southern scientific services ltd

APPROPRIATE ASSESSMENT

Impacts of the Proposed Upgrading of Millstreet Wastewater Treatment Plant (WWTP) on the Conservation Objectives of the Blackwater River (Cork/Waterford) SAC (Site code 002170).

Requested By:	Mott Mac Donald Pettit 5 Eastgate Avenue Little Island Co. Cork
Prepared By:	Norma Mc Kenna
Date Reported:	4th September 09
Our Reference:	08P 133

Issue Date	Revision	Comment
24/04/09		1st Draft to client
06/05/09	Rev 01	2nd Draft to client
04/09/09	Rev 02	3rd Draft to client
11/09/09	Rev 03	4th Issue to client

dunrine │killarney │county kerry │ireland │telephone+353 64 33922 fax +353 64 39022
email: info@southernscientificireland.com

Registered in Ireland No. 323196 VAT Reg. No. IE 6343196

TABLE OF CONTENTS

1 Introduction

1.1 Background

Southern Scientific Services Ltd were commissioned by Mott Mac Donald Pettit to prepare an Appropriate Assessment (AA), which would identify potential impacts, if any, of the proposed upgrading of Millstreet Wastewater Treatment Plant (WWTP) on the conservation objectives of the Blackwater River (Cork/Waterford) SAC (Site code 002170). Sections of the proposed outfall route from the WWTP to the point of discharge are within this SAC, namely from Finnow Bridge to the confluence with the River Blackwater. A section of the Tanyard Stream is also included within the SAC. Also included in this SAC are the lands bounding both the River Finnow and the Tanyard Stream. Refer to Figure 1, highlighting the sections of the survey area, which are within the SAC. It is proposed to discharge the treated wastewater into either one or other of these watercourses.

During consultation with the National Parks & Wildlife Services, it was established that an Appropriate Assessment would be required for this development.

As stated above, an appropriate assessment is an assessment of the potential impacts of a proposed project or plan on the conservation objectives of the Natura 2000 site and the development where necessary of mitigation and /or avoidance measures to preclude negative effects. The impacts assessed must include the indirect and cumulative impacts of approving the project, together with any current or proposed activities and developments impacting on the site. The potential impacts of projects/developments outside the Natura 2000 sites, but potentially impacting upon them must also be included in the assessment.

1.2 Brief Description of the Project

The proposed development consists of upgrading the existing WWTP at Millstreet, which was constructed in the early 1970's on a site adjacent to the Tanyard stream. The area of the current WWTP site is 0.97 Ha, which includes an area of 0.28 Ha of undeveloped land to the north of the existing treatment plant. The treated wastewater will be discharged to a

surface water body. There are 5 no. options under consideration for the proposed point of discharge, which are as follows and as outlined in Figure 2 – Appendix 1

1. Upstream of existing outfall
2. Upstream of confluence with sister stream
3. Finnow River at Finnow Bridge
4. Confluence of the Finnow River and Tanyard stream
5. Upstream of Wallis's bridge at the confluence of the River Finnow with the Blackwater River.

At present there are 2 no. options under consideration for the route of the outfall pipe from the WWTP to the proposed point of discharge, namely along the Tanyard stream or along the third class road from the WWTP to Finnow Bridge.

The excavation associated with the outfall route for the discharge pipe will consist of a trench depth of 2.5m and the use of a 450mm pipe. A setback of at least 10m from both the River Finnow and Tanyard stream will be adhered to during the construction phase.

The construction of the treatment plant and associated collection system will be in two phases. It is anticipated that the collection system will be constructed in 3 – 4 months and the WWTP will be constructed in 1 year approximately.

Data pertaining to the effluent quality suggests that the plant is currently able to treat existing loads. However, during peak loadings to the plant, the quantity of flow diverted to the storm water overflow system is increased in an effort to prevent overloading the oxidation ditch. It is predicted that the existing flow to the WWTP will increase further by 2025, with a predicted dry weather flow reaching the WWTP of 1,507.44m^3/day. These estimates are based on current flows and the location of lands on which further development is expected to proceed.

Tertiary treatment will be provided in the upgraded WWTP through either membrane treatment or a conventional system with a sand-polishing filter.

The dried sludge produced at the end of the treatment process is currently removed at regular intervals and transported to Kanturk WWTP for further treatment and dewatering. This process will continue in the future following completion of the proposed upgrading. No land spreading of bio-solids arising from the treatment process at Millstreet will be landspread adjacent to watercourses.

1.3 Regulatory Context

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora – Habitats Directive – provides a legal framework for the legal protection of habitats and species of European importance. Articles 3 to 9 of this Council Directive provides the legislative means to protect habitats and species of community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000. Natura 2000 sites are those identified as sites of community importance, namely Special Areas of Conservation (SACs), under the habitats directive or classified as Special Protection Areas (SPAs) under the Conservation of Wild Birds Directive (79/409/EEC).

Articles 6(3) and 6(4) of the Habitats Directive outlines the decision-making tests for projects/plans likely to affect Natura 2000 sites. Article 6(3) establishes the requirement for appropriate assessment:

"*Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent National Authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public*".

Article 6(4) of the Directive deals with alternative solutions, the test of "imperative reasons of overriding public interest" and compensatory measures.

2 Methodology

This AA 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*" and the European Commission Guidance on "*Managing Natura 2000 Sites*".

In complying with the obligations under Article 6(3) and following the above guidelines, this AA has been prepared following the following structure:

Stage 1: Screening, which includes the following:

- Description of the proposed development/project
- Identification of all Natura 2000 sites potentially affected by the project
- Identification and description of individual and cumulative impacts likely to arise from the development
- Assessment of the significance

Stage 2: Appropriate Assessment, which includes the following:

- Description of the Natura 2000 site which will be considered further in the assessment
- Impact Prediction: description of significant impacts on the integrity of the Natura 2000 site as defined by the conservation objectives and status of the site.
- Recommendations

3 Screening

3.1 Description of the Project

As per section 1.2 above.

3.2 Consultation

As part of the consultation process for the impact assessment previously carried out, Mr. Jervis Good, Divisional Ecologist, NPWS for the Southern Region was contacted in relation to their requirements for the project survey. He replied verbally that an Appropriate Assessment would be required for this project.

3.3 Identification of Natura 2000 sites

With respect to the proposed project, the Blackwater River (Cork/Waterford) SAC (Site code 002170) is the only site which may be potentially effected.

In addition to the above identified site, consideration is also given to species listed in Annexes I and II of the Habitat Directive, and which the site is selected for, namely Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Crayfish, Twaite Shad, Atlantic Salmon, Otter and the plant, Killarney Fern.

3.4 Identification of Potential Impacts

Only those features of the proposed project which are considered likely to impact on the integrity of the Blackwater River SAC with respect to the conservation objectives of the site and also to its structure and function are considered. The following areas were examined in relation to potential impacts from the upgrading of the WWTP:

- Water Quality
- Alteration to existing flows within the proposed receiving waters

- Disturbance of habitats and species during the construction phase
- Direct Loss of Habitat within the SAC

Water Quality:

The proposed discharge of treated effluent to either the Tanyard Stream or the River Finnow may result in deterioration of existing water quality and /or alteration to the volumetric flow in the watercourses. These potential resulting effects may impact negatively on the aquatic ecology of the Blackwater SAC.

Disturbance of habitats and species during the construction phase:

The site of the WWTP is outside the site of the Blackwater River SAC and it is unlikely that the construction of the plant will impact on the Natura 2000 site and its associated habitats and species.

However, the proposed outfall routes and discharge locations are within the Blackwater River SAC. The excavation of the trench for the outfall pipe has potential to displace mammals and aquatic fauna, which may inhabit areas along the bank of the river and stream.

Direct Loss of Habitat within the SAC:

The excavation required to facilitate the outfall pipe will result in loss/disturbance to and removal of flora/habitats within the stretch of ground from the WWTP to the confluence of the River Finnow and Tanyard Stream. This may extend to the confluence with the River Blackwater if discharge point no. 5 is considered (See figure 2 – Appendix 1). However, construction methodologies will be reviewed following any remaining surveys.

The wet grassland habitat, which exists along the stretch of the Tanyard stream from the WWTP to the confluence, would experience the greatest impact, whereby sections of this habitat would be disturbed to facilitate the laying of the pipe.

Some areas of scrub and scattered trees may also experience disturbance particularly that land on either bank of the River Finnow from the confluence with the Tanyard stream to the confluence with the River Blackwater. It may be necessary to remove a number of trees and scrub vegetation to facilitate the laying of the outfall pipe in the event of utilising the proposed discharge point no. 5 located at the confluence of the River Finnow with the River Blackwater.

3.5 Assessment of Significance

The section of the River Finnow from Finnow Bridge to the confluence with the Blackwater is considered the most sensitive area within the study area and that, which may experience the greatest impact arising from the proposed upgrading of the WWTP. In particular, the species listed and thought to exist within the River Finnow should be considered further in the AA.

Overall, the main areas of concern identified within this assessment and which should be considered further in the Appropriate Assessment include the following:

- Loss of habitat within the Blackwater River SAC – potential loss of breeding/nesting/feeding sites for mammals and birds
- Impact on sensitive aquatic species arising from the direct discharge of treated wastewater to either the Tanyard stream or River Finnow
- Deterioration of water quality within the Tanyard Stream, River Finnow and Blackwater River

The Appropriate Assessment in the following section examines the risk of the proposed project on the Blackwater River SAC. This AA will also consider the risk to the relevant species listed in Annex I & II of the Habitats Directive.

4 Stage 2 Appropriate Assessment

4.1 Introduction

In this section, the Blackwater River (Cork/Waterford) SAC, which has been selected for appropriate assessment is described and the potential impacts arising from the upgrading of the WWTP at Millstreet are discussed in relation to the conservation objectives of the site. The AA also considers potential risks to a number of identified Annex I and II species.

4.2 Characteristics of the Blackwater River (Cork/Waterford) SAC (Site code 002170)

The Blackwater River is a candidate SAC selected for a number of habitats listed on Annex 1 of the E.U Habitats Directive, such as alluvial wet woodlands, Yew wood, floating river vegetation, estuaries, tidal mudflats, Atlantic salt meadows, Mediterranean salt meadows, perennial vegetation of stony banks and Oak Woodlands. The site is also selected for the following species listed on Annex II of the same directive – Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Crayfish, Twaite Shad, Atlantic Salmon, Otter and the plant, Killarney Fern. A section of the site, namely the Awbeg, supports a population of White-clawed Crayfish. This threatened species has been recorded from a number of locations and its remains are also frequently found in Otter spraints. The freshwater stretches of the Blackwater and Bride Rivers are designated salmonid rivers. See Appendix V – Site Synopsis Blackwater River (Cork/Waterford) SAC (Site Code 002170).

This Natura 2000 site also supports many of the mammal species occurring in Ireland, among which include the Pine Marten, Badger and Irish Hare, all of which are listed in the Irish Red Data Book. A number of bat species are also known to feed over the river and roost under the old bridges and in old buildings.

Landuse within the site is predominately agricultural, characterised by improved grasslands, which are drained and heavily fertilised. Slurry is spread over much of this grassland area. Fishing is the main tourist attraction along the Blackwater and its tributaries.

4.2.1 Conservation Interest in the SAC – Annex I Habitats

Current land use within the survey area is classed as agricultural, where the predominant habitats identified include grassland, scrub, scattered trees, mixed woodland and watercourses. The grassland areas support both cattle and horse grazing. Refer to Appendix VI – Ecological Assessment.

None of the Annex I habitats listed above, namely Alluvial Wet Woodlands, Yew Wood, estuaries, tidal mudflats, Atlantic and Mediterranean salt meadows exist within the survey area.

The woodlands, which exist along the stretch of the River Finnow from the confluence with the Tanyard stream to the confluence with the Blackwater River, supports many non-native species and appears to be unmanaged. Both the wet grassland and improved grassland habitats which exists throughout the survey area and which are within the SAC site are for the most part species poor and indicative of land in receipt of fertiliser.

