



**southern scientific
services ltd**

TERRESTRIAL & AQUATIC ECOLOGY
RE: MILLSTREET TREATMENT PLANT UPGRADE

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1.0 Introduction

Southern Scientific Services Ltd. was commissioned by Mott Mac Donald Pettit to carry out a terrestrial and aquatic ecological assessment as part of the planned upgrading of the wastewater treatment plant (WWTP) at Millstreet. The survey area, as outlined in this report, includes the length of the Tanyard Stream from the existing WWTP to the confluence with the River Finnow and also a stretch of the River Finnow from Finnow Bridge to the confluence with the River Blackwater. Refer to Figure 1– Appendix 1, which outlines the survey area.

At present there are 2 no. options under consideration for the route of the outfall pipe from the WWTP to the proposed point of discharge, namely along the Tanyard stream or along the third class road from the WWTP to Finnow Bridge. Also, there are 5 no. options under consideration for the proposed point of discharge, which are as follows and as outlined in Figure 4 – Appendix 1:

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

1.1 Survey Limitations

The site survey was conducted during November/December 08. This is outside the field season as recommended in the Draft Habitat Survey Guidelines – A standard Methodology for Habitat Survey and Mapping in Ireland. These guidelines state that in general surveys should be conducted during the main growing season for plants between March/early April and mid/late October. Those species identified during the survey are documented within the report together with those thought likely to occur having regard to the habitats present.

It was also outside the EPA's recommended time period for undertaking Q rating assessments, namely May to September.

1.2 Key Objectives of the Survey

- To identify the habitats and their associated flora existing throughout the site and to determine the wildlife value of these habitats
- To identify the fauna, including avian fauna existing throughout the survey area and surrounds and to determine their conservation status
- To assess the existing aquatic ecology of both the Tanyard stream from the WWTP to the confluence with the River Finnow and also the River Finnow from Finnow Bridge to the confluence with the River Blackwater.

- To assess the likely impacts (direct, indirect, cumulative & residual), if any, on the existing aquatic and terrestrial habitats and the associated flora & fauna which may arise from the proposed upgrading of Millstreet WWTP and associated works
- To assess the likely impacts on the aquatic ecology of discharging treated effluent to the Tanyard Stream or the River Finnow.
- To outline mitigation measures, where necessary which will reduce or eliminate any likely impacts on the flora and fauna (terrestrial and aquatic)

1.3 Survey Methodology

This study consisted of both a desk study and a field assessment, which was carried out in accordance with the Habitat Survey Guidelines – A Standard Methodology for Habitat Surveys and Mapping in Ireland (Heritage Council). The habitat types identified and outlined in this report have been classified in accordance with “*A Guide to Habitat Types in Ireland*” (Fossit, J 2000) published by the Heritage Council.

This walkover survey does not provide for a comprehensive floral species list. However, the species documented are considered sufficient to describe and evaluate the ecological value of the terrestrial and aquatic survey areas.

The faunal survey was carried out by searching for dwellings, dropping and nesting/feeding areas. The habitat types identified throughout the survey area were used to predict the fauna thought likely to utilise the survey area.

“*Ecological Census Techniques – A Handbook*” (Sutherland, 2003) was also referred to during the field surveys.

The following material has been referred to throughout the assessment on fauna:

- *Irish Red Data Book: Vertebrates, Threatened Mammals, Birds, Amphibians and Fish in Ireland* (A. Whilde, 1993)
- *Birds of Conservation Concern in Ireland* (Newman et al 2000)
- *Bird Census Techniques 2nd Edition* (Bibby, C.J., Burgess, N.D., Hill, D.A., Mustoe, S.H 2000)
- *EU Birds Directive 79/409/EEC*

“*Threatened Mammals, Birds, Amphibians and Fish in Ireland*” (Whilde, A., 1993) is a comprehensive review of vertebrates in Ireland and defines the status of each species and outlines the conservation issues associated with the species.

"*Birds of Conservation Concern in Ireland*" (Newman et al, 2000) was published by Birdwatch Ireland and RSPB Northern Ireland, where a list of priority bird species for conservation action in Ireland was agreed. It classifies avian fauna according to their conservation status into three lists, where the red list will include only those species considered a high conservation concern, the amber list will include species of medium conservation concern and the green list will contain those birds which are not considered threatened. Each species has been assessed and categorised according to a number of criteria, which are set for each list.

Levels of ecological value have been assigned to each habitat identified within the site. These levels are based on Regini's (2000) Guidelines for Ecological Evaluation, whereby the evaluation considers the presence/absence of noteworthy species, a judgement of the viability of the habitat and the presence/absence of any designations on the site. Table 1 outlines these levels of ecological value.

