

Gort Lowlands FRS- Ground Investigations

Report for the Screening of Appropriate Assessment

July 2021

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1 Introduction

1.1 Context

The Gort lowlands catchment, in south County Galway covers an area of approximately 500km². The catchment includes the sandstone uplands of the Slieve Aughty Mountains and the limestone lowlands between Gort and Kinvarra Bay. Drainage from the upland area is to the Ownndalulleagh, Boelyneendorrish, and Owneshree Rivers. The entire catchment drains via karstic flow system in the lowlands to several intertidal springs which discharge to Kinvarra Bay. The lowlands are characterised by karst landscape features such as turloughs, springs, swallow holes, and estavelles. During the wetter winter months, the subterranean karst conduits (channels and caves) fill with water and surcharge through estavelles and springs associated with the turloughs of the lowlands. The turlough water levels fluctuate naturally in association with groundwater flows and can dry out completely in the summer. However, in periods of sustained and/or heavy rainfall, the upwelling of groundwater to the turloughs, combined with overland flows to the turloughs can result in the turlough's natural and established upper seasonal boundaries being breached. Such events led to damage and isolation of properties and infrastructure within the Gort Lowlands in the winters of 1994/1995, 2009, 2014 and 2015/16.

Galway County Council, acting as the Contracting Authority on behalf of the Office of Public Works (OPW), intend to develop a flood relief scheme for the affected areas of South Galway. The purpose of the South Galway (Gort Lowlands) Flood Relief Scheme is to identify the most appropriate measures to mitigate flood risk within the Gort lowlands region of Galway.

As part of this design Ground Investigation (GI) works are required. These GI works are necessary to characterise ground conditions within the study area to inform the design.

1.2 Legislative Context for Appropriate Assessment

The EU Habitats Directive (92/43/EEC) is transposed into Irish law by the Planning and Development Act 2000 (as amended) and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011).

Section 42(1) of the European Communities (Birds and Natural Habitats) Regulations 2011 ((hereafter referred to as 2011 Regulations) states:

“A screening for Appropriate Assessment of a plan or project for which an application for consent is received, or which a public authority wishes to undertake or adopt, and which is not directly connected with or necessary to the management of the site as a European Site, shall be carried out by the public authority to assess, in view of best scientific knowledge and in view of the conservation objectives of the site, if that plan or project, individually or in combination with other plans or projects is likely to have a significant effect on the European site.”

This screening for Appropriate Assessment report has been prepared to assist the planning authority screen the proposed GI works for Appropriate Assessment.

The Ground Investigation works proposed are necessary to characterise ground conditions to inform the design of the flood defence scheme. The Project is not therefore necessary for the conservation management of any European site. Ground investigation works fall under

exempted development in Irish planning law. However, Case C-98/03 Commission v Germany, found that

“The condition, to which the assessment of the implications of a plan or a project on a particular site is subject, which requires such an assessment to be carried out where there are doubts as to the existence of significant effects, does not permit that assessment to be avoided in respect of certain categories of projects, on the basis of criteria which do not adequately ensure that those projects will not have a significant effect on the protected sites”.

As such, although the ground investigation works are exempt under Irish Planning Law, however, there is still a requirement for screening for Appropriate Assessment to take place irrespective of this.

The report has been drafted in accordance with the following European Commission Guidance:

- EC (2018) Managing Natura 2000 sites. The provisions of Article 6 of the Habitats Directive 92/43/EEC Commission Notice C (2018) 7621
- DEHLG (2009) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities (Revised 2010).
- EC (2001) ‘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’

This report has similarly been prepared with regard to relevant rulings by the Court of Justice of the European Union (CJEU), the High Court, and the Supreme Court

2 Project Description

2.1 Project Location

The Gort lowlands catchment, in south County Galway covers an area of approximately 500km². The catchment includes the sandstone uplands of the Slieve Aughty Mountains and the limestone lowlands between Gort and Kinvara Bay. The works are throughout this catchment from Kinvarra in the west to Gort in the east, and between Ardrahan in the north, and Termon lough in the south.

The location of these works is presented in Appendix A.

2.2 Project Overview

The works consist of the following:

- 50 boreholes
- 18 geobore boreholes
- 76 rotary core boreholes
- Two slit trenches
- 134 trial pits
- 7 archaeological trenches

2.3 Project Location in Relation to European Sites

The location of European sites within 15km of the Ground Investigation works is presented below in Figure 2.1 and Table 2.1.

