



**CORK COUNTY COUNCIL**  
**COMHAIRLE CONTAE CHORCAÍ**

**RIVER BLACKWATER WWTP DISCHARGES –  
CERTIFICATES OF AUTHORISATION  
NATURA IMPACT STATEMENT**

**APRIL 2011**



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# 1 Introduction

## 1.1 Background

Ryan Hanley Consulting Engineers have been contracted by Cork County Council to carry out an assessment of the potential ecological impacts of the effluent discharging to the River Blackwater catchment from a series of WWTPs in North Cork and prepare a Natura Impact Statement (NIS). This NIS will subsequently be used to inform the Appropriate Assessment carried out by the Council. In total, 46 agglomerations discharge within the Blackwater catchment.

Applications for Waste Water Discharge Certificates for 22 of these agglomerations have been submitted to the EPA by Cork County Council in accordance with the Waste Water Discharge (Authorisation) Regulations 2007 (SI 864 of 2007). Section F of the waste water discharge certificate application requires an assessment of the impacts of discharges on the existing environment.

The Blackwater discharges which require Certificates of Authorisation are:

- Ballydesmond
- Ballyhea
- Ballynoe
- Bartlemy
- Bridebridge
- Castlemagner
- Cecilstown
- Cullen
- Dernagree
- Freemount
- Glantane
- Kilcorney
- Kiskeam
- Knocknagree
- Liscarroll
- Lombardstown

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- Lyre
- Meelin
- Nadd
- Rathcool
- Shanballymore
- Glenville
- Kilbrin

Where such discharges occur within the catchment of a Natura 2000 site, EPA guidelines state that 'Initial Screening' be carried out in accordance with Appendix 1 of the Circular L8/08 entitled "Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments" issued by the Department of the Environment, Heritage and Local Government (DoEHLG) in 2008. Should the outcome of this screening process indicate that negative effects to any Natura site cannot be ruled out, a full 'Appropriate Assessment' is to be carried out. Further details on the various stages of Appropriate Assessment are included in Section 1.2.

The purpose of this report is to determine the ecological effects, if any, of the respective WWTPs being assessed for certification. The final objective is to assess if any such predicted impacts have the potential to have significant negative impacts on the qualifying interests or on the conservation objectives of the receiving Natura 2000 site.

## 1.2 Appropriate Assessment – Legislative Context

The EU Habitats Directive (*Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna*) contains a list of rare habitats and species (Annex I and II respectively); the conservation of these is considered to be of European and International importance. Similarly, the EU Birds Directive (*Council Directive 79/409/EC on the conservation of wild birds*) aims to protect specific bird species considered to be at risk. Member states have the responsibility to designate geographic sites according to their conservation value for the aforementioned habitats and species, namely

Special Areas of Conservation and Special Protection Areas, which together form a network referred to as *Natura 2000*; see Section 1.2.

Paragraph 3 of Article 6 of the Habitats Directive state that:

6(3) *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.*

Where such an assessment finds that all potential impacts cannot be successfully avoided or mitigated against, then Paragraph 4 of Article 6 is applied:

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

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

The statutory agency responsible for *Natura 2000* sites is the National Parks and Wildlife Service of the Department of Environment, Heritage and Local Government. The European Court of Justice has recently (December 13 2007) issued a judgment in a legal case against Ireland that found that Ireland has failed in its statutory duty to confer adequate protection on designated areas. Following on from this the Circular Letter 1/08 & NPWS 1/08 on Appropriate Assessment of Land Use Plans (from the Department of the Environment, Heritage and Local Government) states that all plans and projects will be subject to critical assessment to ensure that they comply with all relevant legislation.



AA is a focused and detailed impact assessment of the implications of the plan or project, alone and in combination with other plans and projects, on the integrity of a Natura 2000 site in view of its conservation objectives. The terms of AA have been worked out in judgments of the European Court of Justice. The case law has established that assessments should be undertaken on the basis of the best scientific evidence and methods. Accordingly, if the consent authority so requires, data and information on the project and on the site and an analysis of potential effects on the site must be obtained and presented in a **Natura Impact Statement** (NIS) which must be presented by the applicant.

Ecological specialists are generally engaged by applicants to undertake the surveys, research and analysis, with input from other experts (e.g. hydrologists or engineers) as necessary to prepare the NIS. In general, larger projects will entail a greater amount of scientific scrutiny. It is the responsibility of the applicant to have the NIS prepared for submission to the consent authority. Having satisfied itself that the Statement is complete and objective, the competent authority carries out the AA on the basis of the NIS and any other appropriate sources of information. In the case of Waste Water Discharge Licensing, the Environmental Protection Agency is considered to be the competent authority.

There are 4 stages in an Appropriate Assessment as outlined in the European Commission Guidance document (2001). The following is a brief summary of these steps.

Stage 1 - Screening: This stage examines the likely effects of a project either alone or in combination with other projects upon a Natura 2000 Site and considers whether it can be objectively concluded that these effects will not be significant

Stage 2 - Appropriate Assessment: In this stage, the impact of the project on the integrity of the Natura 2000 site is considered with respect to the conservation objectives of the site and to its structure and function. The Appropriate Assessment is informed by the Natura Impact Statement.

Stage 3 - Assessment of Alternative Solutions: Should the Appropriate Assessment determine that adverse impacts are likely upon a Natura 2000 site, this stage examines alternative ways of implementing the project that, where possible, avoid these adverse impacts.

Stage 4 - Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the Natura site will be necessary.

### 1.3 Natura 2000 sites

There are two designations which form part of the Natura 2000 network of sites that require specific ecological protection in Ireland:

#### Special Areas of Conservation (SACs)

These are sites that have been identified to be of conservation importance in a European context, based on the habitats and species; both plant and animal; that they support. The Directive has a number of Annexes. Habitats listed on Annex I are those habitat types of community interest whose conservation requires the designation of Special Areas of Conservation. Some of these are known as priority habitats for which there is a particular obligation for protection. Animal and plant species of community interest whose conservation requires the designation of Special Areas of Conservation are listed on Annex II of the Directive.

All SACs are also proposed Natural Heritage Areas. There is a list of Notifiable Actions which apply to each annexed habitat and species. These are activities for which consent must be sought from the Minister of Environment, Heritage and Local Government within SACs. SACs are protected under the Habitats Directive of 1992 (EU Directive 92/43/EEC) and the Natural Habitats Regulations of 1997 (S.I.94/97).

#### Special Protection Areas (SPAs)

These are sites of European importance that have been identified as being of conservation importance on account of the bird species and populations they support.

The Directive directs all member states to take measures to protect all wild birds and to preserve a sufficient diversity of habitats for all species naturally occurring within their territories, so as to maintain populations. Species whose status is a cause for concern are specifically identified for special conservation measures in Annex I of the Directive, and SPAs have been designated based on either the presence of these species or the presence of significant numbers of wintering waterfowl.

All SPAs are also proposed Natural Heritage Areas. SPAs are protected under the Birds Directive of 1979 (EU Directive 79/409/EEC) and the Natural Habitats Regulations of 1997 (S.I.94/97).

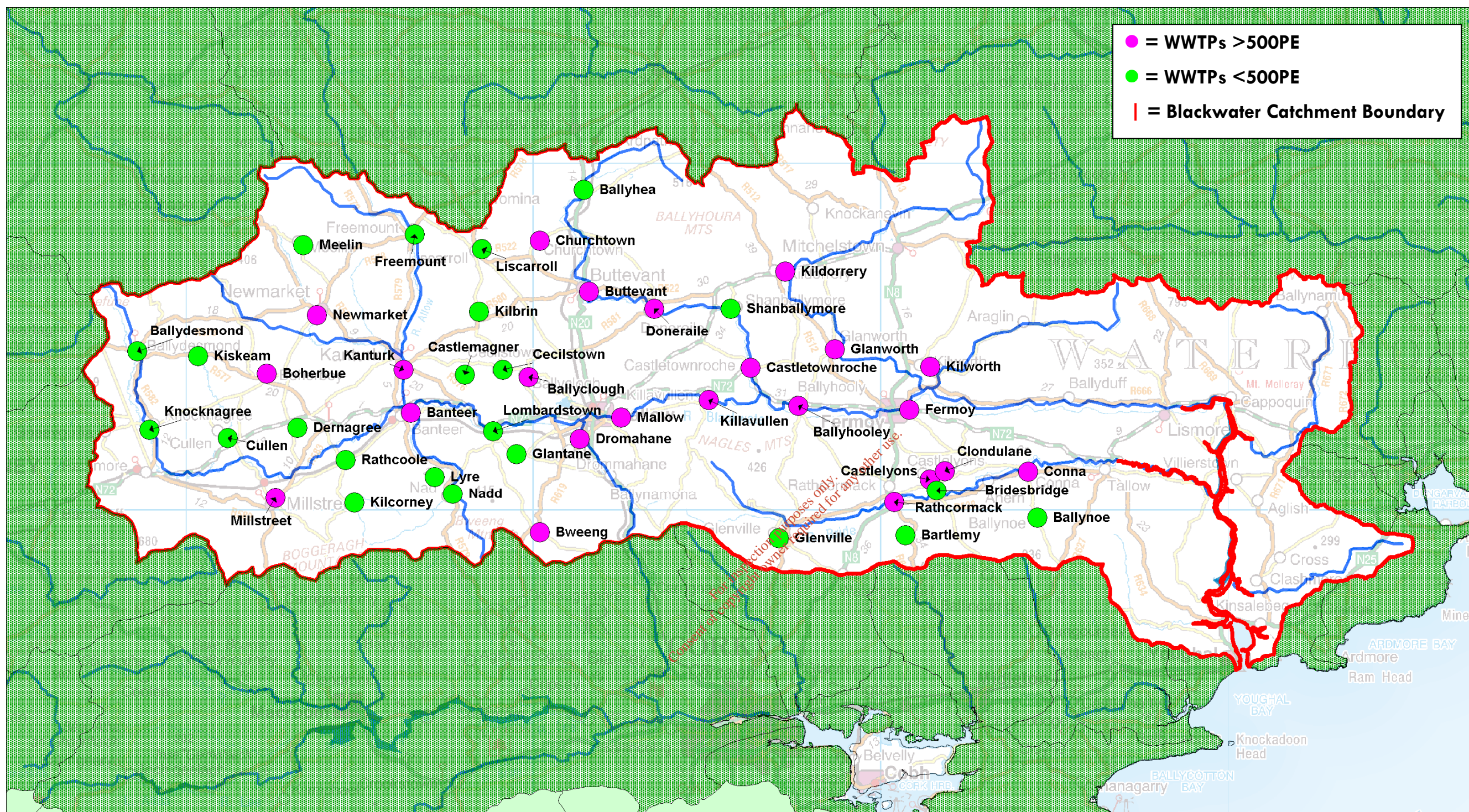
A number of SPAs are located in the vicinity of the headwaters of the Blackwater and its tributaries; these however are associated with upland terrestrial habitats and will not be affected in any way by the respective WWTP discharges. No SPAs are therefore considered as part of this Natura Impact Assessment process.

#### 1.4 Scheme locations

The geographic locations of the respective agglomerations are shown in Figure 1.1. While several other Natura 2000 sites are located within the region, this report only considers potential impacts which relate to the overall Blackwater catchment, the majority of the rivers of which form the Blackwater River (Cork/Waterford) candidate SAC. Also shown are the Cork WWTPs of over 500PE, which will be assessed in a subsequent report.

Figure 1.2 shows the extent of the Blackwater River cSAC in relation to the respective WWTPs.





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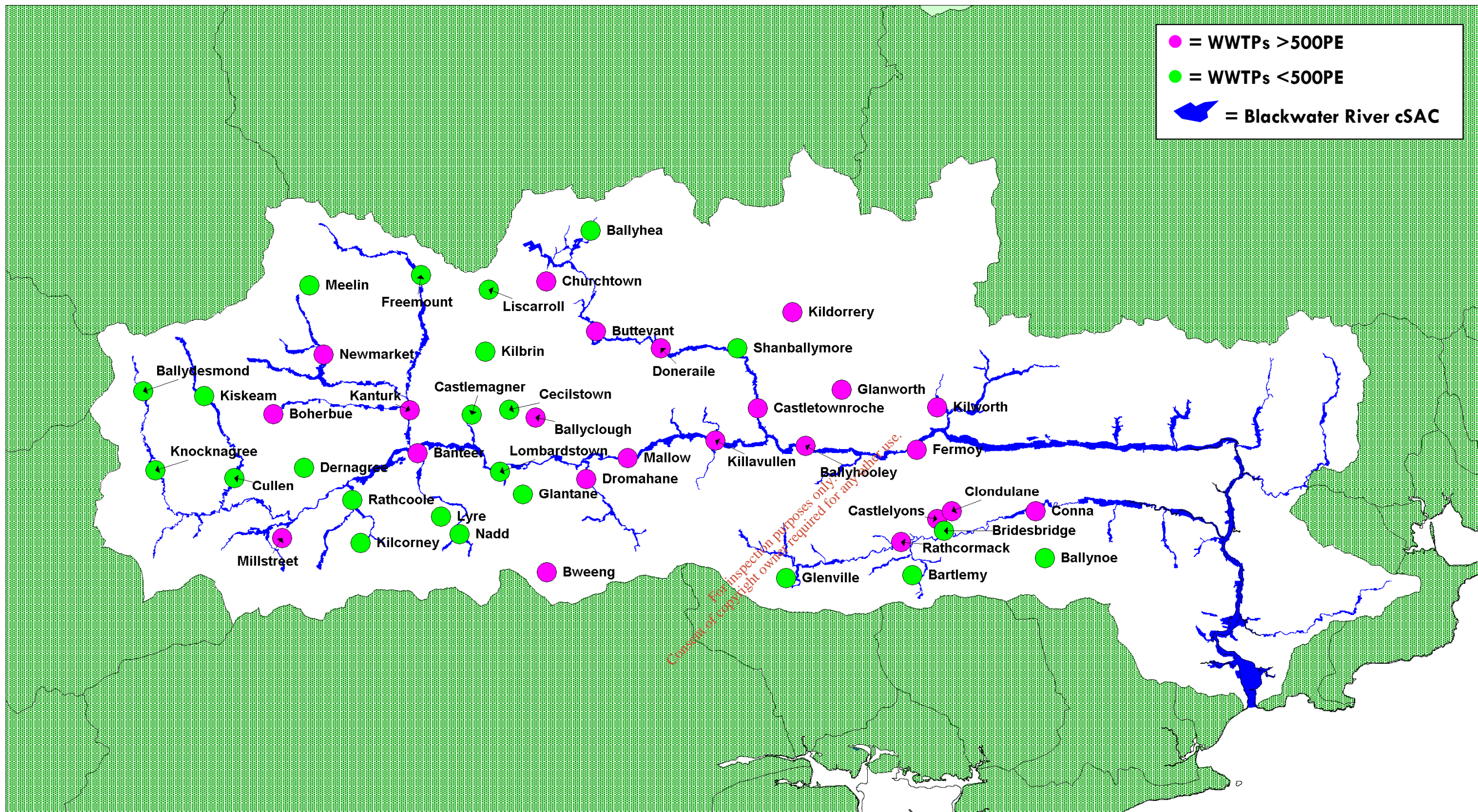
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Figure 1.1 – Geographic locations of Blackwater River WWTPs





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Figure 1.2 – Extent of Blackwater River cSAC

## 2 Methodology

### 2.1 Desk study

A desk study was carried out to collate the available information on the ecological environment. Water quality data from sampling points upstream and downstream of the respective discharges was gleaned from the Environmental Protection Agency website ([www.epa.ie](http://www.epa.ie)). The National Parks and Wildlife Service (NPWS) website ([www.designatednatureareas.ie](http://www.designatednatureareas.ie)) was also queried in relation to areas and records of rare and protected species within the discharge receiving waters. Further information was collated from the Water Framework Directive website ([www.wfdireland.ie](http://www.wfdireland.ie)). The licence application forms already submitted by Cork County Council were consulted, as was water sampling data supplied by Cork County Council, in relation to various water quality standards, where available for the respective discharges. Other environmental reports submitted in relation to plans or projects in the region were also reviewed. Key ecological reports for studies carried out in Cork and the wider Munster area were reviewed for applicable information relating to the distribution and ecology of the qualifying interests of the Blackwater River cSAC.

### 2.2 Consultation

A range of key stakeholders and other organisations with an interest in the Blackwater River were formally consulted during the assessment. These included:

- National Parks and Wildlife Service Regional Management
- DoEHLG Development Applications Unit
- Inland Fisheries Ireland
- South Western River Basin District Advisory Council
- Dr Evelyn Moorkens (Freshwater Pearl Mussel Specialist)
- Mr Eugene Ross (Freshwater Pearl Mussel Specialist)
- Teagasc
- Coillte
- Department of Agriculture
- Cork County Council Environmental Services Unit

To date, responses have been received from Inland Fisheries Ireland, Cork Co. Co. Environmental Services Unit and the Department of Agriculture. NPWS Regional Staff were informally consulted.



### 2.3 Field surveys

Site visits to the locations of the respective discharges were made by the Ryan Hanley Senior Ecologist on during March and April 2011 to document local conditions and potential impacts, if any.

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### 3 Assessment

The assessment of impacts associated with the respective WWTP discharges has been prepared in accordance with the following documents:

- Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007). Environmental Protection Agency. Wexford. 2009.
- Circular L8/08 Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments. 2 September 2008.
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government. Dublin. 2009 (Revised March 2010)
- Assessment of Plans and Projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, European Commission 2001
- Managing Natura 2000 Sites: The Provisions of Article 6 of the ‘Habitats Directive’ 92/43/EEC, European Commission, 2000

Details relating to the Blackwater River catchment are laid out in Section 4. For ease of reference and subsequent separation if necessary, screening and, where applicable, Natura Impact Assessments are laid out for each agglomeration in Appendices 2 through 24.



## 4 Description of the Blackwater River catchment

### 4.1 Background

The Blackwater River is the second largest river in Ireland after the Shannon, and is one of the most important features of the south-western landscape (Moriarty, 1998). The Blackwater or Munster Blackwater is the main river which flows through counties Kerry, Cork and Waterford. There are many peat bogs on the upper river, which give the river its distinctive peaty colour, and ultimately its name. The river rises at 460m in the Mullaghareirk Mountains in County Kerry and flows in an easterly direction through County Cork, through Mallow and Fermoy (Moriarty, 1998). The river then enters County Waterford for the final 35km of its journey, flowing through Lismore before turning abruptly south at Cappoquin and finally draining into the sea at Youghal.

In total, the Blackwater River is 120kms long and the total catchment area is 3,380 km<sup>2</sup> (Moriarty, 1998). The entire length of the catchment forms part of the Blackwater River (Cork/Waterford) candidate Special Area of Conservation (SAC) and it also incorporates part of the Galtee Mountains SAC.

The river has many tributaries, most draining from the northern side of the catchment, the largest being the Owentaraglin and Allula rising in the Mullaghareirk Mountains and the Awbeg and Funcheon rising from the Ballyhoura and Galtee mountains respectively. The Araglin rises in the Knockmealdown Mountains. The Finnow, Glen and Clyda drain the Boggeragh Mountains from the south. The Bride, Finisk and Licky complete the list of major tributaries (Moriarty, 1998).

The Blackwater River is notable for being one of the best salmon fishing rivers in the country. Sea Trout ascend the lower reaches and one of its tributaries, the Bride.

The catchment area of the Blackwater is largely rural and served by relatively small towns including Rathmore, Millstreet, Kanturk, Banteer, Mallow, Buttevant, Doneraile, Castletownroche, Fermoy, Ballyduff, Rathcormac, Tallow, Lismore, Cappoquin and Youghal.

The upland parts of the catchment are open country or afforested. There are large tracts of plantation forestry on the Ballyhoura, Nagle, Boggeragh, Galtee, Knockmealdown and Kilworth Mountains. Lower down, the landuse is primarily agricultural. Based on the Corine land cover data (obtained from aerial imagery <http://www.eea.europa.eu/publications/COR0-landcover>), the most common Corine land use type within the Munster-Blackwater is agricultural with

“pastures” accounting for (62.02%). “Peat bogs” make up (5.28%) together with “coniferous forest” (7.75%).

## 4.2 Blackwater River Special Area of Conservation

### 4.2.1 Details of site designation

The site designated as the Blackwater River cSAC consists of the freshwater stretches of the River Blackwater as far upstream as Ballydesmond and as far downstream as the tidal stretches into Youghal Harbour as well as the many tributaries along the way, the larger of which include 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. The total river length within the cSAC is 449.26 km (NS2, 2010) and the designated site covers a total area of 15048.77 ha.

The site is of considerable conservation significance for the occurrence of good examples of habitats and populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive respectively; as well as good examples of a range of marsh and wetland plant communities and assemblages. In addition, the Blackwater River is of conservation value for populations of bird species and two Special Protection Areas, designated under the E.U. Birds Directive, are located within the site, namely the Blackwater Callows and Blackwater Estuary.

The Blackwater River has been designated as a candidate Special Area of Conservation on the basis of the presence of extensive and good quality examples of ten habitats types listed in Annex I of the EU Habitats Directive (92/43/EEC May 1992), two of which are ‘priority Annex I’ habitats. These habitats are described in Table 4.1 below and the NPWS Site Synopsis is presented in Appendix 25. Note that taxonomy and nomenclature within the main text follow Stace (1997).

**Table 4.1. Habitats of qualifying interest for the Blackwater River cSAC**

HABITATS LISTED IN ANNEX I OF THE EU HABITATS DIRECTIVE	NOTES AND CONSERVATION STATUS
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> ) (EU Habitat Code 91E0)	‘Priority’ Annex I habitat. The site is rich in the presence of riparian alluvial forest and wet woodlands, forming one of the most extensive tracts of this habitat in the country. Wet woodlands are particularly notable on the River Bride and between Cappoquin and Youghal where the channel is lined by narrow woods of White and Almond Willow ( <i>Salix alba</i> and <i>S. triandra</i> ) with isolated Crack Willow ( <i>S. fragilis</i> ) and Osier ( <i>S. viminalis</i> ).

<i>Taxus baccata</i> woods of the British Isles (EU Habitat Code 91J0)	'Priority' Annex I habitat. A small stand of Yew ( <i>Taxus baccata</i> ) woodland, a rare habitat in Ireland and the EU, occurs within the site. This is on a limestone ridge at Dromana, near Villierstown in Co Waterford.
Water courses of plain to montane levels with the <i>Ranuncion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation (EU Code 3260)	Floating river vegetation is found along much of the freshwater stretches within the site. The species list is extensive and includes Pond Water-crowfoot ( <i>Ranunculus peltatus</i> ), Water-crowfoot ( <i>Ranunculus</i> sp.), Canadian Waterweed ( <i>Elodea canadensis</i> ), Broad-leaved Pondweed ( <i>Potamogeton natans</i> ), Water Milfoil ( <i>Myriophyllum</i> spp.), Common Club-rush ( <i>Scirpus lacustris</i> ), Water-starwort ( <i>Callitriche</i> sp.) and Lesser Water-parsnip ( <i>Berula erecta</i> ).
Estuaries (EU Code 1130)	Found in the lower estuarine reaches of the site – the Blackwater River discharging into Youghal Harbour.
Mudflats and sandflats not covered by seawater at low tide (EU Code 1140)	The lower estuarine parts of the site has extensive areas of intertidal flats, comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones. The best examples are the wide expanses on the eastern side (Co Waterford) known as Kinsalebeg, and the stretch between Youghal and the Youghal Bridge to the north on the Co Cork side which also encompasses the estuary of the Tourig River.
<i>Salicornia</i> and other annuals colonizing mud and sand (EU Code 1310)	The lower sections of the site (estuarine) contain examples of this habitat.
Atlantic salt meadows ( <i>Glaucopuccinellietalia maritimae</i> ) (EU Code 1330)	The site has a few small areas of saltmarsh in the townlands of Foxhole and Blackbog. The species include list Common Saltmarsh-grass ( <i>Puccinellia maritima</i> ), Greater Sea-spurrey ( <i>Spergularia media</i> ), Glasswort ( <i>Salicornia</i> sp.), Sea Arrowgrass ( <i>Triglochin maritima</i> ), Annual Sea-blite ( <i>Suaeda maritima</i> ) and Sea Purslane ( <i>Halimione portulacoides</i> ), Lavender ( <i>Limonium</i> sp.), Thrift ( <i>Armeria maritima</i> ), Red Fescue ( <i>Festuca rubra</i> ), Common Scurvy-grass ( <i>Cochlearia officinalis</i> ) and Sea Plantain ( <i>Plantago maritima</i> ), Oraches ( <i>Atriplex</i> sp.).
Mediterranean salt meadows ( <i>Juncetalia maritimi</i> ) (EU Code 1410)	The site has a few small areas of this saltmarsh.
Perennial vegetation of stony banks (EU Habitat Code 1220)	The shingle spit at Ferrypoint supports a good example of perennial vegetation of stony banks. At the lowest part, Sea Beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> ), Curled Dock, ( <i>Rumex crispus</i> ) and Yellow-horned Poppy ( <i>Glaucium flavum</i> ) occur as well as Sea Mayweed ( <i>Tripleurospermum maritimum</i> ), Cleavers ( <i>Galium aparine</i> ), Rock Samphire ( <i>Crithmum maritimum</i> ), Sandwort ( <i>Honkenya peploides</i> ), Spear-leaved Orache ( <i>Atriplex prostrata</i> ) with Babington's Orache ( <i>A. glabriuscula</i> ) at a slightly higher level.
Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles (EU Habitat Code 91A0)	Oak woodland is well developed in the site in a number of locations including on sandstone near Ballinatray, with the acid Oak woodland community of Holly ( <i>Ilex aquifolium</i> ), Bilberry ( <i>Vaccinium myrtillus</i> ), Greater Woodrush ( <i>Luzula sylvatica</i> ) and Buckler Ferns ( <i>Dryopteris affinis</i> , <i>D. aemula</i> ) occurring in one place. Oak woodland is also found in Rincrew, Carrigane, Glendine, Newport and Dromana. Oak wood community in the Lismore and Glenmore valleys is of the classical upland type where Rowan ( <i>Sorbus aucuparia</i> ) and Downy Birch ( <i>Betula pubescens</i> ) occur.

Nine species listed under Annex II of the Habitats Directive form qualifying interests for the Blackwater River cSAC. These species are listed below and are discussed in more detail in Section 4.3. The NPWS Site Synopsis is presented in Appendix 25.

- Sea Lamprey (*Petromyzon marinus*)\*
- River Lamprey (*Lampetra fluviatilis*)\*
- Brook Lamprey (*Lampetra planeri*)\*
- Twaite Shad (*Alosa fallax fallax*)\*
- Salmon (*Salmo salar*)\*
- Freshwater Pearl Mussel (*Margaritifera margaritifera*)\*
- White-clawed Crayfish (*Austropotamobius pallipes*)\*
- Otter (*Lutra lutra*)\*
- Killarney Fern (*Trichomanes speciosum*)\*

\*represents species which are listed as 'species of special conservation significance within the County Cork Biodiversity Action Plan 2009-2013 (Cork County Council, 2009).

#### 4.2.2 Conservation status of qualifying interest habitats species

The overriding **Conservation Objective** for Natura 2000 sites is the maintenance (or restoration) of 'favourable conservation status' of habitats and species. Site-specific conservation objectives for a Natura 2000 site should therefore define what constitutes favourable status for the habitats and species for which the site has been designated ('qualifying interests' or 'special conservation interests').

Currently there is no available Natura 2000 Management Plan outlining the Conservation Objectives for the Blackwater River cSAC (NPWS, pers. comm.). Generic objectives have been compiled for SAC and SPA sites based on a sites' qualifying interests and these are based on the concept of 'favourable conservation status' as defined by Articles 1(e) and 1 (i) of the EU Habitats Directive (see box).

**Favourable Conservation Status as defined by Articles 1 (e) and 1(i) of the Habitats Directive**

The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species. The conservation status of a natural habitat will be taken as favourable when:

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

The conservation status of a species is the sum of the influences acting on the species that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as ‘favourable’ when:

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

Under Article 17 of the Habitats Directive, each member state is obliged to report to the European Commission on the status of listed habitats and species every six years. In December 2007, Ireland submitted the first baseline assessments of conservation status for all 59 habitats and c.100 species that occur in Ireland. Conservation status was assessed across the whole national territory (not just within SAC sites) and for habitats, is based on the parameters of Range, Area, Structure & Functions and Future Prospects, and for species is based on the parameters of Range, Population, Area of suitable habitat and Future Prospects. Results are published within ‘The status of EU protected habitats and species in Ireland’ (NPWS, 2008) and summarised in Table 4.2 for the habitats and species that form qualifying interests for the Blackwater River cSAC. Each parameter was classified as being “favourable” (good), “unfavourable – inadequate” (poor), “unfavourable – bad” (bad) or “unknown”.

**Table 4.2. Conservation status of qualifying interest habitats and species of the Blackwater River cSAC (2170) (after NPWS, 2008).**

HABITATS & SPECIES OF QUALIFYING INTEREST ~ CONSERVATION STATUS (AS PER NPWS, 2008)					
HABITATS OF QUALIFYING INTEREST	RANGE	AREA	STRUCTURE & FUNCTION	FUTURE PROSPECTS	OVERALL
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (EU Habitat Code 91E0)	Good	Bad	Bad	Bad	Bad
<i>Taxus baccata</i> woods of the British Isles (EU Habitat Code 91J0)	Bad	Bad	Bad	Bad	Bad
Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation (EU Code 3260)	Good	Good	Bad	Bad	Bad
Estuaries (EU Code 1130)	Good	Good	Unknown	Poor	Poor
Mudflats and sandflats not covered by seawater at low tide (EU Code 1140)	Good	Good	Poor	Poor	Poor

Salicornia and other annuals colonizing mud and sand (EU Code 1310)	Good	Poor	Poor	Poor	Poor
Atlantic salt meadows ( <i>Glauco-Puccinellietalia maritimae</i> ) (EU Code 1330)	Good	Poor	Poor	Poor	Poor
Mediterranean salt meadows ( <i>Juncetalia maritimi</i> ) (EU Code 1410)	Good	Good	Poor	Poor	Poor
Perennial vegetation of stony banks (EU Habitat Code 1220)	Good	Poor	Poor	Poor	Poor
Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles (EU Habitat Code 91A0)	Good	Bad	Bad	Bad	Bad
<b>SPECIES OF QUALIFYING INTEREST</b>	<b>RANGE</b>	<b>POPULATION</b>	<b>HABITAT</b>	<b>FUTURE PROSPECTS</b>	<b>OVERALL</b>
Sea Lamprey ( <i>Petromyzon marinus</i> )	Poor	Poor	Poor	Poor	Poor
River Lamprey ( <i>Lampetra fluviatilis</i> )	Good	Good	Good	Good	Good
Brook Lamprey ( <i>Lampetra planeri</i> )	Good	Good	Good	Good	Good
Twaite Shad ( <i>Alosa fallax fallax</i> )	Good	Bad	Unknown	Poor	Bad
Salmon ( <i>Salmo salar</i> )	Good	Bad	Poor	Poor	Bad
Freshwater Pearl Mussel ( <i>Margaritifera margaritifera</i> )	Good	Bad	Bad	Bad	Bad
White-clawed Crayfish ( <i>Austropotamobius pallipes</i> )	Poor	Poor	Poor	Poor	Poor
Otter ( <i>Lutra lutra</i> )	Good	Poor	Good	Good	Poor
Killarney Fern ( <i>Trichomanes speciosum</i> )	Good	Good	Good	Good	Good

#### 4.2.3 Additional habitats and species of conservation interest

In addition to the habitats of qualifying interest, the SAC site synopsis refers to additional habitats of conservation interest. These are listed below, classified as per Fossitt (2000):-

- Wet Willow-Alder-Ash-woodland (WN6)
- Marsh (GM1)
- Reed and large sedge swamp (FS1)
- Wet grassland (GS4)
- Wet heath (HH3)
- Lowland Blanket Bog (PB3)
- Semi-natural woodland (WN) and highly modified/non-native woodland (WD).

Marsh, reedbeds, lowland blanket bog and semi-natural woodland are listed as habitats of special conservation significance within the County Cork Biodiversity Action Plan 2009-2013 (Cork County Council, 2009).

In addition to the species of qualifying interest, the SAC site synopsis refers to additional species of conservation interest. These include five plant species listed in the Red data Book that have been recorded within the site - Starved Wood Sedge (*Carex depauperata*), Pennyroyal (*Mentha pulegium*), Golden Dock (*Rumex maritimus*), Bird Cherry (*Prunus padus*) and Bird's-nest orchid

(*Neottia nidus-avid*). Starved Wood Sedge and Pennyroyal are also listed on the Flora Protection Order, 1999.

The site also supports a range of mammal species listed in the Irish Red Data Book, including Pine Marten (*Martes martes*), Badger (*Meles meles*) and Irish Hare (*Lepus timidus hibernicus*). These are all protected species under the Wildlife Act 1976 & Wildlife (Amendment) Act, 2000, the principal national legislation relating to wildlife protection. All three species are listed in Appendix III of the Bern Convention<sup>1</sup>.

Bat species including Natterer's Bat (*Myotis nattereri*), Daubenton's Bat (*Myotis daubentoni*), Whiskered Bat (*Myotis mystacinus*), Brown Long-eared Bat (*Plecotus auritus*) and Pipistrelle (*Pipistrellus* sp.) have all been recorded feeding along the river and/or roosting under old bridges. All of these bat species are afforded protection under the Wildlife Act 1976 & Wildlife (Amendment) Act, 2000, Annex IV of the EU Habitats Directive, and are listed in Appendix II of the Bern Convention and in Appendix II of the Bonn Convention<sup>2</sup>.

Common Frog (*Rana temporaria*), a Red Data Book species that is legally protected (Wildlife Act 1976 & Wildlife (Amendment) Act, 2000), occurs throughout the site. The rare bush cricket, *Metriopectera rosellii* has also been recorded in reed/willow vegetation of the Lower Blackwater River. The Swan Mussel (*Anodonta cygnea*), a scarce species nationally, also occurs at a few sites along the freshwater stretches of the Blackwater River.

Several bird species listed on Annex I of the E.U. Birds Directive are found within the designated site (for a full list of the bird species listed for the site, please refer to the site synopsis in Appendix 25). The protection and conservation of wintering waterbird species are considered in two complementary designations of the Blackwater River i.e. the Blackwater Callows SPA (Site Code 4094) and Blackwater Estuary SPA (Site Code 4028).

Of note is the occurrence of the Annex I species Kingfisher *Alcedo atthis* along the Blackwater River. The piscivorous Kingfisher is primarily a freshwater aquatic bird species and favours lowland slow-flowing rivers. To date, no sites in Ireland have been formally designated for the Kingfisher. This issue was raised in a recent European Court of Justice ruling against Ireland (December 2007) and it seems likely that any future designations for Kingfisher may include the Blackwater River – this river being included in recent waterway bird projects (e.g. Crowe et al.

<sup>1</sup> Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) 1979.

<sup>2</sup> Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) 1979.



2008; Cummins et al. 2010). These recent survey results suggest a slight decline in the density of Kingfisher territories along the Blackwater; from 0.06-0.07 in 2008 to 0.05 in 2010. Furthermore no territories were recorded along the Awbeg in 2010 which contrasts with previous observations (Crowe et al. 2010).

### 4.3 Further notes on the species of conservation interest

#### 4.3.1 Salmonids

The Blackwater River gets one of the biggest Salmon runs of any Irish river, with perhaps the exception of the Moy. The main channel of the Blackwater is a designated Salmonid river<sup>3</sup> and Salmon are fished mostly on this main channel whilst Brown Trout (*Salmo trutta*) are fished on the main channel and on larger tributaries. Sea Trout are important on the River Bride and on the main channel upstream as far as Lismore.