Table 1: Levels of Ecological Value

Level A	International value
Level B	National Value
Level C	Regional Value
Level D	High Local Value
Level E	Moderate Local Value
Level F	Low Local Value
Level G	Negligible

This impact assessment and categorisation of the likely impacts is based on that outlined in the Advise Notes on Current Practice in the Preparation of Environmental Impact Statements – Glossary of Impacts. Table 2 serves as an outline of the definition of the impacts in terms of quality of impact, significance of impacts and duration, as applied in this report.

Table 2: Definition and Outline of Impacts

Quality of Impacts	<i>Positive Impact:</i> A change which improves the quality of the environment	<i>Neutral Impact:</i> A change which does not effect the quality of the environment	<i>Negative Impact:</i> A change which reduces the quality of the environment		
Significance of Impacts	<i>Imperceptible Impact:</i> Impact capable of measurement but without noticeable consequences	<i>Slight Impact:</i> An impact which causes notable changes in the character of the environment without affecting its sensitivities	<i>Moderate Impact:</i> An impact that alters the character of the environment in a manner that is consistent with existing and emerging trends	<i>Significant Impacts:</i> An impact which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment	<i>Profound Impact:</i> An impact which obliterates sensitive receptors
Duration of Impacts	<i>Short-term Impact:</i> Impact lasting one to seven years	<i>Medium-term Impact:</i> Impact lasting seven to fifteen years	<i>Long-term Impact:</i> Impact lasting fifteen to sixty years	<i>Permanent Impact:</i> Impact lasting over sixty years	<i>Temporary Impact:</i> Impact lasting for one year or less

Biological Water Quality Assessment Methodology:

Biological (Q rating) assessments of the Tanyard Stream and the River Finnow were also carried out as part of this assessment. Biological material for examination was obtained by a “kick sampling” technique in accordance with the EPA approved Quality Rating System and involved the following:

1. The sample was collected by means of a two-minute kick sampling technique of bottom dwelling invertebrates at the site, using a sampling net as recommended by the EPA. A standard hand net with a mesh size of 12 threads/cm was used for this monitoring event.
2. The samples were placed in a bucket along with some river water. Two-minute stone washing was also carried out to dislodge those organisms with efficient holdfast mechanisms. The bigger stones were returned to the river following this stone washing.
3. An alcohol solution is added to the samples to preserve them while awaiting analysis.
4. The sample was then transported to the laboratory for analysis.
5. The sample collected was placed on a white tray along with some river water.
6. Any large stones that had not been removed following stone washing were removed from the tray
7. The macroinvertebrate present were sorted and identified into major groups and numbers of species, genera families or classes (taxa) according to the Q (Quality) Rating system approved by the EPA
8. Where necessary further identification of macroinvertebrates was carried out using a low powered microscope

For the purpose of the EPA assessment procedure “macroinvertebrates have been divided into five arbitrary ‘Indicator Groups’ as follows: Group A, the sensitive forms, Group B the less sensitive forms, Group C, the tolerant forms, Group D, the very tolerant forms and Group E, the most tolerant forms.” (EPA Water Quality Report – Biological & Physico – Chemical Surveillance) The frequency of occurrence of macroinvertebrate groups is determined using the below table.

Table 3: Classification for Macroinvertebrate Abundance

Abundance Category	Approximate Frequency of Occurrence	
	Number	Percentage
One	1	-
Scarc / Few	2-5	<1%
Present in small numbers	6-10	<5%
Present in fair numbers	11-20	5 – 10 %
Common	21-50	10 – 20 %
Numerous	51-100	25 – 50 %
Abundant / Dominant	100-200	50 – 75%
Superabundant / Excessive	200+	>75%

Source: 1st Schedule S.I. 258 of 1998

A Q rating for the water quality is determined from the above table in conjunction with Part 1 and 2 of the 1st schedule S.I. 258 of 1998. A Q rating of 1 – 5 is assigned, which corresponds to a specified water quality classification as outlined in Table 4.

Table 4: Quality Rating Classifications

Q Value	Water Quality	Quality Classes
Q 5	Pristine, Unpolluted	Class A
Q 4	Unpolluted	Class A
Q 3-4	Slight Pollution	Class B
Q 3	Moderate Pollution	Class C
Q 2	Heavy Pollution	Class D
Q 1	Gross Pollution	Class D

Source: 1st Schedule S.I 258 of 1998

This report has been compiled following:

- Literature review of ecological documents and reports prepared for the Millstreet area and the River Finnow/Blackwater
- Site assessment carried out during November and December 08
- Consultation with the NPWS Rare Plant Database
- Consultation the National Parks & Wildlife Service – Mr. Barry O'Donoghue (awaiting response)
- Consultation with the Shannon Regional Fisheries Board – Mr. Andrew Gillespie
- Consultation with the site designations unit – NPWS

1.4 Site Designations

The site of the WTP does not form part of, or is not included within a pNHA, cSAC or SPA. However, the stretch of the River Finnow included in this report, namely from Finnow Bridge to the confluence with the River Blackwater is within the Blackwater River (Cork/Waterford) SAC (Site Code 002170). A section of the Tanyard Stream is also included within this SAC. Also included in this SAC are the lands bounding the River Finnow and a section of the Tanyard Stream. Refer to Figure 2, highlighting the sections of the survey area, which are within the SAC. It is proposed to discharge the treated wastewater into either one or other of these watercourses.

