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Our Ref : JC/MC

4th August 2009

Administration , Environmental Licensing Programme
Office of Climate, Licensing & Resource Use
Environmental Protection Agency
Headquarters, PO Box 3000
Johnstown Castle Estate
Co Wexford

RE : Waste Water Discharge Licence for the Clonegal Waste Water Works

Dear Sir

In relation to the Waste Water Discharge Licence for the Clonegal Waste Water Works and as requested please find attached Appropriate Assessment of Biological Impacts of Clonegal Waste Water Works on Special Area of Conservation 000781.

The Appropriate Assessment is provided in the form of one original copy plus one further copy also one copy in electronic PDF format on CD Rom.

Should you have any queries in relation to the attached please do not hesitate to contact the undersigned Jerry Crowley, Water Services Department, Carlow County Council telephone number 059 9136263 or 9136225.

Yours sincerely

Jerry Crowley
Senior Executive Engineer
Water Services

C A R L O W
COUNTY COUNCIL
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Appropriate Assessment of Biological Impacts of Clonegal Waste Water Works on Special Area of Conservation 000781

July 2009

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1. INTRODUCTION

The present report by Pascal Sweeney, Consultant Ecologist, was commissioned by Carlow County Council. The discharge from Clonegal Waste Water Works enters the River Derry within Special Area of Conservation 000781 (Slaney River Valley SAC). Under Article 6(3) of the EU Habitats Directive, there is a requirement for an Appropriate Assessment of the implications for the designated site of a discharge such as this, in view of the site's conservation objectives.

The objective of this report is to establish the implications of the existing discharge on the protected habitats and species within SAC 000781.

Because the discharge from Clonegal Waste Water Works is to a river with unpolluted conditions (Q4) recorded in the latest EPA results both upstream and downstream of the discharge, further field investigations were deemed unnecessary. This Appropriate Assessment report is a desktop study.

The scope of this assessment is :

- Review of EPA Q-values.
- Review of available chemical data.
- Likely occurrence of protected aquatic species at and downstream of the proposed discharge point, based on habitat suitability and available records.
- Likely impacts of the discharge on protected aquatic species and habitats.
- Cumulative effects on the qualifying interests of the Natura 2000 site.
- Measures to mitigate negative impacts on the protected species and habitats.

2. METHODOLOGY

Because the Clonegal Waste Water Works is already in existence, the current impact on the biota of the receiving environment can be directly assessed. Biological water quality assessment is based on EPA Q-values and available chemical data. Available records of species listed in Annex II of the EU Habitats Directive were checked.

3. RESULTS

3.1 EPA Q-values

The Clonegal Waste Water Works outfall is on the River Derry, between EPA Sites 900 and 1000. Site 1000 was not assessed in the most recent (2007) EPA Q-scheme monitoring. The River Derry enters the River Slaney between EPA Sites 1600 and 1800.

EPA Q-values for the River Derry and for the River Slaney downstream of Site 1600 are presented in Appendix 1. The 2007 results show unpolluted conditions (Q4) at all site on the River Derry and at Site 1800 on the River Slaney downstream of the confluence.

The most recent EPA Q-value results therefore do not show the discharge from Clonegal Waste Water Works to be having any impact on biological water quality.

3.1 Chemical Data

The EPA 2006 chemical results are the most recent for which there are corresponding data for both Sites 900 (upstream) and 1000 (downstream). These are presented in Appendix 2.

Available chemical data from Carlow County Council are for the inlet and outfall only and, without relevant detailed flow data, are less useful in assessing the impact within the river.

At the downstream site, one high orthophosphate result was recorded in January 2006 and one elevated BOD_5 was recorded in July 2006. No difference in the mean nitrate level was seen. The mean ammonia level was lower t the downstream site. Any slight differences in the chemical results between the upstream and downstream sites are not reflected in the EPA Q-value results.

3.3 Protected Habitats and Species.

In this section, the impact of Clonegal Waste Water Works discharge on each of the habitats and species for which the SAC is designated, is estimated. While the zone of potentially highest impact was taken as being from the discharge point to 1km downstream and this section of river was the main focus of the detailed investigation, the entire downstream freshwater section of the river was considered when assessing the presence of protected habitats and species and the potential effects of the discharge on these.