The Blackwater is also noted for its coarse fish, particularly the cyprinids Roach (*Rutilus rutilus*) and Dace (*Leuciscus leuciscus*). Other fish in the system include European Eel (*Anguilla anguilla*), Perch (*Perca fluviatilis*) and Gudgeon (*Gobio gobio*) (Moriarty, 1998).

There are very few fishing clubs on the river and only a couple of those have Salmon fishing rights. The Salmon fishing is nearly all private and let by the fishery owners.

A decline in Salmon stocks is well recognised in Ireland and throughout the range of the North Atlantic Salmon (*Salmo salar*) and is attributed to several factors including the salmon disease Ulcerative Dermal Necrosis (UDN), poor marine survival and some overfishing (NPWS 2007a). In response to this, a 'Salmon Management Task Force' was established by the Minister for the Marine and Natural Resources in 1996 to review the management of Irish salmon stocks. Currently, various data are analysed annually by the Standing Scientific Committee (SSC) of the National Salmon Commission to provide an estimate of the status of salmon stocks in each of the designated 148 Irish salmon rivers. An estimate of spawning salmon is compared to the individual salmon conservation limit (CL) for each river to determine if it is above or below CL.<sup>4</sup> The most

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<sup>3</sup> EU Freshwater Fish Directive (78/659/EC) transposed by S.I/ 293/1988 – European Communities (Quality of salmonid waters) Regulations, 1988.

<sup>4</sup> A conservation limit is defined by the North Atlantic Salmon Conservation Organisation (NASCO) as "the spawning stock level that produces long term average maximum sustainable yield as derived from the adult to adult stock and recruitment relationship".



recent assessment shows that the Blackwater River is meeting its Conservation Limit with the exception of one tributary, the Bride (Anon, 2007; NPWS, 2007a).

NPWS (2007a) collated habitat impact information for the 148 designated Salmonid rivers. They suggest that agricultural enrichment, forestry related pressures and poor water quality resulting from inadequate sewage treatment are the major pressures affecting Irish salmon rivers. The following pressures are considered to act upon the Blackwater River: agricultural enrichment, afforestation, artificial barriers/fish pass, flash flooding/excessive substrate displacement, overgrazing/bank trampling and quarrying/suspended solids run-off, together with inadequate sewage treatment (River Bride) (NPWS, 2007a).

#### 4.3.2 Otter

The Eurasian Otter (*Lutra lutra*) is widespread throughout all Irish freshwater and most coastal habitats (Chapman & Chapman, 1981). It is an aquatic predator and in freshwater areas the diet typically comprises stickleback, salmonids, frogs, and eels (Bailey & Rochford, 2006).

Ireland is considered a stronghold for Otters as dramatic declines occurred in many European otter populations during the latter half of the 20<sup>th</sup> Century (largely attributed to hunting), and otters remain threatened, declining, rare, or extinct in many European countries. This trend however, is reversing in many countries due to recent conservation efforts.

The Eurasian Otter is protected under international (Habitats Directive) and national (Wildlife Act, 1976 and Wildlife Amendment Act, 2000) legislation. It is listed as a strictly protected species under Appendix II of the Bern Convention (Council of Europe, 1979) and is listed on Appendix 1 of CITES (1979).

The first systematic survey of otter distribution in Ireland was carried out between January 1980 and February 1981 (Chapman and Chapman, 1982). This was followed by a partial re-survey in 1990/91 (Lunnon & Reynolds, 1991) and a full national survey from August 2004 to August 2005 (Bailey & Rochford, 2006). Between the first national survey in 1980/81 and the most recent survey in 2004/05, a net population loss of 23.7% (- 0.98% p.a.) has been estimated, with the majority of this decline occurring in the first ten years (Bailey & Rochford, 2006). This has led to the parameter of population and overall status of Otters being classified as Unfavourable – Inadequate in the NPWS Conservation Assessment (NPWS, 2007c).

The Blackwater River is considered one of the most important SAC sites in Ireland for Otters. Results from the most recent national survey found that 78% of sites surveyed within the SAC recorded the presence of Otters.

As Otters are aquatic animals, their conservation status is dependent largely on the status of the freshwater environment. NPWS (2007c) lists 28 threats and pressures which may impact upon Otters with habitat destruction and water pollution considered the most significant across Europe.

Otters of the Araglin River, a 29km tributary of the Blackwater River, were the subject of intense study (Ottino & Giller, 2004) as part of the River Araglin Catchment Study that commenced in 1990 and focused on the influence of catchment afforestation on water quality and ecology (e.g. Giller et al. 1997).

#### 4.3.3 White-clawed Crayfish

*Austropotamobius pallipes* is the only freshwater crayfish species that occurs in Ireland (Demers et al. 2005). It is protected under international (Habitats Directive) and national (Wildlife Act, 1976 and Wildlife Amendment Act, 2000) legislation.

The White-clawed Crayfish can inhabit larger rivers but also smaller streams as well as lakes and canals. The species is widespread in the midlands and is associated with areas where the geology is predominantly limestone (Lucey & McGarringle, 1987).

The current range of White-clawed Crayfish in Ireland spans most of the Irish lowlands overlying either Palaeozoic limestone rock or lime-rich glacial deposits. It extends from South Donegal and the north midlands (Erne system) to Limerick, Cork and Waterford (Maugue, Awbeg and Suir systems), and from the Corrib in the west to the Boyne and Liffey systems in the east. Crayfish are absent from acid Palaeozoic rocks, as in Wicklow, Kerry, Connemara and west Donegal, as well as from most of Northern Ireland.

With regards the Blackwater River, the species is only known from the Awbeg where it was recorded at six sites in the 1960's (Toner & O'Connell, 1970). Surveys undertaken between 1990 and 2003 also confirmed a population of White-clawed Crayfish in the Awbeg (Demers et al. 2005). More recent assessments confirmed the species' presence and breeding evidence in the Awbeg but reported the species at one locality only, Buttevant. This is currently the only known location of this species in County Cork. However, a survey in 2009, did not record the species and the current status of the species is unknown (SWRBD, 2010a).

An overall decrease in the species' range, some 13% from previous assessments, has led to an overall range assessment of unfavourable (inadequate) in the NPWS Conservation Assessment (Reynolds, 2007).

White-clawed Crayfish require moderate to good water quality (Q3 or higher), slow to moderate current and a heterogeneous habitat with different types of shelter (Reynolds, 2007 and references therein). As crayfish do not migrate to breed, the habitat used by adult and juvenile crayfish for foraging, shelter and breeding is considered to be identical.

While the species is relatively tolerant of less than pristine water quality (Gallagher et al. 2005), population disappearances have been documented in systems where quality has deteriorated from Q3-4 to Q3. The habitats and conditions used by the White-clawed Crayfish are (after Reynolds, 2007):

- Stream bank, suitable for burrowing;
- Tree-roots;
- Cobble and stones;
- Aquatic vegetation, particularly *Fontinalis antipyretica*, *Rorippa nasturtiumaquaticum* and *Apium nodiflorum* in streams, and charophytes in lakes;
- Water quality of Q3 and above, pH generally 7.0 and above, adequate lime, and cool temperature (below 20°C).

Pressures upon the White-clawed Crayfish include declines in water quality (particularly discharges from industry or waste water treatment plants), loss of habitat quality, angling and leisure-related disturbances, introduced (alien) species and disease (Reynolds, 2007). The last two pressures on this list are linked because some of the observed declines in White-clawed Crayfish distribution are attributed to outbreaks of the crayfish plague which was brought about by the disease being introduced alongside a non-native crayfish species (Demers et al. 2005).

#### 4.3.4 Lamprey species

Lampreys are Ireland's most primitive freshwater fish species, belonging to a group of vertebrates known as the Agnatha ('jawless fish'). Three taxa of lamprey are recognised in Ireland – the Sea Lamprey (*Petromyzon marinus* L.), the River Lamprey (*Lampetra fluviatilis* L.) and the Brook Lamprey (*Lampetra planeri* Bloch). There is uncertainty about the genetic relationship

between the Brook and River Lamprey so the two are usually considered together despite their differing management requirements (NPWS, 2007d).

Sea and River Lampreys show many similarities in their life cycles, spending their adult life at sea or in the lower reaches of estuaries and ascending to freshwater to spawn (Igoe et al. 2004). The marine phase may last up to several years. The Sea Lamprey spawning migration commences in early summer and spawning occurs from May to early August. The River Lamprey has two periods of migration (autumn and spring) with spawning in April (NPWS, 2007d). Adults of both taxa excavate nests in gravel into which eggs are washed once they have been fertilised. After hatching, the young larvae swim or are washed downstream by the current to areas of fine sediment in still water, where they burrow. They live as filter feeders and can remain in fine sediment habitat for several years before transforming into young adult fish (NPWS, 2007d).

The distribution of Lamprey species in the Blackwater River cSAC is detailed in King & Linnane (2004). Good numbers of juvenile lamprey were recorded and of the 18 sites fished on the main river, only two contained no juveniles. The majority recorded were River/Brook Lamprey but juvenile Sea Lamprey were also recorded in many of the channels, including the main Blackwater channel making up approximately one-sixth of the overall recorded population across the catchment.

Juvenile River/Brook and Sea Lamprey were recorded from the main Blackwater channel and from the following rivers: Licky, Bride, Araglin, Clyda, Allow, Owenkeal, Finnow, Owentaraglin, Awanaskirtaun River, Crooked River and Awbeg 2. The following watercourses recorded only River/Brook Lamprey with no Sea Lamprey: Greagagh, Finisk, Glenshalane, Awbeg, Lyre, Dalua, Mocollop Glen, Duvglasha, Awbeg 2 and Breedog Rivers.

During a Sea Lamprey spawning investigation, a total of 65 redds were counted along a stretch between Mallow and Cappoquin. A single redd was recorded opposite Mallow Castle, 7 downstream of Killavullen and 3 downstream of Ballyhooly. The majority of Sea Lamprey spawning sites were observed downstream of Fermoy Bridge and weir with a further 18 redds observed in small clusters between Careysville and Cappoquin. Juvenile Sea Lampreys were more widespread in the Blackwater compared with other rivers studied (NPWS, 2007d). The only River Lamprey spawning site encountered was at Rathcormack Bridge (River Bride).

Important requirements for the successful spawning of anadromous lamprey are unimpeded access from the sea through the estuarine and tidal areas and up rivers to the spawning grounds, and suitable gravelled areas for redd construction. It therefore follows that major pressures upon

the species relate to factors that might impede their migration or modify/disturb their spawning habitat. NPWS (2007d) discuss various pressures and threats upon lamprey species. In particular, obstructions to passage such as weirs, impact upon Sea Lamprey (Igoe et al. 2004). It is apparent that Sea Lamprey can, at least in some years, ascend the weirs and other physical obstructions on the Blackwater in sufficient numbers to permit upstream dispersal prior to spawning (NPWS, 2007d).

Water quality and eutrophication are not considered to be highly significant pressures upon lamprey species although specific pollutants can cause mortality (NPWS, 2007d).

#### 4.3.5 Twaite Shad

Three taxa of shad are recognised in Ireland – the Allis Shad (*Alosa alosa* L.), the Twaite Shad (*Alosa fallax* Lacepede) and the landlocked Killarney shad (*Alosa fallax killarnensis* Regan). These fish are members of the Herring family – Clupeidae. They are protected under Annex II and V of the EU Habitats Directive and are listed in Appendix III of the Bern Convention.

The Twaite and Allis Shad show many similarities in their life cycles, spending their adult life at sea or in the lower reaches of estuaries and ascending to fresh water to spawn in early summer.

Until relatively recently, little scientific research had been undertaken on the marine and migratory phases of Twaite and Allis Shad in Ireland. Doherty et al. (2004) reported that the only known spawning population of Twaite Shad occurred in the River Barrow. NPWS (2007e) provide a summary of previous records including those from the Central Fisheries Board (CFB) and Southern Regional Fisheries Board (SRFB) who confirmed the presence of Twaite Shad in the Munster Blackwater, River Barrow and River Suir during the period 1999-2000. In 2003, NPWS commissioned CFB to undertake investigations on the Slaney and Munster Blackwater to assess the use of each SAC by shad and lamprey. Results published in King & Linnane (2004) confirm the presence of Twaite Shad in the Blackwater, of significance were 16 caught in floating drift nets at Brian's Cúl on the Broads of Clashmore.

Currently, the only well known spawning site for the Twaite Shad is at St. Mullins on the Barrow. However, the fact that some of the Blackwater shad were juveniles of the 2+ age group suggests successful spawning may occur in some years. Cappoquin is the likely spawning area (NPWS, 2007e).

One of the most significant pressures upon shad species is the restricted access to spawning grounds as a result of man-made barriers to migration. This is thought to have impacted on shad populations throughout Europe (NPWS, 2007e). Doherty et al. (2004) suggest that impacts upon the species include water quality, including eutrophication, as well as habitat deterioration. King & Linnane (2004) discuss the following pressures in relation to the Blackwater River:

- by-catch from commercial fisheries (i.e. unintentional catches during fishing for other species such as Salmon);
- obstruction of up-stream migration and likely obstruction by the Careysville weir;
- impacts upon water quality – thought not to be overriding factor in determining current status in these estuaries.

#### 4.3.6 Killarney Fern

*Trichomanes speciosum* Willd (Killarney Fern) is a large filmy fern in the family Hymenophyllaceae.

*T. speciosum* has a typical fern 2-stage life cycle, the second “fern” like stage is known as the sporophyte and the first stage the gametophyte. Both the sporophyte and gametophyte stages are capable of asexual reproduction by means of rhizomes (in the former) and gemmae (in the latter). In Ireland the sporophyte and gametophyte can occur together and can occupy similar habitats such as dripping caves, cliffs, crevices and gullies by waterfalls, crevices in woodland, and occasionally the floor of damp woodland; all deeply shaded humid habitats (Ratcliffe et. al 1993).

The Killarney Fern is protected under Annex II and V of the EU Habitats Directive and is listed on the Flora Protection Order, 1999.

The range of the Killarney Fern in Ireland is centred on the extreme south in Kerry and West Cork. There are restricted sites in Carlow, Clare, Donegal, Limerick, Waterford, Wicklow and Sligo (Curtis & McGough 1998). The gametophyte range is similar but is more widespread and occurs in counties Galway and Mayo (Preston et al. 2002).

At present there are at least 65 populations of *Trichomanes speciosum* in Ireland, of which at least 39 of these are protected within pNHA or SAC sites. Monitoring of colonies in Ireland by Ratcliffe et al (1993) suggests there is a reasonable level of stability over a ten to thirty-year period in the number of fronds found in each colony and their position within the habitat. The conservation status of *Trichomanes speciosum* in Ireland is Favourable (NPWS, 2007f).

NPWS (2007f) give location and population estimates for *Trichomanes speciosum* in Ireland. For the Blackwater River, one record is given for Co Waterford from 2001 (grid square X08).

Pressures and threats upon the species are reviewed in NPWS (2007f). These include: water pollution, disturbance, woodland clearance, overgrazing and climate change.

#### 4.3.7 Freshwater Pearl Mussel

The Freshwater Pearl Mussel is a bivalve mollusc. Populations of *Margaritifera margaritifera* are known from North America, northern and central Europe and Russia. The species is declining throughout its range and is listed in the IUCN red data book (Ver 2.3) as endangered worldwide. In Ireland the species is protected under international legislation (EU Habitats Directive Annex II and V) and the primary national legislation (Wildlife Acts 1976 and Wildlife Amendment Act, 2000). The species is also listed under Appendix III of the Bern Convention.

The Freshwater Pearl Mussel lives in oligotrophic, acid to neutral waters of rivers flowing over granite or sandstone rock, mainly in the western part of Ireland, but also in areas of the south and south east where geological conditions allow. The adult Pearl Mussel burrows to two-thirds of its shell depth, and is almost sessile in nature. As a filter feeder, large quantities of water are pumped through the animal's siphons and food particles are trapped and passed to the mussel's mouth.

The ecology of the species is particularly notable in that individuals can grow to very large sizes relative to other freshwater molluscs, building up thick calcareous valves in rivers which have soft water with low levels of calcium. Shell building is very slow and individuals can live to over a hundred years of age (NPWS, 2007b).

Members of the Pearl Mussel family, Margaritiferidae, have a complex life cycle. This is summarised in NPWS (2007b) and references therein. The presence of sufficient salmonid fish to act as temporary hosts of the larval glochidial stage of the Pearl Mussel life cycle is essential. In Ireland, Pearl Mussel rivers are either currently or historically important for migratory salmonids. Irish Pearl Mussels also encyst on resident brown trout (Moorkens 1999).

*Margaritifera margaritifera* is restricted to near natural, clean flowing waters, often downstream of ultra-oligotrophic lakes. It requires a stable cobble and gravel substrate with very little fine material below pea-sized gravel. Adult mussels are two-thirds buried and juveniles up to 5-10

years old are buried totally within the substrate. The lack of fine material (e.g. silt) in the river bed allows for free water exchange and hence oxygen exchange between the open water and water within the substrate interstices. This is essential for juvenile recruitment, as this species requires continuous high oxygen levels. As a consequence, the substrate must be free of inorganic silt, organic peat, and detritus, as these can all block oxygen exchange. The open water must also be of high quality with very low nutrient concentrations in order to limit algal and macrophyte growth. Table 4.3 shows the habitat attributes, with ecological quality objectives for Pearl Mussel sites as set out in the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (S. I. No 296 of 2009).

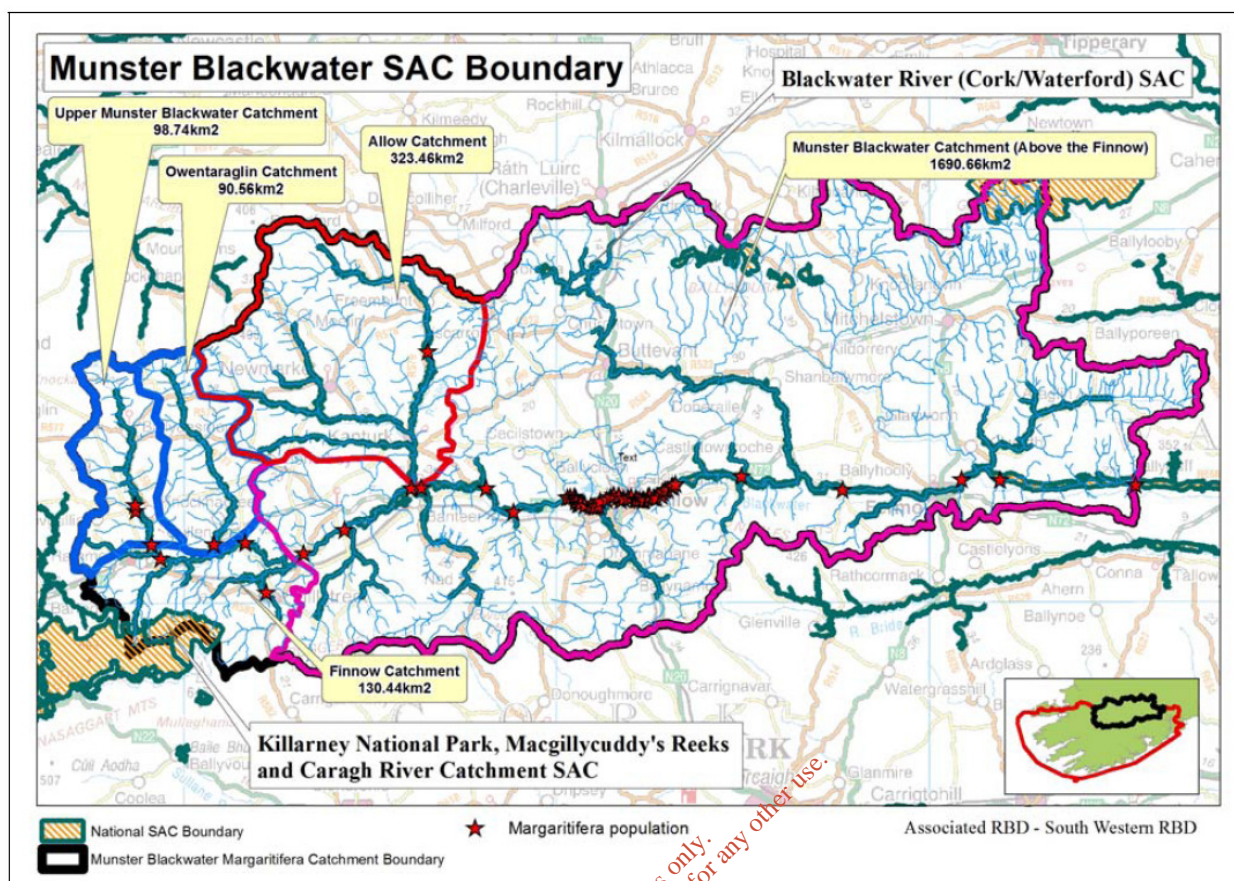
**Table 4.3. Ecological quality objectives for freshwater Pearl Mussel (as per draft European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009.**

Element	Objective	Notes
Macroinvertebrates	EQR $\geq$ 0.90	High status
Filamentous algae (macroalgae)	Trace or Present (<5%)	Any filamentous algae should be wispy and ephemeral and never form mats
Phytobenthos (microalgae)	EQR $\geq$ 0.93	High status
Macrophytes	Trace or Present (<5%)	Rooted macrophytes should be absent or rare within the mussel habitat.
Siltation	No artificially elevated levels of siltation	No plumes of silt when substratum is disturbed

NPWS (2007b) reported that there were 93 remaining populations of *Margaritifera margaritifera* in Ireland, of which none were considered viable (i.e. reproducing). NS2 (2010) report that 'only one of the 96 populations in the country is considered to be in favourable conservation status, as in the others, population reproduction and juvenile survival is not matching adult mortality rates and numbers are declining annually.'

The Munster Blackwater catchment is the largest Pearl Mussel catchment in Ireland encompassing 2333.83 km<sup>2</sup> in the south west of the country (South Western RBD). The species is recorded from the Blackwater main channel, the River Allow and the River Licky. The distribution is shown in Figure 4.1 below.





**Figure 4.1 – Locations of Freshwater pearl mussel populations in Blackwater River catchment**

NS2 (2010) present an account of the status of the Freshwater Pearl Mussel in the Blackwater catchment. Historical information is mostly derived from single records and shells lodged in museum collections. The earliest records come from the early 20th century, near Mallow and from Fermoy. Across the years there has been many records from targeted surveys carried out by e.g. NPWS/EPA staff, plus casual records of sightings sent to NPWS by conservation rangers, anglers, fisheries officers etc. However, there has been no detailed or systematic survey carried out on the Munster Blackwater Pearl Mussel population. Surveys carried out in the past five years and summarized in NS2 (2010) are as follows:-

- A survey by Moorkens in 2004 in the Clyda area, 2 km upstream of Mallow yielded two living mussels and 300 dead shells from 500m of river. Siltation of the mussels caused by instream works was believed to be the cause of the mussel kill.
- Between 1997 and 2005, NPWS staff surveyed tributaries of the Munster Blackwater: Glenlara River, Brogeen River, Dalua River, Owenbaun, Glen River, Nadd River, Awanaskirtaun River, Finnow River, Rathcool River, Corrigduff/Ivale River, Grinaloo River, Glashawee River, Owenkeal, Cregg Stream, Ross River, Clyda River, Duvglasha River, Glen River, Rahan Stream, Ogeen River and the River Bride; and recorded no mussels.

- In September 2008, Moorkens surveyed a short c.250m section of the Blackwater River upstream of Keale Bridge (W29560 93554). A small number of adult mussels were found: 14 mussels were found on the south bank in gravels under willows between W29404 93538 and W29296 93506. Another 17 were seen in similar habitat on north bank between the same grid references.
- A Stage 1 (presence/absence) non-continuous survey of the Pearl Mussel was carried out in the Blackwater River in September 2008 by Ecoserve, from approximately 6 km upstream to 6 km downstream of Mallow, Co. Cork. Mussels were found at 19 of the 38 examined locations. The mussel was found at every site examined upstream of Mallow town, in some places in relatively high density. Downstream of Mallow town, *M. margaritifera* was recorded from only one station. At a location along the north bank of the river adjacent of the Sugar Factory, an estimated density of up to 50-60 individuals per m<sup>2</sup> was found beneath overhanging trees.
- Three sites in the upper catchment surveyed by Ross in August 2009 recorded no evidence of mussels.

Whilst this information suggests that Pearl Mussels may still be relatively widespread in the Blackwater, and with small localised areas with moderately high densities, numbers are known to have declined, and the population is composed entirely of aged adults with no evidence of recruitment for at least 20 years (NS2, 2010). A condition assessment of the Blackwater River and Licky undertaken by NPWS (2007b) for the attributes 'population' and 'water quality', resulted in a 'Fail' for both attributes, while the Allow resulted in a 'data deficient' and 'fail' for the two attributes respectively. More recently, NS2 (2010) report a poor (unfavourable) conservation status for the Blackwater catchment.

A large number of activities and factors at catchment level may impact directly upon Pearl Mussels or indirectly on its habitat. These include pollution incidents, diffuse pollution including from agriculture, forestry, road building, drainage, river bank and bed erosion and modification, water abstraction, the introduction of exotic species, salmonid stocks, climate change, domestic septic tanks and malpractice in the storage and application of slurries (NPWS, 2008). Although pearl fishing was once a major threat it is now only permissible under licence and, given the status of the population, licences are most unlikely to be issued in the foreseeable future (NPWS, 2008).

The loss of Pearl Mussel populations is attributed to the continuous failure to produce new generations of mussels because of the loss of clean gravel beds, which have become infiltrated by fine sediment and/or over-grown by algae or macrophytes (NPWS, 2007b). While sedimentation can impact on any life stage of the species, juvenile mussels are most sensitive. During this time, exchange of water between the river and the substrate is essential in order to provide the young mussels with sufficient oxygen and food. Plumes of sediment can also cause adults to close up in order to prevent clogging of their gills. Prolonged closure can lead to the death of the adults through oxygen deprivation or starvation (NPWS, 2008).

Nutrient enrichment is the increase in the concentration of nutrients such as phosphorus and/or nitrogen in the water. Phosphorus and nitrogen compounds can be directly toxic to the Freshwater Pearl Mussel, however nutrient enrichment is most likely to impact indirectly through its contribution to algal blooms. The algae can block water exchange between the river and the river bed substrate, thereby reducing the oxygen concentration in the substrate and leading to juvenile deaths. This is further exacerbated when the algae die and decompose, further clogging the substrate. In the worst case, dense growths of algae can lead to night time oxygen depletion in the water column and if these conditions are sustained, adult deaths occur (NPWS, 2008).

Pressures and threats upon Pearl Mussel populations are discussed in NPWS (2007b). Furthermore, the Munster Blackwater Sub-basin Management Plan (NS2, 2010) provides a review of key pressures affecting the Freshwater Pearl Mussel in the Munster Blackwater catchment. As many of these pressures affect the general ecology of habitats and species of the Blackwater River SAC, these pressures are reviewed in Section 4 below, with additional information added, where available and relevant.

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## 4.4 Pressures

### 4.4.1 Drainage

Part of the Blackwater catchment has been previously drained, namely the Awbeg Drainage District. However the extent is below the national risk assessment threshold of 50% of river length within the water body. Furthermore, this area is not within the vicinity of Pearl Mussel populations and is at least 10km upstream of known Pearl Mussel areas (NS2, 2010).

### 4.4.2 Barriers

A major requirement of anadromous fish species is unimpeded access from the sea through the estuarine and tidal areas and up rivers to their spawning grounds. Barriers to migration can therefore impact upon the life cycle and success of species of conservation interest of the Blackwater River cSAC: River and Sea Lamprey and Twaite Shad. Furthermore, barriers can indirectly pose a threat to the efficient reproduction of Freshwater Pearl Mussels by affecting their host fish species (NS2, 2010).

The Central Fisheries Board (CFB) has identified possible barriers to migration in Ireland and national datasets indicate that barriers to fish migration may be a pressure in the Blackwater catchment. However, no details are available at present and River Basin Management Plans have identified this as a key data gap which must be addressed.

Careysville Weir, downstream of Fermoy, is known to be a barrier to fish movement when water levels are low, although fish run the weir when the water rises.

### 4.4.3 Agriculture practices

It is well known that catchment land-use adjacent to rivers is one of the primary factors governing the ecology of aquatic systems (Giller and Malmqvist 1998).

Agriculture is the dominant land use within the Blackwater catchment and many agricultural practices can result in an increase of nutrients or silt entering a river which can be damaging to the ecology of the system. In particular, nutrient enrichment through slurry spreading and toxic effects of liming, fertilizers, pesticides and herbicides can have serious implications for the health of freshwater systems and the species of conservation interest as discussed in Section 4.3.

NS2 (2010) identified the following as main issues in relation to the Blackwater catchment:

- Insufficient or lack of fencing of agricultural land – within the Blackwater catchment this has resulted in increased erosion from the use of fords by both vehicles and animals, with subsequent increased siltation as trampled patches of bare sediment leads to the washing of silt into the river. Animals being allowed in or near the river channel may also lead to increased nutrient enrichment of the watercourse. Cummins et al (2010) highlight grazing pressure as a particular threat to the Blackwater with ‘intensive cattle grazing’ recorded in 57% of sections surveyed<sup>5</sup> and specifically, the risk posed by animals being allowed direct access to riparian areas and the water channel itself.
- Inadequate or no buffer or tree line in areas where the river channel is in close proximity to agriculture or forestry. This may result in nutrients or silt being washed directly into the channel from agricultural land or forestry (e.g. following ploughing or felling of trees). Agriculture is the main source of total phosphorous inputs, mostly diffuse, to the Blackwater catchment, for example, 80% to the Awbeg (SWRBD, 2010a) and 79% to the Bride (SWRBD, 2010b).
- Unmanaged ditches and drainage.

#### 4.4.4 Fords

NS2 (2010) identified six fords within the Blackwater catchment that have vehicular and animal access and could therefore cause siltation downstream: Farnankeel Bridge, Owentaragli, Funshion River, Araglin, Munster Blackwater, Ballyhooley.

#### 4.4.5 Abstractions

Abstraction is the permanent or temporary removal of water from a waterbody. As biological communities are adapted to natural flow regimes, unnaturally low or altered flows caused by water abstraction can have damaging impacts on river systems and their ecology.

For the Blackwater catchment, NS2 (2010) assigned a risk classification to each waterbody in terms of abstractions. One water body was classified a ‘1a’ (at risk). Three waterbodies were assigned ‘1b’ (probably at risk) one waterbody was assigned a ‘2a’ (probably not at risk). A remaining ninety-three water bodies were classified as ‘2b’ (not at risk).

<sup>5</sup> during a national Kingfisher survey where 443 sections were surveyed along the Munster Blackwater covering some 217.4km.

Mallow Racecourse has a small scale abstraction for sprinklers which are operated 2-3 days prior to a race meeting. This is in close proximity to the Freshwater Pearl Mussel population.

#### 4.4.6 Forestry

Forestry establishment (including drainage and ground preparation) and many associated management practices such as thinning, felling, re-planting and creation of stream crossings, can be a major source of silt and nutrients to watercourses. Site preparation including drainage, can cause erosion and release of silt into rivers or lakes and may involve the use of herbicide. During the establishment phase, fertilization and especially aerial fertilization, can lead to pollution concerns when close to watercourses or when drainage networks discharge to watercourses without adequate buffering (Kilfeather, 2000).

Brash left on site during and following harvesting releases nutrients through decomposition and this can impact for a significant number of years. Timber debris can also wash into streams and rivers and cause obstructions that not only moderate fish movement, but may also be responsible for flooding events further downstream.

Both insecticides and herbicides are used during afforestation and replanting of coniferous forestry. Insecticides, such as cypermethrin, are used at re-establishment stage (replanting) on post-clearfelled sites to limit attack of the pine weevil (*Hylobius abietus*) (NS2, 2010). Potential therefore exists for entry of insecticides to the aquatic environment.

There is a link between coniferous forestry and acidification impacts upon watercourses. A study on the interaction between forestry and aquatic ecology in Irish catchments showed that surface waters in heavily afforested sites on granite bedrock had significantly lower pH values (higher levels of acidity) than non-afforested sites (Kelly-Quin et al. 1997). More recently, research carried out by the Western RBD linked coniferous forest cover on peat soils overlying igneous/metamorphic rock (Granites) and sedimentary rock (Old Red Sandstones) to acidification impacts (NS2, 2010). Although the main known impacts from coniferous forestry to date have been as a result of increased sedimentation and nutrient pollution (rather than acidification) (NS2, 2010), the potential for increases in acidification have serious implications for the fisheries resource as well as for Freshwater Pearl Mussel populations. However, forest stands in the Munster Blackwater Catchment are located mainly in the upper tributary catchments and above the Freshwater Pearl Mussel populations (NS2, 2010).



Note that a body of research on the interactions between forestry and stream water quality has been built up by studies undertaken within the Blackwater catchment. The River Araglin Catchment Study has yielded much published works and has provided valuable inputs into the understanding of the interactions between forest and aquatic ecology in Munster (O'Halloran et al. 2000).

#### 4.4.7 On-site waste water treatment systems

On-site wastewater treatment systems and other small effluent systems can be significant sources of nutrients to rivers. These are typically diffuse nutrient sources but more serious leaks and inappropriate systems can cause point source pollution damage.

The risk posed by on-site wastewater treatment systems to the Blackwater River was assessed by the Munster Blackwater Sub-basin Management Plan for Freshwater Pearl Mussel (NS2, 2010). This found that there is a very high to extreme risk from many on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters.

#### 4.4.8 Waste Water Treatment Plants

Within the Munster Blackwater catchment there are approximately 40 Waste Water Treatment Plants (WWTPs) that are point sources of nutrients to the Blackwater River (NS2, 2010). Of these, 18 WWTPs were listed as likely to have significant adverse effects on the Freshwater Pearl Mussel or its habitat. These are referenced in the respective assessments, as in some cases, upgrades to various plants has not been taken into account for such risk designation.

#### 4.4.9 Quarries

19 registered quarries occur within the Munster Blackwater catchment (NS2, 2010). Only one of these quarries is located beside a Pearl Mussel location (J.A. Wood at Lackanamona in Mallow).

#### 4.4.10 Miscellaneous

The Irish Sugar Factory near Mallow was closed in 2006. The existing lagoons at the site will be filled in and the site rehabilitated for future use as agricultural land. There is some risk of adverse impacts upon Freshwater Pearl Mussel populations that occur in the vicinity of the site during the sites' rehabilitation phase.

## 5 Conclusions

### 5.1 Ballydesmond

The Natura Impact Assessment screening process for Ballydesmond is laid out in Appendix 2. The findings of this process are summarised below.

It is the case that the Ballydesmond plant is presently slightly overloaded, though in relation to the overall size of the catchment, the agglomeration is relatively small and is unlikely to be contributing to significant nutrient input to the overall catchment. Despite historical sewage input to the catchment, the Blackwater displays good ecological status for much of its length, suggesting high assimilative capacity due to large dilution levels.

However, localised impacts to qualifying species of the SAC (particularly the Pearl Mussel) may be significant due to the high vulnerability of these species to the effects of nutrient enrichment. The cumulative impact of additional nutrient input from the Munster Joinery plant is also hard to quantify.

Given the fact that the WWTP discharges effluent directly to the SAC in upstream of an area where pearl mussels and other qualifying species have been recorded, the screening exercise concludes that further assessment should be carried out in a Stage 2 assessment.

The Stage 2 assessment finds that owing to the contextual minor nature of the discharge, distance from known pearl mussel populations and the fact that the effluent remains close to being compliant despite some overloading, no significant impacts to the conservation objectives of the Blackwater River cSAC are expected.

### 5.2 Ballyhea

The Natura Impact Assessment screening process for Ballyhea is laid out in Appendix 3. The findings of this process are summarised below.

