchment will have the potential to result in a reduction in the extent of suitable riverine habitat within the SAC to support this qualifying habitat.
43	Habitat distribution	No decline, subject to natural processes.	For the reasons outlined for Attribute no. 42 the project will have the potential to result in a decline in the distribution of this habitat within the Owenriff River catchment downstream of the project site.
44	Hydrological regime: river flow	Maintain appropriate hydrological regimes	The project will not result in any instream works and will not change the nature of the hydrological regime of the Owenriff River catchment.
45	Hydrological regime: tidal influence	Maintain natural tidal regime	The project will not have the potential to influence the tidal regime of this SAC.
46	Hydrological regime: freshwater seepages	Maintain appropriate freshwater seepage regimes	The project will not have the potential to influence input of freshwater seepage to examples of tall herb habitat occurring upstream and downstream of the project site.
47	Substratum composition: particle size range	The substratum should be dominated by the particle size ranges, appropriate to the habitat sub-type (frequently sands, gravels and cobbles)	The release of silt during the construction phase from the project site to the Owenriff River catchment will have the potential to undermine the quality of substratum in the watercourse downstream of the project to support this habitat. As noted under attribute 37 listed above the potential for the discharge of sediment fines to river beds to result in the abundant growth of commonly occurring and species poor stands of crowfoot vegetation has been identified by the NPWS (NPWS, 2019b)
48	Water quality: nutrients	The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition	Any inadvertent discharge of pollutants to the Owenriff River catchment during construction will have the potential to undermine this target.
49	Vegetation composition: typical species	Typical species of the relevant habitat sub-type should be present and in good condition	Any emission of pollutants to the Owenriff River catchment as a result of the project will have the potential to undermine this target.
50	Floodplain connectivity	The area of active floodplain at and	The project will not result in any changes to the existing river floodplain habitat within the Owenriff River catchment.

Attribute No.	Attribute	Target	Consideration of likely significant effects
		upstream of the habitat should be maintained	
51	Riparian habitat	Maintain the area and condition of fringing habitats necessary to support the habitat and its sub-types	Lesser knotweed has been identified as occurring at the project site. The spread of this species within the Owenriff River catchment to fringing riparian habitats could result in changes to the vegetation communities fringing the river and thereby undermine the targets for this conservation objective attribute.
Lake Habitats			
52	Habitat area	Area stable or increasing, subject to natural processes	The project will not result in the loss of any lake habitat. The lake habitats are buffered from the project by approximately 1.6km which will ensure no change to the area of this habitat within the SAC.
53	Habitat distribution	No decline, subject to natural processes.	For the reason outlined for attribute no. 52 above the project will not have the potential to result in changes to the distribution of this habitat.
54	Typical Species	Typical species present, in good condition, and demonstrating typical abundances and distribution	In the absence of suitable safeguards the project could result in the introduction of non-native invasive species at the project site that could in turn spread to lake habitats downstream as a result of conveyance by the Canrawer East Stream and the Owenriff River. Lesser knotweed is already present at the project site and construction activity without due consideration for the proper treatment of this species, could also lead to the spread of this species downstream to the lake and its establishment at lake fringing habitat. With regard to the risk of the introduction and spread of new non-native invasive species during the construction phase the potential for the spread of such species will be via their introduction during the transport of machinery on site and the movement of site operatives. It is noted that the likelihood of such introductions occurring are low, especially when the scale of project works are taken into consideration.
55	Vegetation composition: characteristic zonation	All characteristic zones should be present, correctly distributed and in good condition	In the event that the project results in the release of polluted surface water with elevated concentrations of suspended solids or nutrients to the Owenriff River and Lough Corrib downstream, it could combine with other sources of such contaminants in the Lough Corrib catchment and result in an increase in sediment and nutrient deposition within Lough Corrib. Increases in sedimentation and/or nutrient could in turn effect the zonation of vegetation communities.