The Site Synopsis for the Slaney River Valley SAC states:

"The site is a candidate SAC selected for alluvial wet woodlands, a priority habitat on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for floating river vegetation, estuaries, tidal mudflats and old oak woodlands, all habitats listed on Annex I of the E.U. Habitats Directive. The site is further selected for the following species listed on Annex II of the same directive - Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Twaite Shad, Atlantic Salmon and Otter."

Some of the species and habitats listed above are terrestrial and could not be affected by the Clonegal Waste Water Works discharge. Some are estuarine, in which cases the distance from the outfall to the saline waters must be taken into account when assessing the likelihood of any impacts.

3.3a Protected Habitats

Floating River Vegetation

Of the Annex I habitats listed above, only floating river vegetation would occur within 1 km downstream of the discharge and is therefore considered to be the only Annex I habitat that could potentially be affected to any significant degree. A slight increase in plant nutrients would result in increased growth of floating river vegetation. A more substantial increase in plant nutrients could cause an increase in the competitive interactions between plant species, resulting in a loss of species. However, the available chemical data do not show an increase in plant nutrients downstream of the outfall that would have a negative impact on floating river vegetation.

Old Oak Woodlands

Terrestrial habitat, unaffected by discharges to rivers.

Alluvial Wet Woodlands

Alluvial wet woodland occurs along banks of the Slaney, particularly in the lower reaches and the tidal section, e.g. at Macmine marshes. Plant growth in this habitat could potentially be positively affected to some extent if there were increased nutrient concentrations in the water. However, no change in biological water quality was detected close to the outfall and the available chemical data do not show an increase in plant nutrients downstream of the outfall that would significantly impact on this habitat.

Estuary, Tidal Mudflats

Saline habitats which potentially could be affected by substantially increased nutrient concentrations in the freshwater sections of rivers. However, no change in biological water quality was detected close to the outfall and the available chemical data do not show an increase in plant nutrients downstream of the outfall that would significantly impact on this habitat, particularly considering the distance from Clonegal to saline waters and the dilution involved.

3.3b Protected Species

Freshwater Pearl Mussel (*Margaritifera margaritifera*)

Within SAC 000781, the freshwater pearl mussel population is concentrated in the Dereen River. Low numbers of found adult freshwater pearl mussels have also been found in the River Derry downstream of Clonegal and in the River Slaney main channel downstream of the River Derry confluence (Moorkens, 2000). Although the current biological water quality of the River Clonegal, both upstream and downstream of the Clonegal Waste Water Works is rated as unpolluted, Q4 is considered to be an unsatisfactory quality for a sustainable population of freshwater pearl mussels, which need pristine conditions for successful reproduction. However, as no decline in biological water quality associated with the discharge from Clonegal Waste Water Works in the most recent EPA Q-scheme survey, it is considered that the discharge is currently having no significant impacts on the remaining mussels downstream of the discharge.

Atlantic Salmon (*Salmo salar*)

The Site Synopsis for The Slaney River Valley SAC states:

"The Slaney is primarily a spring salmon fishery and is regarded as one of the top rivers in Ireland for early spring fishing. The upper Slaney and tributary headwaters are very important for spawning."

The main channel of the River Slaney, but not the River Derry, is a Salmonid Water, designated under the European Communities (Quality of Salmonid Waters) Regulations of 1988 (S.I. No. 293 of 1988). The chemical data presented in Appendix 2 are within the standards specified for compliance with these regulations in Salmonid Waters, both upstream and downstream of the outfall for the following parameters for which data are available: Temperature, Dissolved Oxygen, pH, Non-ionised Ammonia, Total Ammonium, Nitrite. The BOD_5, standard specified in these regulations is less than 5mg/l. The EPA 2006 data shows this BOD_5 level exceeded once and the downstream site. The egg and juvenile stages of the salmon life cycle are very vulnerable to deteriorations in water quality (Hendry and Cragg-Hine, 2003). A significant drop in water quality would also negatively affect adult salmon. As EPA Q-value results show unpolluted conditions both upstream and downstream of the outfall, no significant impacts on salmon are considered likely.

Brook Lamprey (*Lampreta planeri*) and **River Lamprey** (*Lampreta fluviatilis*)

King and Linnane (2004) report a widespread distribution of brook and river lampreys in the main channel of the main channel of the Slaney and in tributaries examined, including the Derry. A significant drop in water quality could negatively affect any lamprey population present. However, as EPA Q-value results show unpolluted conditions both upstream and downstream of the outfall, no significant impacts on these species are considered likely.