Figure 2.1: Works in Relation to European Sites

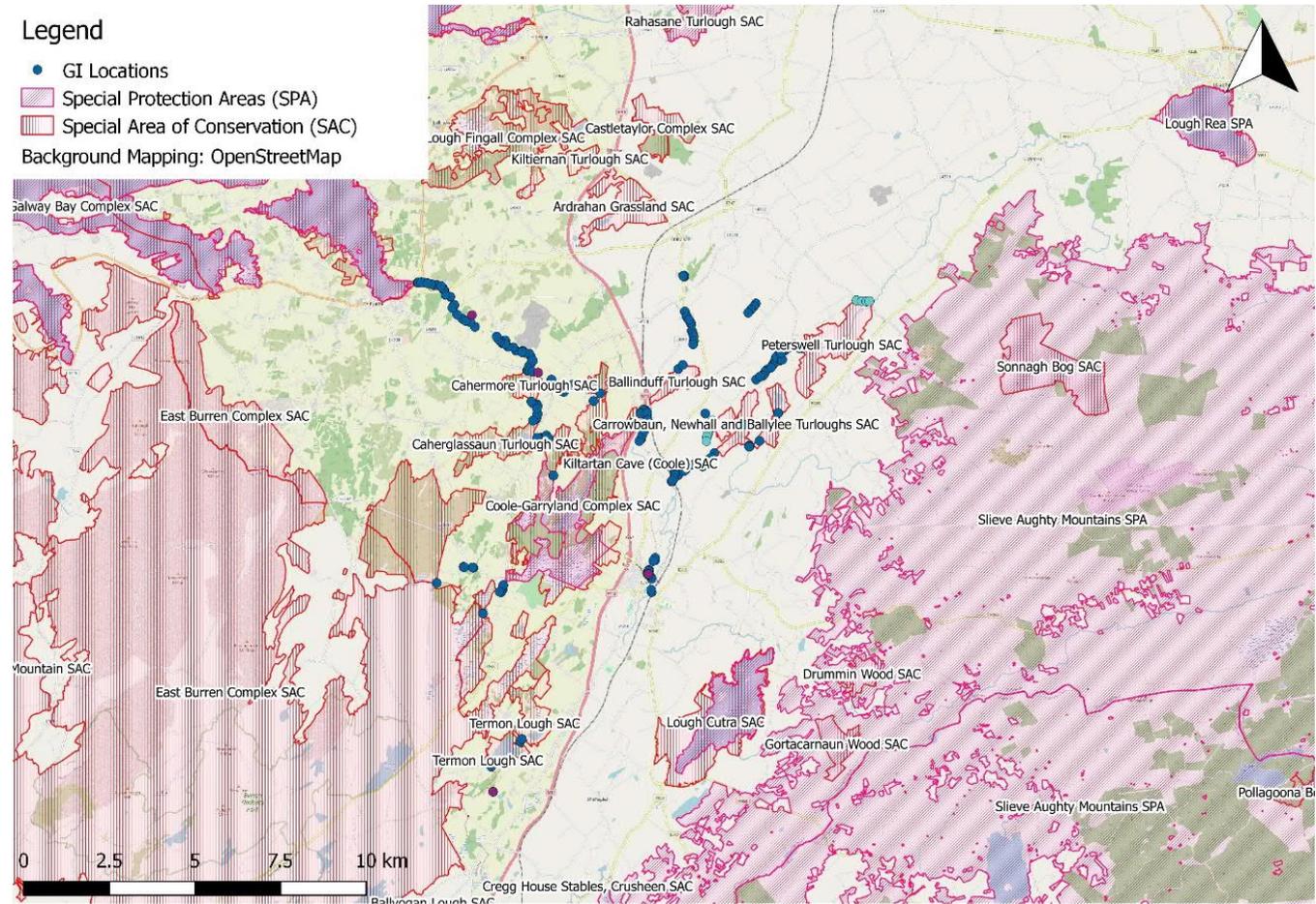


Table 2.1: European Sites Within 15km of the Ground Investigation Works

Site Name	Qualifying Interests/Special Conservation Interests	Closest Extent of Works to European Site (Straight line)
Special Areas of Conservation (SAC)		
Cahermore Turlough SAC (002294)	<ul style="list-style-type: none"> • Turloughs [3180] 	0.00km
Carrowbaun, Newhall and Ballylee Turloughs SAC (002293)	<ul style="list-style-type: none"> • Turloughs [3180] 	0.00km
Coole-Garryland Complex SAC (000252)	<ul style="list-style-type: none"> • Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> - type vegetation [3150] • Turloughs [3180] • Rivers with muddy banks with <i>Chenopodium rubri</i> p.p. and <i>Bidention</i> p.p. vegetation [3270] • <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] • Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] • Limestone pavements [8240] • <i>Taxus baccata</i> woods of the British Isles [91J0] 	0.00km
Termon Lough SAC (001321)	<ul style="list-style-type: none"> • Turloughs [3180] 	0.00km
Galway Bay Complex SAC (000268)	<ul style="list-style-type: none"> • Mudflats and sandflats not covered by seawater at low tide [1140] • Coastal lagoons [1150] • Large shallow inlets and bays [1160] • Reefs [1170] • Perennial vegetation of stony banks [1220] • Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] • Salicornia and other annuals colonising mud and sand [1310] • Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] • Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] • Turloughs [3180] • <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] • Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] 	0.00km

Site Name	Qualifying Interests/Special Conservation Interests	Closest Extent of Works to European Site (Straight line)
	<ul style="list-style-type: none"> • Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] • Alkaline fens [7230] • Limestone pavements [8240] • <i>Lutra lutra</i> (Otter) [1355] • <i>Phoca vitulina</i> (Harbour Seal) [1365] 	
Lough Coy SAC (002117)	<ul style="list-style-type: none"> • Turloughs [3180] 	0.00km
Peterswell Turlough SAC (000318)	<ul style="list-style-type: none"> • Turloughs [3180] • Rivers with muddy banks with <i>Chenopodium rubri</i> p.p. and <i>Bidention p.p.</i> vegetation [3270] 	0.002km
East Burren Complex SAC (001926)	<ul style="list-style-type: none"> • Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara spp.</i> [3140] • Turloughs [3180] • Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] • Alpine and Boreal heaths [4060] • <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] • Calaminarian grasslands of the <i>Violetalia calaminariae</i> [6130] • Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] • Lowland hay meadows (<i>Alopecurus pratensis</i>, <i>Sanguisorba officinalis</i>) [6510] • Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] • Petrifying springs with tufa formation (Cratoneurion) [7220] • Alkaline fens [7230] • Limestone pavements [8240] • Caves not open to the public [8310] • Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0] • <i>Euphydryas aurinia</i> (Marsh Fritillary) [1065] • <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] • <i>Lutra lutra</i> (Otter) [1355] 	0.01km

