

COMHAIRLE CONTAE AN CHLÁIR CLARE COUNTY COUNCIL

Ms Carmel Kirby Director of Services Physical Development Directorate

March 26th 2021

Re: N19 Shannon Airport Access Road Improvement Scheme - Ground Investigation Design Stage Contract Appropriate Assessment Screening Report

Dear Carmel

Enclosed is a copy of the "Appropriate Assessment Screening Report" in respect of proposed Ground Investigation Works for the N19 Shannon Airport Access Road Improvement Scheme. I also enclose a copy of correspondence from Sheila Downes, Environmental Assessment Officer, Clare County Council dated 22nd February 2021 agreeing with the findings of the above report that a full Appropriate Assessment is not required in respect of the proposed Ground Investigation Works.

Having considered the above report and the recommendations of the Environmental Assessment Officer, I recommend your approval that Clare County Council has carried out an Appropriate Assessment (AA) Screening Report (prepared by Fehily Timoney / Clandillon Civil Consulting) and has determined that a full Appropriate Assessment is not required in respect of these proposed Ground Investigation Works.

Notification of this determination shall be made available to the public on the N19 Shannon Airport Access Road Improvement Scheme project website (<u>www.shannonaccess.ie</u>) in accordance with the regulations.

Yours sincerely,

Seán Lenihan BE CEng FIEI Senior Engineer

APPROVED: CARMEL KIRBY

DIRECTOR OF SERVICES

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N19 SHANNON AIRPORT ACCESS ROAD IMPROVEMENT SCHEME

APPROPRIATE ASSESSMENT SCREENING REPORT FOR GROUND INVESTIGATION



February 2021

Rev 03



An Roinn lompair Turasóireachta agus Spóirt Department of Transport, Tourism and Sport











REVISION CONTROL SHEET

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Report Distribution:

Copy No. 1: Sean Lenihan, Senior Engineer, Clare County Council

- Copy No. 2: Sheila Downes, Environmental Assessment Officer, Clare County Council
- Copy No.3 : Seamus Linehan, Senior Executive Engineer, Mid-WestNational Road Design Office



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1 INTRODUCTION

Fehily Timoney and Company (FT) were commissioned by Clare County Council to prepare an Appropriate Assessment Screening Report, as required by Article 6 of Council Directive 92/43/EEC (Habitats Directive) with regards to a proposed ground investigation works within and along the margins of the N19 National Road; extending from Drumgeely Roundabout to Knockbeagh Point Roundabout within the townlands of Rineanna South and Drumgeely, Shannon, County Clare as illustrated in Figure 1. Information gathered from these works will be used to inform the N19 Shannon Airport Access Road Scheme.

In compliance with the provisions of Article 6 of the Habitats Directive, as implemented by Part XAB of the Planning and Development Act 2000, as amended, in circumstances where a proposed plan or project is likely to have a significant effect on a European (Natura 2000) site, either individually or in combination with other plans or projects, an Appropriate Assessment (AA) must be undertaken by the competent authority, of the implications for the site in view of the site's conservation objectives.

European sites comprise both Special Protection Areas (SPAs) for birds and Special Areas of Conservation (SACs) for habitats and species. The Habitats Directive formed a basis for the designation of SACs. Similarly, SPAs are legislated for under the Birds Directive (Council Directive 79/409/EEC on the Conservation of Wild Birds). In general terms, European sites are considered to be of exceptional importance in terms of rare, endangered, or vulnerable habitats and species within the European Community.

Article 6 of the Habitats Directive envisages a two-stage process, which is implemented in some detail by the provisions of sections 177U and 177V of the Planning and Development Act. Screening for appropriate assessment in accordance with section 177U is the first stage of the AA process (Stage One), in which the possibility of there being a significant effect on a European site is considered. Plans or projects that have no appreciable effect on a European site are thereby excluded, or screened out, at this stage of the process. Where screening concludes that there is the potential for significant effects, then it is necessary to carry out an AA (Stage Two) for the purposes of Article 6(3), and a Natura Impact Statement (NIS) is produced. The NIS, which forms the basis of the AA, considers the impact of a project or plan on the integrity of a European site and on its conservation objectives, and where necessary, draws up mitigation measures to avoid/minimise negative impacts.

The competent authority, in this case Clare County Council, in carrying out an AA, is required to make an examination, analysis, evaluation, findings, conclusions and a final determination as to whether or not the proposed works would be likely to have significant effects on the relevant European site(s) in view of their conservation objectives. To evaluate the potential impact(s) of the proposed ground investigation works on the European sites, all sites located within a 15 km radius of the works or those which are ecologically linked were considered. Please note that while a 15 km buffer is recommended for plans, there is no hard and fast rule for buffer size (EPA, 2009). A 15 km buffer was used as it encompasses a distance in which the qualifying features and special conservation interests of European sites may potentially be impacted with regards to the proposed works separately and in combination with other developments. However, European sites located outside of the 15 km buffer with potential links to the proposed works were also considered (e.g., hydrological connections) but no additional European sites were deemed to be within the zone of impact/influence.

The proposed works are not located within any European site.



Twelve European sites are located within 15 km of the proposed ground investigation works:

- Lower River Shannon cSAC (002165)
- River Shannon and River Fergus Estuaries SPA (004077)
- Lough Gash Turlough cSAC (000051)
- Askeaton Fen Complex SAC (002279)
- Curraghchase Woods cSAC (000174)
- Ratty River Cave SAC (002316)
- Barrigone cSAC (000432)
- Poulnagordon Cave (Quin) SAC (000064)
- Newhall and Edenvale Complex SAC (002091)
- Knockanira House SAC (002318)
- Kilkishen House SAC (002319)
- Old Domestic Building (Keevagh) SAC (002010)

The N19 at its closest point is located 30 m from the River Shannon Estuary which is designated as Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077). The closest ground investigation works will be located 41m and 42m respectively from the SAC and SPA. The section of the N19 being surveyed has hydrological links to the SAC/SPA via two watercourse crossings (see Section 4.1 for more information).

1.1 Legislative Requirements

The requirements for an AA are set out in the Habitats Directive 92/43/EEC. Articles 6(3) and 6(4) of this Directive states:

6(3) Any plan or project not directly connected with or necessary to the management of the site (Natura 2000 sites) but likely to have significant effect thereon, either individually or in combination with other plans or projects, shall be subject to Appropriate Assessment of its implications for the site in view of the site's conservation objectives.

In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

6(4) If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.



Where the site concerned hosts a priority natural habitat type and/or a priority species the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.

The statutory agency responsible for European sites is the National Parks and Wildlife Service (NPWS) of the Department of Culture, Heritage, and the Gaeltacht (DCHG). In December 2009 'Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities, Department of the Environment, Heritage and Local Government' was published (DoEHLG, 2009) with a minor amendment in 2010. This guidance document was prepared jointly by the NPWS and Planning Divisions of DoEHLG (now DCHG), with input from local authorities. Previously, in 2001, the European Commission issued a guidance document. This guidance document has been updated in the recently published European Commission (2018) "*Managing Natura 2000 sites the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*". This Appropriate Assessment Screening Report has been prepared in accordance with the relevant Irish and European Commission Guidance.

1.1.1 <u>Regulatory Context</u>

In 1997, the Habitats Directive was transposed into Irish National Law by the European Communities (Natural Habitats) Regulations, SI 94/1997 (as amended by <u>S.I. 233/1998</u> & <u>S.I. 378/2005</u>). The European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477/2011) revoked the 1997 Regulations (and amendments) as well as the European Communities (Birds and Natural Habitats) (Control of Recreational Activities) Regulations 2010. The purpose of the 2011 Regulations was to address transposition failures identified in the Court of Justice of the European Union (CJEU) judgements.

Following additional amendments in 2013 (S.I. 499/2013) and 2015 (S.I. 355/2015) the regulations are now cited as the European Communities (Birds and Natural Habitats) Regulations 2011 to 2015.

The Regulations have been prepared to address several judgments of the CJEU against Ireland, notably cases C-418/04 (*Commission v Ireland*) and C-183/05 (*Commission v Ireland*), in respect of failure to transpose elements of the Birds Directive and the Habitats Directive into Irish law.





2 METHODOLOGY

2.1 Appropriate Assessment

The Habitats Directive promotes a hierarchy of avoidance, mitigation, and compensatory measures to be addressed in the AA process. Firstly, a project should aim to avoid any negative impacts on European sites by identifying possible impacts early in the project and should design the project in order to avoid such impacts.

There are four stages in an AA, as outlined in the European Commission Guidance document (2001). The following is a brief summary of these steps:

- Stage One Screening: This stage examines the likely effects of a project either alone or in combination with other projects upon a European Site and considers whether it can be objectively concluded that these effects will not be significant.
- Stage Two Appropriate Assessment: In this stage, the impact of the project on the integrity of the European site is considered with respect to the conservation objectives of the site and to its structure and function. Mitigation measures should be applied to the point where no adverse impacts on the site(s) remain.
- Stage Three Assessment of Alternative Solutions: Should the Appropriate Assessment determine that adverse impacts are likely upon a European site, this stage examines alternative ways of implementing the project that, where possible, avoid these adverse impacts.
- Stage Four Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the Natura site will be necessary. European case law highlights that consideration must be given to alternatives outside the project area in carrying out the IROPI test. It is a rigorous test which projects are generally considered unlikely to pass.

In the preparation of this assessment therefore regard has been given to the Habitats Directive and the European Communities (Birds and Natural Habitats) Regulations 2011, and with reference to the relevant guidance, in particular:

- Assessment of Plans and Projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, European Commission 2001.
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin 2009.
- European Commission (2018). *Managing Natura 2000 sites. The provisions of Article 6 of the Habitats Directive 92/43/EEC.* Brussels, 21.11.2018 C (2018) 7621 final.

2.1.1 Impact Assessment

The first step in the screening process is to develop a list of European sites potentially affected by the proposed ground investigation works.



Each European site is reviewed to establish whether or not the proposed works are likely to have a significant effect on the integrity of the site, as defined by its structure and function, and its conservation objectives.

The qualifying interests of each European site are identified, and the potential threats are summarised into the following categories for the screening process, and described within the screening matrix as follows:

- Direct impacts refer to habitat loss or fragmentation arising from land-take requirements for development or agricultural purposes. Direct impacts can be as a result of a change in land use or management, such as the removal of agricultural practices that prevent scrub encroachment.
- Indirect and secondary impacts do not have a straight-line route between cause and effect, and it is
 potentially more challenging to ensure that all the possible indirect impacts of the plan (or project) in
 combination with other plans and projects have been established. These can arise when a
 development alters the hydrology of a catchment area, which in turn affects the movement of
 groundwater to a site, and the qualifying interests that rely on the maintenance of water levels.
 Deterioration in water quality can occur as both an indirect or direct consequence of development,
 which in turn changes the aquatic environment and reduces its capacity to support certain plants and
 animals. The introduction of invasive species can also be defined as an indirect impact, which results
 in increased movement of vectors (humans, fauna, surface water), and consequently the transfer of
 alien species from one area to another.
- Disturbance to fauna can arise directly through the loss of habitat (e.g., bat roosts) or indirectly through noise, vibration and increased activity associated with construction and operation.

2.2 Desktop Study

In order to complete the Screening for Appropriate Assessment certain information on the existing environment is required. A desk study was carried out to collate available information on the site's natural environment. This comprised a review of the following publications, data, and datasets:

- National Planning Framework, Project Ireland 2040
- Clare County Development Plan 2017-2023, as varied
- Clare Biodiversity Action Plan 2017-2023
- Shannon Town and Environs Local Area Plan 2012-2018
- Clare County Council Planning Enquiry System
- National Parks and Wildlife Service (NPWS) website and metadata available (<u>www.npws.ie</u>)
- OSI Aerial photography and 1:50,000 mapping
- National Biodiversity Data Centre (NBDC) (on-line map-viewer)
- BirdWatch Ireland website
- Geological Survey Ireland (GSI) area maps
- Environmental Protection Agency (EPA) (online map-viewer)
- River Catchment & Sub-catchment WFD dataset.



2.3 Field Study

The proposed ground investigation works are being undertaken to inform the N19 Shannon Airport Access Road. Due to the preliminary stage of the scheme no field surveys have been undertaken. Information has solely been obtained from desktop study.



3 PROPOSED WORKS

Proposed ground investigation works are located along within the road and margins of a 2.2km section of the N19 National Road which extends from Drumgeely Roundabout to Knockbeagh Point Roundabout; located in the townlands of Rineanna South and Drumgeely, Shannon, Co. Clare (see Figure 1). This section of the N19 is primarily a single carriageway and is comprised of a combination of bituminous and concrete surfaces and margins are mostly comprised of improved grassland.

Proposed ground investigation works follow a utility survey which has informed the locations of exploratory hole placement. The ground investigation work will be carried out to determine the ground and ground water conditions. Works also include a temporary compound and welfare facilities. Soil samples as well as groundwater samples will be collected as part of ground investigation works. Results from the proposed works will be used to inform the N19 Shannon Airport Access Road Scheme.

The proposed works include the following:

- Exploratory Holes:
 - 12 no. cable percussion (CP) borehole
 - o 8 n. Rotary Cored (RC) boreholes
 - 13 no. groundwater installation
 - o 23 no. trial pits
 - o 7 no. slit trenches
 - 18 no. cone penetration testing (CPT)
 - 19 no. dynamic probes
 - 6 no. soakaway tests
- Laboratory Tests (soil and groundwater)
- Temporary site compound and welfare facilities

Please see Appendix 2 for drawings showing locations of ground investigation work.

3.1 Ground Investigation Works

Except for Soakaway test locations, the location of ground investigation works is provided in Appendix 2. At the southern end of the N19, closest point to the Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077), existing distances of 41m and 42m respectively, will be maintained.



3.1.1 <u>Cable Percussive and Rotary Core Boreholes</u>

Cable persuasive boreholes are to be drilled to a final depth of 15m or refusal, whichever is reached first. A Dando 2000 cable percussion rig will be used with a 4x4 vehicle and 2-man crew. Assuming that no services are found, the 4x4 vehicle and drilling rig will be driven to the work location and the rig will be erected using the integral winch unit to lift the mast.

Rotary cores will be drilled to establish the type, quality and strength of the rock. The diameter of the core will be 75mm in bedrock and 100mm in soil. Rotary cored boreholes shall be cored to a minimum of 5m into rockhead. The rock core is recovered and sent for laboratory analysis. Boreholes shall be backfilled with a cement bentonite grout on completion.

Prior to the erection of the rig a site engineer and/or drilling crew will walk access routes and check work location for potential hazards, in particular overhead cables and dangerous ground conditions. The service drawings & location plans will be checked and marked. Safety signage and barrier protection will be set up where there is the potential for contact with pedestrians. The side stays and spreader bar will also be secured. If the presence of underground services is in any way suspected, moving the borehole location will be considered and hand digging a 1.20m deep inspection pit will be carried out, while continuing to use the CAT as the pit progresses. Boring will commence at a specified diameter using the standard tools and sinker bars and temporary threaded steel casing as ground conditions dictate. In situ testing will be performed as well as sampling. Once at the scheduled depth and on receipt of an appropriate instruction from the engineer, either a monitoring well will be constructed, or the borehole will be backfilled. The rig will then be dismantled and lowered prior to being moved to the next location.

3.1.2 Groundwater Installation

Groundwater installations will be undertaken following the creation of boreholes (see Section 3.1.1 above for details). Methods of developing groundwater installations will adhere to IS ISO 14686 (2003). Plate 3-1 provides an indicative diagram of groundwater installation.

Groundwater levels shall be monitored in all exploratory holes at the commencement and end of each working day and at each and every occurrence. Groundwater levels within monitoring wells/standpipes piezometers shall be monitored, using a hand dip meter, on a daily basis for 1 week immediately following borehole completion and on a weekly basis thereafter during fieldworks. Groundwater monitoring wells shall be monitored once a month, for six months, post fieldworks. See Section 3.2 for further information on laboratory testing. Once surveying is completed the groundwater installation will be dismantled and the borehole backfilled.