The Blackwater River is a candidate SAC selected for a number of habitats listed on Annex 1 of the E.U Habitats Directive, such as alluvial wet woodlands, Yew wood, floating river vegetation, estuaries, tidal mudflats and Oak Woodlands. The site is also selected for the following species listed on Annex II of the same directive – Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Crayfish, Twaite Shad, Atlantic Salmon, Otter and the plant, Killarney Fern.

Both the River Finnow and the Tanyard Stream flow into the Blackwater River, where Salmonids, Lamprey and the Freshwater Pearl Mussel are known to exist. Evidence exists to suggest the presence of Otters along a stretch of the River Finnow. Their presence was also confirmed by the landowner.

Candidate Special Areas of Conservation (cSAC) are protected under the European Union (EU) Habitats Directive (92/43/EEC) as implemented in Ireland by the European Communities (Natural Habitats) Regulations 1997. These are prime wildlife conservation areas in the country, considered to be important on a European as well as Irish level.

Proposed Natural Heritage Areas (pNHA) are the basic designation for wildlife in the Natural Heritage Area. Under the Wildlife Amendment Act 2000 NHAs will be legally protected from damage from the date they are formally proposed.

The EU Birds Directive (79/409/EEC) came into force in 1979 and it requires each member state to designate "Special Protection Areas" for birds. The Directive contains annexes, which are lists of birds, which require particular conservation measures (Annex I) and also species, which may be hunted, and species, which may be sold.

2.0 Existing Environment

Current land use within the survey area is classed as agricultural, where the predominant habitats identified include grassland, scrub and watercourses. The grassland areas support both cattle and horse grazing. Private residences also exist in the proximity of the wastewater treatment plant.

The following sections of the report outline details of the existing environment, which has been subdivided into 1. Terrestrial ecology and 2. Aquatic ecology.

1. The terrestrial component of the assessment aims to identify the main habitats and their associated vegetation within the survey area. It also includes an assessment of the fauna to include avian fauna (birds), mammals and amphibians, which were noted and/or thought likely to utilise the survey area. The terrestrial survey focuses predominately on the habitats present along the banks of the Tanyard stream and the River Finnow.
2. The aquatic component of the assessment focuses on the Tanyard stream from the WWTP to the confluence with the River Finnow and also the River Finnow from Finnow Bridge to the confluence with the River Blackwater. The aquatic assessment serves to determine the existing aquatic conditions and the likely impacts of the proposed discharging of treated wastewater on

the aquatic ecology of both the Tanyard stream and the River Finnow. It also addresses the likely impact on the aquatic ecology of the River Blackwater arising from the above-proposed discharge.

2.1 Terrestrial Ecology

2.1.1 Flora

As stated previously, this section outlines those habitats and their associated flora identified along the banks of the River Finnow and Tanyard stream. The NPWS Rare Plant Database was consulted and the site was crosschecked with this database. No rare species were recorded within the survey area. *Lycopodiella inundata* (Marsh Clubmoss) is recorded within the 10 Km grid at Churchhill.

The following habitats were identified during the site assessment (*Refer to Figure 3A & 3B: Habitat Maps, which outline the locations of the following habitats within the site – Appendix 1*). See also Appendix II, which contains pictures of the habitats discussed within this report. The habitats listed below are those, which were present during the site assessment. However, owing to the time of the year during which the survey was carried out, many of the floral species listed were not identified during the survey but are thought likely to occur having regard to the supporting habitats.

2.1.1.1 Wet Grassland (GS4)

This is the predominant habitat existing in the immediate vicinity of the Tanyard Stream and along sections of the bank of the River Finnow. This category is defined as that grassland which "*occurs on wet or waterlogged mineral or organic soils that are poorly drained or in some cases subjected to seasonal or periodic flooding*" (Fossit 2000). This category incorporates areas of poorly drained farmland, similar to that which is present within the survey area. The grassland identified onsite is indicative of non-intensive grassland.

The dominant grass species thought to exist within this wet grassland habitat include Bent grass (*Agrostis* species), Meadow grass (*Poa* species), Cock's foot (*Dactylis glomerata*) and Yorkshire fog (*Holcus lanatus*). Other vegetation noted throughout the grassland and thought likely to occur included an abundance of rushes (*Juncus effuses*, *Juncus articulatus*), Devil's bit Scabious (*Succisa pratensis*), Thistle (*Cirsium arvense*), Broad-leaved dock (*Rumex obtusifolius*), Creeping Buttercup (*Ranunculus repens*), Cuckooflower (*Cardamine pratensis*) and Yellow Iris (*Iris pseudocorus*).