Attribute No.	Attribute	Target	Consideration of likely significant effects
56	Vegetation distribution: maximum depth	Maintain maximum depth of vegetation, subject to natural processes	The project is buffered from the lake habitats of Lough Corrib and will not result in changes to the hydrological regime of the Owenriff River catchment and as such will not have the potential to result in changes to lake depths.
57	Hydrological regime: water level fluctuations	Maintain appropriate natural hydrological regime necessary to support the habitat	The project will not result in any increases to discharge volumes or flows to Lough Corrib and its lake habitats.
58	Lake substratum quality	Maintain appropriate substratum type, extent, and chemistry to support the vegetation	For reasons outlined for attribute no. 55 above the project could combine with other sources of silt in the catchment and lead to an increase in sedimentation within the lake with the potential for resultant changes to composition of the lake substrate.
59	Water quality – transparency	Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	For reasons outlined for attribute no. 55 above the project could combine with other sources of silt in the catchment and lead to an increase in sedimentation within the lake with the potential for resultant changes to transparency in the water column.
60	Water quality - nutrients	Maintain the concentration of nutrients in the water column at sufficiently low levels to support the habitat and its typical species	In the absence of suitable safeguards the inadvertent discharge of wastewater to the Owenriff River will have the potential to undermine the trophic status of lake habitats.
61	Water quality – Phytoplankton biomass	Maintain appropriate water quality to support the habitat, including good chlorophyll a status	For reasons outlined for attribute no. 60 above the project will have the potential to result in excessive growth of phytoplankton biomass within the lake habitats of Lough Corrib SAC.
62	Water quality: phytoplankton composition	Maintain appropriate water quality to support the habitat,	For reasons outlined for attribute no. 60 above the project will have the potential to undermine the achievement of this conservation objective.

Attribute No.	Attribute	Target	Consideration of likely significant effects
		including good phytoplankton composition status	
63	Water quality: attached algal biomass	Maintain trace/absent attached algal biomass (<5% cover) and good phytobenthos status	For reasons outlined for attribute no. 60 above the project will have the potential to undermine the achievement of this conservation objective.
64	Water quality: macrophyte status	Maintain good macrophyte status	The principal parameter influencing macrophyte status in the lake is nutrient status. For reasons outlined for attribute no. 60 above the project have the potential to undermine the achievement of this conservation objective.
65	Acidification status	Maintain appropriate water and sediment pH, alkalinity, and cation concentrations to support the habitat, subject to natural processes	A limit of a pH of <9 has been assigned by the NPWS for this attribute. Any release of excess silts to the lake habitats of the Lough Corrib SAC could combine with other sources of siltation and particularly peat-derived siltation from surrounding peatland in the Lough Corrib catchment to result in an increase in the discharge of low pH silt material to the lake.
66	Water colour	Maintain appropriate water colour to support the habitat	For reasons outlined for attribute no. 55 above the project could combine with other sources of silt in the catchment and lead to an increase in sedimentation within the lake with the potential for resultant changes to transparency in the water column.
67	Dissolved organic carbon (DOC)	Maintain appropriate organic carbon levels to support the habitat	The release of excess silts to the Lough Corrib catchment could combine with other sources of siltation and particularly peat-derived siltation in the catchment to result in an increase in DOC within the catchment and downstream within the lake.
68	Turbidity	Maintain appropriate turbidity to support the habitat	In the event that the project results in the release of polluted surface water to watercourses, the project could combine with other sources of silt in the Lough Corrib catchment and result in an increase in sedimentation deposition within Lough Corrib. Increases in sedimentation could in turn increase turbidity within the lake.
69	Fringing habitat: area and condition	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of the lake habitat	Any changes to pH levels within the lake habitat as outlined for attribute no 65 above could result in a change to the structure of fringing habitats.

