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Administration,
Environmental Licensing Programme,
Office of Climate, Licensing & Resource Use,
Environmental Protection Agency,
Regional Inspectorate,
Inniscarra,
County Cork.

30th September 2010 D0431-01

Re: Notice in accordance with Regulation 18(3)(b) of the Waste Water Discharge (Authorisation) Regulations 2007

Dear Mr Huskisson,

With reference to the notice received for the Ballingeary Waste Water Discharge Licence Application on the 2nd of June last and Cork County Council's response of the 24th June seeking a revised submission date of the 30th of September 2010 please find our response attached.



Yours Faithfully

Patricia Power
Director of Services,
Area Operations South,
Floor 5,
County Hall,
Cork.

**Wastewater Discharge Licence Application: D0301-01 Killeagh**

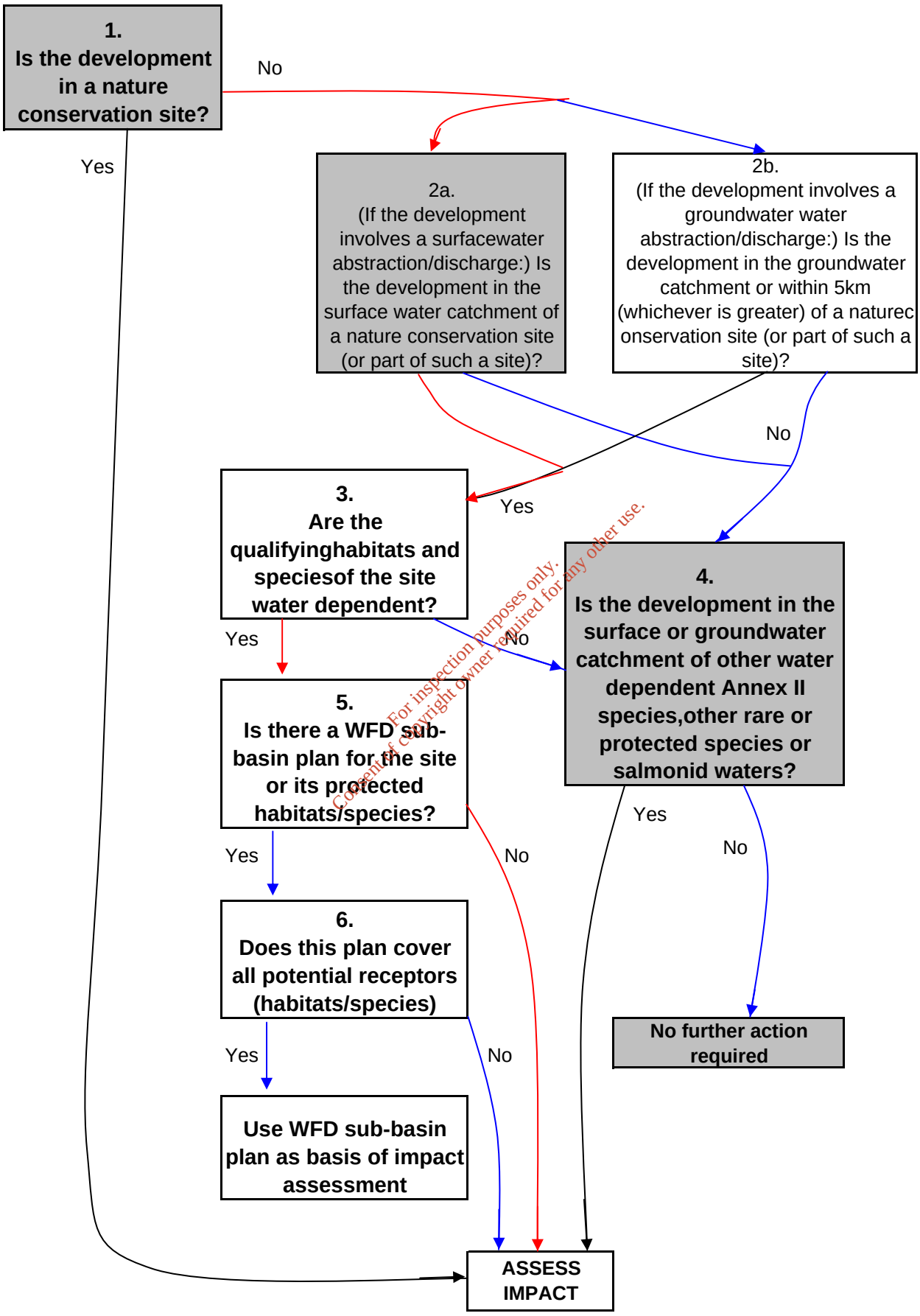
## Circular L8/08 2 September 2008
## Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments

**APPENDIX 1**
**Water Services Schemes - Natural Heritage Checklist for Local Authorities**

**What projects must be screened?**

| For new projects and significant changes to any existing operations, if the answer is 'yes' to any of the following, the project (i.e. construction, operation and maintenance) must be screened for its impacts: | |
|---|---|
| | |
| 1. Is the development in or on the boundary of a nature conservation site NHA/SAC/SPA? | No |
| 2. Will nationally protected species be directly impacted? Wildlife Acts (1976 and 2000), Flora Protection order (S.I. 94 of 1999)? | No |
| 3. Is the development a surface water discharge or abstraction in the surface water catchment, or immediately downstream of a nature conservation site with water dependant qualifying habitats/ species? | yes |
| 4. Is the development a groundwater discharge or abstraction in the ground water catchment or within 5 km of a nature conservation site with water-dependant qualifying habitats/species2? | No |
| 5. Is the development in the surface water or groundwater catchment of salmonid waters? | yes |
| 6. Is the treatment plant in an active or former floodplain or flood zone of a river, lake, etc? | yes |
| 7. Is the development a surface discharge or abstraction to or from marine waters and within 3km of a marine nature conservation site? | No |
| 8. Will the project in combination with other projects (existing and proposed) or changes to such projects affect the hydrology or water levels of sites of nature conservation interest or the habitats of protected species? | No |

**Flow Diagram with Question relating to the Agglomeration of Ballingeary Shaded Red**






Conclusion: An appropriate assessment is required for Ballingeary

# Ballingeary Regulation 18 Further Information Response

**Question 1** **Assess the likelihood of significant effect of the waste water discharges from the above agglomerations on the relevant European sites by referring to Circular L8/08 "Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments" issued by the Department of Heritage and Local Government. In particular, the flow diagram in Appendix 1 should be completed and the results of each section recorded. Provide details of the results of this assessment within one month of the date of this notice and provide a reasoned response for the decision. If significant effects are likely then and appropriate assessment must be carried out and a report of this assessment forwarded to the Agency by the date specified below.**
**You are advised to provide the requested information in accordance with the "Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. 684 of 2007)".**

**Habitats Directive Assessment (Screening Report) in respect of Application by Cork County Council to the EPA for Wastewater Discharge License for Ballingeary Agglomeration.**

**September 2010**

## 1 Introduction

**1.1** Ballingeary is situated approximately twenty-three kilometres south west of Macroom, and approximately eight kilometres west of Inchigeelagh. The village functions as a local service centre and has a seasonal tourism trade, which is based largely on its location on the Macroom – Bantry road and is within close proximity to the National Forest Park at Gougane Barra.



**1.2.1** There is no Wastewater treatment plant in Ballingeary. The wastewater needs of the village are currently served by a septic tank system located to the south of the village. The septic tank was built in the 1930's to serve 10 houses. It currently serves 61 houses, 13 business premises, 2 schools, 1 Summer College, 1 community hall, public toilets and a GAA club. Effluent flows by gravity to the septic tank for treatment before discharge to the Bunsheelin River. The discharge location is approximately 100m upstream of where the Bunsheelin river meets the River Lee.
The original licence application submitted in June 2009 included the Councils proposals for replacing this system in Ballingeary with a new 1300pe WWTP. A copy of the 2007-2009 Assessment of needs programme was included with the application indicating the plan to proceed at Ballingeary. However the 2010 – 2012 Assessment of Needs programme does not include advancing with proposed works in Ballingeary. Cork County Council are in discussions with the Department of Environment to make a special case for revising the programme to include for works to progress at Ballingeary in 2011.
**However at this point in time this assessment is being carried out under the assumption that the proposed WWTP at Ballingeary will not be constructed over the lifetime of this licence.**
**Should this situation change the Agency will be notified immediately.**

***Stage One: Screening***
*The process which identifies the likely impacts upon a Natura 2000 site of a project or plan, wither alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant.*

***Stage Two: Appropriate assessment***
*The consideration of the impact on the integrity of the Natura 2000 site of the project or plan, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts.*

***Stage Three: Assessment of alternative solutions***
*The process which examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site.*

***Stage Four: Assessment where no alternative solutions exist and where adverse impacts remain.***
*An assessment of compensatory measures, where in the light of an assessment of imperative reasons of overriding public interest, it is deemed that the project or plan should proceed.*

**1.3** This document brings together all of the information necessary to make determination as to whether there are likely to be significant impacts arising from the discharge from Ballingeary septic tankt on the designated site 12km downstream at the Gearagh or the proposed NHA site at Lough Allua which is adjacent to the discharge point and represents the first stage of this process (Screening).



***Step 1:***
*Provide a description of the plan and other plans and projects that, in combination, have the potential to have significant effects on Natura 2000 sites within the potential impact zone;*

***Step 2:***
*Identify Natura 2000 sites which may be impacted by the plan, and compile information on their qualifying interests and conservation objectives;*

***Step 3:***
*Determine whether the plan needs to be screened for potential impacts on Natura 2000 sites;*

***Step 4:***
*Carry out an assessment of likely effects – direct, indirect and cumulative – undertaken on the basis of available information as a desk study or field survey or primary research as necessary;*

***Step 5:***
*Assess the significance of any such effects on the Natura 2000 sites within the impact zone.*

**1.4** The assessment has been prepared in accordance with the following guidance:

European Commission (2000) Managing Natura 2000 sites: the provisions of Article 6 of the Habitats Dreictive 92/43/EEC.