It is technically the case that the Ballyhea plant is presently slightly overloaded, though in relation to the overall size of the catchment, the agglomeration is very small with minimal flows and is therefore unlikely to be contributing to significant nutrient input to the overall Awbeg River system.



Ecological conditions have been seen to be improving in the river in recent years, which is likely to be indicative of a reduction in cumulative pressures.

In the context of other discharges to the Awbeg in the overall vicinity, the Ballyhea plant generates a low volume, generally compliant effluent. The river is currently considered to be in satisfactory ecological condition with good ecological conditions recorded upstream and downstream of the discharge.

Other larger discharges such as the Buttevant and Doneraile WWTPs have been recently upgraded and will be contributing to an improvement in water quality in the catchment. It is not considered that the Ballyhea WWTP is acting in combination with these pressures to any significant degree.

The screening exercise concludes that no significant impacts to the Blackwater River cSAC resulting from the Ballyhea discharge are envisaged and therefore no further assessment is required.

### 5.3 Ballynoe

The Natura Impact Assessment screening process for Ballynoe is laid out in Appendix 4. The findings of this process are summarised below.

The Ballynoe plant is significantly underloaded and in relation to the overall size of the catchment, the agglomeration is very small. The discharge is of very high quality and the tertiary treatment produces a very low nutrient effluent. It is therefore unlikely to be contributing to significant nutrient input to the overall Bride River system. Inland Fisheries Ireland also have no concerns relating to the discharge. Qualifying interests which have the highest ecological sensitivity (Crayfish and Pearl Mussel) are not found in this sub-catchment.

The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Ballynoe discharge are envisaged and as such no further assessment is required.

### 5.4 Bartlemy

The Natura Impact Assessment screening process for Bartlemy is laid out in Appendix 5. The findings of this process are summarised below.

The Bartlemy plant is significantly underloaded and in relation to the overall size of the catchment, the agglomeration is very small. The discharge is generally of good quality and the tertiary treatment produces a very low nutrient effluent. Elevated COD levels are not considered to be of risk to the river, which is likely to have a high assimilative capacity for oxygen loading. Inland Fisheries Ireland also have no concerns relating to the discharge. Qualifying interests which have the highest ecological sensitivity (Crayfish and Pearl Mussel) are not found in this sub-catchment.

The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Bartlemy discharge are envisaged and as such no further assessment is required.

## 5.5 Bridebridge

The Natura Impact Assessment screening process for Bridebridge is laid out in Appendix 6. The findings of this process are summarised below.

The Bridebridge plant is significantly underloaded and in relation to the overall size of the catchment, the agglomeration is very small with minimal flows and is therefore unlikely to be contributing to significant nutrient input to the overall Bride River system. Ecological conditions have been seen to be improving in the river in recent years, which is likely to be indicative of a reduction in cumulative pressures.

The nearby Castlelyons plant generates a good quality effluent and is not predicted to be acting in conjunction with the Bridebridge WWTP to a significant degree. The river is currently considered to be in satisfactory ecological condition with good ecological conditions recorded upstream and downstream of the discharge.

The main concern relates to the discharge sampling data, which is sparse and not up to date. Data provided by the EPA and field observations made during this study indicate that no evidence of impact to the river exists; this is likely to be proven to be the case by increased future monitoring effort. Inland Fisheries Ireland also have no concerns relating to the discharge. Qualifying interests which have the highest ecological sensitivity (Crayfish and Pearl Mussel) are not found in this sub-catchment.

The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Bridebridge discharge are envisaged and as such no further assessment is required.

## 5.6 Castlemagner

The Natura Impact Assessment screening process for Castlemagner is laid out in Appendix 7. The findings of this process are summarised below.

It is technically the case that the Castlemagner system generates non-compliant effluent for oxygen demand and suspended solids, though in relation to the overall size of the catchment, the agglomeration is very small with minimal flows and is therefore unlikely to be contributing to significant nutrient input to the overall Ketragh River system. Ecological conditions have been seen to be improving in the river in recent years, which is likely to be indicative of a reduction in cumulative pressures; implementation of the Nitrates Directive is a key driver in this regard.

The Kilbrin WWTP in the same sub-catchment has been very recently upgraded and generates an excellent quality effluent. It is not considered that it would act in combination with the Castlemagner septic tank.

Overall, the screening exercise takes into account the small scale of the agglomeration and the documented evidence of unpolluted river conditions downstream of the discharge. It concludes that no significant impacts to the Blackwater River cSAC resulting from the Castlemagner discharge are envisaged and therefore no further assessment is required.

## 5.7 Cecilstown

The Natura Impact Assessment screening process for Cecilstown is laid out in Appendix 8. The findings of this process are summarised below.

While the Cecilstown discharge is generally compliant, the Finnow Stream is of poor; very low assimilative capacity for phosphorus is likely to be the main cause of the reduced water quality observed. Localised impacts to qualifying species of the SAC (particularly the Pearl Mussel) may be significant due to the high vulnerability of these species to the effects of nutrient enrichment. In combination factors may also be an issue, given that the Ballyclogh WWTP plant also discharges to the Finnow Stream.

Given the fact that the WWTP discharges to a stream with low assimilative capacity which enters the Blackwater where pearl mussels and other qualifying species have been recorded, the screening exercise concludes that further assessment should be carried out in a Stage 2 assessment.

In conclusion, the negative pressure upon Freshwater Pearl Mussel populations occurring in the Blackwater downstream of the Finnow confluence is considered a significant impact that will continue until nutrient removal is put in place at the plant. This is in contravention of Conservation Objective Number 2 for the cSAC.

The assessment therefore concludes that due to likely impacts to Freshwater Pearl Mussel, the possibility of significant impacts to the Blackwater River (Cork/Waterford) cSAC cannot be discounted at this stage.

## 5.8 Cullen

The Natura Impact Assessment screening process for Cullen is laid out in Appendix 9. The findings of this process are summarised below.

The levels of organic and inorganic nutrients contained within the Cullen discharge are relatively small in context. Overall proximity to the Ahane Bridge pearl mussel population is initially a concern, but orthophosphate levels have been predicted to rise by only 7%. This is not considered a significant increase in the overall agricultural context of the site, where phosphorus usage levels in adjoining lands is predicted to fall further in years to come. General treatment at the Cullen plants appears to be excellent, and BOD and sediment loading are not of concern. Overall ecological conditions in the river are of high status, and negative impacts to Salmon, Lamprey and Otter are not envisaged. The Cullen plants are modern installations with good operating parameters. Field observations indicated that the river displays an open substrate with little to no silt plumes and no evidence of organic enrichment, algal mats or excessive macrophyte growth.

The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Cullen discharges are envisaged and therefore no further assessment is required.

## 5.9 Dernagree

The Natura Impact Assessment screening process for Dernagree is laid out in Appendix 10. The findings of this process are summarised below.

The Dernagree septic tank is an old treatment system that from an infrastructure perspective, is probably in need of upgrading; however, in relation to the overall size of the catchment, the agglomeration is very small with minimal output to groundwater and is therefore unlikely to be contributing to significant nutrient input to the overall Garrane Stream sub-catchment and the overall Blackwater system.

Overall, the screening exercise takes into account the small scale of the agglomeration and the documented evidence of unpolluted river conditions downstream of the septic tank groundwater discharge. It concludes that no significant impacts to the Blackwater River cSAC resulting from the Dernagree discharge are envisaged and therefore no further assessment is required.

## 5.10 Freemount

The Natura Impact Assessment screening process for Freemount is laid out in Appendix 11. The findings of this process are summarised below.

In the context of other discharges to the Allow River in the overall vicinity, the contemporary Freemount plant generates a high quality effluent with low nutrient levels. The river is currently considered to be in good ecological condition with an improvement in water quality from good to high recorded downstream of Freemount.

Other negative pressures to the qualifying interests of the cSAC may be resulting from other land uses (primarily agriculture) in the area. It is considered that the Freemount WWTP is likely to be negating these negative impacts to some degree by minimising nutrient input from the Freemount agglomeration. The Duhallow LIFE project aims to target these agricultural pressures and thus further reduce negative cumulative pressures on the River Allow.

The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Freemount discharge are envisaged and therefore no further assessment is required.

## 5.11 Glantane

The Natura Impact Assessment screening process for Glantane is laid out in Appendix 12. The findings of this process are summarised below.

In the context of other discharges to the Blackwater in the overall vicinity, the contemporary Glantane plant generates a high quality effluent with low nutrient levels.

Other negative pressures to the qualifying interests of the cSAC are more pronounced from other sources. The Lombardstown and Mallow WWTPs are identified as being key negative influences on the Freshwater pearl mussel population of the area. Given the small scale of the Glantane discharge, and the excellent quality of effluent it generates, it is not seen as significant negative pressure.

The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Glantane discharge are envisaged, and therefore no further assessment is required.

## 5.12 Kilbrin

The Natura Impact Assessment screening process for Kilbrin is laid out in Appendix 13. The findings of this process are summarised below.

The Kilbrin WWTP is a modern installation, producing a high quality effluent that is unlikely to be contributing to significant nutrient input to the overall sub-catchment. While there is a lack of information regarding recent ecological conditions in the river, it is reasonable to suggest that the tertiary treatment applied at Kilbrin will be contributing to an overall positive influence on water quality in the sub-catchment.

The Castlemagner septic tank in the same sub-catchment has been identified as having very little influence on water quality in the Ketragh River owing to its very small scale. It is not considered that it would act in combination with the Kilbrin WWTP.

Overall, the screening exercise identifies the Kilbrin plant as being exemplary in its level of treatment, which is likely to negating some negative agricultural pressures in the sub-catchment. It



concludes that no significant impacts to the Blackwater River cSAC resulting from the Kilbrin discharge are envisaged and therefore no further assessment is required.

### 5.13 Kilcorney

The Natura Impact Assessment screening process for Kilcorney is laid out in Appendix 14. The findings of this process are summarised below.

In the context of other discharges to the Blackwater in the overall vicinity, the Kilcorney plant generates a high quality effluent with low nutrient levels.

No other major discharges occur in the Rathcool River sub-catchment and overall pressure on water quality in the watershed is considered to be low. Unpolluted water from the Rathcool River enters the main Blackwater channel and is not considered to be acting cumulatively with other pressures to negatively impact upon the water quality of the greater catchment.

The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Kilcorney discharge are envisaged and therefore no further assessment is required.

### 5.14 Kiskeam

The Natura Impact Assessment screening process for Kiskeam is laid out in Appendix 15. The findings of this process are summarised below.

It is technically the case that the Kiskeam plant is presently slightly overloaded, though in relation to the overall size of the catchment, the agglomeration is relatively small and is unlikely to be contributing to significant nutrient input to the overall river system.

In the context of other discharges to the Blackwater in the overall vicinity, the contemporary Kiskeam plant generates a generally compliant effluent with low nutrient levels; as an example, Orthophosphate levels are predicted to rise by only 0.0003mg/l as a result of the discharge. The river is currently considered to be good ecological condition at Kiskeam, which improve further to high in the lower stretches of the river.

It is not considered that the Kiskeam WWTP is acting in combination with other pressures to a significant degree.

The screening exercise concludes that no significant impacts to the Blackwater River cSAC resulting from the Kiskeam discharge are envisaged and therefore no further assessment is required.

### **5.15 Knocknagree**

The Natura Impact Assessment screening process for Knocknagree is laid out in Appendix 16. The findings of this process are summarised below.

It is technically the case that the Knocknagree plant is presently slightly overloaded, though in relation to the overall size of the catchment, the agglomeration is relatively small and is unlikely to be contributing to significant nutrient input to the overall river system. Despite historical sewage input to the catchment, the Blackwater displays good ecological status for much of its length, suggesting high assimilative capacity due to large dilution levels.

In the context of other discharges to the Blackwater in the overall vicinity, the contemporary Knocknagree plant generates a high quality effluent with low nutrient levels. The river is currently considered to be in satisfactory ecological condition with good ecological conditions recorded upstream, which improve further to high, downstream of the discharge.

Negative pressures to the qualifying interests of the cSAC may be resulting from other discharges and/or land uses in the area; these are addressed in other sections of this document. It is not considered that the Knocknagree WWTP is acting in combination with these pressures to a significant degree.

The screening exercise concludes that no significant impacts to the Blackwater River cSAC resulting from the Knocknagree discharge are envisaged and therefore no further assessment is required.

### **5.16 Liscarroll**

The Natura Impact Assessment screening process for Liscarroll is laid out in Appendix 17. The findings of this process are summarised below.

In the context of other discharges to the Awbeg in the overall vicinity, the contemporary Lisscarroll plant generates a high quality effluent with low nutrient levels. The river is currently considered to be in satisfactory ecological condition with an improvement in downstream ecological conditions recorded since 2006 following the commissioning of the plant.

Other negative pressures to the qualifying interests of the cSAC may be resulting from other land uses (primarily agriculture) in the area. It is considered that the Lisscarroll WWTP is likely to be negating these negative impacts to some degree by minimising nutrient input from the Lisscarroll agglomeration.

The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Lisscarroll discharge are envisaged and therefore no further assessment is required.

### 5.17 Lombardstown

The Natura Impact Assessment screening process for Lombardstown is laid out in Appendix 18. The findings of this process are summarised below.

The Lombardstown septic tank is currently releasing a very poor quality effluent to the Blackwater. Localised impacts to qualifying species of the SAC (particularly the Pearl Mussel) may be significant due to the high vulnerability of these species to the effects of nutrient enrichment. In combination factors may also be an issue, given the urbanised and industrial nature of Mallow Town. The Mallow WWTP has been the cause of a number of pollution incidents in recent years. Other point pressures in the area include three IPPC-licensed facilities in Mallow Town, and the Glantane, Cecilstown and Ballyclogh WWTPs which all discharge to the Blackwater or its tributaries within a 10km radius of Mallow.

The Blackwater has a high dilution factor and overall assimilative capacity for nutrients and thus impacts to the majority of qualifying species is considered unlikely.

However, given the fact that the septic tank discharges poor quality effluent to the Blackwater in close proximity to where pearl mussels have been recorded, the screening exercise concludes that further assessment should be carried out in a Stage 2 assessment.

Further investigation indicates that the potential negative pressure upon Freshwater Pearl Mussel populations occurring in the Blackwater downstream of the Lombardstown discharge (in combination with other pressures located in the environs of Mallow Town) is considered a significant impact that will continue until nutrient removal is put in place at the plant. This is in contravention of Conservation Objective Number 2 for the cSAC.

The assessment therefore concludes that due to likely impacts to Freshwater Pearl Mussel, the possibility of significant impacts to the Blackwater River (Cork/Waterford) cSAC cannot be discounted at this stage.

### 5.18 Lyre

The Natura Impact Assessment screening process for Lyre is laid out in Appendix 19. The findings of this process are summarised below.

In the context of other discharges to the Blackwater in the overall vicinity, the contemporary Lyre plant generates a high quality effluent with low nutrient levels. These percolate to groundwater and the remaining nutrients in the effluent will be slowly diffused to the Glen River catchment.

Other negative pressures to the qualifying interests of the cSAC are more pronounced from other sources such as the Lombardstown and Mallow WWTPs a significant distance downstream. Given the small scale of the Lyre discharge, and the excellent quality of effluent it generates, it is not seen as significant negative pressure. The Nadd WWTP in the Glen catchment is also a modern installation; it is not considered that these plants are negatively acting in combination.

The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Lyre discharge are envisaged and therefore no further assessment is required.

### 5.19 Meelin

The Natura Impact Assessment screening process for Meelin is laid out in Appendix 20. The findings of this process are summarised below.

In the context of other discharges to the Dalua River and Allow catchment, the Meelin plant generates a compliant effluent in low volumes. The river is currently considered to be in good

ecological condition with a further improvement in water quality from good to high recorded downstream of Newmarket.

Other negative pressures to the qualifying interests of the cSAC may be resulting from other land uses (primarily agriculture) in the area. The Duhallow LIFE project aims to target agricultural pressures in the Allow River and thus further reduce negative cumulative pressures on the wider catchment.

The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Meelin discharge are envisaged and therefore no further assessment is required.

## 5.20 Nadd

The Natura Impact Assessment screening process for Nadd is laid out in Appendix 21. The findings of this process are summarised below.

In the context of other discharges to the Blackwater in the overall vicinity, the contemporary Nadd plant generates a high quality effluent with low nutrient levels.

Other negative pressures to the qualifying interests of the cSAC are more pronounced from other sources such as the Lombardstown and Mallow WWTPs a significant distance downstream. Given the small scale of the Nadd discharge, and the excellent quality of effluent it generates, it is not seen as significant negative pressure. The Lyre WWTP in the Glen catchment has also been recently upgraded to include tertiary treatment; it is not considered that these plants are negatively acting in combination.

The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Nadd discharge are envisaged and therefore no further assessment is required.

## 5.21 Rathcool

The Natura Impact Assessment screening process for Rathcool is laid out in Appendix 22. The findings of this process are summarised below.

In the context of other discharges to the Blackwater in the overall vicinity, the Rathcool plant generates a compliant effluent with low nutrient levels that does not appear to be responsible for any artificial enrichment of the river. Sampling of the Blackwater indicates no change in its High ecological status from upstream to downstream of the Rathcool River confluence.

No other major discharges occur in the Rathcool River sub-catchment and overall pressure on water quality in the watershed is considered to be low. Unpolluted water from the Rathcool River enters the main Blackwater channel and is not considered to be acting cumulatively with other pressures to negatively impact upon the water quality of the greater catchment.

The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Rathcool discharge are envisaged and therefore no further assessment is required.

## 5.22 Shanballymore

The Natura Impact Assessment screening process for Shanballymore is laid out in Appendix 23. The findings of this process are summarised below.

It is technically the case that the Shanballymore plant is presently slightly overloaded, though in relation to the overall size of the catchment, the agglomeration is very small with minimal flows and is therefore unlikely to be contributing to significant nutrient input to the overall Awbeg River system. Ecological conditions have been seen to be improving in the river in recent years, which is likely to be indicative of a reduction in cumulative pressures.

In the context of other discharges to the Awbeg in the overall vicinity, the Shanballymore plant generates a low volume effluent which 2010 sampling results indicate is generally compliant with UWWT regulations. The river is currently considered to be in satisfactory ecological condition with good ecological conditions recorded upstream and downstream of the discharge.

Other larger discharges such as the Buttevant and Doneraile WWTPs have been recently upgraded and will be contributing to an improvement in water quality in the catchment. Given the small scale of the Shanballymore discharge and the overall improved assimilative capacity of the Awbeg for nutrients, it is not considered that the Shanballymore WWTP is acting in combination with other pressures to any significant degree.



The screening exercise concludes that no significant impacts to the Blackwater River cSAC resulting from the Shanballymore discharge are envisaged and therefore no further assessment is required.

### 5.23 Glenville

The Natura Impact Assessment screening process for Glenville is laid out in Appendix 24. The findings of this process are summarised below.

The Glenville plant is significantly overloaded and in need of capital investment, despite 2009 sampling data indicating that it is capable of generating compliant effluent concentrations. Localised pollution has been recorded, presumably due to organic and inorganic enrichment of the Owenbawn during peak loading of the plant. This effect is limited in extent and the overall Owenbawn/Glashanabrack sub-catchment is considered to be in good ecological condition.

Given the fact that the WWTP discharges occasional poor quality effluent to a river which may form viable spawning habitat for salmon, the screening exercise concludes that further assessment should be carried out in a Stage 2 assessment.

Further investigation indicates that the potential negative pressure upon potential salmon recruitment in the Owenbawn River is considered to be significant in the context of the overall Bride sub-catchment. Salmon stocks need to recover in this watershed; this will be achieved through the prevention of pollution in valuable spawning headwaters. At present, the Glenville WWTP poses a risk to this conservation effort.

The assessment therefore concludes that due to potential impacts to Atlantic salmon in the Owenbawn River, the possibility of significant impacts to a key conservation objective of the Blackwater River (Cork/Waterford) cSAC cannot be discounted at this stage.

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## Appendix 1 – Natura 2000 Site Information

Natura 2000 Site	
Name	Blackwater River (Cork/Waterford)
Designation	Candidate Special Area of Conservation (Site Code 002170)
Basis	EU Habitats Directive (92/43/EEC)
Description	<p>From the NPWS Site Synopsis: The River Blackwater is one of the largest rivers in Ireland, draining a major part of Co. Cork and five ranges of mountains. 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.</p> <p>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, <i>Salicornia</i> 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.</p> <p>The site is further selected for the following species listed on Annex II of the same directive - Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, White-clawed Crayfish, Twaite Shad, Atlantic Salmon, Otter and the Killarney Fern.</p> <p><b>A detailed description of the Blackwater catchment is contained in Chapter 4 of this document. The full NPWS Site Synopsis is reproduced in Appendix 25.</b></p>
Area	10150.13 Ha
Condition	<p>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.</p> <p>Land use at the site is predominantly agricultural. The SAC site synopsis lists the main threats to the site and damaging activities as:-</p> <ul style="list-style-type: none"> <li>• high inputs of nutrients into the river system from agricultural run-off and sewage plants;</li> <li>• dredging of the upper reaches of the Awbeg;</li> <li>• overgrazing within the woodland areas;</li> <li>• invasion by non-native species.</li> </ul> <p>The EUNIS lists mowing/cutting, fertilization, grazing and water pollution as high intensity negative influences on the site (<a href="http://eunis.eea.europa.eu/sites.jsp">http://eunis.eea.europa.eu/sites.jsp</a>).</p>
Conservation Interests	<p><b>SAC Qualifying Interests – Habitats</b></p> <p><u>Priority Annex I Habitats</u></p> <ul style="list-style-type: none"> <li>• Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, <i>Alnion incanae</i>, <i>Salicion albae</i>) (91E0);</li> <li>• <i>Taxus baccata</i> woods of the British Isles (91J0);</li> </ul> <p>(Information Sources: NPWS Site Synopsis &amp; EUNIS Site factsheet) (<a href="http://eunis.eea.europa.eu/sites.jsp">http://eunis.eea.europa.eu/sites.jsp</a>)</p>



Non-priority Annex I Habitats

- Watercourses of plain to montane levels with the *Ranuncion fluitantis* and *Callitricho-Batrachion* vegetation (3260);
- Estuaries (1130);
- Mudflats and sandflats not covered by seawater at low tide (1140);
- Salicornia and other annuals colonizing mud and sand (1310);
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (1330);
- Mediterranean salt meadows (*Juncetalia maritimi*) (1410);
- Perennial vegetation of stony banks (1220);
- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles (91A0).

**SAC Qualifying Interests – Annex II Species**

- Sea Lamprey (*Petromyzon marinus*);
- River Lamprey (*Lampetra fluviatilis*);
- Brook Lamprey (*Lampetra planeri*);
- Freshwater Pearl Mussel (*Margaritifera margaritifera*);
- White-clawed Crayfish (*Austropotamobius pallipes*);
- Twaité Shad (*Allosa fallax*);
- Atlantic salmon (*Salmo salar*);
- Otter (*Lutra lutra*);
- Killarney Fern (*Trichomanes speciosum*)\*

\* also protected under the Flora Protection Order, 1999)

**Additional features/species of conservation interest**

Habitats (classified as per Fossitt, 2000)

- Wet Willow-Alder-Ash-woodland (WN6);
- Marsh (GM1);
- Reed and large sedge swamp (FS1);
- Wet grassland (GS4);
- Wet heath (HH3);
- Lowland Blanket Bog (PB3);
- Semi-natural woodland (WN) and highly modified/non-native woodland (WD).

Plants (<sup>F</sup>Flora Protection Order, 1999; <sup>R</sup>Red Data Book)

- Starved Wood Sedge (*Carex depauperata*)<sup>F,R</sup>;
- Pennyroyal (*Mentha pulegium*)<sup>F,R</sup>;
- Golden Dock (*Rumex maritimus*)<sup>R</sup>;
- Bird Cherry (*Prunus padus*)<sup>R</sup>;
- Bird's-nest orchid (*Neottia nidus-avid*)<sup>R</sup>.

Mammals (protected under the Wildlife Act, 1976 & Wildlife Amendment Act, 2000<sup>I</sup>, EU Habitats Directive Annex IV/V)<sup>II</sup>, Red Data Book<sup>III</sup>, Bonn Convention<sup>IV</sup> and Bern Convention<sup>V</sup>.

- Pine Marten (*Martes martes*)<sup>I, II, III, V</sup>;
- Badger (*Meles meles*)<sup>I, III, V</sup>;
- Irish Hare (*Lepus timidus hibernicus*)<sup>I, II, III, V</sup>;
- Daubenton's Bat (*Myotis daubentoni*)<sup>I, II, III, IV, V</sup>;
- Whiskered Bat (*Myotis mystacinus*)<sup>I, II, IV, V</sup>;
- Natterer's Bat (*Myotis nattereri*)<sup>I, II, IV, V</sup>;
- Common Pipistrelle Bat (*Pipistrellus pipistrellus*)<sup>I, II, III, IV, V</sup>;
- Brown Long-eared bat (*Plecotus auritus*)<sup>I, II, III, IV, V</sup>.

Amphibians

- Common Frog (*Rana temporaria*)<sup>I, II, III, V</sup>

Invertebrates (rare/scarce)

- *Metriopectera rosellii*
- *Anodonta cygnea*

Birds

(regularly-occurring species listed on Annex I as per Directive 2009/147/EC on the conservation of wild birds (the codified version of Council Directive 79/409/EEC as amended) ('Birds Directive')

- Bewick's Swan (*Cygnus columbianus*);
- Whooper Swan (*Cygnus Cygnus*);
- Little Egret (*Egretta garzetta*);
- Peregrine Falcon (*Falco peregrinus*);
- Kingfisher (*Alcedo atthis*);
- Golden Plover (*Pluvialis apricaria*);
- Bar-tailed Godwit (*Limosa lapponica*).

Birds

other species of conservation interest for the Blackwater River SAC, the Blackwater Callows Special Protection Area (Site Code 4094)\* and the Blackwater Estuary Special Protection Area (Site Code 4028)\*

- Barn Owl (*Tyto alba*);
- Long-eared Owl (*Asio otus*);
- Dipper (*Cinclus cinclus*);
- Light-bellied Brent Goose (*Branta bernicla hrota*);
- Shelduck (*Tadorna tadorna*);
- Wigeon (*Anas penelope*);
- Teal (*Anas crecca*);
- Mallard (*Anas platyrhynchos*);
- Shoveler (*Anas clypeata*);
- Pochard (*Aythya ferina*);
- Goldeneye (*Bucephala clangula*);
- Red-breasted Merganser (*Mergus serrator*);
- Cormorant (*Phalacrocorax carbo*);
- Grey Heron (*Ardea cinerea*);
- Oystercatcher (*Haematopus ostralegus*);
- Ringed Plover (*Charadrius hiaticula*);
- Grey Plover (*Pluvialis squatarola*);
- Knot (*Calidris canutus*);
- Lapwing (*Vanellus vanellus*);
- Dunlin (*Calidris alpina*);
- Black-tailed Godwit (*Limosa limosa*);
- Curlew (*Numenius arquata*);
- Greenshank (*Tringa nebularia*);
- Redshank (*Tringa totanus*);
- Turnstone (*Arenaria interpres*);
- Black-headed Gull (*Chroicocephalus ridibundus*);
- Common Gull (*Larus canus*);
- Lesser Black-backed Gull (*Larus fuscus*);
- Herring Gull (*Larus argentatus*);
- Great Black-backed Gull (*Larus marinus*).

\*designated under Directive 2009/147/EC on the conservation of wild birds (the codified version of Council Directive 79/409/EEC as amended) ('Birds Directive').

## Appendix 2 – Ballydesmond Screening & Assessment

Project	
Location	Discharge associated with agglomeration of Ballydesmond village, County Cork.
Distance from designated site	Okm: WWTP discharges to the River Blackwater, inside the cSAC boundary.
Brief description	<p>Ballydesmond village is located on the R577 circa 35 miles west of Mallow Town. The waste water from the agglomeration is currently treated by a package treatment plant prior to being discharged.</p> <p>The wastewater treatment plant (WWTP) was constructed in 2002.</p> <p>The main elements of the WWTP are;</p> <ol style="list-style-type: none"> <li>1. Secondary treatment: Activated Sludge (aeration tank and Clarifier)</li> <li>2. Discharge to the River Blackwater.</li> </ol> <p>The wastewater treatment plant treats only municipal waste water from Ballydesmond village and it environs via the sewerage collection system. The plant is designed to generate final effluent treated to a 25/35 (BOD/SS) standard or better prior to being discharged to the River Blackwater.</p> <p>A flow survey was carried out at the WWTP in February 2008 to establish the degree of infiltration into the Sewer network. The flow survey established a DWF of circa 95m<sup>3</sup>/day.</p> <p>The plant has a design PE of 300 but currently serves an agglomeration of 350 PE and is therefore slightly overloaded. A stormwater holding tank has improved treatment levels in recent years.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

### Stage 1 - Screening

Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Ballydesmond agglomeration receives secondary treatment at the WWTP, before discharging to the River Blackwater. The effluent then disperses in the water column.</p> <p>An observation of the River Blackwater in the vicinity of Ballydesmond village revealed that at this location, the river is relatively minor in scale (3-4m wide) with slow flows and occasional riffles along a shallow incline.</p> <p>The most recent EPA water quality sampling data from 2009 indicates that the River Blackwater displays good (Q=4) ecological conditions downstream of the discharge point, at the first bridge downstream of Ballydesmond Bridge, at Lackanastooka. No change is therefore</p>
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	<p>apparent from the river samples at Ballydesmond Bridge (Q=4).</p> <p>The overall ecological status of the catchment is listed by the EPA as satisfactory, with only moderate and poor Q values found downstream of the major towns of Mallow and Fermoy respectively.</p> <p>Sampling data for the discharge provided by Cork County Council with the Certificate Application indicates the following effluent levels in mg/l:</p> <ul style="list-style-type: none"> <li>• BOD = 36</li> <li>• SS = 28</li> <li>• COD = 76</li> <li>• P = 0.3</li> <li>• N = 8.4</li> </ul> <p>Sampling results of the River Blackwater taken at the same time show a measureable increase in BOD, though the downstream levels are still afforded High Status under the WFD River classification system. Ammonia and Orthophosphate are similarly under the High Status threshold.</p> <p>The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving stream, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied.</p> <p>Under consultation, Inland Fisheries Ireland made no specific comments relating to the Ballydesmond discharge, but made general reference to the negative influence of plants operating near or above their design PEs.</p> <p>The Water Framework Directive assigns 'Moderate' status to the Upper Blackwater River; this is based on 'Fail' results for all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.</p> <p>The Second Draft Freshwater Pearl Mussel Sub-Basin Plan lists the Ballydesmond WWTP as potentially having a significant adverse effect on the pearl mussel; there are records of this species around 12-15km downstream of Ballydesmond, near Rathmore. Pearl mussel populations require rivers to have an extremely low nutrient concentration to facilitate reproduction.</p> <p>Cork County Council note that the Ballydesmond plant is in need of upgrading to facilitate separation of wastewater and stormwater flows. This would form part of the Council's internal investment budget.</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <ul style="list-style-type: none"> <li>Size and scale;</li> <li>Land-take;</li> <li>Distance from Natura 2000 site or key features of the site;</li> <li>Resource requirements;</li> <li>Emissions;</li> <li>Excavation requirements;</li> <li>Transportation requirements;</li> </ul>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC</p>

<p>Duration of construction, operation etc.;</p> <p>Others.</p>	<p>has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>The Ballydesmond WWTP lies in close proximity to the Munster Joinery Plant (Gairdini). This commercial plant is involved in the manufacture of Hardwood, uP.V.C, Steel and Aluminium doors and windows and employed over 1000 people at the peak of the Irish housing market in 2006. The plant, which operates its own wastewater treatment plant with the same treatment levels, may result in a cumulative negative pressure on the River Blackwater at this location. The plant operates an internal WWTP that is licensed under the EPA IPPC system (Ref: P0639-02). This equates to a significantly larger effluent input to the Blackwater than the Ballydesmond village agglomeration. Demand for such products has reduced significantly since 2007 and it is likely that the Munster Joinery WWTP is currently underloaded. The discharge from the plant also occurs upstream of the Lackanastooka Bridge; ecological water quality was recorded as Q=4 at this location.</p> <p>Other WWTP discharges located in the immediate part of the catchment are Knocknagree village WWTP, Rathmore village WWTP and the WWTP associated with the Cadbury Ireland plant at Rathmore.</p> <p>A sand and gravel quarry is also located in the headwaters of the Upper Blackwater at Kingwilliamstown, northwest of Ballydesmond. This may be contributing to siltation and sediment levels in the river, which are being transferred downstream.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme.</p>
<p>Describe any likely changes to the site arising as a result of:</p> <p>Reduction of habitat area;</p> <p>Disturbance of key species;</p> <p>Habitat or species fragmentation;</p> <p>Reduction in species density;</p> <p>Changes in key indicators of conservation value;</p> <p>Climate change.</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Blackwater of this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p>

	<ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> <li>• White-clawed Crayfish - Records in main Blackwater channel only exist near Fermoy. The species has also been historically recorded in the Awbeg sub-catchment.</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic salmon and Otter.</p> <p>Elevated nutrient levels and dissolved oxygen demand can lead to recruitment failure in Freshwater Pearl Mussel populations. While adult specimens may be more tolerant to temporary deoxygenation, juveniles become stressed very easily and mortality can be high. Ongoing eutrophication leads to progressive ageing of populations and associated reduction in density.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of lamprey species which have also been recorded in the Upper Blackwater.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The Blackwater is under threat from a variety of sources, including run-off from intensive agriculture, especially in the well known agricultural area known as the Golden Vale. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river further up its reaches, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the river Blackwater was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The Ballydesmond WWTP has the potential to contribute to this effect as</p>



	<p>it is somewhat overloaded. It is of note that the general effluent from the WWTP is compliant or near-compliant with the UWWT Regulations and no discernible decrease in ecological conditions in the river has been reported by the EPA or Inland Fisheries Ireland.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>It is the case that the Ballydesmond plant is presently slightly overloaded, though in relation to the overall size of the catchment, the agglomeration is relatively small and is unlikely to be contributing to significant nutrient input to the overall catchment. Despite historical sewage input to the catchment, the Blackwater displays good ecological status for much of its length, suggesting high assimilative capacity due to large dilution levels.</p> <p>However, localised impacts to qualifying species of the SAC (particularly the Pearl Mussel) may be significant due to the high vulnerability of these species to the effects of nutrient enrichment. The cumulative impact of additional nutrient input from the Munster Joinery plant is also hard to quantify.</p> <p>Given the fact that the WWTP discharges effluent directly to the SAC in upstream of an area where pearl mussels and other qualifying species have been recorded, the screening exercise concludes that further assessment should be carried out in Stage 2 below. This assessment considers the potential impacts of the discharge with specific reference to the species and/or habitats which may be impacted.</p>

<p><b>Stage 2 - Project Assessment</b></p>	
<p>Describe the elements of the plan that are likely to give rise to significant effects on the site</p>	<p>Waste water treatment plants can contribute significant nutrient and organic loads to rivers. There is potential that the discharge from the Ballydesmond WWTP is in combination with other activities within the Upper River Blackwater leading to increased levels of nutrients downstream of the WWTP.</p>
<p>Set out the conservation objectives of the site</p>	<p>European and national legislation places a collective obligation on Ireland and its citizens to maintain at favourable conservation status areas designated as candidate Special Areas of Conservation. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.</p> <p>According to the EU Habitats Directive, favourable conservation status of a habitat is achieved when its natural range, and area it covers within that range, is stable or increasing, and the ecological factors that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and the conservation status of its typical species is favourable as defined below. The favourable conservation status of a species is achieved when population data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.</p> <p>The generic conservation objectives of the Blackwater River cSAC are:</p> <p><b>1.</b> To maintain the Annex I habitats for which the cSAC has been selected at favourable conservation status: Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) (91E0);</p>

