

Natura Impact Statement Moy Catchment Gravel Replenishment



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Appendix 1 Screening for appropriate assessment report.

1 SUMMARY OF FINDINGS

1.1 NATURA IMPACT STATEMENT

Project Title	Moy Gravel Replenishment
Project Proponent	Inland Fisheries Ireland (IFI)
Project Location	There are 42 subject sites which are located in the Moy and Killala Bay
	catchment in County Mayo.
	In cases where an Appropriate Assessment is required, a Natura Impact
	Statement (NIS) is prepared and includes a report of a scientific
Natura Impact	examination of evidence and data, carried out by competent persons to
Statement	identify and classify any implications of a project, individually, or in
	combination with other plans or projects, for Natura 2000 sites in view of
	the conservation objectives of the site.
Conclusion	For the reasons set out in detail in this NIS, in the light of the best
	scientific knowledge in the field, all aspects of the project which, by itself,
	or in combination with other plans or projects, which may affect the
	relevant European Sites have been considered. The NIS contains
	information which the Board, as competent authority, may consider in
	making its own complete, precise and definitive findings and conclusions
	and upon which the Board is capable of determining that all reasonable
	scientific doubt has been removed as to the effects of the project on the
	integrity of the relevant Natura 2000 sites.

2 INTRODUCTION

According to the Habitats Directive, an Appropriate Assessment is required of the implications for the European site concerned of any plan or project not directly connected with or necessary to the management of that site but likely to have a significant effect thereon, either individually or in combination with any other plans or projects prior to its approval, and to take into account the cumulative effects which result from the combination of that plan or project with other plans or projects (in-combination effects) in view of the European site's conservation objectives.

A screening for appropriate assessment was completed for the proposed River Moy Gravel Replenishment project to determine whether the project was likely to have a significant effect on any Natura 2000 sites, either individually or in combination with any other plans or projects. The screening for appropriate assessment determined the need for a full appropriate assessment of the proposed project was required, as it could not be excluded, on the basis of objective information, that the proposed project, individually or in combination with other plans or projects, is likely to have a significant effect on a Natura 2000 site, in view of the sites conservation objectives. It was concluded that the proposed River Moy Gravel Replenishment project, alone or in combination with other plans or projects, is likely to have a significant effect, or the potential for significant effects cannot be ruled out (at the screening stage) and in the absence of mitigation, on the following Natura 2000 site:

• River Moy SAC (002298)

Refer to **Appendix 1** for the full Screening for appropriate assessment report.

An Appropriate Assessment of the project is required and thus this Natura Impact Statement (NIS) has been prepared, which is a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications of the plan or project, alone and in combination with other plans and projects, on the integrity of a Natura 2000 site in view of its conservation objectives. The aim of the assessment is to provide a sufficient level of information to Inland Fisheries Ireland on which to base their appropriate assessment of the plan or project. Additionally, mitigation measures to avoid or reduce ecological effects were considered. The project is fully described, particularly in relation to the aspects that could interact with the surrounding environment. The description includes details on both the proposed development for which permission is being sought and all other associated elements that constitute the overall project and has been fully described in **Section 4** below.

3 METHODOLOGY

3.1 STATEMENT OF AUTHORITY

Field work and reporting was carried out by Gerard Hayes (Ba. Sc.). Gerard is a senior aquatic ecologist with over 13 years' experience in environmental consultancy. He is a member of the

Chartered Institute of Ecology and Environmental Management (CIEEM) and the Freshwater Biological Association (FBA). Gerard has a diverse ecological profile, with Phase 1 habitat, tree, mammal (including bats), bird, amphibian, fish and macroinvertebrate survey experience. He has had numerous responsibilities including waste assimilation capacity assessment, report writing (EIS, EIA, EA, AA, NIS, RWIA) and ecological monitoring. His project involvement has been primarily in the areas of wind energy development, waste water treatment plants, roads/bridges, water supply, flood defense and hydro schemes. He is co-author and/or carried out surveys for NPWS Irish Wildlife Manual Nos. 15, 24, 26, 37 and 45. He has been formally trained in WFD river monitoring (Environmental Protection Agency), Stage 1 and Stage 2 Freshwater Pearl Mussel Surveying (Evelyn Moorkens), aquatic macroinvertebrate identification (Freshwater Biological Association) and QGIS (CIEEM).

3.2 APPROPRIATE ASSESSMENT GUIDANCE

This Natura Impact Statement (NIS) has been undertaken in accordance with the European Commission Methodological Guidance on the provisions of Article 6(3) and 6(4) of the 'Habitats' Directive 92/43/EEC (EC, 2001), the European Commission Guidance 'Managing Natura 2000 sites' (EC, 2000) and guidance prepared by the NPWS; Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities (DEHLG, 2009) and 'Office of the Planning Regulator (2021) Appropriate Assessment Screening for Development Management'(Office of the Planning Regulator, 2021).

3.3 DESK 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:

- OSI Aerial photography and 1:50000 mapping, and other online mapping sources (online)
- National Parks and Wildlife Service (NPWS)¹ (online)
 - o Conservation Objectives
 - o Site data
 - o Natura 2000 forms
 - Article 12 reports 2008-2012
- National Biodiversity Data Centre (NBDC)² (online)
- BirdWatch Ireland (online)
- Teagasc soil area maps (NBDC website)
- Geological Survey Ireland (GSI) area maps³ (online)
- Environmental Protection Agency (EPA) water quality data⁴ (online)
- Moy & Killala Bay Catchment Assessment 2010-2015 (HA 34) (EPA) (online) (EPA, 2018)
- Central Statistics Office (CSO) (online)
- OSI's GeoHive (online)

¹ <u>https://www.npws.ie/maps-and-data</u> (Accessed in June 2021)

² <u>https://maps.biodiversityireland.ie/</u> (Accessed in June 2021)

³ <u>https://www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx</u> (Accessed in June 2021)

⁴ <u>https://gis.epa.ie/EPAMaps/</u> (Accessed in June 2021)

- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished Report, NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.
- Mayo County Council planning applications⁵ (online)
- Mayo Development Plan⁶
- Sligo County Council planning applications⁷ (online)
- Sligo Development Plan⁸

3.4 FIELD SURVEYS

Ecological field surveys were conducted by staff ecologists with Malachy Walsh and Partners Engineering and during June 2021. The aim of these surveys was to characterise the proposed replenishment sites and environs and establish if there were any important ecological features and resources affected, particularly in relation to the conservation interests of nearby Natura 2000 sites. The methods below were deployed at each site.

The riverine habitats were evaluated with cognisance to 'Ecology of the Atlantic Salmon' (Hendry K & Cragg-Hine D, 2003) to assess habitat suitability for salmonids. An evaluation of lamprey nursery habitat was also carried out, based on the habitat requirements of juvenile lampreys as outlined in Maitland, (2003). Riverine habitats were assessed with respect to the requirements of white-clawed crayfish (*Austropotamobius pallipes*) with reference to Holdich (2003). Habitats at gravel deposition sites were classified according to 'A Guide to Habitats in Ireland' (Fossitt, 2000) and evaluated. The presence of invasive plant species was noted, particularly any species listed on the Third Schedule of the 2011 European Communities (Bird and Natural Habitats) Regulations.

Aerial photography was used together with GPS to accurately enable field navigation. Each site was photographed. A qualitative assessment was made of plant species diversity, vegetation structure, topography and drainage, disturbance and management.

All field survey work was carried out in line with 'IFI Biosecurity Protocol for Field Survey Work' (Inland Fisheries Ireland, 2010). The surveys were timed to coincide with normal water level insofar as possible to maximise efficiency and effectiveness of surveys.

3.5 CONSULTATION

Consultation was carried out with Barry Kelly (IFI), River Moy Catchment Manager.

3.6 ASSESSMENT OF POTENTIALLY SIGNIFICANT EFFECTS

Following the completion of the "Screening for Appropriate Assessment" (see **Appendix 1**), it was concluded that the project could have a significant effect on the following Natura 2000 sites, namely:

• River Moy SAC (002298)

⁵ https://myplan.ie/national-planning-application-map-viewer/ (Accessed in June 2021)

⁶ <u>https://www.mayo.ie/planning/county-development-plans/2021-2027</u> (Accessed June 2021)

⁷ <u>https://myplan.ie/national-planning-application-map-viewer/</u> (Accessed June 2021)

⁸ <u>https://www.sligococo.ie/cdp/</u> (Accessed June 2021)

On this basis, it was necessary to proceed to Appropriate Assessment and as such a NIS was required for the project. An evaluation was undertaken to determine which of the qualifying interests of the SACs, and species of conservation interest (SCI) of the SPA, potentially lie within the zone of influence of the project and required further assessment in the NIS (see **Section 5** below). This was done through a scientific examination of ecological evidence and data listed above in **Section 3.3** or referenced in the text as well as the results of the ecological field surveys (**Section 4.3.3**).

The conservation objectives of a Natura 2000 site are site specific and based on the ecological requirements of the species and habitats present and define the desired conservation condition of these species and habitat types on the site. Conservation objectives are defined using attributes and targets that are based on parameters as set out in the Habitats Directive for defining favourable status, namely area, range, structure and function. The conservation objectives may be either to maintain or restore favourable conservation condition of a habitat. The effects of the proposed project on the qualifying interests of the SACs and the species of conservation interest (SCI) of the SPAs, potentially within their zone of influence, were assessed against the measures designed to achieve the conservation objectives. This was done by way of a focused and detailed examination, analysis and evaluation of the implications of the project, alone and in-combination with other plans and projects, on the integrity of the relevant European sites in view of the site's conservation objectives (see **Section 5**).

4 DESCRIPTION OF THE PROJECT

4.1 BRIEF PROJECT DESCRIPTION

The proposed Moy Gravel Replenishment Project consists of 42 sites in the Moy & Killala Bay Catchment. Each site will be subject to either one, all or a combination of the following;

- Placement of gravel in-stream
- Introduction or use of existing in-stream boulders to create cover for the gravel
- Vegetation pruning
- Installation of riparian fencing

The aim of this project is to provide additional spawning habitat for salmon and trout. In certain river channels that have been subject to arterial drainage in the Moy and Killala Bay Catchment, the natural recruitment of gravels in riverbeds cannot keep up with the erosion of same in those channels. For this reason, it is necessary to periodically replenish the gravels in spawning streams to provide a location for salmon and trout to spawn. At some sites, in order to ensure the gravel is retained where it is placed, boulders will be introduced to create cover for the pools. To supplement the proposed works, where poaching is evident from livestock to the river/stream bank, areas will be fenced off to restrict any access to these areas by livestock such as cows and horses. Over a 5-year period it is proposed to replenish spawning gravels at the locations shown in **Figure 1** below. Method statements for individual proposed replenishment sites are provided in **Appendix 2** of the Appropriate Assessment Screening Report.

It is hoped by introducing more suitable spawning areas that there will be an increase in fish stocks in the catchment.

4.2 SITE LOCATION

Figure 1 below shows the 42 sites for the proposed project. All sites are located within the Moy and Killala Bay Hydrometric Area (34). Within the hydrometric area there are 22 sub catchments. The proposed project is within ten of these. A list of how many sites are within each subbasin is listed in **Table 1** below;

Subbasin name	No. of sites
Addergoole_SC_010	2
Castlebar_SC_020	5
Deel [Crossmolina]_SC_020,	5
Glenree_SC_010	7
Moy_SC_010	2
Moy_SC_020	2
Moy_SC_050	8
Moy_SC_070	8
Moy_SC_080	2
Pollagh_SC_010	1
Total no. of sites:	42

Table 1 showing the no. of sites in each subbasin

Table 2 below shows the location (+/-5m) of each of the works with the exception of the proposedlocation at site 42. These are spread over a length of 328m in the same waterway; the Slieveclaur.



Figure 1 Proposed gravel replenishment site locations.

Table 2 Site locations and the proposed works

ID	Sub-catchment	River	IFI Reference	Or	Appr	Replenis	hment Ext	ent		Channel	Area	Proposed works	Gravel weight
		name		der	ox.	Upstrear	n	Downstr	eam	Length	(ha)		estimates
					width (m)	x	У	x	У	(m)			
1	IE_WE_34M010225	Manulla 34	Manulla – Ballinafad/ Gweeshdan	4	5.6	521291	782314	521247	782347	55	0.031	Additional gravel	6m x9m x.3 =16.2m³ (25t)
2	IE_WE_34M010225	Manulla 34	Manulla – Ballinafad/ Gweeshdan	4	5.6	521413	782268	521315	782303	104	0.058	Additional gravel	6m x 9m x .3 =16.2m ³ (25t)
3	IE_WE_34M010225	Manulla 34	Manulla – Ballinafad/ Gweeshdan	4	3.8	521187	782494	521159	782578	88	0.034	Additional gravel	6m x 9m x .3 =16.2m ³ (25t)
4	IE_WE_34A010600	Addergool e_010	Addergoole	4	5.1	514124	806207	514365	806715	563	0.287	Silt removal and addition of gravel	4m x 6m x.3 =7.2m ³ (11t)
5	IE_WE_34C700920	Creevy 34	Fiddaunglass stream.	2	2.8	513220	812779	513488	812783	269	0.075	Significant spawning stream. Gravel needed in places	1.5m x 2.25m x.3 =1m ³ (1.5t)
6	IE_WE_34M020800	Sranalagh ta south	Enniscoe stream some gravel needed	2	1.8	514135	814807	514489	814807	420	0.076	Gravel introduction	2m x 1.5m x .3 =1.8m ³ (2.7t)
7	IE_WE_34S030200	Spaddagh 34	Bothaul river	3	1.3	532758	799079	532703	799069	57	0.007	Cobble to be raked immediately downstream of bridge GPS point and gravel to be introduced	3m x 1.5m x .3 =4m³ (6t)
8	IE_WE_34Y020400	Shanaghm oyle 34	Rooskey river	3	2.6	536956	787462	536757	787232	353	0.092	Gravel needed downstream of bridge at certain spots.	2m x 3m x.3 =1.8m ³ (2.7t)
9	IE_WE_34M020800	Colladuss aun	Knockmore stream	1	2.1	523108	808494	523094	808480	21	0.005	Gravel needed upstream and downstream of bridge	1m x 1.5m x .3 =.5m ³ (.75t)
10	IE_WE_34S040800	Strade	Straide river	4	3.1	526041	798174	526139	798240	122	0.038	Gravel needed upstream of bridge	2m x 3m x .3 =1.8m ³ (2.7t)

ID	Sub-catchment	River	IFI Reference	Or	Appr	Replenis	hment Exte	nt		Channel	Area	Proposed works	Gravel weight
		name		der	ox.	Upstream	n	Downstre	eam	Length	(ha)		estimates
					width (m)	x	У	x	У	(m)	0.045		
11	IE_WE_34M020750/ IE_WE_34S040800	Strade	Straide river	4	3.8	526148	798267	526102	798375	118	0.045	Gravel needed downstream of bridge	2.5m x 3.75m x .3 =2.8m ³ (4.2t)
12	IE_WE_34S030200	Spaddagh 34	Bothaul River	3	1.8	532795	799004	532776	799044	44	0.008	Access LHB. Not high priority site but additional gravel welcome	2m x 3m x .3 =1.8m ³ (2.7t)
13	IE_WE_34G010060	Glenree 34	Bunree/Brusn a	4	3.5	529469	819498	529469	819467	61	0.021	Gravel. Access LH at White Stream	2.5m x 3.75m x .3 =2.8m ³ (4.2t)
14	IE_WE_34G010060	Glenree 34	Bunree/Brusn a	4	3.5	529553	819419	529522	819439	37	0.013	Gravel. Access LH at White Stream	2.5m x 3.75m x .3 =2.8m³ (4.2t)
15	IE_WE_34G010060	Glenree 34	Bunree/Brusn a	4	3.5	529582	819391	529567	819405	19	0.007	Gravel. Access LH at White Stream	2.5m x 3.75m x .3 =2.8m ³ (4.2t)
16	IE_WE_34G010060	Glenree 34	Bunree/Brusn a	4	3.5	529814	819639	529710	819503	171	0.060	Gravel. Access LH at White Stream	2.5m x 3.75m x .3 =2.8m³ (4.2t)
17	IE_WE_34G010060	Glenree 34	Bunree/Brusn a	4	3.5	529889	819692	529843	819672	64	0.022	Adjacent to cattle feeding area.	6m x 9m x .3 =16.2m ³ (24t)
18	IE_WE_34G010060	Glenree 34	Bunree/Brusn a	4	3.5	529979	819785	529909	819727	92	0.032	Access RHB Corrimbla South	2m x 3m x .3 =1.8m ³ (2.7t)
19	IE_WE_34G010060	Glenree 34	Bunree/Brusn a	4	2.1	534373	820588	534366	820581	10	0.002	Glenree. Access LHB @ bridge	2m x 3m x .3 =1.8m ³ (2.7t)
20	IE_WE_34M020650	Ardhoom stream (Killeen river)	Kileen River	3	2.2	532957	798012	532905	798043	62	0.014	Adjacent to fence and cattle drinker	1.5m x 2.25m .3 =1m ³ (1.5t)
21	IE_WE_34M020650	Ardhoom stream (Killeen river)	Kileen River	3	1.4	533069	797979	532960	798012	118	0.017		1m x 1.5m x .3 =.5m ³ (.75t)
22	IE_WE_34M020650	Faheens	Kileen River	2	1.8	533086	797924	533070	797977	56	0.010	Access LHB	1m x 1.5m x .3 =.5m ³ (.75t)
23	IE_WE_34M020650	Faheens	Kileen River	2	1.8	533100	797879	533086	797921	43	0.008	Smaller gravel (trout stream)	1m x 1.5m x .3 =.5m ³

ID	Sub-catchment	River	IFI Reference	Or	Appr	Replenishment Extent		Channel	Area	Proposed works	Gravel weight		
		name		der	ox.	Upstream	n	Downstre	eam	Length	(ha)		estimates
					width (m)	x	У	x	У	(m)			
					(,								
													(.75t)
24	IE_WE_34M020650	Faheens	Kileen River	2	1.8	533106	797859	533100	797877	19	0.003	Tree planting LHB. Smaller	1m x 1.5m x .3 =.5m ³
												gravel (trout stream)	(.75t)
25	IE_WE_34M020650	Faheens	Kileen River	2	1.8	533148	797784	533108	797854	85	0.015	Smaller gravel (trout stream)	1m x 1.5m x .3 =.5m ³
													(.75t)
26	IE_WE_34E010300	Eighnagh	Eighnagh	4	5.7	541808	808429	541861	808428	55	0.031	Gravel required. 2 trees in	5m x 7.5m x .3 =11m ³
			River									river. Silty substrate. Access	(16.5t)
										-		LHB	
27	IE_WE_34E010300	Eighnagh	Eighnagh	4	5.0	541868	808436	541900	808471	48	0.024	Access LHB but poor access.	5m x 7.5m x .3 =11m ³
			River										(16.5t)
28	IE_WE_34M020750	Unnamed	Straide River	1	3.2	526440	799144	526440	/99090	56	0.018	Gravel. Access LHB	2.5m x 3./5m x .3
20		Linnanaad	Chuaida Divan	1	2.2	526200	700000	F2C414	700076	70	0.024		=3m [°] (4.5t)
29	IE_WE_3410020750	Unnamed	Straide River	1	3.2	526398	798902	526414	/989/6	76	0.024	Access LHB	2.5 m x 3.75 m x .3
20		Strado	Straido Rivor	4	55	526151	709/69	526106	709529	<u>م</u>	0.044		-5111 (4.51)
30	1L_WL_3410020730	Suldue	Straide River	4	5.5	520151	798408	520190	790320	80	0.044		$-2m^{3}(15+)$
21	IE WE 34M020750	Strade	Straide River	Δ	35	526202	798524	526227	7985/10	21	0.011		2 5m x 3 75m x 3
51	12_02_3410020730	Strade	Straide River	-	5.5	520202	750524	520227	750540	51	0.011		$=3m^{3}(4.5t)$
32	IF WF 34M020750	Strade	Straide River	4	3.4	526235	798546	526260	798574	37	0.013		2.5m x 3.75m x .3
		01.440			011	020200		020200		07	0.010		=3m ³ (4.5t)
33	IE WE 34M020750	Strade	Straide River	4	3.6	526307	798602	526335	798642	51	0.018	Across from school (Access	3m x 4.5m x .3 =4m ³
												LHB)	(6t)
34	IE_WE_34M010500	Loona	Manulla River	1	4.8	521457	782495	521476	782643	149	0.072	Trib of Manulla River Smaller	2m x 3m x .3 =1m ³
		more	(Walshpool									gravel	(1.5t)
			stream)										
35	IE_WE_34M010500	Loona	Manulla River	1	4.8	521488	782727	521500	782776	50	0.024	Trib of Manulla River Smaller	2m x 3m x .3 =1m ³
		more	(Walshpool									gravel	(1.5t)
			stream)										
36	IE_WE_34M010500	Loona	Manulla River	1	4.8	521502	782784	521509	782828	44	0.021	Trib of Manulla River Smaller	2m x 3m x .3 =1m ³
		more	(Walshpool									gravel	(1.5t)

ID	Sub-catchment	River	IFI Reference	Or	Appr	Replenis	nment Exte	ent		Channel	Area	Proposed works	Gravel weight
		name		der	ox.	Upstream		Downstream		Length	(ha)		estimates
					width (m)	x	У	x	У	(m)			
			stream)										
37	IE_WE_340010100	Owenaher	Owenaher	4	5.5	544420	814415	544423	814097	56	0.030	Gravel introduction. Access via	6m x 9m x .3 =16m ³
											8	a farm lane, light pruning	(24t)
38	IE_WE_340010100	Owenaher	Owenaher	4	5.5	544430	814260	544421	814201	60	0.033	Gravel introduction. Access via	6m x 9m x .3 =16m ³
												adjoining farmland	(24t)
39	IE_WE_34D010300	Bundeele	Rathnamagh	3	1.3	512716	821983	512870	822041	164	0.021	Gravel needed plus a	1m x 1.5 x .3 =.5m ³
		en	stream									number of random boulders	(.75t)
			Fairfield										
40	IE_WE_34D010300	Bundeele	Rathnamagh	3	2.2	515506	821566	515536	821471	105	0.023	Additional gravel would be	1.5m x 2.25m x .3
		en	stream lower									beneficial to spawning	=1m³ (1.5t)
41	IE_WE_34D010300	Bundeele	Rathnamagh	3	2.2	515062	821498	515122	821528	74	0.016	Gravel (Bank Erosion	1.5m x 2.25m x .3
		en	stream									evident)	=1m³ (1.5t)
42	IE_WE_34S060400	Slieveclau	Rappa stream	3	2.5	519323	822492	519583	822465	328	0.082	Gravel introduction	1m x 1.5m x .3 =.5m ³
		r									05		(.75t)

4.3 DESCRIPTION OF THE SITE

4.3.1 Water

As noted in **Section 4.2** the proposed works will take place in the Moy and Killala bay catchment within ten subbasins. The water framework directive (WFD) sets quality targets for drinking water, legislation of fish waters, shellfish waters, bathing waters and groundwaters. The legislation uses a river basin management plans. The 2010 - 2015 catchment assessment showed the 57% or river and lake water bodies were at Good or high status and 19% were less that good status in 2015. The remaining 24% are unassigned. (EPA, 2018). The 42 sites are on 16 waterways. **Table 3** shows the WFD status of the waterway at each site.

Site	Subcatchment	Subbasin (EU Code)	Stream/River	WFD Status
				2013 - 2018
4	Addergoole_SC_010	IE_WE_34A010600	Addergoole_010	Good
5	Addergoole_SC_010	IE_WE_34C700920	Creevey_010	Good
39	Deel[Crossmolina]_SC_020	IE_WE_34D010300	Deel (Crossmolina)_50	High
40	Deel[Crossmolina]_SC_020	IE_WE_34D010300	Deel (Crossmolina)_50	High
41	Deel[Crossmolina]_SC_020	IE_WE_34S060400	Deel (Crossmolina)_50	High
26	Moy_SC_020	IE_WE_34E010300	Einagh_030	Good
27	Moy_SC_020	IE_WE_34E010300	Einagh_030	Good
13	Glenree_SC_010	IE_WE_34G010060	Glenree_020	Good
14	Glenree_SC_010	IE_WE_34G010060	Glenree_020	Good
15	Glenree_SC_010	IE_WE_34G010060	Glenree_020	Good
16	Glenree_SC_010	IE_WE_34G010060	Glenree_020	Good
17	Glenree_SC_010	IE_WE_34G010060	Glenree_020	Good
18	Glenree_SC_010	IE_WE_34G010060	Glenree_020	Good
19	Glenree_SC_010	IE_WE_34G010060	Glenree_020	Good
1	Castlebar_SC_020	IE_WE_34M010225	Manulla_020	Good
2	Castlebar_SC_020	IE_WE_34M010225	Manulla_021	Good
3	Castlebar_SC_020	IE_WE_34M010225	Manulla_022	Good
34	Castlebar_SC_020	IE_WE_34M010500	Manulla_040	Moderate
35	Castlebar_SC_020	IE_WE_34M010500	Manulla_040	Moderate
36	Castlebar_SC_020	IE_WE_34M010500	Manulla_040	Moderate
6	Moy_SC_080	IE_WE_34M020800	Moy_010	Good
9	Moy_SC_080	IE_WE_34M020800	Moy_010	Good
20	Moy_SC_050	IE_WE_34M020650	Moy_080	Good
21	Moy_SC_050	IE_WE_34M020650	Moy_080	Good
22	Moy_SC_050	IE_WE_34M020650	Moy_080	Good
23	Moy_SC_050	IE_WE_34M020650	Moy_080	Good
24	Moy_SC_050	IE_WE_34M020650	Moy_080	Good
25	Moy_SC_050	IE_WE_34M020650	Moy_080	Good
28	Moy_SC_070	IE_WE_34M020750	Moy_090	Good
29	Moy_SC_070	IE_WE_34M020750	Moy_090	Good

Table 3 site location in relation to the subcatchment, subbasin, stream/river and WFD status

30	Moy_SC_070	IE_WE_34M020750	Moy_090	Good
31	Moy_SC_070	IE_WE_34M020750	Moy_090	Good
32	Moy_SC_070	IE_WE_34M020750	Moy_090	Good
33	Moy_SC_070	IE_WE_34M020750	Moy_090	Good
37	Moy_SC_010	IE_WE_340010100	Owenaher _020	Good
38	Moy_SC_010	IE_WE_340010100	Owenaher _020	Good
42	Deel[Crossmolina]_SC_020	IE_WE_34S060400	Slieveclaur_10	Good
7	Moy_SC_050	IE_WE_34S030200	Spaddagh_010	Good
12	Moy_SC_050	IE_WE_34S030200	Spaddagh_010	Good
10	Moy_SC_070	IE_WE_34S040800	Strade_010	Poor
11	Moy_SC_070	IE_WE_34M020750	Moy_090	Good
8	Pollagh_SC_010	IE_WE_34Y020400	Yellow (Knock)_020	Good

There are five rivers in the catchment which are designated as salmonid rivers under the Salmonid Regulations (S.I. 293 / 1988). These Regulations prescribe quality standards for salmonid waters and designate the waters to which they apply. They also stipulate the sampling programmes and analysis and inspection to be used by local authorities to determine compliance with the standards.

Rivers in the study area have been subjected to arterial drainage to improve land for agriculture and to mitigate flooding. Two drainage schemes were completed on the Deel and Moy Rivers by the OPW during 1962 to 1968 and 1960 to 1971 respectively (EPA, 2018). The OPW is required to maintain Arterial Drainage schemes under sections 37 and 38 of the Arterial Drainage Act, 1945. The morphological character of the watercourses in the study area have been affected by deepening with consequent alteration of flows and substrate composition. The rivers are characterised by a series of glide pool sequences over a bed mainly of gravel and rock.

The alteration of hydromorphological (or physical) conditions is the dominant issue in rivers and lakes in Moy and Killala Bay Catchment. This includes inputs of excess fine sediment and alteration of the morphology of the river channel, which in turn alters habitat conditions. This can occur because of, for example, implementing river and field drainage schemes, forestry activities, animal access, and discharge from quarries (EPA, 2018).

4.3.2 Geology

The solid geology (bedrock) of the study area is largely of Dinantian Pure Bedded Limestones. Namurian sandstones, Namurian shales, Dinitian mixed sandstones, shales and limestones also occur throughout the area. A strip of Granites and other igneous intrusive rocks occur around the loughs. Also present is Ordovician volcanics and Dinitian Sandstones. **Figure 2** illustrates solid geology and groundwater bodies.

The study area is underlain by the Ballina, Ballina Gravels 2, Laherdaun and Swinford groundwater bodies (GWB).

The following are descriptions of the respective groundwater bodies from Geological Survey Ireland⁹ In the Ballina groundwater body diffuse recharge occurs via rainfall percolating through permeable subsoil and rock outcrops. Although there are no records of karst features it is expected that point recharge may occur via many small sinks that are present in the low permeability till areas where the subsoil is breached and through any karst features that are currently unmapped.

With regard to Laherdaun GWB, diffuse recharge occurs via rainfall percolating through the subsoil and rock outcrops. Due to the low permeability of much of the subsoil (blanket peat) and the poor productivity of the aquifers, a high proportion of the available recharge will discharge to the streams. In addition, the steep slopes in the mountainous areas promote surface runoff. The stream density is high in the GWB.

In the Swinford GWB both point and diffuse recharge occur. Diffuse recharge occurs over the GWB via rainfall percolating through permeable subsoil. Despite the presence of peat and till, point recharge to the underlying aquifer occurs by means of swallow holes and collapse features/dolines. Dolines have been recorded even in areas of thick peat deposits (Hickey et al, 2002). Recharge may also occur along 'losing' sections of streams. There are 19 groundwater bodies within the catchment. All 19 recorded a Good status in the 2010 to 2015 WFD cycle.

⁹<u>https://www.gsi.ie/en-ie/programmes-and-projects/groundwater-and-geothermal-</u> <u>unit/activities/understanding-ireland-groundwater/Pages/Groundwater-bodies.aspx</u> (accessed July 2021)



Figure 2 Proposed gravel replenishment sites, solid geology and groundwater bodies

4.3.3 Ecology Survey Results

As discussed in **Section 3.4** ecological surveys were carried out at each of the forty two sites. The focus of these surveys was aquatic conservation interests of the River Moy SAC and supporting habitats where species were concerned. The presence of alien species was also noted and the results are presented here. The most significant results are presented in **Figure 3**.