Plate 3-1: Indicative Groundwater Monitoring Instrumentation at Boreholes Locations

3.1.3 Trial Pits

Trial pits are to be excavated to a final depth of 4.5m using a tracked excavator which is likely to be a 13-ton machine. The specified locations will be excavated as shown on drawings and agreed with landowners prior to works. Turf and topsoil where present shall be stripped at the site of each trial pit and placed to the side for reuse.



After completion of the trial pit the topsoil shall be re-spread and the turf relayed. During works equipment, arisings and spoil will be placed so as not to present a hazard to the operatives or the general public. Backfilling of the pits will be carried out immediately following the completion of the excavation.

3.1.4 <u>Slit Trenches</u>

Slit trenches are to be excavated to a final depth of 3.0m using a tracked excavator (likely 13 ton), rock breaker and concrete saw to cut through concrete/blacktop. The specified locations will be excavated as shown on drawings (see Appendix 2). If necessary, break out concrete or black top material will be undertaken using concrete saws and a breaker attachment. Underlying material will be excavated by hand digging or by mechanical means or by a combination of the two as appropriate. Exposed services and excavated material will be logged and sampled in-situ. Backfilling of the trenches will be carried out immediately following the completion of the excavation. Arisings will be bagged and collected from the site for disposal to a licensed landfill. Concrete and black top material will be reinstated as required.

3.1.5 Cone Penetration Testing

Cone penetration testing (CPT) is to be drilled to a final depth of 20m or refusal via a truck mounted cone penetration rig. During CPT, a hydraulically pushes a solid 40mm diameter cone into the ground, measuring the resistance. No borehole is formed. CPT will be undertaken in the locations shown in drawings (see Appendix 2).

3.1.6 Dynamic Probes

Dynamic probes are to be drilled to a final depth of 3.0m via a portable Dando Terrier type rig with a dieselpowered chain driven winch which raises and drops a weighted hammer to advance successive probing rods into the soil. Hydraulic clamps are used when jacking out the probe rods on completion of the tests.

To undertake dynamic probes, the probing rig is set up on a level works site and levelled. The probe location is drilled to the scheduled depth or refusal, whichever is sooner. Prior to moving to the next exploratory hole location, Jack out rods on completion of test.

3.1.7 Soakaway tests

A maximum of 6 soakaway test locations will be undertaken within and along the margins of the N19. The location of soakaway tests will depend on the findings of trial pit ground investigations. Soakaway test locations will not be located any closer to European sites than the ground investigations work whose locations are known (see Appendix 2). That is, at the southern end of the N19 the location of the closest exploratory hole to the Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077) it at a distance of 41m and 42m respectively and this will be maintained.

Soakaway test locations to be excavated to a final depth of 3.0m via a tracked excavator (likely 13 ton) with a water bowser. The excavation is filled to an appropriate level from the bowser and the changes in water level are monitored as per BRE365. Once the test is complete the trial pit will be backfilled with arisings.



3.2 Laboratory Testing

3.2.1 Soil testing

Soils samples will be undertaken during ground investigation works. One dimensional consolidation tests on organic soils or peat shall be undertaken on 50mm thick specimens and will be held for sufficient time to allow secondary compression parameters to be derived.

Samples shall be transported in appropriate containers to a certified laboratory within 24 hours of the samples being taken and stored correctly until tested.

The following laboratory soil testing may be required:

- (a) Moisture content test on soil samples
- (b) Liquid limit, plastic limit, plasticity index test on soil samples
- (c) Particle size distribution (sieve and hydrometer) test on soil samples
- (d) Organic Matter Content, Loss on Ignition
- (e) Moisture Condition Value (MCV)
- (f) Dry Density/Moisture Content Relationship (2.5 and 4.5kg rammer, vibrating hammer)
- (g) California Bearing Ratio CBR (at natural and/or specified moisture content, soaked, etc.)
- (h) One dimensional consolidation test on soil samples using 20mm and 50mm thick specimens
- (i) Unconsolidated undrained triaxial compression test on soil samples without the measurement of pore water pressure (single stage or multistage)
- (j) Consolidated undrained triaxial compression test on soil samples with the measurement of pore water pressure (single stage or multistage)
- (k) Small/Large Shear box Test
- (I) Geoenvironmental "Suite D"
- (m) Geoenvironmental "Suite E"
- (n) Geoenvironmental "Suite H"
- (o) Unconfined Compressive Strength of rock samples
- (p) Point load test on rock samples

3.2.2 Groundwater testing

The laboratory and any sub-contracted laboratories engaged by the Contractor shall be accredited INAB, UKAS or equivalent EU bodies or demonstrate equivalent competence to undertake the analyses. See Table 3-1 for the groundwater testing suite for each groundwater sample:



Table 3-1:	Groundwater	Sampling
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Determinant	Unit	Minimum Reporting Value (MRV)
pH Value	pH units	+/- 0.01
Electrical Conductivity	μS/cm	10
Redox Potential	mv	0.1
Metals (As, Cr (total), Cr (VI), Cu, Ni, Se, Zn, Pb)	μg/l	1
Cadmium	μg/l	0.1
Mercury (low level)	μg/l	0.01
Cyanide (Total)	μg/l	1
Sulphide	mg/l	1
Sulphate total	mg/l	1
Hardness as CaCO ₃	mg/l	2
Ammoniacal Nitrogen as NH ₄ -N (speciated as Ammonium and Ammonia)	mg/l	0.1
Nitrate	mg/l	0.2
Nitrite	mg/l	0.1
Chloride	mg/l	1
Total Petroleum Hydrocarbons (TPH) with aliphatic / aromatic split including BTEX. MRL for each split)	μg/l	10
PAH - (16 speciated US EPA)	μg/l	0.01
Phenol	μg/l	0.1



3.3 Temporary site Compound and Welfare Facilities

The temporary site compound and welfare facilities will be located in the vicinity of works, on an existing built hard surface outside of any European Site. Welfare facilities shall be comprised of self-contained portable toilets with hand basin and hand dryer. The compound will provide for a temporary office and parking for a minimum of two cars. A crew of 5-6 people are anticipated for works.

3.4 Further Details

3.4.1 Artesian Water

Where artesian water is encountered during ground investigation works, the works will immediately cease. Containment of the artesian head will commence. In adherence with Engineers Ireland Specification for Ground Investigation, (2016). Casing will be extended above the existing ground level by as much as is practical. If extending the casing fails to stem the egress of groundwater, the borehole will be capped and fitted with a bypass and pressure gauge to measure the pressure head of the artesian water. Artesian water will be directed to roadside margins.

3.4.2 <u>Contaminated Water:</u>

In keeping with Engineers Ireland Specification for Ground Investigation (2016), as part of the site investigation procurement process, the Contractor will be required to develop a site- specific Risk Assessment and Method Statement (RAMS). The guidelines specify that *inter alia* the RAMS should include provision for the collection and safe disposal of contaminated soil and liquid arisings from exploratory holes. The Guidance notes that where works are within lands affected by contamination that the groundwater should also be treated as contaminated, and therefore any groundwater pumped from a trial pit or trench shall be collected and removed from site under license for safe disposal.

3.4.3 <u>Storage of Fuels or Lubricants:</u>

Hazardous substances associated with ground investigation activities are as follows:

- Diesel Oil: Used to fuel engine plant: Storage is in proprietary 5-gallon containers.
- Lubricating Oils and Greases: Used to lubricate plant.
- Hydraulic Oil: Used in excavator, rotary drilling rig,
- Bentonite Powder & Ordinary Portland cement: Used during reinstatement, installation of instruments and the construction of headworks (groundwater installations).

The Engineers Ireland Guidelines require that the operations are carried out by competent operatives and experienced ground practitioners. As such plant and equipment will be fit for purpose and in proper working order.

3.4.4 <u>Timing</u>

Ground investigation work is to be carried out between 8am and 6pm, Monday to Friday. Works will be carried out within Spring and/or summer for a maximum of 6 weeks.



3.4.5 <u>Safety</u>

The temporary compound and the site including plant/equipment will be made safe. In accordance with Engineer's Ireland guidelines (2016), where exploratory holes are to be left open and unattended for any period of time the excavation shall be made safe (see Plate 3-1) with the addition of perimeter fencing.

3.4.6 <u>Traffic Management</u>

A traffic management plan shall be provided prior to works and put in place and maintained during works, to ensure safe working conditions. Approvals for all traffic management (including road opening licence) will be received from both Clare County Council and the Gardai. A Traffic Safety and Control Officer shall make all the arrangements necessary for traffic safety and control in accordance with the Traffic Signs Manual (Chapter 8), Temporary Traffic Management Design Guidance and the Temporary Traffic Management Operations Guidance published by the Department of Transport, Tourism and Sport.

3.4.7 <u>Machinery</u>

Machinery for ground investigation works are as follows:

- Tracked excavator, typically 13 tonne
- Water bowser
- Dando 2000 drilling rig
- Track mounted reverse circulation drilling rig plus compressor
- 20 tonne truck mounted rig
- Excavator (JCS C3X or similar)
- Mini digger
- Dando Terrier rig

3.4.8 Wastes

During site works the following wastes will be produced:

- Groundwater
- Food waste
- Packaging (WEEE, mixed recyclables)
- Sanitary waste (portable toilets)
- Fuels and lubricants
- Arisings (soil, rock, tarmac, concrete)

Groundwater run-off will be allowed to soak into the ground in the works area. Runoff will not be permitted to leave the works area or enter any nearby watercourses. Where water is deemed to be 'contaminated' disposal will be in accordance with Engineers Ireland Specification for Ground Investigation (2016).



All food waste, packaging, fuels, and lubricants will be disposed of in accordance with current Irish waste disposal regulations.

With regards to sanitary waste and portable toilets, a licenced contractor collects and dispose of sanitary waste as required.

Arisings will be bagged and collected from the site for disposal to a licensed landfill.

Concrete and black top material required for the reinstatement of works will be ordered as required and any unused material will be removed off site after reinstatement works for use elsewhere.



4 STAGE ONE – SCREENING REPORT

4.1 Brief Description of the Existing Site

The section of the N19 National Road under consideration extends from Drumgeely Roundabout to Knockbeagh Point Roundabout. The proposed scheme is approximately 2.2 kilometres in length and currently comprises primarily single carriageway. The existing surface comprises a combination of bituminous and concrete surfaces. Geological Survey of Ireland (GSI) data indicates that the area is underlain by the Ballysteen Formation, which is described as a fossiliferous dark-grey muddy Limestone. Soil is described as alluvium which is generally underlain by gravelly Clay and angular cobbles.

Corine 2018 land cover¹ data indicates that the site is located within airports (124), industrial and commercial units (121) and discontinuous urban fabric (112). The greater area is comprised of same with the addition of pastures (231), intertidal flats (423) and land principally occupied by agriculture with significant areas of natural vegetation (243), mixed forests (313 and estuaries (522). Shannon Estuary is located to the south, south east and east of the proposed ground investigation works. The southern end of the N19 is located approximately 30m from the estuary at its closest point. Shannon Estuary is designated as River Shannon and River Fergus SPA (site code: 004077), Lower River Shannon cSAC (site code: 002165) and Fergus Estuary and Inner Shannon, North Shore pNHA (site code: 002048).

From aerial mapping marginal land of the lower Shannon Airport half of the N19 appears to be comprised of managed improved grassland with a young sparse treeline and path to the airport side (west) and mostly managed improved grassland accompanied by native semi mature treelines along the estuary side (east) which screen the road; as well as buildings and parking areas where access to the estuary can be gained. Areas of reedbed and rough grass habitat are visible along the estuary side of the N19 where there are breaks in treeline screening.

The marginal land of the upper Shannon Town half of the N19 is mostly comprised of conifer woodland with native deciduous scrub and rough grassland along the road edge with a path present at the lower part of the road along the Shannon Industrial Estate side (west side). The road margin of the Shannon Town side (closest side to the estuary) is comprised of managed improved grassland accompanied by native young treelines and hedgerow and path which block views of the town.

Records from the NBDC indicate that within the 2km grid square (R364) which the proposed works are located, no invasive plant species have been recorded.

Access to the estuary as well as Shannon Airport Lagoon is attainable along the N19 on the approach to Shannon Airport and at multiple locations at the edge of Shannon Town. A footpath runs along the edge of the estuary from the Shannon Airport area east, along the southern edge of Shannon Town and on to Shannon Wastewater Treatment Plant, where the path stops. A dirt path then continues along the edge of the estuary east where Shannon Town ends and there are agricultural fields.

The proposed ground investigation works are located within the Shannon Estuary North Catchment (catchment ID: 17²) and the N19 is located 30m at its closest point to the Shannon Estuary and ground investigation works will be located 41m at their closest point to the estuary.

¹ Corine 2018 data: EPA Maps (mapviewer); <u>https://gis.epa.ie/EPAMaps/</u> viewed 08/12/20.

² WFD Catchments: EPA Maps (mapviewer); <u>https://gis.epa.ie/EPAMaps/</u> viewed 08/12/20.



The proposed works site is hydrologically linked to the Shannon Estuary via two second order watercourses; Urlan_Beg stream and Clonloghan stream³ (for more information see Table 4-1). The Shannon Estuary is designated as the Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077).

The existing N19 crosses both of the streams via culverts and are located at the more northern/eastern half of the proposed works. Aerial mapping indicates that both streams in the vicinity of the proposed works are improved and straight like drainage ditches. Urlan_Beg stream is located 315m (direct distance) at its closest point from N19 to Shannon Estuary. Clonloghan stream is located 353m at its closest point from the N19 to Shannon Estuary. A water quality Q-Value for the streams was not available and their risk projection is under review. However Upper Shannon Estuary (location of the receiving waters) water quality status is unpolluted⁴ whilst it is projected to be at risk⁵. Proposed survey and investigation works are located within the Tull-Newmarket on Fergus⁶ ground waterbody and its 2013-2018 WFD status is 'Good' or Q4.

Table 4-1: Hydrological links Between the proposed ground investigation works and the Shannon Estuary

Catchment ⁷	Sub Catchment ⁸	Sub River Basin ⁹	Watercourse ¹⁰	N19 Crossing Location
Shannon Estuary	Pollygingen SC 010	Urlan Dog. 010	Urlan_Beg	52.698292, -8.900242
North (ID: 27)	Danygneen_SC_010	Unan beg_010	Clonloghan	52.701551, -8.897065

³ EPA name, River Network; EPA Maps (mapviewer); <u>https://gis.epa.ie/EPAMaps/</u> viewed 08/20/20.

⁴ Transitional Water Quality 2010-2012: EPA Maps (mapviewer); <u>https://gis.epa.ie/EPAMaps/</u> viewed 08/20/20.

⁵ Transitional Waterbodies Risk: EPA Maps (mapviewer); <u>https://gis.epa.ie/EPAMaps/</u> viewed 08/20/20.

⁶ 2013-2018 WFD Ground waterbodies Risk: EPA Maps (mapviewer); <u>https://gis.epa.ie/EPAMaps/</u> viewed 08/20/20.

⁷ WFD Catchments: EPA Maps (mapviewer); <u>https://gis.epa.ie/EPAMaps/</u> viewed 08/20/20.

⁸ WFD Sub Catchment: EPA Maps (mapviewer); <u>https://gis.epa.ie/EPAMaps/</u> viewed 08/20/20.

⁹ WFD Sub River Basin: EPA Maps (mapviewer); <u>https://gis.epa.ie/EPAMaps/</u> viewed 08/20/20.

¹⁰ WFD Catchments: EPA Maps (mapviewer); <u>https://gis.epa.ie/EPAMaps/</u> viewed 08/20/20.