Attribute No.	Attribute	Target	Consideration of likely significant effects
Lough Corrib SPA Special conservation interest			
70	Population trend	Long term population trend stable or increasing	The discharge of deleterious emissions to Lough Corrib will have the potential to undermine water quality within the lake downstream in the vicinity of the Owenriff River outfall to the lake. Adverse effects to water quality at this location, will in turn have the potential to undermine the habitats and the associated prey resource upon which the wetland bird species of the SPA rely. Such adverse effects could, over time, result in a decline in the long-term population trend supported by the sections of the SPA surrounding the project site and discharge locations.
71	Distribution	No significant decrease in the range, timing and intensity of use of areas by light-bellied brent geese, Oystercatcher, Black-tailed Godwit, Dunlin and Redshank other than that occurring from natural patterns of variation	For reasons outlined for Attribute No. 2 above the discharge of deleterious water emissions will have the potential to undermine the targets for this attribute.
72	Habitat Area	The permanent area occupied by the wetland habitat should be stable and not decreasing other than from natural patterns of variation	The project is well buffered from the wetland habitats of Lough Corrib SPA by approximately 1.6km and does not provide suitable "offsite" wetland habitat for waterbirds of the SPA. As such it will not have the potential to result in any changes to the extent wetland habitat supported by the SPA.

7.0 A DESCRIPTION OF HOW THE INTEGRITY OF THE SITE IS LIKELY TO BE AFFECTED BY THE PROJECT

EU Guidelines (2001) recommend as part of a Stage 2 Appropriate Assessment that a checklist of site integrity is carried out (see Table 6.1). This aids in establishing the nature of potential adverse effects to the integrity of the European Sites, as defined by the conservation objectives of special conservation interests occurring within the sphere of influence of the project.

Table 7.1: Checklist of Site Integrity

Conservation Objectives	
Does the Project have the potential to:	
Cause delays in progress towards achieving the conservation objectives of the site?	Yes. In the absence of mitigation that aim to prevent pollution to receiving waters, the project will have the potential to result in water quality perturbations downstream of the project site. The discharge of polluted surface water to the Owenriff River catchment will have the potential to undermine the status of aquatic habitats to support freshwater pearl mussel, otters, qualifying fish species and white-clawed crayfish downstream of the project site. The project will also have the potential to undermine the status of vegetation of flowing water and lake habitats downstream and the suitability of these lake habitats to support Najas flexilis.
Interrupt progress towards achieving the conservation objectives of the site?	Yes. See response to first question above.
Disrupt those factors that help to maintain the favourable conditions of the site?	Yes. See response to first question above.
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	Yes. See response to first question above.
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystem?	Yes. See response to first question above.
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	Yes. The discharge of potentially contaminated surface water from the project site to Owenriff River catchment could result in a adverse impacts to the fauna and flora communities upon which freshwater pearl mussel, otters, qualifying fish species and white-clawed crayfish rely upon for foraging.
Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical	Yes. The discharge of potentially contaminated surface water from the project site could result in a decrease in the diversity of key fauna communities

composition)?	supported by the Owenriff River catchment, upon which otters, qualifying fish species and white-clawed crayfish and freshwater pearl mussel rely.
Reduce the area of key habitats?	Adverse water quality effects to the Owenriff River catchment as a result of the project could reduce the area of suitable habitat available for freshwater dependent qualifying species of the SAC and the extent and distribution of vegetation of flowing waters and hydrophilous tall herb fringe qualifying habitats.
Reduce the population of key species?	Yes. See response to questions above.
Change the balance between key species?	Yes, adverse impacts to the water quality of the Owenriff River catchment downstream of the project site will have the potential to alter key invertebrate communities, relied upon by qualifying fish species in the catchment downstream. The spread of non-native invasive plant species such as Lesser Knotweed will have the potential to undermine the status of fringing vegetation communities support by the riparian corridor of the Owenriff River and the lakeshore of Lough Corrib in the vicinity of the Owenriff River outfall.
Reduce diversity of the site?	Yes. See response to the question above.
Result in fragmentation?	No.
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc.)?	The release of pollution to the Owenriff River catchment could result in the loss of suitable foraging habitat for the otter, lamprey and white-clawed crayfish and freshwater pearl mussel populations supported by this catchment.