4.3.3.1 Otter

Otter holts were not recorded at any of the proposed replenishment locations or machinery access routes from local roads. There was no evidence of otter holts at along any access route between road and river and it is considered that no otter holt is at risk of disturbance from the works proposed. It is considered that all locations have stocks of fish, with white-clawed occurring at some locations, so there is therefore potential for otter to occur on the watercourses where replenishment is proposed, as the dietary requirements of otter are met. Evidence of otter was recorded at Loona More Stream and the Addergoole River.



Plate 1 Evidence of otter in the form of sprainting on the Addergoole River (right). This spraint sites indicated the presence of white-clawed crayfish. Suitable juvenile lamprey habitat in the Glenree River (right).

4.3.3.2 Lampreys

Lamprey were recorded at site 27 on the Eighnagh River. It is likely that lampreys occur in soft substrates in other watercourses affected by the proposed replenishment. It is considered that lampreys are likely to occur in low densities where there is only a small proportion of silt and especially along river margins where flows are sluggish. Such habitat occurs for example at Sites 4, 5 and 6. In line with the precautionary principle, it is assumed that at least low densities of lamprey are present in all waterways with the exception of upland high gradient sites within the northeastern extent of the study area.





Figure 3 Results of the ecological surveys carried out at the proposed replenishment sites.

4.3.3.3 Salmon

Juvenile salmon probably occur in all watercourses affected by the works, either within the reaches directly affected, or in downstream areas. Some salmon spawning likely occurs in most channels and there is ample nursery areas (rocks and instream plants providing cover, satisfactory water quality) for salmon in all. Indeed, all watercourses greater than 1st order in the Moy catchment are indicated in McGinnity *et al.* (2003) as being producers of salmon, with the exception of the upper Owenaher



(upstream of Site 37 and 38), Clydagh (Castlebar) and the uppermost reach of the River Deel (Crossmolina) where impassable barriers prevent upstream migration (see Figure 4).

Figure 4 Waterbodies supporting salmon in the Moy catchment (based on McGinnity et al. 2003).



Plate 2 Juvenile salmonids at Site 22 (left) and the Site 37 (right).

4.3.3.4 White clawed crayfish

White clawed crayfish were recorded at the proposed replenishment sites in the Addergoole, Manulla, Washpool Lough and Bundeeleen Rivers. Crayfish were recorded live during biological sampling using a sweep net and also in the remains of otter spraints (having been eaten by otter). Crayfish utilise a variety of river habitats in the study area including rocky substrates, submerged vegetation and soft banks.



Plate 3 White-clawed crayfish occur in vegetation (left) and rocky substrates (right) in the study area.

4.3.3.5 Alien species

Rhododendron *Rhododendron ponticum* and cherry laurel *Prunus laurocerasus rotundifolia* were recorded at Site 6 on the Sranalaghta South Stream. Cherry laurel was also found at Sites 9 and 19. These non native high impact species outcompete native species and suppresses regeneration by forming thick stands and avoid herbivory by wildlife. Roach *Rutilus rutilus* and Canadian pondweed *Elodea canadensis* were recorded in the Addergoole River. These non-native species compete with native aquatic biota.



Plate 4 Roach (left) and Canadian pondweed (right) were recorded in the Addergoole River.

4.4 CHARACTERISTICS OF THE PROJECT

4.4.1 Site Access

Each site will be accessed from agricultural grassland adjacent to the replenishment location. This may necessitate removing riparian fencing that is already in place. In some cases there will be a need to lightly prune bankside vegetation in order to gain entry. It is not envisaged that any trees will be felled in order to gain access to the replenishment sites. Site access and egress will be at the same point to minimise any potential damage to the riverbank.

4.4.2 Construction Works

As noted in **Section 4.1** the proposed project may consist of one, all or a combination of the following at each site;

- 1. Vegetation pruning
- 2. Introduction or use of existing in-stream boulders to create cover for the gravel
- 3. Placement of gravel in-stream
- 4. Installation of riparian fencing

Vegetation pruning will be carried out in selected locations. Pruning may be carried out to allow machinery access. In some areas this may benefit the waterway where shade is too dense. Along a waterway there should be a range of shade conditions to suit the maximum number of aquatic species (Scottish Environment Protection Agency, n.d.). In areas where said vegetation is more sparse only the bare minimum of pruning will be carried out.

In order to create more cover for fish and to slow the washing of the newly placed gravel downstream the programme will involve the installation of boulders. The boulders to be used may be sourced for the waterway or imported to the site. Boulders give a stream or a river heterogeneity in flow and create cover for fish. Boulders will have the added benefit of creating microhabitats for macroinvertebrates to take refuge in (Scottish Environment Protection Agency, n.d.). This will in turn provide a food source for fish. The gravel will be placed downstream of the boulders as the flow downstream will naturally scour a pool in the riverbed.

Where practicable sites will be replenished with the use of wheelbarrows and buckets. Machine entry to the stream will only be utilised where the volume of gravel to be placed is too large to be placed into the stream manually or where the reach of the bucket arm is required to access the location. In some cases where the site is adjacent to the road the bucket will reach from the road to place the gravel. There will be no man or machine entry into these sites a result.

At some sites it has been noted that riverbank is receding due to poaching by livestock such as cattle, horse and sheep. This is having a detrimental effect on the aquatic habitat as it introduces sediment. This sediment then fills the interstitial spaces of the gravels in the riverbed and makes them unsuitable for spawning fish. It also reduces the amount of oxygen within the waterway. In order to reduce the amount of silt reaching the water way it is intended as part of the proposed project to install riparian fencing at some of the sites. This will prevent the poaching by livestock, thus protecting bank side allowing vegetation to recolonise and result in a reduction of silt being introduced to the waterway.

4.4.3 Construction Methods

At sites where all four activities are being carried out the works will evolve as described below. However, at some sites there may only be one or some of the aspects of the works described above in Section 4.4.2. Site Specific method statements as provided by IFI are included in the screening report (Appendix 1).

Key plant and tools:

- Dump Truck
- Track machine
- Teleporter (optional)
- Tractor with front loader (optional)
- Chainsaw
- Pole saw
- Wheelbarrow

Method:

- 1. Inspect area to ensure public safety and carry out biosecurity protocol
- 2. Consult with landowners and secure landowner permission
- 3. Brief operators and staff on safety and duties
- 4. Offload materials (Gravel and/or random boulders) at the location close to river/channel
- 5. Check work location is free of livestock
- 6. Cut and remove any obstructing tree limbs if required
- 7. Remove livestock fencing where required
- 8. Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side
- 9. Introduce gravel /random boulders and distribute where necessary.
- 10. Reinstate/erect stock proof fencing if required
- 11. Debrief and assess project and consult with landowners
- 12. Remove any excess materials and tools from site
- 13. Complete project

All plant will be serviced and maintained according to manufacturer's requirements Any equipment found to be defective is to be taken out of circulation immediately and returned for inspection and repair

Under no circumstances is defective equipment to be used

4.4.4 Construction Materials

Key Materials:

- Spawning gravel
- Random boulders
- Wooden posts
- Sheep wire
- Barbed wire

In terms of riparian fencing being installed it will be timber post and mesh tension fence with a barbed wire top. The fencing will be placed where cattle are known to be entering the stream and causing poaching to the riverbank. Posts will be dug in rather than concreted in to avoid the use of concrete near the water way completely.

Boulders already in stream will be utilised where suitable. Where it is not practicable to use boulders which are already in stream they will be sourced from a quarry. The boulders will be of suitable rock type. Any boulders being imported to the site will be clean of any invasive species before being brought onto site. Boulders will be large enough to withstand high water flows and will be as per OPW guidance (**Figure 5 & Figure 6**).

Gravels will be of the specification advised by Brew & Gilligan, 2019. They will be suitable sized for spawning trout or spawning salmon depending on the aim of the particular site. Gravel will be sourced from a reputable supplier such as Molloy Concrete Ltd, Ballina, Co. Mayo. It will be prewashed and mixed to the below specifications. The stone will be rounded and amenable to spawning fish.





Figure 5 Taken from Brew & Gilligan, 2019 showing pool alignment in relation to random boulders

IOTES:			
Gravel bed should be 3	0mm-450mm deep		The latter of public
			Offy as additional to
Gravel bed should occu	py the full channel cros	is section	
Gravel should be washe	d rounded stones of w	arying particle sizes as deta	Table 1 for trout and Table 2 for salmon
Sample existing spawn	ng gravels to confirm s	imilarity with gravels as sup	λλ d∩auλ anbb∎ei.
Table 1: Trout	Grade	% Composition	
Cobble	64-190 mm	0	
Very coarse grave	32-64 mm	30	
Coarse grave	16-32 mm	35	
Medium grave	8-16 mm	35	
Table 2: Salmon			
Туре	Grade	% Composition	
Cobble	64-190 mm	10	
Very coarse grave	32-54 mm	35	
Coarse grave	2-16 mm	25	
Medium gravel	and a state of the	benluper	

Figure 6 Taken from Brew & Gilligan, 2019 showing gravel bed specifications

All construction tools materials including hazardous materials such as fuels and oils for machinery and chainsaws will be stored offsite.

4.4.5 Waste Management

All waste will be taken off site to be reused or recycled or disposed of at an authorised waste facility in accordance with the Waste Framework Directive (Directive 2008/98/EC)

4.4.6 Construction Emissions

Air emissions will include a minimal amount of dust due to transportation of crushed stone, machinery, and vehicle movement. Vehicle and generator exhaust fumes containing carbon dioxide (CO2), sulphur dioxide (SO2), nitrogen oxides (NOx), carbon monoxide (CO) and particulate matter (PM10).

There is also potential for accidental spill of chemicals, oils and fuels from machinery.

4.5 OPERATIONAL PHASE OF THE PROJECT

There is no operational phase associated with this project. When the boulders and gravel are placed in the water way they will be left to naturalise within the system.

4.6 IDENTIFICATION OF PLANS PROJECTS AND ACTIVITIES

4.6.1 Plans

4.6.1.1 Mayo County Development Plan

Chapter 11 of the 2014-2021 Mayo County Development Plan includes Chapter 4. Environment, Heritage and Amenity Strategy. This recognises the natural resources held by the county including water bodies, agricultural land, forestry, soil, and geology. It acknowledges the importance of the indigenous fisheries resource and the role it plays as key enabler in rural development/diversification and within the rural economy at a County and regional level. It is considered that the proposed project aligns with the following aspects of the Mayo County Development Plan:

- WQ-01 It is an objective of the Council to implement the Western River Basin District Management Plan "Water Matters" 2009-2015 to ensure the protection, restoration and sustainable use of all waters in the County, including rivers, lakes, ground water, coastal and transitional waters, and to restrict development likely to lead to deterioration in water quality or quantity.
- LP-01 It is an objective of the Council, through the Landscape Appraisal of County Mayo, to recognise and facilitate appropriate development in a manner that has regard to the character and sensitivity of the landscape and to ensure that development will not have a disproportionate effect on the existing or future character of a landscape in terms of location, design and visual prominence.
- NH-04 It is an objective of the Council to fully integrate wildlife and biodiversity considerations into all areas of the Council's roles and responsibilities and into all its works and operations.

The proposed project is deemed compliant with the Draft Mayo County Development Plan 2021-2027 with regard to the following:

- Economic Development Objective 51 To facilitate rural enterprises, and resource development (such as agriculture, agrifood sector, agri-tourism, commercial fishing, aquaculture, rural tourism, forestry, bioenergy, the extractive industry, recreation, cultural heritage, marine enterprise sector, research and analysis) and renewable energy resources (such as wind/solar/ocean energy) that are dependent on their locality in rural locations, where it can be demonstrated that the development will not have significant adverse effects on the environment, including the integrity of the Natura 2000 network, residential amenity or visual amenity. Where proposals demonstrate measures to promote environmental enhancement through improved ecological connectivity, such as measures in the Pollinator Plan, additional native species planting or blue and green infrastructure measures, these will be favourably considered.
- Economic Development Policy 32 To protect the county's valuable inland fishery resource and support its sustainable development through the protection of water and habitat quality and facilitation of ancillary infrastructure at appropriate locations.

4.6.1.2 Sligo County Development Plan

Chapter 7 of the Sligo county development plan includes a natural heritage section. The chapter recognises biodiversity loss as a global threat in line with the EU biodiversity strategy.

It is the policy of Sligo County Council to:

- P-NH-1 Protect, sustainably manage and enhance the natural heritage, biodiversity, geological heritage, landscape and environment of County Sligo in recognition of its importance for nature conservation and biodiversity, and as a non-renewable resource, in association with all stakeholders.
- P-NH-2 Promote increased understanding and awareness of the natural heritage and biodiversity of the county.
- P-NH-3 Protect and, where possible, enhance the plant and animal species and their habitats that have been identified under the EU Habitats Directive, EU Birds Directive, the Wildlife Act and the Flora Protection Order.
- P-NH-4 Take full account of the precautionary principle where uncertainty exists regarding the potential impact of a proposed development on the natural heritage resource.

The chapter also includes policy for wetlands which it defines as water courses, water bodies marshes, fens, reed beds, bogs and wet woodlands.

- P-WET-1 Have regard to the County Sligo Wetlands Surveys 2008-2011 and subsequent wetland surveys that may be published during the lifetime of this Plan. Protect surveyed wetland sites that have been rated of A (International), B (National) and C+ (County) importance.
- P-WET-2 Ensure that an ecological assessment at an appropriate level is undertaken in conjunction with proposals involving drainage or reclamation of wetland habitats.

With regard to inland water policies the council has provided the following objectives within the plan:

- P-INW-1 Protect rivers, streams and other water courses and their associated Core Riparian Zones (CRZs) from inappropriate development and maintain them in an open state, capable of providing suitable habitats for fauna and flora. Structures (e.g. bridges) crossing fisheries waters shall be clear-span and shall be designed and built in consultation with Inland Fisheries Ireland.
- P- INW-2 Protect and enhance biodiversity richness by protecting rivers, stream corridors and valleys by reserving land along their banks for ecological corridors, maintaining them free from inappropriate development and discouraging culverting or realignment.
- P- INW-3 Ensure that all proposed greenfield residential and commercial developments use sustainable drainage systems (SUDS) in accordance with best current practice, ensuring protection of the integrity of wetland sites in the adjoining area, including their hydrological regime.
- P- INW-4 Ensure that floodplains and wetlands within the Plan area are retained for their biodiversity and flood protection value.
- P- INW-5 Ensure that proposed developments do not adversely affect groundwater resources and groundwater-dependent habitats and species.

4.6.1.3 Drainage

The proposed replenishment sites are drained channels that are maintained by OPW. Maintenance of channels by the OPW is sometimes carried out with little regard for environmental sensitivities and can therefore impact on aquatic biota. For example, the OPW carried out drainage maintenance in the Straide River, a tributary of the River Moy during the summer of 2021. This maintenance likely had a significant effect on suspended solids (elevated), with removal of river substrates using an excavator. Any maintenance of OPW channels presents a habitat degradation and water quality risk.

4.6.2 Planning Applications

A review of the Mayo County Council and Sligo County Council Planning Registers¹⁰ indicate that the planning applications that have been submitted for the townlands encompassing the proposed project in the last 5 years consist of domestic dwellings and retention of same or small scale agricultural developments. A representative example of these applications is given below.

Local Authority	File Ref.	Development	Townland
Sligo	20109	Development consisting of construction of a four bay enclosed slatted shed and underground slurry storage tank along with all associated site works	Gortersluin , Aclare , Co. Sligo
Sligo	2042	Development consisting of the demolition of existing single storey detached dwelling house and to decommission and remove the existing septic tank, percolation area and all ancillary works	Drimina, Tubbercurry , Co. Sligo
Sligo	19369	Development consisting of construction of dwelling house, garage and foul effluent treatment system together with all ancillary site works and services	Drimina, Tubbercurry , Co. Sligo
Mayo	19685	Construct dwelling house and wastewater	Knockshanbally , straide ,

Table 4 Example of permitted developments within the study area

¹⁰ <u>https://myplan.ie/national-planning-application-map-viewer/</u> (Accessed June 2021)

		treatment system along with all necessary site works	foxford
Мауо	20327	Construction of an agricultural shed along with ancillary site works	Cloonconlan , Straide , Foxford
Мауо	20257	The development will consist of the demolition of two storey extension to rear, construction of a new single storey extension to the rear, renovation of existing dwelling, together with ancillary site development works.	Ardnaree/Shanaghy , Ballina , Co Mayo

4.6.3 Summary of Other Projects or Plans or Activities

In light of the characteristics of the subject sites and surrounds and considering the size and scale of the proposal, it is not envisaged that the project has any potential for interaction with other projects, plans or activities, which could result in significant cumulative effects on Natura 2000 sites.

5 NATURA 2000 SITES

5.1 RIVER MOY SAC (002298)

5.1.1 Description of the Natura 2000 site

This site comprises almost the entire freshwater element of the River Moy and its tributaries including both Loughs Conn and Cullin. The system drains a catchment area of 805 sq. km. Most of the site is in Co. Mayo, though parts are in west Sligo and north Roscommon. Apart from the Moy itself, other rivers included within the site are the Deel, Bar Deela, Castlehill, Addergoole, Clydagh and Manulla on the west side, and the Glenree, Yellow, Strade, Gweestion, Trimogue, Sonnagh, Mullaghanoe, Owengarve, Eighnagh and Owenaher on the east side. The underlying geology is Carboniferous Limestone for the most part, though Carboniferous Sandstone is present at the extreme west of the site, with Dalradian Quartzites and schists at the south-west. Some of the tributaries at the east, the south of Lough Conn and all of Lough Cullin are underlain by granite.

Agriculture, with particular emphasis on grazing, is the main land use along the Moy. Much of the grassland is unimproved but improved grassland and silage fields are also present. The spreading of slurry and fertiliser poses a threat to the water quality of this salmonid river and to the large lakes. Fishing is the main tourist attraction on the Moy and there are a large number of Angler Associations, some with a number of beats.

5.1.2 Identification of Potentially Significant Impacts to Qualifying Interests

The following table lists the qualifying features of the River Moy SAC (002298) and evaluates through a scientific examination of evidence and data whether or not these qualifying features are likely to be significantly affected by the project and should or should not be selected for further assessment in the NIS.

Qualifying Feature	Potential for Significant Impacts	Rationale
White-clawed Crayfish	Yes	White-clawed crayfish are mapped (NPWS, 2016) for the River Moy SAC. They are known to occur in the River Moy and its tributaries and were observed during site surveys. The species is thus considered to be potentially susceptible
(Austropotamobius pallipes)		to impacts from the proposed project. Crayfish could be killed or injured, or trapped and consequently perish by the placement of gravels on refuges.
	inus) Yes	There are no artificial barriers in the Moy catchment limiting lamprey access. Sediment is an important habitat for lamprey as it is used by larval lamprey. The species is considered to be potentially susceptible to significant impacts
Sea lamprey (Petromyzon marinus)		from the proposed project as larvae may occur in silt beds or interstices that could be directly affected by the works If suitable juvenile lamprey habitats were covered by placement of gravels disturbed by machinery, juvenile lampreys
Brook Jamprey (Lampetra planeri)		and their habitat could be lost. There are no artificial barriers in the Moy catchment limiting lamprey access. Sediment is an important habitat for
River lamprey (Lampetra fluviatilis)Yes		lamprey as it is used by larval lamprey. These species are considered to potentially susceptible to significant impacts from the proposed project as larvae may occur in silt beds or interstices that could be directly affected by the works. If suitable juvenile lamprey habitats were covered by placement of gravels disturbed by machinery, juvenile lampreys and their habitat could be lost.
Atlantic salmon (Salmo salar) (only in fresh water)There is potential for some localised reduction in water quality as a result of the proposed activities release of silt and sediment. This in turn may affect spawning areas of salmon due to clogging of gra redds (nest built by spawning salmon) require a constant supply of aerated water for ova development reduce aeration and therefore limit success. Silt may also affect juvenile salmon through water quality the early life stages of salmon require clean water. Thus, further assessment is required to determine potential for significant effects to the conservation objectives for salmon.		There is potential for some localised reduction in water quality as a result of the proposed activities as a result of the release of silt and sediment. This in turn may affect spawning areas of salmon due to clogging of gravel beds. Salmon redds (nest built by spawning salmon) require a constant supply of aerated water for ova development and silt can reduce aeration and therefore limit success. Silt may also affect juvenile salmon through water quality deterioration, the early life stages of salmon require clean water. Thus, further assessment is required to determine if there is potential for significant effects to the conservation objectives for salmon.
Otter (<i>Lutra lutra</i>)	Yes	The proposed project sites will be entered through agricultural grassland and wet grassland and not suitable for otter. There was no evidence of otter at any of the proposed development sites other than sprainting. No holts,

Table 5 Identification of potentially significant impacts to qualifying features of the River Moy SAC (002298)

		couches or slides were recorded at any of the proposed development sites. A localised reduction in water quality	
		during forestry activities is not expected to significantly affect prey biomass, however, on the basis of the	
		precautionary principle otter are included given the potential for significant effects to lamprey and salmon.	
Active Raised Bogs* No		The proposed works will take place on the riverbank and in stream. Access to sites will be through agricultural grassland. As there are no active raised bogs in the vicinity of the proposed project it will not be considered further.	
Degraded raised bogs still capable of No natural regeneration		The proposed works will take place on the riverbank and in stream. Access to sites will be through agricultural grassland or by the existing road network. As there are no degraded raised bogs still capable of natural regeneration in the vicinity of the proposed project it will not be considered further.	
Depressions on peat substrates of the Rhynchosporion	No	The proposed works will take place on the riverbank and in stream. Access to sites will be through agricultural grassland. As there are no depressions on peat substrates of the Rhynchosporionin the vicinity of the proposed project it will not be considered further.	
Alkaline fens	No	Alkaline fens develop on permanently waterlogged areas and for this reason it is not considered that this habitat lies within the zone of influence of the proposed project and thus is not considered further in this NIS.	
Old sessile oak woods with llex and Blechnum in the British Isles	No	There are no old sessile oak woods with Ilex and Blechnum in the vicinity of the proposed works. All works are being accessed through agricultural lands or via the existing road network. As there are no old sessile oak woods with Ilex and Blechnum in the vicinity of the proposed project it will not be considered further.	
*Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	No	There are no alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion, Alnion incanae, Salicion albae</i>) in the vicinity of the proposed works. All works are being accessed through agricultural lands or via the existing road network. As there are no <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion, Alnion incanae, Salicion albae</i>) in the vicinity of the proposed project it will not be considered further.	

5.2 ASSESSMENT OF POTENTIALLY SIGNIFICANT EFFECTS

5.2.1 Habitat Loss

There is no permanent land take associated with the proposed project. However, to gain access into the proposed gravel replenishment sites, there may be a need in places to remove small amounts of riparian vegetation. As many proposed works locations are within the boundary of the River Moy SAC, there may be potential for likely significant negative effects in terms of habitat loss and/or alteration.

5.2.2 Habitat Alteration

With regard to alteration, the proposed works are being carried out to alter the instream habitat in order to improve the fisheries habitat. The placement of the boulders and gravels will create an alteration to the flow. The boulders enhance physical heterogeneity in areas where the gravel is being introduced and will also create cover for fish.

The placement of gravels in watercourses are aimed at enhancing salmonid spawning. If gravels of greater size than existing are introduced to an area used by spawning brook lampreys, then it is possible that the ecological value such areas could be reduced for this species, especially if the gravel is being introduced to target salmon (salmon spawn in substrates of greater size than brook lampreys).

Some watercourses where gravels are to be introduced support white-clawed crayfish, as such there could be direct impacts on the habitats of this species, and possible mortalities if individual crayfish were covered.

5.2.3 Water Quality

Indirect impacts include potential adverse effects on the fluvial habitats of downstream areas within the proposed project area including siltation of Salmon and Lamprey spawning gravels. Any pollution events may potentially have significant direct and/or indirect effects on salmon, lampreys, otter and white-clawed crayfish.

5.2.4 Disturbance and/or Displacement of Species

There is potential for direct and indirect disturbance or displacement of species arising from the construction phase of the proposed works. Pollutants include silt and fuels associated with construction activities. Spawning salmon and lamprey require a clean well aerated riverbed substrate to survive. Siltation of the substrate and eutrophication leading to increased biomass of filamentous algae will reduce the available suitable habitat. A reduction in water quality in the water column can reduce the suitability of the river for salmon and lamprey, resulting in disturbance/displacement of these species The early life stages of salmon (parr) are particularly susceptible to water quality degradation, as are ova and early life stages of lampreys which occur in rivers during spring and summer, so water quality effects could result in the mortality of these fish.

5.2.5 Habitat or Species Population Fragmentation

Habitat and species fragmentation can be caused by polluted stretches of water preventing fish from moving to spawning areas. There is potential for pollutants to enter the waterway during the
construction phase from an accidental spill. A reduction in the quality of the river bed arising from siltation can fragment the available suitable habitat for spawning salmon and lamprey.

5.3 ASSESSMENT OF EFFECT ON THE CONSERVATION OBJECTIVES OF THE RIVER MOY SAC (002298)

5.3.1 Introduction

In **Section 5.1.2** above, an evaluation was undertaken to determine which of the qualifying interests of the River Moy SAC potentially lie within the zone of influence of the project and required further assessment in this NIS. This was done through a scientific examination of ecological evidence and data listed above in **Section 3.3** or referenced, as well as the results of the ecological field surveys as described in **Section 3.4**. The effects of the project on the qualifying interests, potentially within the zone of influence of the project, have been assessed against the measures designed to achieve the conservation objectives. The outcome of the assessment is presented in the following sections.

Attribute/ Measure	Target	Assessment of Potentially Significant Effects	Mitigation Required
Distribution/ Occurrence	No reduction from baseline	Crayfish were encountered during the ecological surveys at sites 1, 4, 34 and 41. As Crayfish are known to be present in a number of the proposed sites there may be potential for the direct mortality where machinery is being used in stream, or due to gravels being introduced. The entire study area is within the range of the species so white-clawed crayfish potentially occur at all sites. According to the River Moy SAC conservation objectives (NPWS, 2016), the following waterbodies support white-clawed crayfish: Upstream of Lough Conn : River Deel and its tributaries the Toreen River, Rathnamagh River and Rappa Stream; Fiddaunglass; Addergoole River. Upstream of Lough Cullin : Tobergal River; Clydagh; tributaries of the Toormore and Manulla Rivers. Moy tributaries : Gweestion River; tributaries of the Pollagh, Glore, Yellow and Geestaun Rivers; Killeen River; Spaddagh River; Sonnagh River; Owenaher River; Owengarve River	Yes
Population structure: recruitment/ % occurrence of juveniles & females with eggs	Juveniles &/or females with eggs in at least 50% samples	Breeding happens between September to November when water temperatures are below 10° Celsius for an extended period. Day length may also trigger breeding. The eggs hatch on the female and become independent at the second stage of development. The juveniles are then released between June and August (Holdich, 2003). The proposed works are being carried out over a five year period between the months of June and September each year. The works may impact on the occurrence of juveniles if there are mortalities due to loss of adult crayfish.	Yes
Negative indicator species/ Occurrence Disease/	No alien crayfish species No	There are currently no records of non-native crayfish in Ireland. There are no components of the proposed development that could bring about the introduction of alien crayfish to the River Moy catchment There are currently five outbreaks of crayfish plague (<i>Aphanomyces</i>	No Yes

5.3.2 1092 White-clawed Crayfish (Austropotamobius pallipes)

0	1	sectors) in the level offerstice the Davides (Free stices at the Leven Diverse	
Occurrence	Instances	astaci) in Ireland, affecting the Bruskey/Erne rivers, the lower River	
	of disease	Suir, the River Deel (Limerick), the River Barrow and the River	
		Lorrha. The disease is spread invisibly in water and the infectious	
		stage may be moved to other river systems on equipment, boats	
		and machinery. Crayfish plague is recognised as a very significant	
		threat to the survival of the globally threatened white-clawed	
		crayfish in Ireland. The disease is considered fatal to all infected	
		native crayfish and the experience in other countries is that where	
		outbreaks occur there is complete extermination White-clawed	
		Crayfish populations. If machinery has been in contact with waters	
		affected by crayfish plague, spores of Aphanomyces astaci could	
		potentially be spread to the catchment. Therefore, there is	
		potential for this conservation objective to be negatively affected.	
Wator	At loast	There are 336 Q monitoring stations within River Moy/Killala Bay	
auglity/	Q3-4 for all	catchment. There is a possibility that the water quality could be	Voc
		negatively affected during the construction phase via suspended	162
	EFA SILES	solids pollution	

Attribute/ Measure	Target	Assessment of Potentially Significant Effects	Mitigation Required
Distribution/ % of river accessible	 > 75% of main stem river lengths accessible from estuary 	The project will not result in the introduction of any permanent barriers to migration of lamprey. No significant effects to the conservation objective is anticipated.	No
Population structure of juveniles/ Number of age/size groups	At least 3 age/size groups present	Lamprey can be present as juveniles for several years after hatching from eggs, and as adults before migration to sea and following migration for several months before spawning. The construction phase of the project could potentially result in sediment release from excavations and silt up clean gravels in the main channel and reduce oxygen levels to the eggs. Therefore, there is potential for this conservation objective to be negatively affected.	Yes
Juvenile density in fine sediment/ Juveniles per m ²	Juvenile density at least 1 per m ²	Juveniles live buried in silt beds. The construction phase of the project could potentially result in release of pollutants in the main channel and affect the quality of the water associated with the silt beds. Therefore, based on the precautionary principle, there is potential for this conservation objective to be negatively affected.	Yes
Extent and distribution of spawning habitat/ m ² and occurrence	No decline in extent & distribution of spawning beds	The construction phase of the project could potentially result in sediment release and silt up clean gravels in the main channel and reduce oxygen levels to the eggs. Therefore, there is potential for this conservation objective to be negatively affected.	Yes
Availability of juvenile habitat/ Number of positive sites in 3 rd order channels	More than 50% sample sites positive	Juvenile habitat consists of silt beds in slower-flowing reaches of the river. The construction phase of the project could potentially result in release of pollutants in the main channel and affect the quality of the water associated with the silt beds. Therefore, there is potential for this conservation objective to be negatively affected.	Yes