4.2 Brief Description of the European Sites within 15km of the area of Proposed Works

There are twelve European sites within the zone of impact influence (15 km) of ground investigation works (see Figure 2). Of these, 11 are SACs and one is a SPA. Table 4-2 lists the European sites located within 15 km of ground investigation works, including their qualifying interests, conservation objectives and known threats to these sites (according to information provided by the NPWS (www.npws.ie). The twelve sites are as follows:

- Lower River Shannon cSAC (002165)
- River Shannon and River Fergus Estuaries SPA (004077)
- Lough Gash Turlough cSAC (000051)
- Askeaton Fen Complex SAC (002279)
- Curraghchase Woods cSAC (000174)
- Ratty River Cave SAC (002316)
- Barrigone cSAC (000432)
- Poulnagordon Cave (Quin) SAC (000064)
- Newhall and Edenvale Complex SAC (002091)
- Knockanira House SAC (002318)
- Kilkishen House SAC (002319)
- Old Domestic Building (Keevagh) SAC (002010)

The N19 is located within the Shannon Estuary North Catchment, as are Lough Gash Turlough cSAC (000051), Ratty River Cave SAC (002316), Poulnagordon Cave (Quin) SAC (000064), Knockanira House SAC (002318), Kilkishen House SAC (002319), Old Domestic Building (Keevagh) SAC (002010), Newhall and Edenvale Complex SAC (002091) and limited sections of the northern margins of the Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077). Barrigone cSAC (000432), Curraghchase Woods cSAC (000174) and Askeaton Fen Complex SAC (002279) are located in Shannon Estuary South Catchment. Except for Poulnagordon Cave (Quin) SAC (000064), Knockanira House SAC (002318), Kilkishen House SAC (002319), Old Domestic Building (Keevagh) SAC (002010), Newhall and Edenvale Complex SAC (002091), Barrigone cSAC (000432) and Curraghchase Woods cSAC (000174) all of the European sites have hydrological links to the Shannon Estuary.

Due to the lack of any hydrological link, works being localised and relatively small in scale and distances of a minimum of 12.4km from proposed investigation works, Poulnagordon Cave (Quin) SAC, Knockanira House SAC, Kilkishen House, Old Domestic Building (Keevagh) SAC, Newhall, and Edenvale Complex SAC, Barrigone cSAC and Curraghchase Woods cSAC can be immediately screened out.

There is potential for silt and water discharge from the proposed investigation works, into the Shannon Estuary due to indirect hydrological links to the estuary (northern bank). Ratty River Cave SAC has a remote indirect hydrological connection to the Shannon Estuary via the Owenogarney¹¹ stream.

¹¹ EPA name, River Network; EPA Maps (mapviewer); <u>https://gis.epa.ie/EPAMaps/</u> viewed 08/12/20.



At its closest hydrological connection Ratty River Cave SAC is located 6km (direct distance) upstream of the Shannon Estuary and another 8km (direct distance) east from where the Owenogarney stream enters the Shannon Estuary and where any potential discharge from works would enter the estuary. Due to the lack of a direct hydrological link, works being localised and relatively small in scale and distance of 10.2km Ratty River Cave SAC can be screened out.

Whilst Askeaton Fen Complex SAC has a remote indirect hydrological connection to the Shannon Estuary through a number of streams which feed into the estuary. At its closest hydrological connection (Dromlohan 24¹²), Askeaton Fen Complex SAC is located 4km upstream of the Shannon Estuary on the opposite side of the estuary (southern bank as opposed to northern bank) to where survey and investigation works are proposed. At the nearest point where the connecting stream (Dromlohan 24) discharges into the estuary (southern bank), there is another 3.4km from where potential discharge would enter the Shannon Estuary (northern bank). Due to the lack of a direct hydrological link, works being localised and relatively small in scale and distance 6.4km, Askeaton Fen Complex SAC can be screened out.

Lough Gash cSAC is located within the same subcatchment as the location of the proposed survey and investigation works. However, the cSAC is not connected directly or indirectly via stream or river to the location of works. Also, the cSAC is located within GWDTE-Lough Gash Turlough (SAC000051) ground waterbody whilst the proposed survey and investigation works are located within Tulla-Newmarket on Fergus ¹³ ground waterbody. Whilst the cSAC does feed into Shannon Estuary (via Boherraroan waterbody¹⁴) the cSAC is located 3km upstream of the Shannon Estuary. From where the connecting stream feeds into the Shannon Estuary there is another ca. 11km from that point to where any discharge from proposed survey or investigation works would enter the Shannon Estuary. Due to the lack of any direct hydrological link, works being localised and relatively small in scale, Lough Gash cSAC (000051) can be screened out.

At this point ten of the 12 European sites can be screened out. Due to the lack of a direct hydrological link, works being localised and relatively small in scale and distance, Lough Gash Turlough cSAC (000051), Askeaton Fen Complex SAC (002279), Curraghchase Woods cSAC (000174), Ratty River Cave SAC (002316), Barrigone cSAC (000432), Poulnagordon Cave (Quin) SAC (000064), Newhall and Edenvale Complex SAC (002091), Knockanira House SAC (002318), Kilkishen House SAC (002319) and Old Domestic Building (Keevagh) SAC (002010) are screened out from further assessment.

Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077) will be discussed further in the below sections. See Table 4-2 for further details of screened out European sites.

¹² EPA name, River Network: EPA Maps (mapviewer); <u>https://gis.epa.ie/EPAMaps/</u> viewed 08/12/20.

¹³ 2013-2018 WFD Ground waterbodies Risk: EPA Maps (mapviewer); <u>https://gis.epa.ie/EPAMaps/</u> viewed 08/12/20.

¹⁴ EPA name, River Network: EPA Maps (mapviewer); <u>https://gis.epa.ie/EPAMaps/</u> viewed 08/12/20.



Table 4-2:	European Sit	es Screened Out

Designated Site (Site Code)	Direct-line Distance from proposed ground investigation works (km)	Conservation Objectives	Qualifying Interests	Threats and Pressures	Screening Rationale
Lower River Shannon cSAC (002165)	41m	To restore (R) /maintain (M) the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the cSAC has been selected (further details available in Appendix 3)	 Sandbanks which are slightly covered by sea water all the time [1110] (M) Estuaries [1130] (M) Mudflats and sandflats not covered by seawater at low tide [1140] (M) Coastal lagoons [1150] (R) Large shallow inlets and bays [1160] (M) Reefs [1170] (M) Perennial vegetation of stony banks [1220] (M) Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] (M) Salicornia and other annuals colonising mud and sand [1310] (M) 	 High level impacts: I01 - invasive nonnative species (inside site) D01.01 - paths, tracks, cycling tracks (inside site) G01.01 - nautical sports (inside site) B - sylviculture, forestry (inside site) F01 - marine and freshwater aquaculture (inside site) F03.01 - hunting (inside site) C01.01.02 - removal of beach materials (inside site) C01.03.01 - hand cutting of peat (inside site) J02.12.01 - sea defense or coast protection works, tidal barrages (inside site) 	 This site is screened out because: Works are localised and relatively small in scale. Any groundwater pumped from a trial pit or trench shall be regarded as contaminated and will be collected and disposed of In the unlikely event of silts entering watercourses, there is a dilution factor available along the watercourse and in the estuary and therefore it is unlikely to have an effect on the Qis.



Designated Site (Site Code)	Direct-line Distance from proposed ground investigation works (km)	Conservation Objectives	Qualifying Interests	Threats and Pressures	Screening Rationale
			 Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] (R) Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] (R) Water courses of plain to montane levels with the <i>Ranunculion fluitantis and Callitricho-Batrachion</i> vegetation [3260] (M) Molinia meadows on calcareous, peaty, or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] (M) Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion, Alnion incanae, Salicion albae</i>) [91E0] (R) Margaritifera (Freshwater Pearl Mussel) [1029] (R) 	 J02.10 - management of aquatic and bank vegetation for drainage purposes (inside site) <u>Medium level impacts:</u> A08 - fertilisation (outside site) E01 - urbanised areas, human habitation (outside site) H04 - air pollution, air-borne pollutants (outside site) H04 - fertilisation (inside site) A08 - fertilisation (inside site) E03 - discharges (outside site) K02.03 - eutrophication (natural) (outside site) E03 - discharges (inside site) E03 - discharges (inside site) A04 - grazing (inside site) 	



Designated Site (Site Code)	Direct-line Distance from proposed ground investigation works (km)	Conservation Objectives	Qualifying Interests	Threats and Pressures	Screening Rationale
			 Petromyzon marinus (Sea Lamprey) [1095] (R) Lampetra planeri (Brook Lamprey) [1096] (M) Lampetra fluviatilis (River Lamprey) [1099] Salmo salar (Salmon) [1106] (R) Tursiops truncatus (Common Bottlenose Dolphin) [1349] (M) Lutra (Otter) [1355] (R) 	 J02.01.01 - polderisation (inside site) J02.01.02 - reclamation of land from sea, estuary, or marsh (outside site) Low level impacts: I01 - invasive non- native species (inside site) D01.01 - paths, tracks, cycling tracks (inside site) G01.01 - nautical sports (inside site) B - sylviculture, forestry (inside site) F01 - marine and freshwater aquaculture (inside site) F03.01 - hunting (inside site) C01.01.02 - removal of beach materials (inside site) C01.03.01 - hand cutting of peat (inside site) 	



Designated Site (Site Code)	Direct-line Distance from proposed ground investigation works (km)	Conservation Objectives	Qualifying Interests	Threats and Pressures	Screening Rationale
				 J02.12.01 - sea defense or coast protection works, tidal barrages (inside site) J02.10 - management of aquatic and bank vegetation for drainage purposes (inside site) 	
River Shannon and River Fergus Estuaries SPA (004077)	42m	To maintain the favourable conservation condition of the bird species listed as Special Conservation Interests for the SPA (further details available in Appendix 3)	 Cormorant (<i>Phalacrocorax</i> <i>carbo</i>) [A017] Whooper Swan (<i>Cygnus cygnus</i>) [A038] Light-bellied Brent Goose (<i>Branta</i> <i>bernicla hrota</i>) [A046] Shelduck (<i>Tadorna</i> <i>tadorna</i>) [A048] Wigeon (<i>Anas</i> <i>penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] 	 High level impacts: E02 - industrial or commercial areas (outside site) E03 - discharges (inside site) A08 - fertilisation (outside site) E01 - urbanised areas, human habitation (outside site) E01 - urbanised areas, human habitation (outside site) E01 - urbanised areas, human habitation (outside site) 	 This site is screened out because: Works to be undertaken in Spring/Summer and therefore outside the wintering bird season, eliminating the potential for effects on wintering birds. Works are localised and relatively small in scale. Any groundwater pumped from a trial pit or trench shall be regarded as contaminated and will be collected and will be collected and



Designated Site (Site Code)	Direct-line Distance from proposed ground investigation works (km)	Conservation Objectives	Qualifying Interests	Threats and Pressures	Screening Rationale
			 Pintail (Anas acuta) [A054] Shoveler (Anas clypeata) [A056] Scaup (Aythya marila) [A062] Ringed Plover (Charadrius hiaticula) [A137] Golden Plover (Pluvialis apricaria) [A140] Grey Plover (Pluvialis squatarola) [A141] Lapwing (Vanellus vanellus) [A142] Knot (Calidris canutus) [A143] Dunlin (Calidris alpina) [A149] Black-tailed Godwit (Limosa limosa) [A156] 	 D03.02 - shipping lanes (inside site) F01 - marine and freshwater aquaculture (inside site) Low level impacts: n/a	disposed of in the unlikely event of silts entering watercourses, there is a dilution factor available along the watercourse and in the estuary and therefore it is unlikely to influence the SCIs.



Designated Site (Site Code)	Direct-line Distance from proposed ground investigation works (km)	Conservation Objectives	Qualifying Interests	Threats and Pressures	Screening Rationale
			 Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa totanus</i>) [A162] Greenshank (<i>Tringa nebularia</i>) [A164] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999] 		
Lough Gash Turlough cSAC (000051)	5.5km	To maintain the favourable conservation condition of the Annex I habitat(s) for which the cSAC has been selected (further details available in Appendix 3)	 Turloughs [3180] Rivers with muddy banks with <i>Chenopodion rubri</i> <i>p.p.</i> and <i>Bidention</i> <i>p.p.</i> vegetation [3270] 	 High level impacts: H01.08- diffuse pollution to surface waters due to household sewage and waste waters (inside site) <u>Medium level</u> impacts: E01 - urbanised areas, human habitation (outside site) 	 This site is screened out because: In separate groundwater body No direct hydrological link Distance between the site and the ground investigation works.



Designated Site (Site Code)	Direct-line Distance from proposed ground investigation works (km)	Conservation Objectives	Qualifying Interests	Threats and Pressures	Screening Rationale
				 Low level impacts: A08 - fertilisation (outside site) D01.02 - roads, motorways (outside site) A04 - grazing (inside site) F03.01 - hunting (inside site) A10.01 - Removal of hedges and copses or scrub (inside site) 	
Askeaton Fen Complex SAC (002279)	6.4km	To maintain the favourable conservation condition of the Annex I habitat(s) for which the SAC has been selected (further details available in Appendix 3)	 Calcareous fens with Cladium mariscus and species of the Caricion davallianae [7210] Alkaline fens [7230] 	 <u>High level impacts:</u> J01 - fire and fire suppression (inside site) J02.01.02 - reclamation of land from sea, estuary, or marsh (inside site) <u>Medium level impacts:</u> A10.01 - removal of hedges and copses or scrub (inside site) H02 - pollution to groundwater (point 	 This site is screened out because: No direct hydrological link (in separate catchment) Distance between the site and ground investigation works;



Designated Site (Site Code)	Direct-line Distance from proposed ground investigation works (km)	Conservation Objectives	Qualifying Interests	Threats and Pressures	Screening Rationale
				 sources and diffuse sources) (outside site) E01.03 - dispersed habitation (inside site) A08 - fertilisation (inside site) Low level impacts: n/a 	
Curraghchase Woods cSAC (000174)	8.3km	To restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the cSAC has been selected (further details available in Appendix 3)	 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0] Taxus baccata woods of the British Isles [91J0] Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303] 	High level impacts: J02.02.01 - dredging/ removal of limnic sediments (inside site) Medium level impacts: G05.04 - vandalism (inside site) B02 - forest and Plantation management & use (inside site) Low level impacts: G01 - outdoor sports and leisure activities, recreational	 This site is screened out because: No hydrological link (in separate catchment and has no hydrological link to the Shannon Estuary). Distance between the site and ground investigation works;



Designated Site (Site Code)	Direct-line Distance from proposed ground investigation works (km)	Conservation Objectives	Qualifying Interests	Threats and Pressures	Screening Rationale
				activities (inside site)	
Ratty River Cave SAC (002316)	10.2km	To restore the favourable conservation condition of the Annex I habitatand the Annex II species for which the SAC has been selected (further details available in Appendix 3)	 Caves do not open to the public [8310] Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303] 	High level impacts:E06.01 - Demolishmentof buildings & humanstructures (inside site)A10.01 - Removal ofhedges and copses orscrub (inside site)(outside site)Medium level impacts:n/aLow level impacts:A10.01 - Removal ofhedges and copses orscrub (inside site)	 This site is screened out because: No direct hydrological link Distance between the site and ground investigation works.
Barrigone cSAC (000432)	12.2km	To restore (R) /maintain (M) the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the cSAC has been selected (further details available in Appendix 3)	 Juniperus communis formations on heaths or calcareous grasslands [5130] (R) Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco- Brometalia) (* 	 High level impacts: K02.01 (inside site) A04.03- species composition change (succession) - abandonment of pastoral systems, lack of grazing (inside site) Medium level impacts: 	 This site is screened out because: No hydrological link (in separate catchment) and has no hydrological link to the Shannon Estuary). Distance between the site and ground investigation works



Designated Site (Site Code)	Direct-line Distance from proposed ground investigation works (km)	Conservation Objectives	Qualifying Interests	Threats and Pressures	Screening Rationale
			 important orchid sites) [6210] (R) Limestone pavements [8240] (M) Euphydryas aurinia (Marsh Fritillary) [1065] (M) 	(n/a) <u>Low level impacts:</u> (n/a)	
Poulnagordon Cave (Quin) SAC (000064)	12.4km	To maintain the favourable conservation condition of the Annex I habitat and the Annex II species for which the SAC has been selected (further details available in Appendix 3)	 Caves do not open to the public [8310] (M) Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303] (M) 	High level impacts:A10.01 - Removal ofhedges and copses orscrub (inside site)(outside site)(outside site)Medium level impacts:E01- urbanised areas,human habitation(outside site)Low level impacts:G05.04 - vandalism(inside site)G01.04.03 -Recreational cave visits(inside site)	 This site is screened out because: No hydrological link Distance between the site and ground investigation works.