8.0 A DESCRIPTION AND EVALUATION OF MITIGATION MEASURES

The following mitigation measures will be implemented in order to avoid significant effects or minimise such effects to a level that they will not constitute a significant effect to the freshwater pearl mussel, otter, white-clawed crayfish, brook lamprey, sea lamprey, Atlantic Salmon and Najas flexilis populations supported by the Owenriff River and Lough Corrib as well as suitable conditions for vegetation of flowing waters and the lake habitats of Lough Corrib downstream of the project site.

All construction phase mitigation measures outlined in this NIS will be required to be included in the Contractor's contract of works. The appointed contractor will be experienced in construction within peat environments. In addition, construction phase environment and

ecological monitoring will be provided to ensure that the mitigation measures and best practice outlined in this Natura Impact Statement are implemented. As part of the environmental/ecological monitoring inspections will be undertaken to ensure that are construction phase requirements are in operation and are providing effective management of the construction works such that there is no risk to surrounding environmental/ecological receptors.. The purpose of this management control is to ensure that the measures in place are operating effectively, prevent accidental leakages, and identify potential breaches in the protective retention and attenuation network and other environmental safeguards during construction operations so that all necessary protective measures can be implemented to prevent pollution to the aquatic environment.

8.1 MEASURES TO PROTECT WATER QUALITY

8.1.1 Mitigation by Design

The design of the project has from the outset sought to avoid the potential for negative impacts to the water quality of the Canrawer East Stream and the Owenriff River downstream. This has been achieved by minimising the scale of the project and maximising the buffer distance between the footprint of the proposed development and the Canrawer East Stream to the north. A buffer distance of 45m has been achieved between the proposed development footprint and this watercourse. In addition, the footprint of the project site has been positioned in a portion of the site where the majority of surface water runoff will flow along existing gradients in an easterly direction.

Given the substantial buffer distance and the natural drainage pathway to the east over vegetated ground will ensure that surface water generated at the project site during the construction phase and operation phase will not be released to the Canrawer East Stream. This approach will in turn prevent pollution to this stream as a result of above ground flows.

The operation phase of the project has included for the provision of surface water management drainage infrastructure that comprises surface water drainage pipe work, interception, attenuation and discharge to ground via a soakaway to the east of the project site. The proposed permeable underground attenuation storage will be constructed above the water table and will be designed to allow the water to infiltrate through the unsaturated zone above the existing water table. According to the Teagasc Soils Map, the site is located within the zone classed as Faoldroim (1150FO) series. The soil associated with the Faoldroim series is classed as a free ‘fine loamy drift with limestones’ type soil. The infiltration of the water into the unsaturated

zone in the soil below and adjacent to the soakaway pits will allow for water collected from the proposed surface water drainage system within the site to be filtered through the unsaturated zone's clay and silt particles. The proposed soakaway pits will be designed to accommodate an additional 20% storage volume over the required design volumes for the facility, in order to ensure that there will be sufficient capacity for rainfall events. A petrol and oil interceptor will be installed immediately upstream of the proposed permeable underground attenuation storage unit in order to remove any petrol or oils that are washed from the surface of the proposed car park and other hardstanding areas into the proposed surface water drainage system.

The design of the operation phase surface water drainage infrastructure will provide safeguards to ensure that the project does not result in the discharge of polluted drainage waters to ground and downstream to the Canrawer East Stream via groundwater baseflows.

8.1.2 Construction Phase Mitigation

- All site personnel will be made aware of their environmental responsibilities at the site.
- Requirements for contractors will include contingency plans to deal with spillages, should they occur.
- Land disturbance will be kept to minimum and disturbed areas will be stabilised as soon as possible.
- Soil excavation should be undertaken during dry periods whenever possible.
- Site visits by a Design Engineer will be agreed in advance and will be undertaken at various stages of the construction process to ensure that the proposed SuDS scheme is being constructed in line with the design.
- An Environmental Manager will also be appointed who will have responsibility for ensuring attenuation measures are appropriately maintained.