5.3.3 1095 Sea Lamprey (Petromyzon marinus)

Attribute/	Target	Assessment of Potentially Significant Effects	Mitigation
Measure	Target		Required
Distribution/ % of river accessible	Access to all watercourses	The project will not result in the physical impediment to the movement of fish. No significant effects to conservation objective anticipated.	No
Population structure of juveniles/ Number of age/size groups	At least 3 age/size groups present	Lamprey can be present as juveniles for several years after hatching from eggs, and as adults before spawning. Brook lamprey tend to spawn at the downstream end of pools, but often in smaller rivers and in slightly shallower and slower flowing water, building a nest in sand or gravel sediment (Maitland, 2003). The construction phase of the project could potentially result in sediment release from excavations and silt up clean gravels downstream and reduce oxygen levels to the eggs. Therefore, there is potential for this conservation objective to be negatively affected in the short term but potential eventual improvement.	Yes
Juvenile density in fine sediment/ Juveniles per m ²	Juvenile density at least 2 per m ²	Juveniles live buried in silt beds. The construction phase of the project could potentially result in release of pollutants in the main channel and affect the quality of the water associated with the silt beds. Therefore, based on the precautionary principle, there is potential for this conservation objective to be negatively affected.	Yes
Extent and distribution of spawning habitat/ m ² and occurrence	No decline in extent & distribution of spawning beds	The construction phase of the project could potentially result in sediment release from excavations and silt up clean gravels in the main channel and reduce oxygen levels to the eggs. Therefore, there is potential for this conservation objective to be negatively affected.	Yes
Availability of juvenile habitat/ Number of positive sites in 2 nd order channels	More than 50% sample sites positive	Juvenile habitat consists of silt beds in slower-flowing reaches of the river. The construction phase of the project could potentially result in release of pollutants in the main channel and affect the quality of the water associated with the silt beds. Therefore, based on the precautionary principle, there is potential for this conservation objective to be negatively affected.	Yes

5.3.4 1096 Brook Lamprey (Lampetra planeri)

Attribute/	Target	Assessment of Potentially Significant Effects	Mitigation
weasure	100% cf	The project will not regult in the relational impediment of the	Required
Distribution/ % of river accessible	100% of river channels to 2 nd order accessible from estuary	The project will not result in the physical impediment of the migration of fish. No significant effects to conservation objective anticipated.	No
Adult spawning fish/ Number	Conservation Limit	In the Ballina district the River Moy and the Easky are listed as being forecast with a surplus above the required conservation limit for 2021. The Cloonaghmore (Palmerstown) river is listed as being only open for catch and release (Gargan et al., 2021). There is potential for construction phase impacts to indirectly affect the CL through localised water quality impairment, with the early life stages of this species potentially adversely affected, thus this attribute could be significantly affected.	Yes
Salmon fry abundance/ Number	Maintain or exceed mean catchment wide abundance threshold value	Salmon need good water quality high in oxygen, low in nutrients and suspended solids, neutral pH and with temperatures never exceeding 25° C (Hendry K & Cragg-Hine D, 2003). The construction phase of the project could potentially result in sediment and nutrient release. Therefore, there is potential for this conservation objective to be negatively affected.	Yes
Out- migrating smolt abundance/ Number	No significant decline	Young Salmon need good water quality high in oxygen, low in nutrients and suspended solids, neutral pH and with temperatures never exceeding 25° C. The construction phase of the project could potentially result in sediment and nutrient release from excavations. Therefore, there is potential for this conservation objective to be negatively affected.	Yes
Number and distribution of redds/ Number and occurrence	No decline in number & distribution of redds	The construction phase of the project could potentially result in sediment release from excavations and silt up clean gravels. Eggs and alevins incubate in the gravel until May and are unable to tolerate gravels becoming clogged with silt or sand. The proposed works are being carried out between June and September of each year. While the timing of the works means it is unlikely that alevins will still be present in redds during the works the potential siltation of gravels become may render them unsuitable for future use as redds.	Yes
Water quality/ EPA Q value	At least Q4 at all EPA sampled sites	While there is a possibility that the water quality could be negatively affected by runoff during the construction phase, a change in water quality status at any EPA station is not envisaged.	No

5.3.5 1106 Salmon (Salmo salar)

Attribute/ Measure	Target	Assessment of Potentially Significant Effects	Mitigation Required
Distribution/ Percentage positive survey sites	No significant decline	Evidence of otter (scat) was noted at site 4 during the site surveys. While the project may indirectly, temporarily impact water quality of the receiving watercourses during construction, it is not expected that it will affect the distribution of Otter associated with the River Moy catchment. The project will not significantly affect this conservation measure.	No
Extent of terrestrial habitat/ Ha	No significant decline	The project is limited to small areas within each site and will not directly affect any terrestrial habitat outside of this. The project will not reduce the area of available terrestrial habitat. The project will not significantly affect this conservation measure.	No
Extent of marine habitat/ Ha	No significant decline	During the construction phase there is potential for indirect temporary impacts to water quality of receiving watercourses during construction. The extent of the project influence is not considered to extend downstream to the nearest marine habitats (ca. 4km straight line measurement) suitable for otter. The project will not reduce the area of available marine habitat. The project will not significantly affect this conservation measure.	No
Extent of freshwater habitat/ Ha	No significant decline	While the project may indirectly temporarily impact water quality of the receiving watercourses, it is not expected that it will reduce the area of available freshwater habitat. The project will not significantly affect this conservation measure.	No
Extent of freshwater (lake) habitat/ Ha	No significant decline	While the project may indirectly impact water quality of the receiving watercourses, it is not upstream of any lake habitat and will thus not result in loss of area of any associated habitat. The project will not significantly affect this conservation measure.	No
Couching sites and holts	No significant decline	The project is limited to the DFI site and will not directly affect any terrestrial habitat outside of this. Couching sites or holts have not been identified within the site. The project will not reduce the number of couching sites or holts. The project will not significantly affect this conservation measure.	No
Fish biomass availability/ Kg	No significant decline	Impacts that reduce the availability or quality of, or cause disturbance to, their terrestrial or aquatic habitats are likely to affect otters. Ample food supply is normally associated with high water quality. Through any construction phase impacts on crayfish, lampreys and salmon as described above, there could be some temporary decline in fish biomass, though no significant decline is envisaged. Mitigation required based on the precautionary principle. The aim of the proposed project is to increase the number of spawning salmon. This will have a positive impact on the biomass available for otter.	Yes
Barriers to connectivity/ Number	No significant decline	No significant effects to conservation objective anticipated.	No

5.3.6 1355 Otter (Lutra lutra)

5.4 ASSESSMENT OF POTENTIALLY SIGNIFICANT IN-COMBINATION EFFECTS

The River Moy SAC Natura 2000 standard data form includes a list of threats of pressures for the SAC. The list includes agricultural intensification, diffuse pollution to surface waters due to agricultural and forestry activities, peat extraction, aerodrome/heliport, use of fertilizers (forestry), forest planting on open ground and invasive non-native species (NPWS, 2020).

The EPA have identified significant pressures for waterbodies that are "At Risk" of not meeting their water quality objectives under the Water Framework Directive. They define significant pressures as those which need to be addressed in order to improve water quality. The maps include over 140 datasets, a suite of modelling tools, and local knowledge from field and enforcement staff from the Local Authorities, Inland Fisheries Ireland and the EPA.

With regard to significant pressures in the Moy/Killala Bay catchment (HA 34) each which is considered to be a significant pressure in the catchment is shown in the **Figure 7** to **Figure 14** below.¹¹



Figure 7 Areas with agricultural pressures.



Figure 8 Areas with anthropogenic pressures

¹¹ Taken from <u>https://gis.epa.ie/EPAMaps/Water</u> (accessed July 2021)



Figure 9 Areas with domestic wastewater pressures



Figure 10 Areas with extractive industry pressures



Figure 11 Areas with forestry pressures



Figure 13 Areas with urban runoff pressures



Figure 12 Areas with hydromorphology pressures



Figure 14 Areas with urban wastewater pressures

Of the above figures the types of pressure within the catchment can be categorised as either point pressure or diffuse pressure. **Figure 7** & **Figure 8**, agricultural pressure and hydromorphology pressure respectively are the most widespread in the catchment.

The proposed project will not introduce any additional point or diffuse pressures to the catchment. While the works may result in the re-suspension of silt, the gravels which will be used will be clean. The re-suspension of sediments will be from sediment already within the proposed works area. The effect of the proposed work sites in comparison the size of the catchment and its assimilative capacity will be negligible. The potential for silt to be re-suspended will be less than that of a stream or river in flood as it will affect only localised areas for a short duration of time. Similarly, as the works are being carried out over a period of five years it is not considered that there will be a cumulative effect due to the localised scale and short duration of works at each of the proposed work sites.

With regard to agricultural pressure the proposed scope of works includes fencing areas where livestock are entering the waterways and poaching the riverbanks. Fencing these areas will create

better riverbed conditions in that it will prevent poaching and reduce the amount of sediment being released to the proposed sites by making the riverbank inaccessible to livestock.

Regarding hydro-morphology pressures, **Section** Drainage**4.6.1.3** above details the drainage scheme currently ongoing in the catchment. As prescribed channels in a drainage scheme are maintained on rotation with a section of each channel being maintained every five years on average. The scale of the drainage scheme is much larger in comparison to the scale of the proposed works. The remit of the OPW in relation to drainage maintenance is to maintain conveyance capacity to limit flooding of land alongside rivers and low-lying areas. The addition of gravels to the subject watercourses at specific locations will actually increase the longitudinal riverbed profile and therefore act in an antagonistic manner with respect to OPW activities. The proposed development aims to increase hydro-morphological variation as opposed to reducing it. For these reasons and due to the scale of the duration of proposed works at each site, it is not anticipated that there will be any significant incombination effect at any of the sites and no significant cumulative effect caused at the catchment level.

5.5 MITIGATION

This mitigation section follows on from impacts identified above in relation to water quality, habitat impairment as well as displacement, disturbance and mortality of species. Water quality maintenance will be important during all stage of work to ensure that aquatic species are not adversely affected by activities such as operating machinery alongside watercourses (potential hydrocarbon emissions, denudation of soils) and liberation of instream sediments to the water column. Fluvial habitats of value to the aquatic fauna white-clawed crayfish, salmon and lampreys need to be preserved at all proposed works locations insofar as possible. To this end, the exact locations of gravel replenishment at each site of must be targeted on a site-by-site basis. The addition of gravel and boulders to watercourses supporting white-clawed crayfish brings about a risk of damage to or mortality of this species. The risk of importation and/or spread of non-native invasive species must also be controlled. The measures set out below caters for this mitigation through proper storage of materials and refuelling procedures, protection of aquatic species, invaise species control, supervision and replenishment gravel

5.5.1Storage

The storage of materials, containers, stockpiles and waste, however temporary, should follow best practice at all times and be stored at designated areas. Storage will be located as follows:

- Away from drains and any watercourses or drains.
- Fuel oils etc. should be stored on a sheltered dry elevated site well removed from aquatic zones.
- On an impermeable base.
- Under cover to prevent damage from the elements.
- In secure areas.
- Well away from moving plant, machinery and vehicles.

All containers will be stored upright and clearly labelled. Sufficient storage should be supplied near to all working areas.

5.5.2Refuelling of Construction Plant On-Site

The following measures will be undertaken to avoid or minimise negative effects to water quality as a result of the use of hydrocarbons:

- Refuelling will be carried out using 110% capacity double bunded mobile bowsers. The refuelling bowser will be operated by trained personnel. The bowser will have spill containment equipment which the operators will be fully trained in using.
- Plant nappies or absorbent mats to be place under refuelling point during all refuelling to absorb drips.
- Mobile bowsers, tanks and drums should be stored in secure, impermeable storage area, away from drains and open water.
- To reduce the potential for oil leaks, only vehicles and machinery will be allowed onto the site that are mechanically sound. An up to date service record will be required from the main contractor.
- Should there be an oil leak or spill, the leak or spill will be contained immediately using oil spill kits; the nearby dirty water drain outlet will be blocked with an oil absorbent boom until the fuel/oil spill has been cleaned up and all oil and any contaminated material removed from the area. This contaminated material will be properly disposed of in a licensed facility.
- Immediate action will be facilitated by easy access to oil spill kits. An oil spill kit that includes absorbing pads and socks will be kept at the site compound and also in site vehicles and machinery.
- Correct action in the event of a leak or spill will be facilitated by training all vehicle/machinery operators in the use of the spill kits and the correct containment and cleaning up of oil spills or leaks. This training will be provided by IFI at site induction.
- In the event of a major oil spill, a company who provide a rapid response emergency service for major fuel spills will be immediately called for assistance, their contact details will be kept in the site office and in the spill kits kept in site vehicles and machinery.

5.5.3Invasive Species Control

There is a range of non-native species of potential concern during the proposed works. Non-native species control be practised according to the following IFI documents:

- 'IFI Biosecurity Protocol for Field Survey Work' (IFI, 2010) and
- 'Disinfection of scuba diving equipment' (IFI, 2011)¹²
- 'Invasive species biosecurity guidelines for boaters' (IFI, 2013)¹³

The most significant invasive species to consider is the crayfish plague. The construction manager will share responsibility for ensuring all new staff are aware of the procedures necessary to contain the crayfish plague. Spores of the crayfish plague require wet or humid conditions. Complete drying also kills the spores.

¹² <u>https://www.fisheriesireland.ie/biosecurity-guidelines-for-scuba-diving.html</u>

¹³ <u>https://www.fisheriesireland.ie/extranet/invasive-species-1/360-invasive-species-biosecurity-guidelines-for-boaters-leaflet-1.html</u>

It may be the case that river water will have been used in certain plant/equipment (e.g. bowsers) intended for use at the proposed development site. River water will not be transported either to or from the proposed works sites. Such plant/equipment will require cleaning and rinsing with a 1% solution of Virkon Aquatic or another proprietary disinfection product (e.g. 5% solution - 100ml/20litre of chlorine bleach) followed by thorough rinsing with clean (mains supply) water. As an additional precaution, all machinery equipment in contact with water from any catchment other than the Moy will need to be dried out fully before further deployment at any other work site in the Moy catchment.

Prior to being brought onto the proposed development site, all plant and equipment will need to be clean and free of soil/mud/debris or any attached plant or animal material. All plant/equipment with water retaining compartments, tanks, etc. will require water to be drained or dried out before transportation to and away from the site. Prior to entering the site, and prior to leaving the site, all plant/equipment will be visually inspected to ensure all adherent material and debris has been removed.

5.5.4 Lampreys

Juvenile lampreys can occur in soft substrates and occur in the study area. Any such areas that will be disturbed including pockets of silt between rocks may contain lampreys. Lampreys in the areas directly affected by the proposed works will be removed by electrofishing in advance of the works following methodology in Harvey & Cowx (2003). This work will be carried out by suitably qualified ecologists/IFI. A best effort will be made to remove all lampreys from the affected areas (at least three passes). Captured lampreys will be collected into a container of river water of adequate dimensions. Lampreys will be transferred to a suitable upstream location with reference to the habitat requirements of juvenile lampreys as outlined in Maitland (2003).

Electrical fishing requires authorisation from the Department of Communication, Energy and Natural Resources if being carried out by a private entity. It is necessary that such authorisation is in place prior to the works commencing. The lampreys will be removed no earlier than 1 week before the works as lampreys could recolonise the depleted areas by drifting from upstream. All such works will require implementation of biosecurity measures as outlined in **Section 5.5.3**.

5.5.5 Crayfish

The river substrates at the proposed replenishment sites were identified as providing suitable niches for white-clawed crayfish. This species can occur in riverbed substrates and also along the banks (crayfish utilise holes in banks as refuges, and submerged vegetation for cover). It is imperative that a best effort be made to remove all white-clawed crayfish from areas directly affected by the works.

This work will require permission from NPWS in the form of a permit to capture and translocate the species. This work will be carried out only by a suitable qualified aquatic ecologist with adequate experience of the species, and in cognisance of the risks associated with the transfer of Crayfish plague. All such works will require implementation of biosecurity measures as outlined in **Section 5.5.3**.

5.5.6 Otter

Otter feed on a range of aquatic species including crayfish, trout, salmon, lamprey and European eel *Anguilla anguilla*. The watercourses where works are proposed support a range of fish species including European eel. A best effort to remove fish, in particular European eel, will be undertaken prior to the instream works proposed. Methodology outlined in the CFB guidance 'Methods for the Water Framework Directive - Electric fishing in wadeable reaches' (CFB, 2008) will be followed. Fish captured will be placed in a container of river water and removed to suitable habitats, with reference to Maitland & Campbell (1992). All fish encountered during electrical fishing for lampreys should be retained and removed from areas directly affected by the works.

Areas where dense submerged vegetation, boulder and rocks occur should be targeted for eel by electrical fishing as these habitats are preferred by eel. The European eel is subject to European Council Regulation 1100/2007 'Establishing measures for the recovery of the stock of European eel'. European eel is listed as 'Critically endangered' and is now 'Red Listed' according to 'Red List No. 5: Amphibians, Reptiles & Freshwater Fish' (King *et al.*, 2011). Due to its depleted status, European eel is also listed in the Convention on International Trade in Endangered Species (CITES).

5.5.7 Replenishment Gravel

Gravel rather than stone will be used to for replenishment. Gravel is sourced from a pit as opposed to a quarry. Gravel is a natural material that consists of water-transported materials and usually has a rounded shape as a result of transport and weathering. Gravel typically has a smooth texture whereas crushed stone often has an angular and jagged edge. Gravel will be:

- sourced as close to destination locations as possible to reduce transportation efforts;
- washed at source pit in advance; and
- be of a size range conducive to salmonid spawning.

5.5.8 Works Supervision

It is important that gravel is introduced to parts of watercourses where there will likely be a positive effect for salmonid (and subsequently also lamprey) spawning. The replenishment locations with the stretch at each river site will be carefully selected on the basis of flows and substrate. Gravel introduction will be carried out only at locations where the reach can be expected to benefit in terms of spawning. The IFI supervisor and/or project manager will have a good knowledge of the spawning requirements of salmonids. These IFI staff, or alternatively suitably qualified ecologist be required to direct machine operators with regard to:

- the exact locations of gravel replenishment at each of the 42 river sites;
- quantities of gravel to be placed into watercourse at each location;
- point out ecologically sensitive areas to avoid (e.g. an already good spawning area, a silt bed that could harbour juvenile lampreys);
- location of random boulder placement; and
- access route from road to river at each of the 42 river sites

In selecting gravel replenishment areas and the desired form and constitution of riverbed, there will be reference to 'Ecology of the Atlantic Salmon' by Hendry & Cragg-Hine (2003), this document outlining the characterises of optimal salmon spawning sites. Ideal salmon spawning habitat at specific river reaches is the aim of the project. This will achieved by enhancement of salmon spawning areas where there is scope for improvement or development of spawning sites where absent. The following key attributes, as outlined in Hendry & Cragg-Hine (2003) will be the aim:

- preferred current velocity for spawning within the range 25–90 cm/s, with a water depth in the range 17–76 cm; and
- Typical spawning sites are the transitional areas between pool and riffle where flow is accelerating and depth decreasing, where gravel of suitable coarseness is present and interstices are kept clean by up-welling flow.

Advice on instream boulder placement and pruning of bankside vegetation will be guided by *Channels and Challenges* (O'Grady, 2006). This Central Fisheries Board publication details strategies for instream development works.

It is important that access from road to river is via existing tracks and through habitats of low ecological value insofar as possible. Most locations will involve tracking on improved agricultural grassland, a habitat of low ecological value and subject to regular maintenance, so where this habitat occurs will take place through same. Riparian areas denuded of vegetation, through cattle poaching, ploughing or otherwise, will not be accessed during wet weather or during waterlogged conditions. Riparian areas prone to bank slippage will be steered clear of by at least 5 meters to avoid further destabilisation.



Plate 5 Bank of the Addergoole River that will be avoided (left). Glenree River adjacent to agricultural grassland that will be used for access (right).

Replenishment of gravel will take place only when watercourses are normal to slightly higher than normal level.

5.5.9 **OPW Consultation**

It is imperative that any works carried out during implementation of this project are known to the OPW. Under the Arterial Drainage Acts, 1945 and 1995, construction and alteration of watercourses, bridges, weirs and embankments require the prior consent of the OPW. These legal requirements mainly serve to ensure that proposed construction and alteration projects do not increase the risk of flooding or have a negative impact on drainage of land. The OPW engineer responsible for overseeing works in the Moy catchment will be notified in advance of the works. The reaches of

watercourses where works area undertaken will be made available to the OPW so that any OPW maintenance activities in the future don't counteract the enhancement works.

5.6 **RESIDUAL IMPACTS**

Provided that the recommended mitigation measures set out in **Section 5.5** above are implemented in full, it is not expected that significant impacts will result to the qualifying features identified for appraisal in this NIS and thus it is not expected that the proposal will have an adverse impact on the integrity of Natura 2000 sites.

6 CONCLUSION

In conclusion, provided the recommended mitigation measures are implemented in full it is not expected that the proposed gravel replenishment project will result in an adverse residual impact on the integrity of Natura 2000 sites considered in this NIS, namely:

• River Moy SAC (002298)

All other Natura 2000 sites have been screened out at Stage 1.

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Appendix 1

Screening for appropriate assessment report



Screening for Appropriate Assessment

Moy Catchment Gravel Replenishment



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ISSUE FORM	
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Appendix 1 Stages of Appropriate Assessment

1 SUMMARY OF FINDINGS

1.1 SCREENING FOR APPROPRIATE ASSESSMENT

Project Title	Moy Catchment Gravel Replenishment
Project Proponent	Inland Fisheries Ireland (IFI)
Project Location	The subject sites are located in the Moy and Killala Bay catchment in
	counties Mayo and Sligo.
Screening for	The Screening for Appropriate Assessment is undertaken to determine
Appropriate	the potential for likely significant effects of proposed rehabilitation works
Assessment	on various reaches of watercourses in the Moy and Killala Bay catchment,
	individually, or in combination with other plans or projects, in view of the
	conservation objectives of the site on the Natura 2000 Network. The
	nature conservation implications of the project are also considered,
	though the project is not necessary for the management of any Natura
	2000 site.
Conclusion	It cannot be objectively concluded, at this stage, that the River Moy
	Gravel replenishment project will not result in likely significant effects on
	the following designated Natura 2000 sites:
	• River Moy SAC (002298)
	Therefore, an Appropriate Assessment is required, and as such a Natura
	Impact Statement is required to assess the implications of the project
	alone and in-combination with other plans and projects, on the integrity
	of the European sites in view of their conservation objectives.



2 INTRODUCTION

2.1 PURPOSE OF ASSESSMENT

This Screening for appropriate assessment has been undertaken to determine the potential for significant impacts arising from proposed gravel replenishment at various locations on watercourses in the Moy and Killala Bay catchment, Co. Mayo and Co. Sligo, on nearby sites with European conservation designations (i.e. Natura 2000 Sites).

Inland Fisheries Ireland (IFI) is the statutory body with the responsibility for the protection, development and management of the inland fishery resource within the State. As part of their responsibility to manage the fish stocks within the Moy and Killala Bay catchment, it is proposed to undertake river spawning gravel replacement works at various locations over the next 5 years. The proposed project locations are illustrated in **Figure 1**.

The Screening for Appropriate Assessment report has been undertaken by Malachy Walsh and Partners ecologists.

2.2 LEGISLATIVE CONTEXT

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and of wild fauna and flora by the designation of Special Areas of Conservation (SACs) and the Birds Directive (79/409/EEC) seeks to protect birds of special importance by the designation of Special Protected Areas (SPAs). It is the responsibility of each member state to designate SPAs and SACs, both of which will form part of Natura 2000, a network of protected sites throughout the European Community. The Habitats Directive has been transposed into Irish law and the relevant Regulations are the European Communities (Birds and Natural Habitats) Regulations 2011. The requirement for appropriate Assessment of the implications of plans and projects on the Natura 2000 network of sites comes from the Habitats Directive (Article 6(3)).

Under the European Communities (Birds and Natural Habitats) Regulations 2011 a public authority is required to carry out a Screening for Appropriate Assessment of a proposed project prior to issuing consent to assess, in view of best scientific knowledge and the sites conservation objectives, if that project or plan, individually or in combination with other plans or projects is likely to have a significant effect on a Natura 2000 site. The information presented in this Screening for Appropriate Assessment will be used by the competent authority to assist them to complete their screening exercise.





Figure 1 Proposed gravel replenishment site locations.

2.3 STAGES OF APPROPRIATE ASSESSMENT

The appropriate assessment process is a four-stage process with issues and tests at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required. The stages are set out in **Appendix 1**.

2.4 STATEMENT OF AUTHORITY

Field work and reporting was carried out by Gerard Hayes (Ba. Sc.). Gerard is a senior aquatic ecologist with over 13 years' experience in environmental consultancy. He is a member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and the Freshwater Biological Association (FBA). Gerard has a diverse ecological profile, with Phase 1 habitat, tree, mammal (including bats), bird, amphibian, fish and macroinvertebrate survey experience. He has had numerous responsibilities including waste assimilation capacity assessment, report writing (EIS, EIA, EA, AA, NIS, RWIA) and ecological monitoring. His project involvement has been primarily in the areas of wind energy development, waste water treatment plants, roads/bridges, water supply, flood defense and hydro schemes. He is co-author and/or carried out surveys for NPWS Irish Wildlife Manual Nos. 15, 24, 26, 37 and 45. He has been formally trained in WFD river monitoring (Environmental Protection Agency), Stage 1 and Stage 2 Freshwater Pearl Mussel Surveying (Evelyn Moorkens), aquatic macroinvertebrate identification (Freshwater Biological Association) and QGIS (CIEEM).

3 ASSESSMENT METHODOLOGY

3.1 APPROPRIATE ASSESMENT GUIDANCE

This Screening for Appropriate Assessment has been undertaken in accordance with the European Commission Methodological Guidance on the provision of Article 6(3) and 6(4) of the 'Habitats' Directive 92/43/EEC (EC, 2001) and the European Commission Guidance 'Managing Natura 2000 sites' (EC, 2000). Guidance from the following documents was also used:

- Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities (DEHLG, 2009)
- *Guidance for Competent Authorities when dealing with proposals affecting SAC freshwater* sites (Scottish Natural Heritage, 2006)
- Guidance Notes for AA screenings in the vicinity of watercourses (Inland Fisheries Ireland, n.d.)

3.2 CONSULTATION

Consultation was undertaken with Barry Kelly (IFI). Each proposed gravel replenishment location was visited during June 2021.

3.3 DESK 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:

• OSI Aerial photography and 1:50000 mapping, and other online mapping sources (online)

- National Parks and Wildlife Service (NPWS)¹ (online)
- National Biodiversity Data Centre (NBDC)² (online)
- BirdWatch Ireland (online)
- Teagasc soil area maps (NBDC website)
- Geological Survey Ireland (GSI) area maps³ (online)
- Environmental Protection Agency (EPA) water quality data⁴ (online)
- Moy & Killala Bay Catchment Assessment 2010-2015 (HA 34) (EPA) (online) (EPA, 2018)
- Central Statistics Office (CSO) (online)
- Mayo County Council planning applications⁵ (online)
- Mayo Development Plan⁶
- Sligo County Council planning applications ⁷ (online)
- Sligo Development Plan⁸

Publicly available GIS data and aerial imagery was used in conjunction with a GIS application to generate maps of the study area.

3.4 FIELD SURVEYS

Ecological field surveys were conducted by staff ecologists with Malachy Walsh and Partners Engineering and during June 2021. The aim of these surveys was to characterise the proposed replenishment sites and environs and establish if there were any important ecological features and resources affected, particularly in relation to the conservation interests of nearby Natura 2000 sites. The methods below were deployed at each site.

The riverine habitats were evaluated with cognisance to 'Ecology of the Atlantic Salmon' (Hendry K & Cragg-Hine D, 2003) to assess habitat suitability for salmonids. An evaluation of lamprey nursery habitat was also carried out, based on the habitat requirements of juvenile lampreys as outlined in (Maitland, 2003). Riverine habitats were assessed with respect to the requirements of white-clawed crayfish (*Austropotamobius Pallipes*) with reference to (Holdich, 2003). Habitats at gravel deposition sites were classified according to 'A Guide to Habitats in Ireland' (Fossitt, 2000) and evaluated. The presence of invasive plant species was noted, particularly any species listed on the Third Schedule of the 2011 European Communities (Bird and Natural Habitats) Regulations.

Aerial photography was used together with GPS to accurately enable field navigation. Each site was photographed. A qualitative assessment was made of plant species diversity, vegetation structure, topography and drainage, disturbance and management.

¹ <u>https://www.npws.ie/maps-and-data</u> (Accessed in June 2021)

² <u>https://maps.biodiversityireland.ie/</u> (Accessed in June 2021)

³ <u>https://www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx</u> (Accessed in June 2021)

⁴ <u>https://gis.epa.ie/EPAMaps/</u> (Accessed in June 2021)

⁵ https://www.mayo.ie/planning/search (Accessed in June 2021)

⁶ <u>https://www.mayo.ie/planning/county-development-plans/2021-2027</u> (Accessed June 2021)

⁷ <u>https://www.sligococo.ie/planning/SearchPlanningApplications/</u> (Accessed June 2021)

⁸ <u>https://www.sligococo.ie/cdp/</u> (Accessed June 2021)

All field survey work was carried out in line with 'IFI Biosecurity Protocol for Field Survey Work' (Inland Fisheries Ireland, 2010). The surveys were timed to coincide with normal water level insofar as possible to maximise efficiency and effectiveness of surveys.

3.5 SCREENING FOR APPROPRIATE ASSESSMENT

As set out in the NPWS guidance, the task of establishing whether a plan or project is likely to have an effect on a Natura 2000 site(s) is based on a preliminary impact assessment using available information and data, including that outlined above, and other available environmental information, supplemented as necessary by local site information and ecological surveys. This is followed by a determination of whether there is a risk that the effects identified could be significant. The precautionary principal approach is required.

Once the potential impacts that may arise from the proposal are identified, the significance of these is assessed through the use of key indicators:

- Habitat loss and alteration
- Disturbance and/or displacement of species
- Habitat or species fragmentation
- Water quality

Guidance notes for AA Screenings in the vicinity of watercourses in accordance with the requirements of Article 6(3) of the EU Habitats Directive (Inland Fisheries Ireland, n.d.) was also consulted.