Sea Lamprey (*Petromyzon marinus*)

King and Linnane (2004) recorded low numbers of juvenile sea lamprey in tributaries of the river Slaney (including the Derry), but none in any of the 35 sites examined in the main channel. Kurz and Costello (1999) report that sea lamprey has occasionally been observed downstream of Enniscorthy. As EPA Q-value results show unpolluted conditions both upstream and downstream of the outfall, no significant impacts on this species are considered likely.

Twaite Shad (*Alosa fallax*)

Twaite shad is an anadromous fish which enters large estuaries in late April or May to spawn in gravels near the end of the freshwater reaches, with the only known spawning population of Twaite shad in Ireland occurring in the River Barrow (Doherty *et al.* 2004). Adult Twaite shad are also known to occur in the lower parts of the River Slaney (King and Linnane, 2004), although spawning has not been recorded here in recent years. Threats to Irish shad populations include deterioration of water quality and habitat degradation.

As EPA Q-value results show unpolluted conditions both upstream and downstream of the outfall, and given the distance from Clonegal Waste Water Works to the upstream end of the tidal range, no impacts are considered likely.

Otter (*Lutra lutra*)

Within the South Eastern River Basin District, which includes the River Slaney catchment, Baily and Rochford (2006) recorded positive results at nearly 73% of the sites surveyed (with no significant difference in the occurrence of otters between polluted and unpolluted sites), indicating a widespread distribution of the species. If water quality dropped to the extent that the abundance of prey species were significantly affected, otters could be negatively impacted. However, as prey species are plentiful in the River Slaney catchment, it is considered that the discharge is currently having no impacts on otters.

4. CONCLUSIONS

4.1 Conservation Objectives

Summarising the main threats to the designated site, the Site Synopsis for The Slaney River Valley SAC states:

"Waste water outflows, runoff from intensive agricultural enterprises, a meat factory at Clohamon and a landfill site adjacent to the river and further industrial development upstream in Enniscorthy and in other towns could all have potential adverse impacts on the water quality unless they are carefully managed."

The relevant conservation objective pertaining to the discharge to Clonegal Waste Water Works must therefore be to avoid impacts from high BOD, suspended solids and nutrients by proper treatment of the effluent before discharge to the river. The fact that the EPA Q-value results show no biological impact of the discharge indicates that this conservation objective is currently being achieved.

4.2 Cumulative Impacts

The 2007 EPA Q-ratings (Appendix 1) show unpolluted conditions (Q4 or better) at all site on the Derry River and at two of the five sites assessed on the River Slaney downstream of the Derry confluence. Slightly polluted conditions (Q3-4) were recorded at the other three Slaney sites, all of which are downstream of Bunclody.

The following facilities in the catchment of the River Derry have IPPC licences:

Duffy Meats Limited Trading As Kerry Foods, Code P0804-01. The licence specifies emission limits to the River Derry and the monitoring requirements.

Irish Flexible Packaging, Code P0108-01. The licence specifies that there will be no emissions to sewer or to waters and also specifies measures for the protection of groundwater and surface water and actions to be taken if contamination is detected.

The following facility in the catchment of the River Slaney, downstream of the River Derry confluence, have a waste licences:

Greenstar Limited (Enniscorthy), Licence Code W0241-01. The licence specifies that there are to be no direct emissions to groundwater. The licence also specifies conditions and limits for emission to sewer.

Killurin Landfill Site, Licence Code W0016-02. The licence specifies that there are to be no direct emissions to groundwater and that no leachate or contaminated surface water is to be discharged directly to the River Slaney catchment. All leachate is treated off-site at Enniscorthy WASTE WATER WORKS.

The following facilities in the catchment of the River Slaney, downstream of the River Derry confluence, have IPPC licences:

Slaney Foods International Limited and Slaney Proteins, Code P0074-03. The licence specifies emission limits to the River Slaney.

Hogg Enterprises Limited, Code P0622-01. The licence specifies measures for the protection of surface waters and groundwater at the facility. The licence also specifies conditions on the landspreading of the slurry produced.

Wexal International, Code P0394-01. The licence specifies measures for the protection of groundwater and surface water and emission limits to sewer and to the river Urrin. The licence also specifies the monitoring requirements for ground and surface water and actions to be taken if contamination is detected.