European Commission (2001) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habtiats Directive 92/43/EEC.

Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities. Environment, Heritage and Local Government, 2009.

## 2 Appropriate Assessment Screening Matrix

| 2.1 Description of project | |
|---|---|
| Location | Ballingeary Septic Tank. See Location map – part A original application. |
| Description of the key components of the project | Ballingeary septic tank was constructed in the 1930's to serve approx. 10 dwellings. It is now catering to a population of approx. 650. It is located on the southern end of the village on the banks of the Bunsheelin river which is a tributary to the River Lee. The discharge point from the septic tank is located approx 100m upstream of the confluence of the two rivers. |
| Distance from designated sites in potential impact zone* | 100m from Salmonoid river (River Lee), 0.5 km upstream of pNHA site at Lough Allua. 12 km upstream of SAC/SPA/NHA at the Gearagh |

| 2.2 Description of the Natura 2000 sites within the potential impact zone[1] | |
|---|---|
| Name | The Gearagh |
| Site Code | 004109 (SPA) 000108 (SAC) |
| Site Description | The Gearagh comprises a stretch of the river Lee located approx. 2km south of Macroom. The river valley formerly held an extensive area of alluvial forest but only part of this now survives. This stretch of the Lee was dammed in the 1950's as part of a hydroelectric scheme. The principal habitat is a shallow lake or reservoir which is fringed by wet woodland, scrub and grassland that is prone to flooding. At times of low water a diverse pioneering plant community develops on the mud |
| Qualifying Interests of the Gearagh | The site was once part of an alluvial forest and still has an almost closed canopy of pendunculate Oak,Ash and Birch. The understorey of Hazel,Holly and Hawthorn. Willows and Alder are largely confined to channel margins and waterlogged areas. Ground Flora includes Ramsons (Allium ursinium), Wood Anenome (Anenome nemorosa), Bugle (Ajuga reptans), Pignut (Conpodium majus), Irish Spurge (Euphorbia hyberna) and Meadowsweet (Filipendula ulmaria). Scarce plant species recorded from within the woodland include Wood Club-rush (Scirpus sylvaticus), Bird Cherry (Prunus padus), Buckthorn (Rhamnus catharticus) and Rough Horsetail (Equisetum hyemale)<br>These species are scarce in Ireland. The epiphytic bryophyte flora is well developed, as are some lichen communities. Variations in this vegetation occur locally, where drainage is impeded and where tree clearance has occurred. The whole area has a remarkably wild character, with many fallen trees blocking the channels, so that access both by foot and boat is difficult.<br><br>The Gearagh supports part of an important wintering bird population: the area most utilised by birds extends also east of the site, towards Cork city (Carrigadroighid). At the Gearagh, Whooper Swans are regular (40-110, 1990's), as are Wigeon (640, average max.1992-1994), Teal (707, average max. 1992-94), Mallard (250 in January 1993) and Tufted Duck (154, average max. 1992-94). Golden Plover utilise the site on occasions (e.g. 2,000 in January 1994), while there is a regular flock of Dunlin (100-200, 1990s) a species unusual at inland sites. A late summering flock of Mute Swan is regular , with numbers between 120 and 250 from 1992 to 1994. Great Crested Grebe and Tufted Duck breed in small numbers, while there is a feral flock of about 50 Greylag Geese. |
| | |

[1] Natura 2000 sites within the potential impact zone of the proposed development have been identified in accordance with guidance provided in the NPWS circular L8/08.

| | |
|---|---|
| Other Notable Features of the Gearagh | Despite the fact that about half the original area has been destroyed the Gearagh still represents the only extensive alluvial woodland in Ireland or Britain, or indeed Western Europe west of the Rhine. For this reason it is a unique site and has been designated as a Statutory Nature Reserve. The international importance of the site is recognised by its designation both as a Ramsar site and as a Biogenetic Reserve. The reservoir is also a Wildfowl Sanctuary. |
| Conservation Objectives | To avoid deterioration of the habitats of the qualifying species and species of special conservation interest, or significant disturbance to these species, thus ensuring that the integrity of the site is maintained.<br><br>To ensure for the qualifying species and species of special conservation interest that the following are maintained in the long-term.<br><br>o the population of the species as a viable component of the site;<br>o the distribution and extent of habitats supporting the species;<br>o the structure, function and supporting processes of habitats supporting the species;<br><br>*Source – National Parks and Wildlife Service* |

| 2.3 Assessment Criteria | |
|---|---|
| Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 site. | **Discharge from Ballingeary septic Tank**<br><br>*Wastewater from the septic tank is discharged into the Bunsheelin river.The discharge consists of primary treated effluent from the septic tank and can also contain overflow volumes in times of heavy rain if the tank is full. The system is overloaded and the waste is not receiving proper treatment. This can be seen by the evidence of cloudy discoloured water in the vicinity of the discharge point.*<br><br>**Other Discharges in the vicinity:**<br>*Wastewater collected in the village of Inchigeela discharges via a septic tank directly into the river Lee downstream of Ballingeary. approx. 8km upstream of the Gearagh site. Inchigeela discharge location is also into salmonoid waters and is approx. 1.5km downstream of Lough Allua pNHA.*<br><br>*Coolcower septic tank (approx.pe 100) discharges directly into the River Lee downstream of the Gearagh site.*<br><br>Macroom WWTP discharges into the Sullane River which is a tributary of the Lee. The lee and the Sullane combine approx 2km downstream of the Gearagh. |
| 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 taking into account the following:<br><br>o Size and scale<br>o Land-take<br>o Distance from the Natura 2000 site or key features of the site:<br>o Resource requirements (water abstraction etc.)<br>o Emissions (disposal to land, water or air)<br>o Excavation Requirements<br>o Transportation Requirements<br>o Duration of construction, operation, decommissioning<br>o Other. | Discharges could give rise to elevated nutrients entering Lough Allua and also the Salmonoid river – River Lee.<br>Because the Natura Site is 12km downstream it is unlikely that the increased nutrients could have a direct impact on the site. Increased nutrient levels may impact on the ecology of an area by changing the composition of floral communities and reducing the ability of less robust plants to survive. Increased nutrient levels may also have a negative impact on the available oxygen levels in the surrounding waters which would have a direct impact on the aquatic life.<br><br>Ballingeary discharge is from a septic tank and therefore is not covered under the Urban Wastewater Treatment Regulations. The population served is also less than 2000. However it can be seen from the samples taken and submitted in Table E of original application that the effluent is not getting proper treatment. This is also evident from the discoloured cloudy water in the vicinity of the discharge point. However the evidence of pollution seems to be localised to the Bunsheelin river immediately downstream of the discharge point.<br><br>The water quality in the River Lee both upstream and downstream of the Bunsheelin confluence has remained steady over the last 10 years and has a consistent Q rating of 4. The downstream sampling point is on the River Lee at Inchigeela approx 8km downstream of Ballingeary.<br>A biological Quality Rating of Q4 represents satisfactory water quality. Eutrophication is unlikely to occur in water bodies with a biological quality rating of Q4 or higher. |

| | |
|---|---|
| | As part of the original WWDL application, water quality would have been tested upstream and downstream of the discharge point. In the case of Ballingeary because the discharge point was so close to the confluence with the Lee river the u/s and d/s points were taken on the Lee. No deterioration was evident downstream of the discharge location. |
| Describe any likely changes to the site arising as a result of:<br>o Reduction in habitat area<br>o Disturbance to key species<br>o Habitat or species fragmentation<br>o Reduction in species density<br>o Changes in key indicators of conservation value (water quality etc)<br>o Climate Change | **Reduction in habitat area:**<br><br>There is no evidence of reduction in habitat area at the Gearagh site due to the discharge at Ballingeary.<br><br>**Disturbance to key species:**<br>*The operation of the WWTP does not cause any disturbance to species within the SPA. Increased nutrients in the river lee downstream of the Bunsheelin confluence could have a negative effect on fish numbers in the Lee. However there is no evidence to support this. (Ref again Qvalue downstream at Inchigeela is 4 since 1999.)*<br><br>**Habitat or species fragmentation:**<br>*No habitat fragmentation has been caused as a result of the operation of this facility.*<br><br>**Reduction in species density:**<br>*No significant impacts are evident or predicted on species for which the SPA is designated.*<br><br>*Birdwatch Ireland have been asked for data to supplement this claim. This data will be forwarded once it is received.*<br><br>**Changes in key indicators of conservation value eg water quality:**<br><br>Water Quality data available from EPA monitoring sites shows water quality both upstream and downstream of Ballingeary discharge has remained constant since 2002**.** This data refers to the river Lee only. The latest results are in 2008.<br><br>The predicted impacts of the discharge on the rivers Bunsheelin and Lee were assessed separately. Worst case scenario was used where there is low flow in river and max. discharge from plant. Both the Bunsheelin and lee rivers immediately downstream of the discharge were in breach of the limits set for good quality surface water for BOD, (Lee) BOD,Ammonia and Orthophosphates (Bunsheelin). The limits used were those set down in the 2009 Environmental Quality Objectives for Surface water.<br><br>When the “Normal Scenarion” was assessed i.e. median flow in river and average volume discharged from the plant, the downstream river Lee was not in breach of the limits set. |

| | |
|---|---|
| Describe any likely impacts on the Natura 2000 site as a whole in terms of:<br><br>o Interference with the key relationships that define the structure of the site<br>o Interference with key relationships that define the function of the site | **Interference with the key relationships that define the structure of the site:**<br>*The structure of the SPA/SAC is not impacted by the operation of this facility.*<br><br>**Interference with key relationships that define the function of the site:**<br>*The function of the SPA/SAC is not impacted by the operation of this facility.* |
| Describe from the above those elements of the project of 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. | No significant impacts are predicted. |