4 SCREENING FOR APPROPRIATE ASSESSMENT

Screening for appropriate assessment determines the need for a full appropriate assessment and consists of a number of steps, each of which is addressed in the following sections of this report:

- 4.1 Establish whether the project is necessary for the management of a Natura 2000 site
- **4.2** Description of the Project (proposed gravel replenishment at various locations on watercourses in the Moy and Killala Bay catchment)
- 4.3 Identification of Natura 2000 sites potentially affected
- 4.4 Identification and description of individual and cumulative impacts of the project
- 4.5 Assessment of the significance of the impacts on the integrity of Natura 2000 sites
- 4.6 Conclusion of screening stage

4.1 MANAGEMENT OF NATURA 2000 SITES

The proposal is not connected with or necessary to the conservation management of a Natura 2000 site. Once the proposed amelioration works are complete however, salmon can be expected to benefit from increased habitat value, with improved spawning and nursery areas. The long-term impact of the proposed project is therefore considered positive in terms of salmon production and will likely contribute to increased numbers of adult salmon migrating through the River Moy and Killala Bay catchment. The project can be expected to assist the Conservation Objectives for River Moy SAC (NPWS, 2016a) by maintaining the target as the threshold value for rivers currently

exceeding their conservation limit; maintaining the number of adult spawning fish; salmon fry abundance, out-migrating smolt abundance; and the number and distribution of redds.

4.2 DESCRIPTION OF PLAN/PROJECT

4.2.1 Brief project description

The aim of this project is to provide additional spawning habitat for salmon and trout. In certain river channels that have been subject to arterial drainage in the Moy and Killala Bay Catchment, the natural recruitment of gravels in riverbeds cannot keep up with the erosion of same in those channels. For this reason, it is necessary to periodically replenish the gravels in spawning streams to provide a location for salmon and trout to spawn. At some sites, in order to ensure the gravel is retained where it is placed, boulders will be introduced to create cover for the pools. To supplement the proposed works, where poaching is evident from livestock to the river/stream bank, areas will be fenced off to restrict any access to these areas by livestock such as cows and horses. Over a 5-year period it is proposed to replenish spawning gravels at the locations listed in **Table 1** below. Method statements for individual proposed replenishment sites are provided in **Appendix 2**.

4.2.2 Site Location

The sites of the proposed replenishment works are within the Moy and Killala Bay Catchment in Hydrometric Area 34. The River Moy and its tributaries drain the eastern side of the Moy and Killala Bay. Lough Conn (48 km2) and Lough Cullin (10 km2) and their tributaries are to the western side of the catchment. The Rivers Deel, Castlebar, Clydagh and Manulla, are to the west and south of Lough Conn. Lands adjacent to the proposed replenishment locations are used primarily for agricultural purposes. Maps showing the site locations and surface water features are provided in to **Figure 2 Figure 5** below.

Table 1 Proposed gravel replenishment locations and details

ID	Sub-catchment	River name	IFI Reference	Order	Approx.	Replenishment Extent			Channel	Area	Area	Proposed works	Gravel weight estimates	
					width	Upstream Downstream		1	Length	(m2)	(ha)			
					(m)	x	У	x	У	(m)				
1	IE_WE_34M010225	Manulla 34	Manulla – Ballinafad/ Gweeshdan	4	5.6	521291	782314	521247	782347	55	308	0.031	Additional gravel	6m x9m x.3 =16.2m³ (25t)
2	IE_WE_34M010225	Manulla 34	Manulla – Ballinafad/ Gweeshdan	4	5.6	521413	782268	521315	782303	104	582	0.058	Additional gravel	6m x 9m x .3 =16.2m³ (25t)
3	IE_WE_34M010225	Manulla 34	Manulla – Ballinafad/ Gweeshdan	4	3.8	521187	782494	521159	782578	88	335	0.034	Additional gravel	6m x 9m x .3 =16.2m ³ (25t)
4	IE_WE_34A010600	Addergoole_010	Addergoole	4	5.1	514124	806207	514365	806715	563	2871	0.287	Silt removal and addition of gravel	4m x 6m x.3 =7.2m ³ (11t)
5	IE_WE_34C700920	Creevy 34	Fiddaunglass stream.	2	2.8	513220	812779	513488	812783	269	753	0.075	Significant spawning stream. Gravel needed in places	1.5m x 2.25m x.3 =1m ³ (1.5t)
6	IE_WE_34M020800	Sranalaghta south	Enniscoe stream some gravel needed	2	1.8	514135	814807	514489	814807	420	756	0.076	Gravel introduction	2m x 1.5m x .3 =1.8m ³ (2.7t)
7	IE_WE_34S030200	Spaddagh 34	Bothaul river	3	1.3	532758	799079	532703	799069	57	74	0.007	Cobble to be raked immediately downstream of bridge GPS point and gravel to be introduced	3m x 1.5m x .3 =4m³ (6t)
8	IE_WE_34Y020400	Shanaghmoyle 34	Rooskey river	3	2.6	536956	787462	536757	787232	353	917	0.092	Gravel needed downstream of bridge at certain spots.	2m x 3m x.3 =1.8m ³ (2.7t)
9	IE_WE_34M020800	Colladussaun	Knockmore stream	1	2.1	523108	808494	523094	808480	21	45	0.005	Gravel needed upstream and downstream of bridge	1m x 1.5m x .3 =.5m ³ (.75t)
10	IE_WE_34S040800	Strade	Straide river	4	3.1	526041	798174	526139	798240	122	378	0.038	Gravel needed upstream of bridge	2m x 3m x .3 =1.8m ³ (2.7t)
11	IE_WE_34M020750 / IE_WE_34S040800	Strade	Straide river	4	3.8	526148	798267	526102	798375	118	448	0.045	Gravel needed downstream of bridge	2.5m x 3.75m x .3 =2.8m ³ (4.2t)
12	IE_WE_34S030200	Spaddagh 34	Bothaul River	3	1.8	532795	799004	532776	799044	44	79	0.008	Access LHB. Not high priority site but additional gravel welcome	2m x 3m x .3 =1.8m³ (2.7t)
13	IE_WE_34G010060	Glenree 34	Bunree/Brusna	4	3.5	529469	819498	529469	819467	61	214	0.021	Gravel. Access LH at White Stream	2.5m x 3.75m x .3 =2.8m ³ (4.2t)
14	IE_WE_34G010060	Glenree 34	Bunree/Brusna	4	3.5	529553	819419	529522	819439	37	128	0.013	Gravel. Access LH at White Stream	2.5m x 3.75m x .3 =2.8m ³ (4.2t)
15	IE_WE_34G010060	Glenree 34	Bunree/Brusna	4	3.5	529582	819391	529567	819405	19	68	0.007	Gravel. Access LH at White Stream	2.5m x 3.75m x .3 =2.8m ³ (4.2t)
16	IE_WE_34G010060	Glenree 34	Bunree/Brusna	4	3.5	529814	819639	529710	819503	171	600	0.060	Gravel. Access LH at White Stream	2.5m x 3.75m x .3 =2.8m ³ (4.2t)
17	IE_WE_34G010060	Glenree 34	Bunree/Brusna	4	3.5	529889	819692	529843	819672	64	224	0.022	Adjacent to cattle feeding area.	6m x 9m x .3 =16.2m ³ (24t)
18	IE_WE_34G010060	Glenree 34	Bunree/Brusna	4	3.5	529979	819785	529909	819727	92	322	0.032	Access RHB Corrimbla South	2m x 3m x .3 =1.8m ³ (2.7t)
19	IE_WE_34G010060	Glenree 34	Bunree/Brusna	4	2.1	534373	820588	534366	820581	10	21	0.002	Glenree. Access LHB @ bridge	2m x 3m x .3 =1.8m ³ (2.7t)
20	IE_WE_34M020650	Ardhoom stream	Kileen River	3	2.2	532957	798012	532905	798043	62	137	0.014	Adjacent to fence and cattle drinker	1.5m x 2.25m .3 =1m ³ (1.5t)



ID S	Sub-catchment	River name	IFI Reference	Order	Approx.	Replenishment Extent			Channel	Area	Area	Proposed works	Gravel weight estimates	
					width	Upstream Downstream			Length	(m2)	(ha)			
					(m)	x	У	x	У	(m)				
		(Killeen river)												
21	IE_WE_34M020650	Ardhoom stream	Kileen River	3	1.4	533069	797979	532960	798012	118	165	0.017		1m x 1.5m x .3 =.5m³ (.75t)
		(Killeen river)												
22	IE_WE_34M020650	Faheens	Kileen River	2	1.8	533086	797924	533070	797977	56	100	0.010	Access LHB	1m x 1.5m x .3 =.5m ³ (.75t)
23	IE_WE_34M020650	Faheens	Kileen River	2	1.8	533100	797879	533086	797921	43	78	0.008	Smaller gravel (trout stream)	1m x 1.5m x .3 =.5m ³ (.75t)
24	IE_WE_34M020650	Faheens	Kileen River	2	1.8	533106	797859	533100	797877	19	34	0.003	Tree planting LHB. Smaller gravel (trout stream)	1m x 1.5m x .3 =.5m ³ (.75t)
25	IE_WE_34M020650	Faheens	Kileen River	2	1.8	533148	797784	533108	797854	85	153	0.015	Smaller gravel (trout stream)	1m x 1.5m x .3 =.5m ³ (.75t)
26	IE_WE_34E010300	Eighnagh	Eighnagh River	4	5.7	541808	808429	541861	808428	55	314	0.031	Gravel required. 2 trees in river. Silty	5m x 7.5m x .3 =11m³ (16.5t)
													substrate. Access LHB	
27	IE_WE_34E010300	Eighnagh	Eighnagh River	4	5.0	541868	808436	541900	808471	48	241	0.024	Access LHB but poor access.	5m x 7.5m x .3 =11m ³ (16.5t)
28	IE_WE_34M020750	Unnamed	Straide River	1	3.2	526440	799144	526440	799090	56	179	0.018	Gravel. Access LHB	2.5m x 3.75m x .3 =3m³ (4.5t)
29	IE_WE_34M020750	Unnamed	Straide River	1	3.2	526398	798902	526414	798976	76	243	0.024	Access LHB	2.5m x 3.75m x .3 =3m ³ (4.5t)
30	IE_WE_34M020750	Strade	Straide River	4	5.5	526151	798468	526196	798528	80	441	0.044		2.5m x 3.75m x .3 =3m³ (4.5t)
31	IE_WE_34M020750	Strade	Straide River	4	3.5	526202	798524	526227	798540	31	108	0.011		2.5m x 3.75m x .3 =3m ³ (4.5t)
32	IE_WE_34M020750	Strade	Straide River	4	3.4	526235	798546	526260	798574	37	126	0.013		2.5m x 3.75m x .3 =3m ³ (4.5t)
33	IE_WE_34M020750	Strade	Straide River	4	3.6	526307	798602	526335	798642	51	184	0.018	Across from school (Access LHB)	3m x 4.5m x .3 =4m ³ (6t)
34	IE_WE_34M010500	Loona more	Manulla River	1	4.8	521457	782495	521476	782643	149	716	0.072	Trib of Manulla River Smaller gravel	2m x 3m x .3 =1m³ (1.5t)
			(Walshpool stream)											
35	IE_WE_34M010500	Loona more	Manulla River (Walshpool stream)	1	4.8	521488	782727	521500	782776	50	240	0.024	Trib of Manulla River Smaller gravel	2m x 3m x .3 =1m³ (1.5t)
36	IE_WE_34M010500	Loona more	Manulla River	1	4.8	521502	782784	521509	782828	44	212	0.021	Trib of Manulla River Smaller gravel	2m x 3m x .3 =1m³ (1.5t)
			(Walshpool stream)											
37	IE_WE_340010100	Owenaher	Owenaher	4	5.5	544420	814415	544423	814097	56	308	0.0308	Gravel introduction. Access via a farm lane,	6m x 9m x .3 =16m ³ (24t)
		· · · · · · · · · · · · · · · · · · ·											light pruning	
38	IE_WE_340010100	Owenaher	Owenaher	4	5.5	544430	814260	544421	814201	60	330	0.033	Gravel introduction. Access via adjoining farmland	6m x 9m x .3 =16m³ (24t)
39 I	IE_WE_34D010300	Bundeeleen	Rathnamagh stream	3	1.3	512716	821983	512870	822041	164	213	0.021	Gravel needed plus a	1m x 1.5 x .3 =.5m ³ (.75t)
			Fairfield										number of random boulders	
40	IE_WE_34D010300	Bundeeleen	Rathnamagh stream	3	2.2	515506	821566	515536	821471	105	230	0.023	Additional gravel would be	1.5m x 2.25m x .3 =1m³ (1.5t)
41	IE W/E 24D010200	Rundooloon	Dathpamagh stream	2	2.2	515060	001400	515100	001500	74	162	0.016	Cravel (Park Erosion	1 Em y 2 2Em y 2 -1m3/1 F+
41	IC_VVE_34D010300	Dundeeleen	natimamagn stream	3	2.2	313062	621498	212177	021228	/4	102	0.016	evident)	1.51) 1.51 x .3 =1111 (1.51)
42	IE_WE_34S060400	Slieveclaur	Rappa stream	3	2.5	519323	822492	519583	822465	328	820.47	0.0820	Gravel introduction	1m x 1.5m x .3 =.5m ³ (.75t)

*Additional information in Appendix 1



Figure 2 Subcatchments and proposed replenishment locations in the Moy and Killala Bay catchment.



Figure 3 Location of proposed replenishment works at the eastern extent of the study area.



Figure 4 Location of proposed replenishment works on the western extent of the study area.



Figure 5 Location of proposed replenishment works at the southern extent of the study area.

4.2.3 Description of the Study Area

Gravel replenishment is proposed within the Moy and Killala Bay catchment. The number of sites in each subbasin is listed below in **Table 2**.

Subbasin name	No. of sites
Addergoole_SC_010	2
Castlebar_SC_020	5
Deel [Crossmolina]_SC_020,	5
Glenree_SC_010	7
Moy_SC_010	2
Moy_SC_020	2
Moy_SC_050	8
Moy_SC_070	8
Moy_SC_080	2
Pollagh_SC_010	1
Total no. of sites:	42

Table 2 No. of sites in each subbasin

The Moy and Killala Bay catchment comprises 22 sub catchments, the proposed replenishment works are in ten of these. The characteristics of the study area is described below.

4.2.3.1 Hydrogeology

The solid geology (bedrock) of the study area is largely of Dinantian Pure Bedded Limestones. Namurian sandstones, Namurian shales, Dinitian mixed sandstones, shales and limestones also occur throughout the area. A strip of Granites and other igneous intrusive rocks occur around the loughs. Also present is Ordovician volcanics and Dinitian Sandstones. **Figure 6** illustrates solid geology and groundwater bodies.

The study area is underlain by the Ballina, Ballina Gravels 2, Laherdaun and Swinford groundwater bodies (GWB). The following are descriptions of the respective groundwater bodies from Geological Survey Ireland⁹. In the Ballina groundwater body diffuse recharge occurs via rainfall percolating through permeable subsoil and rock outcrops. Although there are no records of karst features it is expected that point recharge may occur via many small sinks that are present in the low permeability till areas where the subsoil is breached and through any karst features that are currently unmapped.

With regard to Laherdaun GWB, diffuse recharge occurs via rainfall percolating through the subsoil and rock outcrops. Due to the low permeability of much of the subsoil (blanket peat) and the poor productivity of the aquifers, a high proportion of the available recharge will discharge to the streams. In addition, the steep slopes in the mountainous areas promote surface runoff. The stream density is high in the GWB. In the Swinford GWB both point and diffuse recharge occur. Diffuse recharge occurs over the GWB via rainfall percolating through permeable subsoil. Despite the presence of peat and till, point recharge to the underlying aquifer occurs by means of swallow holes and collapse features/dolines. Dolines have been recorded even in areas of thick peat deposits (Hickey et al, 2002). Recharge may also occur along 'losing' sections of streams.

⁹<u>https://www.gsi.ie/en-ie/programmes-and-projects/groundwater-and-geothermal-</u> <u>unit/activities/understanding-ireland-groundwater/Pages/Groundwater-bodies.aspx</u> (Accessed July 2021)


The 2010-2015 groundwater body status in the study area was 'Good' (EPA, 2018).



4.2.3.2 Surface hydrology

This catchment includes the area drained by the River Moy and all streams entering tidal water in Killala Bay between Benwee Head and Lenadoon Point, Co. Sligo, draining a total area of 2,345km². The largest urban centre in the catchment is Castlebar. The other main urban centres are Ballina, Tubbercurry, Kiltimagh, Swinford, Foxford, Enniscrone and Crossmolina. The total population of the catchment is approximately 77,260 with a population density of 33 people per km² (EPA, 2018). The Moy and Killala Bay catchment comprises 22 subcatchments with 115 river water bodies, 21 lakes, four transitional, two coastal water bodies, and 19 groundwater bodies. Maps showing surface



Figure 1 to Figure 4.

4.2.3.3 Hydromorphology

Rivers in the study area have been subjected to arterial drainage to improve land for agriculture and to mitigate flooding. Two drainage schemes were completed on the Deel and Moy Rivers by the OPW during 1962 to 1968 and 1960 to 1971 respectively (EPA, 2018). The OPW is required to maintain Arterial Drainage schemes under sections 37 and 38 of the Arterial Drainage Act, 1945. The morphological character of the watercourses in the study area have been affected by deepening with consequent alteration of flows and substrate composition. The rivers are characterised by a series of glide pool sequences over a bed mainly of gravel and rock.

The alteration of hydromorphological (or physical) conditions is the dominant issue in rivers and lakes in Moy and Killala Bay Catchment. This includes inputs of excess fine sediment and alteration of the morphology of the river channel, which in turn alters habitat conditions. This can occur because of, for example, implementing river and field drainage schemes, forestry activities, animal access, and discharge from quarries (EPA, 2018).

4.2.3.4 Surface water quality

Rivers are assessed under the European Union Water Framework Directive (WFD). Rivers are classified into five quality classes (status) under the WFD: High; Good; Moderate; Poor; and Bad. The most recent Q-ratings and status of river waterbodies in the study area are illustrated in **Figure 7**. Biological water quality monitoring in the Moy and Killala Bay catchment was most recently carried out in 2018.

Assessments of the watercourses affected by the proposed works based on the most recent biological water quality monitoring are as follows:

In the Addergoole_SC_10 subcatchment:

• Addergoole_010 - deteriorated from Good to Moderate in 2013-2015

In the Castlebar_SC_20 subcatchment;

- Washpool lough, failed to maintain High ecological status in 13-15. No significant pressures were noted in the vicinity of this lake
- Loughnaminoo Stream_010 ecological status deteriorated from moderate in 10-12, to Poor in 13-15
- Manulla_030, has returned Moderate ecological for the past three monitoring cycles; 07-09, 10-12 and 13-15

In the Deel[Crossmolina]_SC_020 subcatchment

• Deel (Crossmolina)_060 returned Moderate ecological status in 10-15

In the Glenree_SC_10 subcatchment:

- The Behy (north mayo)_010 were classed as good ecological status07-18
- The Brusna (North Mayo)_010 has returned food status 07-18
- The Brusna (North Mayo)_020 has returned good status 07-18
- The Glenree_010 deteriorated from high to good between 12 and 15 but then improved to High in 18

• The glenree_030 has remained at Good 09-18

In the Moy_SC_010 subcatchment:

- The ecological status of Mad_010 improved from Poor to Moderate in 13-15
- Loughnaboll_010 returned Good status was returned in 13-15
- Three other water bodies, Moy 34_40, Owenaher_010 and Lenyvee, were classed as High ecological status in 13-15
- Two unassigned water bodies, the Corsallagh Stream_010 and Tullyvellia lake, were deemed to be Not at Risk

In the Moy_SC_20 catchment:

- Talt, has met its high status objective
- Bellanamean_010 failed to achieve its High status objective
- Eignagh _010, 020 and 030 maintained High ecological status in 13-15

In the Moy_SC_50 catchment:

- Trimoge_010 had Moderate ecological status was returned for the past three monitoring cycles (07-09, 10-12 and 13-15).
- Trimoge_030 and Gweestion_020. maintained High ecological status in 13-15.

In the Moy_SC_70 catchment:

• All five river water bodies returned at least Good ecological in 13-15.

In the Moy_SC_80 catchment:

- Lough Conn returned Good ecological status in 13-15
- Lough Cullin returned Moderate ecological status in 13-15. Zebra Mussels (*Dreissena polymorpha*) are present in Lough Cullin

In the Pollagh_SC_010 Catchment:

- Yellow (Knock)_010 is Moderate status for the previous two monitoring cycles (10-12 and 13-15)
- Cloonlavis_010, failed to reach High ecological status in 2013-2015, deteriorating from High to Moderate
- Pollogh_010 & _020 returned High ecological status for both water bodies in 13-15

4.2.3.5 Gravel deposition sites

All gravel deposition sites are on grounds of 'improved agricultural grassland' (GA2), 'buildings and artificial surfaces' (BL3), 'spoil and bare ground' (ED2) and 'recolonising bare ground' (ED3). These areas are in constant use or are being regularly managed.

4.2.3.6 Important aquatic ecological features in the study area

The distribution and range of aquatic species of selected species of conservation interest in the wider study area are illustrated in **Figure 8 to Figure 11**. These maps are based on the most recent Article 17 Conservation Status 2013 – 2018 report (NPWS, 2013). Range is the total geographical area within which all significant ecological variations of the habitat or species are included, and

which is sufficiently large to allow the long-term survival of the habitat or species. The range is drawn as an envelope around the distribution using a standardised procedure. Horizontal or vertical gaps in the habitat distribution of 3 or more grid squares or oblique gaps of 2 or more squares are deemed enough to justify a break in the Range. Where ecological conditions for the development of the habitat are deemed unsuitable, gaps of just 1 grid square may also be permitted.

Aquatic species of high conservation importance in the Moy and Killala Bay catchment are listed in

Table 3. These species are discussed in terms of their occurrence in the study area and ecology below.





Figure 7 Most recent Q-ratings and river waterbody status in the study area.

Common Name	Scientific name	EU Birds Directive Annex I	EU Habitats Directive Annex II	EU Habitats Directive Annex IV	EU Habitats Directive Annex V
Atlantic salmon	Salmo salar		=		V
White-clawed crayfish	Austropotamobius pallipes		Ш		V
Sea lamprey	Petromyzon marinus		Ш		
Brook lamprey	Lampetra planeri		Ш		
Otter	Lutra lutra		Ш	IV	
Freshwater pearl mussel	Margaritifera margaritifera		=		V
Lesser Horseshoe Bat	Rhinolophus hipposideros		II	IV	

 Table 3 Aquatic species of high conservation importance in the Moy and Killala Bay catchment and Lesser

 Horseshoe Bat.

4.2.3.6.1 Salmon

The entire study area is within the range and/or distribution of salmon (*Salmo salar*). Mcginnity et al., (2003) give the total fluvial habitat accessible to salmon in the River Moy as 7,075,959 m², with a lacustrine area of 68,593,514 m² available. Most 2nd order streams in the catchment are indicated in McGinnity *et al* (2003) as significant producers of salmon, except those within tidal reaches to the northern end of the catchment and the "Ballymacloughlin" to the southern end of the catchment.

The Atlantic salmon is an anadromous species. Most salmon spend one winter at sea before returning to their natal rivers as grilse, mainly during the summer. Smaller numbers of Salmon spend two winters at sea and return mainly in spring, hence "spring" salmon. A small proportion of the adult population returns to the sea post spawning and can return to spawn again.

The survival of salmon during the marine phase of its lifecycle has been identified as the key determinant of trends in population size within natal rivers. Known pressures include exploitation at sea in commercial fisheries, interceptory fisheries in coastal waters, aquaculture and predation. In addition, the negative influence of climate change on food prey structure and abundance has increasingly been attributed to declines observed in sea stocks. Within river systems, variation in individual stock abundance can be influenced by a variety of factors, notably alterations in physical habitat, water quality, environmental factors, predation, and angling and commercial fisheries exploitation pressure. The small tributaries are important salmonid spawning and nursery areas, and the health of drains and streams is essential to the well-being of the whole river system. Crisp (2000) notes that tributaries form a large component of each river system and in salmonid rivers they are particularly important as spawning and nursery areas. Crisp (2000) points out that if the environmental quality of small drainage ditches is neglected, then environmental quality throughout the whole river system is likely to suffer.

The International Council for the Exploration of the Sea (ICES) Advisory Committee report on fishing opportunities catch and effort (ICES 2018)(ICES, 2021), specified environmental and ecosystem interactions as pressures on the species. Ireland experienced an extended period of above-average temperatures and exceptionally low rainfall in the summer of 2018. Uncharacteristically large and late runs of fish were observed in two drought-impacted rivers. The higher temperatures forecast as a result of climate change are also predicted to affect all components of the global freshwater

system. The most likely future scenarios include higher temperatures, wetter winters, drier summers, and more extreme events of flooding and drought. Pressures associated with climate change, together with hydrological changes brought about by drainage and forestry activities, represent a synergistic cumulative negative impact on the water resource within the study area and therefore on salmon and other aquatic biota.

In the marine environment, return rates of adult salmon have declined since the 1980s and are now at the lowest levels in the time-series for salmon stock nationwide, even after the closure of marine fisheries. The modification of ecosystem conditions by climatic factors, along with predator impacts at seaare considered to be the main reasons for lower salmon productivity, expressed almost entirely in terms of lower marine survival (ICES, 2019).

4.2.3.6.2 White-clawed crayfish

The proposed replenishment sites on these watercourses are within the range and/or distribution of the white-clawed crayfish *Austropotamobius pallipes*. White-clawed crayfish records collected for Article 17 reporting 2019 (record dates:1971-2018) indicate that the species has widespread distribution in the River Robe catchment. White-clawed crayfish were recorded in the Bundeleen Stream, Deel [Crossmolina], Addergoole 34, Loona More and the Manulla 34 during the current survey (See Error! Reference source not found.) and may also occur in other watercourse affected by the proposed project.

The white-clawed crayfish is the largest non-marine invertebrate found in Ireland. Adults can grow to approximately 11cm in length. It is also a relatively long-lived species with a maximum life of 10 years. White-clawed crayfish are widespread in Irish lowland lakes and rivers which are underlain by Carboniferous limestone, or its derivative - glacial drift (Holdich, 2003). It occurs in small and medium-sized lakes as well as rivers and streams and this is considered to be due to the lack of competition from other crayfish species. Freshwater crayfish require adequate lime in the water (relatively hard water with a pH of 7 or above), high dissolved oxygen, and an absence of organic pollution (Holdich, 2003).

While the greatest threat to the species is from disease and introduction of alien species, the overall trend is considered stable. Crayfish are recognized as being tolerant of moderate pollution levels and are classed as Group C organisms in the EPA Q-Value biotic index. This species is evaluated as being of overall 'Bad' conservation status nationally (NPWS, 2019a). As the white-clawed crayfish is an aquatic species any changes to water quality will impact the species. This species is a protected species under the EU Habitats Directive Annex II¹⁰ and Annex V¹¹. Crayfish plague (*Aphanomyces astaci*) kills white-clawed crayfish and is the principal cause of decline in Britain and parts of Europe. There have several cases of crayfish plague since 2015 confirmed in Ireland affecting the Erne/Bruskey Co Cavan, River Suir Co. Tipperary, River Deel Co. Limerick, Lorrha River Co. Tipperary and the River Barrow at Carlow. The Clare River is listed as a catchment with Crayfish plague records¹². The threat from disease introduction is severe and not likely to disappear and as a result

 ¹⁰ Animal and plant species whose conservation requires the designation of Special Areas of Conservation
 ¹¹Animal and plant species whose taking in the wild and exploitation may be subject to management measures
 ¹²<u>https://www.biodiversityireland.ie/wordpress/wp-content/uploads/Crayfish-plague-map-20190820.pdf</u>



future prospects are considered Inadequate. The key objective is to maintain the Ireland's status as free of both non-native species and the crayfish plague disease.

Figure 8 White-clawed crayfish (1092) Article 17 (2013 - 2018) Assessment and proposed replenishment sites.

4.2.3.6.3 Lampreys

Three indigenous species of lamprey occur in Ireland; the non-parasitic resident brook lamprey; and the parasitic anadromous river lamprey and sea lamprey.

The lamprey spawn in fresh waters, and ammocoetes are found within the same catchments using similar microhabitats but with varying geographical distribution. Lampreys prefer a gravel-dominated substratum for spawning, and mainly silt and sand-dominated substratum for nursery habitat (Maitland, 2003).

A study of juvenile lamprey carried out in the Moy Catchment in 2004 found that at least two species of lamprey are present, the study was unable to confirm the presence of river lamprey due to the difficulty in discerning river lamprey from brook lamprey at the juvenile stage. It also noted that the current drainage regime is likely to have had an adverse effect on lamprey populations however it remains a significant habitat for the species.

More detail on the ecology of the two lamprey species that occur in the study area (sea lamprey and brook lamprey) is provided below.

Sea Lamprey (Petromyzon marinus) [1095]

According to a study caried out in the catchment in 2004 sea lamprey larvae were generally confined to the Lower River Moy, but were also present in some of the tributaries, notably the Deel and Glenree Rivers. Nominal numbers of larvae of this species were also recorded in the Upper Moy catchment – on the main Moy at Annagh Bridge, and in the lower Mulaghanoe River (O'Connor, 2004).

Sea lamprey migrate to sea and only return to rivers to spawn (Kurz & Costello, 1999). They build nests (redds) and spawn in rivers, usually at the downstream end of pools where there is a swift current. The Sea Lamprey usually spawns in late May or June when water temperatures reach at least 15°C (Maitland, 2003) and prefer sediments made up of small cobbles and pebbles for spawning. Once hatched, the larvae are known as ammocoetes and as they swim out of the nest they are washed downstream where they accumulate in areas with slower water flow e.g. backwaters, current eddies or behind big stones on the river bed. There, the ammocoetes bury themselves in stable sandy silt rich in organic matter where they remain until they become adults. After 3 to 6 years, the ammocoetes transform into adults usually between July and September. Sea Lamprey and River Lamprey are known to spawn in the River Shannon and in several tributaries (Kurz & Costello, 1999).