Site Name	Qualifying Interests/Special Conservation Interests	Closest Extent of Works to European Site (Straight line)
Caherglassaun Turlough SAC (000238)	<ul style="list-style-type: none"> • Turloughs [3180] • Rivers with muddy banks with <i>Chenopodium rubri</i> p.p. and <i>Bidention p.p. vegetation</i> [3270] • <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] 	0.01km
Ballinduff Turlough SAC (002295)	<ul style="list-style-type: none"> • Turloughs [3180] 	0.02km
Kiltartan Cave (Coole) SAC (000286)	<ul style="list-style-type: none"> • Caves not open to the public [8310] • <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] 	0.47km
Ardrahan Grassland SAC (002244)	<ul style="list-style-type: none"> • Alpine and Boreal heaths [4060] • <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] • Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] • Limestone pavements [8240] 	1.64km
Lough Fingall Complex SAC (000606)	<ul style="list-style-type: none"> • Turloughs [3180] • Alpine and Boreal heaths [4060] • <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] • Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] • Calcareous fens with <i>Cladium mariscus</i> and species of the Caricion <i>davalliana</i> [7210] • Limestone pavements [8240] • <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] 	2.76km
Lough Cutra SAC (000299)	<ul style="list-style-type: none"> • <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] 	2.90km
Castletaylor Complex SAC (000242)	<ul style="list-style-type: none"> • Turloughs [3180] • Alpine and Boreal heaths [4060] • <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] • Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] • Limestone pavements [8240] 	3.33km
Ballyogan Lough SAC (000019)	<ul style="list-style-type: none"> • Calcareous fens with <i>Cladium mariscus</i> and species of the Caricion <i>davalliana</i> [7210] 	3.65km

Site Name	Qualifying Interests/Special Conservation Interests	Closest Extent of Works to European Site (Straight line)
Cregg House Stables, Crusheen SAC (002317)	<ul style="list-style-type: none"> • <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] 	3.88km
Moyree River System SAC (000057)	<ul style="list-style-type: none"> • Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] • Alkaline fens [7230] • Limestone pavements [8240] • Caves not open to the public [8310] • <i>Rhinolophus hipposideros</i> (<i>Lesser Horseshoe Bat</i>) [1303] • <i>Lutra lutra</i> (Otter) [1355] 	3.96km
Kiltiernan Turlough SAC (001285)	<ul style="list-style-type: none"> • Turloughs [3180] 	4.16km
Sonnagh Bog SAC (001913)	<ul style="list-style-type: none"> • Blanket bogs (* if active bog) [7130] 	5.76km
Drummin Wood SAC (002181)	<ul style="list-style-type: none"> • Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] 	5.96km
Gortacarnaun Wood SAC (002180)	<ul style="list-style-type: none"> • Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] 	6.04km
Rahasane Turlough SAC (000322)	<ul style="list-style-type: none"> • Turloughs [3180] 	6.63km
Dromore Woods And Loughs SAC (000032)	<ul style="list-style-type: none"> • Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> - type vegetation [3150] • Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] • Limestone pavements [8240] • <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] • <i>Lutra lutra</i> (Otter) [1355] 	8.06km
Moneen Mountain SAC (000054)	<ul style="list-style-type: none"> • Turloughs [3180] • Alpine and Boreal heaths [4060] • <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] • Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] • Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] • Limestone pavements [8240] 	10.61km

Site Name	Qualifying Interests/Special Conservation Interests	Closest Extent of Works to European Site (Straight line)
	<ul style="list-style-type: none"> • <i>Euphydryas aurinia</i> (Marsh Fritillary) [1065] • <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] 	
Glendree Bog SAC (001912)	<ul style="list-style-type: none"> • Blanket bogs (* if active bog) [7130] 	11.59km
Lough Rea SAC (000304)	<ul style="list-style-type: none"> • Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. [3140] 	12.12km
Old Farm Buildings, Ballymacrogan SAC (002245)	<ul style="list-style-type: none"> • <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] 	12.55km
Old Domestic Buildings, Rylane SAC (002314)	<ul style="list-style-type: none"> • <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] 	13.21km
Ballycullinan Lake SAC (000016)	<ul style="list-style-type: none"> • Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] 	14.10km
Ballycullinan, Old Domestic Building SAC (002246)	<ul style="list-style-type: none"> • <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] 	14.85km
Special Protection Areas (SPA)		
Inner Galway Bay SPA (004031)	<ul style="list-style-type: none"> • Black-throated diver (<i>Gavia arctica</i>) [A002] • Great northern diver (<i>Gavia immer</i>) [A003] • Cormorant (<i>Phalacrocorax carbo</i>) [A017] • Grey heron (<i>Ardea cinerea</i>) [A028] • Light-bellied brent goose (<i>Branta bernicla hrota</i>) [A046] • Wigeon (<i>Anas penelope</i>) [A050] • Teal (<i>Anas crecca</i>) [A052] • Red-breasted merganser (<i>Mergus serrator</i>) [A069] • Ringed plover (<i>Charadrius hiaticula</i>) [A137] • Golden plover (<i>Pluvialis apricaria</i>) [A140] • Lapwing (<i>Vanellus vanellus</i>) [A142] • Dunlin (<i>Calidris alpina</i>) [A149] • Bar-tailed godwit (<i>Limosa lapponica</i>) [A157] • Curlew (<i>Numenius arquata</i>) [A160] • Redshank (<i>Tringa totanus</i>) [A162] • Turnstone (<i>Arenaria interpres</i>) [A169] • Black-headed gull (<i>Chroicocephalus ridibundus</i>) [A179] • Common gull (<i>Larus canus</i>) [A182] 	0km