Rennard Pig Farms Limited, Code P0453-02. The licence specifies measures for the protection of surface waters and groundwater at the facility. The licence also specifies conditions on the landspreading of the slurry produced.

Provided that the facilities listed above comply with the terms of their licences, they will have no cumulative impact on the biological water quality of the River Nore, and on the conservation objectives of Special Area of Conservation 002162.

4.3 Mitigation Measures

The lack of detected biological impacts on the river indicates that the measures in place within Clonegal Waste Water Works are adequate to maintain the discharge at a quality that does not significantly impact on the conservation objectives of the Natura 2000 site. Details of mitigation measures within Clonegal Waste Water Works, provided by Carlow County Council, are presented in Appendix 4. In any future changes made to Clonegal Waste Water Works in terms of capacity or design that could impact on the effluent quality, it must be ensured that mitigation measures are adequate to avoid inputs to the river that would negatively impact on the conservation objectives of the SAC.

5. NON TECHNICAL SUMMARY

- A desktop assessment was carried out in order to assess the current effect, if any, of the discharge from Clonegal Waste Water Works on the Rivers Derry and Slaney and the implications of any such effects for protected habitats and species within the Special Area of Conservation (SAC).

- Recent EPA biological water quality assessment results indicates unpolluted conditions at all sites on the River Derry and at the site on the River Slaney downstream of the Derry confluence, indicating that that the effluent from Clonegal Waste Water Works is currently having no significant impact on the biological water quality.

- Five species and one habitat which are listed for protection under the EU Habitats Directive were identified as being present, or likely to be present at or downstream of the Clonegal Waste Water Works outfall.

- As the discharge is not resulting in any significant difference between the biota upstream and downstream of the discharge point, it appears unlikely that there could be any negative effects, either direct or cumulative, of the effluent on the protected habitats and species within the SAC.

- Mitigation measures currently in place in Clonegal Waste Water Works are adequate to prevent impacts on the qualifying interests of the SAC site, under present conditions.

APPENDIX 1

Derry River (12D02) EPA Q-values 2001 - 2007

Station No.	Station Location	2001	2004	2007
0100	Cross Br	4	3-4	4
0200	Tinahely Br	4	4-5	4
0350	Greenahill Br	4-5	4-5	4
0500	Shillelagh Br	3-4	3-4	4
0700	Balisland Br	4	4	4
0800	Ford N of Garryhasten	3-4*	4	
0900	Clonegall Br			4
1000	Just u/s Slaney R confl	4	4	

River Slaney (15N01) EPA Q-values 2001 - 2007

Station No.	Station Location	2001	2004	2007
1600	Kilcarry Br	3-4	3-4	4
1800	Slaney Br Bunclody	4	4	4
2000	1.3km d/s Clohamon Br	4	4-5	3-4
2100	Ballycarney Br	3-4	4	3-4
2200	Scarawalsh Br	-	-	4
2220	Just W of Salsborough Br	4	4	-
2400	1 km d/s Enniscorthy Br	-	-	3-4*

APPENDIX 2
CHEMICAL DATA – EPA MONITORING

	SampleDate	BOD mg/l O2	Ortho-phosphate mg/l P	Chloride mg/l	Nitrate mg/l N	Ammonium mg/l N	Non-ionised Ammonia mg/l NH3	Nitrite mg/l N	Dissolved Oxygen % O2	Conductivity @ 25°C uS/cm	Temperature °C	pH	Alkalinity mg/l CaCo3
Upstream	10/01/2006	2.0	0.041	22	4.7	0.13	0.0008	0.022	90	207	8.2	7.5	35
	21/03/2006	1.2	0.007	19	5.7	0.025	0.0001	0.005	96	199	6.4	7.5	
	25/04/2006	0.8	0.011	22	5	0.02	0.0004	0.02	112	203	11.3	7.9	32
	10/07/2006	1.7	0.019	22	4.1	0.009	0.0001	0.024	99	218	15.5	7.6	78
	30/08/2006	0.3	0.024	28	4.2	0.033	0.0006	0.013	99	251	13.3	7.8	
	02/11/2006	1.0	0.015	18	5.6	0.028	0.0001	0.007	94	204	7.9	7.3	39
Downstream	10/01/2006	1.1	0.2	22	4.8	0.055	0.0004	0.018	91	204	8.7	7.5	35
	21/03/2006	1.0	0.008	19	5.6	0.026	0.0001	0.006	97	198	6.8	7.5	
	25/04/2006	0.9	0.013	23	4.9	0.026	0.0005	0.019	113	201	11.3	7.9	31
	10/07/2006	8.4	0.015	22	4	0.005	0.0006	0.023	97	218	17.0	7.4	84
	30/08/2006	0.5	0.022	29	4.1	0.013	0.0002	0.01	101	252	13.6	7.8	