## 3. Finding of No Significant Effects Report Matrix

| 3.1 Project Description | |
|---|---|
| Name of project or plan | Balingeary septic tank discharge |
| Name and location of Natura 2000 site | The Gearagh SPA/SAC |
| Description of the project or plan | Ballingeary septic tank was constructed in the 1930's to serve approx. 10 dwellings. It is now catering to a population of approx. 650. It is located on the southern end of the village on the banks of the Bunsheelin river which is a tributary to the River Lee. The discharge point from the septic tank is located approx 100m upstream of the confluence of the two rivers. |
| Is the project or plan directly connected with or necessary to the management of the site (provide details)? | No |



| 3.2 The assessment of significance of effects | |
|---|---|
| Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 Site. | Septic tanks provide primary treatment only. The passage of sewage through a septic tank helps in the removal of suspended solids but there is very little biological activity and the removal of BOD is not significant. Generally the septic tank removes 50% of the particulate BOD and none of the soluble BOD. Typically BOD in urban wastewater is 50% particulate and 50% soluble, hence the septic tank removes 25% of the BOD from the wastewater. Ballingeary septic tank provides a lower than average level of treatment as it is seriously overloaded. Though monitoring of the Lee downstream of the discharge location shows no deterioration in quality over the last ten years, the assessment of the impacts of the discharge in relation to the 2009 EQS regulations found that in some "worst case scenarios" the discharge is causing the river Lee downstream of the discharge to be in breach of these new standards. |
| Explain why these effects are not considered significant. | The Gearagh site is 12km downstream of the discharge location.<br><br>When assessed against very stringent standards set down in the 2009 EQS regulations the River lee downstream of the discharge narrowly fails to meet the mean standard for BOD. This breach occurs when predicting the impacts of the discharge in a "Worst Case" scenario. i.e. when there is low flow in the river but still max discharge from the septic tank. |

| | |
|---|---|
| | The Lee meets all the relevant standards when assessed in normal conditions.<br><br>The River Lee downstream of Ballingeary has a consistent Q value of 4 which means the river is not eutrophic. Therefore the discharge cannot be having an impact either on the fish life in the river or the species protected by the SAC/SPA at the Gearagh |
| List of agencies consulted: provide contact name and telephone or email address | National Parks and Wildlife Service – Natureconservation@environ.ie, cyril.saich@environ.ie devapp@environ.ie<br><br>Birdwatch Ireland – Data request. |
| Response to consultation | Cyril Saich acknowledged request and recommended rerouting through devapp@environ.ie |

| Data collected to carry out the assessment | | | |
|---|---|---|---|
| **Who carried out the assessment** | **Sources of data** | **Level of assessment completed** | **Where can the full results of the assessment be accessed and viewed** |
| Madeleine Healy y, Cork County Council | IWebs Bird Data supplied by BirdWatch Ireland;<br><br>Site Synopses Gearagh SAC and SPA – National parks and Wildlife Service | Desktop review of cited data. | This report. |

# SITE SYNOPSIS

## SITE NAME: THE GEARAGH SPA

## SITE CODE: 004109

The Gearagh, located *c*. 2 km south-west of Macroom, Co. Cork, comprises a stretch of the River Lee that was dammed in the 1950s as part of a hydroelectric scheme. The river valley formerly held an extensive area of alluvial forest but only part of the forest now survives. The SPA extends from Annahala bridge westwards to Toon bridge. The principal habitat is a shallow lake or reservoir which is fringed by wet woodland, scrub and grassland that is prone to flooding. Alluvial forest occurs on islands. At times of low water, a diverse pioneering plant community develops on the mud.

The alluvial forest is mostly confined to alluvium islands. It consists of an almost closed canopy of Pedunculate Oak (*Quercus robur*), Ash (*Fraxinus excelsior*) and Birch (*Betula* spp.). The understorey is of Hazel (*Corylus avellana*), Holly (*Ilex aquifolium*) and Hawthorn (*Crataegus monogyna*). Willows (*Salix* spp.) and Alder (*Alnus glutinosa*) are largely confined to channel margins and waterlogged areas. The ground flora reflects the damp nature of the woodland and includes such species as Ramsons (*Allium ursinum*), Wood Anemone (*Anemone nemorosa*), Bugle (*Ajuga reptans*), Pignut (*Conopodium majus*), Irish Spurge (*Euphorbia hyberna*) and Meadowsweet (*Filipendula ulmaria*). Scarce plant species recorded from within the woodland include Wood Club-rush (*Scirpus sylvaticus*), Bird Cherry (*Prunus padus*), Buckthorn (*Rhamnus catharticus*) and Rough Horsetail (*Equisetum hyemale*). The epiphytic bryophyte flora and lichen communities are well-developed.



The reservoir has a varied aquatic plant flora that included at least five species of Pondweed (*Potamogeton* spp.). At low water levels, an ephemeral flora develops on the exposed mud and such species as Water Purslane (*Lythrum portula*), Knotgrasses (*Polygonum* spp.) including the scarce Small Water-pepper (*P. mite*), Marsh Yellow-cress (*Rorippa palustris*) and Six-stamened Waterwort (*Elatine hexandra*) are found here. Extensive swards of Mudwort (*Limosella aquatica*), a plant listed in the Red Data Book, occur on the mudflats. The river channels grade into marginal alluvial grassland in places. These grasslands, as well as some semi-improved grasslands within the site, are grazed by wildfowl.

The Gearagh supports part of an important wintering bird population - the area most utilised by the birds also extends east of the site, towards Cork City (Carrigadrohid). Swans, dabbling duck, diving duck and some waders are present and the site provides both feeding and roost sites for the birds. Six of the species have populations of national importance (all figures are average peaks for the 5 winters 1995/96-1999/00): Mute Swan (192), Wigeon (1,080), Teal (1,194), Shoveler (36), Coot (308) and Golden Plover (1,918). Other species which occur regularly in substantial numbers include Whooper Swan (77), Gadwall (10), Mallard (584), Pochard (126),Tufted Duck (271), Lapwing (1,880) and Curlew (400). Other species which use the site include Goldeneye (23), Cormorant (26) and Grey Heron (12). A feral Greylag Goose

flock is present in the area. A few pairs each of Great Crested Grebe and Tufted Duck breed.

The Gearagh is a Nature Reserve, a Ramsar Convention site and a Council of Europe Biogenetic Reserve. There are no imminent threats to the wintering bird populations, though some disturbance is caused to the birds by illegal shooting.

The Gearagh SPA is a unique site due to the presence of remnants of one of the largest stands of alluvial woodland in Ireland or Britain. This habitat is listed, with priority status, on Annex I of the E.U. Habitats Directive. The reservoir created by the past damming activities now attracts important populations of wintering waterfowl, with six of the species having populations of national importance. Also of note is that two of the species which occur regularly, Whooper Swan and Golden Plover, are listed on Annex I of the E.U. Birds Directive.



13.8.2004

# SITE SYNOPSIS

## SITE NAME: THE GEARAGH

## SITE CODE: 000108

This site is located on the River Lee in County Cork, extending westwards and southwards from the Lee Bridge, which is about 1.5km south of Macroom. It extends for about 7km of river, to Dromcarra Bridge. The Gearagh occupies a wide, flat valley of the River Lee, on a bed of limestone overlain with sand and gravel. The adjacent valley walls are of Old Red Sandstone.

This unusual area has formed where the River Lee breaks into a complex network of channels (2 to 6m wide) weaving through a series of wooded islands. The alluvial woodland which remains today at the Gearagh is of unique scientific interest, and qualifies as a priority habitat under Annex I of the European Habitats Directive. The area has probably been wooded throughout the Post-glacial era (i.e. since the end of the last Ice Age, which ended around 10,000 years ago) and frequent flooding has served to enhance its character. Originally, this area of alluvial woodland extended as far as the Lee Bridge. Unfortunately, in 1954/55, in the eastern part of the Gearagh, extensive tree-felling and flooding were carried out to facilitate the operation of a hydro-electric scheme. Around sixty per cent of the former woodland was lost. Today, the reservoir covers the area from Lee Bridge to Annahala Bridge and westwards of Illaunmore Island.



The islands in the Gearagh consist of rather dry alluvium, and support an almost closed canopy of Pedunculate Oak (*Quercus robur*), Ash (*Fraxinus excelsior*) and Birch (*Betula* spp.). The understorey is of Hazel (*Corylus avellana*), Holly (*Ilex aquifolium*) and Hawthorn (*Crataegus monogyna*). Willows (*Salix* spp.) and Alder (*Alnus glutinosa*) are largely confined to channel margins and waterlogged areas. The ground flora reflects the damp nature of the woodland. In spring, Ramsons (*Allium ursinum*) and Wood Anemone (*Anemone nemorosa*) are abundant. Later in the year, other species appear, including Bugle (*Ajuga reptans*), Pignut (*Conopodium majus*), Irish Spurge (*Euphorbia hyberna*), Tufted Hairgrass *(Deschampsia cespitosa*), Enchanter's Nightshade (*Circaea lutetiana*) and Meadowsweet (*Filipendula ulmaria*). Plants species of particular interest within the woodland are Wood Club-rush (*Scirpus sylvaticus*), Bird Cherry (*Prunus padus*) and Buckthorn (*Rhanmus catharticus*). These species are scarce in Ireland. The epiphytic bryophyte flora is well developed, as are some lichen communities. Variations in this vegetation occur locally, where drainage is impeded and where tree clearance has occurred. The whole area has a remarkably wild character, with many fallen trees blocking the channels, so that access both by foot and boat is difficult.