Site Name	Qualifying Interests/Special Conservation Interests	Closest Extent of Works to European Site (Straight line)
	<ul style="list-style-type: none"> • Sandwich tern (<i>Sterna sandvicensis</i>) [A191] • Common tern (<i>Sterna hirundo</i>) [A193] • Wetland and waterbirds [A999] 	
Coole-Garryland SPA (004107)	<ul style="list-style-type: none"> • Whooper swan (<i>Cygnus cygnus</i>) [A038] 	0.01km
Slieve Aughty Mountains SPA (004168)	<ul style="list-style-type: none"> • Hen harrier (<i>Circus cyaneus</i>) [A082] • Merlin (<i>Falco columbarius</i>) [A098] 	1km
Lough Cutra SPA (004056)	<ul style="list-style-type: none"> • Cormorant (<i>Phalacrocorax carbo</i>) [A017] 	3km
Rahasane Turlough SPA (<ul style="list-style-type: none"> • Whooper swan (<i>Cygnus cygnus</i>) [A038] • Wigeon (<i>Anas penelope</i>) [A050] • Golden plover (<i>Pluvialis apricaria</i>) [A140] • Black-tailed godwit (<i>Limosa limosa</i>) [A156] • Greenland white-fronted goose (<i>Anser albifrons flavirostris</i>) [A395] • Wetland and waterbirds [A999] 	6.7km
Lough Rea SPA (<ul style="list-style-type: none"> • Shoveler (<i>Anas clypeata</i>) [A056] • Coot (<i>Fulica atra</i>) [A125] • Wetland and waterbirds [A999] 	9.8km

2.4 Construction Activities and Associated Potential for Effects

Construction works are expected to commence in Q3 2021 and are expected to continue for a total duration of 16 weeks (approximately).

Site preparation

The access corridor necessary to allow rig access within these areas will be 4 m in width, and the works area required for boreholes will be approximately 10 m X 10 m. The works, and access thereto are located within agricultural grasslands, farmyards, and within the existing road curtilage. No works areas have been identified in areas of woodland or scrub where there would likely be a significant amount of site clearance required to facilitate the works. Given that these areas are regularly accessed by farm machinery and vehicles, it is anticipated that the site clearance would be minimal, comprised of removing branches where it encroaches on the works area.

Bog-mats will be used to assist the Contractor in negotiating areas with wet ground conditions, or as required, in order to reduce rutting and reduce the level of reinstatement required.

Machine Excavated Trial Pit

These pits are excavated to a maximum depth of 3m below ground level to determine the nature of the shallow superficial deposits across the site. Samples will be taken for geo-environmental and geotechnical laboratory testing.

To carry out these works, a tracked excavator will dig down through soils whilst an engineer logs and takes samples. Topsoil will be stripped and laid to one side for reinstatement. Subsoil will also be stored separately. On completion, the soils are backfilled and compacted in reverse order, it is common to have a slight mound pronounced above ground level to allow for future subsidence.

Hand vanes will be taken in in cohesive soils to determine the soils shear strength. This is done by pushing the blades of the hand vane into soil, rotating the vane head and reading the maximum deflection reading once the soil shears.

There is a potential for disturbance through noise and vibration emissions, and surface water run-off associated with the excavation of these trial pits.

Machine Excavated Slit Trench

The methods involved are as trial pits covered above, but with a wider rectangular footprint and potentially up to 2m deep.

As with the machine excavated trial pit, there is potential for noise and vibration emissions and surface water run-off associated with these works.

Boreholes

- Geobor S

This method involves drilling to determine the nature of superficial deposits and rock across the site (typically used for weak formations such as clay/sand). Samples are obtained for geotechnical testing. This drilling method is similar to rotary coring however a triple-core barrel system is used to produce a continuous core. The system cases the borehole providing stability and reduces core disturbance. A biodegradable polymer mud flush is applied under low pressure to aide in the reduction of core disturbance. The polymer is contained within the drilling mechanism and is recirculated.

- Cable percussive

These holes are to determine the nature of the superficial deposits across the site. The rig to carry this out is typically towed to site. A 2-tonne capacity winch/pulley system then sets the tripod rig upright. The casing is then installed as the borehole progresses. Water is typically not required for cable percussive boreholes. A limited amount of water may be added if 'blowing' sand (artesian) is required, or if required to speed up drilling in stiff clays. Any water required for the works will be imported into site in a bowser. There will be no abstraction from local water sources. Chiselling may be undertaken in some boreholes to get through obstructions (i.e. cobbles or boulders).

- Rotary Open Hole and Cored Follow On

The purpose of these works is to investigate the depth and condition of bedrock at the site. This method will be used when other borehole methods meet refusal and will be carried out down to This method is typically carried out via a truck mounted drill rig. A water mist flush will be used. Therefore, an air compressor and a water bowser and pump will also be used on site. No water will be abstracted from any watercourses or drains. The water mist is absorbed to ground within the bore and the immediate works area (i.e. 10m x 10m). The rock cores are then stored, and the hole will be backfilled with bentonite pellets.

In-situ Standard Penetration Testing (SPT) will then take place. This involves dropping a hammer onto a cone, and the number of blows are then counted over a depth of about 450mm. Samples of soil and ground water are obtained at regular intervals, bagged or tubbed and taken off-site for geotechnical and geo-environmental laboratory testing. Borehole shear vanes (with extension rods) in cohesive soils may be required.