The presence of obstacles to sea lamprey upstream migration will reduce access to spawning and juvenile habitats, regardless of the prevailing extent and distribution of both throughout catchments. Barriers will often result in a highly localised distribution of spawning in the lower sections of rivers, rather than a diffuse dispersion throughout the system (Gargan *et al.* 2011 and Rooney *et al.* 2015 in NPWS, 2019a). Barrier removal or mitigation measures to facilitate passage are considered essential in the context of conservation status of sea lamprey, especially in Irish SACs where the availability of main stem channel often falls well below the 75% criterion identified for this species.

Increases in river discharge can exacerbate the already high rate of natural egg wash--out, both from within nests and from surrounding spawning gravels (Smith & Marsden, 2009). When aspects of life history such as spawning, egg survival and early larval maturation are dependent on specific flow patterns, any pronounced increase in discharge (N03) could result in decreased or complete failure of recruitment for that year (Humphries & Lake, 2000; Bunn & Arthington, 2002; Maitland, 2003 in NPWS, 2019a).



Figure 9 Sea lamprey (1095) Article 17 (2013 - 2018)

Pollution to surface water from diffuse and point sources is a constant threat to aquatic organisms. Both adult lamprey and ammocoetes are vulnerable to the effects of pollution. The single largest pressure acting on adult sea lamprey is the presence of artificial physical barriers to upstream migrating fish. Consequently, the overall Conservation Status of the species is considered Bad in view of barriers to migration and the low population levels recorded (NPWS, 2019a).

Sea lampreys do not home to their natal river to spawn. In effect all of western Europe contributes to a general marine adult population, from which individuals are free to return to rivers at random across their entire range. This is probably over-simplistic – adults may have a more regionalised marine location directly related to their original natal river, i.e. Irish sea lamprey may for the most part not stray beyond Irish coastal waters and will as a consequence return to Irish rivers due to proximity and convenience (NPWS, 2019a).

Brook Lamprey (Lampetra planeri) [1096]

The watercourses affected by the proposed replenishment are within the range and/or distribution of the brook lamprey. Brook lamprey are the most common of the lampreys and likely occur in most watercourses in the study area. According to 2004 study the *Lampetra sp.* larvae were well distributed in the catchment but cited they were absent from areas above natural impassable barriers (i.e Upper Deel, Glenree and Clydagh Rivers) and absent from areas which have been badly damaged by arterial drainage (i.e. Glore and Manulla Rivers).

The brook lamprey *Lampetra planeri* is the smallest of the three lamprey species native to Ireland and is the only one that is non-parasitic and spends all its life in freshwater (Maitland & Campbell, 1992). The spawning season for Brook Lampreys starts when water temperatures of the river reach 10 to 11°C (Maitland, 2003) and usually occurs in June or April. Ammocoetes of the three lamprey species are often found in the same locations while brook lamprey can inhabit smaller streams often occurring closer to headwaters. Brook lamprey tends to spawn at the downstream end of pools, but often in smaller rivers and in slightly shallower and slower flowing water, building a nest in sandy or gravelly sediment (Kurz & Costello, 1999).

After hatching, the larvae drift or swim downstream to areas of river bed or margins with fine silt deposits. They burrow into this substrate and live as filter feeders over a period of years before transforming into young adult fish. The young adults overwinter before migrating short distances upstream to gravelled areas where they spawn. The adult fish die after spawning.

For brook lamprey in Ireland there are extensive areas of suitable habitat and no significant pressures impacting this species. The status of Brook Lamprey is evaluated as being of 'Favourable' conservation status nationally (NPWS, 2019a).



Figure 10 Brook lamprey (1096) Article 17 (2013 - 2018) Assessment and proposed replenishment sites.

4.2.3.6.4 Otter

The NPWS Conservation Objectives GIS dataset¹³ for otter the entire study area is within the range and/or distribution of the otter. However, the proposed replenishment sites on larger watercourses (> 1st order) are likely used by otters to varying degrees as they provide ample prey and/or cover. The presence of freshwater, a sufficient prey-base and suitable sites for holts/couches are key

¹³ This dataset displays the Special Areas of Conservation sites which have Site-Specific Conservation Objectives set for Qualifying Interest species



factors in determining otter distribution. Evidence of otter (Scat) was recorded in the environs of the proposed replenishment site 4 at the western side of the catchment.

Figure 11 Otter (1355) Article 17 (2013 - 2018) assessment and proposed replenishment sites.

This species is found throughout Ireland and tend to occupy linear territories along watercourses and are rarely found far away from water. Otters have two basic requirements: aquatic prey and safe refuges in which to rest. Otters are found along rivers, lakes and coasts, where fish and other prey are abundant, and where the bank-side habitat offers sufficient cover. A variety of fish from sticklebacks to salmon and eels will be taken, while frogs can be important locally or seasonally.

4.2.3.6.5 Freshwater pearl mussel

There are three freshwater pearl mussel (FPM) *Margaritifera margaritifera* sensitive areas within the Moy and Killala Bay catchment; these are the Moy – Deel, the Moy and the Moy – Tobergal. These three areas are classified as areas with 'other extant populations'. No extant freshwater pearl mussel populations were encountered during the survey. The proposed replenishment works do not occur in an SAC which cites freshwater pearl mussel as a conservation objective.

The FPM is a large, long-lived bivalve mollusc found in clean, fast-flowing, well-oxygenated rivers with unconsolidated substrates. Stable, clean gravel and sand with a readily available supply of dissolved oxygen provides ideal habitat for juveniles. The freshwater pearl mussel has a complex life cycle. Mussels mature at 7-15 years of age and have a prolonged fertile period lasting into old age. The species produces glochidial larvae that use a temporary salmonid host, typically Atlantic salmon and sea trout, but also brown trout. Juvenile mussels occupy interstitial habitats in the riverbed for five years or more. Adults are more tolerant of a wider range of in-river conditions than juveniles (Hastie *et al.*, 2000 in Skinner *et al.*, 2003).

The IUCN¹⁴ Conservation Status of FPM is 'Critically Endangered'. The species is listed under Annex II and Annex IV of the Habitats Directive [92/42/EEC] and is protected by the following two legal instruments: Wildlife Act (1976 / 2012), and European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations (2009). Freshwater pearl mussels are a flagship, indicator, keystone and umbrella¹⁵ species (Geist, 2005).

4.2.3.6.6 Lesser horseshoe bat

While the proposed replenishment works are not taking place within an SAC designated for lesser horseshoe bat it is of note that the Article 17 report sites an area in the south of the Moy and Killala Bay catchment as being within the distribution range of the species. The most northerly distribution gird square in the catchment overlaps with sites 1, 2, 3, 34, 35 & 36.

Like all species of bat, lesser horseshoe bats are long-lived mammals with a complex social life. They use linear landscape features, such as treelines, hedgerows and stonewalls, to move between roosts and feeding grounds, which typically comprise areas of broadleaved woodland and riparian vegetation (NPWS, 2018a). Lesser horseshoe bats may select different types of roosts at certain times of the year corresponding with particular phases in their life cycle. Types of roost include hibernation roosts, summer and nursery roosts, temporary roosts, night feeding roosts and mating roosts/swarming sites. Old buildings are often used during the summer months while underground sites which maintain cool, stable temperatures, such as caves and cellars are typically used during hibernation (NPWS, 2019b). According to Bat Conservation Ireland, lesser horseshoe bat roosts mainly in roofs of old houses or in outhouses, stables or old cottages. In winter this species

¹⁴ International Union for Conservation of Nature

¹⁵ Protecting the pearl mussel has a positive impact on the entire river ecosystem. The most important features of an effective umbrella species are a large range size and complex habitat requirements.

hibernates in caves, disused cellars, mines and souterrains. The lesser horseshoe bat's distribution in the west is strongly linked with broadleaved and mixed woodland and it usually forages in woodland and scrub. The species has a low association with trees as roost-sites. Lesser horseshoe bats are sensitive to disturbance and very sensitive to light pollution avoiding brightly lit areas. Loss of roosting sites and commuting routes linking roosts to foraging sites as well as poor management of foraging areas are considered major threats to this species.

The NPWS Conservation Objectives supporting document for lesser horseshoe bat cites a Core Sustenance Zone (CSZ) of 2.5km from established roosts (NPWS, 2018a). This CSZ refers to an area surrounding a roost site within which habitat availability and quality has a significant influence on the resilience of a colony. This 2.5km zone around lesser horseshoe bat roost sites is taken as the species core foraging range. Previous studies have indicated a maximum foraging range from roost sites of c. 6 km for lesser horseshoe bat (Bat Conservation Ireland, 2012). Lesser horseshoe bat is listed on Annex II of the Habitats Directive and like all other species of bat in Ireland, is also listed on Annex IV. The conservation status of this species has been assessed as 'Inadequate', during the most recent species assessment.

4.2.4 Selection of proposed replenishment site and ecological feature photographs Selection of proposed replenishment site and ecological feature photographs



Plate 1 White Clawed Crayfish found while kick sampling for Q Level Assessment (left) and upstream area at site 3 where gravel will be replenished (right)



Plate 2 showing the downstream section of site 7 (left) and upstream of site 8 showing commercial

forestry draining into the river (right)



Plate 3 Typical section of site 8 (left) and downstream end of site 11 (right)



Plate 4 Poaching of the river bank by livestock at site 11 (left) and poaching at downstream end of site 20 (right)



Plate 5 Juvenile fish at site 20 (left) and lamprey ammocoete encountered at site 27 (right)



Plate 6 Site 27 with suitably heavy silt for lamprey ammocoetes (left) and upstream section of 34 (right)



Pate 7 Otter spraint with evidence of the remains of white clawed crayfish at site 3 (left) and upstream end of site 35 (right)



Plate 8 Upstream end of site 36 (left) and deceased adult trout encountered during the survey of site 36 (right)



Plate 9 Looking downstream to site 38 (left) and juvenile fish encountered during the survey of site 38.



Plate 10 Downstream of site 42 (left) and poaching on the riverbank at site 42 (right)

4.2.5 Characteristics of the Project

The proposal is described below and has been confirmed with IFI.

take place during the various stages	 Set up trap to collect debris in the river if required.
of implementing the proposal	 Remove livestock fencing where required.
	- Machine operator begins to cut brush and lighter branches to
	increase light to the river and allow for the introduction of gravel.
	- Larger branches or trees will be cut by chainsaw and removed
	using the grab attachment on the machine.
	Gravel Storage
	Gravel storage will be selected where hard surfaces occur insofar as
	possible, denuded areas and in agricultural grassland. These areas are
	of low ecological value and outside the Natura 2000 network.
	Gravel Introduction
	 Brief operators and staff on safety and duties
	 Offload materials (gravel) at the preselected location in the vicinity
	of the works.
	- Gravel collected by track machine or teleporter and brought to
	channel or by tractor & trailer if the distance is too great.
	 Introduce gravel and spread/deposited where necessary by track
	machine or teleporter. On smaller stretches with a wheel barrow.
	 The gravel will be deposited at location which have riffle or glide
	characteristics.
	 The gravel will be scattered in the channel or deposited in shallow
	piles and left to be dispersed naturally by water current.
	Random Boulders
	 Boulders already in stream will be used where
	practicable/appropriate.
	 Boulder will be placed in a similar manner to the gravel in an area
	where it is appropriate, above gravel to retain it.
	Completion of works
	Completion of works
	some areas where it was not present previous to the works
	 Any new fencing will be post and wire type fencing and will be
	installed 5m from the river bank.
	 Debrief and assess project and consult with landowners.
	 Remove any excess materials and tools from site.
	Site Management
	 All works will be managed by IFI Project Manager Barry Kelly in the
	Moy River Basin
	 All works will be overseen by IFI supervisors Philip Thornton and
	Osgur Grieve
	 works will be carried out by both IFI and the Office of Public Works
Description of resource requirements	WORKS Materials
for the construction/oneration and	- 12 loads of pitted gravel, sourced from a reputable supplier such
,	



decommissioning of the proposal	as Molloy concrete or other suitable pit that supplies rounded
(water resources, construction	stone.
material, human presence etc)	
	Fuels
	 Fuels will be stored at the IFI stores, from where it will be collected and brough to site when required along will any hand tools needed. All plant will have bunded fuel tanks and will be refuelled away
	from watercourses.
	Equipment
	 Dump Truck – used to bring gravel from quarry to the site. Track Machine – with buckets, brush cutting and grab attachment. Teleporter – with bucket
	 Tractor & trailer to bring gravel to the channel if required.
	 The plant used to distribute the gravel in the channel will depend on the accessibility and ground conditions. (Teleporter or Track machine) Chainsaw / Pole saw
	All plant will be serviced and maintained according to the instructor's handbook.
	Any equipment found to be defective is to be taken out of circulation immediately and returned for inspection and repair.
	Under no circumstances will defective equipment be used.
Description of timescale for the	It is anticipated that the proposed works will commence in Summer
various activities that will take place	2021 and be completed by Autumn 2026.
as a result of implementation (including likely start and finish date)	The duration of work at each site is not expected to exceed 2 weeks
Description of wastes arising and other residues (including quantities)	 Branches/brash will be used for bank stability works insofar as possible.
and their disposal	 The remainder will be left to decay in an area within the subject fields, at a location where they will not be washed into the river.

4.2.6 Identification of Other Projects or Plans or Activities

The Moy and Killala bay catchment is impacted upon by a wide range of anthropogenic factors within both the terrestrial and aquatic environments. A diverse array of impacts include amongst others; agriculture, commercial forestry, recreational fishing, industry, water abstraction, sewage treatment, diffuse and point source pollution and invasive plant species. Other activities, such as residential, commercial, infrastructural or recreational development could potentially give rise to either direct impacts on habitats or species (loss of habitat, disturbance to species) or indirect impacts (e.g. activities which could affect water quality or hydrology which could in turn affect the status/health of populations of water dependant habitats or species). The most significant activities as relevant to the current proposal in terms of water quality are described below.

4.2.6.1 Water quality pressures

The significant pressure affecting the greatest number of water bodies in the Moy and Killala Bay catchment is hydromorphological, followed by agriculture, forestry, urban waste water, domestic waste water, peat, diffuse urban, industry and mines and quarries (EPA, 2018). Significant pressures in the study area are shown in Error! Reference source not found.. Excess phosphate leading to eutrophication is also a concern in several water bodies. While excess ammonia is also of concern, it is only for a limited number of water bodies.

Agriculture is a significant pressure in eleven river and three lake water bodies and the Moy Estuary. The issues related to farming in this catchment are diffuse phosphorus loss to surface waters due mainly for example, to direct discharges; or runoff from yards, roadways or other compacted surfaces, or runoff from poorly draining soils. Sediment can also be a problem from land drainage works, bank erosion from animal access or stream crossings. Pesticides have also been detected in three water bodies, typically associated with grassland management.

Forestry has been identified as a significant pressure in nine river water bodies. The impacts are a combination of forestry taking place on peat soils and extensive felling, which have resulted in heavy siltation and excess nutrients in surface water bodies.

A review of EPA online mapping system was carried out to determine what ongoing emissions occur in the study area, namely the Water frameworks Directive (WFD) Section 4 discharges, licensed facilities (integrated pollution control and industrial emissions), urban waste water treatment plants and extractive industries. Section 4's are licensed and licensable discharges to water to support the characterisation of waterbodies for the 2nd Cycle of River Basin Management Planning. This dataset takes in account, among other datasets, the Section 4s dataset developed in 2005 as Point Source Pressures for the Article 5 Characterisation and Risk Assessment Report for the Water Framework Directive 2000/60/EC; (European Communities (Water Policy) Regulations 2003 (SI 722 of 2003)). Emissions to watercourses and extractive industries in the study area are shown in Error! Reference source not found.. These may be negatively affecting water quality in the receiving waters.





Figure 12 Significant pressures in the study area (based on EPA, 2018)



Figure 13 Emissions to watercourses and extractive industries in the study area

4.2.6.2 Drainage

As discussed in **Section 4.2.3.3** and illustrated in **Figure 2 to Figure 5**, the proposed replenishment sites are drained channels that are maintained by OPW. Maintenance of channels by the OPW is

sometimes carried out with little regard for environmental sensitivities and can therefore impact on aquatic biota. For example, the OPW carried out drainage maintenance in the Straide River, a tributary of the River Moy during the summer of 2021. This maintenance likely had a significant effect on suspended solids (elevated), with removal of river substrates using an excavator. Any maintenance of OPW channels presents a habitat degradation and water quality risk.



Plate 11 Example of OPW maintenance on the River Straide. Instream excavation took place along this stretch (left) where suspended solids pollution probably took place (right). Reach of the River Straide below maintained stretch, with an obvious accumulation of floating scum probably attributed to instream activity upstream (right).

4.2.6.3 Mayo County Development Plan

The 2014-2021 Mayo County Development Plan includes Chapter 4. Environment, Heritage and Amenity Strategy. This recognises the natural resources held by the county including water bodies, agricultural land, forestry, soil, and geology. It acknowledges the importance of the indigenous fisheries resource and the role it plays as key enabler in rural development/diversification and within the rural economy at a County and regional level. It is considered that the proposed project aligns with the following aspects of the Mayo County Development Plan:

- WQ-01 It is an objective of the Council to implement the Western River Basin District Management Plan "Water Matters" 2009-2015 to ensure the protection, restoration and sustainable use of all waters in the County, including rivers, lakes, ground water, coastal and transitional waters, and to restrict development likely to lead to deterioration in water quality or quantity.
- LP-01 It is an objective of the Council, through the Landscape Appraisal of County Mayo, to recognise and facilitate appropriate development in a manner that has regard to the character and sensitivity of the landscape and to ensure that development will not have a disproportionate effect on the existing or future character of a landscape in terms of location, design and visual prominence.
- NH-04 It is an objective of the Council to fully integrate wildlife and biodiversity considerations into all areas of the Council's roles and responsibilities and into all its works and operations.

The proposed project is deemed compliant with the Draft Mayo County Development Plan 2021-2027 with regard to the following:



- Economic Development Objective 51 To facilitate rural enterprises, and resource development (such as agriculture, agrifood sector, agri-tourism, commercial fishing, aquaculture, rural tourism, forestry, bioenergy, the extractive industry, recreation, cultural heritage, marine enterprise sector, research and analysis) and renewable energy resources (such as wind/solar/ocean energy) that are dependent on their locality in rural locations, where it can be demonstrated that the development will not have significant adverse effects on the environment, including the integrity of the Natura 2000 network, residential amenity or visual amenity. Where proposals demonstrate measures to promote environmental enhancement through improved ecological connectivity, such as measures in the Pollinator Plan, additional native species planting or blue and green infrastructure measures, these will be favourably considered.
- Economic Development Policy 32 To protect the county's valuable inland fishery resource and support its sustainable development through the protection of water and habitat quality and facilitation of ancillary infrastructure at appropriate locations.

4.2.6.4 Sligo County Development Plan

Chapter 7 of the Sligo county development plan includes a natural heritage section. The chapter recognises biodiversity loss as a global threat in line with the EU biodiversity strategy.

It is the policy of Sligo County Council to:

- P-NH-1 Protect, sustainably manage and enhance the natural heritage, biodiversity, geological heritage, landscape and environment of County Sligo in recognition of its importance for nature conservation and biodiversity, and as a non-renewable resource, in association with all stakeholders.
- P-NH-2 Promote increased understanding and awareness of the natural heritage and biodiversity of the county.
- P-NH-3 Protect and, where possible, enhance the plant and animal species and their habitats that have been identified under the EU Habitats Directive, EU Birds Directive, the Wildlife Act and the Flora Protection Order.
- P-NH-4 Take full account of the precautionary principle where uncertainty exists regarding the potential impact of a proposed development on the natural heritage resource.

The chapter also includes policy for wetlands which it defines as water courses, water bodies marshes, fens, reed beds, bogs and wet woodlands.

- P-WET-1 Have regard to the County Sligo Wetlands Surveys 2008-2011 and subsequent wetland surveys that may be published during the lifetime of this Plan. Protect surveyed wetland sites that have been rated of A (International), B (National) and C+ (County) importance.
- P-WET-2 Ensure that an ecological assessment at an appropriate level is undertaken in conjunction with proposals involving drainage or reclamation of wetland habitats.

With regard to inland water policies the council has provided the following objectives within the plan:



- P-INW-1 Protect rivers, streams and other water courses and their associated Core Riparian Zones (CRZs) from inappropriate development and maintain them in an open state, capable of providing suitable habitats for fauna and flora. Structures (e.g. bridges) crossing fisheries waters shall be clear-span and shall be designed and built in consultation with Inland Fisheries Ireland.
- P- INW-2 Protect and enhance biodiversity richness by protecting rivers, stream corridors and valleys by reserving land along their banks for ecological corridors, maintaining them free from inappropriate development and discouraging culverting or realignment.
- P- INW-3 Ensure that all proposed greenfield residential and commercial developments use sustainable drainage systems (SUDS) in accordance with best current practice, ensuring protection of the integrity of wetland sites in the adjoining area, including their hydrological regime.
- P- INW-4 Ensure that floodplains and wetlands within the Plan area are retained for their biodiversity and flood protection value.
- P- INW-5 Ensure that proposed developments do not adversely affect groundwater resources and groundwater-dependent habitats and species.

4.2.6.5 Summary of Other Projects or Plans or Activities

In light of the characteristics of the subject sites and surrounds and considering the size and scale of the proposal as outlined in **Section 4.2.5** above, it is not envisaged that the project has any potential for interaction with other projects, plans or activities, which could result in significant cumulative effects on Natura 2000 sites. However, based on the precautionary approach the potential, albeit limited, for cumulative impacts as a result of the proposal, will be evaluated in **Section 4.5.7** below.

4.3 IDENTIFICATION OF NATURA 2000 SITES

4.3.1 Zone of Impact Influence

The screening stage of AA involves compiling a 'long list' of European sites within a zone of potential impact influence for later analysis which may or may ultimately not be significantly impacted upon by the proposal. All Natura 2000 sites within 15km of the proposal location will be characterised in the context of the rationale for designation and qualifying features, in accordance with NPWS guidance. In line with the precautionary principle, during the preparation of this report Natura 2000 sites that lie outside 15km that may be significantly impacted as a result of the proposal will be identified before an assessment is made of the likely significance of these impacts.

As described above, the test for the screening for appropriate assessment is to assess, in view of best scientific knowledge, if the development, individually or in combination with other plan/project is likely to have a significant effect on a Nature 2000 site. If there are any significant, potentially significant, or uncertain effects, it will be necessary to proceed to appropriate assessment and submit an NIS.

4.3.2 Identification of Natura 2000 sites

Adopting the precautionary principle in identifying potentially affected European sites, it has been decided to include all SACs and SPAs, within a 15km radius of the proposal site. **Table 4** below lists designated SACs and SPA within 15km or the anticipated zone of influence of the proposal site including their proximity. Given the nature, scope, scale and location of the works, it is not considered that the proposal will significantly affect Natura 2000 sites outside of those considered here. The SPAs and SACs identified within 15km of the proposed gravel replenishment sites are shown in **Figure 14** and **Figure 15**. The anticipated zone of influence is further reduced to the Moy and Killala Bay Catchment due to lack of hydrological connections. **Table 5** lists the Natura 2000 sites within 1km of the proposed gravel replenishment locations and their features of interest. The proximity of these sites to the proposed project means they are the most likely to be potentially affected. The Natura 2000 site within which works are proposed is the River Moy SAC (000298). Information pertaining to designated sites is from site synopses, conservation objectives and other information available on www.npws.ie.

Table 4 Designated conservation sites within 15km radius of proposal site

Site Code	Site Name	Distance from nearest replenishment site
000463	Balla Turlough SAC	Site 36 is ca. 4858m west of Bealla Turlough SAC.
00281	Ballinafad SAC	Site 2 is ca. 613m west of the Ballinafad SAC.
001922	Bellacorick Bog Complex SAC	Site 39 is ca. 5460m east of the Bellacorkick Bog Complex SAC.
000466	Bellacorick Iron Flush SAC	Site 39 is ca 11804m east of the Bellacorik Iron Flush SAC
000492	Doocastle Turlough SAC	Site 37 is ca. 13714m west of Doocastle Turlough SAC
000458	Killala Bay/Moy Estuary SAC	Site 13 is ca. 4149m south east of the Killala Bay/Moy estuary SAC
000516	Lackan Saltmarsh and Kilcummin Head SAC	Site 42 is ca. 12523m north of the Lackan Saltmarsh and Kilcummin Head SAC
004051	Lough Carra SPA	Lough Cara SPA is ca. 6677m south west of Site 1.
001774	Lough Carra/Mask Complex SAC	Site 2 is ca. 6071m north of the Lough Carra/Mask Complex SAC
004228	Lough Conn and Lough Cullin SPA	Site 9 is ca. 272m north of the Lough Conn and Lough Cullin SPA
002177	Lough Dahybaun SAC	Site 39 is ca. 12180m west of Lough Dahybaun SAC
000633	Lough Hoe Bog SAC	Site 38 is 3.9km east of the Lough Hoe Bog SAC
000634	Lough Nabrickkeagh Bog SAC	Site 37 is ca.2048m west of Lough Nabrickkeagh Bog SAC
000527	Moore Hall (Lough Carra) SAC	Site 2 is ca. 8091m north of the Moore Hall (Lough Carra) SAC
002144	Newport River SAC	Site 4 is ca. 6049m west of the Newport River SAC
002006	Ox Mountains Bogs SAC	Site 38 is ca. 633m south of the Ox Bogs SAC
002298	River Moy SAC	Sites 1, 2, 3, 4, 7, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 38, 37, 40, 41 are within the River Moy SAC
000636	Templehouse and Cloonacleigha Loughs SAC	Site 38 is ca. 13351m west of Templehouse and Cloonacleigha Loughs SAC
002179	Towerhill House SAC	Site 2 is ca. 6012m north of the Twoerhill House SAC
000637	Turloughmore (Sligo) SAC	Site 37 is ca. 9397m west of Turloughmore (Sligo) SAC
001898	Unshin River SAC	Site 38 is ca. 13332m west of the Ushin River SAC
001571	Urlaur Lakes SAC	Site 8 is ca. 11489m west of the Urlaur Lakes SAC



Figure 14 Special Protection Areas within a 15km radius of the proposed gravel replenishment works



Figure 15 Special Areas of Conservation within a 15km radius of the proposed gravel replenishment works

Natura 2000 Distance from Site Qualifying features of Special Conservation Interest

Site		
River Moy SAC (000298) Ballinafad	Sites 1, 2, 3, 4, 7, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 38, 37, 40, 41 are within the River Moy SAC Ballinfad SAC is within	 White-clawed Crayfish (Austropotamobius pallipes) [1092] Sea Lamprey (Petromyzon marinus) [1095] Brook Lamprey (Lampetra planeri) [1096] Salmon (Salmo salar) [1106] Otter (Lutra lutra) [1355] Active raised bogs* [7110] Degraded raised bogs still capable of natural regeneration Depressions on peat substrates of the Rhynchosporion [7150] Alkaline fens [7230] Old sessile oak woods with Ilex and Blechnum in the British Isles [91AO] Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) * [91EO] Lesser Horseshoe Bat (Rhinolophus hipposideros) [1303]
SAC (002081)	1km to the east of sites 1, 2, 3, 34, 35 and 36	
Lough Conn and Lough Cullin SPA (004228)	Sites 6 and 9 are within the SPA boundary with sites 5 and 4 being less than 5km to the west of the SPA.	 Tufted Duck (<i>Aythya fuligula</i>) [A061] Common Scoter (<i>Melanitta nigra</i>) [A065] Common Gull (<i>Larus canus</i>) [A182] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]
Ox Mountains Bog SAC	Sites 37 and 38 are within 1km of the Ox Mountains Bog SAC	 Geyer's Whorl Snail (<i>Vertigo geyeri</i>) [1013] Marsh Saxifrage (<i>Saxifraga hirculus</i>) [1528] Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110] Natural dystrophic lakes and ponds [3160] Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] European dry heaths [4030] Blanket bogs (* if active bog) [7130] Transition mires and quaking bogs [7140] Depressions on peat substrates of the Rhynchosporion [7150]

 Table 5 Natura 2000 sites within 1km of the proposed gravel replenishment locations and their features of interest.

The Convention on Wetlands of International Importance especially as Waterfowl Habitat, more commonly known as the Ramsar Convention, was ratified by Ireland in 1984 and came into force for Ireland on 15 June 1985. Ireland presently has 45 sites designated as Wetlands of International Importance, with a surface area of 66,994 hectares. Killala Bay, Easky Bog and Owenboy are within the vicinity of the proposed works.

^{*} Denotes an Annex habitat.

4.3.3 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 long-term 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.

All conservation objectives together with other designated site information are available on http://www.npws.ie/protectedsites/. Site specific conservation objectives were available for:

- 000463 Balla Turlough SAC (NPWS, 2021a)
- 00281 Ballinafad SAC (NPWS, 2018b)
- 001922 Bellacorick Bog Complex SAC (NPWS, 2017c)
- 000466 Bellacorick Iron Flush SAC (NPWS, 2019c)
- 000492 Doocastle Turlough SAC (NPWS, 2020b)
- 000458 Killala Bay/Moy Estuary SAC (NPWS, 2012)
- 000516 Lackan Saltmarsh and Kilcummin Head SAC (NPWS, 2016c)
- 002177 Lough Dahybaun SAC (NPWS, 2021b)
- 000633 Lough Hoe Bog SAC (NPWS, 2017b)
- 000634 Lough Nabrickkeagh Bog SAC (NPWS, 2019a)
- 000527 Moore Hall (Lough Carra) SAC (NPWS, 2018c)
- 002144 Newport River SAC (NPWS, 2019b)
- 000534 Owenduff/Nephin Complex SPA (NPWS, 2017a)
- 0002006 Ox Mountains Bogs SAC (NPWS, 2016b)
- 002298 River Moy SAC (NPWS, 2016a)
- 002179 Towerhill House SAC (NPWS, 2018d)
- 000637 Turloughmore (Sligo) SAC (NPWS, 2021f)
- 001571 Urlaur Lakes SAC (NPWS, 2017d)

Management plans are not available for:

• 004051 Lough Carra SPA (NPWS, 2021c)

- 001774 Lough Carra/Mask Complex SAC (NPWS, 2020a)
- 004228 Lough Conn and Lough Cullin SPA (NPWS, 2021d)
- 000636 Templehouse and Cloonacleigha Loughs SAC (NPWS, 2021e)
- 001898 Unshin River SAC (NPWS, 2021f),

however Generic Conservation Objectives are available.