Within the reservoir, the former extent of the woodland can still be seen at times of low water: the cut stumps of larger trees remain prominently preserved in place. At least five species of Pondweed (*Potamogeton* spp.) occur in the reservoir, including two species which are uncommon in Ireland (*Potamogeton praelongus* and *P. gramineus*). At low water levels, a diverse ephemeral flora develops on the exposed mud. Species here include Water Purslane (*Lythrum portula*), Knotgrasses

(*Polygonum* spp.), Trifid Bur-marigold (*Bidens tripartita*), Marsh Yellow-cress (*Rorippa palustris*) and Six-stamened Waterwort (*Elatine hexandra*).

An oakwood occurs just north of Toon Bridge. Although wooded from ancient times, today the area supports relatively young oaks (*Quercus* sp.) on a southerly slope. Apart from oaks, Silver Birch (*Betula pendula*), Holly (*Ilex aquifolium*), Hazel (*Corylus avellana*), Ash (*Fraxinus excelsior*) and Rowan (*Sorbus aucuparia*) are also present. The ground flora is typical of that found in an oakwood, but is relatively species-rich, partly as a result of water seepage downslope. Species present include: Bilberry (*Vaccinium myrtillus*), Great Wood-rush (*Luzula sylvatica*), Hard Fern (*Blechnum spicant*), Buckler Fern (*Dryopteris aemula*), Woodruff (*Galium odoratum*), Wood Melic (*Melica uniflora*), Hairy Wood-rush (*Luzula pilosa*) and Early Purple Orchid (*Orchis mascula*).

Along the Gearagh, the river channels grade into marginal alluvial grassland in places. These grasslands, as well as some semi-improved grasslands within the site, are grazed by wildfowl. An area of cutaway bog and some Gorse (*Ulex* sp.) scrub also occur in the site. Extensive swards of Mudwort (*Limosella aquatica*), a Rare plant listed in the Red Data Book, occur on the mudflats along the reservoir. Otter, an Annex II species on the European Habitats Directive, is frequent throughout the site.

The Gearagh supports part of an important wintering bird population: the area most utilised by birds extends also east of the site, towards Cork city (Carrigadroighid). At the Gearagh, Whooper Swans are regular (40-110, 1990's), as are Wigeon (640, average max.1992-1994), Teal (707, average max. 1992-94), Mallard (250 in January 1993) and Tufted Duck (154, average max. 1992-94). Golden Plover utilise the site on occasions (e.g. 2,000 in January 1994), while there is a regular flock of Dunlin (100-200, 1990s) a species unusual at inland sites. A late summering flock of Mute Swan is regular , with numbers between 120 and 250 from 1992 to 1994. Great Crested Grebe and Tufted Duck breed in small numbers, while there is a feral flock of about 50 Greylag Geese.



The wooded part of the Gearagh is largely undisturbed due to the inaccessible nature of the terrain. Cattle graze in some areas, but the impacts of this are very localised. In the past, coppicing was practiced over most of the area. Little felling has occurred since the early 1950's, and the installation of the hydro-electric scheme. The least disturbed part of woodland occurs in the upper reaches of the Gearagh. Tree regeneration is occurring around the reservoir, which may restore some of the lost portion of woodland.

Despite the fact that about half the original area has been destroyed the Gearagh still represents the only extensive alluvial woodland in Ireland or Britain, or indeed Western Europe west of the Rhine. For this reason it is a unique site and has been designated as a Statutory Nature Reserve. The international importance of the site is recognised by its designation both as a Ramsar site and as a Biogenetic Reserve. The reservoir is also a Wildfowl Sanctuary.

9.1.1997

# The Gearagh

| Species | 1% National | 1% International | 2003/04 | 2004/05 | 2005/06 | 2006/07 | 2007/08 | 2008/09 | Mean (04/05-08/09) | Peak (04/05-08/09) |
|---|---|---|---|---|---|---|---|---|---|---|
| Mute Swan | 110 | | 43 | 40 | 60 | 130 | 82 | 80 | 78 | 130 |
| Whooper Swan | 130 | 210 | 67 | 46 | 38 | 72 | 70 | 64 | 58 | 72 |
| Pink-footed Goose | | 2,250 | | | | | | 2 | 0 | 2 |
| Greenland White-fronted Goose | 110 | 270 | | 1 | | | | | 0 | 1 |
| Greylag Goose | 50 | 870 | | 63 | 143 | 143 | 143 | 26 | 104 | 143 |
| Barnacle Goose | 90 | 560 | | | | | | 1 | 0 | 1 |
| Shelduck | 150 | 3,000 | | | | 1 | | | 0 | 1 |
| Wigeon | 820 | 15,000 | 550 | 760 | 270 | 750 | 830 | 1,100 | 742 | 1,100 |
| Gadwall | 20 | 600 | 4 | 14 | 5 | 5 | 3 | 20 | 9 | 20 |
| Teal | 450 | 5,000 | 650 | 2,000 | 425 | 1,000 | 1,000 | 1,400 | 1,165 | 2,000 |
| Mallard | 380 | 20,000 | 350 | 300 | 140 | 480 | 700 | 800 | 484 | 800 |
| Pintail | 20 | 600 | 2 | 20 | 2 | 2 | 2 | 6 | 6 | 20 |
| Shoveler | 25 | 400 | 12 | 50 | 35 | 75 | 130 | 130 | 84 | 130 |
| Pochard | 380 | 3,500 | 65 | 40 | 1 | 2 | 2 | 2 | 9 | 40 |
| Ring-necked Duck | | | | 1 | | | | 1 | 0 | 1 |
| Tufted Duck | 370 | 12,000 | 240 | 600 | 233 | 400 | 320 | 410 | 393 | 600 |
| Scaup | 45 | 3,100 | | 5 | | 3 | 2 | 8 | 4 | 8 |
| Goldeneye | 95 | 11,500 | 30 | 15 | 27 | 25 | 30 | 37 | 27 | 37 |
| Goosander | | | | | | | 3 | 1 | 1 | 3 |
| Ruddy Duck | | | 5 | 1 | | | | | 0 | 1 |
| Great Crested Grebe | 55 | 3,600 | | 3 | 1 | 5 | 2 | 4 | 3 | 5 |
| Cormorant | 140 | 1,200 | 12 | 7 | | 14 | 4 | 5 | 6 | 14 |
| Little Egret | | 1,300 | | | | 5 | 3 | 4 | 2 | 5 |
| Grey Heron | 30 | 2,700 | 4 | 4 | 2 | 11 | 3 | 3 | 5 | 11 |
| Water Rail | | | | | | | | 1 | 0 | 1 |
| Moorhen | 20 | | | 2 | | 1 | | 4 | 1 | 4 |
| Coot | 330 | 17,500 | 33 | 276 | 135 | 450 | 80 | 400 | 268 | 450 |
| Golden Plover | 1,700 | 9,300 | 3,000 | 3,000 | 3,000 | 6,000 | 2,500 | 2,000 | 3,300 | 6,000 |
| Lapwing | 2,100 | 20,000 | 750 | 1,500 | 2,000 | 2,000 | 1,000 | 2,500 | 1,800 | 2,500 |
| Dunlin | 880 | 13,300 | 4 | 120 | 150 | 200 | 1 | 120 | 118 | 200 |
| Snipe | | 20,000 | 3 | 10 | | 3 | 1 | 2 | 3 | 10 |
| Black-tailed Godwit | 140 | 470 | | 54 | | 4 | | | 12 | 54 |
| Curlew | 550 | 8,500 | 150 | 250 | 2 | 150 | 92 | 140 | 127 | 250 |
| Common Sandpiper | | | | 1 | | | | | 0 | 1 |
| Green Sandpiper | | | | 2 | | 1 | | 2 | 1 | 2 |
| Greenshank | 20 | 2,300 | | 1 | | | | 1 | 0 | 1 |
| Redshank | 310 | 3,900 | | 7 | | 2 | | 1 | 2 | 7 |
| Little Gull | | | | 1 | | | | | 0 | 1 |
| Black-headed Gull | | 20,000 | 8 | 10 | | 30 | 10 | 35 | 17 | 35 |
| Common Gull | | 16,000 | | | | | | 2 | 0 | 2 |
| Lesser Black-backed Gull | | 4,500 | 14 | 70 | 10 | 300 | 32 | 280 | 138 | 300 |
| Kingfisher | | | | 1 | | 1 | 2 | 1 | 1 | 2 |



The counts presented in the table refer to the peak counts of species in each I-WeBS season.
Site peak and mean are calculated as the peak and mean of peak counts respectively over the seasons specified. Blank cells within columns which contain positive values for one or more species constitute zero for those species.