APPENDIX 3

REFERENCES

Bailey, M. and Rochford J. (2006) Otter Survey of Ireland 2004/2005. Irish Wildlife Manuals, No. 23. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

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Kurz, I. and Costello, M.J. (1999). An outline of the biology, distribution and conservation of lampreys in Ireland. Irish Wildlife Manuals No. 5, Dúchas, The Heritage Service.

Moorkens, E.A. (2000). Conservation Management of the Freshwater Pearl Mussel *Margaritifera margaritifera*. Part 2: Water Quality Requirements. Irish Wildlife Manuals No. 9, Dúchas, The Heritage Service.

APPENDIX 4

Clonegal WASTE WATER WORKS – Mitigation Measures

C A R L O W
COUNTY COUNCIL
COMHAIRLE CHONTAE CHEATHARLOCHA

CARLOW COUNTY COUNCIL

CLONEGAL WASTEWATER WORKS

WASTEWATER DISCHARGE LICENCE APPLICATION

Mitigation Measures for Biological Assessment

August 2009

Introduction

The purpose of a Waste Water Discharge licence is to make provision for the protection of the environment and the protection of human, animal and plant life from harm or nuisance caused by the discharge of Dangerous Substances to the aquatic environment as well as to ensure compliance with National Law. Waste Water Discharge Licensing encourages the use of advanced waste water treatment technologies, the regularisation of waste water discharges from primary and secondary discharge points and storm water overflows, improved efficiency and effectiveness of pollution control, and allows for a more streamlined regulatory system that is open and transparent.

Clonegal and the Catchment Area

Clonegal is located 30 kms south-east of Carlow Town. At present sewage is treated at a site to the south-west of the village in the Huntington Estate and effluent from the existing treatment works discharges to the Derry River, 150m downstream of Clonegal and about a mile upstream of where the River Derry joins the Slaney River. The catchment area consists of the village of Clonegal. No areas outside of the village of Clonegal are pumped or transferred to this WWTP.

Clonegal Waste Water Works

The existing WWTP had been built in mid 1970s for a designed capacity of 200pe. The WWTP currently is receiving a load of approximately over 400pe. The treatment works is over 30 years old and no longer providing adequate levels of treatment for the catchment it serves.

There was considerable development in the village during the recent building boom and there are currently planning permission for three further developments which incorporate an additional 46 housing units.

Carlow County Council have therefore decided to replace the existing wastewater treatment plant with a new larger WWTP with a proposed capacity of 1,000p.e.

The project has gone through the tendering process as a bundle with the Rathoe WWTP.

The successful tenderer was EPS Ltd from Mallow, Co Cork. Work is currently underway on the Rathoe WWTP Upgrade and work will commence on the Clonegal WWTP in late 2009 or early 2010.

The existing works at Clonegal consists of a secondary treatment works using an extended aeration process. There is a storm water overflow in the inlet manhole and there is a Forward Feed Pumping Station which lifts the flow into the aeration tank. The aeration tank is aerated by a vertical shaft surface aerator which is far too small. Aeration has been supplemented by a venturi aerator, which provides adequate aeration for the current load. Venturi aerators are not very energy efficient and are generally used as a temporary solution.

The secondary settlement tank is hydraulically over loaded particularly as the inflow can be high, particularly in storm conditions and the inlet pumps are oversized. This creates pumping high flows through the works when running, which hydraulically shock loads the settling tank every time. There is also sludge drying beds, with sludge wasted to them on a regular basis.

Carlow County Council is now progressing the procurement of the new Clonegal Waste Water Treatment Plant and the works will be funded through the monies given each year by the DEHLG for Small Schemes.

Tenders were received during May 2008 and the Tender has been awarded to Electrical & Pump Services Limited (EPS).

The contract included the design and construction of a waste water treatment plant with a capacity of 1,000pe.