Designated Site (Site Code)	Direct-line Distance from proposed ground investigation works (km)	Conservation Objectives	Qualifying Interests	Threats and Pressures	Screening Rationale
Newhall and Edenvale Complex SAC (002091)	13.8km	To maintain the favourable conservation condition of Lesser Horseshoe Bat population for which the SAC has been selected (further details available in Appendix 3)	 Caves do not open to the public [8310] <i>Rhinolophus</i> <i>hipposideros</i> (Lesser Horseshoe Bat) [1303] 	High level impacts:Not applicable (n/a)Medium level impacts:• A04 – grazing (outside site)Low level impacts:• G05.04 - vandalism (inside site)• A04 – grazing (inside site)• A04 – grazing (inside site)	 This site is screened out because: No hydrological link (in separate subcatchment from the proposed works and no hydrological link to the Shannon Estuary). Distance between the site and ground investigation works.
Knockanira House SAC (002318,)	13.8km	To restore the favourable conservation condition of Lesser Horseshoe Bat population for which the SAC has been selected (further details available in Appendix 3)	 Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303] 	<u>High level impacts:</u> n/a <u>Medium level impacts:</u> • A04 – grazing (outside site) <u>Low level impacts:</u> n/a	 This site is screened out because: No hydrological link Distance between the site and ground investigation works.
Kilkishen House SAC (002319)	14km	To restore the favourable conservation condition of Lesser Horseshoe Bat population for which the SAC has been selected	 Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303] 	 High level impacts: E06.01 - Demolishment of buildings & human 	This site is screened out because:No hydrological link



Designated Site (Site Code)	Direct-line Distance from proposed ground investigation works (km)	Conservation Objectives	Qualifying Interests	Threats and Pressures	Screening Rationale
		(further details available in Appendix 3)		structures (inside site) <u>Medium level</u> <u>impacts:</u> • A10.01 - Removal of hedges and copses or scrub (inside site) • A10.01 - Removal of hedges and copses or scrub (outside site) <u>Low level impacts:</u> n/a	 Distance between the site and ground investigation works.
Old Domestic Building (Keevagh) SAC (002010)	14.2km	To restore the favourable conservation condition of Lesser Horseshoe Bat population for which the SAC has been selected (further details available in Appendix 3)	 Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303] 	 <u>High level impacts:</u> n/a <u>Medium level impacts:</u> A04 – grazing (outside site) <u>Low level impacts:</u> 	 This site is screened out because: No hydrological link Distance between the site and ground investigation works.

Path: R-\Ma

nt P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kada nce Survey, Esri Japan, METI, Esri China (Hong Kong), (c) C Mapping Reproduced Under Licence from the Ord eland Licence No. EN 0001220 © G







4.3 Conservation Objectives

According to the Habitat's Directive, the *conservation status of a natural habitat* will be taken as 'favourable' within its biogeographic range when:

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

According to the Habitat's Directive, the conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as 'favourable' within its biogeographic range when:

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

The specific conservation objectives for each site are available on www.npws.ie. These have been accessed for the sites listed in Table 4-2 above on the 8th December 2020.

Detailed site-specific conservation objectives were available for all European sites:

- Lower River Shannon cSAC (002165); published 7th August 2012 (Version 1.0)
- River Shannon and River Fergus Estuaries SPA (004077); published 17th September 2012 (Version 1.0)
- Lough Gash Turlough cSAC (000051); published 20th November 2017 (Version 1)
- Askeaton Fen Complex SAC (002279); published 18th May 2018 (Version 1)
- Curraghchase Woods cSAC (000174); published 30th July 2018 (Version 2018)
- Ratty River Cave SAC (002316); published 30th July 2018 (Version 1)
- Barrigone cSAC (000432); published 15th February 2019 (Version 1)
- Poulnagordon Cave (Quin) SAC (000064); published 10th July 2018 (Version 1)
- Newhall and Edenvale Complex SAC (002091); published 30th July 2018 (Version 1)
- Knockanira House SAC (002318); published 24th July 2018 (Version 1)
- Kilkishen House SAC (002319); published 31st July 2018 (Version 1)
- Old Domestic Building (Keevagh) SAC (002010); published 24th July 2018 (Version 1)



Supporting documents for European sites are as follows:

Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077):

- NPWS (2012). Lower River Shannon SAC (site code: 2165) Conservation objectives supporting document
 marine habitats and species (Version 1).
- NPWS (2012). Lower River Shannon SAC (002165) Conservation objectives supporting document coastal habitats [Version 1]
- NPWS (2012). Lower River Shannon SAC (002165) Conservation objectives supporting document lagoon habitats [Version 1] Lough Gash Turlough cSAC (000051).
- NPWS (2012). Lower River Shannon SAC Conservation objectives supporting document water courses [Version 1].
- NPWS (2012). Lower River Shannon SAC (002165) Conservation objectives supporting document_woodland habitats [Version 1].
- NPWS (2012). River Shannon and River Fergus Estuaries SPA (004077) Conservation objectives supporting document - Appendix 8.2 [Version 1].
- NPWS (2012). River Shannon and River Fergus Estuaries SPA (004077) Conservation objectives supporting document [Version 1].
- NPWS (2012). River Shannon and River Fergus Estuaries SPA (004077) Conservation objectives supporting document - Appendix 9 [Version 1].
- NPWS (2012). River Shannon and River Fergus Estuaries SPA (004077) Conservation objectives supporting document - Appendix 8.1 [Version 1].
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- Lough Gash Turlough cSAC (000051):
- O Connor, Á. (2017) Conservation objectives supporting document: Turloughs* and Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation. Conservation Objectives Supporting Document Series. National Parks and Wildlife Service, Dublin.

Askeaton Fen Complex SAC (002279):

– Young, R. (1971). A Report on Areas of Scientific Interest in Co. Limerick.

Curraghchase Woods cSAC (000174):

- NPWS (2018). Conservation Objectives Supporting Document, Lesser Horseshoe Bat (*Rhinolophus hipposideros*).
- Young, R. (1971). A Report on Areas of Scientific Interest in Co. Limerick.

Barrigone cSAC (000432):

- NPWS (2005) Barrigone CSAC Site Code 432 Co. Limerick. National Parks and Wildlife Service Conservation Plan for 2005-2010.
- Young, R. (1971). A Report on Areas of Scientific Interest in Co. Limerick.



Ratty River Cave SAC (002316), Poulnagordon Cave (Quin) SAC (000064) Newhall and Edenvale Complex SAC (002091), Knockanira House SAC (002318), Kilkishen House SAC (002319) and Old Domestic Building (Keevagh) SAC (002010):

NPWS (2018). Conservation Objectives Supporting Document, Lesser Horseshoe Bat (Rhinolophus hipposideros).

Conservation objectives and conservation objectives supporting documents for these sites are available from the NPWS through the protected sites search portal at <u>https://www.npws.ie/protected-sites</u>.

Barrigone SAC is the only European site with an available management plan (see supporting documents above for reference).

4.4 Potential Cumulative Impacts

In considering whether the proposed ground investigation works, by itself or in combination with other plans and projects, has the potential to affect the conservation objectives of the designated sites within 15km of the proposed ground investigation locations, the following were considered:

- Clare County Development Plan 2017-2023, as varied
- Clare Biodiversity Action Plan 2017-2023
- Clare County Development Plan 2017-2023; Shannon Municipal District
- Shannon Town and Environs Local Area Plan 2012-2018
- Clare County Council Planning Enquiry System (<u>www.eplanning.ie/ClareCC/searchexact</u>)

A planning search limited to applications submitted within the townlands overlapping and surrounding survey/investigation works (townlands of Rineanna South and Drumgeely, Shannon, Co. Clare) during the previous 5 years was conducted on 8^h December 2020.

Within the townlands of Rineanna South, South Shannon Airport seeks permission for the refurbishment works of existing coastal defense embankments at Shannon Airport, immediately west of Shannon Lagoon (Clare County Council Planning Reference: 191006). Both the defence embankment works and Shannon Lagoon are located within the Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077). Ground investigation works are to be located within the road and margins of a section of the N19. The N19 (closest element including location of works is located ca. 760m away from the closest part of proposed embankment works at Shannon Airport. A Natura Impact Statement (Stage 2 AA) has been prepared for the refurbishment works of existing coastal defense embankments at Shannon Airport and the proposed development is at the stage of further information. Due to the nature of works, nature of the receiving estuarine environment and distance no cumulative impact is anticipated to Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077).

Within the townlands of Rineanna South, Shannon Airport have received permission for the extension to existing covered walkways located within existing car parks (planning ref: 17602) and also seek the erection of



68m linear glazed and covered passenger walkway. (planning ref: 20886). Due to the nature of works and distance between he permitted development no cumulative impacts are anticipated.

Within the townland of Drumgeely, permitted developments are comprised of retention and extensions of existing buildings as well as two demolitions that include the requirement of demolition waste management plan as part of their planning conditions (planning ref: 16361 & 18417), a community playground (planning ref: 15234); which aerial maps confirm is built, the installation of a portacabin and connection to services (planning ref: 18545 and 20207), construction of an industrial unit, office and warehouse (planning ref: 17125) and the construction of changing rooms for an existing soccer pitch (planning ref: 19207). Due to the scale of work of permitted developments, their locations and planning conditions, no cumulative impact is anticipated.

Shannon Town and Environs Local Area Plan 2012-2018 proposes four looped walks within the plans area; Free Zone/Estuary Walkway 5.5km is the only walk potentially located in the vicinity of the surveys/work; along the edge of the N19. The proposed ground investigation work will be carried out in spring/summer 2021 and permission for the proposed walk has not yet been applied for, therefore the two projects will not act cumulatively.

Shannon Town and Environs Local Area Plan 2012-2018 also proposes a fibre duct within or immediately adjacent to the N19 and Shannon Airport Rail Link along the northern margin of proposed survey/investigation works. The installation of fibre ducts and the construction of railway lines are linear and phased in nature and will not be concentrated in any one area. Proposed survey/investigation works will not be concentrated in any one area. Proposed survey/investigation works will not be concentrated in any one area. Proposed survey/investigation works will not be concentrated in any one area and temporary. The overlapping of proposed survey/investigation works, and the construction of Shannon Airport Rail Link are highly unlikely as surveys are to be undertaken in spring/summer 2021 whilst no planning permission has been sought for the railway link at the time of writing this report.

4.5 Screening Assessment Criteria

Throughout this section the line items in *italics* refer to suggested instructions for information to be contained in a screening assessment, and in an appropriate assessment from the guidance document 'Assessment of Plans and Projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC', (European Commission, 2001). The standard 'Screening Matrix' and 'Finding of No Significant Effects Report Matrix' in Annex 2 of this guidance document are also followed.

As set out in NPWS guidance (DoEHLG, 2009), the task of establishing whether a plan or project is likely to have an effect on a European site(s) is based on an evaluation using available information and data (e.g., water quality data), supplemented as necessary by local site information and ecological surveys. This results in a determination by the competent authority as to whether there may be a significant effect on the designated site. A precautionary approach is required.

Some examples given in the NPWS guidance (DoEHLG, 2009) of effects that are likely to be significant are:

- 1. Any impact on an Annex I habitat,
- 2. A reduction in the area of a habitat of conservation interest in a European site or a reduction in the area of a European site,
- 3. Direct or indirect damage to the physical quality of the environment (e.g., water quality and supply, soil compaction) in the European site,
- 4. Serious or ongoing disturbance to species or habitats for which the European site is selected (e.g., increased noise, illumination, and human activity),



- 5. Direct or indirect damage to the size, characteristics, or reproductive ability of populations in the European site,
- 6. Interference with mitigation measures put in place for other plans or projects.

4.6 Screening Matrix

Assessment Criteria	Discussion of Potential Impacts		
Brief description of project or plan	The proposed works include the following: • Ground Investigations/Exploratory Holes: • 12 no. cable percussion (CP) borehole • 8 no Rotary Cored (RC) boreholes • 13 no. groundwater installation • 23 no. trial pits • 7 no. slit trenches • 18 no. cone penetration testing (CPT) • 19 no. dynamic probes • 6 no. soakaway tests • Laboratory Tests (soil and groundwater) • Temporary site compound and welfare facilities Please see Appendix 2 for location of ground investigation works. Note that the location of soakaway tests will depend on the findings of trial pit ground investigations. Soakaway test locations will not be located any closer to European sites than the ground investigations whose locations are known. That is, at the southern end of the N19 the location of the closest exploratory hole to the Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077) it at a distance of 41m and 42m respectively and this will be maintained.		
Brief description of the Natura 2000 (European) Site	Proposed ground investigation works are to be undertaken within the road and margins of a 2.2km section of the N19 National Primary Road; from Drumgeely Roundabout to Knockbeagh Point Roundabout. The Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077) are located 30m and 32m respectively from the N19 (most southern end of road) and 41m and 42m respectively from the nearest ground investigation location.		



Assessment Criteria	Discussion of Potential Impacts
	The section of the N19 which is to be surveyed, crosses two streams via existing culverts; Urlan_Beg stream and Clonloghan stream which travel 315m and 353 m respectively before feeding into the Shannon Estuary. The Shannon Estuary forms part of Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077).
	Lower River Shannon cSAC (002165) is designated for 21 qualifying interests. Six qualifying interests are coastal habitats and two are purely freshwater based (e.g., freshwater pearl mussel) and they are not located or hydrologically linked to the study area of the proposed ground investigation works and are not discussed further.
	According to the cSAC's conservation objective supporting documents ¹⁵ , the receiving habitats of the cSAC directly south/southeast that could potentially receive discharges via the two culvert crossings are mudflats and sandflats not covered by sea water at low tide [1140] and estuaries [1130].
	Shannon Airport Lagoon (code: IL032), is located 1.4km away from where the closest stream discharges into the Shannon estuary and is located behind an embankment; no impact is envisaged due to distance and the habitat will not be considered further.
	Transient qualifying interests of the SAC include <i>Lutra lutra</i> (otter) <i>Petromyzon marinus</i> (Sea Lamprey) [1095], <i>Lampetra planeri</i> (Brook Lamprey) [1096], <i>Lampetra fluviatilis</i> (River Lamprey) [1099] and <i>Salmo salar</i> (Salmon) [1106. Otter may frequent the estuary and streams of the area whilst Lamprey and Salmon are likely to use the estuary to commute; they are unlikely to travel into the streams which connect the N19 to the Shannon Estuary as aerial footage indicates that they are second order streams that have been modified in the past and appear more like drainage ditches. Commuting Lamprey and Salmon are highly unlikely to be impacted by any potential changes in water quality within the estuary due the volume and nature of potential discharge and dilution factor of receiving streams and estuarine waters and are no longer considered.
	River Shannon and River Fergus Estuaries SPA (004077) is designated for Wetland and Waterbirds [A999] as well as 21 wetland wintering bird's species. At the closest point to the proposed ground investigation works the marine communities are comprised of intertidal sand to mixed sediment with polychaetes, molluscs, and crustacean's community complex ¹⁶ . According to the site's conservation objectives supporting documents ¹⁷ , 15 of the SPAs

¹⁵ NPWS (2012) Lower River Shannon SAC (0002165) Conservation Objectives Supporting Documents – lagoon habitats [version 1].

¹⁶ NPWS (2012) Lower River Shannon SAC (0002165) Conservation Objectives Supporting Documents – marine habitats [version 1].