Overall, the habitats noted and assessed throughout the survey area are not considered rare or endangered and no Annex I listed Habitats or protected floral species were identified within this site. Grassland constitutes approximately 90% of the habitats bordering both the Tanyard Stream and the River Finnow. Although, sections of this grassland are within the Blackwater River SAC, species diversity is typical of wet/improved agricultural grassland. Other prominent habitats within the survey area included Scrub (WS1), Mixed Conifer Woodland (WD3) and Scattered Trees (WD5).

The importance of the River Finnow and Blackwater River are discussed in terms of the presence of Annex II species below.

4.2.2 Conservation Interest in the SAC – Annex II Species

As mentioned previously, this site is also selected for the following species listed on Annex II of the E.U Habitats Directive – Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Crayfish, Twaite Shad, Atlantic Salmon and Otter.

Following consultation with the NPWS, Southern Regional Fisheries Board and desktop research it has been established that the stretch of watercourse within the survey area may potentially support populations of the Freshwater Pearl Mussel, Lamprey and Salmon. Otters also exist along the River Finnow within the survey area. Lamprey are also known to exist within the Blackwater River, into which the River Finnow discharges.

4.2.2.1 Freshwater Pearl Mussel Survey

The Freshwater Pearl Mussel (*Margaritifera margaritifera*) is a bivalve i.e.a mollusc with a body that is almost completely enclosed between a pair of shells. This species has a very complicated ecology/life cycle as individuals can grow to very large sizes for invertebrates with thick calcareous shells. The process of shell building is extremely slow with individuals living to over a hundred years.

The Freshwater Pearl Mussel has very specific habitat requirements and in Ireland is restricted to "*near natural, clean flowing waters, often downstream of ultra-oligotrophic lakes. It requires stable cobble and gravel substrate with very little fine material below pea sized gravel. Adult mussels are two-thirds buried and juveniles up to five to ten years old are totally buried within the substrate. The clean substrate must be free of inorganic silt, organic peat and detritus as these can all block oxygen exchange. The open water must be of high quality with very low nutrient concentrations, in order to limit algal and macrophyte growth. The presence of sufficient salmonid fish to carry the larval glochidial stage of the pearl mussel life cycle is essential.*" (DeHLG 2009).

Dr. Eugene Ross was commissioned to survey the entire section of the Tanyard Stream from the WWTP downstream to its confluence with the River Finnow and also the main channel of the River Finnow from its confluence with the Blackwater River upstream to Finnow Bridge for the presence of Freshwater Pearl Mussels. The Tanyard stream was surveyed on the 24th May 2009 and the main channel of the River Finnow was surveyed on 7th February, 23rd May and 28th May 2009. This report, in its entirety, is attached as Appendix III.

4.2.2.1.1 Methodology

The river section was searched using a bathyscope to scan the river substrate while wading. A diving torch was used to provide additional light in heavily shaded or deeper areas. A hand held Garmin GPSmap 60C global positioning device was used to record locations and the limits of the area examined. Data including water depth, channel width,

current speed, substrate composition and instream vegetation were recorded at intervals along the sections of the river and stream surveyed.

4.2.2.1.2 Results for the Tanyard Stream

No evidence of *Margaritifera* was observed at any location in the Tanyard stream. Although a few sections of the stream contained very limited areas of habitat that appeared superficially suitable for *Margaritifera,* most of the stream was too shallow to support a *Margaritifera* population during the drier summer months when water levels are lower and water temperatures are higher.

4.2.2.1.3 Results for the River Finnow

Throughout the entire survey area, only two individual *Margaritifera* were observed. These were located at W 27757 92195 and W 27700 92202, (**location no. 11 as marked on Figure 2, page 7 of report – Appendix III**) namely upstream of the confluence of the Tanyard stream with the River Finnow. No *Margaritifera* shells were observed at any point along the stretch of the River Finnow surveyed. Extensive areas of habitat that appeared superficially suitable for *Margaritifera* were observed. However, excessive growths of macrophytes noted within the survey area, particularly Water Crowfoot and Umbelliferae, were indicative of eutrophication. Siltation was observed at seven of the sixteen sites where habitat data was recorded.

M.margaritifera is present in the Blackwater River upstream and downstream of the confluence with the River Finnow and also at the confluence itself (Proposed Discharge Location No. 5).

The DeHLG Draft Management Plan for the Freshwater Pearl Mussel (March 2009) include the maintenance of free water exchange between the river and the substrate and minimal coverage by algae and weed in the conservation targets for sustainable mussel populations. The maintenance of the riverbed structure, which is required to breed the next generation is also of particular importance.

Overall, it can be concluded that although *Margaritifera* was recorded in that section of the River Finnow surveyed, the population is considered to be very sparse, with only 2 no. individual mussels observed. The Blackwater River is known to support this species also.

4.2.2.2 Salmon

The Blackwater River is of particular importance for its large population of salmon. The river is "*characterised by mighty pools, lovely streams, glides and generally, a good push of water coming through except in very low water*" (NPWS Site synopsis).

Owing to the fact that River Finnow discharges to the Blackwater, the South Regional Fisheries Board was consulted in relation to the importance of the River Finnow with respect to the salmon populations. Conservation Services were commissioned to carry out a Salmonid and Lamprey habitat survey and a semi-quantitative assessment of salmonid fish & juvenile lamprey on sections of the Tanyard stream and the River Finnow. This report, in its entirety, is attached as Appendix IV.

4.2.2.2.1 Methodology

Habitat Assessment: A habitat assessment was carried out on the 3rd June 2009, which consisted of walking/wading the entire stream/river channel. Salmonid and lamprey habitat quality was assessed having regard to stream width and depth, substrate type, flow type, bankside vegetation and degree of shade by bankside vegetation. Based on these observations coupled with more detailed criteria (as outlined in report attached as Appendix IV – sections 2.2.1 and 2.2.2), the value of each section for salmonid and lamprey spawning, as a nursery area for juvenile salmonids and lamprey, and as habitat for adult salmonids, was assessed. Habitat is rated for the different life stages of salmonids and lamprey on a scale of None/Poor/Fair/Good/Very Good/Excellent.

The results of the habitat assessment are as follows: (*Habitat sections are outlined on Map 3 below and photographs are attached as an appendice to the entire report – see appendix IV*)

Tanyard Stream

Habitat Section T-1	
Location	W2728 9087 to W2771 9150
Description	Mixture of riffle on muddy cobble, and glide on silty sand and gravel. Mostly well shaded by alder ash and sycamore.
Length	c. 1km
Photograph Number	1 - 7
Salmonid Adult Habitat	Fair – Good
Salmonid Nursery Habitat	Good
Salmonid Spawning Habitat	Fair
Lamprey Nursery Habitat	Fair
Lamprey Spawning Habitat	Fair

Habitat Section T-2	
Location	W2771 9150 to W2799 9221
Description	Mixture of heavily silted glide on muddy sand, and short sections of muddy riffle on cobble and gravel. Mostly heavily shaded by alder, ash, willow and oak.
Length	c. 1km
Photograph Number	8 - 12
Salmonid Adult Habitat	Fair – Good
Salmonid Nursery Habitat	Fair - Good
Salmonid Spawning Habitat	Fair
Lamprey Nursery Habitat	Good
Lamprey Spawning Habitat	Fair

River Finnow

Habitat Section F-1

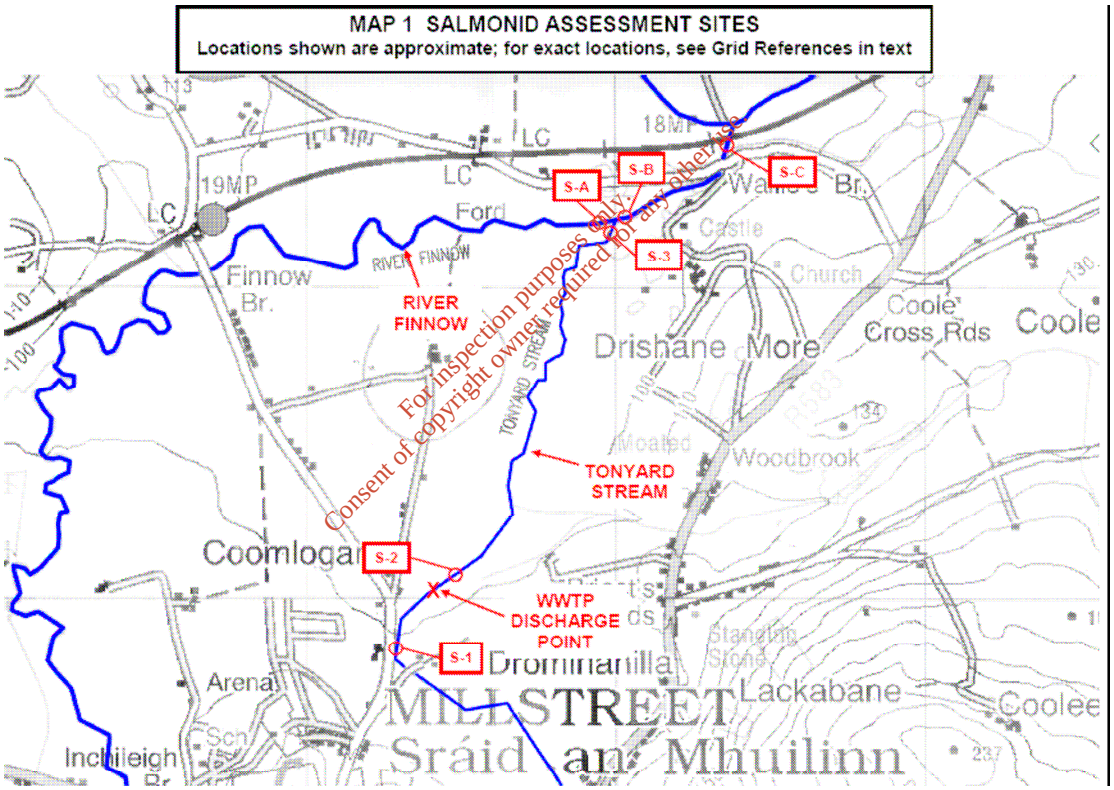
Location	W2728 9087 to W2771 9150
Description	Good mixture of riffle, glide and pool on predominantly cobble substrate with some gravel and sand. Very little marginal silt suitable for juvenile lamprey except in the vicinity of the Tonyard confluence and within a few hundred metres of Finnow Bridge where several very good areas of marginal silt were recorded.
Length	c. 2.5km
Photograph Number	13 - 21
Salmonid Adult Habitat	Very Good
Salmonid Nursery Habitat	Very Good
Salmonid Spawning Habitat	Good
Lamprey Nursery Habitat	Mostly Fair but with a few very good locations
Lamprey Spawning Habitat	Good

The salmonid fish survey was carried out on 26th & 29th June 2009. Timed electrofishing was carried out at the following 6 locations (see Map 1) to provide a Catch Per Unit Effort (CPUE) index and minimum density estimate of the salmonid population density.

River	Site Code	Locations
Tonyard Stream	S-1	W2730 9085
	S-2	W2744 9104
	S-3	W2797 9218
Finnow River	S-A	W2799 9222
	S-B	W2802 9221
	S-C	W2837 9248

Fish were captured using a Safari Research Surveyor pulsed direct current backpack electrofisher. Fish captured were held in the river in a perforated bin. Prior to handling, fish were anaesthetised in a benzocaine solution to reduce handling stress. Fish were then identified, and fork length of salmonids was measured to the nearest mm. Scales were taken from a representative sample of captured trout. Trout age was determined by length frequency distribution combined with scale reading using a high power binocular microscope. Trout were classified according to age as less than 1 year old (0+), 1 year old (1+), and 2 year old (2+). Salmon age was determined using length frequency distribution. To minimise stress no scale samples were taken from salmon.

Other fish species captured were measured.



4.2.2.2.2 Results of Salmonid Survey

Salmonid survey raw data and habitat assessment at each sampling site are presented in the appendices of the full report attached as Appendix IV of this AA report. A summary of the salmonid fish captured at each of the sites, the catch per unit effort of salmonids and the minimum density of salmonids are presented in Tables A - C below. Trout catch per unit effort (CPUE) for all sites is illustrated in Fig. 1. Salmon catch per unit effort (CPUE)

for all sites is illustrated in Fig. 2. Trout length frequency distributions are illustrated for the total trout catch and individually for each site in the appendices of the full report. Salmon length frequency distributions are illustrated for the total salmon catch and individually for each site in these appendices also.