The hole is then backfilled with a groundwater installation, arisings or bentonite/clay (in pellet form). Bentonite is a non-toxic, inorganic, naturally occurring clay, thus is suitable for use as backfill due to its inert nature. Samples of soil and ground water are obtained at regular intervals, bagged or tubbed and taken away to contractor's base for testing. Should the drilling fail, and the borehole is unsuitable, it will be backfilled with arisings. Should the hole be full of water such that backfilling with arisings is not practicable, the hole will be filled with bentonite pellets.

Where boreholes are noted as being type unidentified, these may be progressed as any of the above borehole types. Groundwater monitoring loggers may be installed during the borehole works. These will be inspected at regular intervals. It is anticipated that the inspections to download data will take place approximately every three months

There is potential for noise and vibration emissions, and surface water run-off where drilling flush does not surcharge.

2.5 Potential for Significant Effects

Zone of Influence

CIEEM guidelines states that the “zone of influence (Zol) is the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities” and that the “zone of influence will vary for different ecological features depending on their sensitivity to an environmental change”.

The likely biophysical changes associated with the GI works are set out having regard to the timing, frequency, duration, location, extent and magnitude of the works. The zones of influence associated with these project effects have been derived from relevant published literature and guidance documents. The duration of effect is defined with regard to the EPAs ‘Guidelines on the Information to be Contained in Environmental Impact Assessment Reports’ (Draft, August 2017) which outlines categories for the description of durations: brief (less than 1 day); temporary (less than 1 year); short-term (1-7 years); medium-term (7-15 years); long-term (15-60 years); and permanent (>60 years). All works associated with the ground investigation are temporary.

All European sites within the defined zones of influence were identified using Geographic Information System (ArcGIS).

The potential for environmental effects of the proposed works, along with potential zone of influence for the works is outlined hereunder:

Site Clearance and Ground Excavation

Lands will be temporarily excavated to accommodate the GI works. Excavations will be backfilled with the arisings and reinstated immediately following the works.

Disturbance to and/or degradation of habitats is taken as the lands within the works area (approximately 10mx10m area) and any areas of site clearance that are required to facilitate the works. Works are located within the boundaries of six European Sites. These sites and the baseline habitats¹ in which the works are taking place are outlined below in Table 2.2. The qualifying interests for which these European Sites are designated are provided in table 2.1:

Table 2.2: Baseline Environment for Works Within European Site Boundaries

Site name	Habitat within works footprint	Potential for impact
Lough Coy SAC (002117)	All works within the SAC boundary (two rotary core boreholes, two geobore boreholes, and one trial pit) are located within the existing road curtilage.	The existing roadway in which the works will take place does not constitute the turlough habitat for which the SAC is designated. No works are proposed within QI habitat or other habitat of ecological value. No sensitive groundwater dependent habitats (e.g. fens) occur within the potential Zol of the boreholes.
Carrowbaun, Newhall and Ballylee Turloughs SAC (002293)	The works within the SAC boundary comprise one trial pit, and one rotary core borehole and are located on the edge of an agricultural field directly adjacent to the existing roadway, and within the existing roadway respectively.	The agricultural field and existing roadway in which the works will take place does not constitute the turlough habitat for which the SAC is designated. No works are within QI habitat or other habitat of ecological value. No sensitive

¹ Baseline habitat assessment is based on a combination of field survey observations and assessment through aerial photography and drone footage.

Site name	Habitat within works footprint	Potential for impact
		groundwater dependent habitats (e.g. fens) occur within the potential Zol of the boreholes.
Coole-Garryland Complex SAC (000252)	All works within the SAC boundary (Two rotary core boreholes, two geobore borehole and one borehole (type unidentified) are located within the existing road curtilage.	The existing roadways in which the works will take place do not constitute the any of the habitats for which the SAC is designated. No works are within QI habitat or other habitat of ecological value. No sensitive groundwater dependent habitats (e.g. fens) occur within the potential Zol of the boreholes.
Cahermore Turlough SAC (002294)	The works within the SAC boundary (Two rotary core boreholes) are located within an existing roadway.	The existing roadway does not constitute the Turlough habitat for which Cahermore Turlough SAC is designated. No works are within QI habitat or other habitat of ecological value. No sensitive groundwater dependent habitats (e.g. fens) occur within the potential Zol of the boreholes.

The GI works and access thereto will take place within managed agricultural grasslands, roadside verges and existing hardstanding areas (roads). These do not constitute habitats or key supporting habitat for Qualifying Interests for which the aforementioned SAC and SPA sites are designated. As such, there is no potential for direct impact to any European habitats through disturbance or degradation of habitats.

The Scottish Environmental Protection Agency (2014) specifies the zone of influence for Ground Water Dependant Terrestrial Ecosystems (GWDTE) from excavations deeper than 1m to be a 250m buffer around the works area. However, this guidance is in relation to features such as foundations or borrow pits which may disrupt the flow of groundwater, and dewatering which may change alter the groundwater which supplies the GWDTE. The proposed works are short term excavations and boreholes which will be backfilled and reinstated immediately upon completion (within 1 day). Any pumping out of water will be short term, to enable testing to proceed within trial pits and slit trenches. The catchment within which the works will take place, the Gort lowlands catchment, covers an area of approximately 500km². As such, the short term pumping out of water from within the trial pits and slit trenches will not have a significant effect on GWDTEs in the vicinity of the works.