The proposed works consist of the following:

- Automatic inlet screenings and grit removal.
- Automatic sampler on inlet and outlet.
- Two Sequential batch Reactor(SBR), D.O. probe and ferric sulphate dosing point.
- Forward feed pumping station.
- Was pumps.
- Tertiary sand filter.
- Ferric dosing system with drench shower and bund.
- Sludge holding tank with roof.
- Control building with electric form 4 panel.
- Strom water holding tank with capacity for 3DWF for 2 hours.
- Storm water return to treatment.

Sources of Emissions from the Waste Water Works

The Waste Water Treatment Works discharges final effluent and treated storm water into the Derry River, about a mile upstream from where the River Derry joins the Slaney River. There are no other emissions to the environment except for a minimal level of odour associated with a secondary treatment waste water works, there is no primary treatment and therefore no odours associated with primary sludges.

The effluent being transferred to the WWTP is a typical municipal sewage with no industrial or agricultural type discharges such as food processing.

The treated effluent entering the River Derry is consistent with the type of effluent associated with an activated sludge type process. There are no loadings coming to the WWTP that would be radically different from typical municipal sewage.

The potential loadings to the receiving waters are BOD, COD, Suspended Solids, Phosphorus, Nitrates and Ammonia.

Phosphorus loadings will be greatly reduced by the injection of Ferric Sulphate at the WWTP. There is no ferric dosing at the existing WWTP.

The specification for the proposed WWTP is very tight with the following parameters:

BOD, 10mg/l
SS, 10mg/l
Ammonia, 5mg/l
Total P, 1mg/l

The effects on the receiving waters of the treated effluent are greatly reduced by the treatment process at the WWTP. This includes the dosing of Ferric Acid and the provision of tertiary treatment at the WWTP. There is currently no tertiary treatment at the WWTP.

A stormwater overflow storage tank will also be provided and the effluent is returned to the main plant for full treatment. This will minimise the amount of untreated stormwater entering the River Derry.

Currently the WWTP does not have a storm water tank.

Water Framework Directive (WFD;

The objectives of the Water Framework Directive (WFD) are to protect all high status waters, prevent further deterioration of all waters and to restore degraded surface and ground waters to good status by 2015. A major programme is under way to achieve this target.

The provision by Carlow County Council of a new WWTW at Clonegal with secondary and tertiary treatment meets these objectives. The SERBD Draft Management Plan developed under the WFD is on display at present and the construction of the new WWTW at Clonegal meets the requirements of this plan.

The proposed WWTP will secure good water quality in the River Derry and subsequently into the River Slaney.

Urban Waste Water Treatment Directive (UWWTD);

The proposed new Clonegal Treatment Plant will be designed and constructed in line with all requirements under the UWWTD. Additional tertiary treatment is provided to protect the Slaney River and reduce phosphorous levels. The Slaney River is a designated Nutrient Sensitive Water Catchment.

Storm overflows from the WWTP will be recorded by an electromagnetic meter (magmeter) that displays the volume on the Panel in the Control Building. This reading will be recorded in a daily log book.

Habitat Directive;

The Slaney river valley is designated a candidate Special Area of Conservation (SAC), due to the presence of habitats and species listed in Annexes 1 and 11 of the EU Habitats Directive92/43/EEC.

It is a priority habitat under Annex I of the EU Habitats Directive92/43/EEC). It is also designated as such due to the presence of floating river vegetation, estuaries, tidal mudflats and old oak woodlands which are all habitats listed in Annex I of the EU Habitats Directive. Also Annex II species from the directive such as Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Twaite Shad, Atlantic Salmon and Otter are present in the Slaney River Valley.

The Fresh Water Pearl Mussel, Margaritefera Margaritefera, is of particular significance. This species is in serious decline and is in real danger of extinction. It is found mainly in the Munster Blackwater and also in the Barrow, Slaney, Dereen and Mountain Rivers. A separate species is found in the Nore. It is an excellent indicator of pristine waters as these mussels will only breed in high quality water.

If the programme of measures in the South East River Basin Management Plan can achieve the objective of creating the environment to allow these mussels to reproduce it will be a very good indicator of success as well as preventing its extinction.

The Slaney is also a designated salmonid river in accordance with EU Freshwater Fish Directive (78/659/EEC).