The main results of the salmonid fish survey can be summarised as follows:

Distribution of Salmonid Species

Brown trout were recorded at all six of the sites assessed. Juvenile salmon were recorded at all but one of the sites assessed.

Salmonid Species Dominance on Tanyard Stream

On the Tanyard Stream brown trout were the dominant species. At Sites S-1 & S-2 juvenile trout were present at moderate density. At Site S-3 trout density was relatively low. Density of juvenile salmon at the Tonyard Stream sites was very low.

Salmonid Species Dominance on the River Finnow

On the Finnow River juvenile salmon dominated at the three sites assessed with juvenile trout recorded at low densities. It is, however, important to note that as assessment of this Annex II species is a central aim of the present study, the electrofishing sites on the Finnow River were specifically selected because they constituted high quality salmon nursery habitat. Furthermore, in a river the size of the Finnow the backpack electrofishing method is only effective in very shallow waters, thereby rendering ineffective any assessment of deeper waters, which are likely to be largely occupied by older trout.

Juvenile Salmon Density on River Finnow

The density of juvenile salmon was moderate at Sites S-A and S-B on the Finnow. However, at Site S-C, which is a short distance upstream of the confluence with the Blackwater River, notably high densities of juvenile salmon were recorded in an area of high quality nursery habitat on the right hand side of the river just upstream of the railway bridge. The minimum density of juvenile salmon recorded was 0.75/ m^2. Given that this density was recorded on a single electrofishing pass, the actual density is likely to be considerable higher.

Other Species Recorded

Eel were recorded at two sites (S-2 & S-3) on the Tonyard stream, and stone loach were recorded at a single site on the Finnow River. Lamprey were recorded throughout the surveyed sections of the Tanyard Stream and Finnow River (see Section 3.3 below).

TABLE A: SUMMARY OF FISH CATCH AT SALMONID ASSESSMENT SITES

	0+ trout	1+ trout	2+ trout	0+ salmon	1+ salmon	Stone Loach	Eel
Site S-1	19	2		1	1		
Site S-2	17	1	1				4
Site S-3	7	4	2	6			1
Site S-A	2			22		3	
Site S-B		2		20	4		
Site S-C	1			82	8		

TABLE B: SUMMARY OF SALMONID CATCH PER UNIT EFFORT

To calculate catch per unit effort, the catch figures and fishing time are combined to calculate the theoretical catch per hour fishing.

	0+ trout	1+ trout	2+ trout	0+ salmon	1+ salmon
Site S-1	114	12	-	6	6
Site S-2	102	6	6	-	-
Site S-3	42	24	12	36	-
Site S-A	12	-	-	132	-
Site S-B	-	12	-	120	24
Site S-C	5	-	-	378	37

TABLE C: SUMMARY OF MINIMUM DENSITY OF SALMONIDS (Minimum number per m2) - Based on single pass electrofishing figures.

	0+ trout	1+ trout	2+ trout	0+ salmon	1+ salmon
Site S-1	0.063	0.007	0	0.003	0.003
Site S-2	0.077	0.005	0.005	0	0
Site S-3	0.026	0.015	0.007	0.022	0
Site S-A	0.013	0	0	0.143	0
Site S-B	0	0.009	0	0.089	0.018
Site S-C	0.008	0	0	0.683	0.067

Fig. 1 Trout catch per unit effort

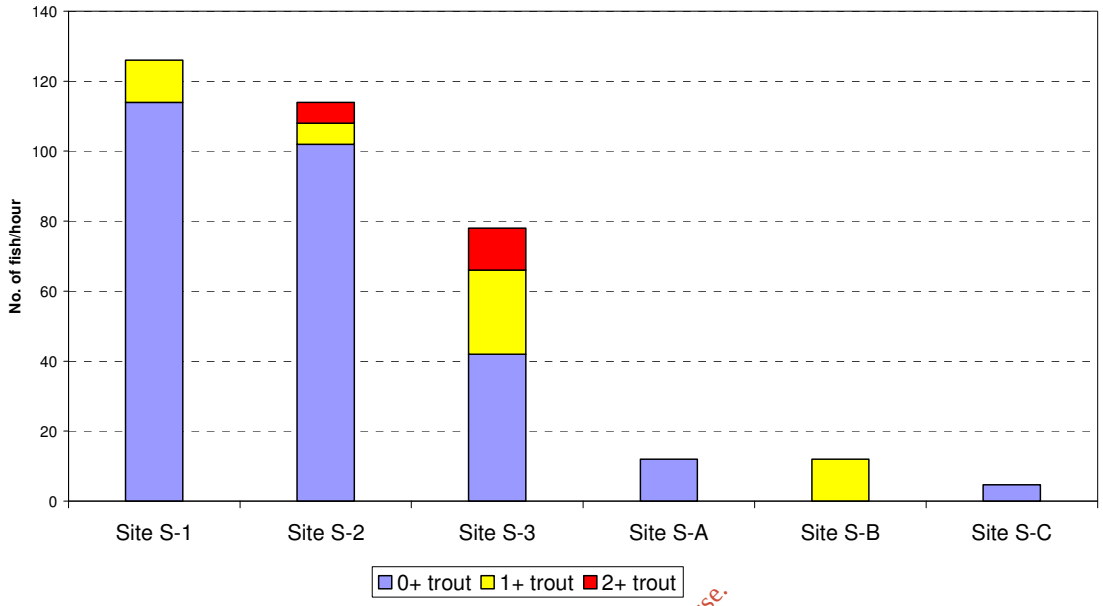
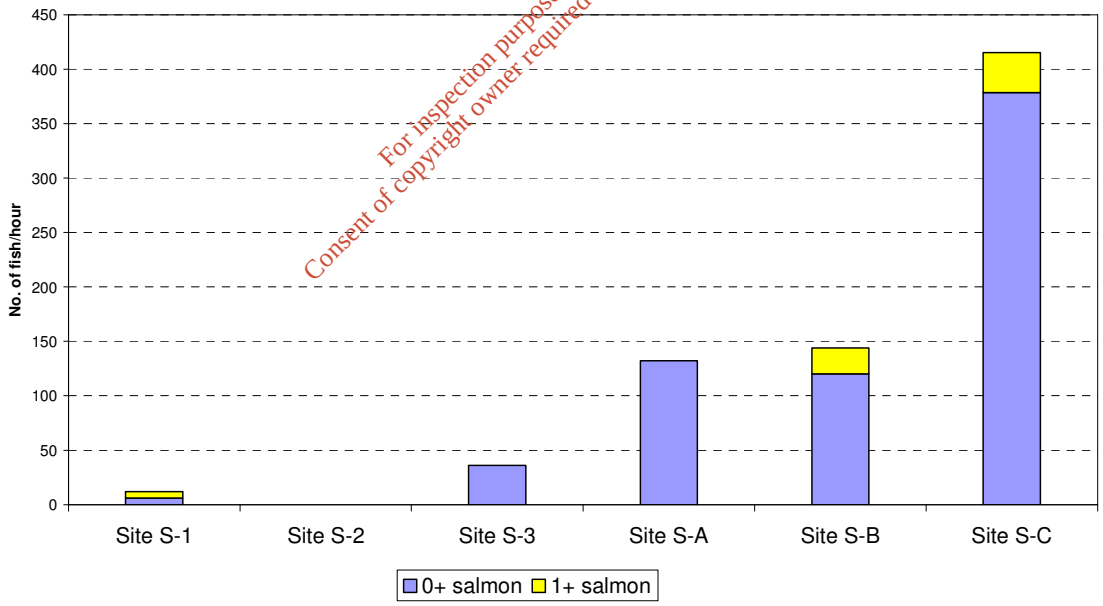


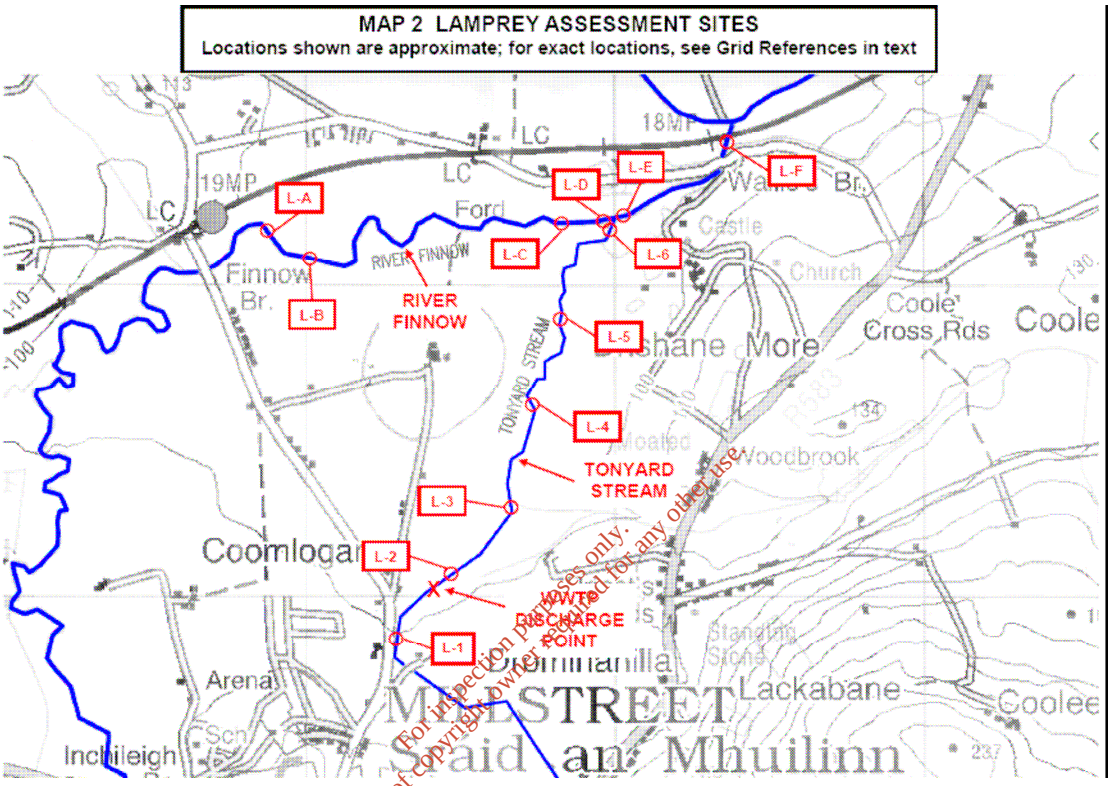
Fig. 2 Salmon catch per unit effort



4.2.2.3 Lamprey

4.2.2.3.1 Methodology

The juvenile lamprey survey was carried out on 26th & 29th June 2009. Juvenile lamprey were assessed at the following sites (see Map 2):



River	Site Code	Locations
Tanyard Stream	L-1	W2728 9087
	L-2	W2744 9104
	L-3	W2767 9129
	L-4	W2773 9163
	L-5	W2781 9188
	L-6	W2797 9218
Finnow River	L-A	W2689 9218
	L-B	W2701 9208
	L-C	W2783 9195
	L-D	W2797 9224
	L-E	W2799 9222
	L-F	W2735 9247

The assessment method used was the qualitative method described by O'Connor (2004). Sampling areas at each site were electrofished in a zigzag manner using a Safari Research Surveyor pulsed direct current electrofisher. The area fished varies depending on the extent of fine-grained bed material and suitable water depth available at the site. At each one m² section of the surveyed area the anode is energised for 20 seconds, then turned off for approximately five second. The anode is switched on and off in this way for approximately two minutes (Harvey & Cowx 2003). While the gear is operated, the anode is slowly pulled backwards in the water to cause lampreys to emerge from burrows as a result of electro-taxis. When lampreys emerge the electrode is held in the 'on' position to stun the larvae for capture. By keeping the anode 10 – 15 cm above the sediment and pulling the anode backwards, the number of lampreys stunned within the substrate is thought to be reduced (O'Connor 2004). Fish are anaesthetized using a benzocaine solution before being measured and identified using the key and descriptive notes in Maitland (2003 & 2004). The area sampled is measured so that the number of ammocoetes per unit area can be determined as a minimum estimate of density.