¹⁷ NPWS (2012), River Shannon and River Fergus Estuaries SPA (004077) Conservation objectives supporting document [Version 1]



Assessment Criteria	Discussion of Potential Impacts
	special conservation interests have been recorded for 2010/11 winter surveys foraging (F), roosting/other activities (R/O) in the areas closest to the proposed ground investigation works. These species are comprised of: Dunlin (F), Black-tailed Godwit (F, R/A), Curlew (F, R/O), Greenshank (F), Redshank F), Shoveler (F, R/O), Black headed gull (F, R/O), Shelduck (F), Wigeon (F, R/O), Teal (F, R/O), Wigeon (F, R/O), Cormorant (F, R/O), Golden Plover (F, R/O), Lapwing (F, R/O) and Knot (F).
Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the	There is potential for a limited amount of groundwater including silt to enter the Shannon Estuary via two streams during ground investigation works. A total of 81 ground investigation exploratory holes are proposed across a 2.2km length. However, any groundwater pumped from a trial pit or trench shall be regarded as contaminated and will be collected and disposed of.
Natura 2000 sites.	Groundwater production is likely to occur during works and there is potential for soakage of this water into the soil along roadside margins. Changes in water quality have the potential to negatively impact habitats and reduce prey availability for Otter; qualifying interests of Lower River Shannon cSAC (002165) and birds; special conservation interests of the River Shannon and River Fergus Estuaries SPA (004077).
	In the case that silty groundwater emission enters the culverted streams which connect the N19 to the Shannon Estuary, there is a distance of a minimum of 315m (direct distance) between the entrance point and discharge point into the Shannon Estuary and any discharge that makes it to the estuary will be even further diluted. The receiving habitats are mudflat/sandflat and estuarine waters. Mudflats/sandflats are silty in nature and estuarine waters will further dilute receiving waters. Any changes to the water quality from proposed ground investigation works will be negligible; therefore, there will be no impact on receiving habitats of the cSAC and no impact on prey availability and therefore no impact on Otter or special conservation interests of the SPA.
	Proposed ground investigation works will be undertaken via a combination of excavation works and drilling works which will create noise. Works will be undertaken during spring and/or summer so no impact is anticipated for special conservation interests of the River Shannon and River Fergus Estuaries SPA (004077) which come to the area to winter. Otters may frequent the study area and are a qualifying interest of the Lower River Shannon cSAC (002165) and will be used to some noise from the nearby N19 and Shannon Airport. Works will be undertaken over a length of 2.2km and not concentrated in one area. An otter's territory can range from approximately 5.5km (Reid et al., 2013) in length upwards, allowing an otter to go to other areas of their territory if required. Noise levels from proposed ground investigation works may cause temporary slight disturbance to Otter.
	A temporary site compound and welfare facilities are to be set up on existing hard surface areas outside of any European sites. Toilet facilities and sinks will be self-contained with sanitary waste removed from site by a certified

Assessment Criteria	Discussion of Potential Impacts
	contractor. Any other wastes (recycling, arisings etc.) will be removed from site and taken to a licenced facility. No impacts are anticipated from the temporary site compound and welfare facilities on any European site and are not discussed further.
	Lough Gash Turlough cSAC (000051), Askeaton Fen Complex SAC (002279), Curraghchase Woods cSAC (000174), Ratty River Cave SAC (002316), Barrigone cSAC (000432), Poulnagordon Cave (Quin) SAC (000064), Newhall and Edenvale Complex SAC (002091), Knockanira House SAC (002318), Kilkishen House SAC (002319) and Old Domestic Building (Keevagh) SAC (002010) have already been screened out due to lack of any direct hydrological link, the proposed works being localised and relatively small in scale, and distances from proposed works and are not discussed further. See Table 4-2 for further details of these screened out European sites.
Describe any likely direct, indirect or secondary impacts	Size and scale, land-take, and distance from Natura 2000 sites Potential Impacts: <i>None</i>
 indirect, or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of: Size and scale. Land-take. Distance from Natura 2000 site or key features of the site. Resource requirements. Emissions. Excavation requirements. Transportation requirements. Duration of construction, operation etc. Other. 	Proposed ground investigations will not be undertaken within either the Lower River Shannon cSAC (002165) or River Shannon and River Fergus Estuaries SPA (004077), therefore no direct impacts regarding land take will occur. Whilst there are two streams which provide potential hydrological links to both the SAC and SPA, any discharge from proposed works will be limited and if discharge enters either of the two connecting streams, there is a minimum distance of 315m between the entrance point and discharge point into the Shannon Estuary and the receiving habitat comprised of mudflats/sandflats and/or estuary. Any potential discharge will be further diluted in the connecting stream and on meeting estuarine waters. No indirect impact from land-take is anticipated for the Lower River Shannon cSAC (002165) or River Shannon and River Fergus Estuaries SPA (004077). A total of 98 ground investigation exploratory holes are proposed both within and along the margins of the N19; spread out over a 2.2km length. No direct impact is anticipated on the Lower River Shannon cSAC (002165) or River Shannon and River Fergus Estuaries SPA (004077) as all locations are outside of the SAC and SPA.
	Proposed ground investigation works will be undertaken via a combination of excavation works and drilling works which will create noise. At their closest point they will be located 41m and 42m respectively from the Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077).
	This section of the cSAC and SPA receives noise from the nearby traffic of the N19 and Shannon Airport, any species frequenting the area will not be overly sensitive to noise. As works are spread out over a 2.2km length any work will not be concentrated in a particular area; any disturbance will be limited and temporary. As works will be undertaken during spring and/or summer no effect on special conservation interests which come to the SPA to winter are anticipated. Otter which ranges across a territory of approximately 5.5km



Assessment Criteria	Discussion of Potential Impacts
	(Reid et al., 2013) in length and longer, allowing the species to avoid the particular area for a limited time.
	Resource requirements and Excavation requirements
	Potential Impacts: None
	There will be no resource requirements or excavation requirements from any European site as a result of the proposed works. Excavation and drilling requirements will be limited to 81 ground investigation exploratory holes of varying depths and widths along a 2.2km length of existing road at a remove from the European Sites. Of these there will be 12 no. ca. 15m deep cable percussion boreholes, 8 no. ca. 20m deep rotary core boreholes, 12 no. ca. 15-20m deep groundwater installations, 23 trial no. 4.5m deep trial pits, 7 no. 3m deep slit trenches, 18 no. 3m deep cone penetration testing, 20 no. 3m deep dynamic probes and 4 no. 3m deep soakaway tests. All excavations are to be backfilled following use.
	No direct or indirect impacts are anticipated for the Lower River Shannon cSAC (002165) or special conservation interests of the River Shannon and River Fergus Estuaries SPA (004077) due to resource or excavation requirements.
	Emissions
	Potential Impacts: None
	There is potential for a limited amount of groundwater and silt to be produced during proposed ground investigation works. There is the potential for some of this discharge to enter the Shannon Estuary/ Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077) via two streams which link the N19 to the Shannon Estuary. Any groundwater pumped from a trial pit or trench shall be regarded as contaminated and will be collected and disposed of. Investigation works are spread out over a length of 2.2km, there is potential for soakage of this water into the vegetated margins of the N19, however there is a distance of a minimum of 315m between the nearest entrance point and discharge point into the Shannon Estuary and any discharge that makes it into a connecting stream will be even further diluted by the time it enters the estuary. Also, the receiving habitat will be mudflat/sandflat which is silty in nature and estuarine waters which will further dilute any emissions. Changes to water quality are likely to be negligible. No impact from emissions is anticipated for the Lower River Shannon cSAC (002165) or River Shannon and River Fergus Estuaries SPA (004077).
	Transportation requirements
	Potential Impacts: None.



Assessment Criteria	Discussion of Potential Impacts
	The existing N19 will be used to transport machinery and to get to site. The temporary compound will be located within existing hard surface and no European site will be traversed.
	Duration of Construction and Operation Potential Impacts: <i>None.</i> Duration of works is anticipated to be no more than 6 weeks.
	Cumulative impacts
	Potential Impacts: None.
	A planning search was conducted on 8 th December 2020. In the local area, no other planned or permitted projects or plans are of a scale or distance that could act cumulatively with the proposed ground investigation works. No cumulative impacts are anticipated. See Section 4.4 for more details.
 Describe any likely changes to the site arising as a result of: Reduction of habitat area. Disturbance of key species. Habitat or species fragmentation. 	There is potential for discharge from ground investigation works to enter the Shannon Estuary via two hydrological links. Any discharge will be silty groundwater and due to the distance between potential emissions entering a connecting stream (315m at nearest distance) and discharging into the estuary, any emissions will be further diluted. Receiving habitats within the estuary will be mudflat/sandflat habitat and estuarine waters. Mudflats/sandflats are silty in nature and estuarine waters will further dilute receiving waters.
 Reduction in species density. Changes in key indicators of conservation value. Climate change 	Any changes to the water quality from proposed ground investigation works will be negligible; therefore, there will be no impact on receiving habitats of the Lower River Shannon cSAC (002165) and no impact on prey availability and therefore no impact on Otter or special conservation interests of the River Shannon and River Fergus Estuaries SPA (004077).
- Chinate change.	Proposed ground investigation works will be undertaken via a combination of excavation works and drilling works which will create noise. At their closest point they will be located 41m and 42m respectively from the Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077). This section of the cSAC and SPA receives noise from the nearby traffic of the N19 and Shannon Airport and any species frequenting the area will not be overly sensitive to noise. Works will be undertaken during spring and/or summer outside the wintering bird species and no disturbance of the SPAs special conservation interests is anticipated. Otter may frequent the study area as part of a larger territory of approximately 5.5km (Reid et al., 2013) in length. Noise levels from proposed ground investigation works may cause temporary slight disturbance to Otter.
	With regards to disturbance of key species, species fragmentation, reduction in species density or changes to key indicators of conservation, no significant impact is anticipated on the Lower River Shannon cSAC (002165) due to proposed works being localised and relatively small in scale., distance between the cSAC and proposed works, nature of potential discharge,

Assessment Criteria	Discussion of Potential Impacts
	distance of hydrological links (between N19 and estuary), dilution factor of streams and receiving estuarine waters and nature of receiving habitats. With regards to disturbance of key species, species fragmentation, reduction in species density or changes to key indicators of conservation, no significant impact is anticipated on the River Shannon and River Fergus Estuaries SPA (004077) due to works being undertaken outside the wintering bird season, the proposed works being localised and relatively small in scale.
 Describe any likely impacts on the Natura 2000 site as a whole in terms of: Interference with the key relationships that define the structure of the site. Interference with key relationships that define the function of the site. 	There are no potential impacts on the key relationships that define the structure or function of any European site considered in this Appropriate Assessment Screening due to the ground investigation works being localised and relatively small in scale.
 Provide indicators of significance as a result of the identification of effects set out above in terms of: loss, fragmentation, disturbance, change to key elements of the site (e.g., water quality etc.). 	With regards to Otter, a qualifying interest of the Lower River Shannon cSAC (002165), as a worst-case scenario, noise has the potential to cause temporary slight disturbance to Otter. There will be no disturbance of other qualifying interests of the cSAC. With regards to water quality (key element of the cSAC), changes are likely to be negligible due to the nature of any proposed discharge, distance between hydrological links from the SPA, dilution of any discharge within connecting stream, further dilution in receiving estuarine waters and nature of receiving habitats. There will be no changes to any other key elements of the cSAC. There will also be no loss, fragmentation, or disruption to special conservation interests of the River Shannon and River Fergus Estuaries SPA (004077). With regards to water quality, a key element of the River Shannon and River Fergus Estuaries within connecting stream, further dilution in receiving estuarine waters and nature of receiving habitats. There will be no loss, fragmentation of any discharge, distance between hydrological links from the SPA, (004077), changes are likely to be negligible due to the nature of any proposed discharge, distance between hydrological links from the SPA, dilution of any discharge within connecting stream, further dilution in receiving estuarine waters and nature of receiving habitats. There will be no changes to any other key elements of the SPA. There will be no loss, fragmentation, disruption, disturbance of any of the special conservation interests of the River Shannon and River Fergus Estuaries SPA (004077).
Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale	No significant impacts or impacts of unknown scale or magnitude, either alone or in-combination with other projects or plans are predicted.



Assessment Criteria	Discussion of Potential Impacts
of magnitude of impacts is not known.	



4.7 Stage One Screening Conclusion

It is concluded beyond reasonable doubt that there are not likely to be significant effects from the proposed ground investigation works on the 12 European sites identified for consideration (or any other European site), either alone or in combination with other plans or projects.

No significant effects on any of European Sites within the zone of potential influence are predicted. Therefore, the following 12 European sites have been 'screened out' within the Stage 1: Appropriate Assessment Screening Report:

- Lower River Shannon cSAC (002165)
- River Shannon and River Fergus Estuaries SPA (004077)
- Lough Gash Turlough cSAC (000051)
- Askeaton Fen Complex SAC (002279)
- Curraghchase Woods cSAC (000174)
- Ratty River Cave SAC (002316)
- Barrigone cSAC (000432)
- Poulnagordon Cave (Quin) SAC (000064)
- Newhall and Edenvale Complex SAC (002091)
- Knockanira House SAC (002318)
- Kilkishen House SAC (002319)
- Old Domestic Building (Keevagh) SAC (002010)

See Appendix 1 for Findings of No Significant Effects Report.



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Finding of No Significant Effects Report

Finding of No Significant Effects Report		
	There are no European Sites within or immediately adjacent to the area of the proposed ground investigation works.	
	The following 12 European Sites are located within 15 km of the proposed ground investigation works:	
	Lower River Shannon cSAC (002165)	
	River Shannon and River Fergus Estuaries SPA (004077)	
	Lough Gash Turlough cSAC (000051)	
	• Askeaton Fen Complex SAC (002279)	
	Curraghchase Woods cSAC (000174)	
	Ratty River Cave SAC (002316)	
	• Barrigone cSAC (000432)	
	Poulnagordon Cave (Quin) SAC (000064)	
	Newhall and Edenvale Complex SAC (002091)	
Name and location of the	Knockanira House SAC (002318)	
	• Kilkishen House SAC (002319)	
	Old Domestic Building (Keevagh) SAC (002010)	
	Proposed ground investigation works are located along a 2.2km section of the N19 National Primary Road which extends from Drumgeely Roundabout to Knockbeagh Point Roundabout; located in the townlands of Rineanna South and Drumgeely, Shannon, Co. Clare (see Figure 1). This section of the N19 is hydrologically linked to the Shannon Estuary via two second order watercourses; Urlan_Beg stream and Clonloghan stream ¹⁸ . The Shannon Estuary is designated as Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077). Both streams are crossed by the N19 via culverts. Both streams in aerial mapping in the vicinity of the proposed ground investigation works appear improved and straight like drainage ditches. Urlan_Beg stream is located 315m at its closest point between the N19 and Shannon Estuary/cSAC and SPA. Clonloghan stream is located 353m at its closest point between the N19 and Shannon Estuary/cSAC and SPA.	
	There are no direct or indirect hydrological links to the remainder of these named European sites.	
Description of the project or plan	 The proposed works include the following: Ground Investigations/Exploratory Holes: 12 no. cable percussion (CP) borehole 8 no. rotary cored (RC) boreholes 12 no. groundwater installation 23 no. trial pits 7 no. slit trenches 	
	 18 no. cone penetration testing (CPT) 20 no. dynamic probes 	

¹⁸ EPA name, River Network; EPA Maps (mapviewer); <u>https://gis.epa.ie/EPAMaps/</u> viewed 05/03/20.