A section of this habitat is located within the Blackwater River (Cork/Waterford) Site Code 002170. However, the remaining area of wet grassland is considered to have a low local ecological value having regard to the abundance of similar habitat in the surrounding area and the lack of floral diversity.

2.1.1.2 Improved Agricultural Grassland (GA1)

The wet grassland habitat forms mosaics with the improved agricultural grassland (GA1), which is defined as “*intensively managed or highly modified agricultural grassland that has been reseeded and/or regularly fertilised, and is now heavily grazed and/or used for silage making*” (Fossit 2000).

2.1.1.3 Scrub (WS1)

This habitat which is defined as “*areas that are dominated by at least 50% cover of shrubs, stunted trees or brambles and where canopy height is generally less than 5m, or 4m in the case of wetland area*” (Fossit, 2000) was noted along the eastern bank of the Tanyard Stream and in areas along the bank of the River Finnow. This scrub was found to be both open and dense at different locations and also found to occur scattered with woodland areas, namely in the vicinity of Wallis’s Bridge and on the eastern bank of the Tanyard stream in the vicinity of the confluence with the River Finnow.

Among the species noted within this habitat included Gorse (*Ulex europaeus*), Bramble (*Rubus fruticosus*), Hawthorn (*Crataegus monogyna*), Willow (*Salix spp*), Ash (*Fraxinus excelsior*), Beech (*Fagus sylvatica*) and Holly (*Ilex aquifolium*).

The above habitat constitutes a significant area of the overall survey area and is considered to have a moderate local ecological value. Sections of this habitat within the survey area are included in the Blackwater (Cork/Waterford) SAC.

2.1.1.4 Scattered trees (WD5)

The scrub habitat was found to grade into scattered trees (WD5) in areas. This habitat also occurred in isolation along stretches of the River Finnow. This category is used “*in situations where scattered trees, standing alone or in small clusters, cover less than 30% of the total area under consideration but are a prominent structural or visual feature of the habitat*” (Fossit 2000).

Among the species noted which constitute this habitat include Willow (*Salix spp*), Ash (*Fraxinus excelsior*), Beech (*Fagus sylvatica*) and Holly (*Ilex aquifolium*) with a small amount of coniferous tree occurring within this habitat also.

The above habitat constitutes a small portion of the overall site area (approximately 10%) and is assigned a low local ecological value.

2.1.1.5 Mixed Woodland (WD3)

This category is used to define woodland areas “*with 75-100% cover of conifers other than conifer plantation - WD4. The broadleaved component should be less than 25%*” (Fossit 2000). This habitat was noted along sections of the River Finnow in proximity to Wallis’s Bridge and stretching the confluence with the Blackwater River. It grades into scrub and scattered trees in areas.

This habitat is considered to have a moderate local ecological value in an area, which is dominated by agricultural grassland habitats.

2.1.1.6 Summary of Flora/Habitat Survey

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

2.1.2 Fauna

This section is subdivided into Birds (avian fauna), Mammals and Amphibians. It outlines those species observed during the site assessment and also those which although not noted are thought to occur within the survey area having regard to the habitats present and also local knowledge.

2.1.2.1 Birds (Avian Fauna)

The species listed and discussed below are based on those species recorded at the site during the survey, and also those thought likely to occur based on the habitats noted throughout the site and the surrounding locale.

With the exception of 13 species listed in Third Schedule of the Wildlife Act, 1976, all birds are protected under Irish Law and the Wildlife Act of 1976 and therefore careful assessment of suitable habitats within the site was required. Annex I refers to a list of species that require strict protection due to their populations declining seriously throughout their locality. No annex 1 species were noted within the survey area during the field assessment.

Bird diversity within the survey area was limited during the survey period and it was also outside the bird-breeding season. Therefore, the importance of the survey area with respect to birds, in particular the wooded areas adjacent to the Tanyard stream and the River Finnow could not be established.

A large population of Mallard (*Anas platyrhynchos*) exists along the Tanyard stream, downstream of the confluence with the sister stream. Other species, which were dominant during the site survey included Hooded Crow (*Corvus corone*), Jackdaw (*Corvus monedula*), Bullfinch (*Pyrrhula pyrrhula*) and Blue tit (*Parus caeruleus*). Table 5 outlines those species observed during the assessment.