4.2.2.3.2 Result of Juvenile Lamprey Survey

Juvenile lamprey survey raw data are presented for each sampling site in the appendices of the full report attached as Appendix IV of this assessment. A summary of the fish captured at each of the sites, and the minimum density of lamprey are presented in Tables D & E below. Minimum density of juvenile lamprey for all sites is illustrated in Fig. 3. Lamprey length frequency distributions are illustrated for all sites and individually for each site in Appendix 6.

The main results of the lamprey survey can be summarised as follows:

Distribution

Juvenile lamprey was recorded at ten of the twelve sites assessed, indicating a healthy distribution of lamprey.

Species Recorded

Only juvenile *Lampetra* sp. i.e. Brook Lamprey and/or River Lamprey were recorded in the present survey (it is not possible to distinguish between these species in live juvenile specimens). No juvenile Sea Lamprey (*Petromyzon marinus*) were recorded. In a lamprey survey of the Blackwater system in 2003 – 2004 a single site was assessed in the lower

reaches of the Finnow. This site "*yielded a population density of 8 individuals / m2. The population differed from all other channels in that it was mostly composed of juvenile sea lamprey with juvenile river / brook lamprey accounting for circa 35% of the numbers captured*." (King & Linnane 2004) On the basis of the findings of King & Linnane (2004) the precautionary principle should be applied and it should be assumed that sea lamprey continue to spawn in the Finnow River, albeit perhaps in low numbers.

Population Structure

The length frequency distribution of the lamprey captured in the present survey indicates the presence of juveniles of at least 3-4 year classes including 0+ (larvae spawned last winter) (see graphs in Appendix 6). Most of the individual sites assessed have a length frequency distribution indicative of at least two-year classes. This indicates a healthy population structure with spawning in the Finnow River and Tonyard Stream on an annual basis in recent years. King & Linnane (2004) state that at the site they assessed on the Finnow: "*The population structure showed a lack of 0+ juveniles, suggesting no recent spawning of lamprey in this channel. Most of the population had lengths ranging between 11 and 13 cm. There was a prominent modal peak at 13 cm composed entirely of sea lamprey."* In contrast, in the present survey 0+ lamprey were recorded at three sites on the Finnow River, and lamprey size ranged from 3 to 17cm.

Juvenile Lamprey Density

Minimum density estimates at the sites assessed ranged from 0 to 46 juvenile lamprey per m^2. The densities indicated in the present survey compare favourably with densities recorded in other Irish catchments. At sites L-A, L-B and L-E, which could be regarded as optimal habitat, the mean of the minimum density estimates is 32 lamprey per m^2. Harvey & Cowx (2003) define densities of *Lampetra* of >10/m^2 in optimal habitat as indicative of '*favourable conservation status*".

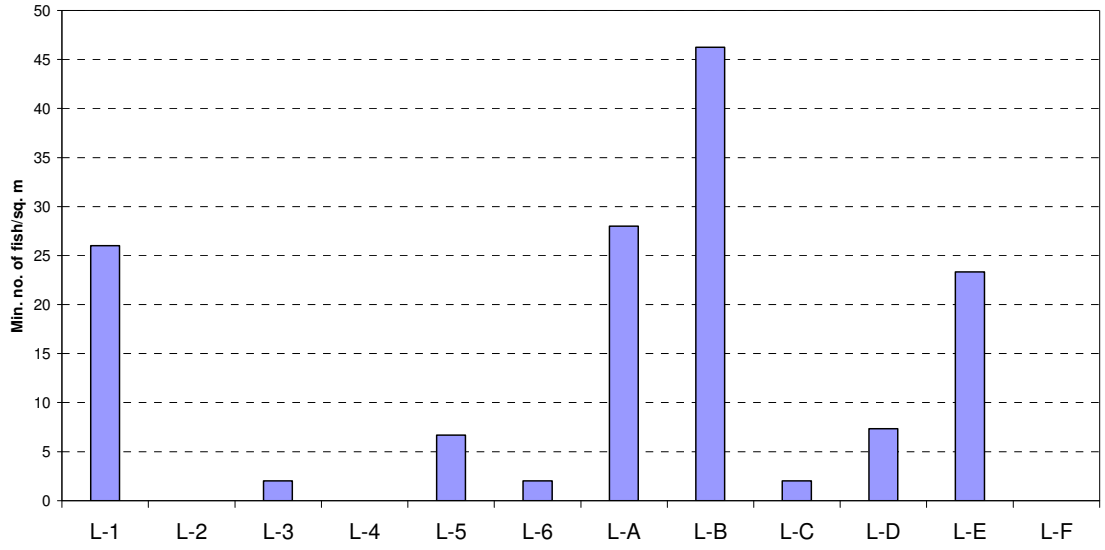
TABLE D: SUMMARY OF FISH CATCH AT LAMPREY ASSESSMENT SITES

	Lampetra sp.	Eel
L-1	13	0
L-2	0	0
L-3	2	1
L-4	0	0
L-5	5	0
L-6	2	0
L-A	14	0
L-B	26	0
L-C	2	0
L-D	11	0
L-E	35	0
L-F	0	0

TABLE E: SUMMARY OF MINIMUM DENSITY OF LAMPREY (Minimum number per m^2)

	Lampetra sp.	Eel
L-1	26.0	0
L-2	0	0
L-3	2.0	1
L-4	0	0
L-5	6.6	0
L-6	2.0	0
L-A	28.0	0
L-B	104.0	0
L-C	2.0	0
L-D	7.3	0
L-E	23.3	0
L-F	0	0

Fig. 3 Lamprey minimum density



4.2.2.4 Otters

The Otter (*Lutra Lutra*) is a semi-aquatic carnivore that is widespread throughout all Irish fresh-water and most coastal habitats. Within an area, otters will usually have a number of resting places, both above ground 'couches' and under-ground 'holts'. Suitable breeding sites for otters "*must be undisturbed, have a good food supply nearby, and not be at risk from flooding*" (DeHLG 2008).

The Otter is protected in Ireland under the Wildlife Act 1976 and the Wildlife Amendment Act (2000) which make it illegal to hunt, disturb, or intentionally kill otters. It is further listed in Annex II and IV of the EU Habitats Directive (92/43/EEC).

During a site visit, Otter spraints were noted along a section of land adjacent to the River Finnow, upstream of the confluence with the Tanyard stream. This area is considered a potential couch. The presence of otters at this location has been confirmed by the landowner, who has stated that he has seen up to three otters at this location on numerous occasions.

The habitat in proximity to where the otter spraints were noted is considered favoured habitat by otters, namely, presence of trees and scrub (including bramble). This area is

not prone to flooding, which is an additional requirement of a habitat to deem it suitable for the presence of otters.

4.3 Consultation with the NPWS on the Potential Impacts of the Project

The following were consulted during the initial ecological assessment:

- Mr. Jervis Good, Divisional Ecologist, NPWS Southern Division

Mr Good stated during verbal communication that an AA should be prepared with respect to the proposed development.

- Mr. BarryO'Donoghue, Conservation Officer, NPWS

Mr. O'Donoghue requested a comprehensive Freshwater Pearl Mussel (Margaritifera margaritifera) survey downstream of any discharge location and along the route of the outfall pipe. He also indicated that the presence of otters within the site should be investigated.

- Mr.Andrew Gillespie, South Regional Fisheries Board

Mr. Gillespie indicated during consultation that with respect to the River Finnow, the Board would have preference for discharge options 4 & 5 as these are downstream of significant recorded salmonid spawning habitat. The outfall line, which is proposed along the Tanyard Stream, would allow use of greater assimilative capacity at proposed discharge locations 4 & 5.

4.4 Potential Ecological Impacts on Annex I Habitats

4.4.1 Impacts During the Construction Phase of the Development

The greatest impact on habitats will arise during the construction phase of the development. The construction phase will include excavation/construction work within the boundary of the existing WWTP and also excavation works required to facilitate the laying of the outfall pipe from the WWTP to the point of discharge. Some additional ground disturbance can be expected at the point of the discharge.

The construction of the WWTP structure and pumping station will have no impact on the habitats within the SAC. Therefore this section of the site is not considered further in the impact assessment.

As outlined above there are 2 no. routes under consideration for the location of the outfall pipe from the WWTP to the discharge point. The first route is that which would involve running the outfall pipe from the WWTP to Finnow Bridge, where the treated effluent would be discharged. This option would have no significant negative impact on the habitats within the SAC as excavations works required to facilitate this route would be confined to the third class road from the WWTP to Finnow Bridge.

The second route under consideration for the location of the outfall pipe encompasses a stretch of ground from the WWTP to the confluence of the River Finnow and Tanyard Stream. This may extend to the confluence with the River Blackwater if discharge point no. 5 is considered (See figure 4 – appendix 1). This option would involve excavation works within the lands running parallel to the Tanyard Stream and would result in disturbance to, and removal of areas of habitat.

The wet grassland habitat, which exists along the stretch of the Tanyard stream from the WWTP to the confluence, would experience the greatest impact, whereby sections of this habitat would be disturbed to facilitate the laying of the pipe. Sections of this grassland are within the SAC site. However, this habitat is not listed as an Annex I habitat and the vegetation in this area would re establish itself over time.

Some areas of scrub and scattered trees, which are also present within the SAC site may also experience disturbance particularly that land on either bank of the River Finnow from the confluence with the Tanyard stream to the confluence with the River Blackwater. It

may be necessary to remove a number of trees and scrub vegetation to facilitate the laying of the outfall pipe in the event of utilising the proposed discharge point no. 5 located at the confluence of the River Finnow with the River Blackwater. As mentioned previously, these habitats are not listed as Annex I habitats for which the site is selected.

Overall, the grassland area will experience the most significant habitat loss. However, having regard to the fact that this habitat is not an Annex I habitat and does not have a high ecological value coupled with the large areas of similar habitat in the surrounding area, it is not thought that the construction phase of the development will have a significant negative impact on the habitats present within the survey area. Nor is it expected that the construction phase of the development will impact negatively on the integrity of the Blackwater River SAC with respect to the conservation objectives for the Annex I habitats within the site.

4.4.2 Impacts during the Operational Phase of the Development

No further impacts are expected on the existing habitats throughout the site during the operational life of wastewater treatment plant. Areas of disturbed ground will re-vegetate following disturbance during the construction phase.

4.5 Potential Ecological Impacts on Annex II Species

4.5.1 Impacts during the Construction Phase of the Development

Disturbance is the greatest impact experienced by species during the construction phase of a development. With respect to this development, it is anticipated that the collection system will be constructed in 3 – 4 months and the WWTP will be constructed in 1 year approximately. The laying of the outfall pipe will result in further disturbance to species along the outfall route to the point of discharge.

4.5.1.1 Potential Impact to the Freshwater Pearl Mussel during the Construction Phase

Provided care is taken during the construction of the WWTP, it is not expected that this stage of the development poses a risk to the Freshwater Pearl Mussel population within the River Finnow, should they exist and within the River Blackwater.

The greatest potential impact to the Freshwater Pearl Mussel arising from the construction phase of the development arises from the risk of sediment and fine materials entering the

watercourse during the laying of the outfall pipe. A build up of fine material in the river bed substrate can impair the process of free water exchange between the open river and the water within the substrate. The free exchange of water means that oxygen levels within the substrate do not fall below those of the open water, which is essential for juvenile recruitment.

4.5.1.2 Potential Impact to Otters during the Construction Phase

Otter populations are sensitive to loss of riparian and scrub habitat (Hamilton & Rochford,2000; NPWS 2008). As mentioned previously, Otters exist along the River Finnow and evidence of their occurance was noted within the survey upstream of the confluence of the River Finnow and Tanyard stream.

The removal of riparian and scrub habitat utilised by otters is considered a significant impact. These habitats are important for otter breeding and resting sites. However, the area where evidence of otter activity was noted is not under consideration as a route for the outfall pipe, thus ensuring that habitats along this stretch of the river remain in tact.

There was no evidence of otter activity downstream of the confluence with the Tanyard stream. Therefore, if the outfall route runs parallel to the Tanyard stream with the discharge point at the confluence with the River Finnow or downstream of Wallis's bridge at the confluence with the River Blackwater, the proposed development will not have a significant negative impact on the existing otter population within the survey area.