Finding of No Significant Effects Report		
	• 4 no. soakaway tests	
	 Laboratory Tests (soil and groundwater) Temporary site compound and welfare facilities 	
Is the Project or Plan directly connected with or necessary to the management of the site (provide details)?	No.	
Are there other projects or plans that together with the project of plan being assessed could affect the site (provide details)?	No. A planning search was conducted on 8 th December 2020. No other projects of a scale or distance that could act cumulatively with the proposed ground investigation works are permitted in the local area.	
Assessment of Effects		
Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site	There is a hydrological connection between the area of the proposed ground investigation works and the Shannon Estuary which is designated as Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077). There is potential for a limited amount of groundwater including silt to enter the cSAC and SPA. The qualifying interest's habitat which could potentially be affected include mudflats and sandflats not covered by sea water at low tide [1140] and estuaries [1130]. Otter is a qualifying interest of the cSAC and wintering birds, (special conservation interest of the SPA) have been recorded feeding and roosting within the area of Shannon Estuary which will receive potential discharge. Changes in water quality have the potential to negatively impact habitats and reduce prey availability for Otter and birds. Noise is also expected from ground investigation works with the SAC and SPA located 41m and 42m respectively from noise. Otter: a qualifying interest of the cSAC may frequent the areas of the SPA have been recorded in the area closest to proposed works. No significant impact is anticipated for either the Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077) due to works being undertaken outside the wintering bird season, the proposed works being localised and relatively small in scale and outside of the European sites.	
	Due to lack of a either a hydrological link and distance, no impact is anticipated for Lough Gash Turlough cSAC (000051), Askeaton Fen Complex SAC (002279), Curraghchase Woods cSAC (000174), Ratty River Cave SAC (002316), Barrigone cSAC (000432), Poulnagordon Cave (Quin) SAC (000064), Newhall and Edenvale Complex SAC (002091), Knockanira House SAC (002318), Kilkishen House SAC (002319) and Old Domestic Building (Keevagh) SAC (002010).	
Explain why these effects are not considered significant	There is potential for a limited amount of groundwater including silt to enter the Shannon Estuary/ Lower River Shannon cSAC (002165) and River Shannon and River Fergus Estuaries SPA (004077) via two streams during ground investigation works. A total of 81 ground investigation exploratory holes are proposed across a 2.2km	

Finding of No Sign	nificant Effect	ts Report							
		length. Groundwater production is likely to occur during works and there is potential for soakage of this water into the soil along roadside margins. In the case that silty groundwater emission enters one of the two culverted streams which connect the N19 to the Shannon Estuary, there is a distance of a minimum of 315m (direct distance) between the entrance point and discharge point into the Shannon Estuary, any discharge that makes it to the estuary will be even further diluted. The receiving habitats are mudflat/sandflat and estuarine waters. Mudflats/sandflats are silty in nature and estuarine waters will further dilute receiving waters. Any changes to the water quality from proposed ground investigation works will be negligible; therefore, there will be no impact on receiving habitats of the cSAC and no impact on prey availability and therefore no impact on Otter or special conservation interests of the SPA. Note, that any groundwater pumped from a trial pit or trench							
		Proposed ground investigation works excavation works and drilling works undertaken during spring and/or summ conservation interests of the River Shann which come to the area to winter. Otte qualifying interest of the Lower River Sh the area will be used to some noise fr Works will be undertaken over a length An otter's territory can range from appro- upwards, allowing an otter to go to othe levels from proposed ground investign disturbance to Otter.	will be undertaken w which will create no ner so no impact is a non and River Fergus E ers may frequent the annon cSAC (002165) om the nearby N19 a of 2.2km and not cond oximately 5.5km (Reid er areas of their territ ation works may ca	via a combination of pise. Works will be nticipated for special stuaries SPA (004077) study area and are a , Otters who frequent and Shannon Airport. centrated in one area. l et al., 2013) in length ory if required. Noise use temporary slight					
Overall, there will not be a significant impact on Shannon Estuary/ Low Shannon cSAC (002165) due to proposed works being localised and relative in scale.									
Overall, there will not be a significant impact on River Shannon and River Estuaries SPA (004077) due to proposed works being undertaken out wintering bird season.									
Name of Agenc Consulted	Name of Agency or Body Consulted								
-		Consultation was not undertaken due to the minor nature of the works and lack of potential significant effects.							
Data Collected to	Carry out the	e Assessment							
Who carried out the assessment	Vho carried out Sources of Data Level of Where can the assessment he assessment assessment completed assessment assessment accessed and the assessment								
This evaluation was completed by Fehily	 Inform conser area w metad 	ation on the designated nature vation sites within 15km of the study as obtained from the NPWS website and ata available online from the NPWS	Appropriate Assessment Screening	Claire County Council					

Finding of I	No Sigi	nificant Effects Report	
Timoney Company	and	mapping system (<u>http://webgis.npws.ie/npwsviewer/</u>).	(Stage One)
		 Information on the waterbody catchments in the area of ground investigation works was obtained from the Water Framework Directive Water Mapping Information System <u>http://gis.epa.ie/Envision</u> 	
		• OSI Aerial photography and 1:50000 mapping.	
		Corine 2018 data obtained from EPA website <u>http://gis.epa.ie/Envision</u>	
		 Species records obtained from the NBDC website <u>https://maps.biodiversityireland.ie/Map</u> 	
		 Proposed and permitted development information was sourced from Clare County Council Planning Enquiry System <u>http://www.eplanning.ie/ClareCC/searchexact</u> 	



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Drawings





Scale 1:750

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European Site Synopses





Site Name: Askeaton Fen Complex SAC

Site Code: 002279

Askeaton Fen Complex consists of a number of small fen areas to the east and southeast of Askeaton in Co. Limerick. This area has a number of undulating hills, some of which are quite steep, and is underlain by Lower Carboniferous Limestone. At the base of the hills a series of fens/reedbeds/loughs can be found, often in association with marl or peat deposits. At the south-east of Askeaton, both Cappagh and Ballymorisheen fens are surrounded by large cliff-like rocky limestone outcrops.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[7210] *Cladium* Fens* [7230] Alkaline Fens

In Askeaton Fen Complex SAC a diversity of fen types are represented in a gradation from open water to drier seepage areas. One of the more important fen types, *Cladium* fen, which contains Great Fen-sedge (*Cladium mariscus*), occurs in various forms and is the most common fen type within the SAC. It is associated with wet conditions generally not >25 cm deep and can be found in mono-dominant stands growing on a marl base, such as at Feereagh and Mornane Loughs, and in the fen in the townland of Mornane. It can also be co-dominant with Common Reed (Phragmites australis) in slightly drier conditions, such as in Deegerty, Blind Lough and Dromlohan. It is also found in association with alkaline fen species such as Black Bog-rush (Schoenus nigricans) where it grows on a peaty substrate. Cladium fen is indicative of extremely base rich conditions. Typical species seen growing with the Great Fen-sedge include pondweeds (Potamogeton spp.), Marsh Horsetail (Equisetum palustre), Water Horsetail (E. fluviatile), Lesser Water-parsnip (Berula erecta), Lesser Marshwort (Apium innundatum), Bottle Sedge (Carex rostrata), particularly where marl is present, and Water Mint (Mentha aquatica). One such area of fen within the site is the only known location in Ireland for the water beetle *Hygrotus decoratus* and is also known to contain Hydroporus scalesianus, a rare water beetle indicative of undisturbed fens. At the edge of some of the Great Fen-sedge fens, particularly where improved grassland is not present, there is typically found a gradation to wet marsh, which in turn grades into wet grassland. These transition habitats add to the ecological diversity of the site.

Alkaline fen is characterised by the presence of Black Bog-rush in association with brown mosses and a small sedge community. The soil is permanently waterlogged but generally not flooded unless for a short period. Examples of this fen type are found at the edge of almost all the sites, but its extent is much less than the Great Fen-sedge fen type within the SAC. The fen in the townlands of Moig West and Graigues is a good example of alkaline fen. Species seen growing with Black Bogrush include Purple Moor-grass (*Molinia caerulea*), Long-stalked Yellow-sedge (*Carex lepidocarpa*), Carnation Sedge (*C. panicea*), rushes (*Juncus* spp.) and an abundance of brown mosses, including *Campylium stellatum*, *Ctenidium molluscum*, *Calliergon cuspidatum* and *Bryum pseudotriquetrum*. This fen type also grades into marsh and wet grassland.

Scrub and woodland is present on high ground in some areas, such as Ballymorisheen, Blind Lough, Ballyvogue, Dromlohan and Lough Feereagh. Species include Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Gorse (*Ulex europaeus*), Ash (*Fraxinus excelsior*), willow (*Salix* sp.), Downy Birch (*Betula pubescens*) and Hazel (*Corylus avellana*). This is a useful faunal habitat particularly as it is adjacent to reedbeds and fens.

A small area of limestone species-rich grassland is found to the north of Balinvirick fen. Species found which are typically associated with the habitat include the Early-purple Orchid (*Orchis mascula*), Carline Thistle (*Carlina vulgaris*) and Mountain Everlasting (*Antennaria dioica*).

Snipe use the tall marsh vegetation at the edge of the fens. Birds of prey such as Sparrowhawk feed over the reedbeds and scrubland areas of the site.

Land use in the area is quite intensive, with improved grassland extending down relatively steep slopes to the edge of the fens/loughs. New drainage or the deepening of existing drains poses a threat to the aquatic habitats at the site. In some instances, the fens appear to be drying out.

This site is of conservation value because it supports two fen types, each of which exhibit many sub-types. *Cladium* fen is listed as an Annex I priority habitat under the E.U. Habitats Directive. These wetland habitats of fen, reedbeds, open water, marsh and wet grassland are also valuable in that they supply a refuge for fauna in an otherwise intensively managed countryside.



Site Name: Barrigone SAC

Site Code: 000432

Barrigone is situated approximately 5 km west of Askeaton, Co. Limerick. The site comprises an area of dry, species-rich, calcareous grassland and patches of scrub on a gentle, north-east-facing slope. The underlying limestone outcrops occasionally, and the proximity of the site to the Shannon Estuary adds a maritime influence.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[5130] Juniper Scrub
[6210] Orchid-rich Calcareous Grassland*
[8240] Limestone Pavement*
[1065] Marsh Fritillary (*Euphydryas aurinia*)

The open calcareous grassland supports an impressive range of plant species. Cowslip (*Primula veris*), Mountain Everlasting (*Antennaria dioica*), Carline Thistle (*Carlina vulgaris*), Wild Thyme (*Thymus praecox*), Wood Sage (*Teucrium scorodonia*) and Violets (*Viola* spp.) are present, while Burnet Rose (*Rosa pimpinellifolia*) is abundant and scattered throughout the grassland. The maritime influence is evident through the presence in the sward of Sea Plantain (*Plantago maritima*). The orchid flora is particularly well-developed and diverse, with eight species recorded on recent visits. These include Fragrant Orchid (*Gymnadenia conopsea*), Frog Orchid (*Coeloglossum viride*), Butterfly Orchid (*Platanthera bifolia*), Pyramidal Orchid (*Anacamptis pyramidalis*) and the scarce Irish Orchid (*Neotinea maculata*).

A range of scrub types are present, including a dense stand of Hazel (*Corylus avellana*) towards the south, and a small area dominated by Juniper (*Juniperus communis*) in the north. Blackthorn (*Prunus spinosa*), Hawthorn (*Crataegus monogyna*) and Gorse (*Ulex europaeus*) also form scrub patches, and these tend to be less species-rich.

Hairy Violet (*Viola hirta*), a species protected under the Flora (Protection) Order, 1999, occurs at Barrigone. The site also holds a large population of the Marsh Fritillary butterfly (*Euphydryas aurinia*), a species listed under Annex II of the E.U. Habitats Directive.

The primary threat to this site is quarrying. Grazing is also an important factor; overgrazing would cause damage to the vegetation, while under-grazing would allow scrub encroachment at the expense of grassland species which require more open conditions. A balance between scrub and grassland is also important for invertebrate species.

A number of factors, including substrate, bedrock, microclimate and maritime influence, contribute to the floristic richness at Barrigone and hence to the ecological interest of this site. The presence of rare species of plant and invertebrate highlight the site's conservation value.



Site Name: Lower River Shannon SAC

Site Code: 002165

This very large site stretches along the Shannon valley from Killaloe in Co. Clare to Loop Head/ Kerry Head, a distance of some 120 km. The site thus encompasses the Shannon, Feale, Mulkear and Fergus estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments and the marine area between Loop Head and Kerry Head. Rivers within the sub-catchment of the Feale include the Galey, Smearlagh, Oolagh, Allaughaun, Owveg, Clydagh, Caher, Breanagh and Glenacarney. Rivers within the sub-catchment of the Mulkear include the Killeenagarriff, Annagh, Newport, the Dead River, the Bilboa, Glashacloonaraveela, Gortnageragh and Cahernahallia.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1110] Sandbanks
[1130] Estuaries
[1140] Tidal Mudflats and Sandflats
[1150] Coastal Lagoons*
[1160] Large Shallow Inlets and Bays
[1170] Reefs
[1220] Perennial Vegetation of Stony Banks
[1230] Vegetated Sea Cliffs
[1310] Salicornia Mud
[1330] Atlantic Salt Meadows
[1410] Mediterranean Salt Meadows
[3260] Floating River Vegetation
[6410] <i>Molinia</i> Meadows
[91E0] Alluvial Forests*
[1029] Freshwater Pearl Mussel (Margaritifera margaritifera)
[1095] Sea Lamprey (Petromyzon marinus)
[1096] Brook Lamprey (Lampetra planeri)
[1099] River Lamprey (Lampetra fluviatilis)
[1106] Atlantic Salmon (Salmo salar)
[1349] Bottle-nosed Dolphin (Tursiops truncatus)
[1355] Otter (Lutra lutra)

The Shannon and Fergus Rivers flow through Carboniferous limestone as far as Foynes, but west of Foynes Namurian shales and flagstones predominate (except at Kerry Head, which is formed from Old Red Sandstone). The eastern sections of the Feale catchment flow through Namurian rocks and the western stretches through Carboniferous limestone. The Mulkear flows through Lower Palaeozoic rocks in the upper reaches before passing through Namurian rocks, followed by Lower Carboniferous shales and Carboniferous limestone. The Mulkear River itself, immediately north of Pallas Green, passes through an area of Rhyolites, Tuffs and Agglomerates.

The Shannon and Fergus Estuaries form the largest estuarine complex in Ireland. They form a unit stretching from the upper tidal limits of the Shannon and Fergus Rivers to the mouth of the Shannon Estuary (considered to be a line across the narrow strait between Kilcredaun Point and Kilconly Point). Within this main unit there are several tributaries with their own 'sub-estuaries' e.g. the Deel River, Mulkear River, and Maigue River. To the west of Foynes, a number of small estuaries form indentations in the predominantly hard coastline, namely Poulnasherry Bay, Ballylongford Bay, Clonderalaw Bay and the Feale or Cashen River estuary.

Both the Fergus and inner Shannon Estuaries feature vast expanses of intertidal mudflats, often fringed with saltmarsh vegetation. The smaller estuaries also feature mudflats, but have their own unique characteristics, e.g. Poulnasherry Bay is stony and unusually rich in species and biotopes. Plant species are typically scarce on the mudflats, although there are some eelgrass (*Zostera* spp.) beds and patches of green algae (e.g. *Ulva* sp. and *Enteromorpha* sp.). The main macro-invertebrate community which has been noted from the inner Shannon and Fergus estuaries is a *Macoma-Scrobicularia-Nereis* community.

In the transition zone between mudflats and saltmarsh, specialised colonisers of mud predominate. For example, swards of Common Cord-grass (*Spartina anglica*) frequently occur in the upper parts of the estuaries. Less common are swards of Glasswort (*Salicornia europaea* agg.). In the innermost parts of the estuaries, the tidal channels or creeks are fringed with species such as Common Reed (*Phragmites australis*) and club-rushes (*Scirpus maritimus, S. tabernaemontani* and *S. triquetrus*). In addition to the nationally rare Triangular Club-rush (*Scirpus triqueter*), two scarce species are found in some of these creeks (e.g. Ballinacurra Creek): Lesser Bulrush (*Typha angustifolia*) and Summer Snowflake (*Leucojum aestivum*).