Table 5: List of Bird Species Observed within the survey area

Species	Scientific Name	Conservation Status ^{Note 1}
Hooded Crow	<i>Corvus corone</i>	Favourable Status
Blue tit	<i>Parus caeruleus</i>	Favourable Status
Pheasant	<i>Phasianus colchicus</i>	Favourable Status
Meadow pipit	<i>Anthus pratensis</i>	Favourable Status
Jackdaw	<i>Corvus monedula</i>	Favourable Status
Bullfinch	<i>Pyrrhula pyrrhula</i>	Favourable Status
Starling	<i>Sturnus vulgaris</i>	Medium Status
Rook	<i>Corvus frugilegus</i>	Favourable Status
Meadow pipit	<i>Anthus pratensis</i>	Favourable Status
Robin	<i>Erithacus rubecula</i>	Favourable Status
Kestrel	<i>Falco tinnunculus</i>	Medium Status
Mallard	<i>Anas platyrhynchos</i>	

Note 1: Classification of Conservation Status is taken from the "Birds of Conservation Concern in Ireland" – Revised 2008

As mentioned previously, no Annex 1 were observed within the survey area during the time of the assessment.

2.1.2.2 Mammals

Mammal surveys were also conducted during the site assessment. The presence of mammals within the site was assessed in terms of reference to feeding signs, tracks, burrows and the presence of droppings. Mammals were identified with reference to Hayden *et al.* (2000) and "Ecological Census Techniques – A Handbook" (Sutherland, 2003) was also referred to during the field surveys.

No mammals were noted during the site survey within the study area. However, having regard to the habitats present and identification of droppings the following species are thought likely to frequent the site:

Bats: A detailed bat survey was not carried out within the study area as it was outside the suitable time for undertaking such surveys. Bats hibernate during winter from mid November to the end of March and therefore were not active during the survey period.

Bats will roost under bridges. However, owing to the proximity of Finnow Bridge to the level crossing at Millstreet train station and Wallis's bridge to the train line, the frequency of trains may have a bearing on the likelihood of use. No old buildings exist along the outfall routes, which would be considered suitable sites for bats.

Likely bat roosts may occur in the wooded areas adjacent to both the River Finnow and the Tanyard Stream. During the site survey the mature trees adjacent to the watercourses were assessed for their likelihood as bat roosts. For the most part bats will favour tree species such as oak, ash, beech, horse chestnut and other hollow forming trees. They may also use other species such as Scot's Pint where large areas of loose bark exist (Keeley, B. 2000). During this initial assessment of the trees no evidence of the presence of bat roosts were identified. However, mitigation measures are outlined below which serve to lessen the impact on bats, should they occur, during the installation of the outfall pipe and discharge point.

Badger (*Meles meles*): While no badger setts were identified during the survey of the site, it is nonetheless thought highly probable that Badgers travel across the site and its surrounds. The abundance of farmland/forestry mosaics within the study area and the local surrounds is a favoured habitat by the badger. However, the areas immediately adjacent to the river and the stream are not considered favourable habitat for badgers owing to the wet water logged nature of these soils.

The Badger is totally protected in Ireland and is listed in Appendix III of the Bern Convention as a species to be protected and whose exploitation must be regulated.

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

The population of otters in Ireland is of international importance and they are strictly protected throughout the country. They are listed in Annexes II and IV of the Habitats Directive as a species, which is of European interest. It is also listed as requiring strict protection in Appendix II of the Berne Convention.

Rabbit (*Oryctolagus cuniculus*): Rabbit burrows (warrens) were noted throughout the site and feeding signs characteristic to rabbits was also noted. The Rabbit is an important part of the diet for mammals such as the Fox and Badger.

Fox (*Vulpes vulpes*): Owing to presence of the scrub/mixed woodland habitats within the study area, which would provide shelter coupled with the dense vegetation along sections of the River Finnow and particularly the Tanyard Stream, it is thought highly probable that the fox would frequent the study area.

Pygmy Shrew (*Sorex minutus*): The areas of scrub along the Tanyard stream and the hedgerow to the public road will most likely be utilised by the pygmy shrew. It may also be found in the areas of

scrub and also within the ground layer vegetation among the scattered trees. The Pygmy Shrew is very common in Ireland, although it may be locally rare depending on food supply.

Mink (*Mustela vison*): It is highly likely that the Mink exists within the survey area owing to the presence of the River Finnow and Tanyard stream. The mink is known to be an extremely adaptable and opportunistic animal that is not usually found far from water.

Other mammals, which may exist within the survey area having regard to the habitats present, include the Woodmouse (*Apodemus sylvaticus*), Hedgehog (*Erinaceus europaeus*) and Irish Hare (*Lepus timidus hibernicus*).

2.1.2.3 Amphibians

Of the three Irish Amphibians (Natterjack toad, Frog and the Smooth Newt) the Common Frog is the most likely to occur at the site. This species is listed as Internationally important in the Irish Red Data Book 2. It is however, known to be both widespread and abundant in Ireland. This species was not observed during the site survey.

2.2 Aquatic Ecology

The aquatic component of this assessment focuses on the Tanyard stream and the River Finnow, at the following locations:

- Tanyard stream – from the WWTP to the confluence with the River Finnow.
- River Finnow – from Finnow Bridge to the confluence with the River Blackwater, downstream of Wallis's bridge.