A number of turlough SAC core habitats exist within 250m of some of the boreholes. None of these turloughs are within the Zol given the small scale and temporary nature of borehole works. This assessment is based on all works are proposed to be conducted during the summer; all boreholes are up gradient of swallow holes and associated wetter turlough vegetation communities; and impacts to ground water flows will be highly localised (around the immediate borehole location) and temporary (< 1day).

A number of SACs (as noted in table 2.1) are designated for lesser horse-shoe bats. The ground investigation works will not result in any interference with or direct damage to any roosting sites for lesser horseshoe bats or to supporting forage habitat including woody vegetation. The proposed works are located within agricultural fields and existing hardstanding surfaces. There is no requirement for any loss of woodland habitat which may be utilised as foraging or commuting habitat for the species.

Noise and Vibration

The proposed project will result in a temporary increase in noise at each GI works location due to machinery operation. Disturbance due to noise varies between species and is dependent on the volume and nature of the noise source.

Wetland Birds

The works have potential to cause a short-term localised increase in noise levels. Wetland birds have been documented to tolerate noise levels at or below 70dB(A) (Institute of Estuarine & Coastal Studies, University of Hull, 2009). BS 5228-1:2009+A1:2014 prescribes typical noise level data for various construction plant and activities within 10m of the various sources. The inverse square law can then be applied to determine likely noise levels at varying distances from the proposed intake works (Table 2.2). This identifies that the noise levels fall below 70dB within 100m of the works. the zone of impact for noise as 100m from the works areas.

Table 2.3: Typical noise level data for various construction plant and activities

Plant Item	100m Distance	200m Distance	300m Distance
Cable percussion drilling rig	54 dB	46 dB	19 dB
Tracked excavator	55 dB	47 dB	20 dB
Earthworks (Dozer)	63 dB	55 dB	28 dB
Dump truck (empty)	65 dB	57 dB	30 dB
Pumping water	42 dB	34 dB	7 dB
Diesel generator	51 dB	43 dB	16 dB
All above	68 dB	60 dB	33 dB

Source: BS 5228-1:2009+A1:2014

In terms of vibration associated with the works, the cable percussive borehole rig is the most significant cause of vibration identified. Excavation works do not typically cause vibration effects beyond the immediate footprint of the works. Nicholls (2009) examines the potential impact of cable percussion drilling. The technical note outlines that key elements associated with drilling activity which are likely to cause concern are surging casings in clay soils, and chiselling's in bedrock. As the geology within the various works area is unknown at present the potential for either is unknown, however given the karst landscape chiselling in bedrock may be required. The technical note does not identify vibration impacts beyond the order of 3mm/sec at 50m for either surging casings or bedrock chiselling. As such, the zone of impact for vibration is taken as 50m from the works areas.

The following sites have works identified within, or in close proximity (within 100m) to their boundaries.

Table 2.4: Works in proximity to European Site Boundaries

European Site Name	Works identified within the site boundary	Works identified outside but within 100m of the boundary
Lough Coy SAC (002117)	<ul style="list-style-type: none"> • Two rotary core boreholes within the boundary • Two geobore boreholes within the boundary • One trial pit within the boundary 	<ul style="list-style-type: none"> • None
Carrowbaun, Newhall and Ballylee Turloughs SAC (002293)	<ul style="list-style-type: none"> • One trial pit within the boundary • One rotary core borehole 	<ul style="list-style-type: none"> • Two geobore boreholes • two rotary core boreholes • Five trial pits
Coole-Garryland Complex SAC (000252)	<ul style="list-style-type: none"> • Two geobore boreholes • One borehole – type unidentified • Two rotary core boreholes 	<ul style="list-style-type: none"> • Five boreholes – type unidentified • Three rotary core boreholes • Three trial pits
Cahermore Turlough SAC (002294)	<ul style="list-style-type: none"> • Two rotary core borehole 	<ul style="list-style-type: none"> • Four boreholes – type unidentified • Two trial pits • One archaeological trench
East Burren Complex SAC (001926)	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • One geo-bore borehole • One trial pit
Termon Lough SAC (001321)	<ul style="list-style-type: none"> • One borehole – type unidentified 	<ul style="list-style-type: none"> • Two trial pits • One borehole – type unidentified
Inner Galway Bay SPA (004031)	<ul style="list-style-type: none"> • One rotary core borehole 	<ul style="list-style-type: none"> • Two boreholes • One rotary core boreholes • One trial pit
Ballinduff Turlough SAC (002295)	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Two trial pit
Caherglassaun turlough SAC (000238)	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • One borehole – type unidentified • One rotary core borehole • Two trial pits
Galway Bay Complex SAC (000268)	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Two boreholes • Two rotary core boreholes • One trial pit
Coole-Garryland SPA (004107)	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Two rotary core boreholes • Four boreholes - Type unidentified • One trial pit • One geobore borehole
Peterswell Turlough SAC	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Five trial pits • One rotary core borehole

Two SPA boundaries were identified within 100m of the works areas, Inner Galway Bay SPA (004031) and Coole Garryland SPA (004107).

All other works are located a minimum of 100m outside of the boundary of any European Sites.

Inner Galway Bay SPA

The works are located on the south eastern edge of the European Site boundary. The works within 100m of the site are located within a busy existing road and an agricultural field. A small laneway which is regularly used as a walkway runs to the north of the works along the edge of the SPA. Given the volume of traffic in the vicinity, and the managed nature of the nearby agricultural fields it is likely that any birds within the 100m Zone of Impact are habituated to human presence and the noise and vibration associated with traffic and agricultural machinery. The works within 100m of the site will be completed over the course of approximately one week between August and November 2021. As such, any disturbance effects will be short term in nature, and within a small area of the overall European site. No significant roosting or feeding areas have been identified within the Zone of influence for the works. There is, therefore, no potential for significant effects on Inner Galway Bay SPA associated with noise and vibration effects caused by the works.