Saltmarsh vegetation frequently fringes the mudflats. Over twenty areas of estuarine saltmarsh have been identified within the site, the most important of which are around the Fergus estuary and at Ringmoylan Quay. The dominant type of saltmarsh present is Atlantic salt meadow occurring over mud. Characteristic species occurring include Common Saltmarsh-grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea-milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*), Red Fescue (*Festuca rubra*), Creeping Bent (*Agrostis stolonifera*), Saltmarsh Rush (*Juncus gerardi*), Long-bracted Sedge (*Carex extensa*), Lesser Sea-spurrey

(*Spergularia marina*) and Sea Arrowgrass (*Triglochin maritima*). Areas of Mediterranean salt meadows, characterised by clumps of Sea Rush (*Juncus maritimus*) occur occasionally. Two scarce species are found on saltmarshes in the vicinity of the Fergus estuary: a type of robust saltmarsh-grass (*Puccinellia foucaudii*), sometimes placed within the species Common Saltmarsh-grass (*P. maritima*) and Hard-grass (*Parapholis strigosa*).

Saltmarsh vegetation also occurs around a number of lagoons within the site, two of which have been surveyed as part of a National Inventory of Lagoons. Cloonconeen Pool (4-5 ha) is a natural sedimentary lagoon impounded by a low cobble barrier. Seawater enters by percolation through the barrier and by overwash. This lagoon represents a type which may be unique to Ireland since the substrate is composed almost entirely of peat. The adjacent shore features one of the best examples of a drowned forest in Ireland. Aquatic vegetation in the lagoon includes typical species such as Beaked Tasselweed (*Ruppia maritima*) and green algae (*Cladophora* sp.). The fauna is not diverse, but is typical of a high salinity lagoon and includes six lagoon specialists (*Hydrobia ventrosa, Cerastoderma glaucum, Lekanesphaera hookeri, Palaemonetes varians, Sigara stagnalis* and *Enochrus bicolor*). In contrast, Shannon Airport Lagoon (2 ha) is an artificial saline lake with an artificial barrier and sluiced outlet. However, it supports two Red Data Book species of stonewort (*Chara canescens* and *Chara cf. connivens*).

Most of the site west of Kilcredaun Point/Kilconly Point is bounded by high rocky sea cliffs. The cliffs in the outer part of the site are sparsely vegetated with lichens, Red Fescue, Sea Beet (*Beta vulgaris* subsp. *maritima*), Sea Campion (*Silene vulgaris* subsp. *maritima*), Thrift and plantains (*Plantago* spp.). A rare endemic type of sea-lavender, *Limonium recurvum* subsp. *pseudotranswallianum*, occurs on cliffs near Loop Head. Cliff-top vegetation usually consists of either grassland or maritime heath. The boulder clay cliffs further up the estuary tend to be more densely vegetated, with swards of Red Fescue and species such as Kidney Vetch (*Anthyllis vulneraria*) and Common Bird's-foot-trefoil (*Lotus corniculatus*).

The site supports an excellent example of a large shallow inlet and bay. Littoral sediment communities in the mouth of the Shannon Estuary occur in areas that are exposed to wave action and also in areas extremely sheltered from wave action. Characteristically, exposed sediment communities are composed of coarse sand and have a sparse fauna. Species richness increases as conditions become more sheltered. All shores in the site have a zone of sand hoppers at the top, and below this each of the shores has different characteristic species giving a range of different shore types.

The intertidal reefs in the Shannon Estuary are exposed or moderately exposed to wave action and subject to moderate tidal streams. Known sites are steeply sloping and show a good zonation down the shore. Well developed lichen zones and littoral reef communities offering a high species richness in the sublittoral fringe and strong populations of the Purple Sea Urchin *Paracentrotus lividus* are found. The communities found are tolerant to sand scour and tidal streams. The infralittoral reefs range from sloping platforms with some vertical steps, to ridged bedrock with

gullies of sand between the ridges, to ridged bedrock with boulders or a mixture of cobbles, gravel and sand. Kelp is very common to about 18 m. Below this it becomes rare and the community is characterised by coralline crusts and red foliose algae.

Other coastal habitats that occur within the site include stony beaches and bedrock shores (these support a typical zonation of seaweeds such as *Fucus* spp., *Ascophyllum nodosum* and kelps), shingle beaches (with species such as Sea Beet, Sea Mayweed - *Matricaria maritima*, Sea Campion and Curled Dock - *Rumex crispus*), sandbanks which are slightly covered by sea water at all times (e.g. in the area from Kerry Head to Beal Head) and sand dunes (a small area occurs at Beal Point, where Marram – *Ammophila arenaria* is the dominant species).

Freshwater rivers have been included in the site, most notably the Feale and Mulkear catchments, the Shannon from Killaloe to Limerick (along with some of its tributaries, including a short stretch of the Kilmastulla River), the Fergus up as far as Ennis, and the Cloon River. These systems are very different in character: the Shannon is broad, generally slow flowing and naturally eutrophic; the Fergus is smaller and alkaline; while the narrow, fast flowing Cloon is acid in nature. The Feale and Mulkear catchments exhibit all the aspects of a river from source to mouth. Semi-natural habitats, such as wet grassland, wet woodland and marsh occur by the rivers, but improved grassland is the most common habitat type. One grassland type of particular conservation significance, *Molinia* meadows, occurs in several parts of the site and the examples at Worldsend on the River Shannon are especially noteworthy. Here are found areas of wet meadow dominated by rushes (*Juncus* spp.) and sedges (*Carex* spp.), and supporting a diverse and species-rich vegetation, including such uncommon species as Blue-eyed Grass (*Sisyrinchium bermudiana*) and Pale Sedge (*C. pallescens*).

Floating river vegetation characterised by species of water-crowfoot (*Ranunculus* spp.), pondweeds (*Potamogeton* spp.) and the moss *Fontinalius antipyretica* are present throughout the major river systems within the site. The rivers contain an interesting bryoflora with *Schistidium alpicola* var. *alpicola* recorded from in-stream boulders on the Bilboa, new to Co. Limerick.

Alluvial woodland occurs on the banks of the Shannon and on islands in the vicinity of the University of Limerick. The woodland is up to 50 m wide on the banks and somewhat wider on the largest island. The most prominent woodland type is gallery woodland where White Willow (*Salix alba*) dominates the tree layer with occasional Alder (*Alnus glutinosa*). The shrub layer consists of various willow species with Rusty Willow (*Salix cinerea* ssp. *oleifolia*) and what appear to be hybrids of *S. alba* x *S. viminalis.* The herbaceous layer consists of tall perennial herbs. A fringe of bulrush (*Typha* sp.) occurs on the river side of the woodland. On slightly higher ground above the wet woodland and on the raised embankment remnants of mixed oak-ash-alder woodland occur. These are poorly developed and contain numerous exotic species but locally there are signs that it is invading open grassland. Alder is the principal tree species, with occasional Pedunculate Oak (*Quercus robur*), elm (*Ulmus glabra* and *U. procera*), Hazel (*Corylus avellana*), Hawthorn (*Crataegus monogyna*) and
the shrubs Guelder-rose (*Viburnum opulus*) and willows. The ground flora is species-rich.

While woodland is infrequent within the site, however Cahiracon Wood contains a strip of old oak woodland. Sessile Oak (*Q. petraea*) forms the canopy, with an understorey of Hazel and Holly (*Ilex aquifolium*). Great Wood-rush (*Luzula sylvatica*) dominates the ground flora. Less common species present include Great Horsetail (*Equisetum telmeteia*) and Pendulous Sedge (*Carex pendula*).

In the low hills to the south of the Slievefelim Mountains, the Cahernahallia River cuts a valley through the Upper Silurian rocks. For approximately 2 km south of Cappagh Bridge at Knockanavar, the valley sides are wooded. The woodland consists of birch (*Betula* spp.), Hazel, oak, Rowan (*Sorbus aucuparia*), some Ash (*Fraxinus excelsior*) and willow (*Salix* spp.). Most of the valley is not grazed by stock, and as a result the trees are regenerating well. The ground flora features prominent Great wood-rush and Bilberry (*Vaccinium myrtillus*), along with a typical range of woodland herbs. Bracken (*Pteridium aquilinum*) is a feature in areas where there is more light available.

The valley sides of the Bilboa and Gortnageragh Rivers, on higher ground north-east of Cappamore, support patches of semi-natural broadleaf woodland dominated by Ash, Hazel, oak and birch. There is a good scrub layer with Hawthorn, willow, Holly and Blackthorn (*Prunus spinosa*) common. The herb layer in these woodlands is often open, with a typically rich mixture of woodland herbs and ferns. Moss species diversity is high. The woodlands are ungrazed. The Hazel is actively coppiced in places.

There is a small area of actively regenerating cut-away raised bog at Ballyrorheen. It is situated approximately 5 km north-west of Cappamore in Co. Limerick. The bog contains some wet areas with good cover of bog mosses (*Sphagnum* spp.). Species of particular interest include Cranberry (*Vaccinium oxycoccos*) and White Sedge (*Carex curta*), along with two regionally rare mosses, including the bog moss *S. fimbriatum*. The site is being invaded by Downy Birch (*Betula pubescens*) scrub woodland. Both commercial forestry and the spread of Rhododendron (*Rhododendron ponticum*) has greatly reduced the overall value of the site.

A number of plant species that are listed in the Irish Red Data Book occur within the site, and several of these are protected under the Flora (Protection) Order, 1999. These include Triangular Club-rush (*Scirpus triquetrus*), a species which is only found in Ireland only in the Shannon Estuary, where it borders creeks in the inner estuary. Opposite-leaved Pondweed (*Groenlandia densa*) is found in the Shannon where it passes through Limerick City, while Meadow Barley (*Hordeum secalinum*) is abundant in saltmarshes at Ringmoylan and Mantlehill. Hairy Violet (*Viola hirta*) occurs in the Askeaton/Foynes area. Golden Dock (*Rumex maritimus*) is noted as occurring in the River Fergus estuary. Finally, Bearded Stonewort (*Chara canescens*), a brackish water specialist, and Convergent Stonewort (*Chara connivens*) are both found in Shannon Airport Lagoon.

Overall, the Shannon and Fergus Estuaries support the largest numbers of wintering waterfowl in Ireland. The highest count in 1995-96 was 51,423 while in 1994-95 it was 62,701. Species listed on Annex I of the E.U. Birds Directive which contributed to these totals include: Great Northern Diver (3; 1994/95), Whooper Swan (201; 1995/96), Pale-bellied Brent Goose (246; 1995/96), Golden Plover (11,067; 1994/95) and Bartailed Godwit (476; 1995/96). In the past, three separate flocks of Greenland Whitefronted Goose were regularly found, but none were seen in 1993/94.

Other wintering waders and wildfowl present include Greylag Goose (216; 1995/96), Shelduck (1,060; 1995/96), Wigeon (5,976; 1995/96), Teal (2,319; 1995-96), Mallard (528; 1995/96), Pintail (45; 1995/96), Shoveler (84; 1995/96), Tufted Duck (272; 1995/96), Scaup (121; 1995/96), Ringed Plover (240; 1995/96), Grey Plover (750; 1995/96), Lapwing (24,581; 1995/96), Knot (800; 1995/96), Dunlin (20,100; 1995/96), Snipe (719, 1995/96), Black-tailed Godwit (1,062; 1995/96), Curlew (1,504; 1995/96), Redshank (3,228; 1995/96), Greenshank (36; 1995/96) and Turnstone (107; 1995/96). A number of wintering gulls are also present, including Black-headed Gull (2,216; 1995/96), Common Gull (366; 1995/96) and Lesser Black-backed Gull (100; 1994/95). This is the most important coastal site in Ireland for a number of the waders including Lapwing, Dunlin, Snipe and Redshank. It also provides an important staging ground for species such as Black-tailed Godwit and Greenshank.

A number of species listed on Annex I of the E.U. Birds Directive breed within the site. These include Peregine Falcon (2-3 pairs), Sandwich Tern (34 pairs on Rat Island, 1995), Common Tern (15 pairs: 2 on Sturamus Island and 13 on Rat Island, 1995), Chough (14-41 pairs, 1992) and Kingfisher. Other breeding birds of note include Kittiwake (690 pairs at Loop Head, 1987) and Guillemot (4,010 individuals at Loop Head, 1987).

There is a resident population of Bottle-nosed Dolphin in the Shannon Estuary. This is the only known resident population of this E.U. Habitats Directive Annex II species in Ireland. The population is estimated (in 2006) to be 140 ± 12 individuals. Otter, a species also listed on Annex II of this Directive, is commonly found on the site.

Five species of fish listed on Annex II of the E.U. Habitats Directive are found within the site. These are Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), River Lamprey (*Lampetra fluviatilis*), Twaite Shad (*Allosa fallax fallax*) and Salmon (*Salmo salar*). The three lampreys and Salmon have all been observed spawning in the lower Shannon or its tributaries. The Fergus is important in its lower reaches for spring salmon, while the Mulkear catchment excels as a grilse fishery, though spring fish are caught on the actual Mulkear River. The Feale is important for both types. Twaite Shad is not thought to spawn within the site. There are few other river systems in Ireland which contain all three species of lamprey. Two additional fish species of note, listed in the Irish Red Data Book, also occur, namely Smelt (*Osmerus eperlanus*) and Pollan (*Coregonus autumnalis pollan*). Only the former has been observed spawning in the Shannon.

Freshwater Pearl Mussel (*Margaritifera margaritifera*), a species listed on Annex II of the E.U. Habitats Directive, occurs abundantly in parts of the Cloon River.

There is a wide range of land uses within the site. The most common use of the terrestrial parts is grazing by cattle, and some areas have been damaged through over-grazing and poaching. Much of the land adjacent to the rivers and estuaries has been improved or reclaimed and is protected by embankments (especially along the Fergus estuary). Further, reclamation continues to pose a threat, as do flood relief works (e.g. dredging of rivers). Gravel extraction poses a major threat on the Feale.

In the past, cord-grass (*Spartina* sp.) was planted to assist in land reclamation. This has spread widely, and may oust less vigorous colonisers of mud and may also reduce the area of mudflat available to feeding birds.

Domestic and industrial wastes are discharged into the Shannon, but water quality is generally satisfactory, except in the upper estuary where it reflects the sewage load from Limerick City. Analyses for trace metals suggest a relatively clean estuary with no influences of industrial discharges apparent. Further industrial development along the Shannon and water polluting operations are potential threats.

Fishing is a main tourist attraction on the Shannon and there are a large number of angler associations, some with a number of beats. Fishing stands and styles have been erected in places. The River Feale is a designated Salmonid Water under the E.U. Freshwater Fish Directive. Other uses of the site include commercial angling, oyster farming, boating (including dolphin-watching trips) and shooting. Some of these may pose threats to the birds and dolphins through disturbance. Specific threats to the dolphins include underwater acoustic disturbance, entanglement in fishing gear and collisions with fast moving craft.

This site is of great ecological interest as it contains a high number of habitats and species listed on Annexes I and II of the E.U. Habitats Directive, including the priority habitats lagoon and alluvial woodland, the only known resident population of Bottle-nosed Dolphin in Ireland and all three Irish lamprey species. A good number of Red Data Book species are also present, perhaps most notably the thriving populations of Triangular Club-rush. A number of species listed on Annex I of the E.U. Birds Directive are also present, either wintering or breeding. Indeed, the Shannon and Fergus Estuaries form the largest estuarine complex in Ireland and support more wintering wildfowl and waders than any other site in the country. Most of the estuarine part of the site has been designated a Special Protection Area (SPA), under the E.U. Birds Directive, primarily to protect the large numbers of migratory birds present in winter.