4.5.1.3 Potential Impact to Salmon and Lamprey during the Construction Phase of the Development

Similar to above, an increase in suspended solids/silt for a prolonged period can result in significant negative impact on salmonid and lamprey spawning ground. Lamprey are sensitive to the particle size of their spawning areas.

4.5.2 Impacts during the Operational Phase of the Development

The proposed development will result in discharge of treated wastewater to either the River Finnow or Tanyard stream. The greatest impact associated with this discharge is deterioration of water quality within the Tanyard stream or River Finnow and subsequently within the Blackwater River.

Also, the risk of flooding at the WWTP poses a significant risk to the water quality and Annex II species inhabitating this water. However, there is no historical data pertaining to flooding of the existing WWTP at Millstreet. Furthermore, the design of the collection system will ensure that it is above the high flood level of the river, thereby eliminating the risk of flooding and resulting impact on the Annex II species existing within the River Finnow and Blackwater River.

The proposed upgrading of the WWTP will have greater capability to cope with peak loads, thus reducing the quantity of flow currently diverted to the storm water overflow system in an effort to prevent overloading of the oxidation ditch.

While there is currently no information pertaining to heavy metal concentrations in the influent, there are only 'dry industries' within the collection system. This should ensure that the heavy metal concentration of the discharge water is within safe concentrations.

As stated previously there are 5 no. options under consideration for the proposed location of the discharge point. The following tables outline the impact on the existing water quality arising from discharging the treated wastewater, with an expected design flow of 1,507.44m^3/day.

Table 1: Effect of Proposed Discharge on the River Finnow at Finnow Bridge – Expected Concentration Increases

PARAMETER	EXPECTED CONCENTRATIONS INCREASES NOTE 1 & 2	RESULTANT RECEIVING WATER CONC. (MG/L)	MAXIMUM CONC DOWNSTREAM NOTE 3
BOD	0.056mg/l (Mean River flow utilised) Note 3 0.446mg/L (95%ile river flow utilised)	2.056 (Mean flow) 2.446 (95%ile flow)	1.5mg O_2/L
Ammonia	0.018mg/l (Mean river flow utilised) 0.141 mg/l (95%ile river flow utilised)	0.068 (Mean flow) 0.191 (95%ile flow)	0.065mg/L
Ortho-phosphate	0.008mg/l (Mean river flow utilised) 0.067 mg/L (95%ile river flow utilised)	0.058 (Mean flow) 0.117 (95%ile flow)	0.035mg/L

Note 1: Values outlined in table 1 obtained from client

Note 2: Values are based on the provision of a tertiary treatment with nutrient reduction

Note 3: Maximum Concentration Downstream – Table 9 S.I No. 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulation 2009 – Good Status Values

Overall, the discharge from the treatment plant will result in an orthophosphate level downstream of 0. 058mg/l P utilising mean flow values. Having regard to the existing background orthophosphate concentration in the river at this location, this increase is not significant. Increased levels of nitrogen and phosphorus within a river can result in increased vegetation growth, particularly algae, which, if takes place is considered a significant negative impact. The existing concentrations and expected resultant ortho-phosphate concentrations are elevated and exceed the limit value for this parameter.

Table 2: Effect of Proposed Discharge on the Tanyard Stream (existing outfall adjacent to the WWTP) – Expected Concentration Increases

PARAMETER	EXPECTED CONCENTRATIONS INCREASES NOTE 1 & 2	RESULTANT RECEIVING WATER CONC. (MG/L)	MAXIMUM CONC DOWNSTREAM NOTE 3
BOD	0.325mg/l (mean river flow utilised) 1.271mg/L (95%ile flow utilised)	3.325 (mean flow) Note 3 4.271 (95%ile flow)	1.5mg O_2/L
Ammonia	0.195mg/l (mean river flow utilised) 0.763mg/L (95%ile flow utilised)	0.995 (mean flow) 1.563 (95%ile flow)	0.065mg/L
Ortho-phosphate	0.063mg/l (mean river flow utilised) 0.248mg/l (95%ile flow utilised)	0.173 (mean flow) 0.358 (95%ile flow)	0.035mg/L

Note 1: Values outlined in table 2 obtained from client

Note 2: Values are based on the provision of a tertiary treatment with nutrient reduction

Note 3: Maximum Concentration Downstream – Table 9 S.I No. 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulation 2009 – Good status values

Table 3: Effect of Proposed Discharge on the Tanyard stream (downstream of confluence with sister stream)

PARAMETER	EXPECTED CONCENTRATIONS INCREASES NOTE 1 & 2	RESULTANT RECEIVING WATER CONC. (MG/L)	MAXIMUM CONC DOWNSTREAM NOTE 3
BOD	0.133mg/l (mean river flow utilised) Note 3 0.699mg/L (95%ile flow utilised)	3.633 (mean flow) 4.199 (95%ile flow)	1.5mg O_2/L
Ammonia	0.147mg/L (mean river flow utilised) 0.773mg/L (95%ile flow utilised)	0.487 (mean flow) 1.113 (95%ile flow)	0.065mg/L
Ortho-phosphate	0.035mg/L (mean river flow utilised) 0.186mg/L (95%ile flow utilised)	0.135 (mean flow) 0.286 (95%ile flow)	0.035mg/L

Note 1: Values outlined in table 3 obtained from client

Note 2: Values are based on the provision of a tertiary treatment with nutrient reduction

Note 3: Maximum Concentration Downstream – Table 9 S.I No. 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulation 2009 – Good status values

Table 4: Effect of Proposed Discharge on the River Finnow (downstream of confluence with Tanyard stream – location no. 4)

PARAMETER	EXPECTED CONCENTRATIONS INCREASES NOTE 1 & 2	RESULTANT RECEIVING WATER CONC. (MG/L)	MAXIMUM CONC DOWNSTREAM NOTE 3
BOD	0.047mg/L (mean river flow utilised) Note 3 0.381mh/L (95%ile flow utilised)	2.047 (mean flow) 2.381 (95%ile flow)	1.5mg O_2/L
Ammonia	0.014mg/L (mean river flow utilised) 0.116mg/L (95%ile flow utilised)	0.104 (mean flow) 0.206 (95%ile flow)	0.065mg/L
Ortho-phosphate	0.007mg/L (mean river flow utilised) 0.057 mg/L (95%ile flow utilised)	0.057 (mean flow) 0.107 (95%ile flow)	0.035mg/L

Note 1: Values outlined in table 4 obtained from client

Note 2: Values are based on the provision of a tertiary treatment with nutrient reduction

Note 3: Maximum Concentration Downstream – Table 9 S.I No. 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulation 2009 – Good status values

Owing to elevated levels of nutrients within the Tanyard stream at present, in particular Phosphate and BOD concentration, any further increase in considered a significant impact. Further deterioration of water quality within this stream could impact on that of the River Finnow. There are 2 no. locations along this stream currently under consideration as a possible point of discharge. The confluence of the Tanyard and the Finnow is also a possible location for the discharge point. Having regard to the present water quality of this stream together with the fact that it is a tributary of the River Finnow, which contains important spawning habitat for salmonids, any discharge to this watercourse is considered a likely significant impact on the aquatic ecology of both the stream and the river Finnow.

The following impacts on Annex II species within the survey area are discussed having consideration to the above.

4.5.2.1 Potential Impacts to the Freshwater Pearl Mussel populations during the Operational Phase of the Development

The open water, which supports Freshwater Pearl Mussels, must be of high quality with very low nutrient concentrations to limit algal and macrophyte growth. The nutrient levels must be close to reference levels for ultra-oligotrophic rivers. Excessive phosphorus levels will result in algal growth, which is detrimental to populations of Freshwater Pearl Mussels. The discharge of inadequately treated wastewater to the River Finnow and Blackwater River can potentially result in the increase of suspended solids together with other nutrients. Where sediment/suspended solids are introduced to a river supporting pearl mussels, the resulting impacts are long term and significant. Direct ingestion of silt by adult mussels can lead to rapid death.

Margaritifera is not present in the Tanyard Stream and only two isolated individuals were recorded in the River Finnow. These protected animals have an intrinsic conservation value in the River Finnow. Dr. Ross has stated that it would be premature to assess the potential impact of the proposed WWTP and it's associated discharge on these mussels. However, in all probability the placing of an effluent discharge point upstream of these mussels at Finnow Bridge would have a likely significant negative impact on these

mussels. In the event that the discharge point should be located at the confluence with the Blackwater and River Finnow, more information on the distribution, population size and demography of the Freshwater Pearl Mussel in the main channel of the Blackwater River downstream of the discharge point should be gathered. This option would involve a Stage 2 Margaritifera survey.

Provided that the proposed quality is reached for the treated wastewater, it is not expected that discharge will further deteriorate the water quality of the River Finnow. Therefore, the most favourable option for discharging of treated wastewater from the WWTP, having regard to the presence of the Freshwater Pearl Mussel within the River Finnow, is at the confluence of the Tanyard stream with the River Finnow.

4.5.2.2 Potential Impacts to the Otter populations during the Operational Phase of the Development

Deterioration of water quality can result in a population decline of mammals such as otters. Poor water quality has been linked to sites that proved negative for otter activity. Pollution arising from sewage discharges and acidification by coniferous forestry will decrease the availability of prey and subsequently otter populations (Mason and Mac Donald, 1989).

Existing background concentrations of Ortho-phosphate in the River Finnow are elevated above the limit concentration of ≤0.03mg/L P. Cumulative concentration calculations show that the addition of the treated wastewater from the WWTP will not result in a significant increase in the concentrations of BOD and Orthophosphates.

There was no evidence of otter activity downstream of the confluence with the Tanyard stream. Therefore, if the outfall route runs parallel to the Tanyard stream with the discharge point at the confluence with the River Finnow or downstream of Wallis's bridge at the confluence with the River Blackwater, the proposed development will not have a significant negative impact on the existing otter population within the survey area. However, any deterioration in water quality in the stretch of river between Finnow Bridge and the confluence with the Tanyard stream and River Finnow could have a potential significant negative impact on the otter population.

4.5.2.3 Potential Impacts to the Salmon and Lamprey populations during the Operational Phase of the Development

Juvenile lamprey were absent at Site L-2, which is a short distance downstream of the WWTP discharge to the Tanyard Stream. It cannot be stated with certainty that the absence of lamprey at this site is due to effects from the WWTP. Harvey & Cowx (2003) found ammocoetes (juvenile lamprey) 10 m downstream of a sewage outfall. They state "*pollution sources can seriously damage spawning areas and smother silt beds. However, pollution levels below sewage outfalls may be sufficiently low to allow sustained use of silt beds by ammocoetes*."

No juvenile salmon were recorded at Site S-2, which is immediately downstream of the WWTP discharge location on the Tanyard Stream. This is likely to be due to the polluting effect of the WWTP effluent. However, the presence of juvenile salmon (albeit at very low density) upstream of the WWTP established the fact that adult salmon have run up the Tanyard Stream past the WWTP discharge, to spawn further upstream.

Greatest density of salmon recorded at location S-C, which is a short distance upstream of the confluence with the Blackwater River. High densities of juvenile salmon were recorded in an area of high quality nursery habitat on the right hand side of the river just upstream of the railway bridge.

Moderate densities of juvenile salmon were recorded at the remaining two sites, namely S-A and S-B.

Any further deterioration in water quality could pose a significant negative impact on the continued use of these spawning habitats for both salmon and lamprey populations.

4.6 Mitigation Measures

The proposed development will not impact impact on the integrity of the Annex I Habitats within the Blackwater SAC. No Annex I Habitat exist within the survey area.

Four Annex II species are known or thought likely to occur within the site. The following mitigation measures are proposed to preclude any negative effects of the development on these species.