Coole-Garryland SPA

The works within 100m of the Coole Garryland SPA are located in three areas at the edge of the SPA. A study carried out (Robinson *et al.*, 2004) notes that wet grasslands around the small cluster of turloughs in the area are used by whooper swans and other wintering wildfowl and waders. The habitats within 100m of the works area are comprised of managed agricultural grassland, existing hard standing, treelines, scrub and a small area of mixed broadleaf woodland. This does not constitute key habitat for whooper swans associated with Coole Garryland SPA. The works within 100m of the site are short term in nature, will be conducted outside winter season (when wintering SCI including Whooper Swan are present) and will take place over approximately three weeks. Given the short-term nature of the works, and the location relative to core foraging areas for whooper swans, there is no potential for significant effects on Coole-Garryland SPA associated with noise and vibration effects caused by the works.

Marine Mammals

Inner Galway Bay SAC is designated for Harbour seal among the site's Qualifying Interests. DAHG (2014) '*Guidance to manage the Risk to marine Mammals from man-made Sound in Irish Waters*' specifies guidance for activities which pose a risk to marine mammals from sound. The document states: '*Drilling is generally acknowledged to produce moderate levels of continuous omnidirectional sound at low frequency (several tens of Hz to several thousand Hz and up to c. 10 kHz). Source sound pressure levels have generally been reported to lie within the 145-190 dB re: 1 µPa range. While sound exposure levels from such operations are thought to be below that expected to cause injury to a marine mammal, they have the potential to cause lower level disturbance.*' The guidance goes on to outline a distance of 500m as the potential zone of impact for drilling. It is important to note that this reference to drilling is in relation to undersea drilling as opposed to land based operations as would be required in this case.

The works within the zone of impact of Inner Galway Bay are located on the edge of Kinvara Bay close to the town of Kinvara. The closest extent of works to the bay are located within the existing roadway. There are no haul out areas (breeding, moulting or resting sites) identified within 500m of the works area. The closest such site is located approximately 3km to the north.

The works within 500m of the bay will take place over the course of approximately 2 weeks. The proportion of seal habitat identified as occurring within the zone of impact comprises an area of approximately 0.05km². Any disturbance effects will be to a small area that does not constitute a

key breeding, moulting or resting areas. As such, there no potential for significant effect to harbour seals associated with the works.

Otter

Inner Galway Bay SAC is designated for otter among the site's Qualifying Interests. The potential zone of impact for noise and vibration effects to otter is taken as 150m as per the NRA "Guidelines for the Treatment of Otter Prior to the Construction of National Road Schemes". The area within 150m of the works at Kinvara bay is comprised of a busy road in close proximity to a tourist attraction. A walkway is present along the northern edge of the zone of impact which is regularly used. As such, the area is subject to a great deal of disturbance at this location.

The works at Kinvara bay will take place over approximately 2 weeks. Further, the works will be carried out during daylight hours. Given that otter are crepuscular, the potential for disturbance is reduced further. Given the nature of the works at Kinvara, the habitat within 150m of the works, and the timing of same, there is no potential for significant effect to otter as a result of the works.

Surface Water Run-off

There is potential for surface water run-off associated with excavations, stockpiled materials, and a limited amount arising from the works themselves in the unlikely event that the arisings do not surcharge under pressure. It is of note that works will be reinstated directly following completion and the potential for surface water run-off associated with stockpiled material is limited.

The majority of the works are not within or adjacent to any watercourses, and are located within hardstanding areas, reducing the potential for surface water run-off. However, some works are required adjacent to Kilchreest river, the Cannahowna river, and the Boleynedorrish river.

Works are required in proximity to the boundary of the Burren Complex SAC, the direction of flow of nearby watercourses are such that any surface water emissions would be carried outside of the SAC boundary.

The following European sites are located downstream of works, adjacent to watercourses

- Coole Garryland Complex SAC / SPA –approximately 140m hydrological route downstream of the nearest works at its closest point
- Galway Bay Complex SAC/ Inner Galway Bay SPA – works are adjacent to the boundary

Coole Garryland Complex SAC

Where works are required in proximity to watercourses, they are within agricultural fields set back outside of the riparian zone associated with the watercourse. This distance will act as a natural vegetated swale. This will allow any run-off to dissipate to ground and trap sediment associated with the works, thus preventing it from entering any watercourses.

The works are short term in nature and are programmed to take place during the drier months of the year. Further, the Gort lowlands catchment, covers an area of approximately 500km². As such, given the volume of water entering into the freshwater systems from the catchment, the surface water run-off would be even further diluted such that any effects associated with same would be negligible. There is no potential for significant effect to Coole-Garryland Complex SAC.

Galway Bay Complex SAC/Inner Galway Bay SPA

Works within and adjacent to Galway Bay complex SAC/Inner Galway Bay SPA are located within existing hard standing and agricultural fields. Any surface water run-off will be contained within the road curtilage or enter into the drainage system associated with the road. This would allow for settlement of sediments associated with the works prior to entering into the bay. Further, the habitats downstream of the works are marine in nature. The input of sediment to these systems takes place as part of their natural processes. As such, there is no potential for significant effects to Galway Bay Complex SAC/Inner Galway Bay SPA as there are no sensitive species or habitats associated that may be impacted by the works.