Site Name: Lough Gash Turlough SAC

Site Code: 000051

Lough Gash Turlough lies in the low landscape west of Newmarket-on-Fergus, Co. Clare. The turlough has a very flat basin and is overlooked by houses to the east and pasture to the west. The shore of the turlough rises as a stony slope on the west side, where outcropping rocks are visible. Water rises mainly from the rocks at the southern end, but there is overground flow also - one stream discharges from the town's sewage works.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[3180] Turloughs*[3270] Chenopodion rubri p.p. and Bidention p.p. vegetation

This turlough is particularly late-draining, and as a result supports a very distinctive plant community: Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation. The central zone is covered by an open vegetation of Red Goosefoot (*Chenopodium rubrum*), Small Water-pepper (*Polygonum minus*), Trifid Burmarigold (*Bidens tripartita*), Fine-leaved Water-dropwort (*Oenanthe aquatica*), Toad Rush (*Juncus bufonius*) and the rare Northern Yellow-cress (*Rorippa islandica*). The rare annual moss *Ephemerum cohaerens* occurs on open mud.

On the slightly higher ground, around the centre of the turlough, Fine-leaved Waterdropwort dominates, with Great Yellow-cress (*Rorippa amphibia*), Thread-leaved Water-crowfoot (*Ranunculus trichophyllus*), Pink Water-speedwell (*Veronica catenata*) and some Amphibious Bistort (*Polygonum amphibium*) also occurring.

Parts of the shore have a more grassy vegetation, comprising Floating Sweet-grass (*Glyceria fluitans*), Creeping Bent (*Agrostis stolonifera*), Marsh Foxtail (*Alopecurus geniculatus*) and the rare Orange Foxtail (*Alopecurus aequalis*) (listed in the Flora (Protection) Order, 1999). This grades into a narrow fringe of Hairy Sedge (*Carex hirta*) and cinquefoil (*Potentilla* spp.) species.

The streams introduce a different flora; by the stream from the sewage works such species as Fool's Water-cress (*Apium nodiflorum*), Reed Canary-grass (*Phalaris arundinacea*), Yellow Iris (*Iris pseudacorus*) and Nodding Bur-marigold (*Bidens cernua*) are found, while at the southern end there is a marshy area with Willows (*Salix* spp.) and sedges (*Carex* spp.).

Gadwall, Pochard and Tufted Duck are regular in winter; Coot, Moorhen, Mallard, Snipe and a high number of Mute Swan (71 individuals, average peak from 3 counts, 1984/85 - 1986-87) are also found.

Lough Gash Turlough is one of the latest turloughs to dry out in any year and may fail to do so sometimes; as such it is highly rated for being at one of the extremes of turlough variation, i.e. wetness. It is also of considerable ecological interest for its eutrophic nutrient status. The annual flora found at the site is highly distinctive and well-developed: there are only fragments of such vegetation at other turloughs. The presence of an abundance of the rare Northern Yellow-cress and of the protected Orange Foxtail (in its only Clare site) is notable.



Site Name: Curraghchase Woods SAC

Site Code: 000174

This site is situated approximately 7 km east of Askeaton in Co. Limerick. The area is characterised by glacial drift deposits over Carboniferous limestone. The site consists largely of mixed woodland and a series of wetlands.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[91E0] Alluvial Forests*[91J0] Yew Woodlands*[1303] Lesser Horseshoe Bat (*Rhinolophus hipposideros*)

One of the main interests at the site is the presence of a hibernation site of the Lesser Horseshoe Bat. The bats hibernate in the cellars of the former mansion Curraghchase House. The entrance to the cellar is now grilled and all other access points blocked to prevent disturbance. In recent years bats have remained within the cellar throughout the year.

In winter 1995/96 more than 60 bats were recorded in the hibernation site, rating the site of international importance. It is considered that the number of bats will increase now that the site is protected from disturbance. This is the largest known site for this species in Co. Limerick.

The woodland consists of both deciduous species and stands of commercial conifers. Beech (*Fagus sylvatica*) is the most frequent deciduous species, but Pedunculate Oak (*Quercus robur*), Ash (*Fraxinus excelsior*), Sycamore (*Acer pseudoplatanus*) and Hornbeam (*Carpinus betulus*) are also present. Spruce (*Picea* sp.) and Scots Pine (*Pinus sylvestris*) are the commonest conifers. Hazel (*Corylus avellana*) scrub and areas of wet woodland (*Salix* spp.) also occur.

The alluvial forest occurs in the southern part of the site and occupies low ground in a stream valley and some areas adjacent to a small lake. The dominant canopy species include Rusty Willow (*Salix cinerea* subsp. *oleifolia*), Alder (*Alnus glutinosa*), Downy Birch (*Betula pubescens*) and Ash. Exotics also occur, both conifer and broadleaved species, such as Beech and Horse-chestnut (*Aesculus hippocastanum*). A rich herb layer is found where the conifers are less dense, characterised by such species as Bugle (*Ajuga reptans*), Hemlock Water-dropwort (*Oenanthe crocata*), Yellow Iris (*Iris pseudacorus*), Meadowsweet (*Filipendula ulmaria*), Water-cress (*Nasturtium officinale*), Common Nettle (*Urtica dioica*) and Wood Sanicle (*Sanicula europaea*). The Yew wood occurs as a stand on a limestone ridge above a stream valley. It is associated with an Oak-Ash wood, but also has a range of commercial planted species. Nevertheless, Yew is well represented and is readily regenerating. Other species present include Holly (*Ilex aquifolium*), Ash, Pedunculate Oak, Hazel and Hawthorn (*Crataegus monogyna*).

A series of small lakes and fens runs the length of the site. Some of these lakes are overgrown with vegetation. Black Bog-rush (*Schoenus nigricans*), Great Fen-sedge (*Cladium mariscus*), Greater Tussock-sedge (*Carex paniculata*), Carnation Sedge (*Carex panicea*) and Blunt-flowered Rush (*Juncus subnodulosus*) are some of the wetland species recorded. These wetlands, along with some wet grassland, add habitat diversity to the site.

The semi-natural habitats within the site provide ideal foraging habitat for the Lesser Horseshoe Bat. Further planting of conifer tree species at the expense of deciduous species should be avoided and attempts should be made to increase the area of deciduous woodland.

The combination of a secure hibernation site and suitable foraging habitat and the presence of over 60 individuals make Curraghchase Woods an internationally important site for the Lesser Horseshoe Bat. The presence of two woodland types that are listed with priority status on Annex I of the E.U. Habitats Directive, and especially Yew woodland, which is of very limited occurrence in Ireland, is of particular note.



Site Name: Newhall and Edenvale Complex SAC

Site Code: 002091

Newhall and Edenvale Complex SAC is situated approximately 4 km south of Ennis in Co. Clare. It consists of three distinct locations which are used, at various times throughout the year, by the Lesser Horseshoe Bat.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[8310] Caves[1303] Lesser Horseshoe Bat (*Rhinolophus hipposideros*)

Newhall and Edenvale Caves are natural fossil limestone caves. Newhall is a narrow, dry passage formed along an inclined joint. The main passage of Edenvale Cave runs into a cliff for 15 m and is crossed by a number of other passages. The side passages run in two directions at acute angles to each other, forming many intersections, hence the local name "The Catacombs". The two caves are used as winter hibernation sites by the bats, while a two-storey farm out-building is used as a breeding site. Two of the locations, Newhall Cave and the farm building, are in the grounds of Newhall House, and the second cave, Edenvale Cave, is in the grounds of Edenvale House, within 1 km of Newhall House. The bats have uninterrupted access to all sites. In 1983 grilles were fitted to both caves.

The surrounding areas of mature mixed woodland, parkland and lakes provide ideal foraging habitat and shelter for the bats throughout the year and are included within the site.

Bats have been recorded at this site since 1983 and the population is estimated at more than 500 individuals. The site is of international importance for Lesser Horseshoe Bat, and ranks as one of the most important sites in Europe for the species.

SITE SYNOPSIS

SITE NAME: RIVER SHANNON AND RIVER FERGUS ESTUARIES SPA

SITE CODE: 004077

The estuaries of the River Shannon and River Fergus form the largest estuarine complex in Ireland. The site comprises the entire estuarine habitat from Limerick City westwards as far as Doonaha in Co. Clare and Dooneen Point in Co. Kerry.

The site has vast expanses of intertidal flats which contain a diverse macroinvertebrate community, e.g. *Macoma-Scrobicularia-Nereis*, which provides a rich food resource for the wintering birds. Salt marsh vegetation frequently fringes the mudflats and this provides important high tide roost areas for the wintering birds. Elsewhere in the site the shoreline comprises stony or shingle beaches.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Cormorant, Whooper Swan, Lightbellied Brent Goose, Shelduck, Wigeon, Teal, Pintail, Shoveler, Scaup, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Greenshank and Black-headed Gull. It 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 Wetland & Waterbirds.

The site is the most important coastal wetland site in the country and regularly supports in excess of 50,000 wintering waterfowl (57,133 - five year mean for the period 1995/96 to 1999/2000), a concentration easily of international importance. The site has internationally important populations of Light-bellied Brent Goose (494), Dunlin (15,131), Black-tailed Godwit (2,035) and Redshank (2,645). A further 17 species have populations of national importance, i.e. Cormorant (245), Whooper Swan (118), Shelduck (1,025), Wigeon (3,761), Teal (2,260), Pintail (62), Shoveler (107), Scaup (102), Ringed Plover (223), Golden Plover (5,664), Grey Plover (558), Lapwing (15,126), Knot (2,015), Bar-tailed Godwit (460), Curlew (2,396), Greenshank (61) and Black-headed Gull (2,681) - figures are five year mean peak counts for the period 1995/96 to 1999/2000. The site is among the most important in the country for several of these species, notably Dunlin (13 % of national total), Lapwing (6% of national total) and Redshank (9% of national total).

The site also supports a nationally important breeding population of Cormorant (93 pairs in 2010).

Other species that occur include Mute Swan (103), Mallard (441), Red-breasted Merganser (20), Great Crested Grebe (50), Grey Heron (38), Oystercatcher (551),

Turnstone (124) and Common Gull (445) - figures are five year mean peak counts for the period 1995/96 to 1999/2000.

Apart from the wintering birds, large numbers of some species also pass through the site whilst on migration in spring and/or autumn.

The River Shannon and River Fergus Estuaries SPA is an internationally important site that supports an assemblage of over 20,000 wintering waterbirds. It holds internationally important populations of four species, i.e. Light-bellied Brent Goose, Dunlin, Black-tailed Godwit and Redshank. In addition, there are 17 species that have wintering populations of national importance. The site also supports a nationally important breeding population of Cormorant. Of particular note is that three of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Golden Plover and Bar-tailed Godwit. Parts of the River Shannon and River Fergus Estuaries SPA are Wildfowl Sanctuaries.

30.5.2015



Site Name: Ratty River Cave SAC

Site Code: 002316

This site lies approximately 2.5 km north of Sixmilebridge in Co. Clare. It consists of a cave, and also an important winter roost and a breeding site of the Lesser Horseshoe Bat.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[8310] Caves[1303] Lesser Horseshoe Bat (*Rhinolophus hipposideros*)

The cave in Ratty River Cave SAC is a natural fossil limestone cave set into the eastfacing bank of Ratty River (also known as Owenogarney River). The cave entrance is overgrown with Bramble (*Rubus fruticosus* agg.). Inside the entrance there is a low crawl, but the cave opens into a main chamber before diverging into two tunnels. This cave has not been documented, but habitats present include rock roof and walls, and stalactites. The floor features are particularly notable because of their pristine condition. The cave is not known to flood.

Lesser Horseshoe Bats have been using the cave beside the Ratty River as a hibernation site for some years. During the winter of 2001, 187 bats were recorded here making it a site of international importance. A stretch of river and the bankside vegetation are included in the site as these are used by commuting bats. A derelict cottage which is situated nearby is also included as it contains a maternity roost of Lesser Horseshoe Bats. A total of 65 bats were recorded here in July 1998. The foraging areas used by these bats have yet to be established.

Neither roost is subject to disturbance and there are no other known threats to this site at present.



Site Name: Poulnagordon Cave (Quin) SAC

Site Code: 000064

This site is a natural limestone cave situated in a field south of Quin, Co. Clare. The cave is used as a hibernation site by the Lesser Horseshoe Bat.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[8310] Caves[1303] Lesser Horseshoe Bat (*Rhinolophus hipposideros*)

The cave consists of a large entrance which leads into a wide chamber from which there are three passages. The cave is a fine example of a phreatic rift maze formed by solution along the joints by very slow moving water. There are large numbers of fossil corals which have been left outstanding while the limestone around them has been removed. Cave habitats include slow moving water, thick mud, boulders, pools of water, rock walls and roof. Bats have been found in all three passages although most of the bats seem to prefer to roost in the most sheltered passage to the left of the entrance.

The entrance to the cave is sheltered with Hawthorn (*Crataegus monogyna*) trees and the surrounding vegetation is scrub and hedgerows which provides suitable foraging habitat and shelter for the bats.

This cave is well known and frequently visited by locals. Such visits could cause disturbance to the bats. The site would benefit from grilling. Some dumping of rubbish at the entrance has occurred in the past.

The number of Lesser Horseshoe Bats hibernating here varies from over 50 to less than 20. As over 50 have been recorded, the site is of international importance. This site is also important as it is at the eastern limit of the species' distribution in Ireland. The site is a fine example of a natural cave, a habitat listed on Annex I of the E.U. Habitats Directive.



Site Name: Knockanira House SAC

Site Code: 002318

Knockanira House is situated approximately 8 km south-west of Ennis, Co. Clare. The site consists of a two storey building with a single storey section to the rear. It contains an important maternity roost of the Lesser Horseshoe Bat.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1303] Lesser Horseshoe Bat (Rhinolophus hipposideros)

At Knockanira House SAC the Lesser Horseshoe Bats roost in the attic of the single storey section of the building, but also to a lesser extent in the main attic. In September 2002, 107 bats were counted using this breeding site, making it a site of international importance.

Although the house is unoccupied it remains in relatively good condition and the conservation status of the bats there seems secure. A number of out-buildings around the house, however, have fallen into disrepair and Lesser Horseshoe Bats no longer use them. The foraging areas and the winter roost of bats at Knockanira House remain unknown.



Site Name: Kilkishen House SAC

Site Code: 002319

Kilkishen House is an 18th century, two-storey over basement mansion situated approximately 7 km north of Sixmilebridge in Co. Clare. It contains an important winter roost of the Lesser Horseshoe Bat.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1303] Lesser Horseshoe Bat (Rhinolophus hipposideros)

At Kilkishen House SAC, 78 Lesser Horseshoe Bats were counted in November 2001, making it a site of international importance. Most of these were hibernating in the basement, but some were also present in the attic. The building also contains a colony of Natterers' Bats and acts as a summer roost for a smaller number of Lesser Horseshoe Bats (19 were counted emerging from the building in June 1999). The exact foraging areas used by the bats have yet to be established, but areas of woodland and wetland nearby would provide suitable habitat.

Renovation of the house, if undertaken sensitively, may benefit the Lesser Horseshoe Bat population by improving the conservation status of the attic. However, special measures may be required to ensure that disturbance or heat seepage do not make the important roosting areas in the basement less suitable for bats.



Site Name: Old Domestic Building (Keevagh) SAC

Site Code: 002010

This site consists of a derelict, two-storey dwelling near the village of Quin, Co. Clare. It is a breeding site of the Lesser Horseshoe Bat.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1303] Lesser Horseshoe Bat (Rhinolophus hipposideros)

The derelict, two-storey house in this SAC is a breeding site of the Lesser Horseshoe Bat. The bats roost in the roof space and gain access through gaps around the roof and lower sections of the building.

The population size is considered to be greater than 100 individuals, which constitutes a population of international importance. This site is also notable as it is situated along the eastern limit of the distribution of this species in Ireland.

The site has deteriorated since 1992, but should remain suitable as a breeding site for the bats for the foreseeable future.

There are mature trees and extensive hedgerows around the site which provide ideal foraging habitat for the bats. Apart from its value for foraging, the surrounding habitat serves as a corridor for the bats between the summer roost and hibernation site(s).



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