	<p><i>Taxus baccata</i> woods of the British Isles (91J0); Watercourses of plain to montane levels with the <i>Ranuncion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation (3260); Estuaries (1130); Mudflats and sandflats not covered by seawater at low tide (1140); Salicornia and other annuals colonizing mud and sand (1310); Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) (1330); Mediterranean salt meadows (<i>Juncetali maritimi</i>) (1410); Perennial vegetation of stony banks (1220); Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles (91A0).</p> <p><b>2.</b> To maintain the Annex II species for which the cSAC has been selected at favourable conservation status: Sea Lamprey (<i>Petromyzon marinus</i>); River Lamprey (<i>Lampetra fluviatilis</i>); Brook Lamprey (<i>Lampetra planeri</i>); Twaite Shad (<i>Alosa fallax fallax</i>); Salmon (<i>Salmo salar</i>); Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>); White-clawed Crayfish (<i>Austroptamobius pallipes</i>); Otter (<i>Lutra lutra</i>); Killarney Fern (<i>Trichomanes speciosum</i>)</p> <p><b>3.</b> To maintain the extent, species richness and biodiversity of the entire site.</p> <p><b>4.</b> To establish effective liaison and co-operation with landowners, legal users and relevant authorities.</p> <p>It should be noted that only a sub-sample of these qualifying interests are water-dependent, as identified in the screening process.</p>
<p>Describe how the project will affect key species and key habitats</p>	<p>Of key concern in relation to the Ballydesmond WWTP is potential negative impact to the Freshwater Pearl Mussel, which acts as a keystone species for the SAC. This species 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 lack of fine material in the river bed allows for 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. This is essential for juvenile recruitment, as this species requires continuous high oxygen levels. The clean substrate must be free of inorganic silt, organic peat, and detritus, as these can all block oxygen exchange. Organic particles within the substrate can exacerbate the problem by consuming oxygen during the process of decomposition. The habitat must be free of filamentous algal growth and rooted macrophyte growth. Both block the free exchange of water between the river and the substrate and may also cause night time drops in oxygen at the water-sediment interface. The open water must be of high quality with very low nutrient concentrations, in order to limit algal and macrophyte growth. Nutrient levels must be close to the reference levels for the river they inhabit. Phosphorus must never reach values that could allow for sustained, excessive filamentous algal growth. The presence of sufficient salmonid fish to carry the larval glochidial stage of the pearl mussel life cycle is essential.</p> <p>The survey of the Upper Blackwater between Ballydesmond and Rathmore (Ross 2009) found no extant pearl mussel populations in this stretch of the river. Poor habitat suitability was attributed to excessive siltation of the river bed, resultant from sand and gravel quarrying works in the headwaters and from frequent cattle access to the river banks leading to progressive erosion.</p> <p>The Ballydesmond WWTP is geographically quite well removed (&gt;12km) from the closest known pearl mussel population in the Blackwater (downstream of Rathmore); as such, direct impacts from increased oxygen demand in the water column is unlikely. Orthophosphate levels in the river</p>

	<p>downstream of the WWTP are recorded as being below the present level of detection (0.05mg/l). AS such, despite being slightly overloaded, it is considered unlikely that the WWTP could, in isolation, negatively affect pearl mussels in the immediate catchment. However, cumulative influences such as the Munster Joinery Plant and the Knockagree WWTP downstream may result in a requirement for a higher standard of treatment to further minimise 'in combination' negative effects between Ballydesmond and Millstreet.</p> <p>In relation to the other qualifying species of the Blackwater cSAC, accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. Such changes are likely to affect stocks of salmon within the river, a qualifying species that is already under pressure in the catchment. Lamprey, which also require high water quality with low levels of sediment are also likely to be similarly affected.</p> <p>Reduction or changes in overall fish stocks will have subsequent effects on predators, most notably otter, for which the site is also designated.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of Lamprey and juvenile fish.</p> <p>Elevated levels of suspended solids from effluent discharges pose a risk to salmon and lamprey recruitment where settlement on spawning gravels and/or redds may occur.</p> <p>Negative impacts to these latter qualifying interests are considered unlikely as no evidence of such gross enrichment of the Blackwater at this location was observed (or has been reported by consultees). The numerous minor tributaries which enter the Blackwater from unpolluted upland areas between Ballydesmond and Rathmore increase the available dilution factor in the river and contribute to minimising any such effects.</p> <p>In a local context, the discharge associated with the Munster Joinery plant (IPPC licensed) poses a significantly larger pressure on the river. However, no evidence of cumulative impacts has been recorded.</p>
<p>Describe how the integrity of the site (determined by structure and function and conservation objectives) is likely to be affected by the project or plan (e.g. loss of habitat, disturbance, disruption, chemical changes, hydrological changes etc).</p>	<p>The key ecological relationships that define the structure and function of the Upper Blackwater as part of the cSAC as a whole are likely to be impacted by potential nutrient enrichment. However, given the minor scale of the discharge, systemic disturbance is not envisaged.</p> <p>The critical matter relating to the Ballydesmond discharge concerns the threat posed to remnant Freshwater Pearl Mussel populations found some 12-15km downstream of the WWTP. This species requires ultra-oligotrophic conditions to facilitate successful recruitment. The most significant threat to populations in the area is posed by the Rathmore WWTP, which generates non-compliant BOD, SS and COD effluent, with a significant increase in ammonia and orthophosphate concentrations recorded in the Blackwater downstream of the discharge. By contrast, no such nutrient elevations have been observed downstream of Ballydesmond. A Q-value of 4-5 (High ecological quality) is recorded upstream of Rathmore, indicating that the Blackwater is in excellent condition upstream of this location.</p> <p>The Blackwater remains an open Salmon fishery, indicating Inland</p>

	<p>Fisheries Ireland’s opinion that the species remains in harvestable surplus for the catchment. The assimilative capacity of the Blackwater for nutrients is high overall, but localised deoxygenation of the water column or clogging of the waterbody with macroalgae and macrophytes may be considered a significant impact to migrating and spawning salmon. Lamprey are known to require equitable water quality standards to salmon. Siltation from non-compliant Suspended Solids may directly effect juvenile lamprey and spawning grounds for both lamprey and salmon. Such impacts downstream of the relatively minor Ballydesmond discharge are considered unlikely.</p> <p>Reduction in key diet species such as salmonids may negatively affect otter populations in the catchment. Competition with the invasive non-native mink may act in combination in this regard. Again, such impacts downstream of the relatively minor Ballydesmond discharge are considered unlikely.</p>
<p>Describe mitigation measures that are to be introduced to avoid, reduce or remedy the adverse effects on the integrity of the site</p>	<p>The Ballydesmond WWTP is listed internally by Cork County Council as being in need of some upgrade works to separate storm water from domestic waste influent. This, when implemented will reduce the degree of organic waste potentially entering the river during periods of protracted wet weather.</p> <p>The Freshwater Pearl Mussel Sub-basin Plan makes specific reference to investigating the need for nutrient removal at the plant, owing to the headwater nature of the receiving river at this location, and the downstream presence of pearl mussels.</p>
<p>Conclusion</p>	<p>In conclusion, the assessment finds that owing to the contextual minor nature of the discharge, distance from known pearl mussel populations and the fact that the effluent remains close to being compliant despite some overloading, no significant impacts to the conservation objectives of the Blackwater River cSAC are expected.</p>

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## Appendix 3 – Ballyhea Screening

Project	
Location	Discharge associated with agglomeration of Ballyhea village, County Cork.
Distance from designated site	0km: WWTP discharges to the Awbeg River, inside the cSAC boundary.
Brief description	<p>Ballyhea Village is located on the N20, 4 Km south of Charleville town. The waste water from the agglomeration is currently treated by a package treatment plant prior to being discharged. Ballyhea wastewater treatment plant (WWTP) was constructed in the 1970's. The design PE of the plant is 125.</p> <p>The main elements of the WWTP are;</p> <ol style="list-style-type: none"> <li>1. Secondary treatment: Activated Sludge Aeration Tank and Clarifier)</li> <li>2. Discharge to River Awbeg.</li> </ol> <p>The Foul sewer network serves two housing estates which gravity discharge to a pumping station which in turn pumps the sewerage to the WWTP.</p> <p>The main source of emissions from the works is via a 150mm pipe outfall to the River Awbeg.</p> <p>The plant is currently operating near its design capacity of 125PE</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

Stage 1 - Screening	
Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Ballyhea agglomeration receives secondary treatment at the WWTP, before discharging to the Awbeg River. The effluent then disperses in the water column.</p> <p>An observation of the Awbeg downstream of the discharge revealed that at this location, the river is very minor in scale (1.5-2m wide) with slow flows and occasional riffles along a shallow incline.</p> <p>The most recent EPA water quality sampling data from 2009 indicates that the Awbeg River displays good (Q=4) ecological conditions downstream of the discharge point, at Longford Bridge. Water quality is effectively consistent therefore from the river samples at Farran Bridge upstream of the WWTP (Q=4).</p> <p>The overall ecological status of the Awbeg (East) catchment is listed by the EPA as improved with good ecological conditions throughout. Conditions have progressively improved since 1994 when Q values of 3 were recorded here.</p> <p>Sampling data for the discharge provided by Cork County Council with</p>

	<p>the Certificate Application indicates the following effluent levels in mg/l:</p> <ul style="list-style-type: none"> <li>• BOD = 10</li> <li>• SS = 19</li> <li>• COD = 67</li> <li>• P = 4.7</li> <li>• N = n/s</li> </ul> <p>Sampling results of the Awbeg River taken at the same time show no detectable increases in BOD or Orthophosphate in the receiving waters; both upstream and downstream levels are afforded High Status under the WFD River classification system. A slight elevation on Ammonia levels were detected (0.06mg/l), but this still scores as High under the above classification.</p> <p>The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving stream, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied.</p> <p>Under consultation, Inland Fisheries Ireland made specific reference to the Ballyhea WWTP in relation to the potential negative pressure of plants operating near or above their design PEs. While the plant is compliant in relation to BOD, SS and COD, the concentrations of Total Phosphorus are higher than may be expected for a WWTP of this size.</p> <p>The Water Framework Directive assigns 'Moderate' status to this sub-catchment of the Awbeg; this is based on results for aquatic macroinvertebrate diversity found in this area.</p> <p>Freshwater Pearl Mussel are not known from this sub-catchment. However, White-clawed crayfish have been historically observed in the Awbeg River (though EPA surveys during 2009 did not record any such specimens).</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <p>Size and scale;          Land-take;          Distance from Natura 2000 site or key features of the site;          Resource requirements;          Emissions;          Excavation requirements;          Transportation requirements;          Duration of construction, operation etc.;</p> <p>Others.</p>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>The surrounding land use is primarily agricultural pasture. The urban area of Charleville town to the north lies in a different watershed to the</p>



	<p>Awbeg River.</p> <p>Other WWTP discharges located in the immediate part of the catchment are the Buttevant WWTP some 12km downstream and the integral WWTP associated with the Dawn Meats plant at Ardnageehy 2km the west, which discharges to the Struhanebally stream. The Buttevant WWTP was upgraded in 2009 to include tertiary treatment; while there is no up to date EPA sampling data following the commissioning of this plants, it is extremely likely that water quality in the middle stretch of the Awbeg will have improved significantly in the past year, owing to this upgrade.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme. It is this programme which is likely to have most significantly accounted for the improvement in water quality observed in the Awbeg (East) in recent years.</p>
<p>Describe any likely changes to the site arising as a result of:                  Reduction of habitat area;                  Disturbance of key species;                  Habitat or species fragmentation;                  Reduction in species density;                  Changes in key indicators of conservation value;                  Climate change.</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Blackwater of this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> <li>• Freshwater Pearl Mussel - Records are restricted to the main Blackwater channel and the Allow catchment.</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, White-clawed Crayfish, Atlantic salmon and Otter.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. Loss of salmonids will in turn affect the feeding ecology of otter populations within the sub-catchment and may reduce</p>

	<p>the carrying capacity of the constituent rivers.</p> <p>Crayfish sensitivity to changes in water quality can result in significant losses following pollution incidents. Eutrophication can lead to luxuriant plant growth, which in turn traps silt and can result in deoxygenation at night, leading to loss of crayfish habitat.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of Lamprey and juvenile fish, and also reduce the recruitment success of White-clawed crayfish.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The greater Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river in its upland tributaries, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the Blackwater catchment was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>Despite the plant being technically overloaded, the generated effluent is generally compliant with the UWWT regulations. Furthermore, an improvement in ecological conditions in the river has been reported by the EPA. The Ballyhea plant is not referenced by the WFD sub-basin plan as being a plant 'at risk'.</p> <p>By contrast, in consultation, Inland Fisheries Ireland noted that the WWTP was operating near capacity and phosphorus levels in the effluent are more elevated than would normally be expected. The Awbeg at this location is minor in nature and is likely to have a low assimilative capacity for phosphate. However, no evidence of gross eutrophication downstream of the plant was observed during field surveys.</p> <p>The overall improvement in ecological conditions observed in the upper Awbeg in recent years is likely to have a beneficial effect on the qualifying interests found within this part the catchment (Atlantic salmon, Lamprey and White-clawed crayfish).</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of</p>	<p>It is technically the case that the Ballyhea plant is presently slightly overloaded, though in relation to the overall size of the catchment, the agglomeration is very small with minimal flows and is therefore unlikely to be contributing to significant nutrient input to the overall Awbeg River system. Ecological conditions have been seen to be improving in the river</p>

<p>magnitude of impacts is not known.</p>	<p>in recent years, which is likely to be indicative of a reduction in cumulative pressures.</p> <p>In the context of other discharges to the Awbeg in the overall vicinity, the Ballyhea plant generates a low volume, generally compliant effluent. The river is currently considered to be in satisfactory ecological condition with good ecological conditions recorded upstream and downstream of the discharge.</p> <p>Other larger discharges such as the Buttevant and Doneraile WWTPs have been recently upgraded and will be contributing to an improvement in water quality in the catchment. It is not considered that the Ballyhea WWTP is acting in combination with these pressures to any significant degree.</p> <p>The screening exercise concludes that no significant impacts to the Blackwater River cSAC resulting from the Ballyhea discharge are envisaged and therefore no further assessment is required.</p>
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## Appendix 4 – Ballynoe Screening

Project	
Location	Discharge associated with agglomeration of Ballynoe village, County Cork.
Distance from designated site	8km: WWTP discharges to the Togher River, upstream of the cSAC boundary.
Brief description	<p>Ballynoe village is situated approximately 16km southeast of Fermoy town, close to the Cork-Waterford border.</p> <p>The wastewater in Ballynoe is collected in a partially separate foul sewerage drainage network. The wastewater from the village gravitates to the wastewater treatment plant.</p> <p>Ballynoe WWTP is designed for a Population Equivalent (PE) of 770, which was commissioned in 2009. Activated Sludge is the process employed at the Ballynoe waste water treatment plant. Influent initially gravitates into the inlet works, consisting of an automatic and manual bypass. Following the screening of the raw sewerage, influent enters an inlet sump where influent is pumped to Aeration Tank. Following the aeration process effluent gravitates to the Clarifier Tank where settlement takes place. The solids settle while the supernatant flows out and discharges to the river. Sludge may be returned from the Clarifier Tank to the Aeration Tank and excess sludge is pumped to the Sludge Holding Tank as required and thereafter removed off site for disposal.</p> <p>The pollution load for the Ballynoe agglomeration arises from the following areas:</p> <ul style="list-style-type: none"> <li>• Domestic population</li> <li>• Commercial premises</li> <li>• School &amp; crèches</li> </ul> <p>The sewerage from all commercial premises is collected via the public sewer and treated in conjunction with the domestic waste at the WWTP.</p> <p>The final effluent is discharged to the Togher River, which is approximately 350m from the wastewater treatment plant site.</p> <p>Based average hydraulic load, the PE of the WWTP equates to 300 and it is therefore significantly underloaded. The process includes tertiary treatment.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

### Stage 1 - Screening

Describe the individual elements of the plan (either alone or in combination)	The Ballynoe agglomeration receives tertiary treatment at the WWTP, before discharging to the Togher River, which is a tributary of the
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<p>with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.</p>	<p>Douglas River and River Bride. The effluent then disperses in the water column.</p> <p>An observation of the Togher River downstream of the discharge revealed that at this location, the river is very minor in scale (2m wide) with slow flows over occasional riffles along a shallow incline. Some aquatic macrophytes were observed; no algal mats were observed. Water quality appeared in good condition.</p> <p>The most recent EPA water quality sampling data from 2009 indicates that the River Bride displayed only moderate (Q=3-4) ecological conditions at the only sampled location, just upstream of the Bride confluence. Historic records at Togher Bridge reveal poor conditions up to 2006, prior to the contemporary upgrade of the WWTP.</p> <p>Sampling data for the discharge was provided by Cork County Council with the Certificate Application, with data from November 2009 which indicates the following effluent levels in mg/l:</p> <ul style="list-style-type: none"> <li>• BOD = &lt;2</li> <li>• SS = 2</li> <li>• COD = &lt;5</li> <li>• P = 0.5</li> <li>• N = 7.22</li> </ul> <p>These are all excellent low-nutrient values, indicating that the discharge will have absolutely minimal impact on the receiving river. No detectable change in BOD, Ammonia or Orthophosphate was detected in the Togher River.</p> <p>The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving stream, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied.</p> <p>Under consultation, Inland Fisheries Ireland made no reference to the Ballynoe WWTP as having a negative influence on fisheries in the catchment.</p> <p>The Water Framework Directive assigns 'Moderate' status to this stretch of the River Bride; this is based on historical results for aquatic macroinvertebrate diversity found in this area, which precede the commissioning of the new plant. Agricultural pressures may also have contributed to these low Q value results.</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <ul style="list-style-type: none"> <li>Size and scale;</li> <li>Land-take;</li> <li>Distance from Natura 2000 site or key features of the site;</li> <li>Resource requirements;</li> <li>Emissions;</li> <li>Excavation requirements;</li> <li>Transportation requirements;</li> <li>Duration of construction, operation etc.;</li> <li>Others.</li> </ul>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p>

	<p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>In relation to the above points, the excellent quality discharge from the Ballynoe WWTP is likely to have a neutral or even positive influence on the water quality of the Togher and Douglas Rivers. As such, it may be negating the negative influence of agricultural run-off in the sub-catchment and thus contributing to an overall reduction in nutrients entering the Blackwater cSAC.</p> <p>There are no other discharges to the Douglas River sub-catchment. The confluence with the Bride River occurs between Bridebridge and Conna, which each have their own WWTPs. Ecological water quality has been seen to improve along this stretch of the Bride in recent years; this is attributed to an improvement in sewage treatment at Bridebridge and a shift in agricultural practices.</p> <p>The surrounding land use is primarily agricultural pasture. There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme. Reduction in slurry usage in the Bride catchment appears to have contributed to an improvement in water quality in recent years.</p> <p>The River Bride was closed to salmon and sea trout fishing in 2010, but is to be re-opened on a catch-release basis in 2011. Inland Fisheries Ireland therefore consider the Bride population to be stable, but not in harvestable surplus.</p>
<p>Describe any likely changes to the site arising as a result of:</p> <ul style="list-style-type: none"> <li>Reduction of habitat area;</li> <li>Disturbance of key species;</li> <li>Habitat or species fragmentation;</li> <li>Reduction in species density;</li> <li>Changes in key indicators of conservation value;</li> <li>Climate change.</li> </ul>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Blackwater of this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower</li> </ul>



	<p>stretches of catchment</p> <ul style="list-style-type: none"> <li>• Freshwater Pearl Mussel - Records are restricted to the main Blackwater channel and the Allow catchment.</li> <li>• White-clawed Crayfish – Historically not recorded from the Bride catchment.</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, Atlantic salmon and Otter.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. Loss of salmonids will in turn affect the feeding ecology of otter populations within the sub-catchment and may reduce the carrying capacity of the constituent rivers.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of Lamprey and juvenile fish. A significant degree of floating river vegetation was observed in the River Bride at Achern Bridge. Some was also observed in the Douglas River at Ballynella. No gross eutrophication in the form of algal mats was observed. The presence of the current levels of vegetation may be attributed to historical phosphorus and nitrate input to the River, the effects of which will take several years to dissipate; levels of in-stream vegetation are predicted to fall over the coming years. Between the vegetation, the river substrate was observed to be open and no barriers to fish migration were recorded.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The greater Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river in its upland tributaries, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the Blackwater catchment was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The Ballynoe plant is currently significantly underloaded and generating an excellent quality effluent. As the plant is a very recent installation, no up-to-date EPA downstream sampling data exists which may statistically indicate an improvement in water quality in the Togher/Douglas rivers. However, given the excellent quality of the Ballynoe discharge, such a</p>

	<p>change is predicted. This is likely to have a beneficial effect on the qualifying interests found within this part the catchment (Atlantic salmon, Lamprey and Otter).</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>The Ballynoe plant is significantly underloaded and in relation to the overall size of the catchment, the agglomeration is very small. The discharge is of very high quality and the tertiary treatment produces a very low nutrient effluent. It is therefore unlikely to be contributing to significant nutrient input to the overall Bride River system. Inland Fisheries Ireland also have no concerns relating to the discharge. Qualifying interests which have the highest ecological sensitivity (Crayfish and Pearl Mussel) are not found in this sub-catchment.</p> <p>The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Ballynoe discharge are envisaged and as such no further assessment is required.</p>

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## Appendix 5 – Bartlemy Screening

Project	
Location	Discharge associated with agglomeration of Bartlemy village, County Cork.
Distance from designated site	0km: WWTP discharges to the Knoppoge River, at the cSAC boundary.
Brief description	<p>Bartlemy village is situated approximately 10km northwest of Newmarket and 18km southwest of Charleville.</p> <p>The wastewater in Bartlemy is collected in a partially separate foul sewerage drainage network. The wastewater from the village gravitates to the wastewater treatment plant.</p> <p>Bartlemy WWTP is designed for a Population Equivalent (PE) of 500, which was commissioned in 2007. Activated Sludge is the process employed at the Bartlemy waste water treatment plant. Influent initially gravitates into the inlet works, consisting of an automatic and manual bypass. Following the screening of the raw sewerage, influent enters a inlet sump where influent is pumped to primary tank, from where the effluent is pumped to a splitter chamber where the influent splits in to the 2 NR + Aeration Tank. Following the aeration process effluent gravities to the settlement, the solids settle while the supernatant flows out and discharges to the river. Sludge may be returned from the settling tank to the primary tank and excess sludge is removed from the primary tank to the sludge holding tank as required and thereafter removed off site for disposal.</p> <p>The pollution load for the Bartlemy agglomeration arises from the following areas:</p> <ul style="list-style-type: none"> <li>• Domestic population</li> <li>• Commercial premises</li> <li>• School &amp; crèches</li> </ul> <p>The sewerage from all commercial premises is collected via the public sewer and treated in conjunction with the domestic waste at the WWTP.</p> <p>The final effluent is discharged to the Knoppoge River, which is adjacent to the wastewater treatment plant site.</p> <p>Based average hydraulic load the current treated PE equates to 120. The plant is thus significantly underloaded.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

### Stage 1 - Screening

Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to	The Bartlemy agglomeration receives tertiary treatment at the WWTP, before discharging to the Knoppoge River, which is a tributary of the River Flesk and River Bride. The effluent then disperses in the water
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<p>give rise to impacts on the Natura 2000 sites.</p>	<p>column.</p> <p>An observation of the Knoppoge River downstream of the discharge revealed that at this location, the river is very minor in scale (2m wide) with fast flows over a large cobble substrate. No aquatic macrophytes or algal mats were observed. Water quality appeared in good condition.</p> <p>The most recent EPA water quality sampling data from 2009 indicates that the Knoppoge displayed good (Q=4) ecological conditions at the only sampled location, at the bridge just to the south of Bluebell Bridge.</p> <p>Sampling data for the discharge was provided by Cork County Council with the Certificate Application, with data from November 2009 which indicates the following effluent levels in mg/l:</p> <ul style="list-style-type: none"> <li>• BOD = 11</li> <li>• SS = 31</li> <li>• COD = 82</li> <li>• P = n/s</li> <li>• N = n/s</li> </ul> <p>The effluent is generally compliant, with only slightly elevated levels for COD. The river, with fast flows over large cobbles is likely to have a high assimilative capacity for oxygen loading. A measureable reduction in BOD, Ammonia and Orthophosphate was detected in the Knoppoge River downstream of the discharge, with WFD status of High or Good being attributed to the above variables. Only moderate status was attributed to an upstream sample; this is likely to be attributed to localised agricultural run-off near the sampling point.</p> <p>The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving stream, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied.</p> <p>Under consultation, Inland Fisheries Ireland made no reference to the Bartlemy WWTP as having a negative influence on fisheries in the catchment.</p> <p>The Water Framework Directive assigns 'Moderate' status to this stretch of the River Bride; this is based on historical results for ecological status found in this area, which precede the commissioning of the new plant.</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <p>Size and scale;</p> <p>Land-take;</p> <p>Distance from Natura 2000 site or key features of the site;</p> <p>Resource requirements;</p> <p>Emissions;</p> <p>Excavation requirements;</p> <p>Transportation requirements;</p> <p>Duration of construction, operation etc.;</p> <p>Others.</p>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on</p>

	<p>effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>In relation to the above points, the generally compliant quality discharge from the Bartlemy WWTP is likely to have a neutral or even positive influence on the water quality of the Knoppoge River. As such, it may be negating the negative influence of agricultural run-off in the sub-catchment and thus contributing to an overall reduction in nutrients entering the Blackwater cSAC.</p> <p>There are no other discharges to the River Flesk sub-catchment. The confluence with the Bride River occurs between Rathcormack and Bridebridge, which each have their own WWTPs. Ecological water quality has been seen to improve along this stretch of the Bride in recent years; this is attributed to an improvement in sewage treatment at Bridebridge and a shift in agricultural practices.</p> <p>The surrounding land use is primarily agricultural pasture. There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme. Reduction in slurry usage in the Bride catchment appears to have contributed to an improvement in water quality in recent years.</p> <p>The River Bride was closed to salmon and sea trout fishing in 2010, but is to be re-opened on a catch-release basis in 2011. Inland Fisheries Ireland therefore consider the Bride population to be stable, but not in harvestable surplus.</p>
<p>Describe any likely changes to the site arising as a result of:          Reduction of habitat area;          Disturbance of key species;          Habitat or species fragmentation;          Reduction in species density;          Changes in key indicators of conservation value;          Climate change.</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Blackwater of this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> </ul>

	<ul style="list-style-type: none"> <li>• Freshwater Pearl Mussel - Records are restricted to the main Blackwater channel and the Allow catchment.</li> <li>• White-clawed Crayfish – Historically not recorded from the Bride catchment.</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, Atlantic salmon and Otter.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. Loss of salmonids will in turn affect the feeding ecology of otter populations within the sub-catchment and may reduce the carrying capacity of the constituent rivers.</p> <p>The Knoppoge River is predicted to have a high assimilative capacity of oxygen loading.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of Lamprey and juvenile fish.</p> <p>No major macrophyte growth or algal mats were observed during field studies.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The greater Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river in its upland tributaries, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the Blackwater catchment was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The Bartlemy plant is a relatively recent installation, is currently significantly underloaded and generating a generally complaint effluent. EPA sampling of the river indicates good ecological conditions; no data on the P and N content of the effluent was available for analysis, but given the tertiary treatment in place at the plant, it is expected that these would be in very low concentrations. This is confirmed by the decreased levels of Ammonia and Orthophosphate concentrations in the downstream samples. Overall nutrient reduction is likely to have a beneficial effect on the qualifying interests found within this part the</p>

	<p>catchment (Atlantic salmon, Lamprey and Otter).</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>The Bartlemy plant is significantly underloaded and in relation to the overall size of the catchment, the agglomeration is very small. The discharge is generally of good quality and the tertiary treatment produces a very low nutrient effluent. Elevated COD levels are not considered to be of risk to the river, which is likely to have a high assimilative capacity for oxygen loading. Inland Fisheries Ireland also have no concerns relating to the discharge. Qualifying interests which have the highest ecological sensitivity (Crayfish and Pearl Mussel) are not found in this sub-catchment.</p> <p>The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Bartlemy discharge are envisaged and as such no further assessment is required.</p>

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## Appendix 6 – Bridebridge Screening

Project	
Location	Discharge associated with agglomeration of Bridebridge village, County Cork.
Distance from designated site	0km: WWTP discharges to the River Bride, at the cSAC boundary.
Brief description	<p>Bridebridge Village is located on the L1519, 7 Km South of Fermoy town. The waste water from the agglomeration is currently treated by a package treatment plant prior to being discharged. The WWTP was constructed in 2005.</p> <p>The main elements of the WWTP are;</p> <ol style="list-style-type: none"> <li>1. Screening</li> <li>2. Secondary treatment: Activated Sludge (Aeration Tank and Clarifier)</li> <li>3. Discharge to the River Bride</li> </ol> <p>The WWTP treats municipal sewerage only.</p> <p>The design PE of the plant is 600, but it is currently underloaded and services an agglomeration with a PE of 490, based on a house count.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

Stage 1 - Screening	
Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Bridebridge agglomeration receives secondary treatment at the WWTP, before discharging to the River Bride. The effluent then disperses in the water column.</p> <p>An observation of the River Bride downstream of the discharge revealed that at this location, the river is quite wide in scale (8-10m wide) with moderate flows over occasional riffles along a shallow incline. Frequent patches of aquatic macrophytes were observed, including Water crowfoot; no algal mats were observed. Water quality appeared in good condition.</p> <p>The most recent EPA water quality sampling data from 2009 indicates that the River Bride displays good (Q=4) ecological conditions upstream and downstream of the discharge point. EPA sampling data from the immediate vicinity of Bridebridge predates the WWTP upgrade.</p> <p>The overall ecological status of the River Bride is listed by the EPA as improved with good ecological conditions at all stations sampled in 2009. This improvement relates to slightly polluted conditions near Shanbally in 2003; farmyard slurry was reaching a nearby stream at the time of the survey. The river was also moderately polluted, due to sewage discharges, on left-hand-side of river below Bridebridge and slightly polluted at Bealacoon Foot-bridge. The Bridebridge WWTP</p>

	<p>upgrade and changes to farming practices along the river have theoretically contributed to the observed improvement in water quality in the river.</p> <p>No sampling data for the discharge was provided by Cork County Council with the Certificate Application in 2009. Sampling was subsequently carried out in March 2010, which indicates the following effluent levels in mg/l:</p> <ul style="list-style-type: none"> <li>• BOD = 34</li> <li>• SS = 30</li> <li>• COD = 137</li> <li>• P = 5.6</li> <li>• N = n/s</li> </ul> <p>These are non-compliant values for BOD, SS and COD. No sampling data for upstream and downstream of the primary discharge was available at the time of this assessment. However, the EPA sampling data from 2009 showing good ecological quality suggest that the WWTP is having some beneficial effect on water quality, when compared to results before the plant was upgraded.</p> <p>The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving stream, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied.</p> <p>Under consultation, Inland Fisheries Ireland made no reference to the Bridebridge WWTP as having a negative influence on fisheries in the catchment.</p> <p>The Water Framework Directive assigns 'Moderate' status to this stretch of the River Bride; this is based on historical results for aquatic macroinvertebrate diversity found in this area, which have only recently improved. The Bridebridge WWTP is listed as a pressure/risk in the River Bride WMU, owing to "Non-compliant frequency of monitoring or non-compliant effluent standard where sufficient capacity is available". Both of these conditions appear to apply in the case of the Bridebridge WWTP.</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <p>Size and scale;</p> <p>Land-take;</p> <p>Distance from Natura 2000 site or key features of the site;</p> <p>Resource requirements;</p> <p>Emissions;</p> <p>Excavation requirements;</p> <p>Transportation requirements;</p> <p>Duration of construction, operation etc.;</p> <p>Others.</p>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p>

	<p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>In relation to the above points, the non-compliant effluent recorded from the Bridebridge WWTP does not initially appear to be having an impact. The EPA state that an improvement in the overall quality of the River Bride has been noted since the upgrade to the plant. However, there is a lack of sampling data in the immediate vicinity of the WWTP.</p> <p>The Bridebridge WWTP lies in close proximity to the Castlelyons WWTP, which discharges to the Shanowennadrimina Stream 1km to the northwest. This stream enters the River 300m upstream of the Bridebridge WWTP; sampling data provided by Cork WWTP indicates that the Castlelyons plant provides a good quality effluent with no discernible impact on the Shanowennadrimina Stream. The Castlelyons WWTP is therefore not considered to be acting in combination with the Bridebridge WWTP to a significant negative degree.</p> <p>The WWTP also lies downstream of Rathcormack WWTP and upstream of the Conna WWTP and Conna Regional Water Treatment Plant, which releases a low-volume, low-nutrient discharge.</p> <p>The surrounding land use is primarily agricultural pasture. There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme. Reduction in slurry usage in the Bride catchment appears to have contributed to an improvement in water quality in recent years.</p> <p>The River Bride was closed to salmon and sea trout fishing in 2010, but is to be re-opened on a catch-release basis in 2011. Inland Fisheries Ireland therefore consider the Bride population to be improved from previous years, but not yet in harvestable surplus.</p>
<p>Describe any likely changes to the site arising as a result of:                  Reduction of habitat area;                  Disturbance of key species;                  Habitat or species fragmentation;                  Reduction in species density;                  Changes in key indicators of conservation value;                  Climate change.</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Blackwater of this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower</li> </ul>

	<p>stretches of catchment</p> <ul style="list-style-type: none"> <li>• Freshwater Pearl Mussel - Records are restricted to the main Blackwater channel and the Allow catchment.</li> <li>• White-clawed Crayfish – Historically not recorded from the Bride catchment.</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, Atlantic salmon and Otter.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. Loss of salmonids will in turn affect the feeding ecology of otter populations within the sub-catchment and may reduce the carrying capacity of the constituent rivers. Elevated BOD loading in the immediate vicinity of the Bridebridge plant could potentially negatively impact these species immediately downstream of the discharge. The River Bride is likely to have relatively fast recovery from deoxygenated conditions; this is indicated by good ecological conditions observed at the EPA sampling point further downstream.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of Lamprey and juvenile fish. A significant degree of floating river vegetation was observed in the River Bride at both Bridebridge and Achem Bridge. No gross eutrophication in the form of algal mats was observed. The presence of the current levels of vegetation may be attributed to historical phosphorus and nitrate input to the River, the effects of which will take several years to dissipate; levels of in-stream vegetation are predicted to fall over the coming years. Between the vegetation, the river substrate was observed to be open and no barriers to fish migration were recorded.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The greater Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river in its upland tributaries, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the Blackwater catchment was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The Bridebridge plant is currently underloaded and should be</p>

	<p>generating a good quality effluent. There is a lack of sampling data in the immediate environs of the plant; there is the potential for negative impacts to fish species immediately downstream of Bridebridge. However, Inland Fisheries Ireland did not raise any specific concerns relating to the discharge, and no evidence of gross eutrophication was observed (this being the main pressure on the wider Blackwater catchment).</p> <p>An overall improvement in ecological conditions has been observed in the River Bride in recent years, attributable to the upgrade to the Bridebridge WWTP and improved agricultural practices along the river. This is likely to have a beneficial effect on the qualifying interests found within this part the catchment (Atlantic salmon, Lamprey and Otter).</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>The Bridebridge plant is significantly underloaded and in relation to the overall size of the catchment, the agglomeration is very small with minimal flows and is therefore unlikely to be contributing to significant nutrient input to the overall Bride River system. Ecological conditions have been seen to be improving in the river in recent years, which is likely to be indicative of a reduction in cumulative pressures.</p> <p>The nearby Castleyons plant generates a good quality effluent and is not predicted to be acting in conjunction with the Bridebridge WWTP to a significant degree. The river is currently considered to be in satisfactory ecological condition with good ecological conditions recorded upstream and downstream of the discharge.</p> <p>The main concern relates to the discharge sampling data, which is sparse and not up to date. Data provided by the EPA and field observations made during this study indicate that no evidence of impact to the river exists; this is likely to be proven to be the case by increased future monitoring effort. Inland Fisheries Ireland also have no concerns relating to the discharge. Qualifying interests which have the highest ecological sensitivity (Crayfish and Pearl Mussel) are not found in this sub-catchment.</p> <p>The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Bridebridge discharge are envisaged and as such no further assessment is required.</p>