# Ballymacoda

| Species | 1% National | 1% International | 2003/04 | 2004/05 | 2005/06 | 2006/07 | 2007/08 | Mean (03/04-07/08) | Peak (03/04-07/08) |
|---|---|---|---|---|---|---|---|---|---|
| Kittiwake | | | | | | | 20 | 4 | 20 |
| Mute Swan | 110 | | 8 | 5 | 5 | 6 | 3 | 5 | 8 |
| Bewick's Swan | 20 | 200 | 6 | | | | | 1 | 6 |
| Whooper Swan | 130 | 210 | 4 | 5 | 1 | | 4 | 3 | 5 |
| Pink-footed Goose | | 2,250 | | | | 2 | 1 | 1 | 2 |
| Greenland White-fronted Goose | 110 | 270 | 6 | | | | | 1 | 6 |
| Greylag Goose | 50 | 870 | 6 | | | 4 | | 2 | 6 |
| Barnacle Goose | 90 | 560 | | | | 1 | | 0 | 1 |
| Light-bellied Brent Goose | | 260 | 94 | 176 | 183 | 124 | 248 | 165 | 248 |
| Black Brant | | | | | | 1 | | 0 | 1 |
| Shelduck | 150 | 3,000 | 131 | 146 | 57 | 46 | 70 | 90 | 146 |
| Wigeon | 820 | 15,000 | 1,376 | 1,040 | 1,303 | 910 | 834 | 1,093 | 1,376 |
| Gadwall | 20 | 600 | 5 | | 6 | | 2 | 3 | 6 |
| Green-winged Teal | | | 1 | 1 | | | | 0 | 1 |
| Teal | 450 | 5,000 | 953 | 976 | 1,082 | 826 | 376 | 843 | 1,082 |
| Mallard | 380 | 20,000 | 70 | 467 | 17 | 39 | 29 | 124 | 467 |
| Pintail | 20 | 600 | 8 | 12 | 15 | 5 | 1 | 8 | 15 |
| Shoveler | 25 | 400 | 14 | 24 | 23 | 44 | 27 | 26 | 44 |
| Goldeneye | 95 | 11,500 | | | 1 | 1 | | 0 | 1 |
| Red-breasted Merganser | 35 | 1,700 | 4 | 2 | 4 | 1 | 1 | 2 | 4 |
| Red-throated Diver | 20 | 3,000 | | 15 | | | 1 | 3 | 15 |
| Great Northern Diver | | 50 | | 1 | | | 1 | 0 | 1 |
| Little Grebe | 25 | 4,000 | 3 | 2 | 2 | | 3 | 2 | 3 |
| Great Crested Grebe | 55 | 3,600 | 8 | 9 | 4 | 2 | 13 | 7 | 13 |
| Cormorant | 140 | 1,200 | 38 | 27 | 34 | 23 | 24 | 29 | 38 |
| Little Egret | | 1,300 | 9 | 28 | 26 | 28 | 32 | 25 | 32 |
| Grey Heron | 30 | 2,700 | 7 | 13 | 11 | 11 | 14 | 11 | 14 |
| Water Rail | | | | 1 | | | 2 | 1 | 2 |
| Moorhen | 20 | | 5 | | | | 2 | 1 | 5 |
| Oystercatcher | 680 | 10,200 | 742 | 440 | 657 | 405 | 396 | 528 | 742 |
| Little Ringed Plover | | | | | 1 | | | 0 | 1 |
| Ringed Plover | 150 | 730 | 57 | 84 | 138 | 146 | 97 | 104 | 146 |
| Golden Plover | 1,700 | 9,300 | 8,400 | 8,780 | 9,800 | 8,150 | 8,500 | 8,726 | 9,800 |
| Grey Plover | 65 | 2,500 | 524 | 337 | 396 | 474 | 482 | 443 | 524 |
| Lapwing | 2,100 | 20,000 | 2,600 | 2,610 | 1,520 | 2,230 | 1,603 | 2,113 | 2,610 |
| Knot | 190 | 4,500 | 211 | 334 | 125 | 130 | 305 | 221 | 334 |
| Sanderling | 65 | 1,200 | 133 | 164 | 132 | 151 | 122 | 140 | 164 |
| Little Stint | | | | | | 1 | 1 | 0 | 1 |
| Pectoral Sandpiper | | | | | | 1 | 1 | 0 | 1 |
| Curlew Sandpiper | | | | | 7 | 2 | 4 | 3 | 7 |
| Dunlin | 880 | 13,300 | 2,640 | 1,865 | 1,085 | 825 | 1,882 | 1,659 | 2,640 |
| Ruff | | 12,500 | | | 1 | 7 | 13 | 4 | 13 |
| Snipe | | 20,000 | 125 | 25 | 100 | 100 | 105 | 91 | 125 |
| Black-tailed Godwit | 140 | 470 | 820 | 1,480 | 801 | 827 | 535 | 893 | 1,480 |
| Bar-tailed Godwit | 160 | 1,200 | 592 | 458 | 468 | 436 | 445 | 480 | 592 |
| Whimbrel | | 2,000 | | 1 | 1 | 1 | 1 | 1 | 1 |
| Curlew | 550 | 8,500 | 1,033 | 486 | 770 | 726 | 545 | 712 | 1,033 |
| Common Sandpiper | | | | | 6 | 1 | | 1 | 6 |
| Green Sandpiper | | | | | | 2 | | 0 | 2 |
| Greenshank | 20 | 2,300 | 16 | 17 | 9 | 23 | 14 | 16 | 23 |
| Redshank | 310 | 3,900 | 251 | 318 | 251 | 257 | 167 | 249 | 318 |
| Turnstone | 120 | 1,500 | 133 | 86 | 85 | 68 | 76 | 90 | 133 |
| Mediterranean Gull | | | 1 | 2 | | | 1 | 1 | 2 |
| Black-headed Gull | | 20,000 | 3,325 | | | | | 665 | 3,325 |
| Common Gull | | 16,000 | 361 | | | | | 72 | 361 |



The counts presented in the table refer to the peak counts of species in each I-WeBS season.
Site peak and mean are calculated as the peak and mean of peak counts respectively over the seasons specified. Blank cells within columns which contain positive values for one or more species constitute zero for those species.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Lesser Black-backed Gull | 4,500 | 6,500 | 445 | 434 | 233 | 460 | 1,614 | 6,500 |
| Herring Gull | 13,000 | 31 | 22 | 41 | 64 | 24 | 36 | 64 |
| Yellow-legged Gull | | | | 1 | | | 0 | 1 |
| Glaucous Gull | | | | | 1 | | 0 | 1 |
| Great Black-backed Gull | 4,800 | 140 | 31 | 141 | 79 | 62 | 91 | 141 |
| Sandwich Tern | | 28 | 82 | | | | 22 | 82 |
| Common Tern | | 2 | | | | | 0 | 2 |
| Kingfisher | | | 2 | 1 | 2 | 1 | 1 | 2 |



The counts presented in the table refer to the peak counts of species in each I-WeBS season.
Site peak and mean are calculated as the peak and mean of peak counts respectively over the seasons specified. Blank cells within columns which contain positive values for one or more species constitute zero for those species.

**Question 2** **Review the assessment of the impact of the discharge in relation to the requirements of the Environmental Quality Objectives regulations (S.I. No. 272 of 2009) and resubmit and update where relevant**

The WWTP discharges into the Bunsheelin River 120m from its confluence with the River Lee, both of which have “good status”. Therefore the “good” standard contained in the surface water regulations was used for comparison purposes.

The upstream and downstream sampling results for 2009 at aSW01u and aSW02d were compared to the relevant EQR/S from the surface water regulations in the following tables. The sample results and the EQR/S were included only if there were values for both, to allow comparison.

The upstream and downstream sample results incorporated in the following tables are those laid out in the upstream and downstream sheets of the Revised Table E. However many of these results are at the limit of detection, or are based on averages that include assumed figures. Therefore additional upstream and downstream tables which incorporate actual results for analysis below the Limit of Detection have been included. This “Analysis below the Limit of Detection” is laid out on a separate sheet in the Revised Table E.

# UPSTREAM COMPARISON TABLE

| ***Physico-chemical conditions*** | ***Ecological quality ratio/standard*** <br> ***Good boundary*** <br> ***Rivers (All Types)*** | ***2009 upstream ambient sampling results at aSW01u*** |
|---|---|---|
| ***Oxygenation conditions Table 9*** | ***River water body*** | ***Ambient sampling results*** |
| Biochemical Oxygen Demand (BOD) ($mgO_2/l$) | Good status≤1.5 (mean) or ≤2.6(95%ile) | 1.0mg/L (mean) <br> 1.0mg/L (95%ile) |
| ***Acidification Status Table 9*** | ***River Water Body*** | ***Ambient sampling results*** |
| pH (individual values) | Soft Water 4.5<pH<9.0 <br> Hard Water 6.0<pH<9.0 | 7.4 |
| ***Nutrient conditions Table 9*** | ***River Water body*** | ***Ambient sampling results*** |
| Total Ammonia (mg N/l) | Good status≤0.065(mean) or ≤0.140(95%ile) | <0.1mg/L (mean) <br> <0.1mg/L (95%ile) |
| Molybdate Reactive Phosphorus (MRP) (mg P/l) | Good status≤0.035(mean) or ≤0.075(95%ile) | <0.05mg/L (mean) <br> <0.05mg/L (95%ile) |
| ***Specific pollutants Table 10*** | ***Inland surface waters AA-EQS*** | ***Ambient sampling results*** |
| Phenol | 8 | <0.1µg/L |
| Toulene | 10 | <0.28µg/L |
| Xylene | 10 | <1.0µg/L |
| Arsenic | 25 | <0.96µg/L |
| Total Chromium | 8.1 | <20µg/L |
| Copper (depending on water hardness) | 5 | <20µg/L |
| Cyanide | 10 | <5.0µg/L |
| Flouride | 500 | <100µg/L |
| Zinc (depending on water hardness) | 50 | <20µg/L |
| ***Priority Substances Table 11*** | ***Inland surface waters AA-EQS*** | ***Ambient sampling results*** |
| Atrazine | 0.6 | <0.01µg/L |
| Dichloromethane | 20 | <1.0µg/L |
| Simazine | 1 | <0.01µg/L |
| Lead and its compounds | 7.2 | <20.0µg/L |
| Nickel and its compounds | 20 | <20µg/L |
| ***Priority Hazardous Substances Table 12*** | ***Inland surface waters AA-EQS*** | ***Ambient sampling results*** |
| Cadmium and its compounds (depending on water hardness) | 0.08 | <20µg/L |
| Mercury and its compounds | 0.05 | <0.2µg/L |