2.2.1 Tanyard stream

This section of the stream was assessed in terms of a proposed outfall route from the WWTP and also in terms of the location of a discharge point from the outfall pipe. There are 3 no. location along the Tanyard stream under consideration as a possible discharge point.

The stream was found to vary in width at different locations. However, in general, the section adjacent to the existing WWTP was found to be narrower than that further downstream. On average the stream was found to be approximately 2 – 2.5 meters in width, with an average depth of 20cm. The Tanyard stream is heavily treelined on either side of the stream bank. Dense scrub also exists along sections of the eastern stream bank.

Among the vegetation noted and thought likely to occur along the bank of the river included Hart's tongue (*Phyllitis scolopendrium*), Hard Fern (*Blechnum spicant*), Male Fern (*Dryopteris affinis*),

Redshank (*Polygonum persicaria*), Lesser celandine (*Ranunculus ficaria*), Marsh cinquefoil (*Potentilla palustris*), Ivy (*Hedera helix*), Bramble (*Rubus fruticosus*), Holly, Ash (*Fraxinus excelsior*) and Beech (*Fagus sylvatica*).

A number of grab surface water samples were obtained from the Tanyard stream from May to August 2008. Results of this analysis are outlined in tables 7 - 9 below (as provided by client). A biological assessment was carried out by Southern Scientific Services Ltd on the Tanyard stream to establish the Q rating. Results of this are outlined in table 10 below.

Table 7: Results of Chemical Water Quality Analysis -
Tanyard stream – Location 1: Immediately upstream of existing outfall (treated effluent/overflows) at the WWTP

Parameter	12/05/2008	29/05/2008	11/06/2008	24/06/2008	09/07/2008	26/08/2008	Median	Max
pH	7.2	7.0	7.2	7.2	7.2	7	7.2	7.2
Electrical Conductivity (ECuScm-1)	287	266	264	254	221	226	259.0	287.0
Dissolved Oxygen DO mg/l	8.8	8.0	7.7	7	9.2	9.2	8.8	9.2
% Satn	85	75	74	70	89	90.4	80.0	90.4
Temperature o C	13.4	11.7	13.8	12	13	14.1	13.2	14.1
Ammonical Nitrogen NH3-N (mg/l)	0.82	-	0.8	0.9	0.07	0.2	0.8	0.9
Chemical Oxygen Demand (mg/l)	5	19	18	18	6	18	18.0	19.0
cBiological Oxygen Demand (mg/l)	3	4	5	3	2	2	3.0	5.0
Ortho-Phosphate-P (mg/l)	0.36	0.24	0.1	0.06	0.08	0.12	0.1	0.4
Total Phosphate-P (mg/l)	0.44	0.27	0.2	0.1	0.11	0.2	0.2	0.4
Suspended Solids (mg/l)	2	2.8	2	2	3	6	2.4	6.0
Nitrate N03-N (mg/l)		4.1	4.8	3.8	3.8	3.4	3.8	4.8
Total Nitrogen		4.3	4.9	4.2	3.9		4.3	4.9

Table 8: Results of Chemical Water Quality Analysis
Tanyard Stream – Location 2: Upstream of confluence with sister stream and downstream of existing outfalls (treated effluent/overflows)

Parameter	12/05/2008	29/05/2008	11/06/2008	24/06/2008	09/07/2008	26/08/2008	Median	Max
pH	7.1	7.2	7.2	7.2	7.2	7	7.2	7.2
Electrical Conductivity (ECuScm-1)	273	286	261	254	220	224	257.5	286.0
Dissolved Oxygen DO mg/l	9.5	7.4	7.9	9	9.2	9.2	9.1	9.5
% Satn	91	69	77	85	89	90.3	87.0	91.0
Temperature o C	13.6	11.9	14	13	13	14.1	13.3	14.1
Ammonical Nitrogen NH3-N (mg/l)	0.48	0.1	0.8	0.9	0.07	0.2	0.3	0.9
Chemical Oxygen Demand (mg/l)	10	11	25	19	12	16	14.0	25.0
cBiological Oxygen Demand (mg/l)	3	5	4	4	2	2	3.5	5.0
Ortho-Phosphate-P (mg/l)	0.26	0.34	0.1	0.05	0.07	0.1	0.1	0.3
Total Phosphate-P (mg/l)	0.36	0.41	0.2	0.1	0.11	0.1	0.2	0.4

Suspended Solids (mg/l)	5	5	3	6	5	5	5.0	6.0
Nitrate N03-N (mg/l)		4.1	4.5	3.7	3.8	3.4	3.8	4.5
Total Nitrogen		4.4	4.8	4.1	3.9	3.9	4.1	4.8