4.4 IDENTIFICATION OF POTENTIAL IMPACTS

Potential likely ecological impacts arising from the project are identified in this section.

Description of elements of the project likely to give rise to potential ecological impacts.	 The proposed gravel replenishment works in various watercourses in the Moy and Killala Bay catchment will alter the fluvial habitat of the subject stretches. Substrates such as bedrock and boulders that currently exist on the beds of these channels will be covered with gravel. The elements of the project likely to give rise to potential aquatic ecological impacts are as follows: Gravel introduction means that existing substrates will be covered and flows may be altered. Macroinvertebrates that occur in such areas will be lost and / or damaged, and the
	 habitat for macroinvertebrates will be changed. There is some potential for juvenile fish such as minnows or stone loach and their habitats to be lost / damaged. The introduction of gravels will increase fluvial heterogeneity and therefore likely support a greater diversity of benthic
	 Re-suspension of deposited silt will occur during the works when working in some depositing river reaches, with a likely increase in suspended solids concentration in the water column downstream. Sediment transport would lead to siltation of the riverbed in downstream areas.
	 Use of fuel and oils in close proximity to the watercourse creates some limited risk of ingress of fuel or oil by means of onsite spill to the habitats at the works location and downstream. The removal of trees and other vegetation shading the
	channels in the proximity of some sites has the potential to cause increased growth of algae and emergent vegetation in the channels.
	 The removal of trees and other vegetation shading the channels in the proximity of some sites will likely increase habitat quality due to the effect of more varied shade - dappled light is known to benefit benthic macroinvertebrates.
	• Location of the works within adjacent to watercourses could potentially cause disturbance or displacement impacts to terrestrial faunal species of conservation interest.
	 The storage of gravel at each site will have some temporary impacts on the low value habitats on which they are placed. Fugitive emissions of noise from the use of machinery and
	 human presence over the works period. The clearance of vegetation, tracking through grassland and along established tracks will have localised impacts of a linear character but will be of limited extent and duration and take place largely in area of low ecological sensitivity

Describe any likely direct, indirect or Size and scale and land-take

 secondary ecological impacts of the project (either alone or in combination with other plans or projects) by virtue of: Size and scale; 	The proposed works are on reaches of various lengths on selected watercourse reaches in the Moy and Killala Bay catchment, ranging from 563m at Site 4 on the Addergoole to 10m at Site 19 on the Glenree.
 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.; and Other. 	River and riparian works will take place along a maximum of 4.5km of watercourses in the Moy and Killala Bay catchment. It is noted that the works will be at specific locations within reaches selected for replenishment, governed by flow and substrate characteristics. The estimated maximum area of watercourses affected is ca. 3 ha. The total length and areas of channels directly affected will be significantly less than 11.27km and 3ha. respectively. Distance from Natura 2000 Sites or key features The proposed works are at forty two sites across the Moy and Killala Bay catchment.
	 Gravel replenishment sites within a Natura 2000 site are outlined below: Sites 1, 2, 3, 4, 7, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 38, 37, 40, 41 are within the River Moy SAC Sites 6 and 9 are within Lough Conn and Lough Cullin SPA
	The placement of gravels in watercourses are aimed at enhancing salmonid spawning. If gravels of greater size than existing are introduced to an area used by spawning brook lampreys, then it is possible that the ecological value such areas could be reduced for this species, especially if the gravel is being introduced to target salmon (salmon spawn in substrates of greater size than brook lampreys).
	Some watercourses where gravels are to be introduced support white-clawed crayfish, so there could be direct impacts on the habitats of this species, and possible mortalities if individual crayfish were covered.
	 Hydrological connections between the proposed works and the River Moy SAC is outlined below: Site 5 is ca. 913.8m upstream of the River Moy SAC Site 6 is ca. 221.4m upstream of the River Moy SAC Site 8 is ca. 899.9m upstream of the River Moy SAC Site 19 is ca. 3256.3m upstream of the River Moy SAC Site 39 Is ca. 2711.3m upstream of the River Moy SAC Site 42 is ca. 4613.3m upstream of the River Moy SAC
	The mechanism by which aquatic conservation interests of the SAC sites and birds of interest in SPAs could be affected is by water quality deterioration and associated habitat alteration brought
about indirectly by the works. This could occur through resuspension of deposited silt when working in some depositing river reaches, where an increase in suspended solids concentration in the water column downstream could ensue after addition of gravel to the watercourse. Sediment transport could lead to siltation of the riverbed in downstream areas. Any such impacts are related to the inherent degree of siltation in the watercourse however, as the proposed work will not add to the fluvial slit load in any of the subject watercourses and will not add to any existing siltation problems.

The reaches of the watercourses affected are likely important to support aquatic interests of the aforementioned SACs, namely salmon, lampreys, otter and crayfish. Water quality impacts can affect these species in terms of food availability, habitat quality and oxygenation. Secondary impacts on aquatic species due to water quality related issues are not considered significant due to distance upstream of SACs, the effects of dilution and relatively small scale of the works on individual watercourses. Habitat for aquatic species (otter, salmon, lamprey and white-clawed crayfish) will likely be affected temporarily while works are ongoing. These species will be displaced during the works, dependent on the fluvial habitats affected. Otter holts were not recorded during the current survey no impacts on breeding otters are envisaged.

Some riparian corridors with good connectivity to wooded areas may also be used by foraging lesser horseshoe bats.

Considering the low-level impacts on water quality and distances of proposed replenishment sites from SPAs, there are no water quality impacts predicted at a level that would affect breeding or wintering birds of special conservation interest in any of the SPAs that receive water from channels where works are proposed.

Resource requirements

Loads of pitted gravel will be sourced from an existing quarry. This gravel is washed and clean, free of silt and does not harbour invasive alien plants. Machinery (various) and cut branches will generate some limited emissions and waste materials.

Emissions

The primary emissions expected from the proposed project are fugitive emissions of noise from the use of hand-held mechanical equipment, vehicular movement and the increase in human activity for the duration of the works.

- Fugitive noise emissions from use of plant and/or human activity will occur but will not greatly exceed the background rate that pertains.
- Because transport requirements will be normal and confined

to a maximum of, emissions will not exceed the existing background rate that pertains in the immediate surrounds and in the wider area extending away from the subject site.

No uncontrolled emissions are expected.

Emissions to Water

Construction phase:

- There is risk of sediment re-suspension in the water column with instream works.
- There is some risk of fuel spillages from the plant machinery and vehicles that could be transferred to the adjacent waters.

Operational phase:

No other operational phase emissions are expected.

Emissions to water and any associated water quality effects are the primary potential impact.

Emissions to Land

Construction phase: Woody debris from cuttings of trees along the river.

Operational phase: No operational phase emissions are expected.

Emissions to Air No significant emissions to air are expected.

Excavation requirements

The requirement for excavations relates to quarry operations at the site used to source stone.

Minor excavations will be carried out in order to install posts in cases where riparian fencing is being installed. These will be set back from the watercourse.

Transportation requirements _

The volume of traffic generated by the transportation requirements will be minimal and will be within the carrying capacity of the existing road network. No significant increase in the background level of traffic normal for the setting is expected.



4.5 ASSESSMENT OF SIGNIFICANCE OF POTENTIAL IMPACTS

This section considers the list of sites identified in **Section 4.3** above together with the potential ecological impacts identified in the previous section and determines whether the project is likely to have significant effects on a Natura 2000 site.

When assessing impact, Natura 2000 sites are only considered relevant where a credible or tangible source-pathway-receptor link exists between the proposed project and a protected species or habitat type. In order for an impact to occur there must be a risk initiated by having a 'source' (e.g. instream works during the proposed rehabilitation works), a 'receptor' (e.g. a protected habitat/species and/or the habitats on which they depend), and an impact pathway between the source and the receptor (e.g. a waterbody which connects the proposal site to the protected species or habitats).

An evaluation based on these factors to determine which Natura 2000 sites are the plausible ecological receptors for potential impacts of the proposed programme of rehabilitation works will be conducted in **Sections** Error! Reference source not found. to **4.5.3** below. The evaluation takes cognisance of the scope, scale, nature and size of the project, its location relative to the Natura 2000 sites listed in **Table 4** above, and the degree of connectedness that exists between the project and each Natura 2000 site's potential ecological receptors.

4.5.1 Natura 2000 sites outside the zone of potential impact influence

With regards to the proposal, it is considered that the project does not include any element that has the potential to significantly alter the conservation objectives for which sites listed in **Table 6 below**, are designated. It is considered that these Natura 2000 sites are outside the zone of potential impact influence of the proposal due to the absence of plausible impact pathways and/or the attenuating effect of the distance intervening. For example, the source - pathway - receptor mechanisms that could potentially result in adverse effects on European sites are considered confined to those the Moy and Killala Bay catchment as all proposed works locations are within the Moy and Killala Bay catchment. Likewise, SACs whose conservation interests are turloughs or other groundwater dependent habitats are excluded due to their geographical separation from the project and their location in subbasins (water catchments) away from proposed works sites. Therefore, it is objectively concluded that significant impacts on these Natura 2000 sites are not reasonably foreseeable as a result of the programme of works described at **Section 4.2.1** and **Section 4.2.5**. The Natura 2000 sites listed in **Table 6**, along with proximity to the proposed works, and the rationale for exclusion, will not be considered further in this report.

Site Code	Site Name	Distance from nearest replenishment site	Rationale for exclusion from assessment
000463	Balla Turlough SAC	Site 36 is ca. 4858m west of Balla Turlough SAC.	The proposed works are taking place outside the boundary of the SAC. As this site is designated for Turloughs [3180] there is no source-pathway connectivity between it and the proposed works.
00281	Ballinafad SAC	Site 2 is ca. 613m west of the	Ballinafad SAC is designated for lesser horseshoe bat. The proposed works are taking place outside the boundary

 Table 6 Natura 2000 sites identified as being outside the zone of potential impact influence



		SAC	the proposed works and the SAC. As there is no connectivity between the works and the SAC there can be no likely significant effect.
004228	Lough Conn and Lough Cullin SPA	Site 9 is ca. 272m north of the Lough Conn and Lough Cullin SPA	The proposed works are taking place in stream. There is no hydrological connectivity between the proposed works and the SPA. The works are outside the boundary of the SPA. Due to the scale of the works compared to the relative foraging area for ex-situ populations of special conservation interests it is not considered there will be a likely significant effect.
002177	Lough Dahybaun SAC	Site 39 is ca. 12180m west of Lough Dahybaun SAC	The proposed works are outside the boundary of the SAC. There is no source pathway between the proposed works and the SAC and therefore there can be no likely significant effect.
000633	Lough Hoe Bog SAC	Site 38 is 3.9km east of the Lough Hoe Bog SAC	The proposed works are taking place outside the boundary of the SA. There is no hydrological connectivity between the proposed works and the SAC. As there is no source pathway connectivity there can be no likely significant effect.
000634	Lough Nabrickkeagh Bog SAC	Site 37 is ca. 2048m west of Lough Nabrickkeagh Bog SAC	The proposed works are taking place outside the boundary of the SAC. The qualifying interest for the SAC is Blanket Bogs [7130]. As there is no land take withing the SAC, there is no connectivity. As there is no source pathway connectivity there can be no likely significant effect.
000527	Moore Hall (Lough Carra) SAC	Site 2 is ca. 8091m north of the Moore Hall (Lough Carra) SAC	The proposed works are taking place in stream. There is no source pathway connectivity between the proposed works and the SAC. Some areas will require some vegetation clearance to gain machine entry, however, these will be a maximum of 3m wide. The Vincent Wildlife Trust suggest a gap of no more than 5m to enable bats to navigate (The Vincent Wildlife Trust, 2012). In areas where riparian fencing is being installed this is due to poaching and as such there is no existing bank side hedgerows at these locations. The conservation objective for lesser horseshoe bat is that "there is no significant decline in potential foraging habitat within 2.5km or qualifying roosts" (NPWS, 2018a). There will be no effect on linear features within the foraging habitat and as such it is not considered that a likely significant effect will arise from the proposed works.
002144	Newport River SAC	Site 4 is ca. 6049m west of the Newport River SAC	The proposed works are taking place outside the boundary of the SAC. There is no hydrological connectivity between the proposed works and the SAC. As there is no source pathway connectivity there can be no likely significant effect.
002006	Ox Mountains Bogs SAC	Site 38 is ca. 633m south of the Ox Bogs SAC	The proposed works are taking place outside the boundary of the SAC. There is no hydrological connectivity between the proposed works and the SAC. There is no connectivity between the proposed works and the SAC. As there is no source pathway connectivity there can be no likely

			significant effect.
000636	Templehouse and Cloonacleigha Loughs SAC	Site 38 is ca. 13351m west of Templehouse and Cloonacleigha Loughs SAC	The proposed works are taking place outside the boundary of the SAC. There is no hydrological connectivity between the proposed works and the SAC. There is no connectivity between the proposed works and the SAC. As there is no source pathway connectivity there can be no likely significant effect.
002179	Towerhill House SAC	Site 2 is ca. 6012m north of the Twoerhill House SAC	The proposed works are taking place outside the boundary of the SAC. They consist of in stream works. There is no source pathway connectivity between the proposed works and the SAC. Some areas will require some vegetation clearance to gain machine entry, however, these will be a maximum of 3m wide. In areas where riparian fencing is being installed this is due to poaching and as such there is no existing bank side hedgerows at these locations. The conservation objective for lesser horseshoe bat is that "there is no significant decline in potential foraging habitat within 2.5km or qualifying roosts" (NPWS, 2018a). There will be no effect on linear features within the foraging habitat and as such it is not considered that a likely significant effect will arise from the proposed works.
000637	Turloughmore (Sligo) SAC	Site 37 is ca. 9397m west of Turloughmore (Sligo) SAC	The proposed works are taking place outside the boundary of the SAC. As this site is designated for Turloughs [3180] there is no source-pathway connectivity between it and the proposed works.
001898	Unshin River SAC	Site 38 is ca. 13332m west of the Ushin River SAC	The nearest site of the proposed works is more over 13km west of the SAC. There is no hydrological connectivity between the proposed site and the SAC. As there is no source pathway connectivity there can be no likely significant effect.
001571	Urlaur Lakes SAC	Site 8 is ca. 11489m west of the Urlaur Lakes SAC	The proposed works are taking place outside the boundary of the SAC. There is no hydrological connectivity between the SAC and the proposed works. As there is no source pathway connectivity there can be no likely significant effect.

4.5.2 Natura 2000 sites within the zone of potential impact influence

Of the Natura 2000 sites listed in **Table 3** above, two are considered to have the potential to be impacted as a result of the proposal. The proposed project potentially poses impacts as follows: habitat alteration; species disturbance/displacement; and water quality impacts. There is physical overlap between the subject sites and the River Moy SAC. Therefore, the assessment of significance of potential impacts that follows focuses on the following Natura 2000 sites:

• River Moy SAC (002298)

The likelihood of significant effects to a Natura 2000 site from the project was determined based on a number of indicators including:

- Habitat loss
- Habitat alteration
- Habitat or species fragmentation
- Disturbance and/or displacement of species
- Water quality and resource

The likelihood of significant cumulative/in-combination effects is assessed in Section 4.5.7.

4.5.3 Water Quality

Water quality may temporarily be affected by the mobilisation of silt during the proposed works. There is also a threat to water quality from an accidental spill of oil and/or fuel from machinery during the construction phase of the proposed works.

Walsh *et al.* (2012) refers to siltation as the deposition of fine particles on the surface or within the stream bed. Siltation as a result of instream disturbance can seriously impact salmon. Re-suspension of deposited silt will occur during the works when working in the river, with a possible increase in suspended solids concentration in the water column downstream. Sediment transport can lead to siltation of the riverbed in downstream areas. Fine sediment can adversely affect salmonid fishes which depend on a plentiful supply of oxygen to their habitat (Walsh *et al*, 2012). As noted in Hendry & Cragg-Hine (2003), fine silt can smother eggs, choke fish and disrupt feeding behaviour. Where the fines content of gravels has been increased by excessive inputs of silts and fine sand, suitability for spawning is likely to be reduced. The fines smother salmonid eggs by preventing intra-gravel currents, and by clogging the interstices at the surface of the riverbed. This prevents or disrupts alevin emergence (and reduces the fitness of the fry and parr, and hence their ability to cope with the natural pressures faced within the riverine environment. Lampreys have similar spawning habitat requirements to salmon, albeit slight finer substrate sizes, so the effects of siltation as described above for the early life stages salmon also apply to lampreys.

By virtue of the spawning requirements of salmonids, which prefer current velocities within the range 25–90 cm/s (Hendry & Cragg-Hine 1997), the targeted placement of gravels will not be in areas where appreciable amounts of silt occur. Gravels will be typically placed at transitional areas between pools¹⁶ and riffles¹⁷, where flow is accelerating and depth decreasing. The gravels proposed are washed and clean and will not introduce fine sediment to the subject watercourses. Siltation of rivers occurs at a much larger scale and greater magnitude during OPW maintenance works in the study area and this activity is not listed as a pressure in the Standard Natura Form for the River Moy SAC (002298). Based on this premise, the proposed works, which are of a lesser scale will not have adverse effects on sensitive aquatic receptors with respect to siltation.

Dilution is another factor that will serve to reduce water quality impacts. Most watercourses in the study area have complex groundwater-surface water interactions and are partially fed by groundwater, so they have good base flows. The dilution provided by the subject streams is deemed

¹⁶ Little/no observable flow

¹⁷ Described in EA (2003) as shallow, fast-flowing, water with a distinctly disturbed surface over unconsolidated gravel-pebble, or cobble, substrate

adequate to assimilate any water quality impacts in the water column and the duration of the works (short-term) avoids continuing water quality impacts.

While the proposed works may cause a temporary increase in siltation, some areas where gravel and boulders are being placed will then be fenced to prevent livestock from entering the waterway. This will prevent poaching of the river bank and thus have a positive effect on sediment levels.

Therefore, due to the location, scale and nature of the proposed works, and the available dilution factor that occurs, it is considered significant water quality impacts will not occur within the waterbodies directly affected or Natura 2000 site downstream.

4.5.4 Habitat Loss and Alteration

There is no permanent land take associated with the proposed project. However, in order to gain access into the proposed gravel replenishment sites, there may be a need in places to remove small amounts of vegetation. As many proposed works locations are within the boundary of the River Moy SAC, there may be potential for likely significant negative effects in terms of habitat loss and/or alteration.

With regard to alteration, the proposed works are being carried out to alter the instream habitat in order to improve the fisheries habitat. The placement of the boulders and gravels will create an alteration to the flow. The boulders enhance physical heterogeneity in areas where the gravel is being introduced and will also create cover for fish.

The placement of gravels in watercourses are aimed at enhancing salmonid spawning. If gravels of greater size than existing are introduced to an area used by spawning brook lampreys, then it is possible that the ecological value such areas could be reduced for this species, especially if the gravel is being introduced to target salmon (salmon spawn in substrates of greater size than brook lampreys).

Some watercourses where gravels are to be introduced support white-clawed crayfish, so there could be direct impacts on the habitats of this species, and possible mortalities if individual crayfish were covered.

Canadian pondweed was noted at one site, site 4. As with any works, invasive species must be considered in terms of potential impact on a European site. While canadian pondweed is not a "listed" species it was highly invasive when first introduced and became widespread. It is problematic in that it outcompetes other plants by shading. Due to its growth pattern in dense stands it creates anoxic conditions and traps sediments. This in turn reduces or removes completely the growth of primary producers such as alphytic algae and cyanobacteria. (Millane & Caffrey, 2014) No other invasive species were noted during the site surveys.

The gravels which will be introduced to the site will be from a nearby quarry. It will be necessary for these to be free of any potentially invasive species. Machinery can also potentially act as a vector for invasive species. As such it is a requirement within the method statements that all machinery be washed down before entering any site associated with the gravel replenishment.



Plate 12 Dense stand of canadian pondweed observed at site 4 (left) and canadian pondweed in the sampling net (right).

4.5.5 Disturbance and/or Displacement of Species

The proposed works are being carried out at forty two locations over five years. The works are small in scale and each individual site will be short term in duration. During the proposed works there will be minor vegetation clearance to allow machinery entry to the river bank. In some cases it may be necessary to introduce machinery to the waterway to deposit the loads of gravel. This may cause the displacement of aquatic species through disturbance. The works may potentially cause disturbance to aquatic qualifying interests due to the presence and/or noise of machinery and workers.

The placement of gravel instream on top of existing river substrates has the potential to directly disturb and displace aquatic species within the River Moy SAC. There could also be indirect disturbance and displacement through alteration of flows and related localised changes to substrate compositions, taking account of the key influence of habitat on aquatic species.

It is reasonable to conclude that there is potential for likely significant negative effects on the qualifying interests of the River Moy Estuary SAC due to direct disturbance caused by the placement of the gravels. While more agile species such as adult salmon and otter will move out of harms way in an attempt to remain hidden, smaller creatures such as the white clawed crayfish and lamprey ammocoetes may not be able to move far enough quick enough to avoid the works.

4.5.6 Habitat or Species Fragmentation

Habitat fragmentation has been defined as 'reduction and isolation of patches of natural environment' (Hall, *et al.*, 1997) cited in (Franklin, *et al.*, 2002) which results in spatial separation of habitat areas which had previously been in a state of greater continuity. Adverse effects of habitat fragmentation on species include the increased isolation of populations which can detrimentally impact on the resilience or robustness of the populations.

As the works are to place boulders and gravel in stream there will be no habitat fragmentation in the riparian zone. Similarly, the introduction of fencing to the riverbanks will not cause species fragmentation. Fencing will only placed where areas of the river bank are poached. This is to prevent

large livestock from entering the waterways and it is not envisaged the fencing would have this same effect for smaller mammal species such as otter due to the type of fencing being used.

4.5.7 Cumulative/In-combination Impacts

A cumulative impact arises from incremental changes caused by other past, present or reasonably foreseeable actions together with the proposed rehabilitation works. With regard to the industries operating identified in **Section 4.2.6**, above, it is considered that their individual compliances with licence requirements, such as environmental quality standards, will preclude the possibility of significant adverse cumulative impacts ensuing from them.

The proposal was considered in combination with other plans and projects in the area that could result in cumulative impacts on Natura 2000 sites. Other plans considered include the Mayo County Development Plan and Sligo County Development Plan as above. Other activities include ongoing discharges to the aquatic environment. No significant cumulative impacts are predicted with these plans or activities, as each plan has a range of environmental and natural heritage policy safeguards in place.

Two drainage schemes were completed on the Deel and Moy Rivers by the OPW during 1962 to 1968 and 1960 to 1971 respectively (EPA, 2018). The OPW is statutorily obligated to maintain arterial drainage channels under the 1945 Arterial Drainage Act, and since their completion, maintenance of this Arterial Drainage Scheme has been ongoing, with the majority of channels maintained every five years. However, larger channels tend to be only maintained every ten years, on average. It is required to retain the arterial drainage scheme design capacity. Arterial drainage maintenance includes a range of operations such as silt and vegetation management, aquatic vegetation cutting, bank protection, bush cutting/branch trimming, tree cutting, mulching gate installation, sluice and bridge maintenance and spraying with herbicide.

Based on GIS data for OPW channels publicised in Jan 2016, the proposed project sites are on watercourses subjected to maintenance. This maintenance could be carried out during the salmonid spawning season and if so, the beds of watercourses would be interfered with. Implementation of the archaic legislation which drives OPW maintenance can sometimes result in habitat loss, animal fatalities, water quality deterioration and degraded habitat quality.

JBA was commissioned by the Office of Public Works (OPW) to provide environmental consultancy services in relation to statutory arterial drainage maintenance activities taking place over the period 2016 - 2020 in the Moy catchment (JBA Consulting, 2016). The Appropriate Assessment investigated the potential direct and indirect impacts of the proposed works on the integrity and interest features of the above European sites, alone and in combination with other plans and projects, taking into account the site's structure, function and conservation objectives. The three pathways of potential impact were again used as a framework of assessment. Where potentially significant adverse impacts were identified, a range of mitigation and avoidance measures have been stipulated to help offset them. The Appropriate Assessment concluded that, with avoidance and mitigation measures, the proposed drainage maintenance operations for the period 2016 - 2020 in the Moy Arterial Drainage Scheme would not have a significant adverse impact a list of European sites. The list of designated sites in **Section 4.3** are included in the list of sites in the JBA Consulting 2016 study.

Climate is an important environmental influence on ecosystems. Changing climate affects ecosystems in a variety of ways. For instance, warming may force species to migrate to higher latitudes or higher elevations where temperatures are more conducive to their survival. Similarly, as sea level rises, saltwater intrusion into a freshwater system may force some key species to relocate or die, thus removing predators or prey that are critical in the existing food chain. Climate change not only affects ecosystems and species directly, it also interacts with other human stressors such as development. Although some stressors cause only minor impacts when acting alone, their cumulative impact may lead to dramatic ecological changes (Settele et al, 2014). Because species differ in their ability to adjust, asynchronies¹⁸ can develop, increasing species and ecosystem vulnerability. These asynchronies can include mismatches in the timing of migration, breeding, pest avoidance, and food availability. Growth and survival are reduced when migrants arrive at a location before or after food sources are present (Horton et al. 2014). Ecosystems can serve as natural buffers from extreme events such as wildfires, flooding, and drought. Climate change and human modification may restrict ecosystems' ability to temper the impacts of extreme conditions, and thus may increase vulnerability to damage. An example is riparian areas that act as buffer zones protecting riverine ecosystems from runoff of silt/nutrient laden waters via overland/pluvial flow, by absorbing/attenuating surface floodwaters. OPW drainage of the watercourses within the catchment may become vulnerable to erosion if climate change leads to increases in heavy rain storms. This could lead to uncontrolled erosion of riverbanks, and riparian areas and loss of soil from fields, resulting in unnatural sediment loads and associated siltation of rivers. Climate change and shifts in ecological conditions could also support the spread of pathogens, parasites, diseases and non-native biota, with potentially serious effects on agriculture and aquatic ecosystems.

Bearing in mind the assimilative capability of the Moy catchment, the scale and temporary, localised nature of the proposal, it is concluded that there is no potential for significant cumulative/in-combination water quality impacts through interaction between the proposal and other projects/activities as a result of the programme of works described in **Section 4.2** above, and as such no significant cumulative/in-combination impacts to Natura 2000 sites listed in **Table 5** above are envisaged.

4.6 CONCLUSION OF SCREENING STAGE

The screening for appropriate assessment is undertaken to determine the potential for likely significant effects of a project, individually, or in combination with other plans or projects, in view of the conservation objectives of the site on a Natura 2000 Site. The proposed project is within 15km of twenty two Natura 2000 sites. It has been objectively concluded that the following twenty sites are not likely to be significantly affected by the proposal and can therefore be screened out for appropriate assessment:

- Bellacorick Bog Complex SAC001922
- Bellacorick Iron Flush SAC 000466
- Doocastle Turlough SAC 000492
- Killala Bay/Moy Estuary SAC 000458

¹⁸ absence or lack of concurrence in time

- Lackan Saltmarsh and Kilcummin Head SAC 000516
- Lough Carra SPA 004051
- Lough Carra/Mask Complex SAC 001774
- Lough Conn and Lough Cullin SPA 004228
- Lough Dahybaun SAC 002177
- Lough Hoe Bog SAC 000633
- Lough Nabrickkeagh Bog SAC 000634
- Moore Hall (Lough Carra) SAC 000527
- Newport River SAC 002144
- Ox Mountains Bogs SAC 002006
- Templehouse and Cloonacleigha Loughs SAC 000636
- Towerhill House SAC 002179
- Turloughmore (Sligo) SAC 000637
- Unshin River SAC 001898
- Urlaur Lakes SAC 001571

It cannot be objectively concluded, at this stage, that the proposed Moy Gravel Replenishment works will not result in likely significant effects on the following designated Natura 2000 sites:

• River Moy SAC 002298

On the basis of the precautionary principle, further assessment is required to determine potential effects of the proposed project on these sites.

Therefore, it has been concluded that, in respect of these European sites, the project should proceed to Stage 2 of the Appropriate Assessment process and as such a Natura Impact Statement is required. It is concluded that all other European sites have been correctly screened out or excluded from further consideration on the basis of objective information that the project, individually or incombination with other plans or projects, will have no, or no appreciable, effects on those sites.



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Appendix 1 Stages of Appropriate Assessment

Malachy Walsh and Partners

Stage 1 - Screening

This is the first stage of the Appropriate Assessment process and that undertaken to determine the likelihood of significant impacts as a result of a proposed project or plan. It determines need for a full Appropriate Assessment.

If it can be concluded that no significant impacts to Natura 2000 sites are likely then the assessment can stop here. If not, it must proceed to Stage 2 for further more detailed assessment.

Stage 2 - Natura Impact Statement (NIS)

The second stage of the Appropriate Assessment process assesses the impact of the proposal (either alone or in combination with other projects or plans) on the integrity of the Natura 2000 site with respect to the conservation objectives of the site and its ecological structure and function. This is a much more detailed assessment that Stage 1. A Natura Impact Statement containing a professional scientific examination of the proposal is required and includes any mitigation measure to avoid, reduce or offset negative impacts.

If the outcome of Stage 2 is negative i.e. adverse impacts to the sites cannot be scientifically ruled out, despite mitigation, the plan or project should proceed to Stage 3 or be abandoned.

Stage 3 - Assessment of alternative solutions

A detailed assessment must be undertaken to determine whether alternative ways of achieving the objective of the project/plan exists.

Where no alternatives exist the project/plan must proceed to Stage 4.

Stage 4 - Assessment where no alternative solutions exist and where adverse impacts remain

The final stage is the main derogation process examining whether there are imperative reasons of overriding public interest (IROPI) for allowing a plan or project to adversely affect a Natura 2000 site where no less damaging solution exists.