**Note the following:**

The black results are within the EQR/S.
The red results break the EQR/S.
The blue results may break the EQR/S.
The results highlighted grey are at the limit of detection.
Water hardness in the Bunsheelin River is 32.0mg$CaCO_3$/L

# UPSTREAM COMPARISON TABLE
# (ANALYSIS BELOW THE LIMIT OF DETECTION)

| ***Physico-chemical conditions*** | ***Ecological quality ratio/standard*** | ***2009 upstream ambient sampling results at aSW01u*** |
|---|---|---|
| | ***Good boundary*** | |
| | ***Rivers (All Types)*** | |
| ***Nutrient conditions Table 9*** | ***River Water body*** | ***Ambient sampling results*** |
| Total Ammonia (mg N/l) | Good status≤0.065(mean) or ≤0.140(95%ile) | 0.032mg/L (mean)<br>0.032mg/L (95%ile) |
| Molybdate Reactive Phosphorus (MRP) (mg P/l) | Good status≤0.035(mean) or ≤0.075(95%ile) | <0.05mg/L (mean)<br><0.05mg/L (95%ile) |
| ***Specific pollutants Table 10*** | ***Inland surface waters AA-EQS*** | ***Ambient sampling results*** |
| Total Chromium | 8.1 | <1.0µg/L |
| Copper (depending on water hardness) | 5 | <1.0µg/L |
| Zinc (depending on water hardness) | 50 | <1.0µg/L |
| ***Priority Substances Table 11*** | ***Inland surface waters AA-EQS*** | ***Ambient sampling results*** |
| Lead and its compounds | 7.2 | <1.0µg/L |
| Nickel and its compounds | 20 | <1.0µg/L |
| ***Priority Hazardous Substances Table 12*** | ***Inland surface waters AA-EQS*** | ***Ambient sampling results*** |
| Cadmium and its compounds (depending on water hardness) | 0.08 | <1.0µg/L |

# DOWNSTREAM COMPARISON TABLE

| ***Physico-chemical conditions*** | ***Ecological quality ratio/standard*** <br> ***Good boundary*** <br> ***Rivers (All Types)*** | ***2009 Downstream ambient sampling results at aSW01d*** |
|---|---|---|
| ***Oxygenation conditions Table 9*** | ***River water body*** | ***Ambient sampling results*** |
| Biochemical Oxygen Demand (BOD) ($mgO_2/l$) | Good status≤1.5 (mean) or ≤2.6(95%ile) | 1.0mg/L (mean) <br> 1.0mg/L (95%ile) |
| ***Acidification Status Table 9*** | ***River Water Body*** | ***Ambient sampling results*** |
| pH (individual values) | Soft Water 4.5<pH<9.0 <br> Hard Water 6.0<pH<9.0 | 7.4 |
| ***Nutrient conditions Table 9*** | ***River Water body*** | ***Ambient sampling results*** |
| Total Ammonia (mg N/l) | Good status≤0.065(mean) or ≤0.140(95%ile) | <0.1mg/L (mean) <br> <0.1mg/L (95%ile) |
| Molybdate Reactive Phosphorus (MRP) (mg P/l) | Good status≤0.035(mean) or ≤0.075(95%ile) | <0.05mg/L (mean) <br> <0.05mg/L (95%ile) |
| ***Specific pollutants Table 10*** | ***Inland surface waters AA-EQS*** | ***Ambient sampling results*** |
| Phenol | 8 | <0.1µg/L |
| Toulene | 10 | <0.28µg/L |
| Xylene | 10 | <1.0µg/L |
| Arsenic | 25 | <0.96µg/L |
| Total Chromium | 8.1 | <20.0µg/L Chromium |
| Copper (depending on water hardness) | 5 | <20.0µg/L |
| Cyanide | 10 | <5.0µg/L |
| Flouride | 500 | <100.0µg/L |
| Zinc (depending on water hardness) | 50 | <20.0µg/L |
| ***Priority Substances Table 11*** | ***Inland surface waters AA-EQS*** | ***Ambient sampling results*** |
| Atrazine | 0.6 | <0.01µg/L |
| Dichloromethane | 20 | <1.0µg/L |
| Simazine | 1 | <0.01µg/L |
| Lead and its compounds | 7.2 | <20.0µg/L |
| Nickel and its compounds | 20 | <20.0µg/L |
| ***Priority Hazardous Substances Table 12*** | ***Inland surface waters AA-EQS*** | ***Ambient sampling results*** |
| Cadmium and its compounds (depending on water hardness) | 0.08 | <20µg/L |
| Mercury and its compounds | 0.05 | <0.2µg/L |



**Note the following:**

The black results are within the EQR/S.
The red results break the EQR/S.
The blue results may break the EQR/S.
The results highlighted grey are at the limit of detection.
Water hardness in the Bunsheelin River is 32.0mg $CaCO_3$/L

# DOWNSTREAM COMPARISON TABLE
# (ANALYSIS BELOW THE LIMIT OF DETECTION)

| ***Physico-chemical conditions*** | ***Ecological quality ratio/standard*** | ***2009 Downstream ambient sampling results at aSW01d*** |
|---|---|---|
| | ***Good boundary*** | |
| | ***Rivers (All Types)*** | |
| ***Nutrient conditions Table 9*** | ***River Water body*** | ***Ambient sampling results*** |
| Total Ammonia (mg N/l) | Good status≤0.065(mean) or ≤0.140(95%ile) | 0.1mg/L (mean)<br>0.1mg/L (95%ile) |
| Molybdate Reactive Phosphorus (MRP) (mg P/l) | Good status≤0.035(mean) or ≤0.075(95%ile) | 0.0215mg/L (mean)<br>0.0215mg/L (95%ile) |
| ***Specific pollutants Table 10*** | ***Inland surface waters AA-EQS*** | ***Ambient sampling results*** |
| Total Chromium | 8.1 | <1.0µg/L |
| Copper (depending on water hardness) | 5 | <1.0µg/L |
| Zinc (depending on water hardness) | 50 | <1.0µg/L |
| ***Priority Substances Table 11*** | ***Inland surface waters AA-EQS*** | ***Ambient sampling results*** |
| Lead and its compounds | 7.2 | <1.0µg/L |
| Nickel and its compounds | 20 | <1.0µg/L |
| ***Priority Hazardous Substances Table 12*** | ***Inland surface waters AA-EQS*** | ***Ambient sampling results*** |
| Cadmium and its compounds (depending on water hardness) | 0.08 | <1.0µg/L |

# BUNSHEELIN RIVER PREDICTED IMPACTS

## MASS BALANCE EQUATIONS FOR BOD:

### Worst Case Scenario:

Maximum Discharge, Low Flow in the River, Maximum BOD in Discharge.

Flow of River (95%ile) = 0.0598m3/sec
Mean BOD in River (upstream) = 1.0mg/L
Max volume of discharge = 0.0017m3/sec
Max value for BOD in discharge = 320.0mg/L (Max from Online Tables)

$$C_{final} = \frac{(0.0598 \times 1.0) + (0.0017 \times 320.0)}{(0.0598 + 0.0017)}$$

$C_{final}$ = 9.82mg/l BOD

This is in breach of the 1.5 mg/L Mean and 2.6mg/L 95%ile EQS for BOD.

### Normal Scenario:

Normal Discharge, Median Flow in the River, Mean BOD in Discharge.

Flow of River (Median) = 0.371m3/sec
Mean BOD in River (upstream) = 1.0mg/L
Normal volume of discharge = 0.0014m3/sec
Mean value for BOD in discharge = 320.0mg/L (2009 Mean from Outlet Table E4)

$$C_{final} = \frac{(0.371 \times 1.0) + (0.0014 \times 320.0)}{(0.371 + 0.0014)}$$

$C_{final}$ = 2.2mg/l BOD

This is in breach of the 1.5 mg/L Mean EQS. However this is within the 2.6mg/L 95%ile EQS for BOD.



## MASS BALANCE EQUATIONS FOR AMMONIA:

### Worst Case Scenario:

Maximum Discharge, Low Flow in the River, Maximum Ammonia in Discharge.

Flow of River (95%ile) = 0.0598m3/sec
Mean Ammonia in River (upstream) = 0.032mg/L
Max volume of discharge = 0.0017m3/sec
Max value for Ammonia in discharge = 50.1mg/L (2009 Max from Outlet Table E4)

$$C_{final} = \frac{(0.0598 \times 0.032) + (0.0017 \times 50.1)}{(0.0598 + 0.0017)}$$

$C_{final}$ = 1.42mg/l Ammonia

This is in breach of the 0.065mg/L Mean and 0.14mg/L 95%ile EQS for Ammonia.

### Normal Scenario:

Normal Discharge, Median Flow in the River, Mean Ammonia in Discharge.

Flow of River (Median) = 0.371m3/sec

Mean Ammonia in River (upstream) = 0.032mg/L
Normal volume of discharge = 0.0014m3/sec
Mean value for Ammonia in discharge = 50.1mg/L (2009 Mean from Outlet Table E4)

$$C_{final} = \frac{(0.371 \times 0.032) + (0.0014 \times 50.1)}{(0.371 + 0.0014)}$$

$C_{final}$ = 0.22mg/l Ammonia

This is in breach of the 0.065mg/L Mean and 0.14mg/L 95%ile EQS for Ammonia.

**MASS BALANCE EQUATIONS FOR ORTHOPHOSPHATE:**

**Worst Case Scenario:**

Maximum Discharge, Low Flow in the River, Maximum Orthophosphate in Discharge.