8.1.2.1 Release of Sewerage

A self-contained port-a-loo system with an integrated waste holding tank will be used on site for toilet facilities. This will be maintained by the service contractor as required and will be removed from the site on completion of the construction phase.

8.1.2.2 Release of Cement-Based Pollutants

The Contractor is obliged to implement the following control measures to avoid the release of cement-based pollutants

- 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 culverts and 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 the chute need be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be tanked and removed from the site to a suitable, non-polluting, discharge location;
- Use weather forecasting to plan dry days for pouring concrete;
- Ensure pour site is free of standing water, and plastic covers will be ready in case of sudden rainfall event.
- Disposal of raw or uncured waste concrete will be controlled to ensure that watercourses or other sensitive areas will not be impacted
- No cement will be required for works associated with horizontal directional drilling under watercourses and no cement will be stored in the vicinity of watercourses during such works.

8.1.2.3 Release of Other Pollutants

All precautions will be taken to avoid spillages of diesel, oil or other polluting substances during the construction phase. The Contractor is obliged to implement the following measures to prevent contamination of watercourses:

- No refuelling of construction vehicles or plant will take place within the 50m surface water buffer zone.
- Undertaking refuelling of plant, equipment and vehicles will only be undertaken on impermeable surfaces.
- No maintenance of construction vehicles or plan will take place along the proposed route, except in a case of emergency.

- All potentially hazardous chemicals, fuel, hydraulic oils and lubricants will be stored in bunded areas (in accordance with established best practice guidelines) at the Contractor's Temporary Compound.
- In order to reduce the risk of contamination arising as a result of spills or leakages, all fuels, chemicals, liquid and solid waste will be stored on impermeable surfaces.
- If there is a requirement to store hazardous chemicals on site, they will be stored within a bunded, locked COSHH container, with upkeep and security ensured by the contractor.
- All tanks and drums are to be bunded in accordance with established best practice guidelines.
- Re-fuelling of construction equipment and the addition of hydraulic oil or lubricants to vehicles / equipment will take place in designated bunded areas within the main construction compound and not on-site where reasonably practicable. If it is not possible to bring machinery to the refuelling point, fuel will be brought to site by a 4x4 in a double skinned bowser with drip trays. The bowser/4x4 will be fully stocked with spill kits and absorbent material, with delivery personnel being fully trained to deal with any accidental spills. The bowser will be bunded appropriately for the fuel usage volume for the time period of the construction.
- The plant and machinery used will be regularly inspected for leaks and fitness for purpose.
- Spill kits will be readily available to deal with accidental spillage at all times.
- A segregated waste storage will be available at the site during the construction phase.
- Any accidental spills of fluids required on site during the construction phase will be cleaned up immediately and waste material stored in a suitable container before being removed from site and appropriately disposed of. All plant and machinery will be fully stocked with spill kits, hydrocarbon absorbent packs and absorbent material and operators will be fully trained in the use of this equipment.
- All existing road drains/culverts will be temporarily blocked during the drilling works to ensure that sediment or accidental spills do not reach any local watercourses.
- An inventory of all chemicals on site will be kept. It will include:
  - Procedures for storage of all materials listed
  - Location details of all materials listed
  - Volume and description of all substances stored on-site
  - Waste disposal records, including copies of all Waste Transfer Notes (WTN) detailing disposal routes and waste carriers used. Where waste is being shipped

abroad, a copy of the Trans Frontier Shipping (TFS) document must be obtained from Dublin City Council and kept on site along with details of the final destination and any relevant permits, licences or other relevant documentation.