- Where possible and practical it is recommended that the proposed outfall pipe be placed in the wet grassland habitat, thus avoiding disturbance and/or loss to areas of scrub habitat and the necessity for tree felling.
- Where this is not possible, no disturbance to these terrestrial habitats should occur during the bird-nesting season, namely 1st March to the 31st August. In the event that disturbance is necessary to facilitate the construction phase, it should be conducted during the period between the 1st September and end of February.
- Where storage of soil/gravel materials during the excavation is required to facilitate the laying of the outfall pipe is required, this storage should be confined to predetermined locations.
- On completion of the construction any remaining unwanted materials should be removed from these locations and taken off site. This is necessary to avoid damage to vegetation and deterioration of habitat quality.
- In addition to the above, no disturbance of habitats in the area utilised by the otters should take place
- Where it is not possible to retain all mature trees along the route of the outfall pipe, mature trees should be assessed during a suitable time for their likelihood as bat roosts.
- Trees should not be felled during the bat breeding season (late May to end of August) or during hibernation (late October to late March)
- Discharges to the Tanyard stream should also be avoided owing to present Q rating, which indicates a moderately polluted status.
- Temporary silt traps should be installed during excavation/construction works at the point of discharge to avoid unnecessary release of sediment/suspended solids to the water
- A setback of at least 10m from both the River Finnow and Tanyard stream must be adhered to during the construction phase

- All fuels or oils, which may be onsite during the construction phase, should be stored in bunded storage areas to avoid leakage to this drain.

4.7 Summary of Findings

- No Annex I Habitats were identified within the survey area
- The construction phase of the development will result in the greatest impact on habitats with loss of some areas of grassland, woodland and scrub
- This disturbance of habitat is not considered significant and will not impact on the integrity of the Blackwater River SAC with respect to the conservation objectives pertaining to the Annex I Habitats.
- Four Annex II species are thought likely to occur within the survey area, namely, Freshwater Pearl Mussel, Otter, Lamprey and Salmon.
- With respect to the **Freshwater Pearl Mussel**, the Tanyard stream consists of limited habitat for this species
- Conditions within the Tanyard stream during the drier summer months are probably unsuitable for the Freshwater Pearl Mussel
- Results of the survey carried out by Dr. Eugene Ross confirm that the Freshwater Pearl Mussel is not present in the Tanyard stream.
- Extensive areas of suitable habitat for the Freshwater Pearl Mussel are present in the River Finnow
- However, siltation and excessive growths of macrophytes indicating eutrophication were observed in the River Finnow
- Two individual mussels were noted in the section of the River Finnow surveyed, which indicates that the population is very sparse in this section of the river.

- The Freshwater Pearl Mussel is known to exist upstream and downstream of the confluence with the River Finnow and Blackwater (location no. 5 – Figure 2). Therefore any discharge at this location should not result in deterioration of existing water quality and should be avoided where possible.

- With respect to the **Lamprey and Salmon**, the survey recorded high quality for all life stages of the salmonids and lamprey in the sections of the Tanyard stream and the River Finnow

- Both juvenile salmon and juvenile lamprey (*Lampetra*) were recorded at high densities at some of the sites assessed on the Finnow River.

- The range in length of the Juvenile lamprey recorded (length frequency distribution) are indicative of successful lamprey spawning on an annual basis in recent years.

- All lamprey recorded were of the genus *Lampetra* i.e. brook lamprey and/or river lamprey. Sea lamprey (*Petromyzon marinus*), which have previously been recorded in the Finnow River, were not recorded in the present survey.

- Otter spraints were noted along a section of land adjacent to the River Finnow, upstream of the confluence with the Tanyard stream. This area is considered a potential couch.

4.8 Conclusion

The above report was prepared following consultation with the relevant authorities and external surveys conducted by Conservation Services and Dr. Eugene Ross.

It can be concluded that four Annex II species occur within the survey area, namely, Freshwater Pearl Mussel, Otter, Lamprey and Salmon.

Having regard to the location of these species within the survey area coupled with both the quality of the final treated wastewater and the expectant receiving water quality at the 5 no. possible discharge locations the following is that location which is considered most favourable for the proposed point of discharge:

- **Location no. 4 – confluence of the River Finnow and Tanyard stream**. At this location the deterioration in water quality arising from discharging treated wastewater is not considered significant. Dilution is greater at this location that it would be at proposed locations no. 1 & 2 along the Tanyard Stream. It is also downstream of locations identified as those supporting Otter populations and the two Freshwater Pearl Mussel individuals.

Appendix I

- Figure 1: Map outlining sections of survey area within the Blackwater River (Cork/Waterford) SAC
- Figure 2: Map outlining the location of the 5 no. options under consideration as a proposed point of discharge

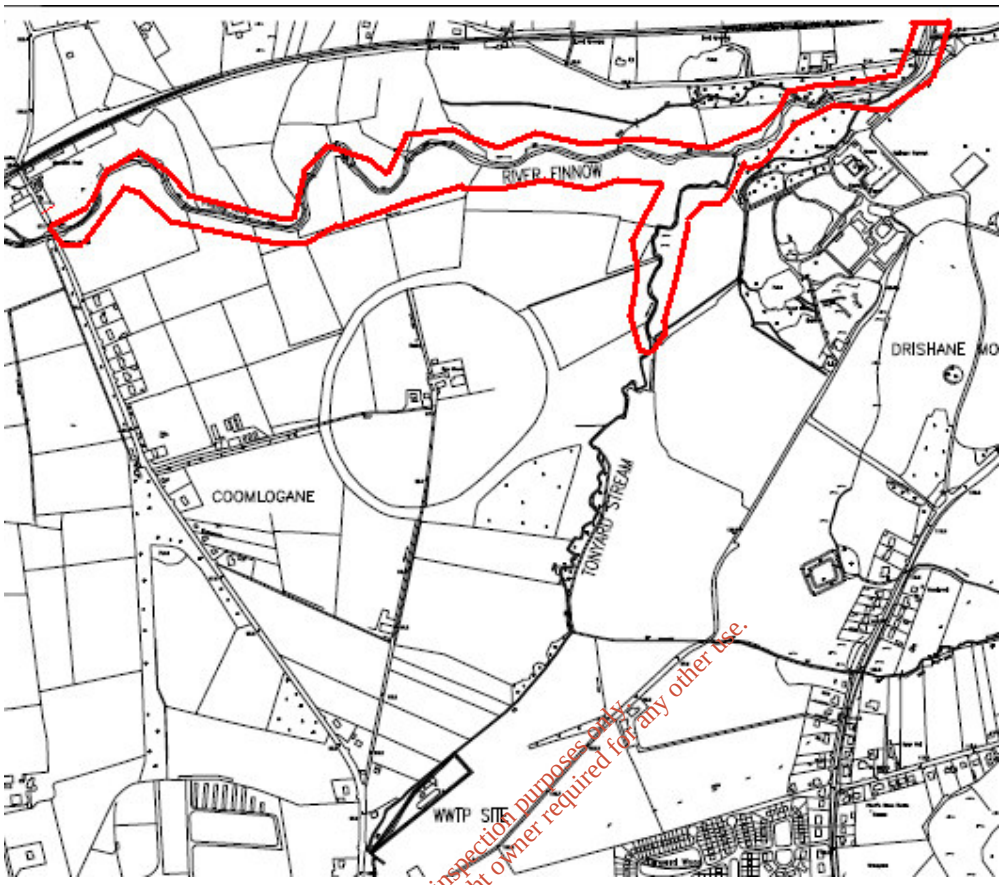


Figure 1: Map outlining sections of survey area within the Blackwater River (Cork/Waterford) SAC (area within red boundary)

Figure 2: Map outlining the location of the 5 no. Options under consideration as proposed point of discharge

Appendix II

- Synopsis of AA Report as per EC Guidance Document Assessment of Plans of Projects Significantly affecting Natura 2000 sites

Synopsis of Appropriate Assessment Report

Description of Project	The proposed development consists of upgrading the existing WWTP at Millstreet, on a site adjacent to the Tanyard stream. The treated wastewater from the WWTP will be discharged to a surface water body. There are 5 no. options under consideration for the proposed point of discharge, which are as follows : (1) Upstream of existing outfall, (2) Upstream of confluence with sister stream, (3) Finnow River at Finnow Bridge, (4) Confluence of the Finnow River and Tanyard stream and (5) Upstream of Wallis's bridge at the confluence of the River Finnow with the Blackwater River. At present there are 2 no. options under consideration for the route of the outfall pipe from the WWTP to the proposed point of discharge, namely along the Tanyard stream or along the third class road from the WWTP to Finnow Bridge.
Description of Natura 2000 site	The Blackwater River is a candidate SAC selected for a number of habitats listed on Annex 1 of the E.U Habitats Directive and Annex II species, which are listed on the same directive. Among the Annex II species listed include Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Crayfish, Twaite Shad, Atlantic Salmon, Otter and the plant, Killarney Fern. The freshwater stretches of the Blackwater and Bride Rivers are designated salmonid rivers. This SAC site also supports many mammal species, among which include the Pine Marten, Badger and Irish Hare, all of which are listed in the Irish Red Data Book.

Description of Individual Elements of the Project likely to give rise to Impacts on the Natura 2000 Site	• The proposed project will involve excavation and disturbance to habitats in the area • The laying of the outfall pipe from the WWTP to the proposed point of discharge will result in disturbance/loss of habitat along the Tanyard stream and possibly the River Finnow, depending on the route chosen. • Construction work necessary at the point of discharge will result in further disturbance to both terrestrial and aquatic habitats • Discharging of treated waste water to either the Tanyard Stream or River Finnow
Description of Likely Direct, Indirect or Secondary Impacts of the Project on the Natura site	• Loss of habitat within the Blackwater River SAC – potential loss of breeding/nesting/feeding sites for mammals and birds • Impact on sensitive aquatic species arising from the direct discharge of treated wastewater to either the Tanyard stream or River Finnow • Deterioration of water quality within the Tanyard Stream, River Finnow and Blackwater River
Description of Likely Changes to the site arising as a result of: • Reduction of habitat area • Disturbance to key species • Habitat or species fragmentation • Reduction in species density • Changes in key indicators of conservation value	• Overall, the habitats noted and assessed throughout the survey area are not considered rare or endangered and no Annex I listed Habitats or protected floral species were identified within this site. Grassland constitutes approximately 90% of the habitats bordering both the Tanyard Stream and the River Finnow. The proposed project will result in disturbance to the habitats noted. • As mentioned previously, this site is also selected for the following species listed on Annex II of the E.U Habitats Directive – Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Crayfish, Twaite Shad, Atlantic Salmon and Otter. Following consultation with the NPWS, Southern Regional Fisheries Board, desktop research and survey work it has been established that the stretch of watercourse within the survey area supports populations of the

	Freshwater Pearl Mussel, Lamprey and Salmon. Otters also exist along the River Finnow within the survey area. The proposed project may potentially cause disturbance to these sensitive Annex II species.
Description of Likely Impacts on the Natura 2000 site as a whole in terms of: • Interference with key relationships that define the structure of the site • Interferences with key relationships that define the function of the site	• It is not expected that the construction phase of the development will impact negatively on the integrity of the Blackwater River SAC with respect to the conservation objectives for the Annex I habitats within the site. No further impacts are expected on the existing habitats throughout the site during the operational life of wastewater treatment plant. Areas of disturbed ground will re-vegetate following disturbance during the construction phase. • Disturbance is the greatest impact experienced by Annex II species during the construction phase of a development. With respect to this project, the laying of the outfall pipe will give rise to the greatest disturbance. • The Freshwater Pearl Mussel, Lamprey and Salmonid species are all susceptible where the sediment/silt concentration of the water increases, which is a likely impact during the construction phase. • The area, which is thought to support otters will not experience disturbance during the construction phase, as this area is not under consideration as an outfall route. • Operational impacts on these species arise from the proposed discharge of treated wastewater to either the River Finnow or Tanyard stream. The greatest impact associated with this discharge is deterioration of water quality within the Tanyard stream or River Finnow and subsequently within the Blackwater River.

Indicators of Significance as a result of the identification of effects set out above in terms of: • Loss • Fragmentation • Disruption • Disturbance • Change to Key Elements of the site (e.g. water quality etc)	• *Margaritifera* population within the River Finnow is considered sparse – 2 no. individuals identified • No *Margaritifera* present in the Tanyard stream • Juvenile lamprey and salmon observed in the River Finnow • The presence of otters has been confirmed. • In the event that there is no further significant deterioration in water quality these species should not experience a significant impact. Such a deterioration could pose a significant negative impact on the continued use of these spawning habitats for both salmon and lamprey populations.