## Appendix 7 – Castlemagner Screening

Project	
Location	Discharge associated with agglomeration of Castlemagner village, County Cork.
Distance from designated site	600m: WWTP discharges to the Ketragh River, upstream of the cSAC boundary.
Brief description	<p>The wastewater from the Castlemagner agglomeration is collected in a partially combined foul and separate foul sewerage drainage network. The wastewater from the village gravitates to the septic tank.</p> <p>The Septic Tank is designed for a Population Equivalent (PE) of approximately 100, which was commissioned in the late 1970's.</p> <p>The primary source of emissions from the works is via a 150mm pipe outfall to the Ketragh River.</p> <p>The wastewater treatment plant treats only municipal waste water from the Village and it environs via the sewerage collection system.</p> <p>The treatment works consists of the following elements:</p> <ul style="list-style-type: none"> <li>• Primary settlement</li> <li>• Anaerobic digestion</li> </ul> <p>The septic tank currently services a PE of approximately 50 (10 houses), and is essentially underloaded.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

Stage 1 - Screening	
Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Castlemagner agglomeration receives primary treatment only at the septic tank, before discharging to the Ketragh River. The effluent then disperses in the water column.</p> <p>An observation of the Ketragh River downstream of the WWTP revealed that at this location, the river is very minor in scale (1-1.5m wide) with slow flows and occasional riffles along a shallow incline. Much of the channel was overgrown with riparian scrub.</p> <p>The most recent EPA water quality sampling data indicates that the Ketragh River (also known as the Awbeg-Kanturk) displays good (Q=4) ecological conditions just upstream of the Blackwater confluence. However, this data was collected in 1990. The Water Framework Directive now assigns 'High' status to the Ketragh River; this is based on results for Macroinvertebrate diversity from the EPA sampling locations.</p>

	<p>Sampling data for the discharge provided by Cork County Council with the Certificate Application indicates the following effluent levels from 2009 in mg/l:</p> <ul style="list-style-type: none"> <li>• BOD = 80</li> <li>• SS = 56</li> <li>• COD = 267</li> <li>• P = 3.4</li> <li>• N = n/s</li> </ul> <p>These are typical discharge values for a septic tank treatment system. While the data is non-compliant for the UWWT Regulations, sampling results of the Ketragh taken at the same time as the effluent results show levels of BOD, Ammonia and Orthophosphate all below the measurable limits of detection. Discharge volumes are very low and dilution factors within the Ketragh River are quite high; as a result, impacts to water quality are immeasurably small.</p> <p>Under consultation, Inland Fisheries Ireland made no reference to the Castlemagner WWTP.</p> <p>The Second Draft Freshwater Pearl Mussel Sub-Basin Plan does not list the Castlemagner septic tank as a risk to the Blackwater pearl mussel population.</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <p>Size and scale;          Land-take;          Distance from Natura 2000 site or key features of the site;          Resource requirements;          Emissions;          Excavation requirements;          Transportation requirements;          Duration of construction, operation etc.;</p> <p>Others.</p>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the septic tank pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment. As the treatment is very basic, such malfunctions are highly unlikely.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand. No evidence of such influence was detected via downstream sampling.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>The Castlemagner tank discharge lies in the same sub-catchment as the newly-commissioned Kilbrin WWTP, approximately 9km upstream along the Awbeg-Kanturk spur.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management</p>



	<p>Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme.</p>
<p>Describe any likely changes to the site arising as a result of:          Reduction of habitat area;          Disturbance of key species;          Habitat or species fragmentation;          Reduction in species density;          Changes in key indicators of conservation value;          Climate change.</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic salmon and Otter.</p> <p>Elevated nutrient levels and dissolved oxygen demand can lead to recruitment failure in Freshwater Pearl Mussel populations. While adult specimens may be more tolerant to temporary deoxygenation, juveniles become stressed very easily and mortality can be high. Ongoing eutrophication leads to progressive ageing of populations and associated reduction in density. Water quality in the Ketragh River is currently very high with low nutrient content. Agricultural pressures still contribute to elevated phosphorus loading in the Awbeg-Kanturk spur; the Kilbrin WWTP located along this spur generates a high quality low-nutrient effluent via tertiary treatment. It is considered unlikely that the two treatment plants in this sub-catchment are contributing eutrophying material to the Blackwater to any great degree. Though currently classified as High quality by the WFD assessment, sources of agricultural enrichment in the Awbeg-Kanturk spur should be investigated further.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. No evidence of eutrophication such as algal mats were observed in the Ketragh River.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of lamprey species which have also been recorded in the overall Blackwater catchment. Macrophytes were not observed in great numbers in the Ketragh River.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases.</p>

	<p>However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The overall Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture, especially in the well known agricultural area known as the Golden Vale. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river further up its reaches, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the river Blackwater was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The Castlemagner discharge is very minor in nature and downstream sampling indicates no inorganic enrichment of the water column. Only the lower stretches of the Ketragh/Awbeg-Kanturk are included within the cSAC boundary; no interference to the structure or ecology of the site are envisaged, despite the treatment system being over 30 years old and generating a technically non-compliant effluent.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>It is technically the case that the Castlemagner system generates non-compliant effluent for oxygen demand and suspended solids, though in relation to the overall size of the catchment, the agglomeration is very small with minimal flows and is therefore unlikely to be contributing to significant nutrient input to the overall Ketragh River system. Ecological conditions have been seen to be improving in the river in recent years, which is likely to be indicative of a reduction in cumulative pressures; implementation of the Nitrates Directive is a key driver in this regard.</p> <p>The Kilbrin WWTP in the same sub-catchment has been very recently upgraded and generates an excellent quality effluent. It is not considered that it would act in combination with the Castlemagner septic tank.</p> <p>Overall, the screening exercise takes into account the small scale of the agglomeration and the documented evidence of unpolluted river conditions downstream of the discharge. It concludes that no significant impacts to the Blackwater River cSAC resulting from the Castlemagner discharge are envisaged and therefore no further assessment is required.</p>

## Appendix 8 – Cecilstown Screening & Assessment

Project	
Location	Discharge associated with agglomeration of Cecilstown village, County Cork.
Distance from designated site	6km: WWTP discharges to the Finnow Stream, upstream of the cSAC boundary.
Brief description	<p>Cecilstown wastewater treatment plant (WWTP) was constructed more than 20 years ago on the site of a pre-existing septic tank which had previously served the village. The design PE of the plant is 180.</p> <p>A combined sewer in the village gravitates to the treatment plant. Additionally, 8 houses are serviced via a pumping station. The WWTP provides secondary treatment.</p> <p>The main source of emissions from the works is via a 150mm pipe outfall to a tributary of the Finnow Stream.</p> <p>The wastewater treatment plant treats only municipal waste water from Village and it environs via the sewerage collection system.</p> <p>The treatment works consists of the following elements:</p> <ul style="list-style-type: none"> <li>• Automatic Screen (6mm) with manual bypass.</li> <li>• Aeration tank (diffused air).</li> <li>• Twin hopper bottom clarifier with sludge return pumps.</li> <li>• Sludge holding tank.</li> </ul> <p>The plant currently services an agglomeration of 121 and is therefore underloaded.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

Stage 1 - Screening	
Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Cecilstown agglomeration receives secondary treatment at the main WWTP, before discharging to a tributary stream of the Finnow Stream. The effluent then disperses in the water column.</p> <p>An observation of the Finnow Stream downstream of the WWTP revealed that at this location, the river is very minor in scale (1-1.5m wide) with slow flows and occasional riffles along a shallow incline.</p> <p>The most recent EPA water quality sampling data from 2009 indicates that the Finnow (Ballyclogh) Stream displays moderate (Q=3-4) ecological conditions just upstream of the Blackwater confluence. However, White-clawed crayfish were recorded at this location for the first time in 2009.</p>

	<p>The overall ecological status of the catchment is listed by the EPA as unchanged from historical poor and moderate water quality results.</p> <p>Sampling data for the discharge provided by Cork County Council with the Certificate Application indicates the following effluent levels from 2009 in mg/l:</p> <ul style="list-style-type: none"> <li>• BOD = 6</li> <li>• SS = 5</li> <li>• COD = 20</li> <li>• P = 3.2</li> <li>• N = 17.39</li> </ul> <p>Sampling results of the Finnow Stream taken at the same time as the effluent results show no detectable decrease in BOD or Ammonia in the downstream sample these were attributed High Status under the WFD River classification system. However, elevated Orthophosphate levels were reported between the upstream and downstream samples, rising from 0.05 to 0.19mg/l, a 'Moderate' result.</p> <p>The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving stream, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied.</p> <p>Under consultation, Inland Fisheries Ireland made no reference to the Cecilstown WWTP.</p> <p>The Water Framework Directive assigns 'Poor' status to the Finnow (Ballyclogh) Stream; this is based on results for Macroinvertebrate diversity from the EPA sampling locations.</p> <p>The Second Draft Freshwater Pearl Mussel Sub-Basin Plan lists the Cecilstown WWTP as potentially having an adverse effect on the pearl mussel, given that there are records of this species downstream of the plant. The stream enters the Blackwater just upstream of the known high concentration of pearl mussel populations upstream and downstream of Mallow town.</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <p>Size and scale;</p> <p>Land-take;</p> <p>Distance from Natura 2000 site or key features of the site;</p> <p>Resource requirements;</p> <p>Emissions;</p> <p>Excavation requirements;</p> <p>Transportation requirements;</p> <p>Duration of construction, operation etc.;</p> <p>Others.</p>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p>

	<p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>The relatively modern Ballyclogh WWTP also discharges to the Finnow (Ballyclogh) Stream. This also provides secondary treatment only, without nitrogen/phosphorus removal. Despite being underloaded and generating a UWWT-compliant effluent, the two plants in combination may be contributing to elevated levels of inorganic eutrophying nutrients which enter the Blackwater upstream of a large number of freshwater pearl mussels.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme.</p>
<p>Describe any likely changes to the site arising as a result of:          Reduction of habitat area;          Disturbance of key species;          Habitat or species fragmentation;          Reduction in species density;          Changes in key indicators of conservation value;          Climate change.</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Finnow Stream at this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic salmon and Otter. Crayfish were recorded in the lowest stretch of the Ballyclogh Stream in 2009. It is unclear whether this is the result of an intentional translocation, or a previously unknown naturally occurring sub-population.</p> <p>Elevated nutrient levels and dissolved oxygen demand can lead to recruitment failure in Freshwater Pearl Mussel populations. While adult specimens may be more tolerant to temporary deoxygenation, juveniles become stressed very easily and mortality can be high. Ongoing eutrophication leads to progressive ageing of populations and associated reduction in density. The cumulative influence of inorganic nutrients entering the Blackwater from the Finnow Stream may contribute to depressing the reproductive capacity of the Blackwater pearl mussel population.</p> <p>Accelerated algae and plant growth within river water columns leads to</p>

	<p>shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. Algal mats were observed in slow stretches of the Finnow stream; this is indicative of gross eutrophication. However, the Finnow Stream is unlikely to act as a key spawning river for Salmon.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of lamprey species which have also been recorded in the overall Blackwater catchment. Macrophytes were not observed in great numbers in the Finnow Stream.</p> <p>Crayfish sensitivity to changes in water quality can result in significant losses following pollution incidents. Eutrophication can lead to luxuriant plant growth, which in turn traps silt and can result in deoxygenation at night, leading to loss of crayfish habitat. The presence of Crayfish in the lower reaches of the Finnow Stream is therefore surprising.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The overall Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture, especially in the well known agricultural area known as the Golden Vale. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river further up its reaches, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the river Blackwater was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The levels of inorganic nutrients contained in the Cecilstown discharge are notably elevated though the effluent is compliant with the UWWT regulations. Ongoing phosphorus input in the vicinity of the Blackwater pearl mussel population will lead to progressive ageing of the population without recruitment and eventual extinction.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>While the Cecilstown discharge is generally compliant, the Finnow Stream is of poor; very low assimilative capacity for phosphorus is likely to be the main cause of the reduced water quality observed. Localised impacts to qualifying species of the SAC (particularly the Pearl Mussel) may be significant due to the high vulnerability of these species to the effects of nutrient enrichment. In combination factors may also be an issue, given that the Ballyclogh WWTP plant also discharges to the Finnow Stream.</p>

	<p>Given the fact that the WWTP discharges to a stream with low assimilative capacity which enters the Blackwater where pearl mussels and other qualifying species have been recorded, the screening exercise concludes that further assessment should be carried out in Stage 2 below.</p> <p>This assessment considers the potential impacts of the discharge with specific reference to the species and/or habitats which may be impacted.</p>
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**Stage 2 - Project Assessment**

<p>Describe the elements of the plan that are likely to give rise to significant effects on the site</p>	<p>Waste water treatment plants can contribute significant nutrient and organic loads to rivers. There is potential that the discharge from the Cecilstown WWTP is in combination with other activities within the Finnwh Stream and Blackwater River catchments is leading to increased levels of nutrients in the main channel of the Blackwater. This may lead to progressive eutrophication of the river.</p>
<p>Set out the conservation objectives of the site</p>	<p>European and national legislation places a collective obligation on Ireland and its citizens to maintain at favourable conservation status areas designated as candidate Special Areas of Conservation. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.</p> <p>According to the EU Habitats Directive, favourable conservation status of a habitat is achieved when its natural range, and area it covers within that range, is stable or increasing, and the ecological factors that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and the conservation status of its typical species is favourable as defined below. The favourable conservation status of a species is achieved when population data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.</p> <p>The generic conservation objectives of the Blackwater River cSAC are:</p> <ol style="list-style-type: none"> <li>1. To maintain the Annex I habitats for which the cSAC has been selected at favourable conservation status: Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) (91E0); <i>Taxus baccata</i> woods of the British Isles (91J0); Watercourses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation (3260); Estuaries (1130); Mudflats and sandflats not covered by seawater at low tide (1140); Salicornia and other annuals colonizing mud and sand (1310); Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) (1330); Mediterranean salt meadows (<i>Juncetalia maritimi</i>) (1410); Perennial vegetation of stony banks (1220); Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles (91A0).</li> <li>2. To maintain the Annex II species for which the cSAC has been selected at favourable conservation status: Sea Lamprey (<i>Petromyzon marinus</i>); River Lamprey (<i>Lampetra fluviatilis</i>); Brook Lamprey (<i>Lampetra planeri</i>); Twait Shad (<i>Alosa fallax fallax</i>); Salmon (<i>Salmo salar</i>); Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>); White-clawed Crayfish (<i>Austropotamobius pallipes</i>); Otter (<i>Lutra lutra</i>); Killarney Fern (<i>Trichomanes speciosum</i>)</li> </ol>



	<p>3. To maintain the extent, species richness and biodiversity of the entire site.</p> <p>4. To establish effective liaison and co-operation with landowners, legal users and relevant authorities.</p> <p>It should be noted that only a sub-sample of these qualifying interests are water-dependent, as identified in the screening process.</p>
<p>Describe how the project will affect key species and key habitats</p>	<p>Of key concern in relation to the Cecilsotwn WWTP is potential negative impact to the Freshwater Pearl Mussel, which acts as a keystone species for the SAC. This species 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 lack of fine material in the river bed allows for 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. This is essential for juvenile recruitment, as this species requires continuous high oxygen levels. The clean substrate must be free of inorganic silt, organic peat, and detritus, as these can all block oxygen exchange. Organic particles within the substrate can exacerbate the problem by consuming oxygen during the process of decomposition. The habitat must be free of filamentous algal growth and rooted macrophyte growth. Both block the free exchange of water between the river and the substrate and may also cause night time drops in oxygen at the water-sediment interface. The open water must be of high quality with very low nutrient concentrations, in order to limit algal and macrophyte growth. Nutrient levels must be close to the reference levels for the river they inhabit. Phosphorus must never reach values that could allow for sustained, excessive filamentous algal growth. The presence of sufficient salmonid fish to carry the larval glochidial stage of the pearl mussel life cycle is essential.</p> <p>A number of surveys have identified numerous pearl mussel colonies in the environs of Mallow Town, immediately downstream of the Finnow Stream's confluence with the Blackwater. Reproductive success in this population is negligible, owing to historic pollution of the river and ongoing elevated inorganic nutrient levels in the water column.</p> <p>The Cecilstown WWTP produces a generally good quality effluent that is unlikely to affect any of the qualifying interests through direct deoxygenation of the river or accumulation of sediment. However, the noted significant increases in Orthophosphate downstream of the discharge are a key concern. Cumulative influences such as the nutrient content of the Ballyclogh WWTP downstream may exacerbate these negative effects.</p> <p>In relation to the other qualifying species of the Blackwater cSAC, accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. Such changes are likely to affect stocks of salmon within the river, a qualifying species that is already under pressure in the catchment. Lamprey, which also require high water quality with low levels of sediment are also likely to be similarly affected.</p> <p>Reduction or changes in overall fish stocks will have subsequent effects on predators, most notably otter, for which the site is also designated.</p>

	<p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of Lamprey and juvenile fish.</p> <p>Elevated levels of suspended solids from effluent discharges pose a risk to salmon and lamprey recruitment where settlement on spawning gravels and/or redds may occur.</p> <p>Given the historic poor water quality in the Finnow Stream, it is likely that the above species are unlikely to utilise said river for feeding etc. (i.e. the river does not contribute to the overall species richness of the site).</p> <p>By contrast, the newly-discovered presence of the White-clawed crayfish in the river is a marked extension of the known distribution of the species in the area; this warrants further survey work.</p>
<p>Describe how the integrity of the site (determined by structure and function and conservation objectives) is likely to be affected by the project or plan (e.g. loss of habitat, disturbance, disruption, chemical changes, hydrological changes etc).</p>	<p>The key ecological relationships that define the structure and function of the Upper Blackwater as part of the cSAC as a whole are likely to be impacted by potential nutrient enrichment. However, given the minor scale of the discharge, systemic disturbance is not envisaged.</p> <p>The critical matter relating to the Cecilstown discharge concerns the threat posed to remnant Freshwater Pearl Mussel populations found in the Blackwater downstream of the Finnow confluence. EPA sampling of the Blackwater itself downstream of the Finnow confluence indicates that the river displays High ecological status (Q=4-5). However, this may not reflect the pressure on the Freshwater pearl mussel colonies in the area caused by increased Orthophosphate concentrations.</p> <p>The Blackwater remains an open Salmon fishery, indicating Inland Fisheries Ireland's opinion that the species remains in harvestable surplus for the catchment. The assimilative capacity of the Blackwater for nutrients is high overall, but localised deoxygenation of the water column or clogging of the waterbody with macroalgae and macrophytes may be considered a significant impact to migrating and spawning salmon. Lamprey are known to require equitable water quality standards to salmon. These species are unlikely to be affected by minor changes in nutrient levels in the main Blackwater caused by the influence of the Finnow Stream</p> <p>Reduction in key diet species such as salmonids may negatively affect otter populations in the catchment. Competition with the invasive non-native mink may act in combination in this regard. Again, such impacts downstream of the relatively small scale Cecilstown discharge are considered unlikely.</p>
<p>Describe mitigation measures that are to be introduced to avoid, reduce or remedy the adverse effects on the integrity of the site</p>	<p>The Cecilstown WWTP is a relatively old installation, which still generates UWWT compliant effluent, and is currently underloaded. There are no plans in place to upgrade the plant. The Ballyclogh plant was upgraded in 2002 and is also underloaded.</p> <p>The Freshwater Pearl Mussel Sub-basin Plan makes specific reference to investigating the need for nutrient removal at the plant, owing to the proximal downstream presence of pearl mussels.</p>
<p>Conclusion</p>	<p>In conclusion, the negative pressure upon Freshwater Pearl Mussel populations occurring in the Blackwater downstream of the Finnow confluence is considered a significant impact that will continue until nutrient removal is put in place at the plant. This is in contravention of</p>

	<p>Conservation Objective Number 2 for the cSAC.</p> <p>The assessment therefore concludes that due to likely impacts to Freshwater Pearl Mussel, the possibility of significant impacts to the Blackwater River (Cork/Waterford) cSAC cannot be discounted at this stage.</p>
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## Appendix 9 - Cullen Screening

Project	
Location	Two discharges associated with agglomeration of Cullen village, County Cork.
Distance from designated site	Okm: WWTP discharges to the Owentaraglin River, inside the cSAC boundary.
Brief description	<p>Cullen is located north of the N72 national route, it is in close proximity to the town of Millstreet.</p> <p>The wastewater in Cullen is collected in a partially combined foul and separate foul sewerage drainage network. The wastewater from the village gravitates to the wastewater treatment plant. At the southern end of the agglomeration a second wastewater treatment plant is located which caters for 13 Council Houses.</p> <p>The main WWTP is designed for a Population Equivalent (PE) of 400, which was commissioned in 2004. Activated Sludge is the process employed at this waste water treatment plant. Influent initially gravitates into the inlet works, consisting of an automatic and manual bypass. Following the screening of the raw sewerage, influent enters in to a RBC Unit. Following the aeration process effluent gravitates to the settlement, the solids settle while the supernatant flows over the weir and discharges to the river. Sludge may be returned from the settling zone to the aeration zone. Excess sludge is removed from the settling tank as required off site for disposal.</p> <p>The second plant consists of a small package plant with a design PE of approximately 40, which caters for the 13 council houses. Following treatment effluent is discharged to a drain which joins the Owentaraglin River.</p> <p>The main WWTP is currently underloaded, serving a PE of 250, while the package plant is slightly overloaded, serving a PE of 55, based on hydraulic loading.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

Stage 1 - Screening	
Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Cullen agglomeration receives secondary treatment at the respective WWTPs, before discharging to the Owentaraglin River. The effluent then disperses in the water column.</p> <p>An observation of the Owentaraglin River downstream of the WWTP revealed that at this location, the river is relatively minor in scale (1-2m wide) with slow flows and occasional riffles along a shallow incline.</p>

	<p>The most recent EPA water quality sampling data from 2009 indicates that the Owentaraglin River displays high (Q=4-5) ecological conditions downstream of the main WWTP discharge point, at Cullen Bridge and further downstream, immediately upstream of the Blackwater confluence.</p> <p>The overall ecological status of the catchment is listed by the EPA as satisfactory, with only High and Good ecological quality recorded. High quality was recorded in the lower stretches of the river, upstream of the confluence with the Blackwater.</p> <p>Sampling data for the discharge provided by Cork County Council with the Certificate Application indicates the following effluent levels in mg/l:</p> <p>Cullen 1</p> <ul style="list-style-type: none"> <li>• BOD = 7</li> <li>• SS = 7</li> <li>• COD = 29</li> <li>• P = 1.69</li> <li>• N = 14.6</li> </ul> <p>Cullen 2</p> <ul style="list-style-type: none"> <li>• BOD = 12</li> <li>• SS = 12</li> <li>• COD = 42</li> <li>• P = 1.37</li> <li>• N = 13.16</li> </ul> <p>Sampling results of the Owentaraglin River taken at the same time show a decrease in BOD loading from upstream Cullen 1 to downstream of Cullen 2, while Ammonia and Orthophosphate in the receiving waters were recorded as remaining High and Good Status respectively under the WFD River classification system.</p> <p>The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving stream, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied.</p> <p>Under consultation, Inland Fisheries Ireland made no reference to any fishery issues or water quality problems associated with the Cullen discharges.</p> <p>The Water Framework Directive assigns 'Moderate' status to the Owentaraglin River; this is based on the presence of a non-recruiting population of Freshwater Pearl Mussels near Ahane Bridge, downstream of Cullen. This population is in relatively close proximity to the Cullen plant and has been recorded as non-recruiting</p> <p>The Second Draft Freshwater Pearl Mussel Sub-Basin Plan lists the Cullen WWTPs as potentially having an adverse effect on the pearl mussel, given that there are records of this species in close proximity downstream of the plant. Pearl mussel populations require rivers to have an extremely low nutrient concentration to facilitate reproduction. However, ecological water quality has been recorded as high in the lower stretches of the Owentaraglin River indicating generally unpolluted conditions.</p>
<p>Describe any likely direct, indirect or secondary impacts of the project</p>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc.</p>

<p>(either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <ul style="list-style-type: none"> <li>Size and scale;</li> <li>Land-take;</li> <li>Distance from Natura 2000 site or key features of the site;</li> <li>Resource requirements;</li> <li>Emissions;</li> <li>Excavation requirements;</li> <li>Transportation requirements;</li> <li>Duration of construction, operation etc.;</li> <li>Others.</li> </ul>	<p>will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>Other WWTP discharges located along the Owentaraglin River are limited to the Kiskeam plant upstream, which is slightly overloaded, but apparently not leading to any evidence of negative impacts in the river. Potential orthophosphate concentration increases downstream are calculated as being miniscule.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme.</p> <p>Other cumulative pressures on the Owentaraglin River are considered to be very low, given the lack of industrial or major urban discharges to the river. No evidence of gross enrichment of the river was observed during field surveys.</p> <p>Orthophosphate levels upstream of the Cullen plants are noted as being already above the recommended pearl mussel reproduction threshold of 0.005mg/l as found in ultra-oligotrophic rivers in Donegal. It is likely that these phosphate levels are resultant from agricultural sources along the river. Calculations indicate that the Cullen plants contribute to an increase of 7% Orthophosphate in the river.</p>
<p>Describe any likely changes to the site arising as a result of:</p> <ul style="list-style-type: none"> <li>Reduction of habitat area;</li> <li>Disturbance of key species;</li> </ul>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Blackwater of this location may</p>

<p>Habitat or species fragmentation; Reduction in species density; Changes in key indicators of conservation value; Climate change.</p>	<p>result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> <li>• White-clawed Crayfish - Records in main Blackwater channel only exist near Fermoy. The species has also been historically recorded in the Awbeg sub-catchment.</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic salmon and Otter.</p> <p>Elevated nutrient levels and dissolved oxygen demand can lead to recruitment failure in Freshwater Pearl Mussel populations. While adult specimens may be more tolerant to temporary deoxygenation, juveniles become stressed very easily and mortality can be high. Ongoing eutrophication leads to progressive ageing of populations and associated reduction in density.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of lamprey species which have also been recorded in the Upper Blackwater.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The overall Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture, especially in the well known agricultural area known as the Golden Vale. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river further up its reaches, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the river Blackwater was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by</p>



	<p>reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The levels of organic and inorganic nutrients contained within the Cullen discharge are relatively small in context. Water quality is seen to progressively increase as one descends the river towards the Freshwater Pearl Mussel population downstream of Cullen. Calculations indicate that Orthophosphate increase in the river is limited to 7% of the total concentrations. Further implantation of the Nitrates Directive is likely to further reduce the phosphorus loading on the overall Owentaraglin catchment.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>Overall proximity to the Ahane Bridge pearl mussel population is initially a concern, but orthophosphate levels have been predicted to rise by only 7%. This is not considered a significant increase in the overall agricultural context of the site, where phosphorus usage levels in adjoining lands is predicted to fall further in years to come. General treatment at the Cullen plants appears to be excellent, and BOD and sediment loading are not of concern. Overall ecological conditions in the river are of high status, and negative impacts to Salmon, Lamprey and Otter are not envisaged. The Cullen plants are modern installations with good operating parameters. Field observations indicated that the river displays an open substrate with little to no silt plumes and no evidence of organic enrichment, algal mats or excessive macrophyte growth.</p> <p>The screening exercise therefore concludes that no significant impacts to the Blackwater River SAC resulting from the Cullen discharges are envisaged and therefore no further assessment is required.</p>

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## Appendix 10 – Dernagree Screening

Project	
Location	Discharge associated with agglomeration of Dernagree village, County Cork.
Distance from designated site	3.5m: WWTP discharges to a percolation area, in the watershed of the Garrane Stream, outside the cSAC boundary.
Brief description	<p>Dernagree Village is located, circa 4 Km North of Millstreet Village. The waste water from the agglomeration is currently treated by a septic tank prior to being discharged.</p> <p>Dernagree wastewater treatment plant (WWTP) was constructed in 1970's. The design PE of the plant is 50.</p> <p>The main elements of the WWTP are;</p> <ol style="list-style-type: none"> <li>1. Primary treatment: Septic Tank.</li> <li>2. Raised percolation filter bed (Puroflow filter)</li> </ol> <p>The primary source of emissions from the works is via the filter bed which discharges to ground.</p> <p>The wastewater treatment plant treats only municipal waste water from the Village and its environs via the sewerage collection system.</p> <p>The septic tank currently services a PE of approximately 50 (10 houses), and is operating at capacity.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

### Stage 1 - Screening

Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Dernagree agglomeration receives primary treatment only at the septic tank, before discharging to ground via percolation.</p> <p>An observation of the Garrane Stream in the vicinity of Dernagree revealed that at this location, the river is very minor in scale (1m wide) with slow flows and occasional riffles along a shallow incline. Much of the channel was overgrown with riparian scrub.</p> <p>There has been no historical EPA sampling in the Garrane Stream. The Water Framework Directive currently assigns 'High' status to the Garrane Stream; this is based on exclusively on Ecological Status.</p> <p>Cork County Sampling from the septic tank indicates that the outflow contains the following chemical attributes:</p> <ul style="list-style-type: none"> <li>• BOD = 303</li> <li>• SS = 57</li> </ul>
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	<ul style="list-style-type: none"> <li>• COD = 470</li> <li>• P = 9.58</li> <li>• N = 77.9</li> </ul> <p>These concentrations are obviously high for all these variables. However, as the septic tank discharges to groundwater and not surface waters, effluent sampling data is considered non-applicable. EPA sampling of the River Blackwater 3km downstream of the Garrane confluence indicates that the river displays high ecological status (Q=4-5).</p> <p>Under consultation, Inland Fisheries Ireland made reference to the fact that the Dernagree septic tank is operating near capacity; however, no specific comments relating to observed negative effects to water quality were received.</p> <p>The Second Draft Freshwater Pearl Mussel Sub-Basin Plan does not list the Dernagree septic tank as a risk to the Blackwater pearl mussel population.</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <ul style="list-style-type: none"> <li>Size and scale;</li> <li>Land-take;</li> <li>Distance from Natura 2000 site or key features of the site;</li> <li>Resource requirements;</li> <li>Emissions;</li> <li>Excavation requirements;</li> <li>Transportation requirements;</li> <li>Duration of construction, operation etc.;</li> <li>Others.</li> </ul>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs. Diffuse sources such as the Dernagree septic tank may contribute to overall nutrient loading, but overall effects are dependent on nutrient loading from surrounding land use and underlying soil geology.</p> <p>Unmitigated contamination events during the operational phase of the septic tank pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment. As the treatment is very basic, such malfunctions are highly unlikely.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand. No evidence of such influence was detected via observations of the Garrane Stream.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>No other major discharges occur in the vicinity of the Garrane stream. Point source pressure is therefore low.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage</p>

	<p>of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme.</p>
<p>Describe any likely changes to the site arising as a result of:                  Reduction of habitat area;                  Disturbance of key species;                  Habitat or species fragmentation;                  Reduction in species density;                  Changes in key indicators of conservation value;                  Climate change.</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaitte Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> <li>• White-clawed Crayfish - Records in main Blackwater channel only exist near Fermoy. The species has also been historically recorded in the Awbeg sub-catchment.</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic salmon and Otter.</p> <p>Elevated nutrient levels and dissolved oxygen demand can lead to recruitment failure in Freshwater Pearl Mussel populations. While adult specimens may be more tolerant to temporary deoxygenation, juveniles become stressed very easily and mortality can be high. Ongoing eutrophication leads to progressive ageing of populations and associated reduction in density. Water quality in the Garrane is currently classified as High quality by the WFD assessment.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. No evidence of eutrophication such as algal mats was observed in the Garrane Stream.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of lamprey species which have also been recorded in the overall Blackwater catchment. Macrophytes were not observed in great numbers in the Garrane Stream.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of:                  Interference with the key relationships that define the structure of the site;</p>	<p>The overall Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture, especially in the well known agricultural area known as the Golden Vale. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the</p>

<p>Interference with key relationships that define the function of the site.</p>	<p>river further up its reaches, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the river Blackwater was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The Dernagree discharge to ground is very minor in nature and downstream sampling of the Blackwater indicates high ecological conditions. The influence of the Dernagree septic tank is therefore considered to be negligible.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>The Dernagree septic tank is an old treatment system that from an infrastructure perspective, is probably in need of upgrading; however, in relation to the overall size of the catchment, the agglomeration is very small with minimal output to groundwater and is therefore unlikely to be contributing to significant nutrient input to the overall Garrane Stream sub-catchment and the overall Blackwater system.</p> <p>Overall, the screening exercise takes into account the small scale of the agglomeration and the documented evidence of unpolluted river conditions downstream of the septic tank groundwater discharge. It concludes that no significant impacts to the Blackwater River cSAC resulting from the Dernagree discharge are envisaged and therefore no further assessment is required.</p>

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## Appendix 11 – Freemount Screening

Project	
Location	Discharge associated with agglomeration of Freemount village, County Cork.
Distance from designated site	0km: WWTP discharges to the Owentaraglin River, inside the cSAC boundary.
Brief description	<p>Freemount village is situated approximately 10km northwest of Newmarket and 18km southwest of Charleville.</p> <p>The wastewater in Freemount is collected in a partially combined foul and separate foul sewerage drainage network. The wastewater from the village gravitates to the wastewater treatment plant.</p> <p>Freemount WWTP is designed for a Population Equivalent (PE) of 500, which was commissioned in 2007. Activated Sludge is the process employed at the Freemount waste water treatment plant. Influent initially gravitates into the inlet works, consisting of an automatic and manual bypass. Following the screening of the raw sewerage, influent a primary tanks/ detention tank, from where the effluent is pumped to a splitter chamber where the influent splits in to the 2 NR Aeration Tank. Following the aeration process effluent gravitates to the settlement, the solids settle while the supernatant flows out and discharges to the river. Sludge may be returned from the settling tank to the primary tank and excess sludge is removed from the primary tank to the sludge holding tank as required and the effluent removed off site for disposal.</p> <p>The pollution load for the Freemount agglomeration arises from the following areas:</p> <ul style="list-style-type: none"> <li>• Domestic population</li> <li>• Commercial premises</li> <li>• School &amp; crèches</li> <li>• Infiltration</li> </ul> <p>The sewerage from all commercial premises is collected via the public sewer and treated in conjunction with the domestic waste at the WWTP. The final effluent is discharged to the Allow River, which is adjacent to the wastewater treatment plant site.</p> <p>The WWTP currently services an agglomeration with a PE of 400 and is therefore underloaded.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

### Stage 1 - Screening

Describe the individual elements of the	The Freemount agglomeration receives tertiary treatment at the WWTP,
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plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.

before discharging to the River Allow. The effluent then disperses in the water column.

An observation of the River Allow downstream of the WWTP revealed that at this location, the river is relatively minor in scale (2-3m wide) with slow flows and occasional riffles along a shallow incline.

The most recent EPA water quality sampling data from 2009 indicates that the River Allow displays high (Q=4-5) ecological conditions downstream of the discharge point, at John's Bridge. This is a slight improvement on the good conditions recorded just upstream of the discharge in Freemount (Q=4).

The overall ecological status of the catchment is listed by the EPA as satisfactory, with only High and Good ecological quality recorded, including downstream of the urban environs of Kanturk.