- Chemical storage details will be part of routine site audits.
- Only where absolutely necessary should any hazardous waste be stored on site. If so, Hazardous Waste should be stored in a COSHH store. Only trained operatives should handle hazardous substances. Please note that COSHH data sheets are NOT risk assessments, and all risk assessment should be carried out separately. All stored hazardous waste will be clearly labelled. All of these will be regularly inspected for visual signs of leaks or something that would impact on their capacity – e.g. where a drip tray is full of rainwater.

8.2 MEASURES TO PREVENT THE SPREAD OF NON-NATIVE INVASIVE PLANT SPECIES

8.2.1 Eradication of Lesser Knotweed

The contractor appointed for the construction of the proposed development will be required to prepare a method statement detailing the approach to the eradication of Lesser Knotweed from the project site and the prevent of its spread within the site or to the wider surrounding environment including in particular the Canrawer East Stream.

In advance of works commencing the Lesser Knotweed infestation will be chemically treated with a herbicide treatment during the 2022 growing season. Spraying will commence in April 2022. Spraying will be undertaken by means of spot spraying the stand of Lesser Knotweed so that blanket spraying on site is avoided. Chemical treatment will continue during the 2022 growing season and during any subsequent growing season prior to the commencement of construction works.

For the construction phase the first item works to be completed for the project will be the implementation of control measures to eradicate the Lesser Knotweed infestation from the project site. In order to properly eradicate the stand of Lesser Knotweed from the site a similar approach that is employed for the eradication of Japanese Knotweed will be implemented. This will involve the provision of a root barrier membrane cell on site. The root barrier membrane cell will be provided within the footprint of the car park on site. All Lesser Knotweed above ground plant material and associated overburden contaminated material will be buried in the membrane cell beneath a minimum of 2m overburden. The burial cell will be located under the

footprint of the car park area and access road, depending on the space required for the infestation burial. All excavated material associated with the excavation of the infestation and all wash down from any machines and tools which have come into contact with the excavated material will also be contained in this root barrier cell ensuring that all material is wrapped in a suitable membrane and buried beneath a minimum of 2m deep of overburden within the footprint of the car park on site. The membrane used to wrap the contaminated soil shall have a 50 year guaranteed design life and be suitable for the containment of Japanese Knotweed. In addition and importantly the root barrier membrane will also be placed over the area of the lands where the contaminated material has been excavated from and will form the base of the formation layers for the car park in the Lesser Knotweed excavated area. The root barrier membrane will extend of a minimum of 7m in all directs from the excavated infestation, subject to the proposed development boundary limit. This will ensure that any Lesser Knotweed below ground root material at and surrounding the infestation site will be buried under the root protection membrane and the footprint of the car park and access road area.

8.2.2 Best Practice & Biosecurity

While it is noted that the presence of lesser knotweed has been recorded on site and that measures to eradicate this species from the project site are detailed in Section 8.2.1 above the following additional measures will be implemented as standard best practice approach to construction works on site. These measures will be put in place with the aim of avoiding the introduction of other non-native invasive plant species during the construction phase of the project. The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) can arise during construction works on development sites. Section 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 prohibits the introduction and dispersal of invasive alien species (particularly plant species) listed on Part 1 (third column) of the 'Third Schedule'.

All construction at the project site will have due regard to the relevant biosecurity measures outlined below:

- All plant machinery will be restricted from disturbing known colonies of invasive species.
- All plant machinery will avoid unnecessary crossings to adjoining lands.

Good site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (i.e. Japanese Knotweed (*Lesser Knotweed*), Himalayan Balsam

(*Impatiens glandulifera*), Himalayan Knotweed (*Persicaria wallichii)*, etc.) by thoroughly inspecting and washing vehicles prior to entering the works area.

The biosecurity measures outlined above are in line with best practice guidelines issued by the National Roads Authority (NRA, 2010) – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads and broadly based on the Environment Agency's (2013) – The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3, amended in 2013, accessed on the Environment Agency's website on the 11th of July 2016).

In addition to the above, Best Practise measures around the prevention and spread of Crayfish plague will be adhered with throughout all construction works and activities.