Appendix III

- A Survey of a section of the Finnow River (Muster Blackwater system) and a section of its tributary, the Tanyard Stream for the Freshwater Pearl Mussel (*Margaritifera margaritifera*)

Appendix IV

- Salmonid and Lamprey Habitat Survey & Semi-Quantitative Assessment of Salmonid Fish & Juvenille Lamprey on sections of the Tanyard Stream and River Finnow at Millstreet, Co. Cork

Appendix V

- Site Synopsis

SITE SYNOPSIS

SITE NAME: BLACKWATER RIVER (CORK/WATERFORD)

SITE CODE: 002170

The River Blackwater is one of the largest rivers in Ireland, draining a major part of Co. Cork and five ranges of mountains. In times of heavy rainfall the levels can fluctuate widely by more than 12 feet on the gauge at Careysville. The peaty nature of the terrain in the upper reaches and of some of the tributaries gives the water a pronounced dark colour. The site consists of the freshwater stretches of the River Blackwater as far upstream as Ballydesmond, the tidal stretches as far as Youghal Harbour and many tributaries, the larger of which includes the Licky, Bride, Flesk, Chimneyfield, Finisk, Araglin, Awbeg (Buttevant), Clyda, Glen, Allow, Dalua, Brogeen, Rathcool, Finnow, Owentaraglin and Awnaskirtaun. The extent of the Blackwater and its tributaries in this site, flows through the counties of Kerry, Cork, Limerick, Tipperary and Waterford. Towns along, but not in the site, include Rathmore, Millstreet, Kanturk, Banteer, Mallow, Buttevant, Doneraile, Castletownroche, Fermoy, Ballyduff, Rathcormac, Tallow, Lismore, Cappoquin and Youghal.

The Blackwater rises in boggy land of east Kerry where Namurian grits and shales build the low heather-covered plateaux. Near Kanturk the plateaux enclose a basin of productive Coal Measures. On leaving the Namurian rocks the Blackwater turns eastwards along the northern slopes of the Boggeraghs before entering the narrow limestone strike vale at Mallow. The valley deepens as first the Nagles Mountains and then the Knockmealdowns impinge upon it. Interesting geological features along this stretch of the Blackwater Valley include limestone cliffs and caves near the villages and small towns of Killavullen and Ballyhooly; the Killavullen caves contain fossil material from the end of the glacial period. The associated basic soils in this area support the growth of plant communities which are rare in Cork because in general the county's rocks are acidic. At Cappoquin the river suddenly turns south and cuts through high ridges of Old Red Sandstone. The Araglin valley is predominantly underlain by sandstone, with limestone occurring in the lower reaches near Fermoy.

The site is a candidate SAC selected for alluvial wet woodlands and Yew wood, both priority habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for floating river vegetation, estuaries, tidal mudflats, *Salicornia* mudflats, Atlantic salt meadows, Mediterranean salt meadows, perennial vegetation of stony banks and old Oak woodlands, all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive - Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Crayfish, Twaite Shad, Atlantic Salmon, Otter and the plant, Killarney Fern.

Wet woodlands are found where river embankments, particularly on the River Bride, have broken down and where the channel edges in the steep-sided valley between Cappoquin and Youghal are subject to daily inundation. The river side of the embankments was often used for willow growing in the past (most recently at Cappoquin) so that the channel is lined by narrow woods of White and Almond-leaved Willow (*Salix alba* and *S. triandra*) with isolated Crack Willow (*S. fragilis*) and Osier (*S. viminalis*). Grey Willow (*S. cinerea*) spreads naturally into the sites and occasionally, as at Villierstown on the Blackwater and Sapperton on the Bride, forms woods with a distinctive mix of woodland and marsh plants, including Gypsywort (*Lycopus europaeus*), Guelder Rose (*Viburnum opulus*), Bittersweet (*Solanum dulcamara*) and various mosses and algae. These wet woodlands form one of the most extensive tracts of the wet woodland habitat in the country.

A small stand of Yew (*Taxus baccata*) woodland, a rare habitat in Ireland and the EU, occurs within the site. This is on a limestone ridge at Dromana, near Villierstown. While there are some patches of the wood with a canopy of Yew and some very old trees, the quality is generally poor due to the dominance of non-native and invasive species such as Sycamore, Beech and Douglas Fir (*Pseudotsuga menzsisii*). However, the future prospect for this Yew wood is good as the site is proposed for restoration under a Coillte EU Life Programme. Owing to its rarity, Yew woodland is listed with priority status on Annex I of the EU Habitats Directive.

Marshes and reedbeds cover most of the flat areas beside the rivers and often occur in mosaic with the wet woodland. Common Reed (*Phragmites australis*) is ubiquitous and is harvested for thatching. There is also much Marsh Marigold (*Caltha palustris*) and, at the edges of the reeds, the Greater and Lesser Pond-sedge (*Carex riparia* and *C. acutiformis*). Hemlock Water-dropwort (*Oenanthe crocata*), Wild Angelica (*Angelica sylvestris*), Reed Canary-grass (*Phalaris arundinacea*), Meadowsweet (*Filipendula ulmaria*), Nettle (*Urtica dioica*), Purple Loosestrife (*Lythrum salicaria*), Marsh Valerian (*Valeriana officinalis*), Water Mint (*Mentha aquatica*) and Water Forget-me-not (*Myosotis scorpioides*).

At Banteer there are a number of hollows in the sediments of the floodplain where subsidence and subterranean drainage have created isolated wetlands, sunk below the level of the surrounding fields. The water rises and falls in these holes depending on the watertable and several different communities have developed on the acidic or neutral sediments. Many of the ponds are ringed about with Grey Willows, rooted in the mineral soils but sometimes collapsed into the water. Beneath the densest stands are woodland herbs like Yellow Pimpernel (*Lysimachia nemorum*) with locally abundant Starwort (*Callitriche stagnalis*) and Marsh Ragwort (*Senecio palustris*). One of the depressions has Silver Birch (*Betula pendula*), Ash (*Fraxinus excelsior*), Crab Apple (*Malus sylvestris*) and a little Oak (*Quercus robur*) in addition to the willows.

Floating river vegetation is found along much of the freshwater stretches within the site. The species list is quite extensive and includes Pond Water-crowfoot (*Ranunculus peltatus*), Water-crowfoot (*Ranunculus* spp.), Canadian Pondweed (*Elodea canadensis*), Broad-leaved Pondweed (*Potamogeton natans*), Pondweed (*Potamogeton* spp.), Water Milfoil (*Myriophyllum* spp.), Common Club-rush (*Scirpus*

lacustris), Water-starwort (*Callitriche* spp.), Lesser Water-parsnip (*Berula erecta*) particularly on the Awbeg, Water-cress (*Nasturtium officinale*), Hemlock Water-dropwort, Fine-leaved Water-dropwort (*O. aquatica*), Common Duckweed (*Lemna minor*), Yellow Water-lily (*Nuphar lutea*), Unbranched Bur-reed (*Sparganium emersum*) and the moss *Fontinalis antipyretica*.

The grassland adjacent to the rivers of the site is generally heavily improved, although liable to flooding in many places. However, fields of more species-rich wet grassland with species such as Yellow-flag (*Iris pseudacorus*), Meadow-sweet, Meadow Buttercup (*Ranunculus acris*) and rushes (*Juncus* spp.) occur occasionally. Extensive fields of wet grassland also occur at Annagh Bog on the Awbeg. These fields are dominated by Tufted Hair-grass (*Deschampsia cespitosa*) and rushes.

The Blackwater Valley has a number of dry woodlands; these have mostly been managed by the estates in which they occur, frequently with the introduction of Beech (*Fagus sylvatica*) and a few conifers, and sometimes of Rhododendron (*Rhododendron ponticum*) and Laurel. Oak woodland is well developed on sandstone about Ballinatray, with the acid Oak woodland community of Holly (*Ilex aquifolium*), Bilberry (*Vaccinium myrtillus*), Greater Woodrush (*Luzula sylvatica*) and Buckler Ferns (*Dryopteris affinis, D. aemula*) occurring in one place. Irish Spurge (*Euphorbia hyberna*) continues eastwards on acid rocks from its headquarters to the west but there are many plants of richer soils, for example Wood Violet (*Viola reichenbachiana*), Goldilocks (*Ranunculus auricomus*), Broad-leaved Helleborine (*Epipactis helleborine*) and Red Campion (*Silene dioica*). Oak woodlands also found in Rincrew, Carrigane, Glendine, Newport and Dromana. The spread of Rhododendron is locally a problem, as is over-grazing. A few limestone rocks stand over the river in places showing traces of a less acidic woodland type with Ash, False Brome (*Brachypodium sylvaticum*) and Early-purple Orchid (*Orchis mascula*).

In the vicinity of Lismore, two deep valleys cut in Old Red Sandstone join to form the Owenashad River before flowing into the Blackwater at Lismore. These valleys retain something close to their original cover of Oak with Downy Birch (*Betula pubescens*), Holly and Hazel (*Corylus avellana*) also occurring. There has been much planting of Beech (as well as some of coniferous species) among the Oak on the shallower slopes and here both Rhododendron and Cherry Laurel (*Prunus laurocerasus*) have invaded the woodland.

The Oak wood community in the Lismore and Glenmore valleys is of the classical upland type, in which some Rowan (*Sorbus aucuparia*) and Downy Birch occur. Honeysuckle (*Lonicera periclymenum*) and Ivy (*Hedera helix*) cover many of the trees while Greater Woodrush, Bluebell (*Hyacinthoides non-scripta*), Wood Sorrel (*Oxalis acetosella*) and, locally, Bilberry dominate the ground flora. Ferns present on the site include Hard Fern (*Blechnum spicant*), Male Fern (*Dryopteris filix-mas*), Buckler Ferns (*D. dilatata, D. aemula*) and Lady Fern (*Athyrium felix-femina*). There are many mosses present and large species such as *Rhytidiadelphus* spp., *Polytrichum formosum, Mnium hornum* and *Dicranum* spp. are noticeable. The lichen flora is important and includes 'old forest' species which imply a continuity of woodland here since ancient times. Tree Lungwort (*Lobaria* spp.) is the most conspicuous and is widespread.

The Araglin valley consists predominantly of broadleaved woodland. Oak and Beech are joined by Hazel, Wild Cherry (*Prunus avium*) and Goat Willow (*Salix caprea*). The ground flora is relatively rich with Pignut (*Conopodium majus*), Wild Garlic (*Allium ursinum*), Garlic Mustard (*Alliaria petiolata*) and Wild Strawberry (*Fragaria vesca*). The presence of Ivy Broomrape (*Orobanche hederae*), a local species within Ireland, suggests that the woodland, along with its attendant Ivy is long established.

Along the lower reaches of the Awbeg River, the valley sides are generally cloaked with mixed deciduous woodland of estate origin. The dominant species is Beech, although a range of other species are also present, e.g. Sycamore (*Acer pseudoplatanus*), Ash and Horse-chestnut (*Aesculus hippocastanum*). In places the alien invasive species, Cherry Laurel, dominates the understorey. Parts of the woodlands are more semi-natural in composition, being dominated by Ash with Hawthorn (*Crataegus monogyna*) and Spindle (*Euonymus europaea*) also present. However, the most natural areas of woodland appear to be the wet areas dominated by Alder and willows (*Salix* spp.). The ground flora of the dry woodland areas features species such as Pignut, Wood Avens (*Geum urbanum*), Ivy and Soft Shield-fern (*Polystichum setiferum*), while the ground flora of the wet woodland areas contains characteristic species such as Remote Sedge (*Carex remota*) and Opposite-leaved Golden-saxifrage (*Chrysosplenium oppositifolium*).

In places along the upper Bride, scrubby, semi-natural deciduous woodland of Willow, Oak and Rowan occurs with abundant Great Woodrush in the ground flora.

The Bunaglanna River passes down a very steep valley, flowing in a north-south direction to meet the Bride River. It flows through blanket bog to heath and then scattered woodland. The higher levels of moisture here enable a vigorous moss and fern community to flourish, along with a well-developed epiphyte community on the tree trunks and branches.