Sampling data for the discharge provided by Cork County Council with the Certificate Application indicates the following non-compliant effluent levels from 2009 in mg/l:

- BOD = 36
- SS = 38
- COD = 82
- P = 0.714
- N = 7.18

However, more recent sampling data from March 2010 indicates that the plant is generating a high quality effluent:

- BOD = 17
- SS = 12
- COD = 67
- P = 0.69
- N = 2.0

Sampling results of the Allow River taken at the same time as the non-compliant effluent results show a detectable decrease in BOD, while Ammonia and Orthophosphate in the downstream receiving waters were afforded High Status under the WFD River classification system.

The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving stream, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied.

Under consultation, Inland Fisheries Ireland made no reference to fisheries concerns on complaints relating to the Freemount WWTP.

The Water Framework Directive assigns 'Moderate' status to the River Allow; this is based on the presence of a non-recruiting population of Freshwater Pearl Mussels in the townland of Ballybahallagh, downstream of Freemount.

The Second Draft Freshwater Pearl Mussel Sub-Basin Plan lists the Freemount WWTP as potentially having an adverse effect on the pearl mussel, given that there are records of this species downstream of the plant. Given that the Freemount plant is a recent installation with tertiary treatment, it is considered that the Freemount plant is contributing to an overall improvement in water quality in the Allow catchment. This should improve the conservation probability for this population of mussels.



<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <ul style="list-style-type: none"> <li>Size and scale;</li> <li>Land-take;</li> <li>Distance from Natura 2000 site or key features of the site;</li> <li>Resource requirements;</li> <li>Emissions;</li> <li>Excavation requirements;</li> <li>Transportation requirements;</li> <li>Duration of construction, operation etc.;</li> <li>Others.</li> </ul>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>A major WWTP is located at Kanturk, downstream of Freemount and the pearl mussel population. Good ecological conditions have been recorded downstream of Kanturk, and immediately upstream of the Blackwater confluence. It is not expected that these plants are acting in combination to reduce overall water quality in the River Allow.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme.</p> <p>The IRD Duhallow LIFE project entitled 'Restoration of the Upper River Blackwater SAC for the Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>), Atlantic Salmon (<i>Salmo salar</i>), European Otter (<i>Lutra lutra</i>) and Kingfisher (<i>Alcedo atthis</i>)' aims to improve habitat quality in the Allow catchment. This is likely to have a beneficial effect via reducing land-based pressures on the river, and may help negate some of the enrichment pressures described above. A key deliverable is the promotion of cattle fencing along the river to prevent further siltation and pollution of the river. This will act cumulatively with the tertiary treatment at Freemount to improve water quality in the upper Allow which will reduce pressures in the lower part of the catchment.</p>
<p>Describe any likely changes to the site arising as a result of:</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p>

<p>Reduction of habitat area; Disturbance of key species; Habitat or species fragmentation; Reduction in species density; Changes in key indicators of conservation value; Climate change.</p>	<p>The potential nutrient enrichment of the Allow of this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> <li>• White-clawed Crayfish - Records in main Blackwater channel only exist near Fermoy. The species has also been historically recorded in the Awbeg sub-catchment.</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic salmon and Otter.</p> <p>Elevated nutrient levels and dissolved oxygen demand can lead to recruitment failure in Freshwater Pearl Mussel populations. While adult specimens may be more tolerant to temporary deoxygenation, juveniles become stressed very easily and mortality can be high. Ongoing eutrophication leads to progressive ageing of populations and associated reduction in density.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of lamprey species which have also been recorded in the River Allow.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The overall Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture, especially in the well known agricultural area known as the Golden Vale. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river further up its reaches, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the river Blackwater was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient</p>

	<p>enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The levels of organic and inorganic nutrients contained within the Freemount discharge are notably small, which is to be expected as the plant is a recent installation and features tertiary treatment. Water quality is seen to progressively increase as one descends the river from upstream of Freemount to downstream towards the noted pearl mussel population.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>In the context of other discharges to the Allow River in the overall vicinity, the contemporary Freemount plant generates a high quality effluent with low nutrient levels. The river is currently considered to be in good ecological condition with an improvement in water quality from good to high recorded downstream of Freemount.</p> <p>Other negative pressures to the qualifying interests of the cSAC may be resulting from other land uses (primarily agriculture) in the area. It is considered that the Freemount WWTP is likely to be negating these negative impacts to some degree by minimising nutrient input from the Freemount agglomeration. The Duhallow LIFE project aims to target these agricultural pressures and thus further reduce negative cumulative pressures on the River Allow.</p> <p>The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Freemount discharge are envisaged and therefore no further assessment is required.</p>

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## Appendix 12 – Glantane Screening

Project	
Location	Discharge associated with agglomeration of Glantane village, County Cork.
Distance from designated site	2.5km: WWTP discharges to a tributary of the Awbeg River, upstream of the cSAC boundary.
Brief description	<p>Glantane is a small village to the west of Mallow town, south of the River Blackwater.</p> <p>Glantane wastewater treatment plant (WWTP) was constructed in 2001 to serve a private housing development. The plant was subsequently taken in charge by Cork County Council.</p> <p>A separate foul sewer gravitates to the Treatment plant. The WWTP provides secondary treatment. The treatment works consists of a Casflo package plant.</p> <p>The plant currently services an agglomeration PE of 40 and is therefore operating at capacity.</p> <p>The package plant discharges to a small stream which flows north to the River Blackwater.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

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Stage 1 - Screening	
Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Glantane agglomeration receives secondary treatment at the WWTP, before discharging to a tributary of the River Blackwater. The effluent then disperses in the water column.</p> <p>An observation of the tributary downstream of the discharge revealed that at this location, the river is very minor in scale (1m wide) with moderate flows down a steady incline.</p> <p>No EPA sampling of the tributary stream has historically taken place. The Blackwater shows an increase in biological water quality from upstream of the tributary confluence to downstream.</p> <p>Sampling data for the discharge provided by Cork County Council with the Certificate Application indicates the following effluent levels in mg/l:</p> <ul style="list-style-type: none"> <li>• BOD = 7</li> <li>• SS = 5</li> <li>• COD = 20</li> <li>• P = 0.8</li> </ul>

	<ul style="list-style-type: none"> <li>• N = 10.15</li> </ul> <p>Sampling results of the receiving stream taken at the same time show no detectable increases in BOD, Ammonia or Orthophosphate in the receiving waters. Both upstream and downstream levels for Ammonia and MRP are afforded High Status under the WFD River classification system. BOD levels were detected as being static at 5mg/l upstream and downstream of the discharge; these levels are likely to be attributable to agricultural practices in the vicinity of the stream, which has a low assimilative capacity for BOD loading.</p> <p>The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving stream, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied.</p> <p>Under consultation, Inland Fisheries Ireland made no reference to the Glantane WWTP. The stream is not classified under the WFD system, but water quality appeared to be excellent during field surveys.</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <ul style="list-style-type: none"> <li>Size and scale;</li> <li>Land-take;</li> <li>Distance from Natura 2000 site or key features of the site;</li> <li>Resource requirements;</li> <li>Emissions;</li> <li>Excavation requirements;</li> <li>Transportation requirements;</li> <li>Duration of construction, operation etc.;</li> <li>Others.</li> </ul>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>The surrounding land use is primarily agricultural pasture. The receiving stream flows to the Blackwater 2.5km to the north. Other pressures in this stretch of the Blackwater relate to the urban environs of the town, and other WWTP discharges in the area. The Glantane receiving stream lies upstream of Mallow Town, which acts as a significant pressure on the River Blackwater in this region. In consultation, Inland Fisheries Ireland report that Mallow WWTP has been the subject of a number of reports over recent years from members of the general public regarding visibly unsatisfactory discharges from its outfall, with most of these incidents being attributed to breakdowns/faults following our investigation and communication with council staff. Mallow Town also contains a number of large industrial complexes with IPPC licences. These are the Dairygold, Micam and Road Binders installations. The decommissioned Irish Sugar Factory and associated lagoons are also located to the west of the town. It is planned that the existing lagoons at the site will be filled in and the site rehabilitated for future use as agricultural land. The Lombardstown, Cecilstown and Ballyclogh are all smaller WWTPs which discharge to the</p>

	<p>rivers of the area. All of the above are likely to act in combination to some degree to put pressure on the water quality in the environs of Mallow Town. This is of key importance to the viability of the pearl mussel population in the Blackwater at this location.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme. It is this programme which is likely to have most significantly accounted for the improvement in water quality observed in the Awbeg (East) in recent years.</p>
<p>Describe any likely changes to the site arising as a result of:</p> <ul style="list-style-type: none"> <li>Reduction of habitat area;</li> <li>Disturbance of key species;</li> <li>Habitat or species fragmentation;</li> <li>Reduction in species density;</li> <li>Changes in key indicators of conservation value;</li> <li>Climate change.</li> </ul>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Blackwater of this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> </ul> <p>Elevated nutrient levels and dissolved oxygen demand can lead to recruitment failure in Freshwater Pearl Mussel populations. While adult specimens may be more tolerant to temporary deoxygenation, juveniles become stressed very easily and mortality can be high. Ongoing eutrophication leads to progressive ageing of populations and associated reduction in density. The Glantane package plant is very small in scale and generates a high quality effluent with low inorganic nutrient levels.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. Water quality in the stream was observed to be high with no evidence of eutrophication.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of lamprey species which have also been</p>

	<p>recorded in the overall Blackwater catchment. Macrophytes were not observed in great numbers in the tributary or main Blackwater downstream of the confluence, though the depth of the river meant submerged vegetation could not be ruled out.</p> <p>Crayfish sensitivity to changes in water quality can result in significant losses following pollution incidents. Eutrophication can lead to luxuriant plant growth, which in turn traps silt and can result in deoxygenation at night, leading to loss of crayfish habitat. The presence of crayfish in the main Blackwater channel in the vicinity of Mallow Town is unclear.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The greater Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river in its upland tributaries, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the Blackwater catchment was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The Glantane plant is a modern package plant which is not overloaded and generates a very high quality effluent that is compliant with the UWWT regulations. Improvements in water quality are seen in the Blackwater when comparing taken from upstream and downstream of the tributary confluence.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>In the context of other discharges to the Blackwater in the overall vicinity, the contemporary Glantane plant generates a high quality effluent with low nutrient levels.</p> <p>Other negative pressures to the qualifying interests of the cSAC are more pronounced from other sources. The Lombardstown and Mallow WWTPs are identified as being key negative influences on the Freshwater pearl mussel population of the area. Given the small scale of the Glantane discharge, and the excellent quality of effluent it generates, it is not seen as significant negative pressure.</p> <p>The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Glantane discharge are envisaged and therefore no further assessment is required.</p>



## Appendix 13 – Kilbrin Screening

Project	
Location	Discharge associated with agglomeration of Kilbrin village, County Cork.
Distance from designated site	9km: WWTP discharges to the Awbeg-Kanturk River, upstream of the cSAC boundary.
Brief description	<p>Kilbrin is situated approximately 7km northeast of Kanturk, the village is an elongated settlement which spreads along the main road through the village.</p> <p>The wastewater in Kilbrin is collected in a combined foul sewerage drainage network. The wastewater from the village gravitates to the wastewater treatment plant.</p> <p>Kilbrin WWTP is designed for a Population Equivalent (PE) of 500, which was commissioned in 2009. Sequence Batch Reactors is the process employed at the Kilbrin waste water treatment plant. Influent initially gravitates into the inlet works, consisting of an automatic, manual bypass and grit trap. Following the screening of the raw sewerage, influent a circular concrete inlet sump, from where the effluent is pumped to the 2 Nr SBR's. Following the treatment process, effluent gravitates to the balance tank, prior to discharge to the river. Sludge may be returned from the SBR to the Picket fence Thickener and thereafter removed off site for disposal.</p> <p>The WWTP currently services an agglomeration with a PE of 260 and is therefore significantly underloaded.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

### Stage 1 - Screening

Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Kilbrin agglomeration receives tertiary treatment at the WWTP, before discharging to the Awbeg (Kanturk) River. The effluent then disperses in the water column.</p> <p>An observation of the Ketragh River downstream of the WWTP revealed that at this location, the river is minor in scale (2-3m wide) with slow flows and occasional riffles along a shallow incline. Much of the channel was obscured by mature riparian cover.</p> <p>The most recent EPA water quality sampling data indicates that the Awbeg-Kanturk River displays good (Q=4) ecological conditions just upstream of the Blackwater confluence. However, this data was collected in 1990. The Water Framework Directive now assigns 'High' status to this river.</p>
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	<p>Sampling data for the discharge provided by Cork County Council with the Certificate Application indicates the following effluent levels from 2009 in mg/l:</p> <ul style="list-style-type: none"> <li>• BOD = 2</li> <li>• SS = 5</li> <li>• COD = &lt;21</li> <li>• P = 0.073</li> <li>• N = 6.6</li> </ul> <p>Sampling results of the Awbeg-Kanturk River taken at the same time as the above effluent results show that the upstream levels produce 'Moderate' results for BOD and Orthophosphate. This is indicative of other pressures on this river, most likely resultant from agricultural activities upstream, where the river has a low assimilative capacity for oxygen demand and eutrophying nutrients. A detectable decrease in BOD and Orthophosphate were observed in the downstream receiving waters. While BOD and phosphate levels in the river still above desirable levels, the tertiary-treated Kilbrin discharge cannot be seen as contributing to this situation.</p> <p>Under consultation, Inland Fisheries Ireland made no reference to fisheries concerns on complaints relating to the Kilbrin WWTP.</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <p>Size and scale;          Land-take;          Distance from Natura 2000 site or key features of the site;          Resource requirements;          Emissions;          Excavation requirements;          Transportation requirements;          Duration of construction, operation etc.;</p> <p>Others.</p>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the septic tank pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment. As the treatment is very basic, such malfunctions are highly unlikely.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand. No evidence of such influence was detected via downstream sampling.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>The Kilbrin WWTP discharge lies in the same sub-catchment as the Castlemagner septic tank, which is located on the Ketragh River spur.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates</p>

	<p>Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme.</p> <p>There are no other major discharges to the sub-catchment, from residential or industrial sources.</p>
<p>Describe any likely changes to the site arising as a result of:          Reduction of habitat area;          Disturbance of key species;          Habitat or species fragmentation;          Reduction in species density;          Changes in key indicators of conservation value;          Climate change.</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> <li>• White-clawed Crayfish - Records in main Blackwater channel only exist near Fermoy. The species has also been historically recorded in the Awbeg sub-catchment.</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic salmon and Otter.</p> <p>Elevated nutrient levels and dissolved oxygen demand can lead to recruitment failure in Freshwater Pearl Mussel populations. While adult specimens may be more tolerant to temporary deoxygenation, juveniles become stressed very easily and mortality can be high. Ongoing eutrophication leads to progressive ageing of populations and associated reduction in density. The tertiary treatment applied at Kilbrin results in an effluent with very low nutrient levels. It is therefore unlikely that it is contributing eutrophying material to the Blackwater to any great degree. Pearl mussel populations in the main channel of the Blackwater will thus be unaffected by the discharge.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. Despite agricultural pressures to the river, no evidence of eutrophication such as algal mats were observed in the Awbeg-Kanturk River.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of lamprey species which have also been recorded in the overall Blackwater catchment. Macrophytes were not observed in great numbers in the Awbeg-Kanturk River.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as</p>

	<p>rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The overall Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture, especially in the well known agricultural area known as the Golden Vale. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river further up its reaches, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the river Blackwater was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The Kilbrin discharge is of very high quality and downstream sampling indicates measurable falls in nutrient levels in the water column. Only the lower stretches of the Ketragh/Awbeg-Kanturk are included within the cSAC boundary, no interference to the structure or ecology of the site are envisaged. The high quality of the discharge may be mitigating against negative pressures on the catchment caused by agricultural pressures.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>The Kilbrin WWTP is a modern installation, producing a high quality effluent that is unlikely to be contributing to significant nutrient input to the overall sub-catchment. While there is a lack of information regarding recent ecological conditions in the river, it is reasonable to suggest that the tertiary treatment applied at Kilbrin will be contributing to an overall positive influence on water quality in the sub-catchment.</p> <p>The Castlemagner septic tank in the same sub-catchment has been identified as having very little influence on water quality in the Ketragh River owing to its very small scale. It is not considered that it would act in combination with the Kilbrin WWTP.</p> <p>Overall, the screening exercise identifies the Kilbrin plant as being exemplary in its level of treatment, which is likely to negating some negative agricultural pressures in the sub-catchment. It concludes that no significant impacts to the Blackwater River cSAC resulting from the Kilbrin discharge are envisaged and therefore no further assessment is required.</p>

## Appendix 14 – Kilcorney Screening

Project	
Location	Discharge associated with agglomeration of Kilcorney village, County Cork.
Distance from designated site	0km: WWTP discharges to the Ivale River, inside the cSAC boundary.
Brief description	<p>Kilcorney wastewater treatment plant (WWTP) was constructed in 2004 to serve a Cork County Council housing development. A separate foul sewer gravities to the Treatment plant. The WWTP provides secondary treatment.</p> <p>The main source of emissions from the works is via a 150mm pipe outfall to the Ivale River, a tributary of the Rathcool River.</p> <p>The wastewater treatment plant treats only municipal waste water from Village and it environs via the sewerage collection system. The final effluent is treated to a 25/35 standard or better prior to being discharged to the Ivale River.</p> <p>The plant currently services an agglomeration of 70PE, and is thus underloaded for the plant's design capacity of 100PE.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

### Stage 1 - Screening

Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Kilcorney agglomeration receives secondary treatment at the WWTP, before discharging to the Ivale River, a tributary of the Rathcool River, which flows to the River Blackwater. The effluent then disperses in the water column.</p> <p>An observation of the river downstream of the discharge revealed that at this location, the river is minor in scale (2-3m wide and &lt;30cm in depth) with fast flows down a steady incline.</p> <p>EPA sampling of the Ivale/Rathcool Rivers indicates that the sub-catchment displayed 'Good' ecological quality at all tested locations in 2009. The WFD classification for the sub-catchment is also 'Good', based on Q-ratings. 2006 sampling at Killeen, 1km downstream of Kilcorney, identified Q-ratings of 4-5, i.e. 'High' ecological status.</p> <p>Sampling data for the discharge provided by Cork County Council with the Certificate Application indicates the following effluent levels in mg/l:</p> <ul style="list-style-type: none"> <li>• BOD = 13</li> <li>• SS = 10</li> <li>• COD = 51</li> <li>• P = 1.5</li> </ul>
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	<ul style="list-style-type: none"> <li>• N = 14.38</li> </ul> <p>Sampling results of the receiving stream taken at the same time show no detectable increases in Ammonia or Orthophosphate in the receiving waters. Both upstream and downstream levels for Ammonia and MRP are afforded High Status under the WFD River classification system. All levels were below the measureable levels for all variables. A 0.2mg/l increase in BOD levels were recorded, but the Ivale river is still attributed 'High' WFD status for this variable. The high numbers of riffles and other oxygenating features along the river's topography are likely to give it a rapid recovery form BOD loading.</p> <p>The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving river, but is should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied. No evidence of eutrophication was observed.</p> <p>Under consultation, Inland Fisheries Ireland made no reference to the Kilcorney WWTP.</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <ul style="list-style-type: none"> <li>Size and scale;</li> <li>Land-take;</li> <li>Distance from Natura 2000 site or key features of the site;</li> <li>Resource requirements;</li> <li>Emissions;</li> <li>Excavation requirements;</li> <li>Transportation requirements;</li> <li>Duration of construction, operation etc.;</li> <li>Others.</li> </ul>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>The Kilcorney WWTP is a relatively modern installation and is operating well within its design parameters. The risk of the impacts above to the Rathcool River sub-catchment is considered to be absolutely minimal.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels</p>

	<p>of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme.</p> <p>The surrounding landuse is primarily upland pasture. Fertilizer run-off from agricultural land is likely to be low in this region. The upland headwaters of the sub-catchment lie in lands where there is extensive commercial coniferous forestry. Nitrate release during forestry operations can lead to reduction in water quality in rivers like the Ivale River; however, no such impacts were noted during field surveys.</p> <p>The plant lies in the same catchment as the Rathcool WWTP. The Rathcool plant, while technically overloaded has been recorded as generating a good quality effluent with no detectable changes in the chemical status of the Rathcool River. Negative cumulative influences upon the water quality of the sub-catchment are therefore considered unlikely. The Rathcool River enters the Blackwater midway between the Millstreet and Banteer WWTPs.</p>
<p>Describe any likely changes to the site arising as a result of:                  Reduction of habitat area;                  Disturbance of key species;                  Habitat or species fragmentation;                  Reduction in species density;                  Changes in key indicators of conservation value;                  Climate change.</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Blackwater of this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> <li>• White-clawed crayfish – Not found in upland peaty and acidic rivers such as the Ivale River</li> </ul> <p>Elevated nutrient levels and dissolved oxygen demand can lead to recruitment failure in Freshwater Pearl Mussel populations. While adult specimens may be more tolerant to temporary deoxygenation, juveniles become stressed very easily and mortality can be high. Ongoing eutrophication leads to progressive ageing of populations and associated reduction in density. There are pearl mussel populations in the main Blackwater channel downstream of the Rathcool River confluence, the closest one located just upstream of Banteer town. The Kilcorney plant is relatively minor in scale, generates a high quality effluent with low inorganic nutrient levels and is 14km upstream of the existing Blackwater populations.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. Water quality in the Rathcool River was observed to be high with no evidence of eutrophication.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of lamprey species which have also been recorded in the overall Blackwater catchment. Some macrophytes were</p>



	<p>observed in the Rathcool River, but these were not considered to be a result of eutrophication.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The greater Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river in its upland tributaries, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the Blackwater catchment was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The Kilcorney plant is a relatively modern plant which is not overloaded and generates a good quality effluent that is compliant with the UWWT regulations. Good to high biological water quality is recorded in all sampling stations of the Ivale and Rathcool Rivers, which are not considered to be at risk of eutrophication.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>In the context of other discharges to the Blackwater in the overall vicinity, the Kilcorney plant generates a high quality effluent with low nutrient levels.</p> <p>No other major discharges occur in the Rathcool River sub-catchment and overall pressure on water quality in the watershed is considered to be low. Unpolluted water from the Rathcool River enters the main Blackwater channel and is not considered to be acting cumulatively with other pressures to negatively impact upon the water quality of the greater catchment.</p> <p>The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Kilcorney discharge are envisaged and therefore no further assessment is required.</p>

## Appendix 15 – Kiskeam Screening

Project	
Location	Discharge associated with agglomeration of Knockagree village, County Cork.
Distance from designated site	Okm: WWTP discharges to the Owentaraglin River, inside the cSAC boundary.
Brief description	<p>Kiskeam is situated along the Regional Road R577 between the villages of Ballydesmond and Boherbue.</p> <p>The wastewater in Kiskeam is collected in a partially combined foul and separate foul sewerage drainage network. In the western section of the agglomeration, a puming staion caters for a number of dwellings. The influent arising from this area is pumped to the village gravity network.</p> <p>Kiskeam WWTP is designed for a Population Equivalent (PE) of 150, which was commissioned in 2000. Activated Sludge is the process employed at the Kiskeam waste water treatment plant. Influent initially gravitates into the inlet works, consisting of an inlet sump, where two number pumps forward the influent to the package treatment plant. Following the aeration process effluent gravitates to the settlement, the solids settle while the supernatant flows over the weir and discharges to the river. Sludge may be returned from the settling tank to the aeration tank and excess sludge is removed from the settling tank as required to the sludge holding tank and thereafter removed off site for disposal.</p> <p>The final effluent is discharged to the Owentaraglin River, which is adjacent to the wastewater treatment plant site. The maximum flow to the existing WWTP is in the order of 54m<sup>3</sup>/d to 162m<sup>3</sup>/d.</p> <p>Kiskeam WWTP currently services an agglomeration PE of 245 based on hydraulic loading; it is therefore overloaded to some degree.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

### Stage 1 - Screening

Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Kiskeam agglomeration receives secondary treatment at the WWTP, before discharging to the Owentaraglin River. The effluent then disperses in the water column.</p> <p>An observation of the Owentaraglin River downstream of the WWTP revealed that at this location, the river is relatively minor in scale (1-2m wide) with slow flows and occasional riffles along a shallow incline.</p> <p>The most recent EPA water quality sampling data from 2009 indicates that the Owentaraglin River displays good (Q=4) ecological conditions downstream of the discharge point, at Dromskarragh and Doon Bridge.</p>
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	<p>The overall ecological status of the catchment is listed by the EPA as satisfactory, with only High and Good ecological quality recorded. High quality was recorded in the lower stretches of the river, upstream of the confluence with the Blackwater.</p> <p>Sampling data for the discharge provided by Cork County Council with the Certificate Application indicates the following effluent levels in mg/l:</p> <ul style="list-style-type: none"> <li>• BOD = 8</li> <li>• SS = 46</li> <li>• COD = 47</li> <li>• P = 0.305</li> <li>• N = 4.81</li> </ul> <p>Sampling results of the Owentraglin River taken at the same time show no detectable increases in BOD, while Ammonia and Orthophosphate in the receiving waters were recorded as decreasing; downstream levels are afforded High or Good Status under the WFD River classification system.</p> <p>The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving stream, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied.</p> <p>Under consultation, Inland Fisheries Ireland made reference relating to the overloaded status of the Kiskeam WWTP. Given that surface water concentrations of Ammonia and Phosphate were seen to fall between upstream and downstream sampling points, it is considered that such concerns do not apply in this case.</p> <p>The Water Framework Directive assigns 'Moderate' status to the Owentraglin River; this is based on the presence of a non-recruiting population of Freshwater Pearl Mussels near Ahane Bridge, downstream of Cullen.</p> <p>The Second Draft Freshwater Pearl Mussel Sub-Basin Plan lists the Kiskeam WWTP as potentially having a significant adverse effect on the pearl mussel, given that there are records of this species downstream of the plant, which is technically overloaded. Pearl mussel populations require rivers to have an extremely low nutrient concentration to facilitate reproduction.</p> <p>Downstream sampling of the river near Kiskeam indicates that nutrient levels were below the minimum level of detection. Further investigation would therefore require an increase in the sensitivity of nutrient detection applied in future water sampling. The Blackwater WMU Action Plan lists Kiskeam as being over capacity, but states that there is no evidence of impact to the ecological status of the river.</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <ul style="list-style-type: none"> <li>Size and scale;</li> <li>Land-take;</li> <li>Distance from Natura 2000 site or key features of the site;</li> <li>Resource requirements;</li> <li>Emissions;</li> </ul>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective</p>

<p>Excavation requirements; Transportation requirements; Duration of construction, operation etc.; Others.</p>	<p>receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>Other WWTP discharges located along the Owentaraglin River are limited to the Cullen plants, which cater for 250PE and 55PE respectively. These underloaded plants lie in closer proximity to the pearl mussel population.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme.</p> <p>Cumulative pressures on the Owentaraglin River are considered to be very low, given the lack of industrial or major urban discharges to the river.</p>
<p>Describe any likely changes to the site arising as a result of: Reduction of habitat area; Disturbance of key species; Habitat or species fragmentation; Reduction in species density; Changes in key indicators of conservation value; Climate change.</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Blackwater of this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> <li>• White-clawed Crayfish - Records in main Blackwater channel only exist near Fermoy. The species has also been historically recorded in the Awbeg sub-catchment.</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic salmon and</p>

	<p>Otter.</p> <p>Elevated nutrient levels and dissolved oxygen demand can lead to recruitment failure in Freshwater Pearl Mussel populations. While adult specimens may be more tolerant to temporary deoxygenation, juveniles become stressed very easily and mortality can be high. Ongoing eutrophication leads to progressive ageing of populations and associated reduction in density.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of lamprey species which have also been recorded in the Upper Blackwater.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The overall Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture, especially in the well known agricultural area known as the Golden Vale. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river further up its reaches, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the river Blackwater was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The levels of organic and inorganic nutrients contained within the Kiskeam discharge are notably small in context, despite the plant being technically somewhat overloaded. Water quality is seen to progressively increase as one descends the river towards the Freshwater Pearl Mussel population downstream of Cullen.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>It is technically the case that the Kiskeam plant is presently slightly overloaded, though in relation to the overall size of the catchment, the agglomeration is relatively small and is unlikely to be contributing to significant nutrient input to the overall river system.</p> <p>In the context of other discharges to the Blackwater in the overall vicinity, the contemporary Kiskeam plant generates a generally compliant</p>

	<p>effluent with low nutrient levels; as an example, Orthophosphate levels are predicted to rise by only 0.0003mg/l as a result of the discharge. The river is currently considered to be good ecological condition at Kiskeam, which improve further to high in the lower stretches of the river.</p> <p>It is not considered that the Kiskeam WWTP is acting in combination with other pressures to a significant degree.</p> <p>The screening exercise concludes that no significant impacts to the Blackwater River cSAC resulting from the Kiskeam discharge are envisaged and therefore no further assessment is required.</p>
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## Appendix 16 – Knocknagree Screening

Project	
Location	Discharge associated with agglomeration of Knocknagree village, County Cork.
Distance from designated site	Okm: WWTP discharges to the River Blackwater, inside the cSAC boundary.
Brief description	<p>Knocknagree is situated approximately 15km northwest of Millstreet and 4km north of Rathmore.</p> <p>The wastewater in Knocknagree is collected in a partially combined foul and separate foul sewerage drainage network. The wastewater from the village gravitates to the wastewater treatment plant.</p> <p>Knocknagree WWTP is designed for a Population Equivalent (PE) of 300, which was commissioned in 2006. Activated Sludge is the process employed at the Knocknagree waste water treatment plant. Influent initially gravitates into the inlet works, consisting of an automatic and manual bypass. Following the screening of the raw sewerage, influent a circular concrete inlet sump, from where the effluent is pumped to the Aeration Tank. Following the aeration process effluent gravitates to the settlement tank, the solids settle while the supernatant flows over the weir and discharges to the River Blackwater.</p> <p>The plant has a design PE of 300 but currently serves an agglomeration of 340 PE and is therefore technically overloaded. However, effluent sampling data provided by Cork County Council indicates that the plant continues to generate a high quality effluent that lies significantly under the compliance thresholds for a plant of this scale.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

Stage 1 - Screening	
Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Knocknagree agglomeration receives secondary treatment at the WWTP, before discharging to the River Blackwater. The effluent then disperses in the water column.</p> <p>An observation of the River Blackwater west of Knocknagree village revealed that at this location, the river is relatively minor in scale (3-4m wide) with slow flows and occasional riffles along a shallow incline.</p> <p>The most recent EPA water quality sampling data from 2009 indicates that the River Blackwater displays high (Q=4-5) ecological conditions downstream of the discharge point, at Nohaval Bridge. An improvement in water quality is therefore apparent from the river samples at Lisheen Bridge upstream of the WWTP (Q=4).</p>



	<p>The overall ecological status of the catchment is listed by the EPA as satisfactory, with only moderate and poor Q values found downstream of the major towns of Mallow and Fermoy respectively.</p> <p>Sampling data for the discharge provided by Cork County Council with the Certificate Application indicates the following effluent levels in mg/l:</p> <ul style="list-style-type: none"> <li>• BOD = &lt;1</li> <li>• SS = 4</li> <li>• COD = &lt;21</li> <li>• P = 0.201</li> <li>• N = 7</li> </ul> <p>Sampling results of the River Blackwater taken at the same time show no detectable increases in BOD, Ammonia or Orthophosphate in the receiving waters; both upstream and downstream levels are afforded High Status under the WFD River classification system.</p> <p>The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving stream, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied.</p> <p>Under consultation, Inland Fisheries Ireland made no specific comments relating to the Knocknagree discharge, but made general reference to the negative influence of plants operating near or above their design PEs. Given the high quality effluent produced by the Knocknagree WWTP, it is considered that such concerns do not apply in this case.</p> <p>The Water Framework Directive assigns 'Moderate' status to the Upper Blackwater River; this is based on 'Fail' results for all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.</p> <p>The Second Draft Freshwater Pearl Mussel Sub-Basin Plan lists the Knocknagree WWTP as potentially having a significant adverse effect on the pearl mussel, given that there are records of this species around 5-6km downstream of Knocknagree, near Rathmore. Pearl mussel populations require rivers to have an extremely low nutrient concentration to facilitate reproduction. Downstream sampling of the river near Knocknagree indicates that nutrient levels were below the minimum level of detection. Further investigation would therefore require an increase in the sensitivity of nutrient detection applied in future water sampling.</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <p>Size and scale;          Land-take;          Distance from Natura 2000 site or key features of the site;          Resource requirements;          Emissions;          Excavation requirements;          Transportation requirements;          Duration of construction, operation etc.;</p>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p>

<p>Others.</p>	<p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>The Knocknagree WWTP lies downstream of the Munster Joinery Plant (Gairdini). This commercial plant is involved in the manufacture of Hardwood, uP.V.C, Steel and Aluminium doors and windows and employed over 1000 people at the peak of the Irish housing market in 2006. The plant, which operates its own wastewater treatment plant with the same treatment levels, may result in a cumulative negative pressure on the River Blackwater at this location. The plant operates an internal WWTP that is licensed under the EPA IPPC system (Ref: P0639-02). This equates to a significantly larger effluent input to the Blackwater than the Knocknagree village agglomeration. Demand for such products has reduced significantly since 2007 and it is likely that the Munster Joinery WWTP is currently underloaded. A minor improvement in biological conditions in the river is observed at Nohaval Bridge; this may be attributable to the influx of oligotrophic water from the numerous upland tributaries to both sides of the river in this area.</p> <p>Other WWTP discharges located in the immediate part of the catchment are Ballydesmond village WWTP, Rathmore village WWTP and the WWTP associated with the Cadbury Ireland plant at Rathmore.</p> <p>A sand and gravel quarry is also located in the headwaters of the Upper Blackwater at Kingwilliamstown, northwest of Ballydesmond. This may be contributing to siltation and sediment levels in the river, which are being transferred downstream. This was noted as a key issue in Ross's (2009) survey.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme.</p>
<p>Describe any likely changes to the site arising as a result of:          Reduction of habitat area;          Disturbance of key species;          Habitat or species fragmentation;          Reduction in species density;          Changes in key indicators of conservation value;          Climate change.</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Blackwater of this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p>

	<ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> <li>• White-clawed Crayfish - Records in main Blackwater channel only exist near Fermoy. The species has also been historically recorded in the Awbeg sub-catchment.</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic salmon and Otter.</p> <p>Elevated nutrient levels and dissolved oxygen demand can lead to recruitment failure in Freshwater Pearl Mussel populations. While adult specimens may be more tolerant to temporary deoxygenation, juveniles become stressed very easily and mortality can be high. Ongoing eutrophication leads to progressive ageing of populations and associated reduction in density.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of lamprey species which have also been recorded in the Upper Blackwater.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The Blackwater is under threat from a variety of sources, including run-off from intensive agriculture, especially in the well known agricultural area known as the Golden Vale. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river further up its reaches, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the river Blackwater was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The levels of organic and inorganic nutrients contained within the Knocknagree discharge are notably small in context, despite the plant being technically somewhat overloaded. An increase in ecological</p>

	<p>conditions in the river has been reported by the EPA and Inland Fisheries Ireland had no specific complaints about the WWTP.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>It is technically the case that the Knocknagree plant is presently slightly overloaded, though in relation to the overall size of the catchment, the agglomeration is relatively small and is unlikely to be contributing to significant nutrient input to the overall river system. Despite historical sewage input to the catchment, the Blackwater displays good ecological status for much of its length, suggesting high assimilative capacity due to large dilution levels.</p> <p>In the context of other discharges to the Blackwater in the overall vicinity, the contemporary Knocknagree plant generates a high quality effluent with low nutrient levels. The river is currently considered to be in satisfactory ecological condition with good ecological conditions recorded upstream, which improve further to high, downstream of the discharge.</p> <p>Negative pressures to the qualifying interests of the cSAC may be resulting from other discharges and/or land uses in the area; these are addressed in other sections of this document. It is not considered that the Knocknagree WWTP is acting in combination with these pressures to a significant degree.</p> <p>The screening exercise concludes that no significant impacts to the Blackwater River cSAC resulting from the Knocknagree discharge are envisaged and therefore no further assessment is required.</p>