8.3 EVALUATION OF MITIGATION MEASURES

The mitigation measures and environmental safeguards outlined above for the construction phase of the project are taken from established best practice guidelines that have been successfully implemented for a wide range of project-level infrastructural developments. These measures have undergone extensive and rigorous monitoring for their effectiveness at development sites where they have previously been applied to ensure adverse environmental impacts are avoided.

The best practice guidance that have informed the mitigation measures and environmental safeguards proposed in this NIS and that will be adhered to throughout the construction and operation of the proposed development include:

- The Good Practice Guidance notes proposed by EA/SEPA/EHS:
- PPG1: General Guide to the Prevention of Water Pollution
- PPG2: Above ground oil storage tanks
- PPG4: The disposal of sewage where no Main Drainage is Available
- PPG5: Works In, Near or Liable to Affect Watercourses
- PPG10: Working at Construction and Demolition Sites.
- PPG21: Pollution Incident Response Planning

- PPG26: Dealing with Spillages on Highways
- CIRIA Environmental Good Practice on Site
- CIRIA Control of Water Pollution from Construction Sites. Technical Guidance C648
- CIRIA SuDS Manual Technical Guidance C697
- Managing Japanese knotweed on development sites - The Knotweed Code of Practice produced by the Environmental Agency (2013)[4];
- NRA Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (2010)[5];
- Managing Invasive Non-native Plants in or near Freshwater, Environment Agency (2010)[6];
- Best Practice Management Guidelines Japanese knotweed *Lesser Knotweed*, Invasive Species Ireland (2015);
- IFI Biosecurity Protocol for Field Survey Work, Inland Fisheries Ireland (2010[7]).

9.0 CONCLUSION

This NIS presents an analysis of the potential for the project to result in adverse impacts to the relevant qualifying features of interest of the Lough Corrib SAC and the Lough Corrib SPA identified during a screening for Appropriate Assessment for this project as occurring within

[4] http://cfinns.scrt.co.uk/wp-content/uploads/2014/06/2013-code-of-practice.pdf

[5] https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf

[6] https://www.midsussex.gov.uk/media/1725/managing-invasive-non-native-plants.pdf

[7] https://www.fisheriesireland.ie/Biosecurity/biosecurity-protocol-for-field-survey-work.html

its zone of influence. An evaluation of the potential impacts to these European Sites has been completed.

During the evaluation of potential impacts associated with the discharge of drainage waters and the presence of non-native invasive plant species it was found that, in the absence of mitigation measures, the potential will exist for contaminants to be released from the project site to the Owenriff River catchment and for adverse impacts to the qualifying species of the Lough Corrib SAC and the Lough Corrib SPA. The potential for the spread of Lesser Knotweed and any other non-native invasive species that could be introduced during the construction phase of the project was also identified as a potential adverse impact to these European Sites.

A range of mitigation measures have been prescribed in this NIS that aim to avoid the discharge of contaminated surface drainage waters from the project site to the Owenriff River catchment. These mitigation measures have been evaluated and reference has been made to their inclusion in published Guideline documentation. It has been concluded that, provide all mitigation measures that aim to avoid the discharge of contaminated surface drainage waters are implemented, the potential for this impact to occur will be eliminated and associated adverse impacts to the Owenriff River catchment and the Lough Corrib SAC and the Lough Corrib SPA will not arise.

Bespoke mitigation measures have been outlined for the treatment of the Lesser Knotweed infestation on site and for the prevention of the introduction of any other non-native invasive species through the implementation of biosecurity measures. The implementation of these measures will provide effective safeguards preventing the spread of non-native invasive species from the project site to the Owenriff River catchment and the Lough Corrib European Sites.

Based upon the information provided in this NIS, it is the considered view of the authors of this NIS that it can be concluded by competent authority that the project will not, alone or in-combination with other plans or projects, result in significant adverse effects to the integrity and conservation status of European Sites in view of their Conservation Objectives and on the basis of best scientific evidence and there is no reasonable scientific doubt as to that conclusion.

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