Table 9: Results of Chemical Water Quality Analysis

Tanyard Stream – Location 3: Downstream of the confluence with the sister stream

Parameter	12/05/2008	29/05/2008	11/06/2008	24/06/2008	09/07/2008	26/08/2008	Median	Max
pH	7.1	7.2	7.2	7.2	7.2	7.1	7.20	7.2
Electrical Conductivity (ECuScm-1)	257	277	248	244	217	319	252.50	319.0
Dissolved Oxygen DO mg/l	8.5	6.9	7.4	8	7.7	9.5	7.85	9.5
% Satn	82	65	71	74	77	93.8	75.50	93.8
Temperature °C	13.2	11.9	13.9	12	14	14	13.55	14.0
Ammonical Nitrogen NH3-N (mg/l)	0.54	0.8	0.4	0.5	0.06	0.1	0.45	0.8
Chemical Oxygen Demand (mg/l)	16	11	16	24	11	14	15.00	24.0
Biological Oxygen Demand (mg/l)	6	5	3	3	2	2	3.00	6.0
Ortho-Phosphate-P (mg/l)	0.22	0.33	0.2	0.08	0.07	0.1	0.15	0.3
Total Phosphate-P (mg/l)	0.32	0.40	0.2	0.2	0.11	0.1	0.20	0.3
Suspended Solids (mg/l)	9	9	<2	3	6	5	6.00	9.0
Nitrate N03-N (mg/l)		3.6	4.4	3.6	3.8	3.6	3.61	4.4
Total Nitrogen		4	4.6	4	3.9		4.00	4.6

Table 10: Results of Biological Assessment - Tanyard stream

SAMPLING LOCATION	SAMPLING DATE	RESULT Q rating
Downstream of confluence with sister stream	26 th November 08	Q3

Based on the above assessment and physical characteristics of the stream, it can be concluded that the Tanyard stream has a Q rating of 3, whereby the water quality is classed as doubtful and the pollution status is classed as moderately polluted.

The South Regional Fisheries Board have stated that the Tanyard stream does support a population of trout. Also their staff has, in recent years, observed adult salmon in the stream.

2.2.2 River Finnow

The River Finnow from Finnow Bridge to the confluence with the River Blackwater was also assessed as part of the aquatic survey. The following locations along the River Finnow are being considered as a possible point of discharge:

- Finnow Bridge
- Confluence of the River Finnow with the Tanyard stream
- Upstream of Wallis's Bridge at the confluence of the River Finnow with the Blackwater River.

The section of the River Finnow included within the survey area, namely from Finnow Bridge to the confluence with the River Blackwater is within the Blackwater River (Cork/Waterford) SAC (Site Code 002170). The River Finnow contains valuable salmonid spawning and nursery habitat for salmon and trout including resident adult trout. Following consultation with the South Regional Fisheries Board, it has been established that significant recorded salmonid spawning habitats are located upstream of the confluence of the River Finnow and Tanyard Stream.

The section of the River Finnow surveyed was found to be approximately 8-10 meters in width. The banks of the river were for the most part treelined, with dense cover noted along either bank from the confluence with the Tanyard stream to the confluence with the River Blackwater. Agricultural grassland was noted on either river bank from Finnow Bridge to the confluence with the Tanyard stream.

A number of grab surface water samples were also obtained from the River Finnow from May to August 2008. Results of this analysis are outlined in tables 11-12 below (as provided by client). Two no. sampling locations along the River Finnow were chosen, namely:

- River Finnow by the Bridge
- Downstream of Finnow/Tanyard confluence but upstream from the discharge from Drishane Convent

A biological assessment was also carried out by Southern Scientific Services Ltd on the River Finnow to establish the Q rating. Results of this are outlined in table 13 below.

Table 11: Results of Chemical Water Quality Analysis
River Finnow – Location 4: River Finnow by the Bridge

Parameter	12/05/2008	29/05/2008	11/06/2008	24/06/2008	09/07/2008*	26/08/2008	Median	Max
pH	7.5	7.4	7.4	7.4	7	7.2	7.4	7.5
Electrical Conductivity (ECuScm-1)	159	160	166	154	140	168	159.5	168.0
Dissolved Oxygen DO mg/l	12	13	10.6	11	10	10.5	10.8	13.0
% Satn	120	124	106	102	99	103.6	104.8	124.0
Temperature °C	14	12.5	15.2	13	13.5	14.3	13.8	15.2

Ammonical Nitrogen NH3-N (mg/l)	0.05	0.05	0.07	0.18	0.05	0.05	0.1	0.2
Chemical Oxygen Demand (mg/l)	<5	18	14	20	21	16	18.0	21.0
cBiological Oxygen Demand (mg/l)	<2	2	2	1	2	2	2.0	2.0
Ortho-Phosphate-P (mg/l)	<0.05	0.05	0.05	0.04	0.05	0.05	0.1	0.1
Total Phosphate-P (mg/l)	<0.05	0.05	0.07	0.06	0.08	0.05	0.1	0.1
Suspended Solids (mg/l)	2	2	2	2	11	2	2.0	11.0
Nitrate N03-N (mg/l)		1.8	2	1.4	1.3	1.8	1.8	2.0
Total Nitrogen		2.1	2.3	1.9	1.9		2.0	2.3