2.6 In-Combination Effects

Article 6(3) of the Habitats Directive requires that:

*“Any plan or project not directly connected with or necessary to the management of the site but likely to have a 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”.*

It is therefore required that the likely impacts of the ground investigation works on any European Sites are considered in combination with any other relevant plans or projects. Projects and plans included as part of the cumulative impacts assessment are detailed in below.

A search of planning applications in the vicinity of the works was undertaken in November 2020 to examine projects with potential for in combination effects. Applications which were made typically consisted of extensions, demolitions and renovations to existing houses and agricultural buildings, and retention of existing developments.

Given the location of the ground investigation works relative to these applications, the short-term duration of the works and the nature of both the ground investigation works and these developments, there is no potential for cumulative or in-combination effects identified.

Other, larger scale, projects which were identified are outlined hereunder:

Gort Lowlands Flood Relief Scheme

The Gort Lowlands Flood Relief Scheme is currently at option appraisal phase. The GI works are required to inform the design of the scheme. As such, there will be no overlap between the GI works and the works to progress the flood relief scheme itself. Given the nature, scale and timing of the works there is no potential for cumulative or in-combination effects identified.

Gort Biogas

An application for planning permission for a Biogas Plant (Planning Ref: 19182) was lodged in Gort in November 2019. This application was refused in 2020. Among the reasons provided for the refusal the potential for effects on European Sites was cited in terms of impacts of air pollutants, water quality, habitat loss/fragmentation and the exclusion of a number of European Sites from the assessment.

The refusal notice states in relation to European Sites *“Therefore, the development is likely to have significant adverse impacts on the qualifying criteria and conservation objectives of Nearby European Sites, in particular the Coole Garryland Complex SAC, the Coole Garryland SPA, Lough Cutra SAC and Kiltartan Cave SAC which would contravene materially a policy, objectives, and a development management standard contained in the current Galway County*

Development Plan, and would be contrary to the proper planning and sustainable development of the area.”

A second appeal of the refusal was lodged in February 2021. The decision is due by the 30th of April 2021. Given this timing, there is no potential for in-combination effects associated with the Ground Investigation works as they will be completed in advance of construction of the Biogas Plant should the development be granted permission.

Conclusion

The scale, nature, locations, extent and duration of the proposed GI works are such that the project does not have the capacity to act in-combination with any other plan or project such as to cause likely significant effects as a direct consequence of its contribution. There are no identified plans or consented projects which have the potential to act in-combination with the proposed GI works in relation to any identified effects.

There are therefore no potential effects identified from the proposed GI works which could act in-combination with any other plans or projects to result in any likely significant effects on any European site.

3 Screening Conclusion Statement

The screening assessment considered whether the proposed works, alone or in combination with other projects or plans, may have the potential to result in significant effects to any European sites.

The following European sites was identified as being within the zone of influence of the proposed GI works in relation to potential disturbance from noise, and potential surface water emissions:

- Lough Coy SAC (002117)
- Carrowbaun, Newhall and Balllylee Turloughs SAC (002293)
- Peterswell Turlough SAC (000318)
- Coole-Garryland Complex SAC (000252)
- Cahermore Turlough SAC (002294)
- East Burren Complex SAC (001926)
- Termon Lough SAC (001321)
- Galway Bay Complex SAC (000268)
- Inner Galway Bay SPA (004031)
- Ballinduff Turlough SAC (002295)
- Caherglassaun turlough SAC (000238)
- Coole-Garryland SPA (004107)

The likely effects were assessed for the potential to result in significant effects.

In conclusion, it can be concluded on the basis of objective scientific information following appropriate assessment screening, that the proposed GI works, individually or in combination with other plans or projects, will not have a significant effect on a European site. These conclusions are outlined below in a Findings of No Significant Effects Matrix

Table 5: Findings of No Significant Effects Matrix

Name of project or plan	Gort GI Works
Name and location of European sites	<ul style="list-style-type: none"> ● Lough Coy SAC (002117) ● Carrowbaun, Newhall and Balllylee Turloughs SAC (002293) ● Peterswell Turlough SAC (000318) ● Coole-Garryland Complex SAC (000252) ● Cahermore Turlough SAC (002294) ● East Burren Complex SAC (001926) ● Termon Lough SAC (001321) ● Galway Bay Complex SAC (000268) ● Inner Galway Bay SPA (004031) ● Ballinduff Turlough SAC (002295) ● Caherglassaun turlough SAC (000238) ● Coole-Garryland SPA (004107)
Description of the project or plan	It is intended to progress GI works throughout the Gort Lowlands Catchment. These GI works are necessary to characterise ground conditions to inform the proposed Gort Lowlands Flood Relief Scheme design.

Name of project or plan	Gort GI Works
Is the project or plan directly connected with or necessary to the management of the site?	No
Are there other projects or plans that together with the project or plan being assessed could affect the site?	No. There are no identified plans or consented projects which have the potential to act in-combination with the proposed GI works in relation to the identified effects.
The assessment of significance of effects	
Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site.	Noise generated by the GI could temporarily disturb bird species, and marine mammals in proximity to the works.
Explain why these effects are not considered significant	The GI works in proximity to these areas will be short term in nature. No significant roosting or foraging areas for birds or haul out areas for seals associated with European sites have been identified within the Zone of Impact of the works area.
List of agencies consulted: provide contact name and telephone or e-mail address	None, other than provision of protected species and habitats datasets for the region provided by NPWS.
Response to consultation.	N/A
Data collected to carry out the assessment	
Who carried out the assessment?	Erin Johnston Senior Ecologist with Mott MacDonald Ireland.
Sources of data?	Listed throughout this document.
Level of assessment?	Desktop study and site survey

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