The River Slaney and its tributaries support a small non recruiting population of the freshwater pearl mussel particularly in the River Dereen which joins the River Slaney approximately 2.5km downstream of Tullow. A small adult population of freshwater mussel has been recorded in the main channel of the Slaney at the confluence with the River Dereen.

The effluent from the Clonegal WWTP enters the River Derry which enters the River Slaney well downstream of the River Dereen confluence with the River Slaney.

Receiving Waters

The primary discharge point from Clonegal Waste Water Treatment Plant is into the River Derry, 150 metres downstream from Clonegal Bridge.

The River Derry rises in County Wicklow, flows along the Wicklow-Carlow and the Carlow–Wexford borders and flows south west from Clonegal Village to join the River Slaney near Kildavin Village just upstream of Kildavin Bridge.

The EPA has a monitoring station (0900) at Clonegal Bridge which is upstream of the discharge from the Clonegal WWTP. In the EPA River Water Quality Report 2008 a Q-rating of 4 (unpolluted) at this station was recorded.

This River Derry has been evaluated for its assimilative capacity so that final effluents standards can be set.

Flow data was obtained from the EPA for the River Derry and based on this flow data and the design population, final effluent discharges to the water courses were modelled. Resulting from this modelling final effluent standards have been set, these are detailed in the table below.

Results of Dilution Modelling

River	BOD/TSS mg/l	Amm N mg/l	Phosphorous mg/l	Orthophosphate mg/l
Derry River	25/35	40	1	0.5

However as the Derry River joins the Slaney River about a mile downstream of the effluent discharge point and as the Slaney is a designated Salmonid water, a stricter standard for the final effluent is required and this is set out in the table below.

Final Effluent Standards for Clonegal WWTW

River	BOD/TSS mg/l	Amm N mg/l	Phosphorous mg/l	Orthophosphate mg/l
Derry River	10/10	5	1	0.5

Setting the ammonia level to 5mg/l requires that the works nitrify the organic nitrogen to nitrates, resulting in nitrate effluent discharges of between 40 - 50mgNO3/l. At low flows in the river these will result in approximately 0.3mg/l increase in nitrate levels, which is negligible. The nitrates levels in the River Derry at Clonegal are in the range of 3 – 5.5 mgNO3/l.

Furthermore most nitrifying treatment plants will have an element of de-nitrification which can reduce the discharge levels of nitrates from the wastewater works by up to 50% further minimising the impact on the river.

Given the small size of the Clonegal WWTW (future design load – 1,000pe), the discharge from this new works with secondary and tertiary treatment will improve this environment, as the new works will discharge, at future design load (2020), about 30% less than the load discharged by the old works due to the performance of the old works and the final effluent is now being discharged to the Derry River directly where there is significant dilution.

To comply with Phorsphorus Regulations (S.I. No 258 of 1998) the WWTP at Clonegal WWTP, phosphorus removal takes place in the WWTP with the injection of Ferric Sulphate.

The EPA Biological Quality Ratings (Q-Values) are the parameters used to monitor river water quality.

Q5, Q4-5, Q4	Unpolluted
Q3- 4	Slightly Polluted
Q3, Q2-3	Moderately Polluted
Q2, Q1-2, Q1	Seriously Polluted

In the EPA 2004 Report a 4 rating was applied upstream at station Ford N of Garryhasten and a 4 rating downstream at station Kildavin. We would now expect there will be improvement in the Q value rating with the removal of the effluent loading from the older WWTP.

Conclusion

Carlow County Council will be constructing a new and high specification WWTP in Clonegal. This replaces the older inefficient WWTP that was the point source of substantial loadings into the River Derry. The new WWTP is expected to reduce the loading by up to 40% into the River Derry. Ferric dosing is provided at the plant to achieve phosphorus reduction.

Storm Tanks will also be installed as part of the upgrade works to manage storm flows.

At a capacity of 1000 pe the plant is adequately sized to cater for the wastewater loadings from Clonegal village for many years. The current loading is 400pe, only 40% of the proposed capacity.

This proposed WWTP will allow Carlow County Council to do its part in removing pollution from the Derry River and contributing to improvements in the water quality in the Derry and Slaney Rivers.

The new proposed WWTP will eliminate a substantial source of phosphate and nitrate loading into the Derry River at Clonegal Bridge.

The new proposed WWTP will allow Carlow County Council to achieve the objectives and programmes set out under the SERBD Management Plan and under the Dangerous Substances Directive.