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## Appendix 17 – Liscarroll Screening

Project	
Location	Discharge associated with agglomeration of Liscarroll village, County Cork.
Distance from designated site	5.5km: WWTP discharges to a tributary of the Awbeg River, upstream of the cSAC boundary.
Brief description	<p>Liscarroll village is located on the R522, 12km west of Buttevant town. The waste water from the agglomeration is currently treated by a package treatment plant prior to being discharged. Liscarroll WWTP was constructed in 2005. The design PE of the plant is 600.</p> <p>The main elements of the WWTP are;</p> <ol style="list-style-type: none"> <li>1. Screening</li> <li>2. Secondary treatment: Activated Sludge (Aeration Tank and Clarifier)</li> <li>3. Discharge to tributary of the Awbeg River</li> </ol> <p>The plant currently treats a PE of 400, and is therefore underloaded.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

### Stage 1 - Screening

Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Liscarroll agglomeration receives secondary treatment at the WWTP, before discharging to a tributary of the western spur of the Awbeg River. The effluent then disperses in the water column.</p> <p>An observation of the tributary downstream of the discharge revealed that at this location, the river is very minor in scale (1.5-2m wide) with moderate flows down a steady incline.</p> <p>The most recent EPA water quality sampling data from 2009 indicates that the Awbeg River displays good (Q=4) ecological conditions downstream of the discharge point, near Altamira. Conditions have improved significantly since 2006 when Q values of 3 were recorded here. This improvement coincides with the commissioning of the new Liscarroll package plant.</p> <p>Sampling data for the discharge provided by Cork County Council with the Certificate Application indicates the following effluent levels in mg/l:</p> <ul style="list-style-type: none"> <li>• BOD = 4</li> <li>• SS = 6</li> <li>• COD = &lt;21</li> <li>• P = 2.16</li> <li>• N = 16.1</li> </ul>
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	<p>Sampling results of the Awbeg River taken at the same time show no detectable increases in Ammonia or Orthophosphate in the receiving waters; both upstream and downstream levels are afforded High Status under the WFD River classification system. A slight elevation in BOD levels were detected (from 2 mg/l to 3mg/l), but as the BOD levels in the WWTP effluent were only 4mg/l, it is highly unlikely that the increase observed was attributable to the WWTP discharge.</p> <p>The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving stream, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied.</p> <p>Under consultation, Inland Fisheries Ireland made no reference to the Liscarroll WWTP.</p> <p>The Water Framework Directive assigns 'Poor' status to this sub-catchment of the Awbeg; this is based on results for aquatic macroinvertebrate diversity results during EPA sampling at Annagh Bridge; this is downstream of the unpolluted sampling point which in turn is downstream of Liscarroll.</p> <p>Freshwater Pearl Mussels are not known from this sub-catchment. However, White-clawed crayfish have been historically observed in the Awbeg River (though EPA surveys during 2009 did not record any such specimens).</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <ul style="list-style-type: none"> <li>Size and scale;</li> <li>Land-take;</li> <li>Distance from Natura 2000 site or key features of the site;</li> <li>Resource requirements;</li> <li>Emissions;</li> <li>Excavation requirements;</li> <li>Transportation requirements;</li> <li>Duration of construction, operation etc.;</li> <li>Others.</li> </ul>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>The surrounding land use is primarily agricultural pasture.</p> <p>Other WWTP discharges located in the immediate part of the catchment include the Churchtown WWTP which also discharges to the western spur of the Awbeg River.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed</p>

	<p>through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme. It is this programme which is likely to have most significantly accounted for the improvement in water quality observed in the Awbeg (East) in recent years.</p>
<p>Describe any likely changes to the site arising as a result of:          Reduction of habitat area;          Disturbance of key species;          Habitat or species fragmentation;          Reduction in species density;          Changes in key indicators of conservation value;          Climate change.</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Blackwater of this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shag - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower reaches of catchment</li> <li>• Freshwater Pearl Mussel - Records are restricted to the main Blackwater channel and the Allow catchment.</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, White-clawed Crayfish, Atlantic salmon and Otter.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. Loss of salmonids will in turn affect the feeding ecology of other populations within the sub-catchment and may reduce the carrying capacity of the constituent rivers.</p> <p>Crayfish sensitivity to changes in water quality can result in significant losses following pollution incidents. Eutrophication can lead to luxuriant plant growth, which in turn traps silt and can result in deoxygenation at night, leading to loss of crayfish habitat.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of Lamprey and juvenile fish, and also reduce the recruitment success of White-clawed crayfish.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of</p>



	<p>approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The greater Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river in its upland tributaries, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the Blackwater catchment was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The Liscarroll plant is a modern package plant which is underloaded and generates a very high quality effluent that is compliant with the UWWT regulations. Furthermore, an improvement in ecological conditions in the river has been reported by the EPA immediately downstream of the plant. The Ballyhea plant is not referenced by the WFD sub-basin plan as being a plant 'at risk'.</p> <p>The overall improvement in ecological conditions observed in the upper waters of the western Awbeg spur in recent years is likely to have a beneficial effect on the qualifying interests found within this part the catchment (Atlantic salmon, Lamprey and White-clawed crayfish). A reduction in water quality observed at Annagh Bridge is likely to be attributable to poor agricultural practices in the area; the well-functioning Liscarroll plant may in fact be contributing to negating against even further degradation of water quality downstream.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>In the context of other discharges to the Awbeg in the overall vicinity, the contemporary Liscarroll plant generates a high quality effluent with low nutrient levels. The river is currently considered to be in satisfactory ecological condition with an improvement in downstream ecological conditions recorded since 2006 following the commissioning of the plant.</p> <p>Other negative pressures to the qualifying interests of the cSAC may be resulting from other land uses (primarily agriculture) in the area. It is considered that the Liscarroll WWTP is likely to be negating these negative impacts to some degree by minimising nutrient input from the Liscarroll agglomeration.</p> <p>The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Liscarroll discharge are envisaged and therefore no further assessment is required.</p>

## Appendix 18 – Lombardstown Screening & Assessment

Project	
Location	Discharge associated with agglomeration of Lombardstown village, County Cork.
Distance from designated site	Okm: Septic tank discharges to the River Blackwater, inside the cSAC boundary.
Brief description	<p>Lombardstown is small village to the south of the River Blackwater, 9km to the west of Mallow town.</p> <p>The wastewater from the Lombardstown agglomeration is collected in a partially combined foul and separate foul sewerage drainage network.</p> <p>The wastewater from the village gravitates to the septic tank. The Septic Tank was designed for a Population Equivalent (PE) of approximately 50, which was commissioned in late 1970's.</p> <p>The primary source of emissions from the works is via a 150mm pipe outfall to the Blackwater River.</p> <p>The wastewater treatment plant treats only municipal waste water from the Village and it environs via the sewerage collection system. The treatment works consists of the following elements:</p> <ul style="list-style-type: none"> <li>• Primary settlement</li> <li>• Anaerobic digestion</li> </ul> <p>There are ongoing discussions with the landowner to acquire land to enable the upgrade of the plant.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

Stage 1 - Screening	
Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Lombardstown agglomeration receives primary treatment only at the septic tank, before discharging to the River Blackwater. The effluent then disperses in the water column.</p> <p>An observation of the Blackwater downstream of the WWTP revealed that at this location, the river is major in scale (12-15m wide) with slow flows and occasional riffles over gravel beds. The banks of the river display mature riparian treelines.</p> <p>The most recent EPA water quality sampling data indicates that the River Blackwater displays good (Q=4) ecological conditions at Lombardstown Bridge, just downstream of the septic tank discharge. Taken in isolation, this would appear to be satisfactory; however, the upstream and downstream samples for Roskeen Bridge and Longfield's Bridge have Q values of 4-5. This reflects a reduction in water quality in the vicinity of Lombardstown, before biological recovery occurs further downstream.</p>

	<p>Sampling data for the discharge provided by Cork County Council with the Certificate Application indicates the following effluent levels from 2009 in mg/l:</p> <ul style="list-style-type: none"> <li>• BOD = 285</li> <li>• SS = 116</li> <li>• COD = 631</li> <li>• P = 8.6</li> <li>• N = n/s</li> </ul> <p>These results are clearly non-compliant with the UWWT regulations. While the Blackwater at this location is a sizeable waterbody with large dilution factors</p> <p>Under consultation, Inland Fisheries Ireland made reference to the Lombardstown septic tank in that it is operating close to its design capacity.</p> <p>The Water Framework Directive assigns 'Moderate' status to the Blackwater River; this is based on the presence of a non-recruiting population of Freshwater Pearl Mussels near in the Blackwater in the vicinity of Mallow Town, and in relatively close proximity to the Lombardstown discharge.</p> <p>The Second Draft Freshwater Pearl Mussel Sub-Basin Plan lists the Lombardstown septic tank as potentially having an adverse effect on the pearl mussel, given that there are records of this species in close proximity downstream of the plant. Pearl mussel populations require rivers to have an extremely low nutrient concentration to facilitate reproduction. A minor reduction in biological water quality has been observed around Lombardstown.</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <p>Size and scale;          Land-take;          Distance from Natura 2000 site or key features of the site;          Resource requirements;          Emissions;          Excavation requirements;          Transportation requirements;          Duration of construction, operation etc.;</p> <p>Others.</p>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>Given that the Lombardstown agglomeration only receives primary treatment, it is likely that it is contributing to elevated levels of organic and inorganic eutrophying nutrients which enter the Blackwater closely upstream to a large number of freshwater pearl mussel colonies.</p>

	<p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme.</p> <p>The Lombardstown plant lies upstream of Mallow Town, which acts as a significant pressure on the River Blackwater in this region. In consultation, Inland Fisheries Ireland report that Mallow WWTP has been the subject of a number of reports over recent years from members of the general public regarding visibly unsatisfactory discharges from its outfall, with most of these incidents being attributed to breakdowns/faults following our investigation and communication with council staff. Mallow Town also contains a number of large industrial complexes with IPPC licences. These are the Dairygold, Micam and Road Binders installations. The decommissioned Irish Sugar Factory and associated lagoons are also located to the west of the town. It is planned that the existing lagoons at the site will be filled in and the site rehabilitated for future use as agricultural land. All of the above are likely to act in combination to some degree to put pressure on the water quality in the environs of Mallow Town. This is of key importance to the viability of the pearl mussel population in the Blackwater at this location.</p>
<p>Describe any likely changes to the site arising as a result of:          Reduction of habitat area;          Disturbance of key species;          Habitat or species fragmentation;          Reduction in species density;          Changes in key indicators of conservation value;          Climate change.</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the River Blackwater at this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaité Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic salmon and Otter. Crayfish were recorded in the lowest stretch of the Ballyclogh Stream in 2009. It is unclear whether this is the result of an intentional translocation, or a previously unknown naturally occurring sub-population. It may also indicate the presence of crayfish in the main Blackwater channel in the stretch of the river.</p> <p>Elevated nutrient levels and dissolved oxygen demand can lead to recruitment failure in Freshwater Pearl Mussel populations. While adult specimens may be more tolerant to temporary deoxygenation, juveniles become stressed very easily and mortality can be high. Ongoing</p>

	<p>eutrophication leads to progressive ageing of populations and associated reduction in density. The influence of organic and inorganic nutrients entering the Blackwater from the Lombardstown discharge may contribute to depressing the reproductive capacity of the Blackwater pearl mussel population.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. While no obvious gross eutrophication was observed, a reduction in macroinvertebrate diversity recorded by the EPA may indicate drops in dissolved oxygen downstream of Lombardstown.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of lamprey species which have also been recorded in the overall Blackwater catchment. Macrophytes were not observed in great numbers in the Blackwater downstream of the discharge, though the depth of the river meant submerged vegetation could not be ruled out.</p> <p>Crayfish sensitivity to changes in water quality can result in significant losses following pollution incidents. Eutrophication can lead to luxuriant plant growth, which in turn traps silt and can result in deoxygenation at night, leading to loss of crayfish habitat. The presence of crayfish in the main Blackwater channel in the vicinity of Mallow Town is unclear.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The overall Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture, especially in the well known agricultural area known as the Golden Vale. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river further up its reaches, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the river Blackwater was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The levels of inorganic and organic nutrients contained in the Lombardstown discharge are notably elevated, and the effluent is non-compliant with the UWWT regulations. Ongoing nutrient input in the vicinity of the Blackwater pearl mussel population will lead to progressive ageing of the population without recruitment and eventual extinction</p>

<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>The Lombardstown septic tank is currently releasing a very poor quality effluent to the Blackwater. Localised impacts to qualifying species of the SAC (particularly the Pearl Mussel) may be significant due to the high vulnerability of these species to the effects of nutrient enrichment. In combination factors may also be an issue, given the urbanised and industrial nature of Mallow Town. The Mallow WWTP has been the cause of a number of pollution incidents in recent years. Other point pressures in the area include three IPPC-licensed facilities in Mallow Town, and the Glantane, Cecilstown and Ballyclogh WWTPs which all discharge to the Blackwater or its tributaries within a 10km radius of Mallow.</p> <p>The Blackwater has a high dilution factor and overall assimilative capacity for nutrients and thus impacts to the majority of qualifying species is considered unlikely.</p> <p>However, given the fact that the septic tank discharges poor quality effluent to the Blackwater in close proximity to where pearl mussels have been recorded, the screening exercise concludes that further assessment should be carried out in Stage 2 below.</p> <p>This assessment considers the potential impacts of the discharge with specific reference to the species and/or habitats which may be impacted.</p>
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<p><b>Stage 2 - Project Assessment</b></p>	
<p>Describe the elements of the plan that are likely to give rise to significant effects on the site</p>	<p>Waste water treatment plants can contribute significant nutrient and organic loads to rivers. There is potential that the discharge from the Lombardstown septic tank in combination with other activities within the Blackwater River catchment is leading to increased levels of nutrients in the main channel of the Blackwater.</p>
<p>Set out the conservation objectives of the site</p>	<p>European and national legislation places a collective obligation on Ireland and its citizens to maintain at favourable conservation status areas designated as candidate Special Areas of Conservation. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.</p> <p>According to the EU Habitats Directive, favourable conservation status of a habitat is achieved when its natural range, and area it covers within that range, is stable or increasing, and the ecological factors that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and the conservation status of its typical species is favourable as defined below. The favourable conservation status of a species is achieved when population data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.</p> <p>The generic conservation objectives of the Blackwater River cSAC are:</p> <p>1. To maintain the Annex I habitats for which the cSAC has been selected at favourable conservation status: Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) (91E0); <i>Taxus baccata</i> woods of the British Isles (91J0); Watercourses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation (3260); Estuaries (1130); Mudflats and sandflats not covered</p>

	<p>by seawater at low tide (1140); Salicornia and other annuals colonizing mud and sand (1310); Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) (1330); Mediterranean salt meadows (<i>Juncetali maritimi</i>) (1410); Perennial vegetation of stony banks (1220); Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles (91A0).</p> <p><b>2.</b> To maintain the Annex II species for which the cSAC has been selected at favourable conservation status: Sea Lamprey (<i>Petromyzon marinus</i>); River Lamprey (<i>Lampetra fluviatilis</i>); Brook Lamprey (<i>Lampetra planeri</i>); Twaiter Shad (<i>Alosa fallax fallax</i>); Salmon (<i>Salmo salar</i>); Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>); White-clawed Crayfish (<i>Austropotamobius pallipes</i>); Otter (<i>Lutra lutra</i>); Killarney Fern (<i>Trichomanes speciosum</i>)</p> <p><b>3.</b> To maintain the extent, species richness and biodiversity of the entire site.</p> <p><b>4.</b> To establish effective liaison and co-operation with landowners, legal users and relevant authorities.</p> <p>It should be noted that only a sub-sample of these qualifying interests are water-dependent, as identified in the screening process.</p>
<p>Describe how the project will affect key species and key habitats</p>	<p>Of key concern in relation to the Lombardstown discharge is potential negative impacts to the Freshwater Pearl Mussel, which acts as a keystone species for the SAC. This species 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 lack of fine material in the river bed allows for 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. This is essential for juvenile recruitment, as this species requires continuous high oxygen levels. The clean substrate must be free of inorganic silt, organic peat, and detritus, as these can all block oxygen exchange. Organic particles within the substrate can exacerbate the problem by consuming oxygen during the process of decomposition. The habitat must be free of filamentous algal growth and rooted macrophyte growth. Both block the free exchange of water between the river and the substrate and may also cause night time drops in oxygen at the water-sediment interface. The open water must be of high quality with very low nutrient concentrations, in order to limit algal and macrophyte growth. Nutrient levels must be close to the reference levels for the river they inhabit. Phosphorus must never reach values that could allow for sustained, excessive filamentous algal growth. The presence of sufficient salmonid fish to carry the larval glochidial stage of the pearl mussel life cycle is essential.</p> <p>A number of surveys have identified numerous pearl mussel colonies in the environs of Mallow Town, immediately downstream of the Finnow Stream's confluence with the Blackwater. Reproductive success in this population is negligible, owing to historic pollution of the river and ongoing elevated inorganic nutrient levels in the water column.</p> <p>The Lombardstown septic tank is generating a poor quality effluent, releasing sediment and organic material to the river. This may affect any of the qualifying interests through direct deoxygenation of the river or accumulation of sediment. This, in combination with the phosphate content of the discharge is likely to be leading to ongoing negative pressure on the Mallow freshwater pearl mussel population.</p> <p>In relation to the other qualifying species of the Blackwater cSAC,</p>



	<p>accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. Such changes are likely to affect stocks of salmon within the river, a qualifying species that is already under pressure in the catchment. Lamprey, which also require high water quality with low levels of sediment are also likely to be similarly affected.</p> <p>Reduction or changes in overall fish stocks will have subsequent effects on predators, most notably otter, for which the site is also designated.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of Lamprey and juvenile fish.</p> <p>Elevated levels of suspended solids from effluent discharges pose a risk to salmon and lamprey recruitment where settlement on spawning gravels and/or redds may occur.</p>
<p>Describe how the integrity of the site (determined by structure and function and conservation objectives) is likely to be affected by the project or plan (e.g. loss of habitat, disturbance, disruption, chemical changes, hydrological changes etc).</p>	<p>The key ecological relationships that define the structure and function of the Upper Blackwater as part of the cSAC as a whole are likely to be impacted by potential nutrient enrichment. However, given the minor scale of the discharge, systemic disturbance is not envisaged.</p> <p>The critical matter relating to the Lombardstown discharge concerns the threat posed to remnant Freshwater Pearl Mussel populations found in the Blackwater downstream of the septic tank. EPA sampling of the Blackwater shows that it recovers High ecological status (Q=4-5) following a dip to Q=4 at Lombardstown. However, this may not reflect the pressure on the Freshwater pearl mussel colonies in the area caused by increased Orthophosphate concentrations or siltation of the river substrate.</p> <p>The Blackwater remains an open Salmon fishery, indicating Inland Fisheries Ireland's opinion that the species remains in harvestable surplus for the catchment. The assimilative capacity of the Blackwater for nutrients is high overall, but localised deoxygenation of the water column or clogging of the waterbody with macroalgae and macrophytes may be considered a significant impact to migrating and spawning salmon. Lamprey are known to require equitable water quality standards to salmon. No such evidence of gross eutrophication was observed downstream of Lombardstown and the overall water quality is good; as such, no impacts most of the aquatic conservation interests of the CSAC are expected, with the exception of the pearl mussel.</p> <p>Reduction in key diet species such as salmonids may negatively affect otter populations in the catchment. Competition with the invasive non-native mink may act in combination in this regard. As noted above, fish stocks are unlikely to be affected and thus pressure on the local otter population is more likely to result from disturbance by humans in the vicinity of Mallow Town.</p>
<p>Describe mitigation measures that are to be introduced to avoid, reduce or remedy the adverse effects on the integrity of the site</p>	<p>The Lombardstown septic tank is a relatively old installation, which generates a poor quality effluent. Cork County Council are involved in ongoing discussions with the landowner to extend the site and upgrade the plant. Any future upgrades are dependent on funding being made available.</p> <p>The Freshwater Pearl Mussel Sub-basin Plan makes specific reference to</p>

	<p>investigating the need for nutrient removal at the plant, owing to the proximal downstream presence of pearl mussels.</p>
<p>Conclusion</p>	<p>In conclusion, the potential negative pressure upon Freshwater Pearl Mussel populations occurring in the Blackwater downstream of the Lombardstown discharge (in combination with other pressures located in the environs of Mallow Town) is considered a significant impact that will continue until nutrient removal is put in place at the plant. This is in contravention of Conservation Objective Number 2 for the cSAC.</p> <p>The assessment therefore concludes that due to likely impacts to Freshwater Pearl Mussel, the possibility of significant impacts to the Blackwater River (Cork/Waterford) cSAC cannot be discounted at this stage.</p>

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## Appendix 19 – Lyre Screening

Project	
Location	Discharge associated with agglomeration of Lyre village, County Cork.
Distance from designated site	1.5km: WWTP discharges to the Glen River, inside the cSAC boundary.
Brief description	<p>Lyre is situated approximately 6km south of Banteer and approximately 14km east of Millstreet. Lyre is a remote rural settlement, situated on the foothills of the Boggeragh Mountains.</p> <p>The wastewater in Lyre is collected in a separate foul sewerage drainage network. The wastewater from the village gravitates to the wastewater treatment plant, which is located at the northern end of a housing estate.</p> <p>Lyre WWTP is designed for a Population Equivalent (PE) of 300, which was commissioned in 2007. Activated Sludge is the process employed at the Lyre waste water treatment plant. Influent initially gravitates into the inlet works, consisting of a flume, automatic and manual bypass. Following the screening of the raw sewerage, influent enters a splitter chamber prior to entering a CAS Unit. Following the aeration process effluent gravitates to the settlement, the solids settle while the supernatant flows over the weir and discharges a sump, where the effluent is pumped via 2 Nr pumps via the 2 Nr sand filters to the Percolation Area. Sludge may be returned from the settling zone to the aeration zone and excess sludge is removed from the settling zone as required to the sludge holding tank and thereafter removed off site for disposal.</p> <p>The percolation area lies within the watershed of a tributary of the Glen River, which is adjacent to the wastewater treatment plant site.</p> <p>The plant currently services a PE of 200 and is significantly underloaded.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

Stage 1 - Screening	
Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Lyre agglomeration receives tertiary treatment at the WWTP, before discharging to the percolation area in the vicinity of a tributary of the Glen River, a tributary of the River Blackwater. The effluent then disperses in the water column.</p> <p>The tributary stream to which some of the percolated discharge will reach via groundwater is very minor scale (~ 1m wide), but running down a step incline over numerous falls. It is expected to have a high assimilative capacity for oxygen loading and is naturally oligotrophic.</p> <p>EPA sampling of the Glen River indicates that it displays High ecological quality at all tested locations. The WFD classification for the sub-</p>

	<p>catchment is also 'High', based on Q-ratings for the Glen River.</p> <p>Sampling data for the discharge provided by Cork County Council with the Certificate Application indicates the following effluent levels in mg/l:</p> <ul style="list-style-type: none"> <li>• BOD = 23</li> <li>• SS = 27</li> <li>• COD = 66</li> <li>• P = 2.18</li> <li>• N = 23.11</li> </ul> <p>As this discharge flows to groundwater, no upstream or downstream sampling applies.</p> <p>The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving stream, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied.</p> <p>Under consultation, Inland Fisheries Ireland made no reference to the Lyre WWTP.</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <p>Size and scale;</p> <p>Land-take;</p> <p>Distance from Natura 2000 site or key features of the site;</p> <p>Resource requirements;</p> <p>Emissions;</p> <p>Excavation requirements;</p> <p>Transportation requirements;</p> <p>Duration of construction, operation etc.;</p> <p>Others.</p>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in</p>

	<p>nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme.</p> <p>The surrounding landuse is primarily upland pasture and commercial forestry. Fertilizer run-off from agricultural land is likely to be low in this region. Nitrate release during forestry operations can lead to reduction in water quality in rivers like the Glen River; however, no such impacts were noted during field surveys.</p> <p>The plant lies in the same catchment as the Nadd WWTP. The Nadd has been recently commissioned and taken into the care of Cork County Council. It generates a high quality effluent. The two plants are not expected to act in combination in a negative manner.</p>
<p>Describe any likely changes to the site arising as a result of:                  Reduction of habitat area;                  Disturbance of key species;                  Habitat or species fragmentation;                  Reduction in species density;                  Changes in key indicators of conservation value;                  Climate change.</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Blackwater of this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaité Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> <li>• White-clawed crayfish – Not found in upland peaty and acidic rivers such as the Glen River</li> </ul> <p>Elevated nutrient levels and dissolved oxygen demand can lead to recruitment failure in Freshwater Pearl Mussel populations. While adult specimens may be more tolerant to temporary deoxygenation, juveniles become stressed very easily and mortality can be high. Ongoing eutrophication leads to progressive ageing of populations and associated reduction in density. There are pearl mussel populations in the main Blackwater channel downstream of the Glen River confluence, the closest one located near Roskeen Bridge. The modern Lyre plant is relatively minor in scale, generates a high quality effluent with low inorganic nutrient levels and is 14km upstream of the existing Blackwater populations.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. Water quality in the Glen River was observed to be high with no evidence of eutrophication.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of lamprey species which have also been recorded in the overall Blackwater catchment. Some macrophytes were observed in the Glen River, but these were not considered to be a result of eutrophication.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as</p>

	<p>rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The greater Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river in its upland tributaries, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the Blackwater catchment was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree. No evidence of negative pressure from forestry in the area was observed.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The Lyre plant is a modern plant which is not overloaded and generates a very high quality effluent that percolates to groundwater and thus acts as a diffuse pressure of minimal impact to the Glen River. High biological water quality is recorded in all sampling stations of the Glen River, and it is not considered to be at risk of eutrophication.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.</p>	<p>In the context of other discharges to the Blackwater in the overall vicinity, the contemporary Lyre plant generates a high quality effluent with low nutrient levels. These percolate to groundwater and the remaining nutrients in the effluent will be slowly diffused to the Glen River catchment.</p> <p>Other negative pressures to the qualifying interests of the cSAC are more pronounced from other sources such as the Lombardstown and Mallow WWTPs a significant distance downstream. Given the small scale of the Lyre discharge, and the excellent quality of effluent it generates, it is not seen as significant negative pressure. The Nadd WWTP in the Glen catchment is also a modern installation; it is not considered that these plants are negatively acting in combination.</p> <p>The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Lyre discharge are envisaged and therefore no further assessment is required.</p>

## Appendix 20 - Meelin Screening

Project	
Location	Discharge associated with agglomeration of Meelin village, County Cork.
Distance from designated site	2.5km: WWTP discharges to a percolation area beside a tributary of the Dalua River, upstream of the cSAC boundary.
Brief description	<p>Meelin is located north of Newmarket just off the road the R576 road to Rockchapel.</p> <p>The wastewater in Meelin is collected in a partially combined foul and separate foul sewerage drainage network. The wastewater from the village gravitates to the wastewater treatment plant. At the western end of the agglomeration a second wastewater treatment plant is located which caters for 5 Houses.</p> <p>The main WWTP is designed for a Population Equivalent (PE) of 150, which was commissioned in 2000. Activated Sludge is the process employed at this waste water treatment plant. Influent initially gravitates into a primary settlement tank, which was the old septic tank. Following the primary settlement influent enters in to a RBC Unit. Following the aeration process effluent gravitates to the settlement, the solids settle while the supernatant flows over the weir and discharges to the river. Sludge may be returned from the settling zone to the aeration zone. Excess sludge is removed from the settling tank as required off site for disposal. The WWTP discharges to a tributary stream of the Dalua River.</p> <p>The second plant consists of a small package RBC plant which caters for the 5 houses This package plant has a design PE of 40. Following treatment at the RBC the effluent is discharge a settlement tank prior to discharge to a percolation area.</p> <p>The pollution load for the Meelin agglomeration arises from the following areas:</p> <ul style="list-style-type: none"> <li>• Domestic population</li> <li>• Commercial premises</li> <li>• School &amp; crèches</li> <li>• Infiltration</li> </ul> <p>The sewerage from all commercial premises is collected via the public sewer and treated in conjunction with the domestic waste at the WWTP.</p> <p>The main WWTP currently services and agglomeration of 150 and is underloaded. The RBC package plant services a PE of 35, and is also slightly under capacity. As the RBC discharges to a percolation area, nutrient input to the river will be diffuse and protracted; this is unlikely to contribute significantly to the overall nutrient load from the main WWTP discharge. As such, only the main WWTP will be considered by this assessment.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No



## Stage 1 - Screening

Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.

The Meelin agglomeration receives secondary treatment at the main WWTP, before discharging to a tributary stream of the Dalua River. The effluent then disperses in the water column.

An observation of the Dalua River downstream of the WWTP revealed that at this location, the river is relatively minor in scale (2-3m wide) with slow flows and occasional riffles along a shallow incline.

The most recent EPA water quality sampling data from 2009 indicates that the Dalua River displays good (Q=4) ecological conditions downstream of the discharge point, at Aldworth Bridge.

The overall ecological status of the catchment is listed by the EPA as 'Improved'. The river was identified as satisfactory throughout with Good and High ecological quality results only

Sampling data for the discharge provided by Cork County Council with the Certificate Application indicates the following effluent levels from 2009 in mg/l:

- BOD = 5
- SS = 9
- COD = 31
- P = 2.31
- N = 13.75

Sampling results of the Dalua River taken at the same time as the effluent results show a detectable decrease in BOD, while Ammonia in the downstream sample was unchanged from the upstream sample and afforded High Status under the WFD River classification system. Orthophosphate levels were unchanged between the upstream and downstream samples as 0.08mg/l, a 'Moderate' result. As the results were unchanged, this elevated phosphate concentration is likely to be attributable to other pressures, most likely fertiliser run-off from agricultural pasture.

The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving stream, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied.

Under consultation, Inland Fisheries Ireland made reference to the Meelin WWTP in that it is operating close to its design capacity. However, sampling indicates good quality effluent with no evidence of eutrophication downstream.

The Water Framework Directive assigns 'Moderate' status to the Dalua River; this is based on results for Macroinvertebrate diversity from 2006, before conditions were reporting as having improved by the EPA.

The Second Draft Freshwater Pearl Mussel Sub-Basin Plan lists the Meelin WWTP as potentially having an adverse effect on the pearl mussel, given that there are records of this species downstream of the plant. However, the known River Allow population exists upstream of the Dalua confluence, and Meelin is 23km upstream of the Blackwater confluence. The risk posed to pearl mussel populations by the small scale discharge of Meelin is negligible; High ecological conditions in the Dalua River exist between Meelin and the Allow confluence.