Appendix 2

Method statements for individual proposed replenishment sites

Moy catchment – Gravel Introduction

Sites number 1, 2 & 3 – Manulla River

Contractor:	Project Owner:	Address:			Tel: 096 22788
OPW / IFI	Inland Fisheries Ireland WRBD	Ardnaree House, A Ballina, County M	Abbey Street, ayo	-	E-mail: Barry.Kelly@fisheriesireland.ie
Project Name	Gravel Introduction – Mo				
Description of Task/Activity	Improve spawning habita	at for salmonids ir	the Manull	a Ri	ver
Site Address/Location:	Lecarrow & Gweeshdan, Site 1: 53.784667 -9.194 Site 2: 53.784336 -9.193	Co Mayo. 46284 35872	Start Date/Time:	Sep 202 Sop	ot 2021 or June to Sept
	Site 3: 53.786683 -9.196	59922	Date/Time	3ep 202	2
	Name			Role/Trade	
	Barry Kelly		Project Man	age	er
Porconnol Involved	Osgur Grieve		IFI supervisor		
reisonnei mvoiveu	Philip Thornton		IFI supervis	or	
Site Supervisor:	Barry Kelly		Tel:	087	1228350
Safety Officer	Barry Kelly		Tel:	087	1228350
Key Plant & Tools	 Dump Truck Track machine Teleporter (option) Tractor with front I 	al) loader (optional)			
	All plant will be serviced a Any equipment found to l immediately and returned Under no circumstances	and maintained a be defective is to d for inspection a is defective equip	ccording to be taken ou nd repair oment to be	man t of useo	d
Key Materials	Spawning Gravel / rando	m boulders / fenc	cing materia	ls	
Other Essential Equipment:	(i.e. access platforms/winches/ladde Chainsaw / Pole saw / wheelbarrow	rrs, etc			

Specific Identified Residual Hazards: (or refer to the task specific risk assessment(s)) (See attachment) Specific Staff Training	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock Safe pass Licensed Operators for track machines Swift water rescue Manual handling
Sequence of Operations: (include sketches if required)	 Inspect area to ensure public safety and carry out biosecurity protocol Consult with landowners and secure landowner permission Brief operators and staff on safety and duties Offload materials (Gravel and/or random boulders) at the location close to river/channel Check work location is free of livestock Cut and remove any obstructing tree limbs if required Remove livestock fencing where required Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side Introduce gravel /random boulders and distribute where necessary. Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners Remove any excess materials and tools from site
Temporary Supports and Props needed to facilitate the works:	(if none, state none) None
Method of Access and Egress to the work area:	Access to Sites 1 & 2 is from the south side of the local (L) road between Gweeshdan Cemetery and the entrance to Ballinafad House, as outlined in the map. The right hand bank is the working bank. Access to Site 3 is directly across from Gweeshdan Cemetery. The left hand bank is the working bank.
Fall Protection Measures:	(i.e. Guard Rails/Toe Boards/Brick Guard/Safety Harnesses/Exclusion Zones, etc.) Traffic management in operation during the unloading of gravel and for the entering and exiting of the work site. Access and egress to work site to be kept clear Limit access to the site High visibility jackets and hard hats to be worn on site Maintain good housekeeping and safety practice on site

Map of Sites 1,2 & 3 on the Manulla River showing access and egress points

4



Prepared By:	Barry Kelly		Date:	19/7/21	Signature:
Reviewed By:	Barry Kelly		Date:	19/7/21	Signature:
Approved By (A	Approved By (Agent or above):				
			Date:		Signature:
Reviewed by Director:			Date:		Signature:

Moy catchment – Gravel Introduction

River/stream name: Site 4 Addergoole

Contractor:	Project Owner:	Address:		Tel: 096 22788
OPW / IFI	Inland Fisheries Ireland WRBD Ardnaree House, Ballina, County M		Abbey Street, ayo	E-mail: Barry.Kelly@fisheriesireland.ie
Project Name	Gravel Introduction – Moy	Catchment		
Description of Task/Activity	Improve spawning habita	at for salmonids ir	n the Adderg	oole river, Co. Mayo
Site Address/Location:	Site Pollawarla, Co. Mayo Address/Location: Site 4: 53.998297 -9.309481		Start Date/Time:	Sept 2021 or June to Sept 2022
			Finish Date/Time	Sept 2021 or June to Sept 2022
	Name			Role/Trade
	Barry Kelly		Project Mana	ager
Dersennellnyelyed	Osgur Grieve		IFI supervisor	
Personner involved	Philip Thornton		IFI supervisor	

Site Supervisor:	Barry Kelly	Tel:	087 1228350
Safety Officer	Barry Kelly	Tel:	087 1228350

	Method Statement 3
Key Plant & Tools	 Dump Truck Track machine Teleporter (optional) Tractor with front loader (optional) All plant will be serviced and maintained according to manufacturer's requirements Any equipment found to be defective is to be taken out of circulation immediately and returned for inspection and repair Under no circumstances is defective equipment to be used
Key Materials	Spawning Gravel Random Boulders Fencing materials
Other Essential Equipment:	(i.e. access platforms/winches/ladders, etc Chainsaw / Pole saw / wheelbarrow

Specific Identified Residual Hazards: (or refer to the task specific risk assessment(s)) (See attachment)	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock
Specific Staff Training	Safe pass Licensed Operators for track machines Swift water rescue Manual handling
Sequence of Operations: (include sketches if required)	 Inspect area to ensure public safety and carry out biosecurity protocol Consult with landowners and secure landowner permission Brief operators and staff on safety and duties Offload materials (Gravel and/or random boulders) at the location close to river/channel Check work location is free of livestock Cut and remove any obstructing tree limbs if required Remove livestock fencing where required Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side Introduce gravel /random boulders and distribute where necessary. Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners Remove any excess materials and tools from site Complete project

	(if none, state none)
Temporary Supports and Props needed to	None
facilitate the works:	
Method of Access and Egress to the work area:	Access and egress to the sites is along a track that travels west from the location 54°00'09.6"N 9°18'16.0"W.
	(i.e. Guard Rails/Toe Boards/Brick Guard/Safety Harnesses/Exclusion Zones, etc.)
Fall	L Traffic management in operation during the unloading of gravel and for the entering
Measures:	and exiting of the work site.
	Access and egress to work site to be kept clear
	Limit access to the site
	High visibility jackets and hard hats to be worn on site
	Maintain good housekeeping and safety practice on site





Prepared By:	Osgur Grieve	ſ	Date:	19/7/21	Signature:		
Reviewed By:	Barry Kelly	[Date:	19/7/21	Signature:		
Approved By (Agent or above):							
		[Date:		Signature:		
Reviewed by Di	rector:	0 .	Date:		Signature:		

Moy catchment – Gravel Introduction

River/stream name: Fiddaunglas stream Site 5

Method Statement 2								
Contractor:	Project Owner:	Address:		Tel: 096 22788				
OPW / IFI	Inland Fisheries Ireland WRBD	Ardnaree House, Ardnaree House, Ardnaree House, Ardnaree House, Ardnaree House, Ardnare House, Ardnare, Ardnare	Abbey Street ayo	, E-mail: Barry.Kelly@fisheriesireland.ie	<u> </u>			
Project Name	Gravel Introduction – Moy Catchment							
Description of Task/Activity	Improve spawning habitat for salmonids in the Fiddaunglas stream							
Site Address/Location:	Castlehill, Moate, Co Ma	yo. Site 5	Start Date/Time:	tart Sept 2021 or June to Sept 2022				
	54°03'24.9"N 9°19'29.3"	W	Finish Date/Time	Sept 2021 or June to Sept 2022				
	Name			Role/Trade				
	Barry Kelly		Project Manager					
	Osgur Grieve		IFI superviso	or				
Personnel Involved	Philip Thornton		IFI superviso)r				
Site Supervisor:	Barry Kelly		Tel:	087 1228350				
Safety Officer	Barry Kelly		Tel:	087 1228350				
Key Plant & Tools	 Dump Truck Track machine Teleporter (optional) Tractor with front loader (optional) All plant will be serviced and maintained according to manufacturer's requirements Any equipment found to be defective is to be taken out of circulation immediately and returned for inspection and repair Under no circumstances is defective equipment to be used 							
Key Materials	Spawning Gravel Random boulders Fencing materials							
Other Essential Equipment:	(i.e. access platforms/winches/ladde Chainsaw / Pole saw / wheelbarrow	rs, etc						

Specific Identified Residual Hazards: (or refer to the task specific risk assessment(s)) (See attachment)	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock
Specific Staff Training	Safe pass Licensed Operators for track machines Swift water rescue Manual handling
Sequence of Operations: (include sketches if required)	Inspect area to ensure public safety and carry out biosecurity protocol •Consult with landowners and secure landowner permission •Brief operators and staff on safety and duties •Offload materials (Gravel and/or random boulders) at the location close to river/channel •Check work location is free of livestock •Cut and remove any obstructing tree limbs if required •Remove livestock fencing where required •Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side •Introduce gravel /random boulders and distribute where necessary. •Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners •Remove any excess materials and tools from site

is SE
rina
illiy



= gravel introduction site location

Prepared By:	Osgur Grieve	D	Date:	19/7/21	Signature:
Reviewed By:	Barry kelly	D	Date:	19/7/21	Signature:
Approved By (A	Igent or above):				
		D	Date:		Signature:
Reviewed by Di	rector:	0 0	Date:		Signature:

Moy catchment – Gravel Introduction

River/stream name: Enniscoe stream Site 6

Method Statement 2								
Contractor:	Project Owner:	Address:			Tel: 096 22788			
OPW / IFI	Inland Fisheries Ireland WRBD	Abbey Street ayo	,	E-mail: Barry.Kelly@fisheriesireland.ie				
Project Name	Gravel Introduction – Moy	Catchment						
Description of Task/Activity	Improve spawning habitat for salmonids in the Enniscoe stream							
Site Address/Location:	Site 6: 54°04'31.2"N 9°1	8'41.4"W	Start Date/Time:	Sep 202	ot 2021 or June to Sept			
	Enniscoe house, Ennisco	be, Co. Mayo	Finish Date/Time	Sep 202	ot 2021 or June to Sept			
	Name				Role/Trade			
	Barry Kelly		Project Manager					
	Osgur Grieve		IFI supervisor					
Personnel Involved	Philip Thornton		IFI superviso	or				
Site Supervisor:	Barry Kelly		Tel:	087	1228350			
Safety Officer	Barry Kelly		Tel:	087	7 1228350			
Key Plant & Tools	 Dump Truck Track machine Teleporter (optional) Tractor with front loader (optional) 							
	All plant will be serviced and maintained according to manufacturer's requirements Any equipment found to be defective is to be taken out of circulation immediately and returned for inspection and repair Under no circumstances is defective equipment to be used							
Key Materials	Spawning Gravel / random boulders / fencing materials							
Other Essential Equipment:	(i.e. access platforms/winches/ladde Chainsaw / Pole saw / wheelbarrow	rs, etc						
Specific Identified Residual Hazards: (or refer to the task specific risk Specific Staff Training	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock Safe pass Licensed Operators for track machines Swift water rescue							
--	--							
Sequence of Operations: (include sketches if required)	 Manual handling Inspect area to ensure public safety and carry out biosecurity protocol Consult with landowners and secure landowner permission Brief operators and staff on safety and duties Offload materials (Gravel and/or random boulders) at the location close to river/channel Check work location is free of livestock Cut and remove any obstructing tree limbs if required Remove livestock fencing where required Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side Introduce gravel /random boulders and distribute where necessary. Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners Remove any excess materials and tools from site 							
Temporary Supports and Props needed to facilitate the works:	(if none, state none) None							

4

Method of Access and Egress to the work area:	Access to these sites is though a gate situated at a layby along the R315 between Crossmolina and Castlehill at co-ordinates 54°04'31.1"N 9°18'44.1"W
	(i.e. Guard Rails/Toe Boards/Brick Guard/Safety Harnesses/Exclusion Zones, etc.)
Protection	Traffic management in operation during the unloading of gravel and for the entering and exiting of
Measures:	the work site.
	Access and egress to work site to be kept clear
	Limit access to the site
	High visibility jackets and hard hats to be worn on site
	Maintain good housekeeping and safety practice on site

Enniscoe stream





Prepared By:	Osgur Grieve		Date:	19/7/21	Signature:
Reviewed By:	Barry Kelly		Date:	20/7/21	Signature:
Approved By (A	Igent or above):				
			Date:		Signature:
Reviewed by Di	rector:	0	Date:		Signature:

Moy catchment – Gravel Introduction

River/stream name: Bothaul River site 12 & Site 7

Method Statement 2						
Contractor:	Project Owner:	Address:			Tel: 096 22788	
OPW / IFI	Inland Fisheries Ireland WRBD	Ardnaree House, A Ballina, County Ma	Abbey Street, ayo	,	E-mail: Barry.Kelly@fisheriesireland.ie	
Project Name	Gravel Introduction – Moy	Catchment	-			
Description of Task/Activity	Improve spawning habita	at for salmonids ir	the Bothau	ıl Ri	ver	
Site Address/Location:	Oldcastle Co. Mayo.		Start Date/Time:	Sep 202	ot 2021 or June to Sept 22 to 2025	
	Site 12: 53°56'11.7"N 9°	°01'28.7"W (U/S)	Finish	Sep	ot 2021 or June to Sept	
	Site 7: 53.93.6683 -9.0	024048 (D/S)	Date/Time	202	2 to 2025	
	Name				Role/Trade	
	Barry Kelly		Project Mana	ager		
	Osgur Grieve		IFI supervisc	r		
Personnel Involved	Philip Thornton		IFI supervisc	or		
Site Supervisor:	Barry Kelly		Tel:	087	1228350	
Safety Officer	Barry Kelly		Tel:	087	1228350	
Key Plant & Tools	 Dump Truck Track machine Teleporter (optionation) Tractor with front I All plant will be serviced at Any equipment found to I immediately and returned Under no circumstances	al) loader (optional) and maintained a be defective is to d for inspection a is defective equip	ccording to be taken ou nd repair oment to be	mar it of use	nufacturer's requirements circulation	
Key Materials	Spawning Gravel / rando	m boulders / fenc	cing materia	ls		

3

Other	
Essential	
Equipment:	

(i.e. access platforms/winches/ladders, etc Chainsaw / Pole saw / wheelbarrow

Specific Identified Residual Hazards: (or refer to the task specific risk assessment(s)) (See attachment)	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock
Specific Staff Training	Safe pass Licensed Operators for track machines Swift water rescue Manual handling
Sequence of Operations: (include sketches if required)	 Inspect area to ensure public safety and carry out biosecurity protocol Consult with landowners and secure landowner permission Brief operators and staff on safety and duties Offload materials (Gravel and/or random boulders) at the location close to river/channel Check work location is free of livestock Cut and remove any obstructing tree limbs if required Remove livestock fencing where required Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side Introduce gravel /random boulders and distribute where necessary. Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners Remove any excess materials and tools from site

	(if none. state none)
Temporary Supports and Props needed to	None
facilitate the works:	
Method of Access and Egress to the work area:	Access and egress to this site is through a gate along a local road north of st. Culleens national school at co-ordinates 53°56'09.7"N 9°01'26.4"W
	(i.e. Guard Rails/Toe Boards/Brick Guard/Safety Harnesses/Exclusion Zones, etc.)
Fall	Traffic many static encoding during the upleading of even alloyed for the exterior
Protection	I raffic management in operation during the unloading of gravel and for the entering
Measures:	and exiting of the work site.
	Access and egress to work site to be kept clear
	Limit access to the site
	High visibility jackets and hard hats to be worn on site
	Maintain good housekeeping and safety practice on site





Prepared By:	Osgur Grieve	Date	: 19/7/21	Signature:
Reviewed By:	Barry Kelly	Date	: 19/7/21	Signature:
Approved By (A	Agent or above):			
		Date	:	Signature:
Reviewed by Di	rector:	0 Date	:	Signature:

Moy catchment – Gravel Introduction

River/stream name: Rooskey river - Site 8

	Metho	d Stateme	nt	2	
Contractor:	Project Owner:	Address:		Tel: 096 22788	
OPW / IFI	Inland Fisheries Ireland WRBD	Ardnaree House, Ardnaree House, Ardnaree House, Ardnaree House, Ardnaree House, Ardnare House, Ardnare, Ardnar	Abbey Street, ayo	E-mail: Barry.Kelly@fisheriesireland.ie	
Project Name	Gravel Introduction – Moy				
Description of Task/Activity	Improve spawning habita	t for salmonids ir	n the Roosky	River	
Site	Derrynalecka, County Ma	ayo.	Start Sept 2021 or June to Sept		
Address/Location:	Site 8:		Date/Time:	2022 to2025	
	53°49'50.9"N 8°57'34.3"	W	Finish Date/Time	Sept 2021 or June to Sept 2022 to 2025	
	Name			Role/Trade	
	Barry Kelly		Project Mana	ger	
	Osgur Grieve		IFI supervisor		
Personnel Involved	Philip Thornton		IFI supervisor		
				07.4000050	
Site Supervisor:	Barry Kelly		Tel:	087 1228350	
	Barry Kelly			087 1228350	
Safety Officer			lel:		
Key Plant & Tools	Dump Truck				
	 I rack machine Teleporter (option) 	al)			
	 Tractor with front I 	oader (optional)			
	All plant will be serviced a	and maintained a	be taken out	nanufacturer's requirements	
	immediately and returned	d for inspection a	nd repair		
	Under no circumstances	is defective equip	pment to be u	ised	
Key Materials	Spawning Gravel/random	n boulders/fencin	g materials		
	(i.e. access platforms/winches/ladde	rs, etc			
Other Essential	Chainsaw / Pole saw				
Equipment:					

Specific Identified Residual Hazards: (or refer to the task specific risk assessment(s)) (See attachment)	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock
Specific Staff Training	Safe pass Licensed Operators for track machines Swift water rescue Manual handling
Sequence of Operations: (include sketches if required)	 Inspect area to ensure public safety and carry out biosecurity protocol Consult with landowners and secure landowner permission Brief operators and staff on safety and duties Offload materials (Gravel and/or random boulders) at the location close to river/channel Check work location is free of livestock Cut and remove any obstructing tree limbs if required Remove livestock fencing where required Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side Introduce gravel /random boulders and distribute where necessary. Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners Remove any excess materials and tools from site

	(if none, state none)
Temporary	None
Supports and	
Props needed to	
facilitate the	
works:	
	Assess and survey is from a locky on the DOOD stars and instars 50040/50 5%
Method of Access	Access and egress is from a layby on the R323 at co-ordinates 53°49'58.5"N
and Egress to the	8°57'26.6"W
work area:	
	There are a number of locations where gravel introduction is needed downstream of
	the bridge.
	(i.e. Guard Rails/Toe Boards/Brick Guard/Safety Harnesses/Exclusion Zones, etc.)
Fall	
Protection	I raffic management in operation during the unloading of gravel and for the entering
Measures:	and exiting of the work site.
	Access and egress to work site to be kept clear
	l imit access to the site
	High visibility jackets and hard hats to be worn on site
	Maintain good housekeeping and safety practice on site
	Maintain good housekeeping and safety practice on site



Rooskey river map Co. Mayo

= parking at bridge and entrance and egress point from the R323 road between Kiltimagh and Knock.
 = gravel introduction at locations along this area.

Prepared By:	Osgur Grieve	Date	: 21/7/21	Signature:
Reviewed By:	Barry Kelly	Date	: 22/7/21	Signature:
Approved By (A	Agent or above):			
		Date	:	Signature:
Reviewed by Di	rector:	0 Date	:	Signature:

Moy catchment – Gravel Introduction

River/stream name: Knockmore stream

Site 9

Method Statement 2						
Contractor:	Project Owner:	Address:			Tel: 096 22788	
OPW / IFI	Inland Fisheries Ireland WRBD	Ardnaree House, Ballina, County M	Abbey Street ayo	3	E-mail: Barry.Kelly@fisheriesireland.ie	
Project Name	Gravel Introduction – Moy	Catchment				
Description of Task/Activity	Improve spawning habita	at for salmonids ir	n the Knock	mor	e stream	
Site Address/Location:	Gortnadrehy, Co. Mayo Site 9 : 54°01'11.7"N 9°′	10'24.1"W	Start Date/Time:	Sep 202	ot 2021 or June to Sept	
		-	Finish Date/Time	Sep 202	ot 2021 or June to Sept	
	Name			_ <u></u>	Role/Trade	
	Barry Kelly		Project Man	ager		
	Osgur Grieve		IFI superviso	or		
Personnel Involved	Philip Thornton		IFI superviso	or		
	Barry Kelly			087	1228350	
Site Supervisor:			Tel:			
Safety Officer	Barry Kelly		Tel:	087	1228350	
Key Plant & Tools	Dump Truck			•		
	 Track machine Teleporter (option) 	al)				
	Tractor with front I	loader (optional)				
			a a sur llur i su t			
	All plant will be serviced a Any equipment found to l	and maintained a be defective is to	be taken ou	mai ut of	nutacturer's requirements	
	immediately and returned for inspection and repair					
	Under no circumstances is defective equipment to be used					
	Prowning Oroval / register	m houldons /free				
Key Materials	Spawning Gravei / rando	m boulders / tend	cing materia	ais		
Other	(i.e. access platforms/winches/ladde Chainsaw / Pole saw /	ers, etc				
Essential	wheelbarrow					
Equipment.						

Specific Identified Residual Hazards: (or refer to the task specific risk assessment(s)) (See attachment)	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock
Specific Staff Training	Safe pass Licensed Operators for track machines Swift water rescue Manual handling
Sequence of Operations: (include sketches if required)	 Inspect area to ensure public safety and carry out biosecurity protocol Consult with landowners and secure landowner permission Brief operators and staff on safety and duties Offload materials (Gravel and/or random boulders) at the location close to river/channel Check work location is free of livestock Cut and remove any obstructing tree limbs if required Remove livestock fencing where required Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side Introduce gravel /random boulders and distribute where necessary. Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners Remove any excess materials and tools from site

	(if none, state none)
Temporary	None
Supports and Props needed to	
facilitate the	
works:	
Mathed of Assess	Access and agrees is through a private dwelling driveway. The location of gravel
and Foress to the	Access and egress is infough a private dwelling driveway. The location of graver
work area:	introduction is within 20 metres of the driveway entrance and situated to the left of
1	the driveway as you enter. Co-ordinates are 54°01'11.2"N 9°10'24.8"W
	(i.e. Guard Rails/Toe Boards/Brick Guard/Safety Harnesses/Exclusion Zones, etc.)
Fall	Traffic management in operation during the unloading of gravel and for the optering
Protection	and exiting of the work site
Weasures.	
	Access and egress to work site to be kept clear
	Limit access to the site
	High visibility jackets and hard hats to be worn on site
	Maintain good housekeeping and safety practice on site



= access and egress point through driveway of house.

= site of gravel introduction

Prepared By:	Osgur Grieve	Date	e: 19/7/21	Signature:
Reviewed By:	Barry Kelly	Date	e: 21/7/21	Signature:
Approved By (A	Agent or above):			
		Date	; :	Signature:
Reviewed by Di	rector:	0 Date	;	Signature:

Moy catchment – Gravel Introduction

River/stream name: Straide river, location 2 Rathrussell

Sites 10 &11

Contractor:	Project Owner:	Address:	-	Tel:	096 22788
OPW / IFI	Inland Fisheries Ireland WRBD	Ardnaree House, Abbey Street, Ballina, County Mayo		E-ma Barry.	il: Kelly@fisheriesireland.ie
Project Name	Gravel Introduction – Mo	by Catchment			
Description of Task/Activity	Improve spawning habita	it for salmonids ir	n the Straide	river	
Site Address/Location:	Rathrussell, Co. Mayo Site No: 10		Start Date/Time:	Sept 202 2022 to 2	1 or June to Sept 2025
	53°56'03.1''N 9°07'05. Site No: 11 53°56'08.0''N 9°07'06.	5"W 4"W	Finish Date/Time	Sept 202 2022 to 2	21 or June to Sept 2025
	Name			Role/	Trade
	Barry Kelly		Project Mar	ager	
Dereen not involved	Osgur Grieve		IFI supervis	or	
Personnermvorved	Philip Thornton		IFI supervis	or	
Site Supervisor:	Barry Kelly		Tel:	087 1228	3350
Safety Officer	Barry Kelly		Tel:	087 1228	3350
Key Plant & Tools	 Dump Truck Track machine Teleporter (optional) Tractor with front loader (optional) All plant will be serviced and maintained according to manufacturer's requirements Any equipment found to be defective is to be taken out of circulation immediately and returned for inspection and repair Under no circumstances is defective equipment to be used				
Key Materials	Spawning Gravel / random boulders / fencing materials				
Other Essential Equipment:	(i.e. access platforms/winches/ladde Chainsaw / Pole saw / wheelbarrow	rs, etc			

Specific Identified Residual Hazards: (or refer to the task specific risk assessment(s)) (See attachment) Specific Staff Training	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock Safe pass Licensed Operators for track machines Swift water rescue Manual handling
Sequence of Operations: (include sketches if required)	 Inspect area to ensure public safety and carry out biosecurity protocol Consult with landowners and secure landowner permission Brief operators and staff on safety and duties Offload materials (Gravel and/or random boulders) at the location close to river/channel Check work location is free of livestock Cut and remove any obstructing tree limbs if required Remove livestock fencing where required Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side Introduce gravel /random boulders and distribute where necessary. Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners Remove any excess materials and tools from site
Temporary Supports and Props needed to facilitate the works:	(if none, state none) None
Method of Access and Egress to the work area:	Access and egress to Site 10 is through a gate from a local road at co- ordinates 53°56'07.7"N 9°07'09.2"W Access and egress to Site 11 is through a gate from the same local road as above at co – ordinates 53°56'12.3"N 9°07'13.8"W
Fall Protection Measures:	(i.e. Guard Rails/Toe Boards/Brick Guard/Safety Harnesses/Exclusion Zones, etc.) Traffic management in operation during the unloading of gravel and for the entering and exiting of the work site. Access and egress to work site to be kept clear Limit access to the site High visibility jackets and hard hats to be worn on site Maintain good housekeeping and safety practice on site





4

Prepared By:	Osgur Grieve		Date:	22/7/21	Signature:		
Reviewed By:	Barry Kelly		Date:	22/7/21	Signature:		
Approved By (A	Approved By (Agent or above):						
			Date:		Signature:		
Reviewed by Di	rector:	0	Date:		Signature:		

Moy catchment – Gravel Introduction

Site numbers 13-16– Bunree River

Contractor:	Project Owner:	Address:		Tel: 096 22788	
OPW / IFI	Inland Fisheries Ireland WRBD	Ardnaree House, Abbey Street Ballina, County Mayo		E-mail: Barry.Kelly@fisheriesireland.ie	
Project Name	Gravel Introduction – Mo	by Catchment			
Description of Task/Activity	Improve spawning habita	at for salmonids ir	n the Bunree/	Brusna system	
Site Address/Location:	Whitestream, Bonniconlo Sites 13-16 . • 54° 07. 1800 009 • 54° 07. 1548 009 • 54° 07. 2388 009 • 54° 07.1360 009	on, Co Mayo. ° 04.7804. °. 04.6988. ° 04.4338. ° 04.6432.	Start Date/Time: Finish Date/Time	Sept 2021 or June to Sept 2022 to 2025 Sept 2021 or June to Sept 2022 to 2025	
	Name		Role/Trade		
	Barry Kelly		Project Mana	ager	
Personnel Involved	Osgur Grieve		IFI superviso	r	
	Philip Thornton		IFI superviso	r	
Site Supervisor:	Barry Kelly		Tel:	87 1228350	
Safety Officer	Philip Thornton		Tel:	087 1139005	
Key Plant & Tools	 Dump Truck Track machine Teleporter (option Tractor with front I All plant will be serviced a Any equipment found to I immediately and returned Under no circumstances 	al) loader (optional) and maintained a be defective is to d for inspection a is defective equip	ccording to n be taken out nd repair oment to be u	nanufacturer's requirements of circulation sed	
Key Materials	Spawning Gravel Random boulders Fencing materials				

2

3

Other Essential Equipment: In the second statement (i.e. access platforms/winches/ladders, etc.) (i.e. access platforms/winches/ladders, etc.) (blainsaw / Pole saw / wheelbarrow

Specific Identified Residual Hazards: (or refer to the task specific risk assessment(s)) (See attachment) Specific Staff Training	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock Safe pass Licensed Operators for track machines Swift water rescue Manual handling
Sequence of Operations: (include sketches if required)	 Inspect area to ensure public safety and carry out biosecurity protocol Consult with landowners and secure landowner permission Brief operators and staff on safety and duties Offload materials (Gravel and/or random boulders) at the location close to river/channel Check work location is free of livestock Cut and remove any obstructing tree limbs if required Remove livestock fencing where required Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side Introduce gravel /random boulders and distribute where necessary. Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners Remove any excess materials and tools from site
Temporary Supports and Props needed to facilitate the works:	(if none, state none) None
Method of Access and Egress to the work area:	Access to Sites 13-16 through farmland adjacent to roadway. The working bank will be the LHB.
Fall Protection Measures:	(i.e. Guard Rails/Toe Boards/Brick Guard/Safety Harnesses/Exclusion Zones, etc.) Traffic management in operation during the unloading of gravel and for the entering and exiting of the work site. Access and egress to work site to be kept clear Limit access to the site High visibility jackets and hard hats to be worn on site Maintain good housekeeping and safety practice on site



Map of Sites 13-16 on the Glenree River showing access and egress points

Access and egress via farmland adjacent to roadway highlighted in red. (LHB)

Prepared By:	Philip Thornton		Date:	19/7/21	Signature:		
Reviewed By:	Barry Kelly		Date:	19/7/21	Signature:		
Approved By (Agent or above):							
			Date:		Signature:		
Reviewed by Di	irector:	0	Date:		Signature:		

Moy catchment – Gravel Introduction

Site numbers 17-18– Bunree River

Contractor:	Project Owner:	Address:		Tel: 096 22788			
OPW / IFI	Inland Fisheries Ireland WRBD	Ardnaree House, A Ballina, County M	Abbey Street, ayo	E-mail: Barry.Kelly@fisheriesireland.ie			
Project Name	Gravel Introduction – Moy Catchment						
Description of Task/Activity	Improve spawning habita	t for salmonids ir	n the Bunree	/Brusna system			
Site Address/Location:	Corrimbla South, Bonnico	onlon, Co Mayo.	Start Date/Time:	Sept 2021 or June to Sept 2022 - 2025			
	Sites 17-18 54° 07 3134 009° 04.33 54° 07. 3322 009° 04.29	353 954	Finish Date/Time	Sept 2021 or June to Sept 2022 - 2025			
	Name			Role/Trade			
	Barry Kelly		Project Man	ager			
Personnel Involved	Osgur Grieve		IFI supervise	or			
			IFI Supervise	or			
Site Supervisor:	Barry Kelly		Tel:	087 1228350			
Safety Officer	Philip Thornton		Tel:	087 1139005			
Key Plant & Tools	 Dump Truck Track machine Teleporter (options Tractor with front I All plant will be serviced a Any equipment found to b immediately and returned Under no circumstances 	al) oader (optional) and maintained a be defective is to d for inspection a is defective equip	ccording to r be taken ou nd repair oment to be u	manufacturer's requirements t of circulation used			
Key Materials	Spawning Gravel / Rando	om boulders / Fe	ncing materi	als			