Table 12: Results of Chemical Water Quality Analysis
River Finnow – Location 5: Downstream of the Finnow/Tanyard confluence but Upstream of discharge from Drishane Convent

Parameter	12/05/2008	29/05/2008	11/06/2008	24/06/2008	09/07/2008*	26/08/2008	Median	Max
pH	7.2	7.4	7.2	7.3	7.1	7	7.2	7.4
Electrical Conductivity (ECuScm-1)	287	174	182	143	144	150	162.0	287.0
Dissolved Oxygen DO mg/l	8.8	10	9.2	10	8.1	10.2	9.6	10.2
% Satn	85	95	91	94	82	101	92.5	101.0
Temperature ° C	13.4	12.1	14.6	13	8	14.4	13.2	14.6
Ammonical Nitrogen NH3-N (mg/l)	0.82	0.1	0.08	0.15	0.05	0.05	0.1	0.8
Chemical Oxygen Demand (mg/l)	5	5	13	12	9	20	10.5	20.0
cBiological Oxygen Demand (mg/l)	3	2	2	1	2	2	2.0	3.0
Ortho-Phosphate-P (mg/l)	0.36	0.05	0.06	0.05	0.05	0.05	0.1	0.4
Total Phosphate-P (mg/l)	0.44	0.07	0.14	0.07	0.08	0.05	0.1	0.4
Suspended Solids (mg/l)	2	3	2	2	2	2	2.0	3.0
Nitrate N03-N (mg/l)		1.8	2.4	1.5	1.8	1.6	1.8	2.4
Total Nitrogen		2.2	2.6	2.1	2.2	2	2.2	2.6

Table 13: Results of Biological Assessment - River Finnow

SAMPLING LOCATION	SAMPLING DATE	RESULT Q rating
Upstream of confluence with Tanyard Stream	26 th November 08	Q3-4

Based on the above assessment, it can be concluded that the River Finnow has a Q rating of 3-4, whereby the water quality is classed as variable with a pollution status of slight.

The River Finnow is a tributary of the River Blackwater, which is known to support populations of Salmonids, Lamprey and Fresh Water Pearl Mussels. There are no available records to suggest that Lamprey or the Fresh Water Pearl Mussel exist within the River Finnow. The DoEHLG were contacted regarding the presence or absence of these species within the River Finnow. Southern Scientific Services Ltd are currently awaiting their response.

3.0 Likely Significant Impacts

The following impact assessment and categorisation is based on that outlined in the Advise Notes on Current Practice in the Preparation of Environmental Impact Statements – Glossary of Impacts.

Likely impacts on the existing ecology of the area arising from the proposed upgrading of Millstreet WWTP are discussed in terms of the those impacts likely during the construction phase of the development and also the likely impacts during the operational phase of the development.

3.1 Impacts on Flora

3.1.1 Impacts during the Construction Phase

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

Construction work within the existing WWTP site is not expected to result in a significant negative impact on flora/habitats as the site is predominantly under hardcore surface. Works within this area will not result in the disturbance to or the loss of habitat. Therefore this section of the site is not considered further in the impact assessment.

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

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

The wet grassland habitat which exists along the stretch of the Tanyard stream from the WWTP to the confluence would experience the greatest impact, whereby sections of this habitat would be disturbed to facilitate the laying of the pipe. However, it is expected that the vegetation in this area would re

establish itself over time. Therefore, the impact of the development on the wet greasland is considered an imperceptible negative impact.

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

Overall, the grassland area will experience the most significant habitat loss. However, having regard to the fact that this habitat does not have a high ecological value coupled with the large areas of similar habitat in the surrounding area, it is not thought that the construction phase of the development will have a significant negative impact on the grassland habitat.

Overall, while the construction phase will result in the loss of habitat area and thus have a long-term negative impact on these habitats, this phase of the development is not considered a significant negative impact.

3.1.2 Impacts during the Operational Phase

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

3.2 Impacts on Fauna

The greatest impact on fauna within the survey area will occur during the construction phase of the development, particularly along the route of the outfall pipe from the WWTP to either the confluence with the River Finnow or the confluence with the River Blackwater.

3.2.1 Impacts during the Construction Phase

3.2.1.1 Impacts on Birds

The greatest negative impact on birds will arise during the construction phase arising from (i) habitat loss and (ii) disturbance. Habitat loss will arise due to the physical placement of the outfall pipe from the WWTP to the point of discharge. Disturbance will arise predominantly as a result of increased human activity and the noise from onsite machinery. As determined above the loss of habitat is not considered significant. Therefore, the impact on the existing bird population arising from removal of habitat during the construction phase is not considered significant but rather an imperceptible negative impact.