Flow of River (95%ile) = 0.0598m3/sec
Mean Orthophosphate in River (upstream) = <0.05mg/L (Use 0.025 for Calculation)
Max volume of discharge = 0.0017m3/sec
Max value for Orthophosphate in discharge = 10mg/L (Max from Online Tables)

$$C_{final} = \frac{(0.0598 \times 0.025) + (0.0017 \times 10)}{(0.0598 + 0.0017)}$$

$C_{final}$ = 0.3mg/l Orthophosphate

This is in breach of the 0.035mg/L Mean and 0.075mg/L 95%ile EQS for Orthophosphate

**Normal Scenario:**

Normal Discharge, Median Flow in the River, Mean Orthophosphate in Discharge.

Flow of River (Median) = 0.371m3/sec
Mean Orthophosphate in River (upstream) = 0.025mg/L
Normal volume of discharge = 0.0014m3/sec
Mean value for Orthophosphate in discharge = 6.94mg/L (2009 Mean from Outlet Table E4)

$$C_{final} = \frac{(0.371 \times 0.025) + (0.0014 \times 6.94)}{(0.371 + 0.0014)}$$

$C_{final}$ = 0.051mg/l Orthophosphate

This is in breach of the 0.035mg/L Mean EQS. However this is within the 0.075mg/L 95%ile EQS for Orthophosphate.

**Comment:**

The final discharge point to the Bunsheelin River is only 120m away from its confluence with the River Lee, where a much larger assimilative capacity is available. Given this short distance, a calculation of the predicted impacts taking the River Lee as the receiving water body is more appropriate.

# RIVER LEE PREDICTED IMPACTS

## MASS BALANCE EQUATIONS FOR BOD:

### Worst Case Scenario:

Maximum Discharge, Low Flow in the River, Maximum BOD in Discharge.

Flow of River (95%ile) = 2.234m3/sec
Mean BOD in River (upstream) = 1.36mg/L (Average of 2009 EPA Data at Inchinossig Bridge)
Max volume of discharge = 0.0017m3/sec
Max value for BOD in discharge = 320.0mg/L (Max from Online Tables)

$$C_{final} = \frac{(2.234 \times 1.36) + (0.0017 \times 320.0)}{(2.234 + 0.0017)}$$

$C_{final}$ = 1.6mg/l BOD

This is in breach of the 1.5 mg/L Mean EQS for BOD. However this is within the 2.6mg/L 95%ile EQS for BOD.

### Normal Scenario:

Normal Discharge, Median Flow in the River, Mean BOD in Discharge.

Flow of River (Median) = 16.98m3/sec
Mean BOD in River (upstream) = 1.36mg/L (Average of 2009 EPA Data at Inchinossig Bridge)
Normal volume of discharge = 0.0014m3/sec
Mean value for BOD in discharge = 320.0mg/L (2009 Mean from Outlet Table E4)

$$C_{final} = \frac{(16.98 \times 1.36) + (0.0014 \times 320.0)}{(16.98 + 0.0014)}$$

$C_{final}$ = 1.39mg/l BOD

This is within the 1.5 mg/L Mean and 2.6mg/L 95%ile EQS for BOD.



## MASS BALANCE EQUATIONS FOR AMMONIA:

### Worst Case Scenario:

Maximum Discharge, Low Flow in the River, Maximum Ammonia in Discharge.

Flow of River (95%ile) = 2.234m3/sec
Mean Ammonia in River (upstream) = 0.021mg/L (Average of 2009 EPA Data at Inchinossig Bridge)
Max volume of discharge = 0.0017m3/sec
Max value for Ammonia in discharge = 50.1mg/L (2009 Max from Outlet Table E4)

$$C_{final} = \frac{(2.234 \times 0.021) + (0.0017 \times 50.1)}{(2.234 + 0.0017)}$$

$C_{final}$ = 0.059mg/l Ammonia

This is within the 0.065mg/L Mean and 0.14mg/L 95%ile EQS for Ammonia.

### Normal Scenario:

Normal Discharge, Median Flow in the River, Mean Ammonia in Discharge.

Flow of River (Median) = 16.98m3/sec
Mean Ammonia in River (upstream) = 0.021mg/L (Average of 2009 EPA Data at Inchinossig Bridge)
Normal volume of discharge = 0.0014m3/sec
Mean value for Ammonia in discharge = 50.1mg/L (2009 Mean from Outlet Table E4)

$$C_{final} = \frac{(16.98 \times 0.021) + (0.0014 \times 50.1)}{(16.98 + 0.0014)}$$

$C_{final}$ = 0.025mg/l Ammonia

This is within the 0.065mg/L Mean and 0.14mg/L 95%ile EQS for Ammonia.

**MASS BALANCE EQUATIONS FOR ORTHOPHOSPHATE:**

**Worst Case Scenario:**

Maximum Discharge, Low Flow in the River, Maximum Orthophosphate in Discharge.

Flow of River (95%ile) = 2.234m3/sec
Mean Orthophosphate in River (upstream) = 0.0053mg/L
Max volume of discharge = 0.0017m3/sec
Max value for Orthophosphate in discharge = 10mg/L (Max from Online Tables)

$$C_{final} = \frac{(2.234 \times 0.0053) + (0.0017 \times 10)}{(2.234 + 0.0017)}$$

$C_{final}$ = 0.012mg/l Orthophosphate

This is within the 0.035mg/L Mean and 0.075mg/L 95%ile EQS for Orthophosphate.



**Normal Scenario:**

Normal Discharge, Median Flow in the River, Mean Orthophosphate in Discharge.

Flow of River (Median) = 16.98m3/sec
Mean Orthophosphate in River (upstream) = 0.0053mg/L
Normal volume of discharge = 0.0014m3/sec
Mean value for Orthophosphate in discharge = 6.94mg/L (2009 Mean from Outlet Table E4)

$$C_{final} = \frac{(16.98 \times 0.0053) + (0.0014 \times 6.94)}{(16.98 + 0.0014)}$$

$C_{final}$ = 0.0059mg/l Orthophosphate

This is within the 0.035mg/L Mean and 0.075mg/L 95%ile EQS for Orthophosphate

## Attachment E4 Ballingeary Inlet Table E4

| Sample Date | 14/05/2009 | |
|---|---|---|
| Sample | Influent | Average |
| Sample Code | GT656 | |
| Flow $M^3$/Day | * | |
| pH | 7.4 | 7.4 |
| Temperature °C | * | * |
| Cond 20°C | 655 | 655 |
| SS mg/L | 72 | 72 |
| $NH_3$ mg/L | 47.6 | 47.6 |
| BOD mg/L | 182 | 182 |
| COD mg/L | 362 | 362 |
| TN mg/L | 81.7 | 81.7 |
| Nitrite mg/L | <0.10 | <0.10 |
| Nitrate mg/L | <0.50 | <0.50 |
| TP mg/L | 7.34 | 7.34 |
| O-PO4-P mg/L | 5.12 | 5.12 |
| SO4 mg/L | <30 | <30 |
| Phenols µg/L | <0.10 | <0.10 |
| Atrazine µg/L | <0.01 | <0.01 |
| Dichloromethane µg/L | <1 | <1 |
| Simazine µg/L | <0.01 | <0.01 |
| Toluene µg/L | <0.28 | <0.28 |
| Tributyltin µg/L | not required | not required |
| Xylenes µg/L | <1 | <1 |
| Arsenic µg/L | <0.96 | <0.96 |
| Chromium ug/L | <20 | <20 |
| Copper ug/L | 50.3 | 50.3 |
| Cyanide µg/L | <5 | <5 |
| Fluoride µg/L | <100 | <100 |
| Lead ug/L | <20 | <20 |
| Nickel ug/L | <20 | <20 |
| Zinc ug/L | 85 | 85 |
| Boron ug/L | <20 | <20 |
| Cadmium ug/L | <20 | <20 |
| Mercury µg/L | <0.2 | <0.2 |
| Selenium µg/L | 1.3 | 1.3 |
| Barium ug/L | <20 | <20 |

# Attachment E4 Ballingeary Discharge Outlet Table E4

| Sample Date | 14/05/2009 | |
|---|---|---|
| Sample | Effluent | Average |
| Sample Code | GT657 | |
| Flow $M^3$/Day | * | |
| pH | 6.4 | 6.4 |
| Temperature °C | * | * |
| Cond 20°C | 716 | 716 |
| SS mg/L | 147 | 147 |
| $NH_3$ mg/L | 50.1 | 50.1 |
| BOD mg/L | 320 | 320 |
| COD mg/L | 695 | 695 |
| TN mg/L | 89.2 | 89.2 |
| Nitrite mg/L | <0.10 | <0.10 |
| Nitrate mg/L | <0.50 | <0.50 |
| TP mg/L | 9.62 | 9.62 |
| O-PO4-P mg/L | 6.94 | 6.94 |
| SO4 mg/L | 32.7 | 32.7 |
| Phenols µg/L | <0.10 | <0.10 |
| Atrazine µg/L | <0.01 | <0.01 |
| Dichloromethane µg/L | <1 | <1 |
| Simazine µg/L | <0.01 | <0.01 |
| Toluene µg/L | <0.28 | <0.28 |
| Tributyltin µg/L | not required | not required |
| Xylenes µg/L | <1 | <1 |
| Arsenic µg/L | <0.96 | <0.96 |
| Chromium ug/L | <20 | <20 |
| Copper ug/L | 62 | 62 |
| Cyanide µg/L | 5 | 5 |
| Fluoride µg/L | <100 | <100 |
| Lead ug/L | <20 | <20 |
| Nickel ug/L | <20 | <20 |
| Zinc ug/L | 97 | 97 |
| Boron ug/L | <20 | <20 |
| Cadmium ug/L | <20 | <20 |
| Mercury µg/L | <0.2 | <0.2 |
| Selenium µg/L | <0.74 | <0.74 |
| Barium ug/L | 42 | 42 |