<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <ul style="list-style-type: none"> <li>Size and scale;</li> <li>Land-take;</li> <li>Distance from Natura 2000 site or key features of the site;</li> <li>Resource requirements;</li> <li>Emissions;</li> <li>Excavation requirements;</li> <li>Transportation requirements;</li> <li>Duration of construction, operation etc.;</li> <li>Others.</li> </ul>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>Larger WWTPs are located at Newmarket and Kanturk, downstream of Meelin. Good ecological conditions have been recorded downstream of these plants, and immediately upstream of the Blackwater confluence. The Newmarket plant was upgraded in 2007. EPA data for the Allow catchment indicates satisfactory conditions throughout. It is predicted that the Meelin discharge is not acting in combination with these WWTPs to negatively influence water quality in the catchment.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme.</p> <p>The IRD Duhallow LIFE project entitled 'Restoration of the Upper River Blackwater SAC for the Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>), Atlantic Salmon (<i>Salmo salar</i>), European Otter (<i>Lutra lutra</i>) and Kingfisher (<i>Alcedo atthis</i>)' aims to improve habitat quality in the Allow catchment. This is likely to have a beneficial effect via reducing land-based pressures on the river, and may help negate some of the enrichment pressures described above. A key deliverable is the promotion of cattle fencing along the river to prevent further siltation and pollution of the river. This will act cumulatively with the WWTPs in the region to reduce negative pressures in the Allow sub-catchment.</p>
<p>Describe any likely changes to the site</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the</p>

<p>arising as a result of:                  Reduction of habitat area;                  Disturbance of key species;                  Habitat or species fragmentation;                  Reduction in species density;                  Changes in key indicators of conservation value;                  Climate change.</p>	<p>operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Dalua at this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> <li>• White-clawed Crayfish - Records in main Blackwater channel only exist near Fermoy. The species has also been historically recorded in the Awbeg sub-catchment.</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic salmon and Otter.</p> <p>Elevated nutrient levels and dissolved oxygen demand can lead to recruitment failure in Freshwater Pearl Mussel populations. While adult specimens may be more tolerant to temporary deoxygenation, juveniles become stressed very easily and mortality can be high. Ongoing eutrophication leads to progressive ageing of populations and associated reduction in density. The compliant Meelin discharge in very small in scale in relation to the overall context and watershed of the Blackwater catchment. Given that such populations are over 20km downstream, it is highly unlikely that pearl mussel populations in the main Blackwater channel are negatively influenced by the Meelin WWTP.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of lamprey species which have also been recorded in the Allow Catchment. The Dalua has seen ecological improvement in recent years and no evidence of river substrate enrichment was observed during field surveys. Such impacts are considered unlikely.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of:                  Interference with the key relationships that define the structure of the site;                  Interference with key relationships that</p>	<p>The overall Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture, especially in the well known agricultural area known as the Golden Vale. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river further up its reaches, where substantial areas of the catchment are</p>

<p>define the function of the site.</p>	<p>under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the river Blackwater was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The levels of organic and inorganic nutrients contained within the Meelin discharge are notably small, and the effluent is compliant with the UWWT regulations. Water quality has been seen to improve in the Dalua since previous EPA sampling; this is likely to be indicative of a reduction in agricultural run-off to the river via the implementation of Nitrates Directive.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>In the context of other discharges to the Dalua River and Allow catchment, the Meelin plant generates a compliant effluent in low volumes. The river is currently considered to be in good ecological condition with a further improvement in water quality from good to high recorded downstream of Newmarket.</p> <p>Other negative pressures to the qualifying interests of the cSAC may be resulting from other land uses (primarily agriculture) in the area. The Duhallow LIFE project aims to target agricultural pressures in the Allow River and thus further reduce negative cumulative pressures on the wider catchment.</p> <p>The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Meelin discharge are envisaged and therefore no further assessment is required.</p>

## Appendix 21 – Nadd Screening

Project	
Location	Discharge associated with agglomeration of Nadd village, County Cork.
Distance from designated site	0km: WWTP discharges to the Glen River, inside the cSAC boundary.
Brief description	<p>Nadd is a small village in the Boggeragh Mountains to the west of Mallow town, south of the River Blackwater. It is situated along the R579 road linking Banteer to Cork.</p> <p>Nadd WWTP is designed for a Population Equivalent (PE) of 150, which was commissioned in 2007. Activated Sludge is the process employed at the Nadd waste water treatment plant. Influent initially gravitates into the inlet works, consisting of an automatic and manual bypass. Following the screening of the raw sewerage, influent enters the Primary Settlement Tank and effluent from here enter a circular GRP inlet sump, from where the effluent is pumped to the RBC Unit. Following the aeration process effluent gravities to the hopper bottomed settlement tank, the solids settle while the supernatant flows over the weir and discharges to the river. Sludge may be returned from the settling tank to the primary settlement tank as required and thereafter removed off site for disposal.</p> <p>The pollution load for the Nadd agglomeration arises from the following areas:</p> <ul style="list-style-type: none"> <li>• Domestic population</li> <li>• Infiltration</li> </ul> <p>The final effluent is discharged to the Glen River, which is adjacent to the wastewater treatment plant site.</p> <p>The plant currently services a PE of 50 and is significantly underloaded.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

Stage 1 - Screening	
Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Nadd agglomeration receives secondary treatment at the WWTP, before discharging to the Glen River, a tributary of the River Blackwater. The effluent then disperses in the water column.</p> <p>An observation of the tributary downstream of the discharge revealed that at this location, the river is very minor in scale (1-2m wide) with fast flows down a steady incline.</p> <p>EPA sampling of the Glen River indicates that it displays High ecological quality at all tested locations. The WFD classification for the sub-catchment is also 'High', based on Q-ratings for the Glen River.</p> <p>Sampling data for the discharge provided by Cork County Council with the Certificate Application indicates the following effluent levels in mg/l:</p>

	<ul style="list-style-type: none"> <li>• BOD = 24</li> <li>• SS = 18</li> <li>• COD = 91</li> <li>• P = 3.4</li> <li>• N = 7.86</li> </ul> <p>Sampling results of the receiving stream taken at the same time show no detectable increases in BOD, Ammonia or Orthophosphate in the receiving waters. Both upstream and downstream levels for Ammonia and MRP are afforded High Status under the WFD River classification system. All levels were below the measureable levels for all variables.</p> <p>The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving stream, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied.</p> <p>Under consultation, Inland Fisheries Ireland made no reference to the Nadd WWTP.</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <p>Size and scale;          Land-take;          Distance from Natura 2000 site or key features of the site;          Resource requirements;          Emissions;          Excavation requirements;          Transportation requirements;          Duration of construction, operation etc.;          Others.</p>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in</p>

	<p>REPS and more recently, to the Nitrates Action Programme.</p> <p>The surrounding landuse is primarily upland pasture and commercial forestry. Fertilizer run-off from agricultural land is likely to be low in this region. Nitrate release during forestry operations can lead to reduction in water quality in rivers like the Glen River; however, no such impacts were noted during field surveys.</p> <p>The plant lies in the same catchment as the Lyre WWTP. The Lyre plant has recently been upgraded to include tertiary treatment and discharges to a percolation area, thus acting as a diffuse pressure.</p>
<p>Describe any likely changes to the site arising as a result of:          Reduction of habitat area;          Disturbance of key species;          Habitat or species fragmentation;          Reduction in species density;          Changes in key indicators of conservation value;          Climate change.</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Blackwater of this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> <li>• White-clawed crayfish – Not found in upland peaty and acidic rivers such as the Glen River</li> </ul> <p>Elevated nutrient levels and dissolved oxygen demand can lead to recruitment failure in Freshwater Pearl Mussel populations. While adult specimens may be more tolerant to temporary deoxygenation, juveniles become stressed very easily and mortality can be high. Ongoing eutrophication leads to progressive ageing of populations and associated reduction in density. There are pearl mussel populations in the main Blackwater channel downstream of the Glen River confluence, the closest one located near Roskeen Bridge. The modern Nadd plant is relatively minor in scale, generates a high quality effluent with low inorganic nutrient levels and is 16km upstream of the existing Blackwater populations.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. Water quality in the Glen River was observed to be high with no evidence of eutrophication.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of lamprey species which have also been recorded in the overall Blackwater catchment. Some macrophytes were observed in the Glen River, but these were not considered to be a result of eutrophication.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of</p>



	<p>approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The greater Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river in its upland tributaries, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the Blackwater catchment was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The Nadd plant is a modern plant which is not overloaded and generates a very high quality effluent that is compliant with the UWWT regulations. High biological water quality is recorded in all sampling stations of the Glen River and it is not considered to be at risk of eutrophication.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>In the context of other discharges to the Blackwater in the overall vicinity, the contemporary Nadd plant generates a high quality effluent with low nutrient levels.</p> <p>Other negative pressures to the qualifying interests of the cSAC are more pronounced from other sources such as the Lombardstown and Mallow WWTPs a significant distance downstream. Given the small scale of the Nadd discharge, and the excellent quality of effluent it generates, it is not seen as significant negative pressure. The Lyre WWTP in the Glen catchment has also been recently upgraded to include tertiary treatment; it is not considered that these plants are negatively acting in combination.</p> <p>The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Nadd discharge are envisaged and therefore no further assessment is required.</p>

## Appendix 22 – Rathcool Screening

Project	
Location	Discharge associated with agglomeration of Rathcool village, County Cork.
Distance from designated site	0km: WWTP discharges to the Rathcool River, inside the cSAC boundary.
Brief description	<p>Rathcool Village is located, circa 7 Km south west of Banteer Village. The waste water from the agglomeration is currently treated by a package treatment plant prior to being discharged.</p> <p>Rathcool wastewater treatment plant (WWTP) was constructed in 2001. The main elements of the WWTP are;</p> <ol style="list-style-type: none"> <li>1. Secondary treatment: Activated Sludge (aeration tank and clarifier)</li> <li>2. Discharge to the Rathcool River</li> </ol> <p>The main source of emissions from the works is via a 150mm pipe outfall to the Rathcool River.</p> <p>The wastewater treatment plant treats only municipal waste water from Village and it environs via the sewerage collection system.</p> <p>The final effluent is treated to a 25/35 standard or better prior to being discharged.</p> <p>The treatment works consists of the following elements:</p> <ul style="list-style-type: none"> <li>– Primary settlement tank</li> <li>– Aeration Tank (surface aerator).</li> <li>– Hopper bottom clarifier with sludge return pumps.</li> </ul> <p>The plant currently services an agglomeration of 260PE, and is thus overloaded for the plant's design capacity of 100PE.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

### Stage 1 - Screening

Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Rathcool agglomeration receives secondary treatment at the WWTP, before discharging to the Rathcool River, which flows to the River Blackwater. The effluent then disperses in the water column.</p> <p>An observation of the river at the location of the discharge revealed that at this location, the river is moderate in scale (6-7mm wide) slow flows; the river here is effectively in the Blackwater valley floodplain. The river banks are dominated by mature treelines and the Banteer-Millstreet railway embankment and bridge.</p> <p>No EPA sampling of the Rathcool River has historically taken place downstream of the WWTP. However, upstream ecological values are</p>
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	<p>good to high, while the main Blackwater channel displays high conditions, both upstream and downstream of the Rathcool River confluence.</p> <p>Sampling data for the discharge provided by Cork County Council with the Certificate Application indicates the following effluent levels in mg/l:</p> <ul style="list-style-type: none"> <li>• BOD = 26</li> <li>• SS = 12</li> <li>• COD = 72</li> <li>• P = 1.1</li> <li>• N = 9.85</li> </ul> <p>The WWTP, while technically overloaded still produces a generally compliant effluent, with only the BOD levels being slightly above the UWWT threshold.</p> <p>Despite the overloaded status of the WWTP, sampling results of the receiving river taken at the same time show no detectable increases in BOD, Ammonia or Orthophosphate in the receiving waters. Both upstream and downstream levels for Ammonia and BOD are afforded High Status under the WFD River classification system. MRP levels in the river were seen to fall from the upstream to downstream sampling points. The Rathcool River is also afforded 'High' status for MRP downstream of the discharge.</p> <p>The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving river, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied. No evidence of eutrophication was observed.</p> <p>Under consultation, Inland Fisheries Ireland made reference to the overloaded status of the Rathcool WWTP, but did not refer to any specific instances of pollution affecting fish populations in the sub-catchment or main Blackwater channel.</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <p>Size and scale;          Land-take;          Distance from Natura 2000 site or key features of the site;          Resource requirements;          Emissions;          Excavation requirements;          Transportation requirements;          Duration of construction, operation etc.;</p> <p>Others.</p>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>The Rathcool WWTP was commissioned in the last 10 years, and while</p>

	<p>technically operating beyond its design capacity, still generates a good quality effluent; only neutral or positive changes to the nutrient content of the Rathcool River downstream of the discharge have been recorded by Cork Co Co sampling. The risk of the above impacts to the Rathcool River sub-catchment is considered to be absolutely minimal.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme.</p> <p>The surrounding landuse is primarily lowland pasture. Fertilizer run-off from agricultural land is likely to contribute to the vast majority of eutrophying material entering the river at this location. The upland headwaters of the sub-catchment lie in lands where there is extensive commercial coniferous forestry. Nitrate release during forestry operations can lead to reduction in water quality in rivers like the Rathcool River; however, no such impacts were noted during field surveys in the vicinity of Rathcool and</p> <p>The plant lies in the same catchment as the Kilcorney WWTP. The Kilcorney plant is underloaded overloaded and generates a high quality effluent with no detectable changes in the chemical status of the Ivale River. Negative cumulative influences upon the water quality of the sub-catchment are therefore considered unlikely. The Rathcool River enters the Blackwater midway between the Millstreet and Banteer WWTPs.</p>
<p>Describe any likely changes to the site arising as a result of:  Reduction of habitat area;  Disturbance of key species;  Habitat or species fragmentation;  Reduction in species density;  Changes in key indicators of conservation value;  Climate change.</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Blackwater of this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> <li>• White-clawed crayfish – Not found in upland peaty and acidic rivers such as the Rathcool River</li> </ul> <p>Elevated nutrient levels and dissolved oxygen demand can lead to recruitment failure in Freshwater Pearl Mussel populations. While adult specimens may be more tolerant to temporary deoxygenation, juveniles become stressed very easily and mortality can be high. Ongoing</p>

	<p>eutrophication leads to progressive ageing of populations and associated reduction in density. There are pearl mussel populations in the main Blackwater channel downstream of the Rathcool River confluence, the closest one located just upstream of Banteer town. The Rathcool plant is relatively minor in scale, generates a generally compliant effluent with low inorganic nutrient levels and is 8km upstream of the existing Blackwater populations.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. Water quality in the Rathcool River was observed to be high with no evidence of eutrophication.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of lamprey species which have also been recorded in the overall Blackwater catchment. Some macrophytes were observed in the Rathcool River, but these were not considered to be a result of eutrophication.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The greater Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river in its upland tributaries, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the Blackwater catchment was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>While the Rathcool plant is effectively overloaded, treatment levels appear to be relatively good, with effluent being found to be generally compliant. No evidence of chemical changes in the Rathcool River (i.e. nutrient enrichment) was detected in downstream samples.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>In the context of other discharges to the Blackwater in the overall vicinity, the Rathcool plant generates a compliant effluent with low nutrient levels that does not appear to be responsible for any artificial enrichment of the river. Sampling of the Blackwater indicates no change in its High ecological status from upstream to downstream of the Rathcool River confluence.</p>

	<p>No other major discharges occur in the Rathcool River sub-catchment and overall pressure on water quality in the watershed is considered to be low. Unpolluted water from the Rathcool River enters the main Blackwater channel and is not considered to be acting cumulatively with other pressures to negatively impact upon the water quality of the greater catchment.</p> <p>The screening exercise therefore concludes that no significant impacts to the Blackwater River cSAC resulting from the Rathcool discharge are envisaged and therefore no further assessment is required.</p>
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## Appendix 23 – Shanballymore Screening

Project	
Location	Discharge associated with agglomeration of Shanballymore village, County Cork.
Distance from designated site	0km: WWTP discharges to a minor tributary of the Awbeg River, at the cSAC boundary.
Brief description	<p>Shanballymore Village is located 7.5 Km east of Doneraile village. The waste water from the agglomeration is currently treated by a package treatment plant prior to being discharged. Shanballymore wastewater treatment plant (WWTP) was constructed in 2005. The design PE of the plant is 600.</p> <p>The main elements of the WWTP are;</p> <ol style="list-style-type: none"> <li>1. Screening</li> <li>2. Secondary treatment: Activated Sludge (Aeration Tank and Clarifier)</li> <li>3. Discharge to tributary of the Awbeg River</li> </ol> <p>The WWTP currently serves a PE of 200 and is therefore underloaded.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

Stage 1 - Screening	
Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	<p>The Shanballymore agglomeration receives secondary treatment at the WWTP, before discharging to a minor stream flowing to the Awbeg River. The effluent then disperses in the water column.</p> <p>An observation of the Awbeg downstream of the confluence with the discharge-receiving stream revealed that at this location, the river is quite wide in scale (6-10m wide) with moderate flows over occasional riffles along a shallow incline. Frequent patches of aquatic macrophytes were observed, including Water crowfoot and Fool's watercress; no algal mats were observed. Water quality appeared in good condition.</p> <p>The most recent EPA water quality sampling data from 2009 indicates that the Awbeg River displays good (Q=4) ecological conditions downstream of the discharge point, at Kilcumber Bridge, which is also downstream of the Castletownroche WWTP.</p> <p>The overall ecological status of the Lower Awbeg catchment is listed by the EPA as satisfactory with good ecological conditions prevailing, apart from at Buttevant which, although improved from recent years, was less than satisfactory due apparently to storm-overflow of sewage discharges.</p> <p>Sampling data for the discharge provided by Cork County Council with the Certificate Application from 2009 indicates the following effluent levels in mg/l:</p>



	<ul style="list-style-type: none"> <li>• BOD = 100</li> <li>• SS = 83</li> <li>• COD = 270</li> <li>• P = 2</li> <li>• N = 27.6</li> </ul> <p>These are clearly non-compliant values. This is also referenced in the 2009 Awbeg Water Management Unit Action Plan. However, more recent sampling from September 2010 indicates that the plant is generating a much better quality effluent:</p> <ul style="list-style-type: none"> <li>• BOD = 21</li> <li>• SS = 14</li> <li>• COD = 97</li> <li>• P = 4</li> <li>• N = 5.7</li> </ul> <p>It is key note that downstream sampling results in the Awbeg River taken at Ballywalter Bridge at the same time as the non-compliant results from 2009 show no detectable increases in Ammonia or Orthophosphate in the receiving waters. At this time, both upstream and downstream levels were afforded High Status under the WFD River classification system. A slight elevation in BOD detected (from 1 to 1.2mg/l), but this still scores as High under the above classification. It is reasonable to suggest that the more recent compliant sampling results indicate an even lower influence of the discharge on the Awbeg River.</p> <p>The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving stream, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied.</p> <p>Under consultation, Inland Fisheries Ireland made no reference to the Shanballymore WWTP as having a negative influence on fisheries in the catchment.</p> <p>The Water Framework Directive assigns 'Poor' status to this sub-catchment of the Awbeg; this is based on results for aquatic macroinvertebrate diversity found in this area. Poor Q-ratings were observed during EPA sampling downstream of Doneraile, where there has been a progressive decline in water quality. Further downstream at Castletownroche beyond, biological recovery appears to have occurred, as good ecological conditions and Q-ratings of 4 and above are recorded. It is predicted that overall water quality conditions downstream of Buttevant and Doneraile will have occurred since this status was applied, as these agglomerations have had more recent upgrades to their WWTPs, to include tertiary treatment.</p> <p>Freshwater Pearl Mussel are not known from this sub-catchment. However, White-clawed crayfish have been historically observed in the Awbeg River (though EPA surveys during 2009 did not record any such specimens).</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of: Size and scale;</p>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended</p>

<p>Land-take;                  Distance from Natura 2000 site or key features of the site;                  Resource requirements;                  Emissions;                  Excavation requirements;                  Transportation requirements;                  Duration of construction, operation etc.;                  Others.</p>	<p>solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p> <p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>The surrounding land use is primarily agricultural pasture, though the immediate vicinity is dominated by the demesne landscape of Clogher Estate; the banks of the Awbeg at this location are dominated by mature broadleaf woodland which is likely to buffer against any fertilizer run-off from surrounding pasture.</p> <p>Other WWTP discharges located in the immediate part of the catchment are the Doneraile and Buttevant WWTPs upstream and the Castletownroche WWTP 6km downstream. No other major industrial discharges occur in this stretch of the Awbeg. Both the Doneraile and Buttevant WWTPs were upgraded in 2009 to include tertiary treatment; while there is no up to date EPA sampling data following the commissioning of these plants, it is extremely likely that water quality in the middle stretch of the Awbeg will have improved significantly in the past year, owing to these upgrades.</p> <p>There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme. It is this programme which is likely to have most significantly accounted for the improvement in water quality observed in the Awbeg (East) in recent years.</p>
<p>Describe any likely changes to the site arising as a result of:                  Reduction of habitat area;                  Disturbance of key species;                  Habitat or species fragmentation;                  Reduction in species density;                  Changes in key indicators of</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Blackwater of this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p>

<p>conservation value; Climate change.</p>	<p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> <li>• Freshwater Pearl Mussel - Records are restricted to the main Blackwater channel and the Allow catchment.</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, White-clawed Crayfish, Atlantic salmon and Otter.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. Loss of salmonids will in turn affect the feeding ecology of otter populations within the sub-catchment and may reduce the carrying capacity of the constituent rivers.</p> <p>Crayfish sensitivity to changes in water quality can result in significant losses following pollution incidents. Eutrophication can lead to luxuriant plant growth, which in turn traps silt and can result in deoxygenation at night, leading to loss of crayfish habitat. No crayfish were encountered in the Awbeg during EPA 2009 surveys, but it is not clear whether this is indicative of a loss of the population, as no species-specific surveying has been carried out.</p> <p>Salmonid spawning grounds may be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of Lamprey and juvenile fish, and also reduce the recruitment success of White-clawed crayfish.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.</p>	<p>The greater Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river in its upland tributaries, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the Blackwater catchment was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g.</p>

	<p>spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The Shanballymore plant is currently underloaded, and sampling from 2010 indicates that the plant is generally compliant with the UWWT regulations. The Awbeg is a large waterbody at this location and is good ecological conditions from upstream of Shanballymore to the Blackwater confluence. No evidence of gross eutrophication downstream of the plant was observed in the Awbeg during field surveys.</p> <p>An overall improvement in ecological conditions has been observed in the upper Awbeg in recent years, with only poor results from 2006 and 2009 being noted by the EPA in Buttevant and Doneraile. Both these plants have been recently upgraded to tertiary treatment and are no longer expected to be contributing to poor water quality. This is likely to have a beneficial effect on the qualifying interests found within this part the catchment (Atlantic salmon, Lamprey and White-clawed crayfish).</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>It is technically the case that the Shanballymore plant is presently slightly overloaded, though in relation to the overall size of the catchment, the agglomeration is very small with minimal flows and is therefore unlikely to be contributing to significant nutrient input to the overall Awbeg River system. Ecological conditions have been seen to be improving in the river in recent years, which is likely to be indicative of a reduction in cumulative pressures.</p> <p>In the context of other discharges to the Awbeg in the overall vicinity, the Shanballymore plant generates a low volume effluent which 2010 sampling results indicate is generally compliant with UWWT regulations. The river is currently considered to be in satisfactory ecological condition with good ecological conditions recorded upstream and downstream of the discharge.</p> <p>Other larger discharges such as the Buttevant and Doneraile WWTPs have been recently upgraded and will be contributing to an improvement in water quality in the catchment. Given the small scale of the Shanballymore discharge and the overall improved assimilative capacity of the Awbeg for nutrients, it is not considered that the Shanballymore WWTP is acting in combination with other pressures to any significant degree.</p> <p>The screening exercise concludes that no significant impacts to the Blackwater River cSAC resulting from the Shanballymore discharge are envisaged and therefore no further assessment is required.</p>

## Appendix 24 – Glenville Screening & Assessment

Project	
Location	Discharge associated with agglomeration of Glenville village, County Cork.
Distance from designated site	0km: WWTP discharges to the Owenbawn River, at the cSAC boundary.
Brief description	<p>Glenville is located approximately 15km north of Cork City in the Owenbawn River Valley.</p> <p>The WWW serving the agglomeration comprises of a combined collection system draining storm runoff and waste water by gravity to a treatment system which discharges clarified effluent to the Owenbawn River.</p> <p>The collection system includes one pumping station which serves Bridge View Terrance and Glendule Housing Estate. There is a single secondary discharge from the WWW in the form of an emergency overflow from this pumping station. This discharges to the Owenbawn River. There are no storm overflows from the collection system. All waste water collected drains to the WWTP.</p> <p>The WWTP provides primary and secondary treatment. The primary treatment is achieved by settlement. The secondary treatment is achieved by intermittent aeration of the settled waste water by means of a rotating biological contactor. There is no pumping within the WWTP. There is no emergency overflow upstream of the WWTP. There are therefore no secondary discharges or storm overflows from the WWTP. All treated effluent from the WWTP drains by gravity to the Owenbawn River where it discharges directly at the primary discharge point.</p> <p>The 2006 Census found that the population of Glenville was approximately 480. The calculated PE to be contributed to the WWW as a result of the planning applications granted since 2005 is 60. An additional assessment by Cork County Council indicates that the current PE loading on the plant is under 500, and as such it is to be processed for a Discharge Certificate as opposed to a Licence.</p> <p>The design PE for the plant is 300m, and thus it is significantly overloaded.</p>
Is the plan directly connected with or necessary to the Natura 2000 site management for nature conservation?	No

### Stage 1 - Screening

Describe the individual elements of the plan (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	The Glenville agglomeration receives secondary treatment at the WWTP, before discharging to the Owenbawn River, which is a tributary of the Glashanabrack River and River Bride. The effluent then disperses in the water column.
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	<p>An observation of the Owenbaun River downstream of the discharge revealed that at this location, the river is minor in scale (1-1.5m wide) with fast flows over large cobbles along a moderate incline. Some enrichment of the substrate was observed immediately downstream of the discharge point.</p> <p>The most recent EPA water quality sampling data from 2009 indicates that the Glashanabrack River displays good (Q=4) ecological conditions at both points sampled.</p> <p>The overall ecological status of the Glashanabrack River is listed by the EPA as satisfactory with good ecological conditions at all stations sampled in 2009. The Owenbawn River is not routinely sampled by the EPA.</p> <p>Sampling data for the discharge was provided by Cork County Council with the Certificate Application in 2009; results were</p> <ul style="list-style-type: none"> <li>• BOD = 8</li> <li>• SS = 9</li> <li>• COD = 21</li> <li>• P = 1.38</li> <li>• N = 14.38</li> </ul> <p>These results are shown to be compliant with the UWWT regulations. At the time of this sampling, no changes to the chemical status of the receiving water were detected.</p> <p>The outfall effluent contains material and solutes which may have a eutrophying effect within the receiving stream, but it should be noted that these are likely to exist in lower concentrations than if no treatment were to be applied.</p> <p>Under consultation, Inland Fisheries Ireland made specific reference to the Glenville WWTP as being exemplar of plants where chronic overloading leads to poor riverbed conditions in the immediate vicinity of the discharge. This impact was observed to be spatially very restricted, as no such poor conditions were observed a short distance downstream.</p> <p>The Water Framework Directive assigns 'Good' status to the Owenbawn/Glashanabrack sub-catchment; this is based on good historical results for aquatic macroinvertebrate diversity. The Glenville WWTP is listed as a pressure/risk in the River Bride WMU, owing to "Insufficient existing capacity of treatment plant".</p>
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</p> <p>Size and scale;</p> <p>Land-take;</p> <p>Distance from Natura 2000 site or key features of the site;</p> <p>Resource requirements;</p> <p>Emissions;</p> <p>Excavation requirements;</p> <p>Transportation requirements;</p> <p>Duration of construction, operation etc.;</p>	<p>All impacts relate to the influence of the contents of the respective effluents entering the receiving waters. No construction, land-take etc. will take place in the vicinity of the WWTPs.</p> <p>Effluent discharging to freshwater catchments can lead to eutrophication (nutrient enrichment) of the receiving waters, increases in suspended solids, build up of toxic materials, reduction of ecological diversity and the subsequent alteration of trophic food webs.</p> <p>Unmitigated contamination events during the operational phase of the plant pose the risk of releasing toxic pollutants to the respective receiving waters. Such events could potentially have significant negative impacts on all of the aquatic species for which the Blackwater River cSAC has been designated. Extensive fish kills resulting from such an event may destabilize the food web of an entire sub-catchment.</p>

<p>Others.</p>	<p>Depending on the natural trophic status of the receiving water, eutrophication can result in accelerated algal growth. This has knock-on effects on aquatic ecology; dissolved oxygen levels can be affected by increased biological oxygen demand.</p> <p>Reduced assimilative capacity of rivers will occur during periods of low flow. This will be further exacerbated in rivers where abstractions are located.</p> <p>In relation to the above points, the effluent recorded from the Glenville WWTP does not initially appear to be having an extended impact. Some pollution is evident in the immediate vicinity of the discharge; this is attributable to the overloading of the plant which is likely to lead to occasional to poor effluent quality being released to the river.</p> <p>No other discharges occur in the Owenbawn and Glashanabrack sub-catchment.</p> <p>The surrounding land use is primarily agricultural pasture. There has been very significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agricultural pressures on the Blackwater catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on-farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in REPS and more recently, to the Nitrates Action Programme. Reduction in slurry usage in the Bride catchment appears to have contributed to an improvement in water quality in recent years.</p> <p>The River Bride was closed to salmon and sea trout fishing in 2010, but is to be re-opened on a catch-release basis in 2011. Inland Fisheries Ireland therefore consider the Bride population to be improved from previous years, but not yet in harvestable surplus. The Owenbawn/Glashanabrack Rivers may provide spawning habitat for migrating salmon populations.</p>
<p>Describe any likely changes to the site arising as a result of:  Reduction of habitat area;  Disturbance of key species;  Habitat or species fragmentation;  Reduction in species density;  Changes in key indicators of conservation value;  Climate change.</p>	<p>There will be no loss of or reduction in Annex I habitats as a result of the operation of the existing WWTP.</p> <p>The potential nutrient enrichment of the Blackwater of this location may result in a range of changes to the SAC, both on a localised and system-wide basis.</p> <p>The following key species of the SAC are not expected to be impacted by the discharge:</p> <ul style="list-style-type: none"> <li>• Killarney Fern - Non water-dependent species</li> <li>• Twaite Shad - Distribution restricted to lower reaches of River Blackwater</li> <li>• Sea lamprey - Anadromous phase of species restricted to lower stretches of catchment</li> </ul>



	<ul style="list-style-type: none"> <li>• Freshwater Pearl Mussel - Records are restricted to the main Blackwater channel and the Allow catchment.</li> <li>• White-clawed Crayfish – Historically not recorded from the Bride catchment.</li> </ul> <p>The remainder of the species which may be affected are thus: River Lamprey, Brook Lamprey, Atlantic salmon and Otter.</p> <p>Accelerated algae and plant growth within river water columns leads to shifts in diurnal oxygen concentrations. This in turn leads to loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. Loss of salmonids will in turn affect the feeding ecology of other populations within the sub-catchment and may reduce the carrying capacity of the constituent rivers. Elevated BOD loading in the immediate vicinity of the Glenville plant could potentially negatively impact these species immediately downstream of the discharge. The Owenbawn is likely to have relatively fast recovery from deoxygenated conditions; this is indicated by good ecological conditions observed at the EPA sampling point further downstream. Potential salmonid recruitment could be adversely affected by temporal poor water quality caused by peak loading at the WWTP; this may lead to distress in larval and juvenile fish stages.</p> <p>Salmonid spawning grounds may also be significantly impacted by the increased growth of plants on the river substrate. Such growth will also impede the movement of Lamprey and juvenile fish.</p> <p>It is estimated that climate change will result in more extended but less frequent wet and dry periods and warmer water temperatures, as rainfall patterns in Ireland are changing. This could result in precipitation increases of over 10% in the winter months, and decreases of approximately 25% in the summer, and annual temperature increases. However, there is insufficient information to predict the effects on the site as these will be more closely related to localised rainfall events.</p>
<p>Describe any likely impacts on the Natura site as a whole in terms of:          Interference with the key relationships that define the structure of the site;          Interference with key relationships that define the function of the site.</p>	<p>The greater Blackwater catchment is under threat from a variety of sources, including run-off from intensive agriculture. Nutrient run-off, sedimentation and acidification from forestry also put pressure on the river in its upland tributaries, where substantial areas of the catchment are under coniferous cover. Up until recently, the level of treatment of sewage being discharged to the Blackwater catchment was low, leading to significant pollution. Infrastructural investment via Cork County Council on a number of WWTPs along the channel in the last decade and the implementation of the Nitrates Directive has addressed this nutrient input to a major degree.</p> <p>The key ecological relationships that define the structure and function of the Blackwater River cSAC are likely to be impacted by ongoing nutrient enrichment of its constituent rivers. This may have direct effects by reducing dissolved oxygen and leading to loss of species. Indirect effects include loss of river substrate with specific ecological function (e.g. spawning gravel) due to blanketing with opportunistic aquatic plants.</p> <p>The Glenville plant is currently overloaded; while sampling in 2009 indicated a compliant effluent, evidence of localised pollution is evident in the river. While ecological conditions in the Glashanabrack River have been found to be good, there is the possibility of deleterious effects to salmonid populations migrating up the Owenbawn River to spawn. The Bride salmon population is not in a harvestable surplus, and the protection of spawning rivers is a key aspect of conserving the species</p>

	<p>within the Blackwater River cSAC.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</p>	<p>The Glenville plant is significantly overloaded and in need of capital investment, despite 2009 sampling data indicating that is capable of generating compliant effluent concentrations. Localised pollution has been recorded, presumably due to organic and inorganic enrichment of the Owenbawn during peak loading of the plant. This effect is limited in extent and the overall Owenbawn/Glashanabrack sub-catchment is considered to be in good ecological condition.</p> <p>Given the fact that the WWTP discharges occasional poor quality effluent to a river which may form viable spawning habitat for salmon, the screening exercise concludes that further assessment should be carried out in Stage 2 below.</p> <p>This assessment considers the potential impacts of the discharge with specific reference to the species and/or habitats which may be impacted.</p>

<p><b>Stage 2 - Project Assessment</b></p>	
<p>Describe the elements of the plan that are likely to give rise to significant effects on the site</p>	<p>Waste water treatment plants can contribute significant nutrient and organic loads to rivers. There is potential that the discharge from the Glenville WWTP is leading to a loss of viable salmon spawning habitat, though this is restricted in spatial extent.</p>
<p>Set out the conservation objectives of the site</p>	<p>European and national legislation places a collective obligation on Ireland and its citizens to maintain at favourable conservation status areas designated as candidate Special Areas of Conservation. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.</p> <p>According to the EU Habitats Directive, favourable conservation status of a habitat is achieved when its natural range, and area it covers within that range, is stable or increasing, and the ecological factors that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and the conservation status of its typical species is favourable as defined below. The favourable conservation status of a species is achieved when population data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.</p> <p>The generic conservation objectives of the Blackwater River cSAC are:</p> <ol style="list-style-type: none"> <li>1. To maintain the Annex I habitats for which the cSAC has been selected at favourable conservation status: Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) (91E0); <i>Taxus baccata</i> woods of the British Isles (91J0); Watercourses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation (3260); Estuaries (1130); Mudflats and sandflats not covered by seawater at low tide (1140); Salicornia and other annuals colonizing mud and sand (1310); Atlantic salt meadows (<i>Glauco-Puccinellietalia</i></li> </ol>

	<p><i>maritimae</i>) (1330); Mediterranean salt meadows (<i>Juncetali maritimi</i>) (1410); Perennial vegetation of stony banks (1220); Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles (91A0).</p> <p>2. To maintain the Annex II species for which the cSAC has been selected at favourable conservation status: Sea Lamprey (<i>Petromyzon marinus</i>); River Lamprey (<i>Lampetra fluviatilis</i>); Brook Lamprey (<i>Lampetra planeri</i>); Twaite Shad (<i>Alosa fallax fallax</i>); Salmon (<i>Salmo salar</i>); Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>); White-clawed Crayfish (<i>Austropotamobius pallipes</i>); Otter (<i>Lutra lutra</i>); Killarney Fern (<i>Trichomanes speciosum</i>)</p> <p>3. To maintain the extent, species richness and biodiversity of the entire site.</p> <p>4. To establish effective liaison and co-operation with landowners, legal users and relevant authorities.</p> <p>It should be noted that only a sub-sample of these qualifying interests are water-dependent, as identified in the screening process.</p>
<p>Describe how the project will affect key species and key habitats</p>	<p>Of the above qualifying interests, only spawning salmon are considered to be at risk of negative impacts; i.e. loss of spawning habitat and distress caused to eggs and juvenile fish by occasional polluted conditions.</p> <p>The Glenville WWTP, being significantly overloaded is likely to on occasion generate a poor quality effluent, releasing sediment and organic material to the river. This may affect any of the qualifying interests through direct deoxygenation of the river or accumulation of sediment. This can lead to a worsening of substrate conditions via algal mats and sedimentation from decomposing material. This can directly affect riverbed spawning material; elevated levels of suspended solids from effluent discharges pose a risk to salmon and lamprey recruitment where settlement on spawning gravels and/or redds may occur.</p> <p>It can also lead to a loss of biological indicator macroinvertebrate species. These species form the bases of salmonid feeding patterns, and their loss may lead to alterations in river ecology as other less sensitive invertebrate species begin to dominate. This also likely to be limited in geographic extent, as downstream EPA sampling shows good ecological conditions prevail.</p>
<p>Describe how the integrity of the site (determined by structure and function and conservation objectives) is likely to be affected by the project or plan (e.g. loss of habitat, disturbance, disruption, chemical changes, hydrological changes etc).</p>	<p>The key ecological relationships that define the structure and function of the Upper Blackwater as part of the cSAC as a whole are likely to be impacted by potential nutrient enrichment. However, given the minor scale of the discharge, systemic disturbance is not envisaged.</p> <p>The River Bride had been closed as a salmon fishery in 2010, but will re-open in 2011 on a catch-release basis. This is indicative of a population that is recovering, but is need of conservation of recruitment sites. Pollution in the headwaters of the catchment can be seen as a major issue in the promotion of this conservation effort. If recruitment is low in a number of successive years, populations of salmon in the river will be slow to recover.</p> <p>Potential loss of spawning salmon running the Owenbawn River would be considered an infraction of Conservation Objective No. 2 above.</p>
<p>Describe mitigation</p>	<p>The Glenville WWTP is a relatively old installation, which can be known</p>

<p>measures that are to be introduced to avoid, reduce or remedy the adverse effects on the integrity of the site</p>	<p>to generate a poor quality effluent. Data provided with the Certificate application shows compliant values, but physical evidence in the river contradicts this data.</p> <p>There are proposals at present to prevent or reduce emissions from the WWTP serving the Glenville Agglomeration. A programme of works had been in place for the provision of a new WWTP to serve Glenville. The new WWTP was to be advanced as a SLI but funding was not approved by the DoEHLG. The new WWTP was then to be advanced through the WSIP but funding was not approved by the DoEHLG. Therefore, no funding is currently available for the replacement of the WWTP serving Glenville.</p> <p>To prevent further overloading of the plant, no further planning applications will be granted whereby the waste water arising from those applications would discharge to the existing WWTP. Planning permission will only be granted following the upgrading or replacement of the existing WWTP.</p>
<p>Conclusion</p>	<p>In conclusion, the potential negative pressure upon potential salmon recruitment in the Owenbawn River is considered to be significant in the context of the overall Bride sub-catchment. Salmon stocks need to recover in this watershed; this will be achieved through the prevention of pollution in valuable spawning headwaters. At present, the Glenville WWTP poses a risk to this conservation effort.</p> <p>The assessment therefore concludes that due to potential impacts to Atlantic salmon in the Owenbawn River, the possibility of significant impacts to a key conservation objective of the Blackwater River (Cork/Waterford) CSAC cannot be discounted at this stage.</p>

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## Appendix 25 – Blackwater River cSAC 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, Twaité 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 menziesii*). 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 Waterdropwort, 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 Ballinatrav, 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 woodland is 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 filix-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 hederæ*), 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 furoid 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 Seaspurrey (*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 Couchgrass (*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*), Twaites 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 rosellii* (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), Blackheaded 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 nonnative 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.

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