At Banteer a type of wetland occurs near the railway line which offers a complete contrast to the others. Old turf banks are colonised by Royal Fern (*Osmunda regalis*) and Eared Willow (*Salix aurita*) and between them there is a sheet of Bottle Sedge (*Carex rostrata*), Marsh Cinquefoil (*Potentilla palustris*), Bogbean (*Menyanthes trifoliata*), Marsh St. John's-wort (*Hypericum elodes*) and the mosses *Sphagnum auriculatum* and *Aulacomnium palustre*. The cover is a scraw with characteristic species like Marsh Willowherb (*Epilobium palustre*) and Marsh Orchid (*Dactylorhiza incarnata*).

The soil high up the Lismore valleys and in rocky places is poor in nutrients but it becomes richer where streams enter and also along the valley bottoms. In such sites Wood Speedwell (*Veronica montana*), Wood Anemone (*Anemone nemorosa*), Enchanter's Nightshade (*Circaea lutetiana*), Barren Strawberry (*Potentilla sterilis*) and Shield Fern occur. There is some Wild Garlic, Three-nerved Sandwort (*Moehringia trinervia*) and Early-purple Orchid (*Orchis mascula*) locally, with Opposite-leaved Golden-saxifrage, Meadowsweet and Bugle in wet places. A Hazel stand at the base of the Glenakeeffe valley shows this community well.

The area has been subject to much tree felling in the recent past and re-sprouting stumps have given rise to areas of bushy Hazel, Holly, Rusty Willow (*Salix cinerea* subsp. *oleifolia*) and Downy Birch. The ground in the clearings is heathy with Heather (*Calluna vulgaris*), Slender St John's-wort (*Hypericum pulchrum*) and the occasional Broom (*Cytisus scoparius*) occurring.

The estuary and the other Habitats Directive Annex I habitats within it form a large component of the site. Very extensive areas of intertidal flats, comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones are present. The main expanses occur at the southern end of the site with the best examples at Kinsalebeg in Co. Waterford and between Youghal and the main bridge north of it across the river in Co. Cork. Other areas occur along the tributaries of the Licky in east Co. Waterford and Glendine, Newport, Bride and Killahaly Rivers in Waterford west of the Blackwater and large tracts along the Tourig River in Co. Cork. There are narrow bands of intertidal flats along the main river as far north as Camphire Island. Patches of green algae (filamentous, *Ulva* species and *Enteromorpha* sp.) occur in places, while fucoid algae are common on the more stony flats even as high upstream as Glenassy or Coneen.

The area of saltmarsh within the site is small. The best examples occur at the mouths of the tributaries and in the townlands of Foxhole and Blackbog. Those found are generally characteristic of Atlantic salt meadows. The species list at Foxhole consists of Common Saltmarsh-grass (*Puccinellia maritima*), small amounts of Greater Sea-spurrey (*Spergularia media*), Glasswort (*Salicornia* sp.), Sea Arrowgrass (*Triglochin maritima*), Annual Sea-blite (*Suaeda maritima*) and Sea Purslane (*Halimione portulacoides*) - the latter a very recent coloniser - at the edges. Some Sea Aster (*Aster tripolium*) occurs, generally with Creeping Bent (*Agrostis stolonifera*). Sea Couch-grass (*Elymus pycnanthus*) and small isolated clumps of Sea Club-rush (*Scirpus maritimus*) are also seen. On the Tourig River additional saltmarsh species found include Lavender (*Limonium* spp.), Sea Thrift (*Armeria maritima*), Red Fescue (*Festuca rubra*), Common Scurvy-grass (*Cochlearia officinalis*) and Sea Plantain (*Plantago maritima*). Oraches (*Atriplex* spp.) are found on channel edges.

The shingle spit at Ferrypoint supports a good example of perennial vegetation of stony banks. The spit is composed of small stones and cobbles and has a well developed and diverse flora. At the lowest part, Sea Beet (*Beta vulgaris*), Curled Dock (*Rumex crispus*) and Yellow-horned Poppy (*Glaucium flavum*) occur with at a slightly higher level Sea Mayweed (*Tripleurospermum maritimum*), Cleavers (*Galium aparine*), Rock Samphire (*Crithmum maritimum*), Sandwort (*Honkenya peploides*), Spear-leaved Orache (*Atriplex prostrata*) and Babington's Orache (*A. glabriuscula*). Other species present include Sea Rocket (*Cakile maritima*), Herb Robert (*Geranium robertianum*), Red Fescue (*Festuca rubra*) and Kidney Vetch (*Anthyllis vulneraria*). The top of the spit is more vegetated and includes lichens and bryophytes (including *Tortula ruraliformis* and *Rhytidiadelphus squarrosus*).

The site supports several Red Data Book plant species, i.e. Starved Wood Sedge (*Carex depauperata*), Killarney Fern (*Trichomanes speciosum*), Pennyroyal (*Mentha pulegium*), Bird's-nest Orchid (*Neottia nidus-avis*, Golden Dock (*Rumex maritimus*) and Bird Cherry (*Prunus padus*). The first three of these are also protected under the

Flora (Protection) Order 1999. The following plants, relatively rare nationally, are also found within the site: Toothwort (*Lathraea squamaria*) associated with woodlands on the Awbeg and Blackwater; Summer Snowflake (*Leucojum aestivum*) and Flowering Rush (*Butomus umbellatus*) on the Blackwater; Common Calamint (*Calamintha ascendens*), Red Campion (*Silene dioica*), Sand Leek (*Allium scorodoprasum*) and Wood Club-rush (*Scirpus sylvaticus*) on the Awbeg.

The site is also important for the presence of several Habitats Directive Annex II animal species, including Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), River Lamprey (*L. fluviatilis*), Twaite Shad (*Alosa fallax fallax*), Freshwater Pearl-mussel (*Margaritifera margaritifera*), Otter (*Lutra lutra*) and Salmon (*Salmo salar*). The Awbeg supports a population of White-clawed Crayfish (*Austropotamobius pallipes*). This threatened species has been recorded from a number of locations and its remains are also frequently found in Otter spraints, particularly in the lower reaches of the river. The freshwater stretches of the Blackwater and Bride Rivers are designated salmonid rivers.

The Blackwater is noted for its enormous run of salmon over the years. The river is characterised by mighty pools, lovely streams, glides and generally, a good push of water coming through except in very low water. Spring salmon fishing can be carried out as far upstream as Fermoy and is very highly regarded especially at Careysville. The Bride, main Blackwater upstream of Fermoy and some of the tributaries are more associated with grilse fishing.

The site supports many of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Pine Marten, Badger and Irish Hare. The bat species Natterer's Bat, Daubenton's Bat, Whiskered Bat, Brown Long-eared Bat and Pipistrelle, are to be seen feeding along the river, roosting under the old bridges and in old buildings.

Common Frog, a Red Data Book species that is also legally protected (Wildlife Act, 1976), occurs throughout the site. The rare bush cricket, *Metrioptera roselii* (Orthoptera: Tettigoniidae), has been recorded in the reed/willow vegetation of the river embankment on the Lower Blackwater River. The Swan Mussel (*Anodonta cygnea*), a scarce species nationally, occurs at a few sites along the freshwater stretches of the Blackwater.

Several bird species listed on Annex I of the E.U. Birds Directive are found on the site. Some use it as a staging area, others are vagrants, while others use it more regularly. Internationally important numbers of Whooper Swan (average peak 174, 1994/95-95/96) and nationally important numbers Bewick's Swan (average peak 35, 1994/95-95/96) use the Blackwater Callows. Golden Plover occur in regionally important numbers on the Blackwater Estuary (average peak 885, 1984/85-86/87) and on the River Bride (absolute max. 2141, 1994/95). Staging Terns visit the site annually (Sandwich Tern (>300) and Arctic/Common Tern (>200), average peak 1974-1994). The site also supports populations of the following: Red Throated Diver, Great Northern Diver, Barnacle Goose, Ruff, Wood Sandpiper and Greenland White-fronted Goose. Three breeding territories for Peregrine Falcon are known along the Blackwater Valley. This, the Awbeg and the Bride River are also thought to support at

least 30 pairs of Kingfisher. Little Egret now breed at the site (12 pairs in 1997, 19 pairs in 1998) and this represents about 90% of the breeding population in Ireland.

The site holds important numbers of wintering waterfowl. Both the Blackwater Callows and the Blackwater Estuary Special Protection Areas (SPAs) hold internationally important numbers of Black-tailed Godwit (average peak 847, 1994/95-95/96 on the callows, average peak 845, 1974/75-93/94 in the estuary). The Blackwater Callows also hold Wigeon (average peak 2752), Teal (average peak 1316), Mallard (average peak 427), Shoveler (average peak 28), Lapwing (average peak 880), Curlew (average peak 416) and Black-headed Gull (average peak 396) (counts from 1994/95-95/96). Numbers of birds using the Blackwater Estuary, given as the mean of the highest monthly maxima over 20 years (1974-94), are Shelduck (137 +10 breeding pairs), Wigeon (780), Teal (280), Mallard (320 + 10 breeding pairs), Goldeneye (11-97), Oystercatcher (340), Ringed Plover (50 + 4 breeding pairs), Grey Plover (36), Lapwing (1680), Knot (150), Dunlin (2293), Snipe (272), Black-tailed Godwit (845), Bar-tailed Godwit (130), Curlew (920), Redshank (340), Turnstone (130), Black-headed Gull (4000) and Lesser Black-backed Gull (172). The greatest numbers (75%) of the wintering waterfowl of the estuary are located in the Kinsalebeg area on the east of the estuary in Co. Waterford. The remainder are concentrated along the Tourig Estuary on the Co. Cork side.

The river and river margins also support many Heron, non-breeding Cormorant and Mute Swan (average peak 53, 1994/95-95/96 in the Blackwater Callows). Heron occurs all along the Bride and Blackwater Rivers. 2 or 3 pairs at Dromana Rock; *c.* 25 pairs in the woodland opposite; 8 pairs at Ardsallagh Wood and *c.* 20 pairs at Rincrew Wood have been recorded. Some of these are quite large and significant heronries. Significant numbers of Cormorant are found north of the bridge at Youghal and there are some important roosts present at Ardsallagh Wood, downstream of Strancally Castle and at the mouth of the Newport River. Of note are the high numbers of wintering Pochard (e.g. 275 individuals in 1997) found at Ballyhay quarry on the Awbeg, the best site for Pochard in County Cork.

Other important species found within the site include Long-eared Owl, which occurs all along the Blackwater River, and Barn Owl, a Red Data Book species, which is found in some old buildings and in Castlehyde west of Fermoy. Reed Warbler, a scarce breeding species in Ireland, was found for the first time in the site in 1998 at two locations. It is not known whether or not this species breeds on the site, although it is known to nearby to the south of Youghal. Dipper occurs on the rivers.

Landuse at the site is mainly centred on agricultural activities. The banks of much of the site and the callows, which extend almost from Fermoy to Cappoquin, are dominated by improved grasslands which are drained and heavily fertilised. These areas are grazed and used for silage production. Slurry is spread over much of this area. Arable crops are grown. The spreading of slurry and fertiliser poses a threat to the water quality of this salmonid river and to the populations of Habitats Directive Annex II animal species within it. Many of the woodlands along the rivers belong to old estates and support many non-native species. Little active woodland management occurs. Fishing is a main tourist attraction along stretches of the Blackwater and its tributaries and there are a number of Angler Associations, some with a number of

beats. Fishing stands and styles have been erected in places. Both commercial and leisure fishing takes place on the rivers. Other recreational activities such as boating, golfing and walking are also popular. Water skiing is carried out at Villierstown. Parts of Doneraile Park and Anne's Grove are included in the site: both areas are primarily managed for amenity purposes. There is some hunting of game birds and Mink within the site. Ballyhay quarry is still actively quarried for sand and gravel. Several industrial developments, which discharge into the river, border the site.

The main threats to the site and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and several sewage plants, dredging of the upper reaches of the Awbeg, overgrazing within the woodland areas, and invasion by non-native species, for example Cherry Laurel.

Overall, the River Blackwater is of considerable conservation significance for the occurrence of good examples of habitats and of populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive respectively; furthermore it is of high conservation value for the populations of bird species that use it. Two Special Protection Areas, designated under the E.U. Birds Directive, are also located within the site - Blackwater Callows and Blackwater Estuary. Additionally, the importance of the site is enhanced by the presence of a suite of uncommon plant species.

13.09.2006

Appendix VI

- Ecological Assessment of Proposed Development Area