# Attachment E4 Ballingeary Upstream Table E4

| Sample Date | 14/05/2009 | |
|---|---|---|
| Sample | River | Average |
| Sample Code | GT659 | |
| Flow $M^3$/Day | * | |
| pH | 7.4 | 7.4 |
| Temperature °C | * | * |
| Cond 20°C | 91 | 91 |
| SS mg/L | <2.5 | <2.5 |
| $NH_3$ mg/L | <0.1 | <0.1 |
| BOD mg/L | 1 | 1 |
| COD mg/L | <21 | <21 |
| TN mg/L | 0.85 | 0.85 |
| Nitrite mg/L | <0.10 | <0.10 |
| Nitrate mg/L | 0.51 | 0.51 |
| TP mg/L | <0.05 | <0.05 |
| O-PO4-P mg/L | <0.05 | <0.05 |
| SO4 mg/L | <30 | <30 |
| Phenols µg/L | <0.10 | <0.10 |
| Atrazine µg/L | <0.01 | <0.01 |
| Dichloromethane µg/L | <1 | <1 |
| Simazine µg/L | <0.01 | <0.01 |
| Toluene µg/L | <0.28 | <0.28 |
| Tributyltin µg/L | not required | not required |
| Xylenes µg/L | <1 | <1 |
| Arsenic µg/L | <0.96 | <0.96 |
| Chromium ug/L | <20 | <20 |
| Copper ug/L | <20 | <20 |
| Cyanide µg/L | <5 | <5 |
| Fluoride µg/L | <100 | <100 |
| Lead ug/L | <20 | <20 |
| Nickel ug/L | <20 | <20 |
| Zinc ug/L | <20 | <20 |
| Boron ug/L | <20 | <20 |
| Cadmium ug/L | <20 | <20 |
| Mercury µg/L | <0.2 | <0.2 |
| Selenium µg/L | <0.74 | <0.74 |
| Barium ug/L | <20 | <20 |

# Attachment E4 Ballingeary Downstream Table E4

| Sample Date | 14/05/2009 | |
|---|---|---|
| Sample | River | Average |
| Sample Code | GT658 | |
| Flow $M^3$/Day | * | |
| pH | 7.4 | 7.4 |
| Temperature °C | * | * |
| Cond 20°C | 91 | 91 |
| SS mg/L | <2.5 | <2.5 |
| $NH_3$ mg/L | 0.1 | 0.1 |
| BOD mg/L | 1 | 1 |
| COD mg/L | <21 | <21 |
| TN mg/L | 0.92 | 0.92 |
| Nitrite mg/L | <0.10 | <0.10 |
| Nitrate mg/L | 0.51 | 0.51 |
| TP mg/L | 0.052 | 0.052 |
| O-PO4-P mg/L | <0.05 | <0.05 |
| SO4 mg/L | <30 | <30 |
| Phenols µg/L | <0.10 | <0.10 |
| Atrazine µg/L | <0.01 | <0.01 |
| Dichloromethane µg/L | <1 | <1 |
| Simazine µg/L | <0.01 | <0.01 |
| Toluene µg/L | <0.28 | <0.28 |
| Tributyltin µg/L | not required | not required |
| Xylenes µg/L | <1 | <1 |
| Arsenic µg/L | <0.96 | <0.96 |
| Chromium ug/L | <20 | <20 |
| Copper ug/L | <20 | <20 |
| Cyanide µg/L | 5 | 5 |
| Fluoride µg/L | <100 | <100 |
| Lead ug/L | <20 | <20 |
| Nickel ug/L | <20 | <20 |
| Zinc ug/L | <20 | <20 |
| Boron ug/L | <20 | <20 |
| Cadmium ug/L | <20 | <20 |
| Mercury µg/L | <0.2 | <0.2 |
| Selenium µg/L | 1.1 | 1.1 |
| Barium ug/L | 57.62 | 57.62 |

## D0431-01 Attachment E4 tabulation of monitoring results for compliance purposes against SI 272 of 2009 for comparison purposes where results are below LOD for analytical method

| Sample Date | 14/05/2009 | Average | 95% percentile |
|---|---|---|---|
| Sample | Upstream River | | |
| Sample Code | GT659 | | |
| $NH_3$ mg/L | 0.032 | **0.032** | **0.032** |
| O-PO4-P mg/L | 0 | **0** | **0** |
| Chromium ug/L | <1 | **<1** | **n/a** |
| Copper ug/L | <1 | **<1** | **n/a** |
| Lead ug/L | <1 | **<1** | **n/a** |
| Nickel ug/L | <1 | **<1** | **n/a** |
| Zinc ug/L | <1 | **<1** | **n/a** |
| Boron ug/L | <1 | **<1** | **n/a** |
| Cadmium ug/L | <1 | **<1** | **n/a** |
| Barium ug/L | <1 | **<1** | **n/a** |

| Sample Date | 14/05/2009 | Average | 95% percentile |
|---|---|---|---|
| Sample | Downstream River | | |
| Sample Code | GT658 | | |
| $NH_3$ mg/L | 0.1 | **0.1** | **0.1** |
| O-PO4-P mg/L | 0.0215 | **0.0215** | **0.0215** |
| Chromium ug/L | <1 | **<1** | **n/a** |
| Copper ug/L | <1 | **<1** | **n/a** |
| Lead ug/L | <1 | **<1** | **n/a** |
| Nickel ug/L | <1 | **<1** | **n/a** |
| Zinc ug/L | <1 | **<1** | **n/a** |
| Boron ug/L | <1 | **<1** | **n/a** |
| Cadmium ug/L | <1 | **<1** | **n/a** |
| Barium ug/L | 57.62 | **57.62** | **n/a** |

<1 Note values of 0ug/l recorded as <1ug/l

## Revised Non-Technical Summary Sept 2010

Ballingeary is situated approximately twenty-three kilometres south west of Macroom, and approximately eight kilometres west of Inchigeelagh. The village functions as a local service centre and has a seasonal tourism trade, which is based largely on its location on the Macroom – Bantry road and is within close proximity to the National Forest Park at Gougane Barra.

Ballingeary is designated as a key village and is an important local service and commercial centre. The village itself also has a strong industrial base and is an important settlement as an employment provider for the wider area. Udaras na Gaeltachtha, which promotes employment opportunities within the area has a number of industrial premises within the village most of which are located to the southwest of the village centre. The village also provides seasonal summer school facilities for students and this is a significant contributing factor which needs to be considered for the design of a new waste water treatment facility.

### The Waste Water Works and the Activities Carried Out Therein



The wastewater needs of the village are currently served by a septic tank system located to the south of the village. The septic tank was built in 1930 to serve 10 houses. It currently serves 61 houses, 13 business premises, 2 schools, 1 Summer College, 1 community hall, public toilets and a GAA club. Effluent flows by gravity to the septic tank for treatment before discharge to the Bunsheelin River.

When the river floods the tank is completely covered and totally submerged. This can cause a back flow in the pipe network and the overflow of raw sewage on to the street. Raw sewage flows into the river as a result of the inadequate capacity of the tank. Cork County Council has identified that the existing system is no longer satisfactory and proposes to install an improved wastewater treatment plant (WWTP).

There are proposals to upgrade the Ballingeary Waste Water Treatment System to a 1,700 PE plant, this upgrade will include:

- Inlet Works
- Storm water Holding Tank
- Sludge Thickening and Storage facilities
- 2 No. Aeration Tanks c/w diffused aeration
- 2 No. Final Settlement Tanks with sludge return and waste facilities
- Phosphorus Dosing Facility

It is unlikely that this upgrade will be carried out during the lifetime of the license.

### The Sources of Emissions from the Waste Water Works

The population load for the Ballingeary agglomeration arises from the following areas:

- Domestic population
- Commercial premises
- Industrial premises
- Schools
- Infiltration

Other potential emissions from the waste water treatment plant include odour generated from the treatment process – there have been no recorded issues to date.

**The nature and quantities of foreseeable emissions from the waste water works into the receiving aqueous environment as well as identification of significant effects of emissions on the environment**

The final effluent is discharged to the Bunsheelin River, approximately 100m up-stream of the Bunsheelin – Lee confluence. Currently, the waste water treatment facility is receiving effluent from a PE of 650 at peak season. For a PE of 650 there is a potential Dry Weather Flow (DWF) of approximately 150m$^3$ entering the plant each day. The PE of Ballingeary increases by approximately 25% from winter to summer. In the winter there would be a DWF of approximately 120 m$^3$ entering the plant each day.

There are proposals to upgrade the waste water treatment facility to a 1,700PE plant with provisions to further upgrade to a 2,300PE plant in the future. This proposed upgrade would greatly reduce the effects of the emissions on the receiving environment. There is no storm water overflow from the septic tank therefore all discharges to the river are conveyed via the primary discharge point.



It is unlikely that this upgrade will be carried out during the lifetime of the license.

**The proposed technology and other techniques for preventing or, where this is not possible, reducing emissions from the waste water works**

**Technology**
The new WWTP will have a sufficient number of standby pumps, streams, storm holding facilities, sludge holding facilities, etc is provide to ensure continuation of the waste water treatment.

The new plant will include the following elements:
- Inlet Screening
- 2 No Aeration Tanks
- 2 No Final Settlement tanks
- Sludge thickening and storage facilities
- Phosphorus dosing facilities

**Techniques**

The new WWTP shall be operated and maintained in accordance with the best practice shall comply with the standards set down in the proposed design.

**Further measures planned to comply with the general principle of the basic obligations of the operator, i.e., that no significant pollution is caused**

The upgrading of the plant will ensure that the basic obligations of the operator are being adhered to.

**Measures planned to monitor emissions into the environment**

The Cork County Council Environmental Laboratory carries out sampling of the influent and effluent. The Cork County Council Environmental Department located in Inniscarra takes samples from the Bunsheelin River upstream and downstream of the wastewater treatment plant discharge point.