3

Other Essential Equipment: In the second statement (i.e. access platforms/winches/ladders, etc.) (i.e. access platforms/winches/ladders, etc.) (blainsaw / Pole saw / wheelbarrow
Specific Identified Residual Hazards: (or refer to the task specific risk assessment(s)) (See attachment) Specific Staff Training	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock Safe pass Licensed Operators for track machines Swift water rescue Manual handling
Sequence of Operations: (include sketches if required)	 Inspect area to ensure public safety and carry out biosecurity protocol Consult with landowners and secure landowner permission Brief operators and staff on safety and duties Offload materials (Gravel and/or random boulders) at the location close to river/channel Check work location is free of livestock Cut and remove any obstructing tree limbs if required Remove livestock fencing where required Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side Introduce gravel /random boulders and distribute where necessary. Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners Remove any excess materials and tools from site
Temporary Supports and Props needed to facilitate the works:	(if none, state none) None
Method of Access and Egress to the work area:	Access to Sites 17-18 via gateway to rear of farmyard. See red arrow in map below. The working bank will be the RHB.
Fall Protection Measures:	(i.e. Guard Rails/Toe Boards/Brick Guard/Safety Harnesses/Exclusion Zones, etc.) Traffic management in operation during the unloading of gravel and for the entering and exiting of the work site. Access and egress to work site to be kept clear Limit access to the site High visibility jackets and hard hats to be worn on site Maintain good housekeeping and safety practice on site



Map of Sites 17-18 on the Glenree River showing access and egress points

Access and egress via gateway at rear of farmyard highlighted in red (RHB)

Prepared By:	Philip Thornton		Date:	19/7/21	Signature:	
Reviewed By:	Barry Kelly		Date:	19/7/21	Signature:	
Approved By (Agent or above):						
			Date:		Signature:	
Reviewed by Di	irector:	0	Date:		Signature:	

Moy catchment – Gravel Introduction

Site number 19 – Bunree River

	Metho	d Stateme	nt	2			
Contractor:	Project Owner:	Address:			Tel: 096 22788		
OPW / IFI	Inland Fisheries Ireland WRBD	Ardnaree House, Ardnaree	Abbey Street ayo	,	E-mail: Barry,Kelly@fisheriesireland.ie		
Project Name	Gravel Introduction – Mo	by Catchment	•				
Description of Task/Activity	Improve spawning habita	t for salmonids ir	n the Bunree	e/Br	usna system		
Site Address/Location:	Glenree, Bonniconlon, Co Site 19- 54° 07. 8062	o. Mayo.	Start Date/Time:	Sep 202	ot 2021 or June to Sept 22-2025		
	009° 00.2477		Finish Date/Time	Sep 202	ot 2021 or June to Sept 22 - 2025		
	Name				Role/Trade		
	Barry Kelly		Project Mar	nage	er		
	Osgur Grieve		IFI supervis	sor			
Personnel Involved	Philip Thornton		IFI supervis	sor			
Site Supervisor:	Barry Kelly		Tel:	087	7 1228350		
Safety Officer	Philip Thornton		Tel:	087	7 1139005		
Koy Plant & Toolo	Dump Truck						
Rey Flant & TOOIS	Track machine Take action all						
	 Tractor with front I 	oader (optional)					
			o o o ralin a to	100.0	oufo eturorio, requiremente		
	All plant will be serviced and maintained according to manufacturer's requirements Any equipment found to be defective is to be taken out of circulation						
	immediately and returned for inspection and repair						
	Under no circumstances	is defective equip	oment to be	use	d		
	Spawning Gravel/random	houlders/fencing	n materials				
Key Materials			g materiale				
	(i.e. access platforms/winches/ladde	rs. etc					
Other	Chainsaw / Pole saw	-,					
Equipment:							

Specific Identified Residual Hazards: (or refer to the task specific risk assessment(s)) (See attachment) Specific Staff Training	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock Safe pass Licensed Operators for track machines Swift water rescue Manual handling
Sequence of Operations: (include sketches if required)	 Inspect area to ensure public safety and carry out biosecurity protocol Consult with landowners and secure landowner permission Brief operators and staff on safety and duties Offload materials (Gravel and/or random boulders) at the location close to river/channel Check work location is free of livestock Cut and remove any obstructing tree limbs if required Remove livestock fencing where required Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side Introduce gravel /random boulders and distribute where necessary. Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners Remove any excess materials and tools from site
Temporary Supports and Props needed to facilitate the works:	(if none, state none) None
Method of Access and Egress to the work area:	Access to Site 19 on the LHB Downstream of the bridge. The working bank will be the LHB.
Fall Protection Measures:	(i.e. Guard Rails/Toe Boards/Brick Guard/Safety Harnesses/Exclusion Zones, etc.) Traffic management in operation during the unloading of gravel and for the entering and exiting of the work site. Access and egress to work site to be kept clear Limit access to the site High visibility jackets and hard hats to be worn on site Maintain good housekeeping and safety practice on site

4

Map of Site 19 on the Glenree River showing access and egress points



Access and egress from the road downstream of the bridge highlighted in red. (LHB)

Prepared By:	Philip Thornton			Date: 19/7/21	Signature:
Reviewed By:	Barry Kelly		Date:	19/7/21	Signature:
Approved By (Agent or above):					
			Date:		Signature:
Reviewed by Di	rector:	0	Date:		Signature:

Moy catchment – Gravel Introduction

River/stream name: Killeen stream (Sites 20-25)

	Metho	d Stateme	nt	2				
Contractor:	Project Owner:	Address:		Tel: 096 22788				
OPW / IFI	Inland Fisheries Ireland WRBD	Ardnaree House, A Ballina, County M	Abbey Street, ayo	E-mail: Barry.Kelly@fisheriesireland.ie				
Project Name	Gravel Introduction – Moy Catchment							
Description of Task/Activity	Improve spawning habita	t for salmonids ir	n the Killeen	stream				
Site Address/Location:	Cloonagalloon, Loughan Sites 20-25 are located	e, Co. Mayo between the	StartSept 2021 or June to SeptDate/Time:2022					
	co-ordinates below:		Finish	Sept 2021 or June to Sept				
	53°55'37.2"N 9°01'10.2"\	N	Date/Time	2022				
	53°55'40.7"N 9°01'00.2"\ 	N						
	Name			Role/Trade				
	Barry Kelly		Project Mana	ger				
D	Osgur Grieve		IFI superviso	r				
Personnel Involved	Philip Thornton		IFI supervisor					
	Barry Kelly			087 1228350				
Site Supervisor:			Tel:					
Safety Officer	Barry Kelly		Tel:	087 1228350				
Key Plant & Tools	 Dump Truck Track machine Teleporter (optional) Tractor with front loader (optional) All plant will be serviced and maintained according to manufacturer's requirements Any equipment found to be defective is to be taken out of circulation 							
	immediately and returned for inspection and repair Under no circumstances is defective equipment to be used							
Key Materials	Spawning Gravei/randon	i Douiders/Tencin	y materials					

3

Other Essential Equipment: (i.e. access platforms/winches/ladders, etc Chainsaw / Pole saw

Specific Identified Residual Hazards: (or refer to the task specific risk assessment(s)) (See attachment)	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock
Specific Staff Training	Safe pass Licensed Operators for track machines Swift water rescue Manual handling
Sequence of Operations: (include sketches if required)	 Inspect area to ensure public safety and carry out biosecurity protocol Consult with landowners and secure landowner permission Brief operators and staff on safety and duties Offload materials (Gravel and/or random boulders) at the location close to river/channel Check work location is free of livestock Cut and remove any obstructing tree limbs if required Remove livestock fencing where required Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side Introduce gravel /random boulders and distribute where necessary. Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners Remove any excess materials and tools from site

	(if none, state none)
Temporary	None
Props needed to	
facilitate the	
works:	
Method of Access	Access and egress to these sites are through a gate that is situated about 1 km
and Egress to the	south of St. Joseph's Culleens National School, Cloonagalloon, Co. Mayo.
work area:	·
	Co-ordinates are 53°55'38.0"N 9°01'23.5"W
Fall	(i.e. Guard Rails/Toe Boards/Brick Guard/Safety Harnesses/Exclusion Zones, etc.)
Protection	Traffic management in operation during the unloading of gravel and for the entering
Measures:	and exiting of the work site.
	Access and egress to work site to be kept clear
	Limit access to the site
	High visibility jackets and hard hats to be worn on site
	Maintain good housekeeping and safety practice on site





Prepared By:	Osgur Grieve		Date:	19/7/21	Signature:
Reviewed By:	Barry Kelly		Date:	19/7/21	Signature:
Approved By (A	Agent or above):				
			Date:		Signature:
Reviewed by Di	irector:	0	Date:		Signature:

Moy catchment – Gravel Introduction

Site numbers 26-27- Eighnagh River

Contractor:	Project Owner:	Address:		Tel: 096 22788	
OPW / IFI	Inland Fisheries Ireland WRBD	Ardnaree House, A Ballina, County M	Abbey Street, ayo	E-mail: Barry,Kelly@fisheriesireland.ie	
Project Name	Gravel Introduction – Mo	by Catchment	•		
Description of Task/Activity	Improve spawning habita	it for salmonids ir	n the Eighna	igh River	
Site Address/Location:	Coolerecuill, Aclare, Co S	Sligo.	Start Date/Time:	Sept 2021 or June to Sept 2022 to 2025	
	 51tes 26-27 54° 01.3064 008 54° 01.3334 008 	° 53.2489 ° 53.1900	Finish Date/Time	Sept 2021 or June to Sept 2022 to 2025	
	Name			Role/Trade	
	Barry Kelly		Project Mar	nager	
Personnel Involved	Osgur Grieve		IFI supervis	or	
			IFI supervisor		
Site Supervisor:	Barry Kelly		Tel:	087 1228350	
Safety Officer	Philip Thornton		Tel:	087 1139005	
Key Plant & Tools	 Dump Truck Track machine Teleporter (option) Tractor with front I All plant will be serviced a Any equipment found to I immediately and returned Under no circumstances 	manufacturer's requirements It of circulation used			
Key Materials	Spawning Gravel/ randor	n boulders/fencir	ng materials		

3

Other Essential Equipment: Method Statement (i.e. access platforms/winches/ladders, etc Chainsaw / Pole saw/ wheelbarrow

Specific Identified Residual Hazards: (or refer to the task specific risk assessment(s)) (See attachment) Specific Staff Training	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock Safe pass Licensed Operators for track machines Swift water rescue Manual handling
Sequence of Operations: (include sketches if required)	 Inspect area to ensure public safety and carry out biosecurity protocol Consult with landowners and secure landowner permission Brief operators and staff on safety and duties Offload materials (Gravel and/or random boulders) at the location close to river/channel Check work location is free of livestock Cut and remove any obstructing tree limbs if required Remove livestock fencing where required Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side Introduce gravel /random boulders and distribute where necessary. Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners Remove any excess materials and tools from site
Temporary Supports and Props needed to facilitate the works:	(if none, state none) None
Method of Access and Egress to the work area:	Access to Sites 26-27 through farmland adjacent to roadway. The working bank will be the RHB.
Fall Protection Measures:	(i.e. Guard Rails/Toe Boards/Brick Guard/Safety Harnesses/Exclusion Zones, etc.) Traffic management in operation during the unloading of gravel and for the entering and exiting of the work site. Access and egress to work site to be kept clear Limit access to the site High visibility jackets and hard hats to be worn on site Maintain good housekeeping and safety practice on site



Map of Sites 26-27 on the Eighnagh River showing access and egress points

Access and egress via farmland adjacent to roadway highlighted in red. (RHB)

Prepared By:	Philip Thornton		Date:	19/7/21	Signature:		
Reviewed By:	Barry Kelly		Date:	19/7/21	Signature:		
Approved By (A	Approved By (Agent or above):						
			Date:		Signature:		
Reviewed by Di	rector:	0	Date:		Signature:		

5

Moy catchment – Gravel Introduction

River/stream name: Straide River

Sites 28 to 33

	Metho	d Stateme	nt	2	
Contractor:	Project Owner:	Address:			Tel: 096 22788
OPW / IFI	Inland Fisheries Ireland WRBD	Ardnaree House, / Ballina, County M	Abbey Street avo	,	E-mail: Barrv.Kellv@fisheriesireland.ie
Project Name	Gravel Introduction – Moy	Catchment			
Description of Task/Activity	Improve spawning habita	at for salmonids ir	the Straide	e riv	'er
Site Address/Location:	Knockagauraun, Straide, Upstream gravel introd	Start Date/Time:	Sep 202	ot 2021 or June to Sept 22 to 2025	
	53°55'40.4"N 9°07'32.4"	Finish	Sep	ot 2021 or June to Sept	
	Downstream location: 5 9°07'30.3"W	53°55'45.4"N	Date/Time	202	22 to 2025
	Name			1	Role/Trade
	Barry Kelly	Project Mana	agei	ſ	
	Osgur Grieve		IFI superviso	or	
Personnel Involved	Philip Thornton		IFI superviso	or	
	Rarry Kelly			087	7 1228350
Site Supervisor:			Tel:	00,	1220300
Safety Officer	Barry Kelly		Tel:	087	/ 1228350
Key Plant & Tools	 Dump Truck Track machine Teleporter (optional) Tractor with front loader (optional) All plant will be serviced and maintained according to manufacturer's requirements Any equipment found to be defective is to be taken out of circulation immediately and returned for inspection and repair Under no circumstances is defective equipment to be used 				
	Snawning Gravel/randon	n houldore/fencin	a materiale		
Key Materials	Spawning Gravemanuon		y materiais		
Other Essential Equipment:	(i.e. access platforms/winches/ladde Chainsaw / Pole saw / wheelbarrow	ırs, etc			

Specific Identified Residual Hazards: (or refer to the task specific risk assessment(s)) (See attachment)	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock
Specific Staff Training	Safe pass Licensed Operators for track machines Swift water rescue Manual handling
Sequence of Operations: (include sketches if required)	 Inspect area to ensure public safety and carry out biosecurity protocol Consult with landowners and secure landowner permission Brief operators and staff on safety and duties Offload materials (Gravel and/or random boulders) at the location close to river/channel Check work location is free of livestock Cut and remove any obstructing tree limbs if required Remove livestock fencing where required Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side Introduce gravel /random boulders and distribute where necessary. Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners Remove any excess materials and tools from site

	(if none, state none)
Temporary	None
Supports and	
Props needed to	
facilitate the	
works:	
Mathed of Assess	Access and earlies to the unstream sites is through a date into a field at c_{-}
and Egress to the	ordinates 53°55'42.4"N 9°07'27.9"W
work area:	Access and egress to the downstream site is at co-ordinates 53°55'44.6"N 9°07'29.9"W
	Access is through a small, unfenced stretch of land adjacent to the local road that
	brings you to Saint Peter and Paul National School, Knockafall, Foxford, Co. Mayo
	situated opposite the gravel introduction site.
	(i.e. Guard Rails/Toe Boards/Brick Guard/Safety Harnesses/Exclusion Zones, etc.)
Fall	
Protection	I raffic management in operation during the unloading of gravel and for the entering
Measures:	and exiting of the work site.
	Access and egress to work site to be kept clear
	Limit access to the site
	High visibility jackets and hard hats to be worn on site
	Maintain good housekeeping and safety practice on site

Straide River Sites 28 - 33



Prepared By:	Osgur Grieve	Date:	21/7/21	Signature:
Reviewed By:	Barry Kelly	Date:	22/7/21	Signature:
Approved By (A	Agent or above):			
		Date:		Signature:
Reviewed by D	irector:	Date:		Signature:

Moy catchment – Gravel Introduction

Sites number 34,35 & 36 - Manulla River

	Metho	d Stateme	nt	2			
Contractor:	Project Owner:	Address:			Tel: 096 22788		
OPW / IFI	Inland Fisheries Ireland WRBD	Ardnaree House, Ballina, County M	Abbey Street ayo	,	E-mail: Barry.Kelly@fisheriesireland.ie		
Project Name	Gravel Introduction – Moy Catchment						
Description of Task/Activity	Improve spawning habita	t for salmonids ir	n the Manul	la Ri	ver		
Site Address/Location:	Lecarrow, Co Mayo. Site 34: 53°47.1890 00	Start Date/Time:	Sep 202	ot 2021 or June to Sept			
	Site 35: 53° 47.3080 00 Site 36: 53° 47.3318 00	Finish Date/Time	Sep 202	ot 2021 or June to Sept			
	Name				Role/Trade		
	Barry Kelly		Project Mar	nage	er		
	Osgur Grieve		IFI supervis	sor			
Personnel Involved	Philip Thornton		IFI supervis	sor			
	Barry Kelly			087	1228350		
Site Supervisor:			Tel:				
Safety Officer	Barry Kelly	Tel:	087	1228350			
Key Plant & Tools	 Dump Truck Track machine Teleporter (optional) Tractor with front loader and trailer (optional) 						
	All plant will be serviced and maintained according to manufacturer's requirements Any equipment found to be defective is to be taken out of circulation immediately and returned for inspection and repair Under no circumstances is defective equipment to be used						
Key Materials	Spawning Gravel. Fencir	ng materials. Ran	dom boulde	ers			
Other Essential Equipment:	(i.e. access platforms/winches/ladde Chainsaw / Pole saw / wheelbarrow	rs, etc					

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-	
2	

Specific Identified Residual Hazards: (or refer to the task specific risk assessment(s)) (See attachment) Specific Staff Training	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock Safe pass Licensed Operators for track machines Swift water rescue Manual handling
Sequence of Operations: (include sketches if required)	 Inspect area to ensure public safety and carry out biosecurity protocol Consult with landowners and secure landowner permission Brief operators and staff on safety and duties Offload materials (Gravel and/or random boulders) at the location close to river/channel Check work location is free of livestock Cut and remove any obstructing tree limbs if required Remove livestock fencing where required Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side Introduce gravel /random boulders and distribute where necessary. Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners Remove any excess materials and tools from site
Temporary Supports and Props needed to facilitate the works:	(if none, state none) None
Method of Access and Egress to the work area:	Access to Sites 35 & 36 is from a local (L) road off the road between Ballinafad and the main N60. The road runs parallel to the stream and the gravel at these locations can be inputted from the actual road. The right-hand bank is the working bank. Access to Site 34 is from the road as described above. The right-hand bank is the working bank.
Fall Protection Measures:	(i.e. Guard Rails/Toe Boards/Brick Guard/Safety Harnesses/Exclusion Zones, etc.) Traffic management in operation during the unloading of gravel and for the entering and exiting of the work site. Access and egress to work site to be kept clear Limit access to the site High visibility jackets and hard hats to be worn on site Maintain good housekeeping and safety practice on site

Method Statement

4

Map of Sites 34,35 & 36 on the Manulla River showing access and egress points



Prepared By:	Barry Kelly		Date:	19/7/21	Signature:	
Reviewed By:	Barry Kelly		Date:	19/7/21	Signature:	
Approved By (A	Approved By (Agent or above):					
			Date:		Signature:	
Reviewed by Director:		0	Date:		Signature:	

Moy catchment – Gravel Introduction

River/stream name: Rathnamagh stream (middle and lower sites) Sites 40 & 41

	Metho	d Stateme	nt	2		
Contractor:	Project Owner:	Address:			Tel: 096 22788	
OPW / IFI	Inland Fisheries Ireland WRBD	Ardnaree House,	Abbey Street ayo	,	E-mail: Barry,Kelly@fisheriesireland.ie	
Project Name	Gravel Introduction – Moy	Catchment				
Description of Task/Activity	Improve spawning habita	t for salmonids ir	the Rathna	ama	igh stream	
Site	Sites 40&41 Rathnamag	h, Co. Mayo	Start Sept 2021 or June to Sept			
Address/Location:	Middle site: 54°08'07.7"N	l 9°17'58.0"W	Date/Time: 202		22	
	Downstream site: 54°08	Finish	Sep	ot 2021 or June to Sept		
	9°17'34.9"W		Date/Time	202	2 Pole/Trade	
	Indille				Kole/ ITade	
	Barry Kelly		Project Man	agei		
	Osgur Grieve		IFI superviso	or		
Personnel Involved	Philip Thornton		IFI superviso	or		
	Barry Kelly			087	1228350	
Site Supervisor:			Tel:	00.	1220000	
	Barry Kelly			087	1228350	
Safety Officer			Tel:	00.	1220000	
	Dump Truck					
Key Plant & Tools	Track machine					
	Teleporter (optional	al)				
	Tractor with front I	oader (optional)				
	All plant will be convised (and maintained a	ocording to	ma	pufacturar'a raquiramenta	
	Any equipment found to b	be defective is to	be taken or	ina it of	circulation	
	immediately and returned	d for inspection a	nd repair			
	Under no circumstances is defective equipment to be used					
	Spawning Gravel					
Key Materials	Random boulders					
	rencing materials					
Other	(i.e. access platforms/winches/ladde Chainsaw / Pole saw /	rs, etc				
Essential	wheelbarrow					
Equipment:						

Specific Identified Residual Hazards: (or refer to the task specific risk assessment(s)) (See attachment)	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock
Specific Staff Training	Safe pass Licensed Operators for track machines Swift water rescue Manual handling
Sequence of Operations: (include sketches if required)	 Inspect area to ensure public safety and carry out biosecurity protocol Consult with landowners and secure landowner permission Brief operators and staff on safety and duties Offload materials (Gravel and/or random boulders) at the location close to river/channel Check work location is free of livestock Cut and remove any obstructing tree limbs if required Remove livestock fencing where required Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side Introduce gravel /random boulders and distribute where necessary. Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners Remove any excess materials and tools from site

	(if none_state none)
Tomporany	None
Supports and	
Prons needed to	
facilitate the	
works:	
Method of Access	Access and egress to the middle site is through a gate off a local road at co-
and Egress to the	ordinates 54°08'04.0"N 9°17'52.6"W
work area:	Access and egress to the downstream site is through a gate at co-ordinates
	54°08'08.6"N 9°17'46.3"W
	(i.e. Guard Rails/Toe Boards/Brick Guard/Safety Harnesses/Exclusion Zones, etc.)
Fall	
Protection	I raffic management in operation during the unloading of gravel and for the entering
Measures:	and exiting of the work site.
	Access and egress to work site to be kept clear
	i imit access to the site
	Linh visibility is skets and hard hats to be warn an site
	High visibility jackets and hard hats to be worn on site
	Maintain good housekeeping and safety practice on site



5





Prepared By:	Osgur Grieve		Date:	21/7/21	Signature:
Reviewed By:	0	Date:		Signature:	
Approved By (A	Agent or above):				
			Date:		Signature:
Reviewed by D	rector:	0	Date:		Signature:

Moy catchment – Gravel Introduction

River/stream name: Rappa stream

Site 42

Method Statement 2					
Contractor:	Project Owner:	Address:		Tel: 096 22788	
OPW / IFI	Inland Fisheries Ireland WRBD	Ardnaree House, Abbey Street, Ballina, County Mayo		E-mail: Barry.Kelly@fisheriesireland.ie	
Project Name	Gravel Introduction – Moy Catchment				
Description of Task/Activity	Improve spawning habita	at for salmonids ir	n the Rappa	stre	eam
Site Address/Location:	Rathbal, Nephin View, Co. Mayo The gravel sites are located between the co- ordinates below: • 54°08'28.9"N 9°14'00.6"W • 54°08'41.9"N 9°13'51.4"W		Start Date/Time: Finish Date/Time	Sep 202 Sep 202	ot 2021 or June to Sept 22 to 2025 ot 2021 or June to Sept 22 to 2025
	Name				Role/Trade
	Barry Kelly		Project Manager		
	Osgur Grieve		IFI supervisor		
Personnel Involved	Philip Thornton		IFI supervisor		
	Barry Kelly			087	1228350
Site Supervisor:			Tel:		
Safety Officer	Barry Kelly		Tel:	087	1228350
Key Plant & Tools	 Dump Truck Track machine Teleporter (optional) Tractor with front loader (optional) All plant will be serviced and maintained according to manufacturer's requirements Any equipment found to be defective is to be taken out of circulation immediately and returned for inspection and repair Under no circumstances is defective equipment to be used 				
Key Materials	Spawning Gravel Random boulders Fencing materials				
Other					

Essential					
Equipment:					

Method Statement (i.e. access platforms/winches/ladders, etc Chainsaw / Pole saw/wheelbarrow

Specific Identified Residual Hazards: (or refer to the task specific risk assessment(s)) (See attachment)	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock
Specific Staff Training	Safe pass Licensed Operators for track machines Swift water rescue Manual handling
Sequence of Operations: (include sketches if required)	 Inspect area to ensure public safety and carry out biosecurity protocol Consult with landowners and secure landowner permission Brief operators and staff on safety and duties Offload materials (Gravel and/or random boulders) at the location close to river/channel Check work location is free of livestock Cut and remove any obstructing tree limbs if required Remove livestock fencing where required Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side Introduce gravel /random boulders and distribute where necessary. Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners Remove any excess materials and tools from site

Temporary Supports and Props needed to facilitate the works:	(if none, state none) None
Method of Access and Egress to the work area:	Access and egress to the furthest downstream point for gravel introduction on the Rappa stream sites is through a gate along a local road at co-ordinates 54°08'25.5"N 9°13'58.5"W Access and egress to the furthest upstream point for gravel introduction on the Rappa stream is through a gate along a local road at co-ordinates 54°08'39.0"N 9°14'01.0"W
Fall Protection Measures:	(i.e. Guard Rails/Toe Boards/Brick Guard/Safety Harnesses/Exclusion Zones, etc.) Traffic management in operation during the unloading of gravel and for the entering and exiting of the work site. Access and egress to work site to be kept clear Limit access to the site High visibility jackets and hard hats to be worn on site Maintain good housekeeping and safety practice on site





Prepared By:	Osgur Grieve	Da	te:	20/7/21	Signature:	
Reviewed By:	Barry Kelly	Da	te:	20/7/21	Signature:	
Approved By (A	Approved By (Agent or above):					
		Da	ite:		Signature:	
Reviewed by Director:		0 Da	ite:		Signature:	

Moy catchment – Gravel Introduction

Site numbers 43 & 44*– Owenaher River

These sites were substituted for numbers 37 and 38 and were visited and assessed by the Ecologists

Contractor:	Project Owner:	Address:		Tel: 096 22788			
OPW / IFI	Inland Fisheries Ireland WRBD	Ardnaree House, Ardnaree	Abbey Street, ayo	E-mail: Barry.Kelly@fisheriesireland.ie			
Project Name	Gravel Introduction – Moy Catchment						
Description of Task/Activity	Improve spawning habitat for salmonids in the Owenaher River						
Site Address/Location:	Sessuegilroy, Glendarrag Sites 43 & 44 *	gh, Co Sligo	Start Date/Time:	Sept 2021 or June to Sept 2022 to 2025			
	54°07.1310 009°04.57 Both sites are adjacent co-ordinate	78 to the above	Finish Date/Time	Sept 2021 or June to Sept 2022 to 2025			
	Name			Role/Trade			
	Barry Kelly		Project Mar	nager			
Personnel Involved	Osgur Grieve		IFI supervisor				
	Philip Thornton		IFI supervis	or			
Site Supervisor:	Barry Kelly		Tel:	087 1228350			
Safety Officer	Philip Thornton		Tel:	087 1139005			
Key Plant & Tools	 Dump Truck Track machine Teleporter (optional) Tractor with front loader (optional) All plant will be serviced and maintained according to manufacturer's requirements Any equipment found to be defective is to be taken out of circulation immediately and returned for inspection and repair Under no circumstances is defective equipment to be used 						
Key Materials	Spawning Gravel / Rando	om boulders/ fen	cing materia	als			

Other Essential Equipment: Method Statement (i.e. access platforms/winches/ladders, etc Chainsaw / Pole saw /Wheelbarrow

Specific Identified Residual Hazards: (or refer to the task specific risk assessment(s)) (See attachment) Specific Staff Training	 Drowning as working near the river Slips, trips and falls Manual lifting and handling Falling debris or materials Livestock Safe pass Licensed Operators for track machines Swift water rescue Manual handling
Sequence of Operations: (include sketches if required)	 Inspect area to ensure public safety and carry out biosecurity protocol Consult with landowners and secure landowner permission Brief operators and staff on safety and duties Offload materials (Gravel and/or random boulders) at the location close to river/channel Check work location is free of livestock Cut and remove any obstructing tree limbs if required Remove livestock fencing where required Fill teleporter bucket/track machine bucket/front loader/tractor trailer and transport materials to river side Introduce gravel /random boulders and distribute where necessary. Reinstate/erect stock proof fencing if required Debrief and assess project and consult with landowners Remove any excess materials and tools from site
Temporary Supports and Props needed to facilitate the works:	(if none, state none) None
Method of Access and Egress to the work area:	Access to Sites 43 /44 is via a farm track adjacent to roadway. The working bank will be the LHB.
Fall Protection Measures:	(i.e. Guard Rails/Toe Boards/Brick Guard/Safety Harnesses/Exclusion Zones, etc.) Traffic management in operation during the unloading of gravel and for the entering and exiting of the work site. Access and egress to work site to be kept clear Limit access to the site High visibility jackets and hard hats to be worn on site Maintain good housekeeping and safety practice on site

5

Map of Sites 37-38 on the Owenagher River showing access and egress points



Access and egress via farm track adjacent to roadway highlighted in red. (LHB)

Prepared By:	Philip Thornton		Date:	19/7/21	Signature:
Reviewed By:	Barry Kelly		Date:	19/7/21	Signature:
Approved By (Agent or above):					
			Date:		Signature:
Reviewed by Director:		0	Date:		Signature: