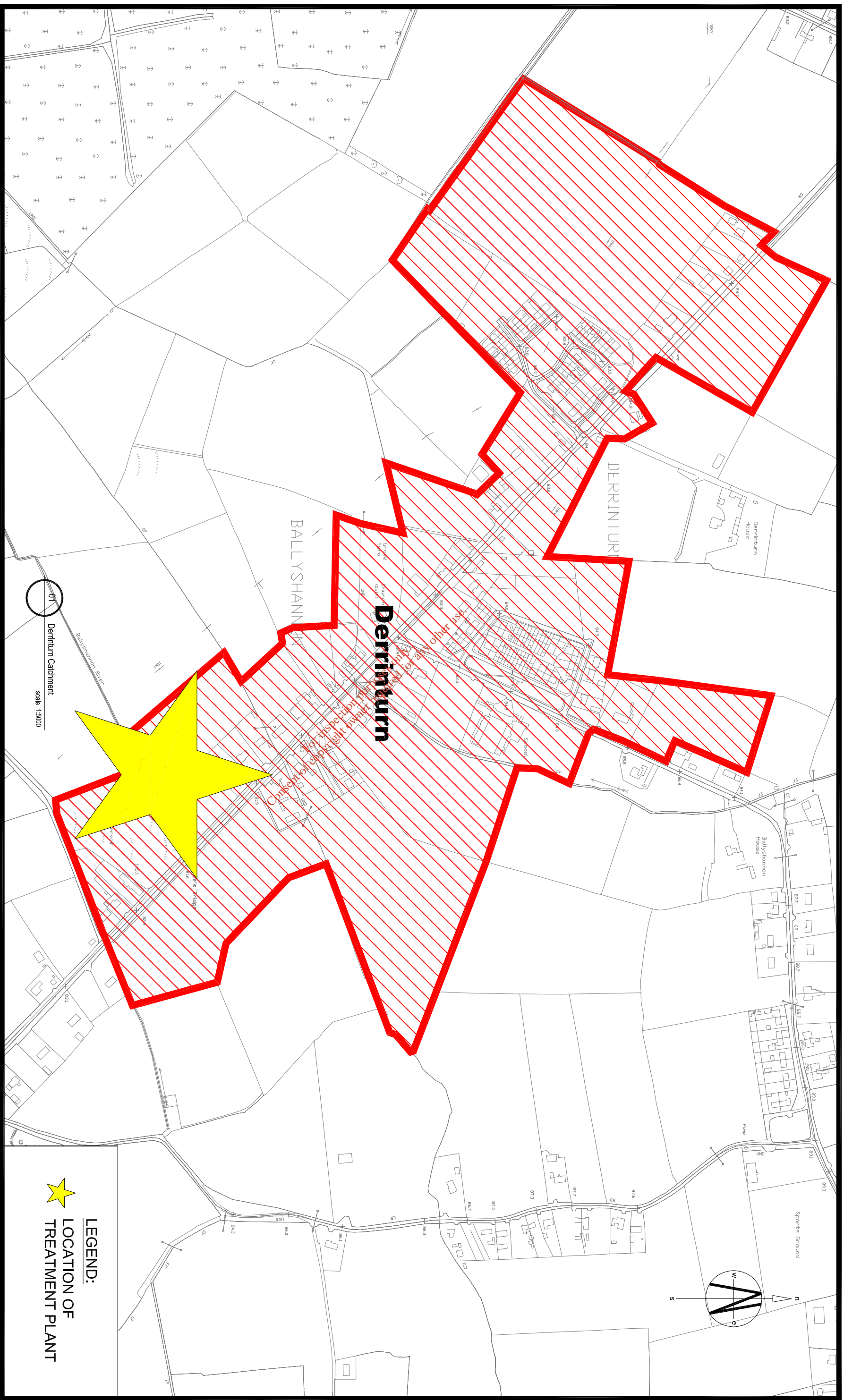


## ATTACHMENT B.1 – MAP OF AGGLOMERATION

Drawing Derrinturn B.1

For inspection purposes only.  
Consent of copyright owner required for any other use.



**PROJECT:**

2009 E.P.A Licensing

**DRAWING:**

Derrinturn Agglomeration

**SUFFIX INITIALS DATE DESCRIPTION**

SUFFIX	INITIALS	DATE	DESCRIPTION

FILE NAME: EPA Licensing\Derrinturn\Site Master\Feb 09

DRAWING NO:

Derrinturn B.1

**REVISIONS**



**Kildare County Council**

Water Services Section

Aras Chill Dara, Devoy Park, Naas, Co. Kildare, Ireland.

Tel: 045-980362, Fax: 045-980359

**LEGEND:**  
 LOCATION OF TREATMENT PLANT

Scale: 1:5000

Date: Feb 09

Drawn by: J.O'D.

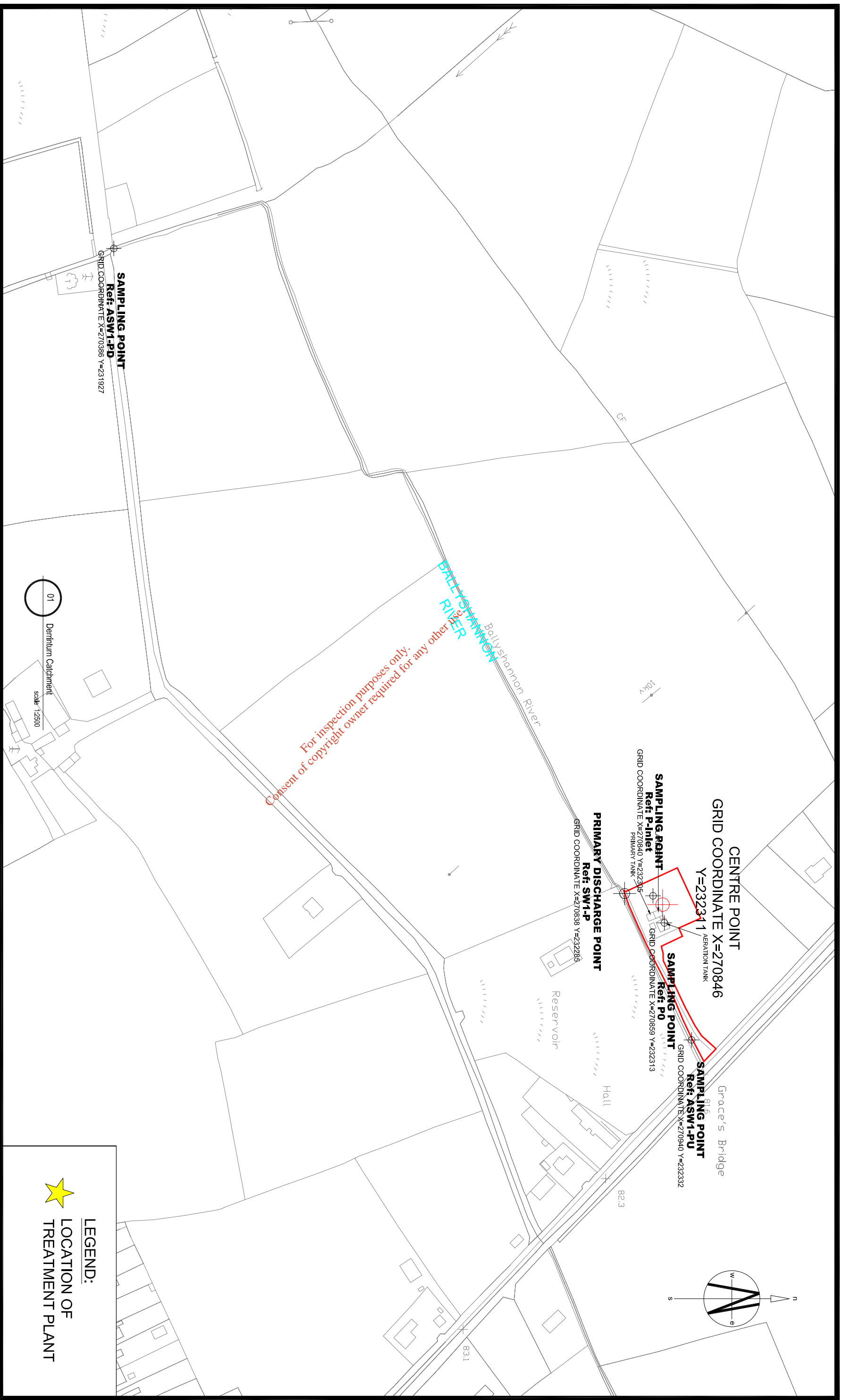
Checked: P.H.

Revision: \_

## ATTACHMENT B.2 – OVERALL SITE PLAN

Drawing Derrinturn B.2.

For inspection purposes only.  
Consent of copyright owner required for any other use.



PROJECT: 2009 E.P.A Licensing

DRAWING: Derrinturn Site Plan

FILE NAME: EPA Licensing\Derrinturn\Site Master\Feb 09

DRAWING NO: Derrinturn B.2

SUFFIX	INITIALS	DATE	DESCRIPTION

REVISIONS

01 Derrinturn Catchment  
scale 1:2500



**Kildare County Council**

Water Services Section

Aras Chill Dara, Deyoy Park, Naas, Co. Kildare, Ireland.  
Tel: 045-980362, Fax: 045-980359

**LEGEND:**  
★ LOCATION OF TREATMENT PLANT

Scale: 1:2500

Date: Feb 09

Drawn by: J.O'D.

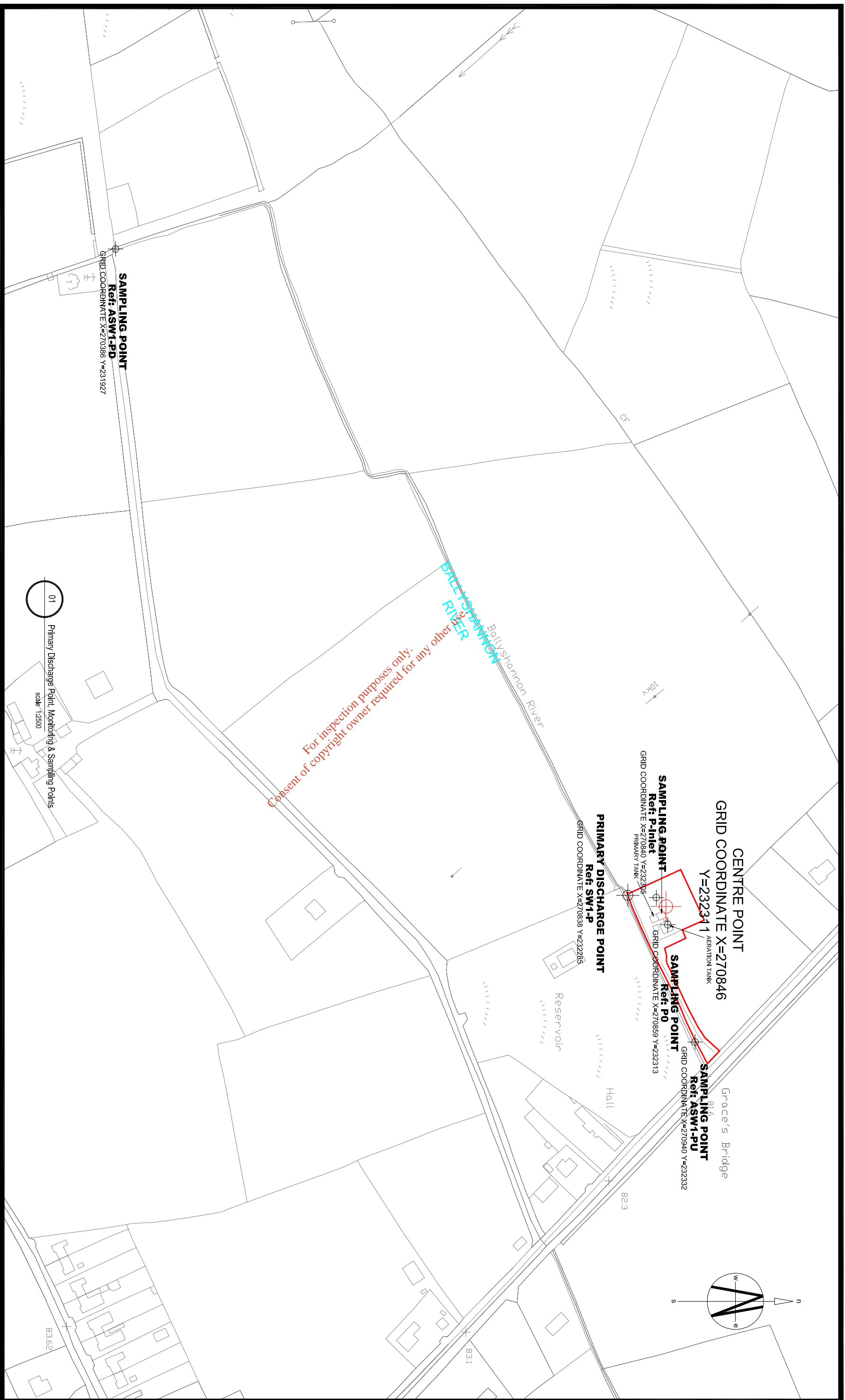
Checked: P.H.

Revision: -

**ATTACHMENT B.3 – PLAN SHOWING PRIMARY DISCHARGE POINT &  
DISCHARGE MONITORING LOCATIONS**

Drawing Derrinturn B.3.

For inspection purposes only.  
Consent of copyright owner required for any other use.



PROJECT: 2009 E.P.A Licensing

DRAWING: Primary Discharge Point, Monitoring & Sampling Points

FILE NAME: EPA Licensing\Derintum\Site Master\Feb 09

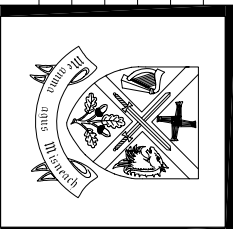
DRAWING NO:

Derintum B.3

SUFFIX	INITIALS	DATE	DESCRIPTION

REVISIONS

01 Primary Discharge Point, Monitoring & Sampling Points  
scale 1:2500



**Kildare County Council**

Water Services Section

Aras Chill Dara, Deyoy Park, Naas, Co. Kildare, Ireland.

Tel: 045-980362, Fax: 045-980359

Scale: 1:2500

Date: Feb 09

Drawn by: J.O'D.

Checked: P.H.

Revision: -

## ATTACHMENT B.6 – PLANNING REQUIREMENTS

- Kildare County Council Planning Report and conditions for replacement WWTP at Derrinturn (Sep 2005).
- Planning report for new WWTP by Nicholas O'Dwyer Consulting Engineers (Jun 2005)

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

# KILDARE COUNTY COUNCIL

## DERRINTURN WASTEWATER TREATMENT PLANT

### PART 8 PUBLIC CONSULTATION

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

**Nicholas O'Dwyer Ltd.,  
Consulting Engineers,  
Nutgrove Office Park,  
Nutgrove Avenue,  
Dublin 14.**

**June 2005**

PROJECT NO. 20240		Prepared by		Approved by		Issued by	
		Initials	Date	Initials	Date	Initials	Date
Revision	Reason for Revision	TOF	29.06.05	ND	29.06.05	ND	29.06.05
A							
B							
C							
D							

**CONTENTS**

<b>1.0</b>	<b>INTRODUCTION</b>	<b>1</b>
<b>2.0</b>	<b>EXISTING WASTEWATER COLLECTION / TREATMENT WORKS</b>	<b>2</b>
2.1	Existing Wastewater Treatment Plant	2
2.2	Existing Sewerage Network	2
<b>3.0</b>	<b>OUTLINE DESCRIPTION OF PROPOSALS</b>	<b>3</b>
3.1	General	3
3.2	Wastewater Treatment Plant Proposals	3
3.3	Network Proposals	4
<b>4.0</b>	<b>IMPACT OF THE SCHEME</b>	<b>5</b>
4.1	General	5
4.2	Visual Impacts of Proposed Scheme	5
4.3	Archaeological Impact of Proposed Scheme	6
4.4	Environmental Impacts of Proposed Scheme	6
<b>5.0</b>	<b>DRAWINGS</b>	<b>9</b>

For inspection purposes only.  
Consent of copyright owner required for any other use.

## 1.0 INTRODUCTION

Derrinturn is located in the north west of County Kildare approximately 6 miles from the county boundary with County Offaly. The village is situated approximately 15 miles northwest and 6 miles east of the towns of Naas and Edenderry respectively.

The population of the village has been estimated at 800 and the policy of providing a new wastewater treatment plant has been established by Kildare County Council in the Derrinturn Local Area Plan, 2001. In keeping with this policy, the objectives of this scheme are to improve the overall wastewater treatment facilities of the village of Derrinturn for a planning horizon to the year 2025 in order to facilitate the growth and physical development of Derrinturn.

This document has been prepared in compliance with the “*Part 8 Requirements in Respect of Specified Development by, On Behalf of, Or in Partnership with Local Authorities*” of the Planning and Development Regulations 2001. It should be read in conjunction with the Drawings listed in Section 5 of this document.

For inspection purposes only.  
Consent of copyright owner required for any other use.

## **2.0 EXISTING WASTEWATER COLLECTION / TREATMENT WORKS**

### **2.1 Existing Wastewater Treatment Plant**

The village of Derrinturn is currently served by a wastewater treatment plant located to the south east of the village, just outside the development boundary. The existing wastewater treatment plant is an extended aeration plant and was originally designed to cater for a population equivalent (PE) of 500. Extra aeration has been added to the treatment process to bring the design capacity of the wastewater treatment plant to 750 PE. A population analysis of the village, performed as part of this scheme, has indicated that the wastewater treatment plant is overloaded. It is clear from field inspection that the wastewater treatment plant is in need of immediate replacement.

Recent effluent sampling from the wastewater treatment plant has also highlighted a problem in achieving acceptable environmental standards. The treated effluent from the wastewater treatment plant is discharged to the Ballyshannon River at Derrinturn. The assimilative capacity of the receiving water is extremely limited and is not considered suitable as a discharge point. This can be verified by inspection of the poor ecological and water quality condition of the river.

### **2.2 Existing Sewerage Network**

The existing wastewater collection network in Derrinturn discharges by gravity to an inlet pump station at the wastewater treatment plant. The capacity of the network is sufficient to provide for the projected growth of the town.

### 3.0 OUTLINE DESCRIPTION OF PROPOSALS

#### 3.1 General

The need for a wastewater treatment plant in the village of Derrinturn has been identified by Kildare County Council in the Derrinturn Local Area Plan, 2001. The specific objective of Kildare County Council for the provision of public utilities in Derrinturn is contained in Section 2.3.2 of the Local Area Plan as follows,

*“Sewerage.*

*A new sewage treatment works is planned for the village.*

*P2.3.2 – It is the policy of the Council to ensure that the necessary drainage facilities to serve the needs of all development within the town are provided and to separate the disposal of foul and surface water through the provision of separate sewerage networks.”*

In keeping with this policy, this scheme proposes to provide a new wastewater treatment plant to cater for the current and future population of the village of Derrinturn.

#### 3.2 Wastewater Treatment Plant Proposals

It is proposed to de-commission and demolish the existing wastewater treatment plant at Derrinturn and to construct a new wastewater treatment plant on a greenfield site 260 metres to the south west of the existing site. The location of the proposed and existing wastewater treatment plant sites are shown on Drawing No. 20240-PC-01. The new wastewater treatment plant will be designed for a population equivalent of 2,000 and will consist of the following:

- Inlet Pumping Station.
- Package Inlet Works – Screening & Grit Removal.
- Package Treatment Plant – Secondary Treatment.
- Tertiary Sand Filter.

- Chemical Dosing Facilities for Precipitation of Phosphorus.
- Sludge Holding Tank.
- Control/Administration Building.
- Outlet Pumping Station.

An indicative plan and section of the proposed wastewater treatment plant site is shown in Drawing No. 20240-PC-04.

### 3.3 Network Proposals

All wastewater flows from the village of Derrinturn will be diverted to the new wastewater treatment plant through a gravity sewer extension to the existing network. A layout of the extension to the sewerage network is shown in Drawing No 20240-PC-01 & 02.

### 3.4 Outfall Proposals

It is proposed to provide a 100 mm diameter treated effluent rising main between the outlet pumping station at the new Derrinturn wastewater treatment plant to discharge the treated effluent at the proposed outfall location downstream of the confluence of the Ballyshannon and Cushing Rivers. The proposed route of the rising main is shown in Drawing No. 20240-PC-01.

## 4.0 IMPACT OF THE SCHEME

### 4.1 General

The overall goal of this scheme is the improvement in the wastewater treatment facilities for the village of Derrinturn. It is recognised that this development has associated potential impacts. This section will discuss the potential impacts and the corresponding mitigation measures proposed as part of the scheme. Particular attention has been given to visual, archaeological and environmental issues associated with the scheme.

### 4.2 Visual Impacts of Proposed Scheme

The proposed tertiary sand filter at the site of wastewater treatment plant will be no higher than 5 metres in height and will be the tallest structure on the site. The proposed inlet works, secondary treatment plant, control building, sludge holding tank and chemical dosing facilities will not exceed the height of the proposed tertiary sand filter. The inlet and outlet pumping stations will be constructed beneath ground level and will have no visual impact. The hard standing areas on site will have bitumen macadam and kerbing to form roadways and turning areas.

It is recognised that the above development has the potential to impact negatively on the visual environment of the surrounding area. For this reason, it is proposed to mitigate this potential impact by providing low visibility fencing and additional screening at the site boundary in the form of suitable indigenous trees. The landscaping provided on the site will merge harmoniously with the surrounding environment. An indicative detail of the proposed control building is shown in Drawing No. 20240-PC-05.

The existing wastewater treatment plant will be demolished and removed upon completion of the proposed wastewater treatment plant at Derrinturn. This will have a positive impact on the visual environment of the surrounding area.

The proposed treated effluent rising main from Derrinturn to the effluent discharge point will be constructed underground and will have no visual impact. A section of the proposed wastewater treatment plant is shown in Drawing No. 20240-PC-04.

### **4.3 Archaeological Impact of Proposed Scheme**

An Archaeological Desktop Study is currently being prepared as part of this Scheme by a licensed archaeologist. This study will involve a comprehensive and thorough examination of all existing archaeological and historical information relating to the study area. This report will assess the impact of the Scheme and propose mitigation strategies to overcome any potential archaeological issues that could adversely affect the project.

### **4.4 Environmental Impacts of Proposed Scheme**

The environmental impacts of the proposed scheme have been sub-divided and addressed individually as follows.

#### **4.4.1 Water Quality**

The existing treatment plant serves a population equivalent of approximately 800 and is over-loaded. The plant is in poor condition and produces low quality effluent. There is no dedicated nutrient removal at the existing plant, which discharges to the Ballyshannon River, a small tributary of the Cushaling River, 35 km upstream of the River Barrow candidate Special Area of Conservation (cSAC).

The most recent effluent quality results from the existing wastewater treatment plant are shown in Table 4.1. The Ballyshannon River is not capable of assimilating the effluent discharged from the existing plant. This is reflected in the poor water quality and ecological condition of the river.

**Table 4.1 – Existing Effluent Quality**

<b>Parameter</b>	<b>Effluent Conc. (mg/l)</b>
Biological Oxygen Demand	110
Total Suspended Solids	130
Total Phosphorus	3.7

The proposed wastewater treatment plant is designed to serve a population equivalent of 2,000 and will comply with the Urban Wastewater Treatment Regulations, the Phosphorus Regulations and the River Barrow Water Quality Management Plan. The wastewater treatment plant will have a treated effluent quality as shown in Table 4.2.

**Table 4.2 – Proposed Effluent Standard**

<b>Parameter</b>	<b>Effluent Conc. (mg/l)</b>
Biological Oxygen Demand	8
Total Suspended Solids	8
Total Ammonia	1.5
Total Phosphorus	0.7

There will be dedicated nutrient removal at the proposed wastewater treatment plant. The wastewater treatment plant will discharge to the Cushaling River, downstream of the confluence with the Ballyshannon River. The design proposed for the new wastewater treatment plant utilises the principle of Best Available Technology Not Entailing Excessive Cost (BATNEEC) in order to provide an effluent that the Cushaling River is capable of assimilating.

The existing wastewater treatment plant will be demolished and the existing discharges to the Ballyshannon River will cease. This should lead to a marked improvement in the water quality and ecology of this water body.

#### 4.4.2 Noise

The existing wastewater treatment plant will be decommissioned and demolished as part of this scheme. This should have a positive impact in the area. The proposed wastewater treatment plant will incorporate appropriate noise suppression, avoidance, attenuation and control measures in order to ensure that no adverse noise impact arises.

#### 4.4.3 Odour

The existing wastewater treatment plant will be decommissioned and demolished as part of this scheme. This should have a positive impact in the area. The proposed wastewater treatment plant will incorporate appropriate odour abatement and treatment systems in order to ensure that no adverse odour impact arises.

#### 4.4.4 Habitats Directive

The proposed discharge location for the wastewater treatment plant is at the confluence of the Ballyshannon and Cushaling Rivers. It has been recognised that the receiving water of the proposed wastewater treatment plant, the Cushaling River, is a tributary of the Figile River which is in turn a tributary of the Black River. The Black River is a tributary of the River Barrow which has been designated a candidate Special Area of Conservation (cSAC No. 002162). The cSAC site is approximately 35 km downstream of the proposed discharge point and hosts White Clawed Crayfish (*Austropotamobius pallipes*), Twaite Shad (*Alosa fallax*), Salmon (*Salmo salar*) and species of Lamprey (*Lampetra*). All of these species are afforded protection under Annex II of the EU Habitats Directive (92/43/EEC). A desktop study, in consultation with the Heritage Division of the Department of Environment Heritage & Local Government, was undertaken in order to determine the potential impacts of the proposed development on the cSAC site at the River Barrow. This study established that, given the improvement of the treated effluent quality and the considerable distance to the cSAC site, the proposed wastewater treatment plant would have a marginally positive impact on the water quality of the habitats at the cSAC site on the River Barrow.

## 5.0 DRAWINGS

The following drawings accompany, and should be read in conjunction with, this document:

<b>Drawing Number</b>	<b>Drawing Title</b>
20240-PC-01	Overall Plan of Proposed Sewerage Scheme in Derrinturn
20240-PC-02	Site Location Map of Proposed Wastewater Treatment Plant.
20240-PC-03	Indicative Site Layout Plan of Proposed Wastewater Treatment Plant.
20240-PC-04	Indicative Plan & Section of Proposed Wastewater Treatment Plant.
20240-PC-05	Indicative Details of Proposed Control Building.

For inspection purposes only.  
Consent of copyright owner required for any other use.

**MEMO Part VIII**

**Pat Gallagher : Senior Planner**

**Re: Report prepared in Accordance with Planning & Development Regulations 2001**

**Proposal: Wastewater treatment system at Derrinturn**

**(A) Description**

The works include:

- (1) Construction of a new Wastewater Treatment works close to the existing facility at Derrinturn. The treatment works will consist of a inlet pumping station, inlet works, package treatment system, clarifier, sludge holding tank, chemical dosing facilities, sand filter outlet pumping station and a control building.
- (2) Construction of a proposed treated effluent rising main from the proposed pumping station in Derrinturn to Cushaling river downstream of its confluence with the Ballyshannon river.
- (3) Access roads, site fencing and landscaping at the proposed Wastewater Treatment works at Ticknevin.
- (4) Demolition of existing wastewater treatment plant in Derrinturn and landscaping of existing wastewater treatment plant site.

**(B) Implications for the proper planning and development of the area**

The proposed development would appear fully consistent with the relevant policies of the County Development Plan, 2005-2011

**The Kildare County Development Plan 2005-2011 has the following policies:**

**WW 1 To ensure that all villages and settlements are provided with an adequate waste water treatment plant within the limits of cost effectiveness and availability of finance.**

The Derrinturn site is located just outside the Development Boundary of Derrinturn as identified in the Local Area Plan. The development would appear to be consistent with the policies in the Derrinturn Local Area Plan 2001, in relation to sewerage. It is the policy (P2.4.1) of the Council 'to ensure that the necessary drainage facilities to serve the needs of all development within the town are provided and to separate the disposal of foul and surface water through the provision of separate networks'.

**(C) Submissions/Observations**

A public advertisement was published on the 7<sup>th</sup> of July 2005. The development was advertised in the Leinster Leader.

Plans and particulars relating to this development were placed on public display in the offices of Kildare County Council during the period 8<sup>th</sup> of July 2005 to 5<sup>th</sup> August, 2005. Submissions and observations with respect to the proposed development relating to the proper planning and development of the area were invited on or before 5:00pm on 19<sup>th</sup> August 2005.

No submission/objections were received.

**(D) Referrals**

The following Prescribed Bodies were informed of the proposed development in accordance with Article 82 of the Planning & Development Regulations 2001:

- An Taisce,
- Department of Arts, Heritage, Gaeltacht and The Islands,
- The Arts Council,
- Bord Failte Eireann,
- The Heritage Council
- Eastern Regional Health Board,
- Department of the Environment Heritage & Local Government
- Southern Regional Fisheries Board

**(E) Reports received**

1. The Southern Regional Fisheries Board – No objection
2. Department of the Environment, Heritage and Local Government – No objection subject to condition
3. KCC – Environmental Section – No objection subject to conditions
4. KCC – Roads Section – No objection subject to conditions
5. Environmental Health Officer – No objection subject to conditions
6. Area Engineer – No objection, subject to conditions

**(F) Issues raised in Submissions/Observations**

No objections to the proposal proceeding, subject to road restoration conditions of the Area Engineer being inserted and implemented as part of the scheme.

**(G) Assessment:**

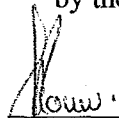
The existing treatment plant in the village of Derrinturn is operating at capacity. It is proposed that the new treatment system will have a capacity of 2,000 pe, which represents a significant increase on the current capacity of 750 pe. The inlet and outlet pumping stations will be located beneath ground level and the highest structure on site will be no higher than 5m. Visual impact will be mitigated by means of low visibility fencing and indigenous trees. It is recommended that the screening be supplemented by an evergreen hedge that should be planted so as to integrate over time with the wire mesh fence.

The proposed treatment plan will have noise suppression, avoidance, attenuation and control as well as odour abatement and treatment systems to ensure no odour nuisance is created. These systems are not in place in the existing facility, which is to be demolished and removed.

**(H) Conclusion**

Having regard to the above, the proposed water works will be of great benefit to the town of Derrinturn, will have no negative impact on the amenities of the area and can therefore be recommended for approval subject to conditions.

1. The development shall be constructed as per plans and particulars submitted 8<sup>th</sup> of July 2005, unless amended by conditions of this permission.
2. The treatment plant will be confined within the boundary of the site indicated in the plans.
3. The proposed wastewater treatment plans will incorporate odour abatement and treatment systems in order to prevent any odour nuisance emanating from the site.
4. The conditions as required by the Department of Environment, Heritage and Local Government.
5. Conditions as per the roads design report.
6. Conditions as per Environment section's report.
7. Drinking water shall be made available in the office for staff employed on the site.
8. The external walls of all buildings shall be rendered and roofs shall be blue / black or slate grey using tiles or slates.
9. All tanks shall be painted dark green or dark grey.
10. The plant shall be designed and maintained using best available practices to minimise emissions from the site.
11. All boundaries of the site shall be planted with native deciduous hedgerow species interspersed with broadleaved deciduous trees at 2m centres.
12. All road restoration works will be carried out in accordance with the "Guidelines for the Opening, Backfilling and Reinstatement of Trenches in Public Roads" as published by the Department of the Environment and Local Government



Nicolaas Louw  
A/SEP  
Date: 16/09/05



Tommy Skehan  
Director of Services  
Date: 19. 09. 05

## ATTACHMENT B.8 – NOTICES AND ADVERTISEMENTS

1. Copy of Site Notice
2. Plan showing location of Site Notice
3. Copy of Newspaper Advertisement (original application contains original page of newspaper).

For inspection purposes only.  
Consent of copyright owner required for any other use.

**NOTICE PURSUANT TO THE WASTE WATER DISCHARGE  
(AUTHORISATION) REGULATIONS 2007**

**APPLICATION TO  
THE ENVIRONMENTAL PROTECTION AGENCY  
FOR A WASTE WATER DISCHARGE LICENCE**

Kildare County Council, Áras Chill Dara, Devoy Park, Naas, County Kildare hereby gives notice that it intends to apply to the Environmental Protection Agency for a Waste Water Discharge Licence in respect of **Derrinturn Waste Water Treatment Plant, Dreenan, Derrinturn, Co. Kildare.**

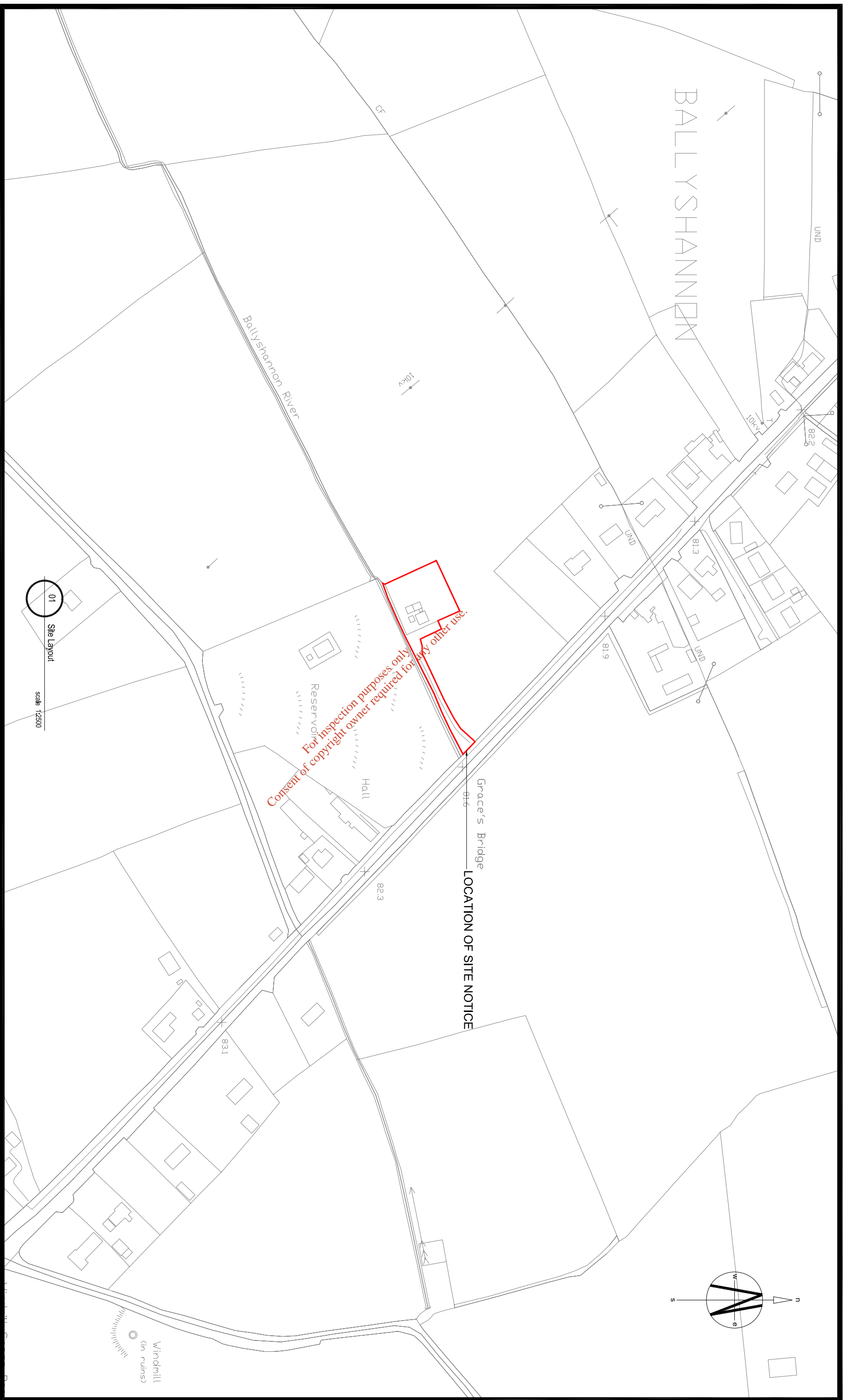
The primary discharge point is located at the Ballyshannon River at Dreenan, Derrinturn, Co. Kildare.

The National Grid Reference of the Wastewater Treatment Plant is

E 270846 N 232311

A copy of the application for a wastewater discharge licence and any such further information as may be furnished to the Agency in the course of the Agency's consideration of the application, shall, as soon as practicable after receipt by the Agency, be available for inspection or purchase at the Environmental Protection Agency Headquarters, Johnstown Castle Estate, Wexford and at the offices of Kildare County Council, Áras Chill Dara, Devoy Park, Naas, Co. Kildare after 28<sup>th</sup> February 2009.

Any submissions in relation to this application may be made to the Environmental Protection Agency at its headquarters.



PROJECT: 2009 E.P.A Licensing

DRAWING: Site Notice Location

FILE NAME: EPA Licensing\Derintum\Site Master\Feb 09

DRAWING NO:

Derintum B.8

SUFFIX	INITIALS	DATE	DESCRIPTION

01 Site Layout  
scale 1:2500



**Kildare County Council**

Water Services Section

Aras Chill Dara, Devoy Park, Naas, Co. Kildare, Ireland.

Tel: 045-980362, Fax: 045-980359

Scale: 1:2500

Date: Feb 09

Drawn by: J.O'D.

Checked: P.H.

Revision: \_

COMMENT

# Controlling our destiny within the EU

THAT so much attention is being paid to Irish financial and economic problems in recent times is understandable.

But there is a danger that too much is read into specific acts of individual banks or persons within them, be they deemed illegal, careless or greedy or blameless.

Such events are part and parcel of a competitive neo liberal economy.

The swings and roundabouts of outrageous fortune, as our friend Shakespeare, once put it, are more noticeable when something goes wrong.

But following the growth of the Celtic Tiger in Ireland and its progress or regress in associated kindred economies, the UK and the USA, we should not be surprised that somebody at the top has done something bold.

Boys and girls have always been bold. Usually what has differed has been the attitude of

those in charge of them.

During the Celtic Tiger, things got out of hand, we now know, but it was a brave man or woman who would stand up and shout stop.

You would just get mowed down, perhaps described as a begrudger.

If shouting did not work, there was always go and cast your vote every five years.

It was very understandable that a majority would return basically the same Government three times, particularly when the main potential replacements had little choice but to be of the same mindset.

Ireland had been a huge beneficiary of a global financial boom and who could argue with its leaders over that.

But problems were building up. And now, we are told, if we did not know it ourselves via our own or a neighbour's redundancy notice, the boom has ended.

## Leinster Leader

In many quarters there is considerable anger based on the perception that this was caused only due to careless or bad banking practices.

We say, however, that even with good banking practice, there are and will be considerable hurdles to climb over the next few years. There have not been property booms in every country but many still face difficult financial conditions.

Japan, which had a property driven banking crisis in the early 1990's - the use of inflated property prices to act as securities for loans included ie. a dose of part of what we are experiencing now - is having economic problems.

There has been much condem-

nation of the views expressed by former practicing solicitor, Michael Lynn, in a newspaper over the weekend.

Basically, he said, he did ill advised things but they were not fraudulent. He also said banks were encouraging him to borrow. He did not want to be the only scapegoat in an angry witchhunt at the end of the failed Celtic Tiger.

He is yet to go on trial and it remains to be seen what the legal system will make of any detailed evidence presented either against him or on his behalf.

There is a danger that in the heat of public debate we forget the difference between pure unmitigated fraud and the kind of economic risk taking which was encour-

aged.

While some citizens are rightly and understandably angry at revelations over financial decisions, many others have been experiencing some unease for some time now.

The vote against the Lisbon Treaty last year was probably a manifestation of this.

It was interesting to note that this week's poll on the Treaty showed that support has risen by 8% and a majority, if only a small one, now support it.

The change is likely due to fears of what would happen if Ireland did not have the support of the European Union and voices from elsewhere, including the cold winds of Iceland, that they would have been better off in than out.

But opinion polls are showing that, while a majority see justice and equity as important, the country remains split in a number of directions about how this might be

brought about in a country with considerably less money to spend.

The desire to remain part of the EU (80% want it according to the Irish Times tns/mrbi poll) is stronger than support for the Lisbon Treaty.

It follows therefore that we remain concerned about the direction of the Union, itself, and control of our own destiny within it.

Increasing unemployment, particularly of such a sudden nature, has sent many of us into a nose-dive spirit wise.

But there will be advantages to a downturn in the economy, including lower real prices for those who keep jobs.

Ireland has many things going for it. We are still wealthier than most European countries. It is not so long ago we were amongst the poorest of them.

Income will, and may need to fall, but the chances are that shall be relatively well off.

Our biggest concern should be that any reduction will be shared out proportionately and in a progressive manner. Justice suggests that, other things being equal, who earn the most, in public or private sectors, should take the biggest nominal cuts.

Relative pay scale can still exist in these conditions.

The most intense debate appears to be between those arguing over whether the private or public sector should bear the biggest burden.

The reality is that the revenue serving both sectors is inextricably linked. Less business, less tax revenue. Less tax revenue, less spending.

It is unfortunate then if budget balancing becomes a new religion rather than a flexible goal.

There remain many key public amenities to be built and, due to competitive tendering, it should be possible to get these done at a much lower price than in the past.

# Brian the brave and the bold

BRIAN Cowen, in some respects, has it all to play for.

He can make brave and bold decisions with nothing to lose. His personal rating is low, his party is in freefall, and these are dark and worrying times for the country.

Things may get worse for the Taoiseach, his party and the country.

There is a lack of self-confidence about Ireland today that is breathtaking and heartbreaking at the same time.

It is breathtaking, given the manner in which the country had become dynamic and modernised after decades of a roller-coaster where a temporary boom was replaced by yet another grisly recession.

And it is heartbreaking when one considers the missed opportunities, the squandering of the boom, the tattered image abroad.

Rather than being the prisoner of his party, and particularly his backbenchers, Brian Cowen is as free as a breeze.

By taking the kind of decisive action, on a number of fronts, which his Government and country is crying out for, he will be doing no more than attempting to rescue his party from a massacre at the polls.

Many of his backbenchers will bite the dust at the next election if there is not a change from the traditional politics handed out to the electorate by this Government and particularly Fianna Fail.

A coherent economic

policy, tough treatment for rogue bankers, reform of the Oireachtas, as a sign that the mess on the Government's own doorstep is being sorted out, are urgently called for.

And Brian Cowen must face down any of his own parliamentary party if they feel uneasy about any of this, not least in the clean-up of the Government's own messy, inflated and costly structures.

Brian Lenihan was guilty of sloppy work, to put it mildly, in not reading the detail of a report last October which showed the questionable lodgement by Irish Life & Permanent with Anglo Irish Bank.

More, significantly, however, what were his officials and advisers doing? In fairness to Lenihan, he has a job that is indeed a poisoned chalice.

No Minister for Finance, in recent times, has had such a difficult job from the first day he was appointed to Merrion Street by the Taoiseach.

If it was Britain, Lenihan would have resigned.

But Ireland is not Britain, in political terms. That is even obvious from the fact that Gordon Brown is much more accountable to the House of Commons than our Taoiseach has been to the Dail for several years now.

It would have been pointless for Lenihan to resign. He has shown himself to be a hardworking Minister, and there is no indication at all that any other member of the Government would do bet-

## POLITICAL NOTEBOOK with Paul Corr

ter than him in the job.

Lenihan would appear to be more conscious than his colleagues of the need to show the public that the bankers have to be brought to heel.

So, too, is John Gormley, Minister for the Environment, who bluntly told the Dail that he wanted to see bankers being taken away in handcuffs as happens in the United States.

It is, in truth, an extraordinary turn of events when Fianna Fail finds itself third in the polls, behind Fine Gael and Labour.

An election soon would see Fianna Fail hammered, dismissed from office with a political bloody nose, to be replaced by an FG-Labour Government.

Following the latest negative poll for the party, a succession of Fianna Fail Ministers hit the media trail to explain it all away.

The message was: we have taken tough decisions which have led to our unpopularity.

This is dangerous nonsense.

Fianna Fail's slump in the polls is due to the fact that the Government is seen as indecisive, inept, lazy and sometimes con-

ceited.

Bankers go free, the Dail goes into recess, like the Ahern years, and the bloated Oireachtas structure continues while the Government talks the talk but fails to walk the walk.

The Government must cut 2 billion euros in public spending this year. It has to prune expenditure by twice that amount next year.

These are blunt realities. It must be done fairly, with no bank rogues escaping into the night, and the same tired only clichés dusted down to defend a Government structure which sees five junior ministers alone attached to the Department of Education.

In years to come, historians will, no doubt, analyse the lunchtime interview on television last week when a bank executive said that his salary would dip under 2 million euro because of reductions in his income.

My God, how did it come to this?

Where, now, the idealism of those who founded this State and developed it through the decades?

They were of differing

political colour, and were bitter enemies in some cases.

But they had an idealism and a work ethic which owed nothing to a banker telling us, in the brazen light of day, that his income had dipped below 2 million euro.

And what have these bankers to say about the manner in which senior people in these institutions have contributed to the destruction of our image internationally?

They expressed regret. Perhaps some of the decisions made were not the best.

In the name of goodness, is it not time for the Taoiseach to have sufficient political steel to tell them publicly and unequivocally, to get up the yard?

Senator Shane Ross, a sane and sensible voice in these times, described the bankers in the following terms: "a group of clowns who have disgraced themselves over many years and who had one aim in the negotiations - the saving of their jobs."

Brian Cowen was young backbencher when a minority Fianna Fail Government tackled an economic recession which was also threatening the country's viability.

Charlie Haughey and his party had contributed to that economic decline with reckless economic policies initiated by Haughey's predecessor, Jack Lynch, in the 1977 general election.

That 1987 Government, with the help of Fine Gael,

set about tackling the economy with diligence and energy.

Rather than reacting negatively, the electorate supported the hairshirt. In time, that Government's approval rating started to rise.

In fact, the Government was going so well that Haughey called an election in 1989, thinking that he might get an overall

majority.

The electorate reacted angrily. Haughey and Fianna Fail were chastised for calling an election which nobody wanted.

Haughey, the country was to learn much later, was anxious to stay in power so that the flow of money into his personal coffers would continue.

He formed a Government with the hated PDs.

Brian Cowen can bring the people with him, but he has to move on from the old politics of the Ahern era.

There is one shaft of light for the Government from series of polls in The Irish Times.

A strong majority would now pass the Lisbon Treaty. The sense of complacency, and in some cases bloodyminded approach

to politics on the part of a section of the electorate, led, in part, to the No vote the last time.

But it is a very different Ireland now.

That referendum poll result must surely encourage the Government to go for another referendum sooner rather than later.

Waiting until the autumn might not be the best option.

### KILDARE COUNTY COUNCIL

#### COMHAIRLE CONTAE CHILL DARA

#### TRANSPORTATION & PUBLIC SAFETY

#### NOTICE TO LANDOWNERS

#### ATTENTION TO TREES AND HEDGES

The maintenance of roadside trees, hedges and other vegetation is the responsibility of the landowners on whose land they are growing. Landowners should therefore ensure that trees, hedges or other vegetation are maintained in such condition that they are not a hazard to road users or that they do not interfere with the maintenance of the road. In particular branches that jut out onto the road should be cut back. Dead and unsafe trees should be removed and hedges should be cut and trimmed. All reasonable care should be taken to ensure the safety of road users when this work is being carried out.

Hedges provide shelter for nesting birds and small animals; therefore hedge cutting should not be undertaken, except in the case of an emergency, during growth season between 1 March and 31 August.

N.B. Professional advice on the condition of roadside trees should be obtained from time to time, and before the removal of mature roadside trees.

---

#### ARE YOU REGISTERED TO VOTE?

**Have you changed address recently, or is there any person in your household who is 18 years of age or over and who is not registered to vote**

The Register of Electors for 2009/2010 has been published and is available for inspection at your local post office, garda station and library and also at the offices of Kildare County Council and at the office of the County Registrar, Courthouse, Naas, Co. Kildare. You can also check online at [www.checktheregister.ie](http://www.checktheregister.ie)

The Register will be in force for one year from 15 February 2009.

Please check the register and ensure that your details are correct and up-to-date.

If your name is not on the Register of Electors and you are 18 years of age or over, or if you have recently changed address you can apply to put your details on the Supplementary Register.

Supplementary Forms are available from all of the above locations and also to download on our website [www.kildarecoco.ie](http://www.kildarecoco.ie)

If you have any queries you can contact the Franchise Section at 045 980201 or email [regelectors@kildarecoco.ie](mailto:regelectors@kildarecoco.ie)

---

#### NOTICE PURSUANT TO THE WASTE WATER DISCHARGE (AUTHORISATION) REGULATIONS 2007

#### "APPLICATIONS TO THE ENVIRONMENTAL PROTECTION AGENCY FOR A WASTE WATER DISCHARGE LICENCE"

Kildare County Council, Áras Chill Dara, Devoy Park, Naas, County Kildare hereby gives notice that it intends to apply to the Environmental Protection Agency for Waste Water Discharge Licences in respect of each of the following Waste Water Treatment Plants :-

Name of Wastewater Treatment Plant	Location and address of Wastewater Treatment Plant	Location of Discharge	National Grid Reference of Wastewater Treatment Plant
1 Ballymore Eustace Wastewater Treatment Plant	Ballymore Eustace East, Ballymore Eustace, Co. Kildare.	River Liffey at Ballymore Eustace East, Co. Kildare.	E 292518 N 209717
2 Castledermot Wastewater Treatment Plant	Dairyfarm, Castledermot, Co. Kildare.	River Lerr at Dairyfarm, Castledermot, Co. Kildare.	E 277592 N 184571
3 Coill Dubh Wastewater Treatment Plant	Brockagh, Coill Dubh, Co. Kildare.	River Slate at Blackwood, Coill Dubh, Co. Kildare.	E 279113 N 227233
4 Derrintum Wastewater Treatment Plant	Dreenan, Derrintum, Co. Kildare.	Ballyshannon River at Dreenan, Derrintum, Co. Kildare.	E 270846 N 232311
5 Kilmeague Wastewater Treatment Plant	Kilmeague, Co. Kildare.	Avillynish Stream at Kilmeague, Co. Kildare.	E 277525 N 222265
6 Robertstown Wastewater Treatment Plant	Derrymullen, Robertstown, Co. Kildare.	Slate River at Derrymullen, Robertstown, Co. Kildare.	E 278194 N 225830

Copies of the above applications for wastewater discharge licences and any such further information as may be furnished to the Agency in the course of the Agency's consideration of these applications, shall, as soon as practicable after receipt by the Agency, be available for inspection or purchase at the Environmental Protection Agency Headquarters, Johnstown Castle Estate, Co. Wexford and at the offices of Kildare County Council, Áras Chill Dara, Devoy Park, Naas, Co. Kildare after 28 February 2009.

Any submissions in relation to these applications may be made to the Environmental Protection Agency at its Headquarters at Johnstown Castle Estate, Co. Wexford.

Kildare County Council, Áras Chill Dara, Devoy Park, Naas, Co. Kildare.  
 Phone: 045-980200 :: Fax 045-980240 :: Website [www.kildare.ie/council](http://www.kildare.ie/council)  
 Emergency Number (Outside Office Hours) 1890 500 333

## Letters to the Editor

# Praise for staff at Naas General Hospital

Dear Sir

Having recently been a guest of the HSE at Naas General Hospital I, through the medium of your widely-read newspaper, would like to thank all concerned.

I was a patient for 16 days at the hospital and I could not have been treated better.

The doctors, nurses and catering staff treated me with the greatest respect and kindness.

The Inaai and Moate wards were my residence for the duration of my stay and I have to put it on record that the treatment I received was excellent.

I have always maintained that nursing is a stronger vocation than a religious one, and the last few weeks have proven me right.

Doctors and nurses at Naas General are working long hours and they take it all in their stride.

It grieves me to think that the government are now going to slice into their wages.

It is not fair that these people should pay for the mistakes of others.

Doctors and nurses, plus a good hospital system, are the right of the people.

We here in Kildare are very lucky to have a hospital and staff like Naas General Hospital. To everyone concerned, I would like to say a very big thank you and may God remain with you all.

Yours sincerely  
 Liam Buckley, St Evin's Park, Monasterevin.

### Speeding not so fine

get four points on the licence and waste the court time and taxpayers money.

Where is the justice in all this and is there any leeway on this 'steal fine'?

Yours  
 (Name and address with editor.)

#### Enrolling Now for Spring/Summer Courses

**ibht**

**VTCT & ITEC Diplomas starting in Spring:**

- Holistic Massage (start 9th April)
- Aromatherapy (start 26th March)
- Diet & Nutrition (start 8th April)
- Reflexology - I.R.I Dip (start 23rd March)
- Anatomy & Physiology (start 9th April)
- Beauty Therapy (Fridays, start 15th May)
- **New!** - Teacher Training Diploma (start 16th March)
- **New!** - Facial Rejuvenation Diploma (Fri 10th - Mon 13th April)

**Monthly CPD Courses:**

- ½ day - Stress Management Workshop (25th April)
- ½ day - Aromatherapy Workshop (19th April)
- 1 day - Nutrition - The Truth about Food! (24th May)
- 1 day - Hand Reflexology (9th April)
- 1 day - Hopi Ear Candling (22nd March)
- 1 day - Aryuvedic Balancing Foot Massage (26th April)
- 2 day - Indian Head Massage (21/22 Feb, 9th /10th May)

Please contact **ibht** in Newbridge:  
 info@ibht.ie www.ibht.ie  
 ph: 045 438090

# Fire officer called to overcrowded auction

By Noel O'Driscoll

AN AUCTION of plant machinery and tractors at Toghers in Newhall, Naas was interrupted for a period of time last Thursday after Kildare County Fire Officer Michael Fitzsimons was called to the site after a complaint that the room in which the auction was being held was grossly overcrowded.

and also at the request of Naas Gardai. "The fire officer went to where the auction was being held and when he arrived he found the function room in which the auction was being held to be so overcrowded that he was unable to gain entry into the premises by the front entrance. He made his way around the back of the building and once inside he ordered that the people in charge of the event to solve the problem and told them that if they failed to do it, then he would solve the problem for them," he said. "The people from Merlin Car

Auctions who were running the event then asked everyone without an auction card to leave. However this proved to be insufficient to satisfy the fire officer and the room was then completely evacuated," said Mr Talbot. "After the room was evacuated it was then repopulated in a satisfactory way and the auction was able to proceed. It was fortunate that the fire officer was able to attend. If there had been a fire the consequences would have been unimaginable. There is a serious obligation on people who run events to do so in a safe and proper

manner. It is not acceptable that an event like this was run in a premises which was so grossly overcrowded," Mr Talbot stated. When contacted about the incident Joanne Cranley of Merlin Auctioneers confirmed that there had been an issue at the auction but said that it had arisen due to an unanticipated level of interest from the public. "The auction turned out to be a massive event, somewhat larger than we had anticipated. There was an incident and we dealt with that incident as best we could and the auction did proceed," she said.

# Judge severely critical of Oireachtas stand on drug use

By Noel O'Driscoll

A DISTRICT court judge in Kildare has severely criticised the members of the Oireachtas for not putting in place sufficient deterrents to combat the level of drug use. Judge Desmond Zaiden was commenting as he sentenced a young man who was before the courts for the third time, having been caught in possession of cannabis. The pointed out people appearing before the court on their first and second charge of possession of cannabis could only be given paltry fines by a presiding judge. However if they appeared a third time it is open to the judge to impose a prison sentence.

ed by all that drug addicts begin by using drugs like cannabis and move on to use harder drugs in time and we all know the problems associated with that for society. "The fines, which I as a judge can impose on a first or second offence for cannabis use are paltry. Where is the deterrent in that? It would be better if people could be hit with the full force of the law on their first offence," he said. Judge Zaiden went on to impose a custodial sentence and a fine of €1,000 on the defendant. "The Oireachtas should be sending out a clear message about the recreational use of cannabis. It gives me no pleasure sending this young man to prison but it is clear that having come before the courts on two previous occasions that he has learned nothing". Stephen Joyce of the

Local Drugs Task Force said that he couldn't specifically comment on the issue of the sanctions applied to offenders before the court without consulting with all of the interested parties involved in the task force. However he did comment about how fines imposed by the courts should be used. "The local Drugs Task Force would be of the view that any money collected from fines should be directed towards local community groups who are working to prevent drug use in their areas and also groups who are working to help drug users combat their addiction". Judge Zaiden's comments at Kildare District Court came two days after he heard the cases of 124 men and five women who were before Naas District Court on charges of possessing drugs and possessing

drugs for sale and supply during the three day Oxygen Festival at Punchestown. During one of those cases he told the defendant that drug use would end up destroying him.

**HIGH TREES**  
ARLES  
Saturday, 21st Feb.  
Music by  
**WICKLOW MAN**  
Coming Saturday, 28th Feb.  
**GERRY GALVIN**  
*Lounge Available For Parties*  
Transport available contact  
Bridie (059) 9147622

# Rickardstown school gets green light

By Vicki Weller

NEWBRIDGE'S new school at Rickardstown will definitely go ahead this year, according to information released by the Department of Education recently. Scoil na Naomh Uilig, which opened in September 2007, is currently housed in temporary buildings in the grounds of St Conleth's VEC school on Station Road. While the department initially gave a commitment that the permanent school building would be provided this September, there was some local concern that the work would not be undertaken on time, especially given the current cutbacks.

However, on Thursday last Minister Batt O'Keefe announced a list of 43 schools around the country, where new buildings, extensions or refurbishments are being provided. The minister stated that, as a result, a total of almost 20,000 new school places would be opened up from September, at both primary and secondary level. Minister O'Keefe stated that five of the projects were being re-tendered under the new form of contracts for public capital projects "to get the best value for money in the construc-

tion sector". He added that the remaining 38 projects will go to tender and construction as soon as possible and it's expected that building work will begin on the majority of these projects this year. The Rickardstown project is listed among both projects going to tender this year and projects to proceed to architectural planning, indicating a phased development. The first phase, including 16 classrooms and other facilities, will be to tender immediately for completion by September. The second phase, classified as "a major extension" is on the architectural planning list.

Scoil na Naomh Uilig was set up as an inclusive school which caters for special needs children. According to principal Noreen Duggan, the first phase of building at Rickardstown will include not just the 16 classrooms, but also a PE hall, library, resource rooms, staff room and office accommodation. "It will be a fully functioning school and three of the classrooms will be specially adapted for the special needs children," said Ms Duggan, adding that the planned extension will effectively double the size of the school. Scoil na Naomh Uilig

currently has 210 pupils. "We had 59 Junior Infants enrolled last year and expect it to be around 55 this year," she said, noting that the new building will be "very much needed". Ms Duggan praised the Department of Education, saying that officials had kept "in constant communication" with the school. "They promised us all along that it would be ready for next September and we were delighted to have it confirmed. In all the doom and gloom, it's great to have something positive happening in the area."



Overcrowded conditions in Nurney school

# Athy 'thrilled' at school news

By Chris Fingleton

ATHY has fared well in the latest announcement made by education minister, Batt O'Keefe. Among the school's that have gone to architectural design is Scoil Ath I, a new eight classroom primary school, earmarked for the town's growing Gaelscoil campus on the Monasterevin Road. Welcoming the announcement Príomóide of the Gaelscoil Ath I, Sínead Ní Nualáin, stated: "We are absolutely thrilled with this news. I am particularly thrilled for the pupils and parents who have worked so hard to achieve this." There was also good news for students at Scoil Phadraic Naofa at St John's Lane, with the announcement that a major extension to the school has now gone to architectural planning stage in the planning process.

# Celebration time in Nurney

By Noel O'Driscoll

THE rural community of Nurney is also celebrating after the announcement of a new eight-classroom school for the area signalled the end of a long campaign.

The need for a new school was first identified almost 20 years ago and the news of the eight-classroom school going to tender stage and start of construction in the middle of 2009 was met with great excitement in Nurney and its hinterlands.

The community of Nurney showed great patience over the years and it was they who had the foresight to raise the money to buy the site to insure the future for their children.

The new school is going to be an eight classroom building which will replace the run down prefabs that teachers and students have had to endure over a long number of years and in particular over the very cold weather over the last month.

The new school in Nurney is one of five schools around the country which have to repeat the tendering process

because the previous tender has lapsed. Nurney principal Eddie Julian said that he and his staff are delighted with the news. "It has been a very long road with very many twists and turns along the way but finally now it looks as if the end is in sight. He said they were hoping to begin the tendering process shortly.

"I am not sure how long that will take but I would be hopeful that we will be able to open the doors to the school in the spring or summer of 2010," he said.

There had been some debate in Nurney as to whether an eight classroom school would be sufficient to meet the needs of the community. Now that the decision has been made to build an eight classroom school Ms Julian says that the new school will be adequate in the short term. "It's hard to know what way the numbers in a community like Nurney will be like over the coming years, particularly in the current economic environment but at the moment all I can say is that the school will be able to accommodate our current numbers".

# Naas school to grow by a third

SCOIL Bhríde in Naas is to benefit from a major eight-classroom extension plus ancillary accommodation.

Principal Fiona O'Reilly said that the school's pupils and teachers were "delighted" with the news. The land is owned by the Department of Education which applied for permission to construct the extension last year. This move comes as the number of classes in the school continues to

increase. "We were asked to take these junior infant classes last year and we were asked to take another three this year," explained Ms O'Reilly.

The eight classrooms and ancillary rooms will bring the Scoil Bhríde from a 16- to a 24-teacher school. It is expected that construction on the extension will begin this year. "We look forward to work on the site starting in the near future," said Principal O'Reilly.

**KILDARE COUNTY COUNCIL**  
COMHAIRLE CONTAE CHILL DARA

**NOTICE PURSUANT TO THE WASTE WATER DISCHARGE (AUTHORISATION) REGULATIONS 2007**  
**APPLICATIONS TO THE ENVIRONMENTAL PROTECTION AGENCY FOR A WASTE WATER DISCHARGE LICENCE**

Kildare County Council, Áras Chill Dara, Devoy Park, Naas, County Kildare hereby gives notice that it intends to apply to the Environmental Protection Agency for Waste Water Discharge Licences in respect of each of the following Waste Water Treatment Plants:-

Name of Wastewater Treatment Plant	Location and address of Wastewater Treatment Plant	Location of Discharge	National Grid of Wastewater Plant	Reference Treatment
1 Ballymore Eustace Wastewater Treatment Plant	Ballymore Eustace East, Ballymore Eustace, Co. Kildare.	River Liffey at Ballymore Eustace East, Co. Kildare.	E 292518	N 209717
2 Castledermot Wastewater Treatment Plant	Dairyfarm, Castledermot, Co. Kildare.	River Lerr at Dairyfarm, Castledermot, Co. Kildare.	E 277592	N 184571
3 Coill Dubh Wastewater Treatment Plant	Brockagh, Coill Dubh, Co. Kildare.	River Slate at Blackwood, Coill Dubh, Co. Kildare.	E 279113	N 227233
4 Derrinturn Wastewater Treatment Plant	Dreenan, Derrinturn, Co. Kildare.	Ballyshannon River at Dreenan, Derrinturn, Co. Kildare.	E 270846	N 232311
5 Kilmeague Wastewater Treatment Plant	Kilmeague, Co. Kildare.	Awillynish Stream at Kilmeague, Co. Kildare.	E 277525	N 222265
6 Robertstown Wastewater Treatment Plant	Derrymullen, Robertstown, Co. Kildare.	Slate River at Derrymullen, Robertstown, Co. Kildare.	E 278194	N 225830

Copies of the above applications for wastewater discharge licences and any such further information as may be furnished to the Agency in the course of the Agency's consideration of these applications, shall, as soon as practicable after receipt by the Agency, be available for inspection or purchase at the Environmental Protection Agency Headquarters, Johnstown Castle Estate, Co. Wexford and at the offices of Kildare County Council, Áras Chill Dara, Devoy Park, Naas, Co. Kildare after 28 February 2009.

Any submissions in relation to these applications may be made to the Environmental Protection Agency at its Headquarters at Johnstown Castle Estate, Co. Wexford

**ARE YOU REGISTERED TO VOTE?**  
Have you changed address recently, or is there any person in your household who is 18 years of age or over and who is not registered to vote  
The Register of Electors for 2009/2010 has been published and is available for inspection at your local post office, garda station and library and also at the offices of Kildare County Council and at the office of the County Registrar, Courthouse, Naas, Co. Kildare. You can also check online at [www.checktheregister.ie](http://www.checktheregister.ie)  
The Register will be in force for one year from 15 February 2009.  
Please check the register and ensure that your details are correct and up-to-date.  
If your name is not on the Register of Electors and you are 18 years of age or over, or if you have recently changed address you can apply to put your details on the Supplementary Register.  
Supplementary Forms are available from all of the above locations and also to download on our website [www.kildarecoco.ie](http://www.kildarecoco.ie)  
If you have any queries you can contact the Franchise Section at 045 980201 or email [regelectors@kildarecoco.ie](mailto:regelectors@kildarecoco.ie)

**TEMPORARY ROADS CLOSURE**  
**ROADS ACT 1993**  
**PUBLIC INFORMATION NOTICE**  
Please take notice that the temporary road closure in place at:  
A section of the N9, between 150m south and 350m north of the Priory Public House at Usk Little will now be extended until 6.00p.m. on Friday 20 March 2009  
Due to recent inclement weather conditions the extension is necessary to complete works on the construction of the Usk Little Overbridge as part of the N9/N10 Phase 3 Carlow to Kilcullen Road Scheme.  
**Alternative route:** Traffic will be diverted onto a newly constructed temporary diversion road on the east side of the existing N9 and running virtually parallel to the existing N9. The diversion route will be signposted. Any inconvenience caused is regretted.

**TRANSPORTATION & PUBLIC SAFETY**  
**NOTICE TO LANDOWNERS**  
**ATTENTION TO TREES AND HEDGES**  
The maintenance of roadside trees, hedges and other vegetation is the responsibility of the landowners on whose land they are growing. Landowners should therefore ensure that trees, hedges or other vegetation are maintained in such condition that they are not a hazard to road users or that they do not interfere with the maintenance of the road. In particular branches that jut out onto the road should be cut back. Dead and unsafe trees should be removed and hedges should be cut and trimmed. All reasonable care should be taken to ensure the safety of road users when this work is being carried out. Hedges provide shelter for nesting birds and small animals; therefore hedge cutting should not be undertaken, except in the case of an emergency, during growth season between 1March and 31 August.  
N.B. Professional advice on the condition of roadside trees should be obtained from time to time, and before the removal of mature roadside trees.

**TEMPORARY ROAD CLOSURE**  
**ROADS ACT 1993**  
**NOTICE OF INTENTION**  
The council hereby gives notice in accordance with Section 75 of the Roads Act 1993 that it intends to close  
The Nine Tree Hill Road (L8025), Crookstown  
From 8.00a.m. on Monday 9March until 6.00p.m. on Friday 12June 2009  
The closure is required to facilitate the installation of drainage, service pipes and ducts on the N9/N10 Carlow to Kilcullen Project.  
**Alternative routes** - adequate diversionary signage and traffic management will be in place as agreed with the council and the Garda Síochána. Any objections/submissions should be lodged in writing to the Senior Executive Officer, Transportation Dept. on or before 5.00p.m. on Wednesday 25 February 2009.

Kildare County Council, Áras Chill Dara, Devoy Park, Naas, Co. Kildare.  
Phone: 045-980200; Fax 045-980240; Website [www.kildare.ie/countycouncil](http://www.kildare.ie/countycouncil)  
Emergency Number (Outside Office Hours) 1890 500 333; Help Text 087 7714666

Kildare County Council is an equal opportunities employer

**McLOUGHLINS** THE OIL PEOPLE **MCL**

**HEATING OIL**

**1,000 LITRES FROM €434**

Valid on 19th February, 2009

**NEWBRIDGE 045 431281**  
**DUBLIN 01 6249710**

Credit Cards Accepted

## ATTACHMENT B.9(ii) – PENDING DEVELOPMENT

The additional loading from pending development has been estimated from planning records as follows :-

- Residential un-built = 254 PE
- Commercial un-built = 2 p.e

The percentage PE contribution to the additional loading from pending commercial development is 1 % approx.

The existing plant is beyond it's capacity.

The stated design capacity of the replacement plant **currently under construction** is 1,600 PE.

The current PE loading on the plant has been determined to be 1,138 PE following a recent PE survey. An increase of 256 PE to the WWTP would result in a PE load of 1,394 PE. The capacity of the plant (1,600PE) is in excess of this figure ensuring adequate capacity to treat this effluent.

## ATTACHMENT B.10 – CAPITAL INVESTMENT PROGRAMME

Derrinturn Wastewater Treatment Plant is currently being replaced, including the relocation of the plant from its existing site to a new adjacent site in Derrinturn.

A programme has been developed by Nicholas O'Dwyer Consulting Engineers, working on behalf of Kildare County Council and the construction phase, which is under way is expected to reach completion in June 2009.

The following are attached for reference :-

- a. Water Services Investment Programme Assessment of Needs 2007 – 2014 (Jul 2006)
- b. Water Services Investment Programme 2007 – 2009 (Kildare) – extract from National Programme Tables
- c. Nicholas O'Dwyer Consulting Engineers design report (Sep 2005) for Derrinturn Sewerage Scheme



# **KILDARE COUNTY COUNCIL**

## **WATER SERVICES**

### **WATER SERVICES INVESTMENT PROGRAMME**

#### **ASSESSMENT OF NEEDS 2007 – 2014**

*Consent of copyright owner required for any other use.*

**P. Minnock**  
**Director of Services**  
**31<sup>st</sup> July 2006**

# WATER SERVICES INVESTMENT PROGRAMME

## ASSESSMENT OF NEEDS 2006

### **Introduction:**

Local Authorities are required to prepare “Assessments of Needs” for water services capital works in their areas at regular intervals. These assessments provide the basis for scheme approval and scheduling under the Water Services Investment Programme. The last “Assessment of Needs” took place in 2003. Whereas normally they are updated at 5 year intervals, because of the scale and pattern of demographic and economic development in recent years, Sanitary Authorities are being requested to carry out new assessments in 2006.

The new Assessment of Needs will cover the period 2007 – 2014 and will be used as an input to the next National Development Plan. It is to be carried out in accordance with the general guidelines set out in Circular L2/06 and is to be returned to the Department not later than the 31<sup>st</sup> July 2006.

### **Previous Assessment of Needs:**

The last Assessment of Needs was carried out in 2003 and covered the period 2007 – 2012. This Assessment identified 18 schemes for Kildare namely:-

1. Kildare Town Sewerage Scheme Treatment Plant and Network
2. Lower Liffey Valley Regional Sewerage Scheme
3. Watermain Castlewarden - Ballygoran
4. Water Treatment Plant Athy and Associated Distribution Network
5. Upper Liffey Valley Regional Sewerage Scheme
6. Moone/Timolin/Ballitore Sewerage Scheme
7. Pumping Station Ardscull and Rising Main to Old Kilcullen Reservoir
8. Rathangan Sewerage Scheme- Pipeline Rehabilitation and Augmentation
9. Athy and Environs Water Supply
10. River Crossing Leixlip Water Treatment Plant
11. Rathangan Allenwood – Integration of Water Networks
12. Athy Sewerage Scheme – Extension to Treatment Plant and Network  
Augmentation and Rehabilitation
13. High Level Area South Kildare
14. Old Kilcullen Reservoir Supply Area
15. Milltown Sewerage Scheme
16. Allen Reservoir Water Supply Area
17. Phase 2 Castledermot Sewerage Scheme
18. Continuing extension of Water Supply Network

Since 2003 significant progress has been made on a number of these schemes.

1. **Kildare Town Sewerage Scheme**
    - Consultants appointed October 2004
    - EIS (WWTP) approved March 2006
    - Part 8 Planning Process (network) completed April 2006
    - Contract Documents for network being finalised
    - Contract Documents for Waste Water Treatment Plant being prepared
    - Planned to commence construction Q2 2007
  
  2. **Lower Liffey Valley Regional Sewerage Scheme**
    - Consultants appointed March 2004
    - EIS (WWTP) approved June 2006
    - Part 8 Planning Process (network) completed July 2005
    - Contract Documents for network with DOEHLG for approval
    - Contract Documents for Waste Water Treatment Plant being prepared
    - Straffan element of network under construction
    - Planned to commence balance of network upgrade Q2 2007
  
  3. **Watermain Castlewarden to Ballygoran**
    - Consultants appointed for Castlewarden to Ballygoran August 2005
    - Design review completed
    - Pipeline route selection being finalised
    - Contract Documents being prepared
    - Planned to commence construction Q2 2007
  
  4. **Water Treatment Plant Athy and associated Distribution Network**
    - EIS approved November 2003
    - Abstraction Order confirmed by High Court May 2005
    - Consultants appointed January 2006
    - Contract Documents being prepared
    - Planned to commence construction Q2 2007
- Ardscull Reservoir and Pipeline to Athy – construction due to commence Q3 2006
5. **Upper Liffey Valley Regional Sewerage Scheme**
    - Preliminary Report with DOEHLG for approval
  
  6. **Moone/Timolin/Ballitore Sewerage Scheme**
    - Scheme approved to progress to planning stage 2004
    - Preliminary Report prepared
    - Consultants being appointed for Detailed Design/construction
  
  7. **Pumping Station Ardsclull and Rising Main to Old Kilcullen Reservoir**
    - Consultants appointed November 2001
    - Route selection being finalised

It should also be noted that in this period the following schemes have been completed or are under construction:-

- Castledermot Sewerage Scheme – Phase 1
- Monasterevin Sewerage Scheme
- Allenwood Sewerage Scheme
- Curragh/Cutbush Sewerage Scheme
- Sludge Handling Facility Osberstown
- South Kildare Water Supply Scheme
- Ballymore Eustace to Naas Watermain
- Ballymore Eustace to Old Kilcullen Watermain
- Rathangan/Hybla Wellfield Scheme
- Castlewarden to Kilcock Watermains and Reservoirs

### **Assessment of Needs 2007 – 2014 Methodology**

In preparing the Assessment of Needs the Department advise that one should take into account the following:-

- Relevant National and EU Directives and Standards
- County Development Plan, Regional Planning Guidelines and National Spatial Strategy
- Relevant Water Services Water Quality Reports
- Adequacy of existing infrastructure
- Developments in River Basin Management

In addition to the foregoing in prioritising schemes for inclusion the Council must satisfy itself in terms of their affordability both from a value for money perspective and direct cost implications for the Council (Water Services Pricing Policy/Marginal Cost).

### **Kildare – specific drivers:**

The driving force for the current “Assessment of Needs” has been identified as “the scale and pattern of demographic and economic development” and Kildare is very much to the forefront in this regard.

County Kildare is one of the fastest growing areas in the country. Over the past ten years the population of the county has grown by 38%, 134,992 (1996) to 186,075 (2006). This level of growth is more than twice the national average of 17%. In the same period 30,000 new houses have been built in the county and major national “trophy industries” based in Kildare (e.g. Intel, Hewlett Packard, Wyeth) have continued to expand.

Obviously meeting the demands of this level of growth places an inordinate strain on water services throughout the county both from a service level and from environmental requirements. In considering the current “Assessment of Needs” we have looked at schemes which need to be brought on stream as a matter of urgency to meet the immediate needs of the county. Thereafter we have prioritised schemes that will meet the strategic needs of the county up to 2014. To this end we have had

regard to the County Development Plan (2005 - 2011) which has identified the need for removing infrastructural blockages, and building capacity for future population and employment growth.

#### **Proposed Programme of Works:**

The following list of schemes represents the Council's Assessment of Needs for the period 2007 – 2014 in order of priority:-

1. **Derrinturn Wastewater Treatment Plant**
2. **Ballymore Eustace Sewerage Scheme**
3. **Moone/Timolin/Ballitore Sewerage Scheme**
4. **Athy Sewerage Scheme (1)**
5. **Ballyna Regional Water Supply Scheme**
6. **Rathangan Sewerage Scheme – Pipeline Rehabilitation and Augmentation**
7. **River Crossing Leixlip Water Treatment Plant**
8. **North Kildare Bundled Sewerage Scheme – Ardclough, Staplestown, Rathcoffey, Broadford, Kilmeague, Clonuff, Donore**
9. **South Kildare Bundled Sewerage Scheme – Kilberry, Kildangan, Calverstown, Kilkea**
10. **Athy Sewerage Scheme – Treatment Plant Upgrade and Network (2)**
11. **Milltown Sewerage Scheme**
12. **Castledermot Sewerage Scheme – Phase 2**
13. **Monasterevin Sewerage Scheme – Phase 2**
14. **Rathangan/Allenwood – Integration of Water Networks**
15. **Athy and Environs Water Supply Scheme**
16. **High Level Area South Kildare Water Supply Scheme**
17. **Old Kilcullen Reservoir Supply Area Water Supply Scheme**
18. **Allen Reservoir Supply Area Water Supply Scheme**
19. **Continuing Extension of Water Supply Network**

When considering the above it should be noted that in accordance with Circular L2/06 the following schemes have not been included as a new requirement as they have already been assigned a construction start date in the Water Services Investment Programme 2005 – 2007 (Appendix 1).

- Kildare Town Sewerage Scheme – Treatment Plant and Network
- Kildare Water Strategy Phase 1 – Wellfield Contracts
- Kildare Water Strategy Phase 2 – Castlewarden to Ballygoran
- Kildare Water Strategy Phase 1 – Barrow Abstraction and Associated Pipelines
- Kildare Water Strategy Phase 1 – Ardscull to Old Kilcullen
- Kildare Water Strategy Phase 1 – Ardscull to Athy
- Lower Liffey Valley Sewerage Scheme – Treatment Plant and Network
- Upper Liffey Valley Sewerage Scheme – Treatment Plant (3) and Network

It should also be noted that while the following schemes have been included, they may be progressed separately under the Serviced Land Initiative Programme:-

1. Derrinturn Waste Water Treatment Plant
2. Ballymore Eustace Sewerage Scheme
4. Athy Sewerage Scheme Network (1)

12. Castledermot Sewerage Scheme – Phase 2
13. Monasterevin Sewerage Scheme – Phase 2

**Details of Schemes listed:**

**1. Derrinturn Wastewater Treatment Plant**

Existing Wastewater Treatment Plant overloaded. It is proposed to provide a new Wastewater Treatment Plant with 2000 PE capacity.

Estimated Cost €1,900,000

**2. Ballymore Eustace Sewerage Scheme**

Existing Wastewater Treatment Plant overloaded. It is proposed to provide a new Wastewater Plant with 2000 PE capacity.

Estimated Cost €2,125,000

**3. Moone/Timolin/Ballitore Sewerage Scheme**

- A Preliminary Report to construct a new Sewerage Scheme for Moone/Timolin/Ballitore was prepared in 2001
- Consultants to be appointed to carry out design review and to progress scheme to detailed design/construction.

Estimated cost €4,300,000

**4. Athy Sewerage Scheme Network (1)**

It is proposed to provide a new trunk foul sewer in the south-east of the town to serve development lands and to refurbish the existing sewer network in the town centre.

Estimated Cost €2,350,000

**5. Ballyna Regional Water Supply Scheme**

It is proposed to provide a regional water supply scheme in the north-west of the county. This scheme will also facilitate the decommissioning of the “Annex 14” Ballindoolin private group scheme.

Estimated Cost €1,500,000

**6. Rathangan Sewerage Scheme – Pipeline Rehabilitation and Augmentation**

- A Preliminary Report was prepared in 2001
- The Wastewater Treatment Plant at Rathangan has recently been upgraded from 2000 PE to 4000 PE.
- The existing network has significant capacity, exfiltration and infiltration problems and needs to be upgraded.

Estimated Cost €2,750,000

**7. River Crossing Leixlip Water Treatment Plant**

The North East of Kildare is supplied via a 700mm main from Leixlip Water Treatment Plant which crosses under the River Liffey to a pump station on the opposite side of the River. The pump station pumps water to Ballygoran Reservoir to supply the region and also, through a separate set of pumps, supplies Intel directly.

It is proposed to duplicate the river crossing and improve pumping capacity and standby arrangements to provide adequate security of supply to the region and to Intel.

Estimated Cost: €6,000,000.

**8. North Kildare Bundled Sewerage Scheme – Ardclough, Staplestown, Rathcoffey, Broadford, Kilmeague, Clonuff, Donore**

It is proposed to form a bundled sewerage scheme for the provision/upgrade of sewerage facilities in the above settlements.

Estimated Cost: €5,000,000.

**9. South Kildare Regional Sewerage Scheme – Kilberry, Kildangan, Calverstown and Kilkea**

It is proposed to form a bundled sewerage scheme for the provision/upgrade of sewerage facilities in the above settlements.

Estimated Cost €3,500,000.

**10. Athy Sewerage Scheme – Treatment Plant Upgrades and Networks**

The capacity of the current sewerage treatment plant in Athy is 15,000 PE with a current loading of 10,000 PE. It is anticipated that it will be necessary to extend the plant to 22,500 PE before 2014 to meet increased domestic and non-domestic demand.

The existing network has significant capacity, exfiltration and infiltration problems and needs to be upgraded.

Estimated Cost €7,000,000.

**11. Milltown Sewerage Scheme**

There are two small treatment plants in Milltown which cannot be expanded because of a lack of suitable receiving waters.

It is proposed to connect Milltown to the Upper Liffey Regional Sewerage Scheme at Newbridge in order to meet environmental requirements and to facilitate development.

Estimated Cost €2,500,000

**12. Castledermot Sewerage Scheme – Phase 2**

A 2400 PE Wastewater Treatment Plant has been built. It is anticipated that this capacity will be reached before 2014 and that it will be necessary to expand the Plant to 4000 PE.

Estimated Cost €2,000,000

**13. Monasterevin Sewerage Scheme – Phase 2**

A 9000 PE Wastewater Treatment Plant has been built. It is anticipated that this capacity will be reached before 2014 and that it will be necessary to expand the Plant to 15,000 PE.

Estimated Cost €4,000,000

**14. Rathangan/Allenwood – Integration of Water Networks**

Wellfields will be developed in Rathangan to supply the Rathangan and Kildare Town areas and in Robertstown to supply areas north of the Reservoir at the Hill of Allen. It is proposed to connect these two wellfield supply areas with a link between Allenwood and Rathangan to provide greater flexibility in supply.

Estimated Cost: €4,000,000

**15. Athy and Environs Water Supply Scheme**

- Network extension to rural environs

Estimated Cost €4,000,000

**16. High Level Area in South East Kildare**

- 200 mm diameter branch connection from existing 27” or new 800 mm pipeline at Brannockstown to new pumping station
- New pumping station at Brannockstown
- 250 mm diameter rising main to new reservoir at Moorhill
- Construction of 1500 m<sup>3</sup> capacity reservoir (190 m.o.d) at Moorhill
- 200 mm diameter main from Moorhill to Ballitore Junction
- 150 mm diameter main from Ballitore Junction to Ballitore

Estimated Cost €6,000,000

**17. Old Kilcullen Reservoir Distribution Area**

- 400 mm diameter main via Athgarvan to Newbridge to reinforce existing 400 mm diameter main
- 300 mm diameter main from Suncroft to Monasterevin Reservoir
- 300 mm diameter main from Newlands to the Naas Ring Main to reinforce supply from Old Kilcullen Reservoir to Naas

Estimated Cost €5,000,000

**18. Allen Reservoir Supply Area**

- Construction of 400 mm diameter main from Allenwood to Clane
- 300 mm main between Clane and Sallins

Estimated Cost €4,000,000

**19. Continuing extension of network in following areas:-**

- North West Kildare including replacement of 250 mm diameter PVC Class B main
- Castledermot Regional Water Supply Scheme

Estimated Cost €4,000,000

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

**Kildare County Council  
Water Services**

**July 2006**

# Kildare\*

## Water Services Investment Programme 2007 - 2009

<b>Schemes at Construction</b>	<b>W/S</b>	<b>Est. Cost</b>
Kildare Sludge Management	S	19,500,000
Kildare Water Supply Scheme Phase 1 -Trunk Watermains (Contract 3B - Ardscull to Athy)	W	5,100,000
Lower Liffey Valley Sewerage Scheme (Treatment Plant & Collection System for Kilcock, Straffan, Celbridge, Maynooth and Leixlip)	S	35,700,000
		<b>60,300,000</b>
<b>Schemes to start 2007</b>		
Kildare Water Supply Scheme Phase 1 (Contract 3A - Ardscull to Old Kilcullen Reservoir)	W	6,000,000
Kildare Water Supply Scheme Phase 1 Wellfield Contract (Johnstownbridge/Robertstown)	W	15,000,000
		<b>21,000,000</b>
<b>Schemes to start 2008</b>		
Kildare Town Sewerage Scheme	S	21,400,000
Kildare Water Supply Scheme Phase 1 (River Barrow Abstraction Scheme and Associated Pipelines)	W	44,200,000
Kildare Water Supply Scheme Phase 2 (Castlewarden to Ballygoran)	W	15,300,000
Upper Liffey Valley Sewerage Scheme Stage 3 (Osberstown)	S	18,000,000
		<b>98,900,000</b>
<b>Serviced Land Initiative</b>		
Athgarvan/Newbridge Water Supply Scheme	W	640,000
Ballymore Eustace Wastewater Treatment Plant	S	1,400,000
Derrinturn Wastewater Treatment Plant	S	2,100,000
Sunnyhill (Kilcullen) Water Supply Scheme	W	520,000
		<b>4,660,000</b>
<b>Schemes to Advance through Planning</b>		
Athy Sewerage Scheme	S	2,400,000
Ballyna Regional Water Supply Scheme	W	11,500,000
Moone/ Timolin/ Ballitore Sewerage Scheme	S	4,300,000
Rathangan Sewerage Scheme	S	2,800,000
		<b>21,000,000</b>
<b>Water Conservation Allocation</b>		<b>1,300,000</b>
<b>Asset Management Study</b>		<b>160,000</b>
<b>Programme Total</b>		<b>207,320,000</b>

\* All Kildare schemes fall within the Greater Dublin Area as described in the National Spatial Strategy

# KILDARE COUNTY COUNCIL

## DERRINTURN WASTEWATER TREATMENT PLANT

### DESIGN REVIEW REPORT

For inspection purposes only.  
Consent of copyright owner required for any other use.

**Nicholas O'Dwyer Ltd,  
Consulting Engineers,  
Nutgrove Office Park  
Nutgrove Avenue  
Dublin 14.**

**Revision B - September 2005**

PROJECT NO. 20240		Prepared by		Approved by		Issued by	
		Initials	Date	Initials	Date	Initials	Date
<b>Revision</b>	<b>Reason for Revision</b>	SMcC	07/02	ND	07/02	ND	07/02
<b>A</b>	Amendments to Budgets	SMcC	10/02	ND	10/02	ND	10/02
<b>B</b>	Revised WWTP Site	TO'F	05/09/05	ND	05/09/05	ND	05/09/05
<b>C</b>							
<b>D</b>							

## CONTENTS

<b>1.0</b>	<b>INTRODUCTION</b>	<b>1</b>
1.1	Appointment	1
1.2	Scope of Work for the New Wastewater Treatment Plant	1
1.3	Drawings	1
<b>2.0</b>	<b>SCHEME BACKGROUND</b>	<b>2</b>
2.1	Scheme Background / Description of Scheme	2
2.2	Objectives of the Scheme	2
2.3	Environmental Impact Assessment	2
2.4	Local Area Plan	3
2.5	County Development Plan	3
<b>3.0</b>	<b>POPULATION PROJECTIONS</b>	<b>4</b>
3.1	Existing Population	4
3.2	Estimated Future Population Projections	5
<b>4.0</b>	<b>REVIEW OF EFFLUENT DISCHARGE STANDARDS</b>	<b>8</b>
4.1	Wastewater Treatment Plant	8
4.2	Receiving Waters	8
4.3	Relevant Legislation	9
4.4	River Water Quality	12
4.5	Final Effluent Standards	12
4.6	Discussion & Recommendations	16
<b>5.0</b>	<b>WASTEWATER TREATMENT PLANT LOCATION</b>	<b>18</b>
5.1	Existing Wastewater Treatment Plant & Collection System	18
5.2	Options for Wastewater Treatment Plant Site Location	18
5.3	Wastewater Treatment Plant Site Selection	20
5.4	Proposed Network Extension	21
5.5	Discussion & Recommendations	22
<b>6.0</b>	<b>WASTEWATER TREATMENT OPTIONS</b>	<b>24</b>
6.1	Introduction	24
6.2	Preliminary Treatment	25
6.3	Primary <i>and / or</i> Secondary Treatment Process Options	26
6.3.1	MBR Technology	26
6.3.2	BMS Aerator Units	26

6.3.3	Gemini Package Treatment Plant	26
6.3.4	Activated Sludge Package Plants	27
6.3.5	Low Sludge Biological Treatment Process (EA Technology Ltd.)	27
6.3.6	Puraflo Biofiltration System	27
6.3.7	FAST Aeration System	27
6.3.8	Extended Aeration Package Plants	28
6.3.9	Advantages / Disadvantages of Package Treatment Plants	28
6.3.10	Plant Performance and Selection	29
6.4	Tertiary Treatment	29
6.4.1	Reed Beds	30
6.4.2	Tertiary Filters	31
6.4.3	Chemical Dosing for Phosphorus Removal	32
6.4.4	Summary of Process Requirements	32
6.5	Stormwater Treatment	32
6.6	Sludge Disposal	33
<b>7.0</b>	<b>COST ESTIMATES</b>	<b>35</b>
7.1	Wastewater Treatment Plant Costs	35
7.2	Extension to Sewerage Network Costs	35
7.3	Other Costs	36
7.4	Economic Viability	37
<b>8.0</b>	<b>PROCUREMENT OPTIONS</b>	<b>38</b>
8.1	Traditional Contract	38
8.2	Design Build (DB) Contract	39
8.3	Design Build Operate (DBO) Contract	41
8.4	Discussion & Recommendations	41
<b>9.0</b>	<b>DESIGN PARAMETERS</b>	<b>43</b>
9.1	Wastewater Treatment Plant	43
9.2	Storm Tank	43
9.3	Effluent Standards	44
<b>10.0</b>	<b>CONCLUSIONS AND RECOMMENDATIONS</b>	<b>45</b>
<b>APPENDIX 1 – Letter of Appointment</b>		
<b>APPENDIX 2 – Drawing List</b>		
<b>APPENDIX 3 – Breakdown of Operational Costs</b>		

## 1.0 INTRODUCTION

### 1.1 Appointment

Kildare County Council appointed Nicholas O'Dwyer Ltd. to prepare a Design Report for a new wastewater treatment plant in Derrinturn by way of letter dated 22<sup>nd</sup> August 2001.

### 1.2 Scope of Work for the New Wastewater Treatment Plant

- Carry out a review of the population and establish the 2025 population equivalent.
- Review the assimilative capacity of potential receiving waters and establish a suitable discharge location.
- Establish a suitable level of treatment appropriate to the assimilative capacity of the receiving waters.
- Examine potential Wastewater Treatment Plant site locations and recommend a preferred solution.
- Carry out topographical surveys on the preferred Wastewater Treatment Plant location and any pipeline routes required.
- Examine wastewater treatment options, wastewater flows and possible staging of the scheme.
- Prepare outline costs of construction for the preferred option.

### 1.3 Drawings

The Drawings, which form part of this Report, are submitted as separate documents.

## 2.0 SCHEME BACKGROUND

### 2.1 Scheme Background / Description of Scheme

The town of Derrinturn is located in the north west of County Kildare approximately 12 km from Clane and 9 Km from Edenderry (Co. Offaly). The main roads in the area are the R403 and R402 with a number of third class roads also serving the area. There are no major rivers in the surrounding environs as the town is situated near the watershed of the Boyne and Barrow river basins. The Grand Canal is located approximately 3 km to the south of the town. An existing sewerage network and wastewater treatment plant currently serves the town of Derrinturn. The wastewater treatment plant is on the edge of the town development area and discharges into the Ballyshannon River. The town and its environs are shown in Drawing No. 20240-DR-01.

### 2.2 Objectives of the Scheme

The main objectives of the scheme can be summarized as follows:

- To provide wastewater treatment capacity for Derrinturn for a planning horizon of twenty years (to the year 2025).
- To comply with current E.U. Directives, the Water Quality Management Plan for the catchment area and the County Sludge Management Plan.
- To make adequate provisions for this vital infrastructure to facilitate the overall growth and physical development of the town.

The primary objective in setting an effluent quality standard for the works is to ensure that the water quality goals for the receiving water, as set out in the Water Quality Management Plan (WQMP), are achieved. In addition, the effluent quality must comply with all current statutory environmental regulations applying to discharges to freshwaters.

### 2.3 Environmental Impact Assessment

The projects future population equivalent is less than the mandatory Environmental Impact Assessment threshold (10,000) and as such an EIA will not

be required. However, under Irish EIA legislation provision is also made for sub-threshold EIA requirements where such a development may give rise to significant effects. A sub-threshold EIA is not considered appropriate as the proposed wastewater treatment plant will not impact on any environmentally sensitive area and the overall effect of this proposal will be a reduction in the waste load to the river.

## 2.4 Local Area Plan

The Derrinturn Local Area Plan (2001) sets out the development strategy goal for the town as follows:

*"To consolidate Derrinturn as a self-sustainable village retaining its own unique village atmosphere and serving the needs of its rural hinterland"*

In this regard, the Council are to

*"reinforce the village centre as the heart of Derrinturn and to improve its environment".*

The need for a new wastewater treatment plant in Derrinturn has also been identified by Kildare County Council in Section 2.3.2 of the Local Area Plan as follows,

*"Sewerage*

*A new sewage treatment plant is planned for the village.*

*P2.3.2 – It is the policy of the Council to ensure that the necessary drainage facilities to serve the needs of all development within the town are provided and to separate the disposal of foul and surface water through the provision of separate sewerage networks."*

## 2.5 County Development Plan

The County Development Plan (2005 – 2011) has identified Derrinturn as a 'key village' and incorporated the provisions of the Local Area Plan into the zoning of lands in the village.

### 3.0 POPULATION PROJECTIONS

#### 3.1 Existing Population

Derrinturn has its own electoral area and is therefore included in the National Census with a total population of 791 for 2002. The Local Area Plan estimated the 2006 population of Derrinturn as being approximately 1,400. A 2005 population review was carried out using data from the geo-directory for Kildare County and the town development boundary. The population equivalent from this most recent review was estimated to be 791, as detailed below in Table 3.1.

**Table 3.1 - Existing Development**

Description	Population Estimate 2005	
	No.	p.e.
Existing houses	246	728
Licensed Premises	2	10
Shops	4	4
Tourist	0	0
Primary School (No. pupils)	205	41
Community Centre	1	2
Others	3	6
<b>Total</b>		<b>791</b>

The population equivalent estimate is based on the following figures:-

#### Domestic Household (from 2002 Census)

- Existing (Derrinturn Average)                      2.96 Persons / House
- Future (County Average)                                3.18 Persons / House

#### Commercial / Institutional

Community Centre / Health Centre	2 PE each
Business Premises	1 PE each
Licensed Premises	5 PE each
Shops	1 PE each
Tourist Accommodation	2 PE / Room
Primary School	0.20 PE / pupil

### 3.2 Estimated Future Population Projections

There are a number of development proposals lodged at present with Kildare County Council. Drawing No. 20240-DR-14 and Table 3.2 detail the status of planned developments in the Derrinturn development area.

**Table 3.2 - Planned Developments**

No. of Units	Description	Status
24	01/303: 8 No. bungalows and 16 No. 3 bed semi – detached houses.	Under Construction
26	04/555: 12 No. 3 bed bungalows, 14 No. 3 bed semi – detached houses.	Under Construction
26	04/1479: 26 Residential Dwellings comprising 4 No. bungalows and 22 No. 3 bed semi – detached houses.	Granted with Conditions
43	04/3015: 43 Units in Phase II of Newbury Park Development	Under Construction
14	05/150: 4 No. 3 Bed Bungalows, 10 No. Houses.	Decision Pending

Census data for the period 1981 to 2002, shows that the historical growth rate for the Derrinturn electoral area is 4.8% per annum. In recent years, the development of Derrinturn town has expanded rapidly with a population increase of 45% between 1996 and 2002.

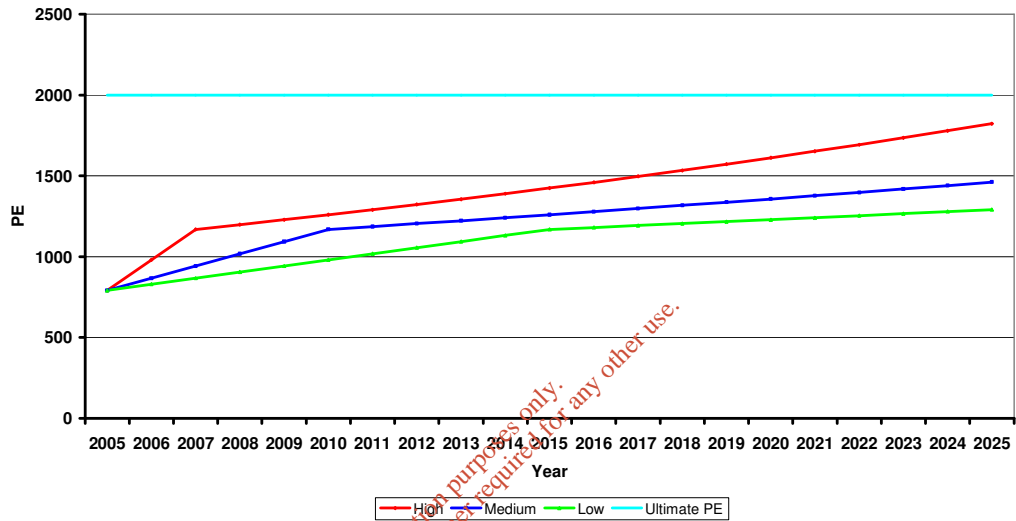
The 2005 population equivalent of Derrinturn is estimated at 791 PE. At present in Derrinturn there is planning permission granted for developments with the potential to contribute a further 378 PE. The majority of these planning permissions are conditional on the provision of temporary wastewater treatment facilities and it is likely that any further development in the town will be dependent on the construction of a new wastewater treatment plant. However, a number of developers, with housing estates currently under construction, have indicated their intention to make further planning applications in the town of Derrinturn. This is indicative of the high growth trend of the town since the original design report was commissioned in 2002.

The projected population growth, shown in Figure 3.1 below, for Derrinturn is based on the following:-

- i) High Growth Rate – Full Contribution of 378 PE within 2 years followed by annual average growth of 2.5%

- ii) Medium Growth Rate – Full Contribution of 378 PE within 5 years followed by annual average growth of 1.5%.
- iii) Low Growth Rate – Full Contribution of 378 PE within 10 years followed by annual average growth of 1.0%.

**Figure 3.1 – Population Projection for Derrinturn**



The strategy for the Derrinturn area is stated in the Local Area Plan 2001 as being to:

*"...consolidate Derrinturn as a self-sustainable village retaining its own unique village atmosphere and serving the needs of its local rural hinterland."*

The available area for development within the catchment boundary is approximately 13 hectares. The ultimate population for the town is taken as the full development of all areas within the catchment boundary. A population density of 20 houses per hectare, considered to be appropriate, was used to estimate the ultimate population of the town as being approximately 2,000 PE.

A design population equivalent of 2,000 for the proposed WWTP would:

- Provide sufficient capacity for all development work currently under construction.

- Provide spare capacity for anticipated developments in short term.
- Allow for a reasonable level of local growth over the next 20 years.
- Be in keeping with the stated strategy of the Derrinturn Local Area Plan 2001.

For these reasons, it is recommended that a design PE of 2,000 be adopted for the proposed WWTP in Derrinturn.

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

## 4.0 REVIEW OF EFFLUENT DISCHARGE STANDARDS

### 4.1 Wastewater Treatment Plant

It is proposed to construct a wastewater treatment plant capable of treating flow from a design P.E. of 2,000 in Derrinturn. This will ensure that the facility will deal with all foul flows up to 2025. A third stream may be added as part of a second phase of works post-2025 as required. The existing wastewater treatment plant in Derrinturn discharges to the Ballyshannon River to the south-east of the town. The Ballyshannon River is in poor condition and may not have the required assimilative capacity for the upgraded works. A review of the assimilative capacity of available receiving waters was made in order to determine an appropriate discharge point for the proposed wastewater treatment plant.

### 4.2 Receiving Waters

Derrinturn is located near the catchment watershed of the Boyne and Barrow rivers. A desktop study and field survey of Derrinturn identified two potential receiving waters in the proximity of the town, the Ballyshannon River and the Cushaling River. The Ballyshannon River is a tributary of the Cushaling River, which is in turn a tributary of the Figile River. All of these rivers are in the River Barrow hydrometric area.

The EPA has advised that there are no gauges on any of these rivers in Derrinturn and that there is a lack of good flow and water level records in this area. Results have been obtained from gauging stations on other rivers in the area and have been used to provide best estimates of the 95 percentile flow at the following locations:

- Ballyshannon River u/s of Derrinturn WWTP 0.002 m<sup>3</sup>/s
- Cushaling River at Dillon Bridge 0.015 m<sup>3</sup>/s

There is no data available at Ticknevin Bridge where the Ballyshannon and Cushaling Rivers merge so the 95 percentile flow is assumed for conservative purposes to be 0.02 m<sup>3</sup>/s.

### 4.3 Relevant Legislation

The primary objective in setting an effluent quality standard for the plant is to ensure that water quality goals for the river are achieved. In addition, the effluent quality must comply with all current statutory environmental regulations applying to discharges to freshwaters.

The relevant regulatory guidelines in this case are mainly to be found in the following documents:

- (i) Urban Wastewater Treatment Regulations, 2001 (SI No. 254 of 2001).
- (ii) Water Quality Management Plan for the River Barrow.
- (iii) Local Government (Water Pollution) Act, 1977 (Water Quality Standards for Phosphorus) Regulations, 1998. (S.I. No. 258 of 1998).

The minimum treatment standards required for the plant as set down in the urban wastewater regulations are as follows:

"A Sanitary Authority should ensure by the 31st December 2005 that urban wastewater entering a collection system shall before discharge be subject to appropriate treatment in respect of discharges to freshwater from agglomerations with a population equivalent of less than 2,000".

Since the River Barrow and its tributaries have not been classified as sensitive waters under the terms of the urban wastewater regulations, the minimum effluent standards to be applied, as set out in the Second Schedule, Part I of S.I. 254, are given in Table 4.1.

**Table 4.1 – Minimum Effluent Quality Standards**

Parameter	Concentration	Min. % Reduction *
BOD <sub>5</sub> (without nitrification)	25 mg/l O <sub>2</sub>	70 - 90
COD	125 mg/l O <sub>2</sub>	75
Total Suspended Solids	35 mg/l	90

\* Reduction in relation to influent load

The Water Quality Management Plan (WQMP) for the River Barrow, 1985, and its tributaries provides a comprehensive evaluation of the water resource, including catchment hydrology, water quality, water uses, pollution loads, etc. The main objective of the plan is to ensure that the quality of the Barrow catchment waters is maintained in a satisfactory condition and where necessary improved, thereby:-

- (i) Safeguarding public health.
- (ii) Catering for the abstraction of increased quantities of water for domestic, industrial and agricultural purposes.
- (iii) Catering for the needs of commercial and game fisheries.
- (iv) Catering for the relevant water-based amenities and recreational requirements.

Another vital objective of the WQMP is to identify the control measures deemed necessary in relation to the satisfactory treatment and disposal of existing and future wastewater and industrial effluent discharges to the River Barrow. The water quality standards recommended in the WQMP are set out in Table 4.2.

Although the achievement of a salmonid water quality is a key objective of the WQMP, the River Barrow has not been included in the designated salmonid rivers in Schedule 1 of the European Communities (Quality of Salmonid Waters) Regulations, S.I. 293/88 (this Statutory Instrument (S.I.) gives effect in Ireland to EU Directive 78/659/EEC, which governs the quality of fresh waters needing protection or improvement in order to support fish life). The water quality requirements of S.I. 293/88 are given in Table 4.3 for reference only.

**Table 4.2 – Water Quality Standards from WQMP**

Parameter	Recommendation
Dissolved Oxygen (mg/l O <sub>2</sub> )	≥ 4 for 99.9% of the time ≥ 6 for 95% of the time ≥ 9 for 50% of the time
BOD <sub>5</sub> (mg/l O <sub>2</sub> )	≤ 5 for 95% of the time ≤ 3 for 50% of the time
Non-ionised Ammonia (mg/l N)	≤ 0.02 for 95% of the time
Total Ammonia (mg/l N)	≤ 0.5 for 95% of the time
Nitrate (mg/l N)	≤ 11 for 95% of the time
Orthophosphate (mg/l P)	≤ 0.2 for 95% of the time ≤ 0.1 for 50% of the time

**Table 4.3 – EC (Quality of Salmonid Waters) Regulations, S.I. 293/88**

Parameter	Value
Dissolved Oxygen (mg/1O <sub>2</sub> )	50% ≥ 9
PH	≥ 6 ≤ 9
Suspended Solids (mg/1)	≤ 25
BOD <sub>5</sub> (mg/O <sub>2</sub> )	≤ 5
Nitrite (mg/1 NO <sub>2</sub> )	≤ 0.05
Non-Ionised Ammonia (mg/1 NH <sub>4</sub> )	≤ 0.02
Total Ammonia (mg/1 NH <sub>4</sub> )	≤ 1

The phosphorus loads permitted in the river are governed by the Phosphorus Regulations (S.I. 258 of 1998). The salient features of these regulations are summarised below:

- The standards quoted are in terms of Molybdate – Reactive Phosphate.
- The concentrations measured are median values determined using a minimum of 10 samples taken at intervals of four weeks or longer in any 12 consecutive month period.
- The existing biological quality rating / Q index is to be improved to meet the minimum target biological quality rating / Q index as detailed in the Regulations.

#### 4.4 River Water Quality

There is no published river water quality data for the Ballyshannon River. The nearest sampling station to Derrinturn is on the Cushaling River south of Ticknevin.

**Table 4.4 – Q Rating of Cushaling River at Bridge South of Ticknevin, EPA**

Year	1989	1990	1993	1994	1997	2000
Quality Rating	2	1-2	2	1	1/0	1-2

**Table 4.5 – Water Quality Readings at Bridge South of Ticknevin, EPA**

Water Quality Parameter	Unit	Min	Med	Max
BOD	mg/l O <sub>2</sub>	-	-	-
Ammonia	mg/l NH <sub>3</sub>	-	-	-
Ortho – Phosphorus	mg/l P	0.05	0.16	0.43

Due to the lack of river water quality data, Kildare County Council performed river sampling and established the average background value for BOD in the Ballyshannon and Cushaling Rivers as being 2 mg/l O<sub>2</sub>.

**Table 4.6 – Biological Quality Rating for Cushaling River**

Existing Biological Quality (Q) Rating/Q Index	Minimum Target Biological Quality (Q) Rating /Q Index	Molybdate Reactive Phosphate Median Concentration (µg P/L)
≤ 2	3	70

#### 4.5 Final Effluent Standards

The final effluent standards are calculated as follows:

$$WAC = (C_{max} - C_{back}) \times F_{95} \times 86.4$$

WAC	=	Waste Assimilation Capacity (kg/d)
$C_{max}$	=	Maximum Concentration (mg/l)
$C_{back}$	=	Background Concentration (mg/l)
$F_{95}$	=	95 Percentile Flow ( $m^3/s$ )
86.4	=	Conversion Constant

This calculation was used to determine the waste assimilative capacity of the Ballyshannon and Cushaling Rivers for a range of water quality parameters. The results are detailed below in Table 4.7 and 4.8.

The proposed treatment plant is designed to cater for a population equivalent of 2,000. Using standard influent quality data, the expected daily load and concentrations to the wastewater treatment plant were estimated for a range of water quality parameters. The calculations were based on a Per Capita Water Consumption figure of 225 litres per person per day. The results are shown below in Table 4.9.

**Table 4.7 – Summary of WAC Figures for Ballyshannon River at Derrinturn**

Parameter	95% Flow	Mean Flow <sup>(1)</sup>	Allowable Concentration	Background Concentration	Waste Assimilative Capacity <sup>(2)</sup>
	( $m^3/s$ )	( $m^3/s$ )	(mg/l)	(mg/l)	(kg/d)
BOD <sub>5</sub>	0.002	0.018	4.0	2.0	2.2
Total NH <sub>4</sub>	0.002	0.018	0.5	0.05 <sup>(4)</sup>	0.3
MRP <sup>(3)</sup>	0.002	0.018	0.07	0.03 <sup>(5)</sup>	0.04

**Table 4.8 – Summary of WAC Figures for Cushaling River at Ticknevin**

Parameter	95% Flow	Mean Flow <sup>(1)</sup>	Allowable Concentration	Background Concentration	Waste Assimilative Capacity
	( $m^3/s$ )	( $m^3/s$ )	(mg/l)	(mg/l)	(kg/d)
BOD <sub>5</sub>	0.02	0.06	4.0	2.0	3.5
Total NH <sub>4</sub>	0.02	0.06	0.5	0.05 <sup>(4)</sup>	0.8
MRP <sup>(3)</sup>	0.02	0.06	0.07	0.03 <sup>(5)</sup>	0.2

**Table 4.9 – Influent Load Estimates**

Parameter	PE	Contribution per PE	Influent Load
		(kg/h/d)	(kg/d)
BOD <sub>5</sub>	2000	0.06	120
Total NH <sub>4</sub>	2000	0.0079	15.8
MRP	2000	0.0025	5

- (1) It has been assumed that mean flow is equivalent to 3 times the 95% flow (including DWF from WWTP for Ballyshannon River).
- (2) The WAC formula has been altered to  $(C_{max} \cdot D/s \text{ Flow} - C_{back} \cdot U/s \text{ Flow}) \times 86.4$  in order to reflect the high proportion of d/s flow contributed by the wwtp.
- (3) As the P concentration reported under the phosphorus regulations is a median value, the mean river flow has been used to calculate the assimilative capacity of the river in terms of phosphorus.
- (4) See Section 4.5.2 for assumptions made in background and acceptable NH<sub>4</sub> concentration.
- (5) See Section 4.5.3 for assumptions made in background and acceptable phosphorus concentration.

#### 4.5.1 BOD

As can be seen from Tables 4.7 and 4.9, the available waste assimilative capacity offered by the Ballyshannon River is approximately 1.8% of the estimated BOD influent loading from the design population of 2,000. An effluent standard of 5 mg/l would be required from the proposed WWTP in order to respect the limited assimilative capacity offered by the Ballyshannon River. This is comparable to a 8 mg/l effluent standard that could be assimilated by the Cushaling River at Ticknevin. This would suggest that a highly robust treatment process is required in Derrinturn to provide an acceptable effluent quality at either discharge point.

#### 4.5.2 Ammonia

The Urban Wastewater Treatment Regulations states that only conglomerations over 10,000 PE are subject to statutory nutrient removal. However, consideration of local conditions can be applied in assessing the acceptable nutrient concentrations in a proposed effluent. The assimilative capacities of the two possible discharge points have been estimated using allowable NH<sub>4</sub> concentrations from the River Barrow WQMP and background NH<sub>4</sub> concentrations representative of the BOD sampling previously undertaken by Kildare County Council.

These estimates are shown in Tables 4.7 and 4.8. It is clear from comparison with the influent NH<sub>4</sub> estimates in Table 4.9 that the assimilative capacity of both

receiving waters is limited and that, in keeping with best environmental practice, an effluent standard for  $\text{NH}_4$  is required.

An effluent standard of 0.7 mg/l  $\text{NH}_4$  would be required from the proposed WWTP in order to respect the limited assimilative capacity offered by the Ballyshannon River. This is comparable to a 1.7 mg/l  $\text{NH}_4$  effluent standard that could be assimilated by the Cushaling River at Ticknevin.

#### 4.5.3 Phosphorus

The Urban Wastewater Treatment Regulations states that only conglomerations over 10,000 PE are subject to statutory nutrient removal. However, consideration of local conditions can be applied in assessing the acceptable nutrient concentrations in a proposed effluent. The most recent Q rating of 1 – 2, given above in Table 4.4, indicates heavy to gross pollution in the Cushaling River. There is no reason to suspect that this situation is any better in the Ballyshannon River upstream of this monitoring point and for these reasons the issue of phosphorus in the effluent will be examined.

The Kildare County Sludge Management Plan examined the Phosphorus load spread by agriculture in each river catchment within the county. The results of this examination are shown in Table 4.10 and highlight the over application of Phosphorus within the Cushaling River catchment.

**Table 4.10 – Phosphorus Application in Cushaling Catchment**

Organic P Load applied (i.e. slurry) Kg/yr	Inorganic P load applied (re fertilizer) Kg/yr	Actual P load required Kg/yr	Surplus Kg/yr
24,050	18,297	22,205	20,142

It is clear from the above analysis that agriculture has a significant impact on water quality, particularly in terms of phosphorus and, as a consequence, the Sludge Management Plan recommended the implementation of nutrient management at farm level. It has been assumed in these calculations that nutrient management will have a significant improvement on the water quality in these rivers.

The most recent EPA results indicate that the Cushaling River has a biological quality rating of Q1 – 2. It has been assumed that, due to nutrient management

at farm level and the removal of the existing discharge, the quality rating will be improved to Q4. This is equivalent to a median concentration of 30 µg P/L. This value has been assumed as the background phosphorus concentration in both possible receiving waters.

The Phosphorus Regulations aims to improve water bodies with a quality rating of Q1 – 2 to Q3. This is equivalent to an allowable median concentration of 70µg P/L. This value has been assumed as the allowable phosphorus concentration in both possible receiving waters.

These background and allowable phosphorus concentrations were used to estimate the assimilative capacity of the two possible receiving waters, as shown in Tables 4.7 and 4.8. It is clear from comparison with the influent P load estimated in Table 4.9 that the assimilative capacity of both receiving waters is limited and that, in keeping with best environmental practice and due to the importance of phosphorus in the control of eutrophication, an effluent standard for phosphorus is required.

An effluent standard of 0.1 mg/l P would be required from the proposed WWTP in order to respect the limited assimilative capacity offered by the Ballyshannon River. This is comparable to a 0.5 mg/l P effluent standard that could be assimilated by the Cushaling River at Ticknevin.

#### 4.6 Discussion & Recommendations

The above analysis indicates that the waste assimilative capacity in the Ballyshannon River would impose unrealistic effluent standards on the proposed wastewater treatment plant. The required effluent standards at this location could not be provided in accordance with the principle of Best Available Technology Not Entailing Excessive Cost (BATNEEC). For these reasons, its use as a discharge location is to be avoided.

The Cushaling River, downstream of the confluence with the Ballyshannon River, offers better waste assimilative capacity and is recommended as the discharge point for the proposed wastewater treatment plant. The recommended effluent standards for the proposed wastewater treatment plant are shown in Table 4.11. A robust treatment process with nutrient removal will be required in order to meet these standards.

**Table 4.11 – Recommended Effluent Standards for Derrinturn WWTP**

Parameter	Effluent Concentration mg/l
BOD <sub>5</sub>	8
TSS	8
Total Ammonia	1.5
Total Phosphorus	0.5

The effluent standards have been calculated using best estimates for the river flows in the Derrinturn area. It is recommended that a flow station be erected adjacent to the discharge point so that more accurate assessments of the assimilative capacity can be made. This will be particularly relevant for the onerous phosphorus standard.

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

## 5.0 WASTEWATER TREATMENT PLANT LOCATION

### 5.1 Existing Wastewater Treatment Plant & Collection System

The existing treatment plant is located to the south east of the village centre and is 90 metres from the R403. The nearest property boundary is 37 metres from the works boundary. New housing developments are proposed in close proximity to the existing works.

The wastewater treatment plant uses an extended aeration process and had an original design P.E. of 500. The subsequent installation of an extra aerator has increased the capacity of the wastewater treatment plant to 750 P.E. The population equivalent from Derrinturn, from Section 3 above, is 791. A site visit confirmed that the plant is overloaded and in urgent need of repair and upgrading. The current outfall is discharging poor quality effluent approximately 150m down stream of the works.

An existing sewer network serves Derrinturn. Work has recently been carried out on the foul network to upgrade it and eliminate as much storm water as possible by the provision of a separate storm sewer.

### 5.2 Options for Wastewater Treatment Plant Site Location

It has been established above in Section 4, that the poor assimilative capacity of the Ballyshannon River precludes its use as a receiving water for the proposed wastewater treatment plant. It was further recommended that the discharge point for the proposed wastewater treatment plant should be downstream of the confluence of the Cushaling and Ballyshannon Rivers at Ticknevin.

Three possible site locations, shown in Drawing No. 20240-DR-02, for the proposed wastewater treatment plant have been identified.

#### Site 1 – Existing Wastewater Treatment Plant Site

The existing wastewater treatment plant is located 400 metres east of Derrinturn village centre. Access is made to the site from the main Derrinturn – Allenwood road at Grace's Bridge.

The nearest property boundary is 37 metres from the works boundary. New housing developments are proposed in close proximity to the existing works. There is limited room on the site to accommodate the proposed expansion, and insufficient room for any future development, of the wastewater treatment plant. This site would also impinge significantly on the existing housing and the proposed housing development. A pump station and 3,000 metre rising main would be required to transfer treated effluent to the recommended discharge point

However, the site could be considered suitable for the following reasons:

- (i) Access should be available to the site.
- (ii) The site would serve all existing development by gravity.
- (iii) The land is available to Kildare County Council.

### **Site 2 – Site South of Existing Wastewater Treatment Plant**

The second site considered is located on the west bank of the Ballyshannon River approximately 260 metres to the south of the existing wastewater treatment plant. The site is greenfield in nature.

The nearest property boundary is 280 metres from the works boundary. New housing developments are proposed 180 metres to the north of the site. This site is not served by any access road. A pump station and 3,000 metre rising main would also be required to transfer treated effluent to the recommended discharge point

However, the site could be considered suitable for the following reasons:

- (i) There is room for expansion of the wastewater treatment plant on site.
- (ii) The site would be able to drain all existing development by gravity.
- (iii) The site is 180 metres outside the Derrinturn development area.

### **Site 3 – Site at Ticknevin Bridge**

The final site considered is located at the confluence of the Ballyshannon and Cushaling Rivers, 2,500 metres to the south of Derrinturn village. The site is greenfield in nature and is located in close to the Grand Canal at Ticknevin, an area of high amenity.

The nearest property boundary is 90 metres from the works boundary. This site is not served by any access road and is not in a natural drainage location for the

town. A pump station on the existing wastewater treatment plant site and a 3,000 metre rising main would be required to transfer foul flows to this site.

However, the site could be considered suitable for the following reasons:

- (i) There is room for expansion of the wastewater treatment plant on site.
- (ii) The site is outside the development plan area for Derrinturn.
- (iii) The proposed receiving water runs alongside the site.

### 5.3 Wastewater Treatment Plant Site Selection

The existing wastewater treatment plant site is not considered to be suitable for the proposed wastewater treatment plant as this site;

- Has residential properties within 40 metres on two sides and is close to land of high development potential.
- The land-owner may be reluctant to sell the land required for the expansion in lieu of its development potential.

For these reasons this option will not be considered further.

Both the remaining sites require a pump station and a 3,000 metre rising main pipeline to transfer flows to the confluence of the Cushaling and Ballyshannon Rivers.

Part VIII planning had previously been initiated for Site No.3, Ticknevin Bridge, but was withdrawn following submissions from residents of Ticknevin, who would receive no benefit from the development, and from organisations concerned regarding the proximity of the development to the village of Ticknevin and the Grand Canal. This site will no longer be considered for the location of the proposed wastewater treatment plant.

Site No.2, South of Existing Wastewater Treatment Plant, has the following advantages:

- It is located a considerable distance from any area of high amenity.
- It is 180 metres outside the Derrinturn development plan area and is 280 metres from the nearest existing housing development.

- There are fewer operational problems associated with pumping treated effluent than could be expected from the equivalent pumped foul flow.
- Following initial consultations, it would appear that the land-owner would be willing to sell the site.

On this basis, Site No. 2 is considered to be the most suitable candidate for the construction of the proposed wastewater treatment plant.

#### 5.4 Proposed Network Extension

The above site selection process identified Site No. 2 as the recommended location for the proposed wastewater treatment plant. The recommended discharge point for the proposed wastewater treatment plant is located at the confluence of the Ballyshannon and Cushaling Rivers. These recommendations require that the following two extensions be made to the existing drainage network in Derrinturn:

- A 200 metre extension to the 300 mm diameter, gravity sewer from the existing wastewater treatment plant to the proposed inlet works.
- A pipeline to transfer treated effluent from the wastewater treatment plant to the recommended discharge location.

The following two routes, shown in Drawing No. 20240-DR-03 and 20240-DR-04, were identified as possibilities for the effluent transfer pipeline:

- Along Ticknevin Road to Discharge Point.
- Along Ballyshannon River to Discharge Point.

A detailed topographic survey of each route was undertaken. The results of this survey demonstrated that it was not economically or technically feasible to transfer the effluent from the wastewater treatment plant to the discharge point by gravity flow only.

A number of possible combinations of pumped and gravity flow were identified as methods of transfer along either route. However, it is recommended that for both routes pumped flow, from the proposed wastewater treatment plant site to the route high point, and gravity flow, from route high point to outfall location, be used in order to eliminate the need for intermediate pump stations.

After using this design criterion, both routes were found to be technically feasible and an economic comparison was performed in order to evaluate their suitability. The results of the comparison are shown in Tables 5.1 and 5.2.

A breakdown of the operational cost estimates, used below, is detailed in Appendix 3.

**Table 5.1 – Cost Estimate for Route along Ticknevin Road**

Description	Quantity	Unit	Rate	Cost
300 mm Inlet Sewer	320	m	110	35,200
Manholes	7	No.	1000	7,000
Wayleave Costs	320	m	30	9,600
150 mm Rising Main	3500	m	80	280,000
Wayleave Costs	150	m	30	4,500
Capital Costs	-	-	-	336,300
Operating Costs (NPV)	-	-	-	73,437
<b>Total</b>	-	-	-	<b>409,737</b>

**Table 5.2 – Cost Estimate for Route along Ballyshannon River**

Description	Quantity	Unit	Rate	Cost
300 mm Inlet Sewer	320	m	110	35200
Manholes	7	No.	1000	7000
Wayleave Costs	320	m	30	9600
150 mm Rising Main	2400	m	80	192,000
Wayleave Costs	2250	m	30	67,500
Pipeline Access Roads	450	m	270	121,500
Capital Costs	-	-	-	432,800
Operating Costs (NPV)	-	-	-	30,975
<b>Total</b>	-	-	-	<b>463,775</b>

## 5.5 Discussion & Recommendations

Following the site selection process, outlined above, it is recommended that the proposed wastewater treatment plant for Derrinturn village be located on Site No. 2, south of existing wastewater treatment plant site.

This site was chosen as:

- It moves the town wastewater treatment facility, which is currently located in close proximity to existing housing, outside the development boundary.
- It is possible to drain the town by gravity to this site.
- It allows for straightforward access to wastewater treatment plant through an access road required for a housing development.
- The land-owner appears to be willing to sell the site.
- It is not located in an area considered to be of high amenity value.

The recommended location of the proposed wastewater treatment plant in Derrinturn necessitates the two following extensions to the town sewerage network.

- A 250 metre length of 300 mm gravity sewer from the existing wastewater treatment plant to the inlet pump station at the proposed wastewater treatment plant site location.
- A 3,000 metre length of 150 mm pressurised outfall from the proposed wastewater treatment plant along Ticknevin Road to the recommended discharge location at the confluence of the Ballyshannon and Cushaling Rivers.

The route of the pressurised outfall pipeline along Ticknevin Road to the discharge point was determined using topographic survey results, economic analysis and planning objectives from the Derrinturn Local Area Plan. A plan and longitudinal section of the pipeline extension is shown in Drawings No. 20240-DR-05 to 11.

## 6.0 WASTEWATER TREATMENT OPTIONS

### 6.1 Introduction

The broad function of a municipal wastewater treatment system is the separation of the polluting load from its carrier water. The processes, which effect this separation, generate a number of solid residue streams as well as the treated effluent stream. The solid residue streams may require further processing to render them suitable for environmental disposal.

The liquid treatment stage may incorporate some or all of the following stages of treatment:

- Preliminary Treatment  
A preliminary treatment stage is invariably included in municipal treatment systems, typically incorporating screening and grit separation. It generates two categories of waste solids, screenings and grit.
- Primary Treatment *and / or* Secondary Treatment  
Primary treatment involves the removal of suspended particulate matter from the wastewater by sedimentation or flotation processes. It generates clarified effluent and primary sludge streams.

Secondary treatment involves the removal of suspended and colloidal particulate matter in addition to dissolved organic matter, using biological, physicochemical or membrane processes. Biological processes are invariably used in municipal wastewater treatment systems, where secondary treatment is required. Secondary treatment generates a clarified liquid effluent and a sludge residue.

- Tertiary Treatment

Tertiary or advanced treatment is included in municipal wastewater treatment streams where low residual effluent nitrogen and phosphorus levels are required or where the residual suspended solids or BOD<sub>5</sub> must be reduced to a very low level. Biological processes typically achieve advanced nitrogen removal; advanced phosphorus removal may be achieved by biological and/or chemical precipitation processes. Filtration

processes are applied to achieve an advanced level of suspended solids removal. The solids streams may include screenings, grit, primary sludge and a variety of bio-sludge.

- Storm Water Treatment

Storm water treatment is considered in municipal wastewater treatment plants where the contributing population is served by a combined or partially separate sewerage network. This is typically achieved by providing a suitably sized storm detention tank to store flows in excess of the plants design flow to full treatment (FFT). A screened outlet should be provided for overflows in the event that the storm detention tanks volume is exceeded.

The technical considerations to be taken into account in the selection and design of appropriate treatment technologies for the liquid and solids streams can be conveniently grouped, for discussion purposes, under the following headings:

- I Required effluent quality.
- II Options for sludge disposal.
- III Size of works, including phased development.
- IV Site constraints, including environmental impacts.

Economic evaluation is also applied to the selection/design process to ensure that the treatment system represents good value for money, taking into account capital and running costs.

## 6.2 Preliminary Treatment

A preliminary treatment stage incorporating screening as a minimum is essential for a plant of this size. It is also recommended that grit removal be included in the preliminary treatment stage as the sewerage network in Derrinturn is a partially separate system.

To install a traditional inlet works would be onerous for a scheme of this size. Instead a package type system would be more appropriate. Systems are in the market place that offer high screenings capture, efficient screenings handling, grit

removal and low running costs. These systems can deal with flows as low as 2 l/s and as such are ideal for applications such as this.

### **6.3 Primary and / or Secondary Treatment Process Options**

There are a number of treatment process options for this type and scale of application and these are described below.

#### **6.3.1 MBR Technology**

This recently developed process would prove quite attractive in this particular application. Its main advantage would be the level of treatment available with this process (greater than 96% removal of BOD and S.S.), and its small footprint. The effluent produced is fully disinfected and is suitable for direct discharge to a small stream or receiving water. The capital and operating costs are higher than conventional package treatment plants, but this is offset by reduced civil costs and landtake.

#### **6.3.2 BMS Aerator Units**

This system involves construction of fine screening, a primary settling tank followed by aerobic treatment using RBC units. To achieve a good standard of final effluent a secondary settlement tank is also required. These treatment units are supplied in modular forms and are normally manufactured from GRP with the use of primary settlement tanks in the process layout. An advantage of this process is its low operation and maintenance costs for the production of a 25/35 effluent. The design of the units is quite robust but requires a high level of attendance to produce a high quality effluent.

#### **6.3.3 Gemini Package Treatment Plant**

This plant process is specially designed for the treatment of domestic effluents from small population centers and is based on sequencing batch reactors at extended aeration loading rates. The manufacturers claim to provide full biological treatment with a high level of purification and effluent levels of 20 mg/l BOD, SS of 30 mg/l and N of 15 mg/l. The plant uses a fine bubble diffused air system and a sludge holding tank is recommended as part of the process layout. Again high level of attendance is required to ensure that the process produces a high quality effluent.

### **6.3.4 Activated Sludge Package Plants**

These tanks are normally circular activated sludge package plants complete with circular or rectangular secondary clarifiers. These are a generally a conventional type of treatment system with surface aerators installed in the aeration tank. Another form of these units is the Minipak range supplied by Treatment Systems Ltd.

### **6.3.5 Low Sludge Biological Treatment Process (EA Technology Ltd.)**

This biological process is a recently developed process and is described as a suspended growth biological treatment process, created and maintained by a high rate oxygenation and mixing system. It produces a rate of digestion giving good organic carbon removed and low sludge activity, leading to significant reductions in the volume of sludge for disposal.

A major advantage claimed for this process is its ability to withstand shock loadings and it also requires a small footprint area. However, this is a recently developed system and there is not yet sufficient operational data available to fully assess the performance of these units.

### **6.3.6 Puraflo Biofiltration System**

This process involves the construction of a septic tank followed by the Puraflo system. The Puraflo system is a highly efficient biofiltration system where the primary effluent is evenly distributed over a biofibrous peat media and percolated through the biofilter emerging as a clear innocuous liquid at the base of the unit. Treatment is achieved by the combination of physical, chemical and biological interactions between the wastewater and the active specialised media. With correct operation of the units reductions of 95% in BOD levels and suspended solids can be achieved, and a 99.9% reduction in faecal coliform bacterial numbers has also been recorded. Seasonal variations in hydraulic loadings do not have an apparent effect on treatment efficiency. The life expectancy of the units are approximately 10 years.

However regular desludging of the septic tank is necessary to ensure a high performance in the Puraflo plant.

### **6.3.7 FAST Aeration System**

Submerged aerated biological filters consist on an aerated tank which is partially filled with a media, upon which a biofilm grows. Although this is a highly efficient

system, the capital and operating costs tend to be high due to the fact that the plant requires a support medium and continuous aeration.

The Bord na Móna aeration system is based on the above principles and comprises a concrete tank partially filled with plastic media. The media surrounds a central floor mounted aerator fitted with a vertical draught tube. Humus solids are passed forward with the treated liquid to a settlement zone for clarification.

### **6.3.8 Extended Aeration Package Plants**

In extended aeration package plants, primary clarification is not employed and the plants are designed in a similar manner to the conventional extended aeration process. The tanks are often circular tanks with the centre section used as a secondary clarifier. It is also necessary to provide sufficient aeration capacity to ensure solids are not settled in the aeration tank, and the installation of controlled rates of sludge return are necessary to ensure the process operates as a full nitrification process. These units are usually reinforced concrete structures and provide a robust treatment system for the treatment of domestic wastes from small communities. The main disadvantage would be the higher capital cost involved, but this is normally offset by lower running and maintenance costs. The standard of mechanical plant equipment normally installed in the conventional package plant is generally of a higher standard than the equipment installed in package plant units, which tend to be of general industrial standard.

### **6.3.9 Advantages / Disadvantages of Package Treatment Plants**

The principal problems and constraints associated with package treatment plants for small communities are summarized as follows:

- a) Stringent discharge requirements set primarily for larger plants tend to influence discharge requirements for smaller plants.
- b) High per capita costs (scale is lost with the construction of smaller plants).
- c) Limited finances available for small community treatment plants.
- d) Limited operation and maintenance budgets.

Small system flow rates differ significantly from those of larger systems and peak flows (dry weather) can vary up to 4 to 6 times the average daily flow to a small plant. Very few package treatment plants have been installed with balancing tanks for elimination of these regularly occurring peak flows. Flow balancing will

be provided at the proposed WWTP in Derrinturn through the use of a storm detention tank.

Normally single treatment streams are installed and malfunction of any of the main mechanical plant can lead to failure of the full plant. It would be more prudent to provide two treatment streams to provide flexibility of operation but this is not always possible with limited finances and with the small size of the plants.

### **6.3.10 Plant Performance and Selection**

The performance of most package plants can be improved by sizing the treatment facilities conservatively, in particular the secondary settlement tanks, and by correct specification of sludge return rates and sludge waste rates. Consideration must also be given to the volumes of sludge produced, and the proposed method of handling and disposal of sludge.

As there is little to differentiate between these systems in terms of performance, the selection of the most economically advantageous option is most reliably made through the competitive tendering process based on a treatment process performance specification.

## **6.4 Tertiary Treatment**

In view of the stringent effluent requirements it is clear that all of the plants discussed above, would not meet these targets. For this reason a tertiary treatment process must be examined to ensure compliance with the effluent requirements of 8 mg BOD<sub>5</sub>/l, 1.5 mg NH<sub>4</sub>/l and 0.5 mg P/l. There are options for tertiary processes for the scale and performance required for this particular application as detailed below.

The following processes were examined as possible tertiary processes.

1. Reed Beds
2. Tertiary Filters
3. Chemical dosing

### 6.4.1 Reed Beds

The reed bed treatment system is a method of sewage treatment in an artificially constructed wetland containing common reeds (*Phragmites australis*). It depends upon the flow of sewage through a bed of either soil or gravel in which reeds are growing. The key features are as follows:

- a) Rhizomes of the reeds grow vertically and horizontally opening up the soil to provide a hydraulic pathway.
- b) Wastewater is treated by bacterial activity. Aerobic treatment takes place in the rhizophore with anoxic and anaerobic treatment taking place in the surrounding soil.
- c) Oxygen is passed from the atmosphere to the rhizophore via the leaves and stems of the reeds through the hollow rhizomes and out through the roots.
- d) Suspended solids in the sewage are composted aerobically in the aboveground layer of straw formed from dead leaves and stems.

The following advantages have been claimed:

- i) Low capital costs are involved.
- ii) Construction of the plant is simple, and no mechanical or electrical equipment is needed.
- iii) Maintenance costs are low.
- iv) The process is robust and is able to withstand a wide range of operating conditions.
- v) A consistent effluent quality is produced.
- vi) There is potential for wildlife conservation.

The size of the reed beds proposed for this project would be based on the principle of 1m<sup>2</sup>/p.e. A reed bed of this size would accept the discharge of spills from the pumping station in the case of a prolonged diurnal peak. The capital cost of installing an RBT type system will vary with (a) the ease or difficulty of working with the existing soil or the site (b) size and (c) the degree of sophistication. Published results show that, when used as a tertiary treatment system, reed bed technology can achieve an effluent quality as indicated in Table 6.4.1.

**Table 6.1 Typical Reed Bed Effluent Quality**

Sampling Position	Dissolved Oxygen mg/l	BOD <sub>5</sub> mg/l	Suspended Solids mg/l	Ammonia mg/l
Inlet	1.7	22	37	6.1
Outlet*	6.4	2	15	0.3

\* Results relate to a 100m long bed.

Phosphorus reduction is not normally associated with reed beds however trials have been done and plants are in place, which demonstrate phosphorus reduction.

#### **6.4.2 Tertiary Filters**

There are a number of filters available in the market. For the purposes of this report the 'DynaSand Filter' was examined.

The DynaSand filter is based on the counterflow principle. The water to be treated is admitted through the inlet distributor in the lower section of the unit and is cleaned as it flows upward through the sand bed, prior to discharge through the filtrate outlet at the top. The sand containing the entrapped impurities is conveyed from the tapered bottom section of the unit by means of an airlift pump to the sand washer at the top.

Cleaning of the sand commences in the pump itself, in which particles of dirt are separated from the sand grains by the turbulent mixing action. The contaminated sand spills from the pump outlet into the washer labyrinth in which it is washed by a small flow of clean water. The impurities are discharged through the wash water outlet while the grains of clean sand (which are heavier) are returned to the sand bed. As a result, the bed is in constant downward motion through the unit.

Thus, treatment and sand washing both take place continuously, enabling the filter to remain in service without interruption. Tertiary Filters are frequently used for the final filtration of biologically treated wastewater. Their primary effect is to reduce the suspended solids and BOD<sub>5</sub> concentrations in the effluent. They have no effect on phosphorus levels.

### **6.4.3 Chemical Dosing for Phosphorus Removal**

It is difficult to achieve a consistent phosphorus level by biological methods, and would not be appropriate for a plant of this size. Therefore chemical dosing is the preferred method. Aluminum or iron salts may be added, as required, to precipitate phosphorous. This is best achieved by adding the chemical to the effluent from the biological stage prior to secondary sedimentation. The end product can be designed to meet the highest environmental standards applicable to municipal wastewaters. It should be stated that the effluent standard of 0.5 mg P/l required in this instance is onerous and will be difficult to achieve.

### **6.4.4 Summary of Process Requirements**

None of these tertiary treatment options can meet the effluent requirements as a stand-alone process. However, a combination in series of chemical dosing followed by either tertiary filters or reed beds should adequately satisfy the standards.

The capital cost for the two options has been estimated at €188,000.00 for the reed bed option and €140,000.00 for the filtration option.

It is recommended that the tertiary treatment process be provided through a combination of chemical dosing and rapid sand filtration.

## **6.5 Stormwater Treatment**

The existing sewerage network in Derrinturn is considered to be a partially separate drainage system. Although rehabilitation works have recently been completed, it is believed that significant volumes of storm water are still entering the drainage network as a result of infiltration and inflow. It is noted that current developments in Derrinturn are required to incorporate separate storm water sewers and sustainable drainage systems (SuDS) into their proposals as a condition of planning permission. However, it is recommended that a storm detention tank is installed in order to prevent hydraulic overloading of the wastewater treatment plant in Derrinturn from the existing combined catchment.

The storm detention tank has been sized on the basis of providing sufficient volume to retain a peak of 3 DWF from the existing combined population for two hours. A tank with 45m<sup>3</sup> storage volume will satisfy this requirement. It is also recommended that a screened outlet is provided in the storm detention tank for

the discharge of storm flows in the event that the storage volume of the tank is exceeded.

## 6.6 Sludge Disposal

In accordance with the Sludge Management Plan for Kildare County, sludge disposal will be allowed for through the installation of a sludge holding tank with 7 days storage followed by the transfer of liquid sludge (2-3 % solids) by tanker to the sludge hub in Osberstown.

The estimated sludge production at the 2,000 PE design load is given in Table 7.1 below:

**Table 6.2 – Sludge Production Estimates**

Design Population	Specific Output (g/PE/day)	Sludge Output	
		(kg/day)	(m <sup>3</sup> /day)
2000	75	150 <sup>(1)</sup>	4.5 <sup>(2)</sup>

<sup>(1)</sup> Dry Solids

<sup>(2)</sup> Volume at 3% Solids

## 6.7 Conclusions

The recommended treatment process shall incorporate an inlet pumping station, a storm detention tank, a package inlet works including 6 mm perforated screen and grit removal, followed by a package secondary treatment plant. Two package treatment units in parallel are recommended (*Note: these can be operated in series in the initial years*).

It is also recommended that a tertiary treatment process be provided through a combination of chemical dosing and rapid sand filtration. The sludge generated by the works shall be transported to Osberstown wastewater treatment plant for treatment.

It is recommended that the selection of the most economically advantageous option is made through the competitive tendering process based on a treatment process performance specification.

A typical Wastewater Treatment Plant Layout, incorporating Preliminary Treatment, Inlet Pumping Station, Flow Balancing Tank, Typical Treatment Process Units, Sludge Holding Tank and Outlet Pumping Station is shown in Drawing No. 20240-DR-12.

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

## 7.0 COST ESTIMATES

### 7.1 Wastewater Treatment Plant Costs

The current estimated construction costs for the proposed wastewater treatment plant are summarised below in Table 7.1. These costs take account of the recommendations contained in this report and are based on recent tenders for similar projects.

**Table 7.1 – Estimated WWTP Costs**

Description	Unit	Cost (€)
Inlet Pumping Station & Storm Detention Tank	Sum	60,000
Preliminary Treatment	Sum	50,000
2,000 PE Package Plant	Sum	150,000
Phosphorus Dosing	Sum	70,000
Tertiary Filter/Pumping Station	Sum	70,000
Sludge Holding Tank	Sum	50,000
Outlet Pumping Station	Sum	30,000
Control Building	Sum	40,000
Control Systems	Sum	25,000
Telemetry	Sum	40,000
Electrical Supply	Sum	60,000
Emergency Generator	Sum	25,000
Site Works	Sum	150,000
Flow Station	Sum	15,000
<b>Sub-Total</b>		<b>835,000</b>
Preliminaries and General Items		167,000
		1,002,000
Contingency		16,502
<b>Total (excluding VAT)</b>		<b>1,018,502</b>
VAT @ 13.5%		137,498
<b>Total (including VAT)</b>		<b>1,156,000</b>

### 7.2 Extension to Sewerage Network Costs

The current estimated construction costs for the proposed extension to the sewerage network in Derrinturn are summarised below in Table 7.2. These costs

take account of the recommendations contained in this report and are based on recent tenders for similar projects.

**Table 7.2 – Estimated Network Costs**

Description	Unit	Quantity	Rate (€/Unit)	Cost (€)
150 mm DI Rising Main	m	3020	80	241,600
300 mm uPVC Gravity Sewer	m	320	110	35,200
Manholes	No.	7	1000	7,000
Outfall Structure	Sum			10,000
<b>Sub-Total</b>				283,800
Preliminaries and General Items				57,450
				341,250
Contingency 2.5%				8,530
<b>Total (excluding VAT)</b>				349,780
VAT @ 13.5%				47,220
<b>Total (including VAT)</b>				<b>397,000</b>

### 7.3 Other Costs

A list of miscellaneous costs associated with the procurement of the wastewater treatment plant and sewerage scheme are summarised below in Table 7.3. The land acquisition and way leave costs are based on typical Kildare County Council rates.

**Table 7.3 – Other Costs**

Description	Unit	Cost (€)
Land Acquisition	Sum	50,000
Wayleaves/Right of Ways	Sum	25,000
Site Investigation	Sum	50,000
Archaeology	Sum	25,000
Site Supervision	Sum	100,000
Consultants Fees	Sum	90,000
<b>Total</b>		<b>347,000</b>

## 7.4 Economic Viability

The unit costs per PE for the Derrinturn scheme as a whole are shown in Table 7.4 below.

**Table 7.4 – Unit Cost per PE – Derrinturn**

<b>Scheme Component</b>	<b>Cost (€)</b>
WWTP Costs	1,156,000
Network Costs	<u>397,000</u>
Total Construction Cost	1,553,000
Other Costs	<u>347,000</u>
<b>Total Scheme Cost</b>	<b>1,900,000</b>
Design Population Equivalent	2,000
<b>Cost per PE</b>	<b>950</b>

For inspection purposes only.  
Consent of copyright owner required for any other use.

## 8.0 PROCUREMENT OPTIONS

The following options are available for the procurement of the proposed wastewater treatment plant in Derrinturn:

- **Traditional Contract**
- **Design Build (DB) Contract**
- **Design Build Operate (DBO) Contract**

### 8.1 Traditional Contract

The traditional approach to the procurement of a wastewater treatment plant would involve the following procedure:

- The development of a design to meet the project requirements, involving a full scope of the necessary works.
- The preferred design option, with detailed costs, would be developed in a Preliminary Report and submitted to the Client for approval.
- The detailed design of the agreed scheme would be carried out following approval and Contract Documents would be prepared for the separate civil and mechanical/electrical elements of the scheme.
- Each of the contracts would then be advertised and tenders invited for the civil and mechanical/electrical works.
- Each contract would be awarded on the basis of the outcome of a detailed tender evaluation.
- The construction phase would involve the appointed civil and mechanical/electrical contractors carrying out the work detailed in the contracts under the supervision of a Resident Engineer representing the Client's interest.
- Following completion of construction, the plant would be commissioned and taken over by the Client who would commence operating the plant.

Recently, the traditional approach has been considered less satisfactory for the procurement of modern wastewater treatment plants for the following reasons;

- A modern wastewater treatment plant has become more complex in order to meet more rigorous environmental standards and to incorporate the developments in wastewater technology and process automation.
- The separation of the scheme design, construction and operation does not facilitate the selection of the most economic option in terms of the project whole life.
- The separation of the scheme design and construction can cause claims for additional costs to arise frequently due to the division of responsibility between the Civil and Mechanical/Electrical contractors and disputes over the level of risk allowed for under the Contract.

However, the traditional approach can still be used when the scope for innovation within the works is limited.

## 8.2 Design Build (DB) Contract

The design build contract has been developed in order to resolve the outstanding problems experienced with the traditional procurement approach, outlined above. The design build approach to the procurement of a wastewater treatment plant would involve a broadly similar procedure of preliminary design but with the following differences:

- Following approval of the outline design and costs, the Engineer would produce Contract Documents containing the overall requirements of the scheme.
- The Contract would then be advertised and tenders invited for the scheme.
- The Tenders from Contractors/Consortia invariably include a variety of proposals intended to address the requirements of the contract. Each proposal brings together the expertise of Civil Works and M&E Plant Contractors.

- The Contract is then awarded on the basis of the outcome of a detailed tender evaluation, including both technical and financial scoring.
- During construction, the co-ordinated approach of the Contractor will eliminate the traditional scheduling conflicts between the civil and mechanical/electrical contractors which can lead to delay and disruption, with a consequent adverse affect on project cost.
- Following completion of construction, the plant would be commissioned and taken over by the Client who would commence operating the plant.

In a competitive situation, the design build approach can generate a most economical design for a given scheme. The tendering process can, subject to adherence to the specified requirement of the scheme, present the Client with a number of different and perhaps innovative solutions.

For such Design Build contracts in water service schemes, the Department of Environment Heritage & Local Government (DEHLG) accepts the use of the Conditions of Contract contained in an amended version of the 'Orange Book' published by the Federation International des Ingenieurs-Conseil (FIDIC).

The DEHLG also accepts the use of a modified version of the '*Model Form of General Conditions of Contract for use in connection with home or overseas contracts for the supply of electrical, electronic or mechanical plant*' (MF/1) published by a Joint IMech/IEE Committee as a performance specification contract in water service schemes. The modified MF/1 form of contract would typically be used for the procurement of mechanical or electrical plant, such as pumps or control panels, required as an element of a water service scheme. However, this form of performance specification contract can also be used for the procurement of package type wastewater treatment plant as such units consist primarily of mechanical plant and require only electrical fit-out. This form of contract cannot be used for the civil works requirement of a wastewater treatment plant.

### 8.3 Design Build Operate (DBO) Contract

A Design Build contract offers the flexibility to ensure acquisition of the best value plant and assigns the performance risk associated with advanced technologies to the Contractor, who is in the best position to manage it. However, well-trained personnel are required to operate and manage plants of this nature. This can be achieved by adding an operate element to the design build approach. There is merit in combining operation with design as having the Operator involved from the beginning with the Builder and Designer allows the expertise and experience of each to be included in the preferred scheme. This can bring benefits to a scheme which may not be obtained in a traditional approach to procurement. The design build operate approach to the procurement of a wastewater treatment plant would involve a very similar procedure to the above design build contract but with the following difference:

- Following completion of construction, the plant would be operated by the Contractor for the Client in compliance with specified contract requirements for a fixed term.

The design build operate approach is best used in bundled schemes where a number of wastewater treatment plants are procured under a single contract. This allows the Contractor to avail of significant economies of scale a tender submission, particularly in the area of operation and maintenance.

The Department of Environment Heritage & Local Government (DEHLG) accepts the use of the Conditions of Contract contained in an amended version of the 'Orange Book' published by the Federation International des Ingenieurs-Conseil (FIDIC) for such Design Build Operate contracts in water service schemes.

### 8.4 Discussion & Recommendations

Recent experience in Co. Kildare has shown that suppliers of package wastewater treatment plant, of the type appropriate for Derrinturn, are not familiar with the opportunities presented by DB contracts and are apprehensive about entering consortia with Civil Contractors. This has led to disproportionate per capita costs on small wastewater treatment plant schemes procured using a DB contract. Further, the scale of this project would discount the inclusion of an operate phase into the procurement of the proposed wastewater treatment plant under a DBO contract. However, it may become feasible if a number of similar schemes were

grouped together into a bundled scheme to allow a Contractor to avail of economies of scale.

It is therefore recommended that the scheme should be let as two contracts, a civil contract and a mechanical/ electrical contract.

The Civil Contract should be let as a traditional contract, as there is limited scope for innovation, and should cover;

- All known civil elements on the proposed wastewater treatment plant (access roads, control building, site works, pumping stations, structures etc.)
- The construction of the proposed extension to the sewerage network in Derrinturn. This would include the inlet sewer to the proposed wastewater treatment plant and the rising main outfall pipeline to the Cushaling River.
- The Mechanical/Electrical Contract should be let as a performance specification (Modified MF/1) contract and should cover;
- The provision of all mechanical and electrical works associated with the supply, installation and commissioning of the package wastewater treatment facility and pumping stations.

## 9.0 DESIGN PARAMETERS

### 9.1 Wastewater Treatment Plant

The basic design parameters for the proposed wastewater treatment plant in Derrinturn can be summarised as follows in Table 9.1.

**Table 9.1 – Design Parameters – WWTP**

Parameter	Design Value	Units
Population Equivalent	2,000	-
Wastewater Flow	225	l/h/d
DWF	450	m <sup>3</sup> /d
	5.2	l/s
Max. Flow to WWTP (3 DWF)	1350	m <sup>3</sup> /d
	15.6	l/s

### 9.2 Storm Tank

The basic design parameters for the proposed storm tank in Derrinturn can be summarised as follows in Table 9.2.

**Table 9.2 – Design Parameters – Storm Tank**

Parameter	Design Value	Units
Combined Population Equivalent	800	-
Wastewater Flow	225	l/h/d
DWF from Combined Population	180	m <sup>3</sup> /d
	2.08	l/s
Retention Time at 3 DWF	2	hrs
Storm Tank Required	45	m <sup>3</sup>

### 9.3 Effluent Standards

The effluent standards for the proposed wastewater treatment plant in Derrinturn can be summarised as follows in Table 9.3.

**Table 9.3 – Effluent Standards**

Parameter	Concentration	Units
Biological Oxygen Demand	8	mg/l O <sub>2</sub>
Total Suspended Solids	8	mg/l
Total Ammonia	1.5	mg/l NH <sub>4</sub>
Total Phosphorus	0.5	mg/l P

For inspection purposes only.  
Consent of copyright owner required for any other use.

## 10.0 CONCLUSIONS AND RECOMMENDATIONS

The main conclusions and recommendations of the Design Review Report are summarised as follows:

- a) A new wastewater treatment plant with a design population equivalent of 2,000 is required for Derrinturn.
- b) The proposed wastewater treatment plant should be located on a site south of the existing wastewater treatment plant site in Derrinturn.
- c) A new inlet sewer is required in order to transfer existing and future flows to the proposed wastewater treatment plant.
- d) A rising main pipeline is required in order to transfer final treated effluent to the proposed outfall to the Cushaling River.
- e) The proposed wastewater treatment plant should have the following effluent standard;

Parameter	Effluent Concentration mg/l
BOD <sub>5</sub>	8
Total Suspended Solids	8
Total Ammonia	1.5
Total P	0.5

- f) The civil elements of the works required for the wastewater treatment plant site and the extension to the sewerage network should be procured using a traditional contract.
- g) The mechanical and electrical elements of the works required for the wastewater treatment plant and pumping stations should be procured using a performance specification (Modified MF/1) contract.

- h) The total construction cost of the scheme has been estimated at € 1,553,000 (including VAT).
- i) The total cost of the scheme has been estimated at € 1,900,000 (including VAT).

Signed: \_\_\_\_\_  
for **NICHOLAS O'DWYER LTD.**

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

**APPENDIX 1**

**Letter of Appointment**

For inspection purposes only.  
Consent of copyright owner required for any other use.

**APPENDIX 2**

**Drawing List**

For inspection purposes only.  
Consent of copyright owner required for any other use.

**Drawing List for Derrinturn WWTP**

<b>Drawing No.</b>	<b>Title</b>	<b>No.</b>
20240-DR-01	Location Plan	1
20240-DR-02	WWTP Site Selection	1
20240-DR-03	Proposed Network Plan Option 1 – Ticknevin Road	1
20240-DR-04	Proposed Network Plan Option 1 – Ballyshannon River	1
20240-DR-05-11	Longitudinal Sections of Pipelines	7
20240-DR-12	Indicative WWTP Site Layout	1
20240-DR-13	Population Review	1
<b>Total</b>		<b>13</b>

For inspection purposes only.  
Consent of copyright owner required for any other use.

**APPENDIX 3**

**Operational Costs**

For inspection purposes only.  
Consent of copyright owner required for any other use.

### Option 1 – Ticknevin Road

The table 'Option 1' below outlines the manner in which the operating costs for utilising pumped flow along Ticknevin Road to transfer treated effluent from the proposed wastewater treatment plant site to the Cushaling River have been calculated.

Option 1	Rising Main	Units
x DWF	3	
Per Capita Consumption	225	l/h/day
Roughness	0.20	mm
Viscosity	0.000001	m <sup>2</sup> /s
Density	1000	kg/m <sup>3</sup>
Gravity	9.81	m/s <sup>2</sup>
Diameter	150	mm
Length	1850	m
Sump Volume	10	m <sup>3</sup>
Population Equivalent	2000	
Dry Weather Flow	5.21	l/s
Design Flow	15.63	l/s
Velocity	0.88	m/s
Reynold's Number	132629	
Friction Factor	0.0109	
Friction Head	5.34	m
Static Head	7.90	m
Total Head	13.24	m
Power Consumption	0.68	kwh
No. of Hours Operation Daily	8.00	
Annual Power Consumption	1970.92	kw
Unit Cost Electricity Supply	295.64	€/annum
Life Cost	5912.77	
<b>Net Present Value</b>	73436.66	<b>€</b>

## Option 2 – Ballyshannon River

The table 'Option 1' below outlines the manner in which the operating costs for utilising pumped flow along the Ballyshannon River to transfer treated effluent from the proposed wastewater treatment plant site to the Cushaling River have been calculated.

Option 2	Rising Main	Units
x DWF	3	
Per Capita Consumption	225	l/h/day
Roughness	0.20	mm
Viscosity	0.000001	m <sup>2</sup> /s
Density	1000	kg/m <sup>3</sup>
Gravity	9.81	m/s <sup>2</sup>
Diameter	150	mm
Length	1450	m
Sump Volume	10	m <sup>3</sup>
Population Equivalent	2000	
Dry Weather Flow	5.21	l/s
Design Flow	15.63	l/s
Velocity	0.88	m/s
Reynold's Number	132629	
Friction Factor	0.0109	
Friction Head	4.18	m
Static Head	1.40	m
Total Head	5.58	m
Power Consumption	0.29	kwh
No. of Hours Operation Daily	8.00	
Annual Power Consumption	831.33	kw
Unit Cost Electricity Supply	124.70	€/annum
Life Cost	2493.98	
<b>Net Present Value</b>	<b>30975.27</b>	<b>€</b>

## ATTACHMENT C.1 – PLANT OPERATIONAL INFORMATION

For inspection purposes only.  
Consent of copyright owner required for any other use.

**ATTACHMENT C.1**

**Derrinturn**

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

### C.1.1 Storm Water Overflows

There are no storm water overflows

### C.1.2 Pumping Stations

There is one pumping station at Ashgrove estate, Derrinturn. There is a duty pump and a standby one. In the event of a power failure there is storage available. Other possible measures such as tankering or the hire of a temporary generator have not been required. There is approximately a half-day's storage available in oversized pipes near the pumping station. There is no facility for an emergency overflow to waters.

For inspection purposes only.  
Consent of copyright owner required for any other use.



**ON-LINE TABLES D.1(i)(a) – (c) for PRIMARY DISCHARGE POINT**

Table D.1(i)(a)	Primary Discharge Details & Volume
Table D.1(i)(b)	Primary Discharge Monitoring Results
Table D.1(i)(c)	Primary Discharge Monitoring Results

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

WWD Licence Application

Agglomeration details

Leading Local Authority	Kildare County Council
Co-Applicants	
Agglomeration	Derrinturn SS
Population Equivalent	1138
Level of Treatment	Secondary treatment
Treatment plant address	Derrinturn WWTP, Dreenan, Derrinturn, County Kildare
Grid Ref (12 digits, 6E, 6N)	270846 / 232311 (Verified using GPS)
EPA Reference No:	

Contact details

Contact Name:	Liam O'Dowd, Area Engineer
Contact Address:	Kildare County Council, Osberstown Waste Water Treatment Plant, Osberstown, Naas, County Kildare
Contact Number:	(045) 880712
Contact Fax:	(045) 880722
Contact Email:	lodowd@kildarecoco.ie

Table D.1(i)(a): EMISSIONS TO SURFACE/GROUND WATERS (Primary Discharge Point)

Discharge Point Code: SW-1

Local Authority Ref No:	SW1-P	
Source of Emission:	Derrinturn WWTP	
Location:	Dreenan, Derrinturn, County Kildare	
Grid Ref (12 digits, 6E, 6N)	270838 / 232285 (Verified using GPS)	
Name of Receiving waters:	Ballyshannon River	
Water Body:	River Water Body	
River Basin District	South Eastern RBD	
Designation of Receiving Waters:	Sensitive	
Flow Rate in Receiving Waters:	0	m <sup>3</sup> .sec <sup>-1</sup> Dry Weather Flow
	0.002	m <sup>3</sup> .sec <sup>-1</sup> 95% Weather Flow
Additional Comments (e.g. commentary on zero flow or other information deemed of value)	A new treatment plant is under construction at a nearby site. 95%ile flow is an estimate from a design report. Figure for normal flow is an estimate based on a flow survey for a week in November 2008. Zero value means data is missing.	

Emission Details:

(i) Volume emitted			
Normal/day	470 m <sup>3</sup>	Maximum/day	0 m <sup>3</sup>
Maximum rate/hour	0 m <sup>3</sup>	Period of emission (avg)	60 min/hr 24 hr/day 365 day/yr
Dry Weather Flow	0 m <sup>3</sup> /sec		

Table D.1(i)(b): EMISSIONS TO SURFACE/GROUND WATERS - Characteristics of The Emission (Primary Discharge Point)

Discharge Point Code: SW-1

Substance	As discharged			kg/day
	Unit of Measurement	Sampling Method	Max Daily Avg.	
pH	pH	24 hr composite	= 7.8	
Temperature	°C	24 hr composite	= 20.9	
Electrical Conductivity (@ 25°C)	µS/cm	24 hr composite	= 882	
Suspended Solids	mg/l	24 hr composite	= 82	
Ammonia (as N)	mg/l	24 hr composite	= 9.7	
Biochemical Oxygen Demand	mg/l	24 hr composite	= 25	
Chemical Oxygen Demand	mg/l	24 hr composite	= 121	
Total Nitrogen (as N)	mg/l	24 hr composite	= 13	
Nitrite (as N)	mg/l	24 hr composite	= 1.97	
Nitrate (as N)	mg/l	24 hr composite	= 2.58	
Total Phosphorous (as P)	mg/l	24 hr composite	= 5.85	
OrthoPhosphate (as P)	mg/l	24 hr composite	= 2.4	
Sulphate (SO <sub>4</sub> )	mg/l	24 hr composite	= 38.9	
Phenols (Sum)	µg/l	24 hr composite	= 0.1	

For Orthophosphate: this monitoring should be undertaken on a sample filtered on 0.45µm filter paper  
 For Phenols: USEPA Method 604, AWWA Standard Method 6240, or equivalent.

For inspection purposes only  
 Consent of copyright owner required for any other use

Table D.1(i)(c): DANGEROUS SUBSTANCE EMISSIONS TO SURFACE/GROUND WATERS - Characteristics of The Emission (Primary Discharge Point)

Discharge Point Code: SW-1

Substance	As discharged			kg/day
	Unit of Measurement	Sampling Method	Max Daily Avg.	
Atrazine	µg/l	24 hr composite	< 0.01	
Dichloromethane	µg/l	24 hr composite	< 1	
Simazine	µg/l	24 hr composite	< 0.01	
Toluene	µg/l	24 hr composite	< 1	
Tributyltin	µg/l	24 hr composite	< 0.02	
Xylenes	µg/l	24 hr composite	< 1	
Arsenic	µg/l	24 hr composite	< 0.96	
Chromium	µg/l	24 hr composite	< 0.93	
Copper	µg/l	24 hr composite	= 17.5	
Cyanide	µg/l	24 hr composite	< 5	
Flouride	µg/l	24 hr composite	= 0.35	
Lead	µg/l	24 hr composite	= 1.3	
Nickel	µg/l	24 hr composite	= 3.2	
Zinc	µg/l	24 hr composite	= 44	
Boron	µg/l	24 hr composite	= 92.6	
Cadmium	µg/l	24 hr composite	< 0.09	
Mercury	µg/l	24 hr composite	< 0.2	
Selenium	µg/l	24 hr composite	< 0.01	
Barium	µg/l	24 hr composite	= 55.1	

For Orthophosphate: this monitoring should be undertaken on a sample filtered on 0.45µm filter paper  
 For Phenols: USEPA Method 604, AWWA Standard Method 6240, or equivalent.

For inspection purposes only. Consent of copyright owner required. Number 123

**ATTACHMENT TABLE D.2 – TABULAR DATA ON DISCHARGE POINTS**

For inspection purposes only.  
Consent of copyright owner required for any other use.



**ON-LINE TABLE E.1(i) for PRIMARY DISCHARGE POINT**

Table E.1(i)                      Primary Discharge frequency & quantity to be  
Emitted

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

TABLE E.1(i): WASTE WATER FREQUENCY AND QUANTITY OF DISCHARGE – Primary and Secondary Discharge Points

Identification Code for Discharge point	Frequency of discharge (days/annum)	Quantity of Waste Water Discharged (m <sup>3</sup> /annum)
SW-1	365	171550

For inspection purposes only.  
Consent of copyright owner required for any other use.

TABLE E.1(ii): WASTE WATER FREQUENCY AND QUANTITY OF DISCHARGE – Storm Water Overflows

Identification Code for Discharge point	Frequency of discharge (days/annum)	Quantity of Waste Water Discharged (m <sup>3</sup> /annum)	Complies with Definition of Storm Water Overflow
---	-------------------------------------	--	--

For inspection purposes only.  
Consent of copyright owner required for any other use.

## ATTACHMENT E.2 – MONITORING PROGRAMME

The programme for environmental monitoring is outlined in the attached document entitled "Kildare County Sampling Plan 2009".

For inspection purposes only.  
Consent of copyright owner required for any other use.

## ATTACHMENT E.2 – MONITORING AND SAMPLING POINTS

The programme for environmental monitoring is outlined in the attached document entitled '*Kildare County Sampling Plan 2009*'.

For inspection purposes only.  
Consent of copyright owner required for any other use.

# WATER SERVICES SECTION KILDARE COUNTY COUNCIL

## *Kildare County Sampling Plan*

**2009**

For inspection purposes only.  
Consent of copyright owner required for any other use.

<b>1. INTRODUCTION .....</b>	<b>2</b>
<b>2. SAMPLING SCHEDULE.....</b>	<b>2</b>
<b>2.1 RIVER WATER SAMPLING .....</b>	<b>3</b>
<b>3. SAMPLING PRECEDURE<sup>1,2,3</sup> .....</b>	<b>3</b>
<b>3.1 INTRODUCTION .....</b>	<b>3</b>
<b>3.2 SAMPLING PROCEDURE .....</b>	<b>4</b>
<b>4. ANALYSIS METHODS.....</b>	<b>4</b>
<b>5. QUALITY CONTROL .....</b>	<b>5</b>
<b>6. RESULT RECORDING/REPORTING PROCEDURES.....</b>	<b>5</b>
<b>APPENDIX 1 .....</b>	<b>6</b>

## 1. Introduction

The Sampling Plan for Kildare Co. Co. is intended to give an overview of how the Local Authority intends to comply with the Urban Waste Water Treatment Regulations, SI254 / 2001 in 2009. The Plan will indicate the minimum number of samples required to be taken for each waste water treatment plant, the parameters to be analysed for, the type of samplers used and how samples should be taken. The samples are followed from point of sampling through to reporting.

## 2. Sampling Schedule

- The Fifth Schedule to the Urban Waste Water Treatment Regulations, SI254 / 2001 prescribes a minimum frequency of sampling, at regular intervals, as set out in Table 1. The Regulations set out minimum sampling and analysis requirements; it is recommended that if at all possible, all waste water treatment plants should be monitored above the statutory minimum. There is no provision made in the regulations for the specific monitoring of treatment plants of < 2,000 p.e. but it is accepted best practice that all plants, regardless of size, should be monitored regularly, if practically possible. Consequently, Kildare County Council's policy is to monitor all plants > 500 p.e.<sup>1</sup>. The waste water treatment plants in County Kildare with < 500 p.e. should be sampled as requested by the Area Engineers.

1. *Urban Waste Water Discharges in Ireland – A Report for the years 2002/2003; Section 2.1.3, page 10.*

**Table 1**  
**Sampling Schedule 2009**

Plant Name	P.E.*	Discharge to	Sensitive**	Min. No. of Samples
Osberstown	96,317	R. Liffey	Yes	24
Leixlip	56,649	R. Liffey	No	24
Kildare Town	6,797	R. Tully	Yes	12
Monasterevin	2,943	R. Barrow	Yes	12
Castledermot	1,099	R. Lerr	Yes	6
Ballymore Eustace	1,509	R. Liffey	No	6
Nurney	500 Est	R. Tully	Yes	6
Robertstown	1,000	R. Slate	Yes	6
Coill Dubh	1,300	R. Slate	Yes	6
Kilmeague	1,500	Awillynish Stream	Yes	6
Derrinturn	1,300	R. Ballyshannon	Yes	6
Rathangan	2,000	R. Slate	Yes	12
Athy	13,500	R. Barrow	Yes	12

\* P.E. as calculated for 2008 and submitted in the 2008 EPA returns

\*\* The outflow discharges to a sensitive area or the catchment of a sensitive area

- Waste Water Treatment Plants are required to be sampled in accordance with the Fifth Schedule of the Urban Waste Water Treatment Regulations, SI254 / 2001 and must satisfy the performance requirements specified in Part 1 of the Second Schedule to the Regulations.

These performance requirements, i.e. concentration limits for key parameters in the effluents from secondary treatment plants, are as follows.<sup>1</sup>

*BOD: 25 mg/l O<sub>2</sub>; COD: 125 mg/l O<sub>2</sub>; SS: 35 mg/l*

- Part 2 of the Second Schedule gives a further requirement that Plants discharging to sensitive areas must meet one or both of the following.

*Total Phosphorus: 2 mg/l P; Total Nitrogen: 15 mg/l N*  
*(10,000 – 100,000 p.e.)*

Therefore samples must be analysed for a minimum of BOD, COD and SS (and Total Phosphorus in sensitive areas). Samples, in general, are tested for the full set of parameters (See Appendix 1).

## **2.1 River Water Sampling**

It is recommended that in 2009, all rivers receiving discharges from waste water treatment plants with > 500 p.e. be sampled according to the Regulations. The number of river samples taken (above and below discharge point) should equal the minimum number of effluent samples required for the plant (See Appendix 1).

**The following sections refer to procedures and methods, etc. carried out at the Osberstown Laboratory. Different procedures are undertaken at the Athy and Leixlip Laboratories and reference should be made to the Environmental Technicians there for further information.**

## **3. Sampling Procedure<sup>1,2,3</sup>**

### **3.1 Introduction**

The objective of sampling is to collect a portion of material small enough in volume to be transported conveniently and handled in the laboratory while still accurately representing the material being sampled. This implies that the relative proportions or concentrations of all pertinent components will be the same in the samples as in the material being sampled, and that the sample will be handled in such a way that no significant changes in composition occur before the tests are made.

### 3.2 Sampling Procedure

Consult the Osberstown WWTP Methods Manuals to determine whether any special precautions should be taken when sampling for specific parameters. Therefore each point made below is for general samples, the Methods Manuals may require you to ignore certain points i.e. glass bottles used instead of plastic containers.

- The use of some form of automatic sampler (flow-proportional or 24-hour composite) is essential.
- Portable 24-hour composite samplers may be used. Ideally ones with a sample refrigeration facility.
- When using portable 24-hour composite samplers with no refrigeration facility, minimise the effects of elevated temperature by protecting equipment from sunlight.
- Again for 24-hour composite samplers with no refrigeration facility, try to start 24-hour sampling period for example at 09:00 and finish at 09:00 the next day (Therefore the least amount of time in the sunlight). Sample should be brought straight to laboratory for testing, thus eliminating standing time.
- Samples are taken in plastic containers (1L or 2.5L).
- Containers are filled to the top to eliminate air/oxygen.
- When sampling, ensure that the material/sample is a homogenous mixture i.e. Sample from composite sampler may need mixing before sampling.
- Samples must be transported to the laboratory in a cooler box.
- All samples must be labelled, indicating name of collector, date and time of collection, place of collection.
- When sample is presented to the laboratory for analysis the sample is assigned a number and sample details are logged in the laboratory logbook.

1. The Environmental Protection Agency Act, 1992 [Urban Waste Water Treatment] Regulations, 1994  
A Handbook on Implementation for Sanitary Authorities
2. Standard Methods for the examination of Water and Waste Water. 19<sup>th</sup> Edition 1995
3. Methods Manuals, Osberstown WWTP Environmental Laboratory, 2000 Version 3

## 4. Analysis Methods

The methods used by the Osberstown WWTP Laboratory when analysing samples are documented in the Laboratory Method Manuals (No. 1 & 2). These methods should be referenced for details of analysis and the methods followed whenever samples are being analysed.

## 5. Quality Control

### Osberstown Laboratory

Reference should be made to the Osberstown Laboratory Quality Control Procedures Manual for all details pertaining to Quality Control protocol in the Osberstown WWTP Laboratory.

## 6. Result Recording/Reporting Procedures

### Osberstown Laboratory

- All samples entering Osberstown WWTP Laboratory are logged in the Sample Logbook. This allocates a unique identifying number to the sample.
- Each parameter has an associated result logbook in which the sample details and results are recorded.
- Results for all the parameters are recorded on a result sheet, which is designated to a specific waste water treatment plant for a specific date.
- All results are inputted into a central database, from which a printout of results is obtained for each plant. These are signed and verified.
- The EPA Returns Co-ordinator will request returns data from individuals in January / February of every year for the previous period, for submission to the EPA.

### *Author*

*Fergal Humphreys (EPA Returns Co-ordinator)*

## Appendix 1

The full set of analytical parameters are tested in Osberstown WWTP Environmental Laboratory and include BOD, COD, SS, *ortho*-phosphate, Total Phosphorus, ammonia, nitrite, nitrate, Total Kjeldahl Nitrogen (TKN) (and/or Total Nitrogen, TN). For operational purposes some additional parameters such as pH, dissolved oxygen (DO), alkalinity, dry solids should be measured.

Included below are the recommended analyses as set out in the regulations.

The Environmental Protection Agency Act, 1992 (Urban Waste Water Treatment) Regulations, 1994: A Handbook on Implementation for Sanitary Authorities

### *Recommended Analyses: Non-sensitive Areas*

Parameter	Influent	Effluent	RWUS	RWDS	Note(s)
BOD <sub>5</sub>	Yes	Yes	Yes	Yes	-
COD	Yes	Yes	No	[Yes]	a
Total S Solids	[No]	Yes	Yes	[Yes]	b, c

#### Notes

**a** The COD test is not suited to very clean waters and is not usually carried out on such samples. However, a provision is made in the table for the carrying out of the test on down-stream receiving waters visibly affected by discharge(s).

**b** In view of the often unpleasant nature of influent samples it is considered that suspended solids measurement need not be mandatory on such samples.

**c** The measurement of suspended solids in waters of apparent clarity is of little practical value, and it is proposed that their determination be confined to those down-stream samples of receiving water on which it is considered the COD should be determined (see above).

**d** The measurement of nutrients is essential in sensitive areas. Although phosphorus is the key element concerning the eutrophication of fresh waters, nitrogen is very often determined routinely on such waters, hence its recommended inclusion in programmes.

**e** Total Oxidised Nitrogen comprises nitrate and nitrite. The Total Kjeldahl Nitrogen [TKN] determination includes the measurement of ammonia. The measurement of TKN is not particularly suited to unpolluted (or mildly polluted) receiving waters and, accordingly, it is considered that the determination of ammonia instead of TKN on such waters is more practicable.

*Recommended Analyses: Sensitive Areas – Rivers*

<b>Parameter</b>	<b>Influent</b>	<b>Effluent</b>	<b>RWUS</b>	<b>RWDS</b>	<b>Note(s)</b>
BOD <sub>5</sub>	Yes	Yes	Yes	Yes	-
COD	Yes	Yes	No	[Yes]	a
Total S Solids	[No]	Yes	Yes	[Yes]	b, c
Total Phosphorus	Yes	Yes	Yes	Yes	d
Total Oxidised Nitrogen	No	Yes	Yes	Yes	d, e
Total Kjeldhal Nitrogen	Yes	Yes	No	No	d, e
Ammonia	No	No	Yes	Yes	e

For inspection purposes only.  
Consent of copyright owner required for any other use.

# Accreditation Certificate

## Bord Na Móna Environmental Ltd

Environmental & Consultancy Services-Analytical Laboratory, Main Street, Newbridge, Co. Kildare

### Testing Laboratory

Registration number: 083T

is accredited by the Irish National Accreditation Board (INAB) to undertake testing as detailed in the Schedule bearing the Registration Number detailed above, in compliance with the International Standard ISO/IEC 17025:2005 2<sup>nd</sup> Edition "General Requirements for the Competence of Testing and Calibration Laboratories"  
*(This Certificate must be read in conjunction with the Annexed Schedule of Accreditation)*

Date of award of accreditation: 16:11:2001

Date of last renewal of accreditation: 21:08:2006

Expiry date of this certificate of accreditation: 16:11:2011

This Accreditation shall remain in force until further notice subject to continuing compliance with INAB accreditation criteria, ISO/IEC 17025 and any further requirements specified by the Irish National Accreditation Board.

Manager:



Mr Tom Dempsey

Chairperson:



Dr Máire Walsh

Issued on 01 October 2008

Organisations are subject to annual surveillance and are re-assessed every five years. The renewal date on this Certificate confirms the latest date of renewal of accreditation. To confirm the validity of this Certificate, please contact the Irish National Accreditation Board.

The INAB is a signatory of the European co-operation for Accreditation (EA) Testing Multilateral Agreement (MLA) and the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement.

# Schedule of Accreditation



(Annex to Accreditation Certificate)

Permanent Laboratory:  
Category A

## BORD NA MÓNA ENVIRONMENTAL LTD Technical Services Analytical Laboratory Chemical Testing Laboratory

*Initial Registration Date :* 18-August-1997  
*Postal Address:* Main Street  
*(Address of other locations as they apply)* Newbridge  
Co. Kildare  
*Telephone:* +353 (0) 45431201  
*Fax:* +353 (0) 45434207  
*E-mail:* sharonmcg@bnm.ie  
*Contact Name:* Sharon Mc Guinness  
*Facilities:* Public testing service

Consent to copyright owner required for any other use.

# Schedule of Accreditation



## Permanent Laboratory: Category A

THE IRISH NATIONAL ACCREDITATION BOARD (INAB) is the Irish body for the accreditation of organisations including laboratories.

Laboratory accreditation is available to testing and calibration facilities operated by manufacturing organisations, government departments, educational institutions and commercial testing/calibration services. Indeed, any organisation involved in testing, measurement or calibration in any area of technology can seek accreditation for the work it is undertaking.

Each accredited laboratory has been assessed by skilled specialist assessors and found to meet criteria which are in compliance with ISO/IEC 17025 or ISO/IEC 15189 (medical laboratories). Frequent audits, together with periodic inter-laboratory test programmes, ensure that these standards of operation are maintained.

### Testing and Calibration Categories:

**Category A:** Permanent laboratory calibration and testing where the laboratory is erected on a fixed location for a period expected to be greater than three years.

**Category B:** Site calibration and testing that is performed by staff sent out on site by a permanent laboratory that is accredited by the Irish National Accreditation Board.

**Category C:** Site calibration and testing that is performed in a site/mobile laboratory or by staff sent out by such a laboratory, the operation of which is the responsibility of a permanent laboratory accredited by the Irish National Accreditation Board.

**Category D:** Site calibration and testing that is performed on site by individuals and organisations that do not have a permanent calibration/testing laboratory. Testing may be performed using

- (a) portable test equipment
- (b) a site laboratory
- (c) a mobile laboratory or
- (d) equipment from a mobile or site laboratory

### Standard Specification or Test Procedure Used:

The standard specification or test procedure that is accredited is the issue that is current on the date of the most recent visit, unless otherwise stated.

### Glossary of Terms

#### Facilities:

<b>Public calibration/testing service:</b>	Commercial operations which actively seek work from others.
<b>Conditionally available for public calibration/testing:</b>	Established for another primary purpose but, more commonly than not, is available for outside work.
<b>Normally not available for public calibration/testing:</b>	Unavailable for public calibration/testing more often than not.

Laboratory users wishing to obtain assurance that calibration or test results are reliable and carried out to the Irish National Accreditation Board criteria should insist on receiving an accredited calibration certificate or test report. Users should contact the laboratory directly to ensure that this scope of accreditation is current. INAB will, on request, verify the status and scope.

# Scope of Accreditation

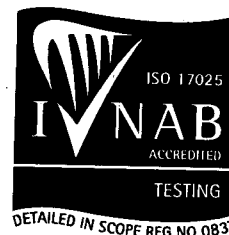


## Bord Na Móna - Technical Services Lab Chemical Testing Laboratory

Permanent Laboratory:  
Category A

INAB Classification number (P9) Materials/products tested	Type of test/properties measured Range of measurement	Standard specifications Equipment/techniques used
766 Waters		Documented In-house methods:
.01 Waters for potable and domestic purposes	Total Dissolved solids 50-4,000mg/L	G/18 based on APHA, 21 <sup>st</sup> Edition 2540 C (2005)
.02 Waters for irrigation and stock	BOD 2 - 170,000 mg/L	G/04 Issue 4 based on APHA 21 <sup>st</sup> Edition 5210 B (2005)
.03 Waters for industrial and steam raising purposes	COD 10 - 60,000 mg/L	G/03 based on APHA 21 <sup>st</sup> Edition 5220 D (2005) Closed Reflux Colorimetric Method
.04 Sewage	Total Phosphorous Range 0.05 - 160 mg/L P	G/23 based on APHA 21 <sup>st</sup> Edition 4500-P D and Method 4500 PB <sub>4</sub> (2005) (for digestion)
.05 Trade Waste Domestic and industrial waste waters and treated effluent	pH 4-10 pH Units	G/05 based on APHA 21 <sup>st</sup> Edition 4500 HB (2005)
	Conductivity 1.5 - 30,000 µs/cm	G/06 based on APHA 21 <sup>st</sup> Edition 2510 B (2005)
	Anions by ion Chromatography Range Fluoride: 0.1 - 1,000 mg/L F Chloride: 0.5 - 5,000 mg/L CL Nitrate: 0.2 - 5,000 mg/L NO <sub>3</sub> Phosphate: 0.5 - 500 mg/L PO <sub>4</sub> Sulphate: 0.5 - 5,000 mg/L SO <sub>4</sub>	G/39 based on APHA 21 <sup>st</sup> Edition 4110B (2005)

# Scope of Accreditation



**Bord Na Móna - Technical Services Lab**  
**Chemical Testing Laboratory**

Permanent Laboratory:  
 Category A

INAB Classification number (P9)	Materials/products tested	Type of test/properties measured Range of measurement	Standard specifications Equipment/techniques used
766	Waters (continued)	Analysis for Acetonitrile, Isopropyl alcohol, Acetone and Methanol 0.5 - 3,900 mg/L Ethanol 0.5 - 10,000 mg/L	G/14 based on ASTM D 3695 (1995): Direct aqueous injection Gas Chromatography with FI Detection
.07	Bore Waters		
.99	Other Waters Ground Waters Surface Waters Waste Waters Leachates	Total suspended solids 5 - 8,000 mg/L Total Alkalinity by Kone Lab 50-3,000 mg/L as (CaCO <sub>3</sub> ) Surfactants - MBAS 0.05-100 mg/L As Lauryl Sulphate Total Solids 50-1,000 mg/L Ammonia by Kone Lab 0.02 - 5 mg/L NH <sub>3</sub> - N (low range) 5 - 2,500 mg/L NH <sub>3</sub> - N (high range) Total Hardness by the Kone Lab 50-4,000 mg/L as (CaCO <sub>3</sub> )	G/19 based on APHA 21 <sup>st</sup> Edition 2540 D (2005) G/69 Method based on APHA 21 <sup>st</sup> edition 2005 2320 and the determination of alkalinity and acidity in water 1981 Method C. G/24 based on APHA 21 <sup>st</sup> Edition 2005 5540C G/65 based on APHA 21 <sup>st</sup> Edition 2005 2540B G/67 based on APHA 21 <sup>st</sup> Edition 4500 -NH <sub>3</sub> F and Methods for the examination of waters and associated materials, ammonia in waters 1981 G/68 based on APHA 21 <sup>st</sup> edition 2005 & 2340 C EDTA.

# Scope of Accreditation



## Bord Na Móna - Technical Services Lab Chemical Testing Laboratory

Permanent Laboratory:  
Category A

INAB Classification number (P9)	Materials/products tested	Type of test/properties measured Range of measurement	Standard specifications Equipment/techniques used
766	Waters		
.01	Waters for potable and domestic purposes	Nitrite 0.02-100 mg/L NO <sub>2</sub> -N by Kone lab	G/67 based on APHA 21 <sup>st</sup> Edition 2005. Method 4500-NO <sub>2</sub> B
.02	Water for irrigation and stock	TON 0.2-1,000 mg/L TON by Kone lab	G/67 based on APHA 21 <sup>st</sup> Edition 2005. Method 4500-NO <sub>2</sub> B
.03	Waters for industrial & steam raising purposes	Nitrate 0.2-1,000 mg/L NO <sub>3</sub> -N by Kone lab	G/67 based on APHA 21 <sup>st</sup> Edition 2005. Method 4500-NO <sub>2</sub> B
.04	Sewage	Orthophosphate Low range 0.01-1.0mg/L PO <sub>4</sub> -P High range 1.0-250 mg/L PO <sub>4</sub> -P by Kone lab	G/67 based on APHA 21 <sup>st</sup> Edition 2005. Method 4500-P E
.05	Trade waste Domestic & industrial wastewaters and treated effluent	Metals by ICP-MS Cr- 2-100, 000µg/L Mn 2-100, 000µg/L Ni 2-100, 000µg/L Co 2-100,000µg/L Ag 2-100, 000µg/L Pb 2-100, 000µg/L Cu 2-100, 000µg/L Zn 2-100, 000µg/L As 2-100, 000µg/L Se 2-100, 000µg/L Cd 2-100, 000µg/L Sb 2-100, 000µg/L Ba 2-100, 000µg/L U 2-100, 000µg/L	G/57 based on EPA method 200.8 (supplement1, Rev 5.4 May 1994)

# Scope of Accreditation



**Bord Na Móna - Technical Services Lab**  
**Chemical Testing Laboratory**

Permanent Laboratory:  
Category A

INAB Classification number (P9)	Materials/products tested	Type of test/properties measured Range of measurement	Standard specifications Equipment/techniques used
766	Waters		
.01	Waters for potable and domestic purposes	Chloride by Kone lab (UV-VIS) 2 - 5,000 mg/L Chloride	G/67 based on APHA 21 <sup>st</sup> Edition 2005. Method 4500-CL E
.02	Waters for irrigation and stock		
.03	Waters for industrial and steam raising purposes		
.04	Sewage		
.05	Trade Waste <i>Domestic and industrial waste waters and treated effluent</i>		
.07	Bore waters		
.99	Other waters <i>Ground Waters Surface Waters Waste Waters Leachates</i>		

For inspection purposes only.  
Consent of copyright owner required for any other use.

# Scope of Accreditation



**Bord Na Móna - Technical Services Lab**  
**Chemical Testing Laboratory**

Permanent Laboratory:  
 Category A

INAB Classification number (P9) Materials/products tested	Type of test/properties measured Range of measurement	Standard specifications Equipment/techniques used
716 Fuels		
.03 Coals and Coke	Moisture content 1-99%	G/86 based on ISO 589-2003
.05 Other Solid Fuels (including Peat)		

For inspection purposes only.  
 Consent of copyright owner required for any other use.

# Schedule of Accreditation

issued by

## United Kingdom Accreditation Service

21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

 <p>Accredited to ISO/IEC 17025:2005</p>	<b>EURO Environmental Services</b>	
	Issue No: 007    Issue date: 01 October 2008	
	Unit 35 Boyne Business Park Drogheda Co Louth Ireland	Contact: Mr G Fitzpatrick Tel: +00 353 41 984 5440 Fax: +00 353 941198 E-Mail: info@euroenv.ie Website: www.euroenv.ie

Testing performed by the Organisation at the locations specified below

Locations covered by the organisation and their relevant activities

### Laboratory locations:

Location details	Activity	Location code
<b>Address</b> Unit 35 Boyne Business Park Drogheda Co Louth Ireland	<b>Local contact</b> Damien O'Reilly  Tel: +00 353 41 984 5440 Fax: +00 353 41 984 6171	Environmental Analysis  A

### Site activities performed away from the locations listed above:

Location details	Activity	Location code
Emission Stacks and Ducts	<b>Local contact</b> Geoff Fitzpatrick  Tel: +00 353 41 984 5440 Fax: +00 353 41 984 6171	Sampling and Analysis  B



2802  
Accredited to  
ISO/IEC 17025:2005

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

**EURO Environmental Services**  
**Issue No: 008 Issue date: 23 October 2008**

Testing performed by the Organisation at the locations specified

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
POLLUTANTS AND EFFLUENTS: STACK EMISSIONS	<u>Physical Testing</u>		
Filter papers and filter assemblies from stack sampling probes	Particulates	In accordance with BS EN 13284-1 using gravimetric analysis	A
ATMOSPHERIC POLLUTANTS	<u>Sampling of source emissions to atmosphere</u>		
	Water vapour	US EPA Method 4	B
ATMOSPHERIC POLLUTANTS	<u>Sampling of source emissions to atmosphere</u>	National and International Methods to meet the requirements of the Environment Agency MCERTS Performance Standard - Manual Stack Emission Monitoring	
Gaseous and Particulate Samples from Emission Stacks/Ducts	Isokinetic sampling for particulate matter	BS EN 13284-1:2002 BS ISO 9096:2003	B
	<u>Gaseous Compounds - sampling and analysis</u>		
	Velocity, temperature and pressure	BS EN 13284-1:2002	B
	Total Organic Carbon	BS EN 12619:1999	B
	Total Organic Carbon	BS EN 13526:2002	B
	Carbon Monoxide	BS EN 15058:2006	B
	Oxygen	BS EN 14789:2005	B
	Oxides of nitrogen	BS EN 14792:2005	B
	Water Vapour	BS EN 14790:2005	B



2802  
Accredited to  
ISO/IEC 17025:2005

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

**EURO Environmental Services**  
Issue No: 008 Issue date: 23 October 2008

Testing performed by the Organisation at the locations specified

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
ATMOSPHERIC POLLUTANTS	<u>Sampling from emission stacks and ducts for subsequent chemical analysis by a UKAS accredited laboratory for:</u>		
	Hydrogen Chloride	BE EN 1911	B
	Hydrogen Fluoride	BS EN 15713:2006	B
	Sulphur Dioxide	BS EN 14791:2005	B
	Metals	BS EN 14385:2004	B
SOILS	Mercury	BS EN 13211:2001	B
	<u>Chemical Testing</u>		
	Elements: Arsenic Barium Beryllium Cadmium Cobalt Chromium Lead Manganese Nickel Selenium Silver Strontium Vanadium Zinc	SOP 202 using Inductively Coupled Plasma Mass Spectrometry (ICP-MS)	A
		Documented In-House Methods to meet the requirements of the Environment Agency MCERTS Performance Standard - Chemical Testing of Soil	
	pH	SOP 300 using meter	A



2802  
Accredited to  
ISO/IEC 17025:2005

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

**EURO Environmental Services**  
Issue No: 008 Issue date: 23 October 2008

Testing performed by the Organisation at the locations specified

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
WATERS	<u>Chemical Tests</u>		
Potable Water	Elements: Lithium Beryllium Boron Aluminium Vanadium Chromium Iron Manganese Cobalt Nickel Copper Zinc Gallium Arsenic Rubidium Strontium Silver Tin Antimony Caesium Barium Thallium Lead Uranium	SOP 177 by ICP-MS	A
	Ammonia	SOP 114 by automated discrete analyser	A
Industrial Effluent	Total oxidised Nitrogen (TON)	SOP 151 by automated discrete analyser	A
	Alkalinity	SOP 102 by automated discrete analyser	A
Industrial and sewage effluent	Orthophosphate	SOP 117 by automated discrete analyser	A
Potable waters, industrial and sewage effluents	Chloride	SOP 100 by automated discrete analyser	A
	Sulphate	SOP 119 by automated colorimetry	
	Total phosphate	SOP 166 by automated discrete analyser	A



2802  
Accredited to  
ISO/IEC 17025:2005

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

**EURO Environmental Services**  
Issue No: 008 Issue date: 23 October 2008

Testing performed by the Organisation at the locations specified

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
WATERS (cont'd)	<u>Chemical Tests</u> (cont'd)		
Potable waters, industrial and sewage effluents (cont'd)	Elements: Calcium Magnesium Sodium Potassium	SOP 184 by ICP-MS	A
Industrial effluent, surface and groundwater	Chemical Oxygen Demand	SOP 107	A
Potable waters, industrial and sewage effluents, surface and groundwater	pH	SOP 110	A
	Conductivity	SOP 112	A
	Turbidity	SOP 109	A
	Biochemical Oxygen Demand	SOP 113	A
	Colour	SOP 108 by automated discrete analyser	A
	Total Hardness	SOP 111 by automated discrete analyser	A
END			

For inspection purposes only.  
Consent of copyright owner required for any other use.

**ATTACHMENT TABLE E.3 – TABULAR DATA ON MONITORING & SAMPLING POINTS**

For inspection purposes only.  
Consent of copyright owner required for any other use.



**ATTACHMENT E.4 – SAMPLING DATA**

For inspection purposes only.  
Consent of copyright owner required for any other use.

**ATTACHMENT E.4**

**2008 Test Results for Derrinturn**

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

**IN-HOUSE ANALYSIS**

Discharge point: Derrinturn Inlet

Parameter	Unit	Date						
		13/11/2008	14/11/2008	15/11/2008	16/11/2008	17/11/2008	18/11/2008	19/11/2008
pH		7.5	7.4	7.4	7.4	7.6	7.39	7.5
Suspended solids	mg/l	183	139	139	98	99	89	130
Ammonia(NH3-N)	mg/l N	8.9	7.4	7.4	8.3	9.1	10.5	11
BOD	mg/l	140	140	140	130	144	189	166
COD	mg/l	110	124	124	89	98	478	516
Nitrate(NO3-N)	mg/l N	<0.1	1.93	1.93	<0.1	<0.1	<0.1	<0.1
Nitrite(NO2-N)	mg/l N	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Orthophosphate(PO4-P)	mg/l P	1.16	1.04	1.04	0.6	1.01	0.86	0.78
Total phosphorous	mg/l P	1.47	1.4	1.4	1.38	1.98	2.1	2.3
Flow	m3/d	501	482	482	471	473	482	502
BOD	kg/d	70	68	68	61	68	91	83
P.E.		1169	1125	1125	1021	1135	1518	1389

For inspection purposes only.  
Consent of copyright owner required for any other use.

## IN-HOUSE ANALYSIS

Discharge point: Derrinturn Outlet

Parameter	Unit	Date										Compliance	
		13/11/2008	14/11/2008	15/11/2008	16/11/2008	17/11/2008	18/11/2008	19/11/2008	18/11/2008	17/11/2008	16/11/2008		
pH		7.4	7.5		7.4	7.7	7.28	7.8					Yes
Suspended solids	mg/l	23	20		8	3	20	16					Yes
Ammonia(NH3-N)	mg/l N	7.3	6.8		6.4	2.3	6	4.2					Yes
BOD	mg/l	13	7		11	8	6	3					Yes
COD	mg/l	87	23		40	12	19	35					Yes
Nitrate(NO3-N)	mg/l N	<0.1	0.13		<0.1	<0.1	<0.1	2.58					Yes
Nitrite(NO2-N)	mg/l N	<0.1	1.14		<0.1	<0.1	<0.1	1.97					Yes
Orthophosphate(PO4-P)	mg/l P	1.31	0.56		2.4	1.36	1.46	0.81					Yes
Total phosphorous	mg/l P	1.65	0.85		3.04	1.82	5.85	1.02					No
Temperature	°C	20.9	20.9		20.9	18.1	20.1	20.3					Yes
D.O.	mg/l	8.34	8.09		8.78	8.75	8.52	5.71					Yes

For inspection purposes only.  
Consent of copyright owner required for any other use.

# IN-HOUSE ANALYSIS

Discharge point: Derrinturn Upstream

Parameter	Unit	16/11/2008	18/11/2008
pH		7.4	7.36
Suspended solids	mg/l	4	1
Ammonia(NH3-N)	mg/l N	0.2	0.2
BOD	mg/l	2	3
COD	mg/l	17	10
Nitrate(NO3-N)	mg/l N	-	-
Nitrite(NO2-N)	mg/l N	-	-
Orthophosphate(PO4-P)	mg/l P	0.12	0.14
Total phosphorous	mg/l P	0.11	0.17

For inspection purposes only.  
Consent of copyright owner required for any other use.

# IN-HOUSE ANALYSIS

Discharge point: Derrinturn Downstream

Parameter	Unit	16/11/2008	18/11/2008
pH		7.4	7.42
Suspended solids	mg/l	2	2
Ammonia(NH3-N)	mg/l N	0.4	0.7
BOD	mg/l	3	4
COD	mg/l	30	13
Nitrate(NO3-N)	mg/l N	-	-
Nitrite(NO2-N)	mg/l N	-	-
Orthophosphate(PO4-P)	mg/l P	0.62	0.79
Total phosphorous	mg/l P	0.99	0.96

Consent of copyright owner required for any other use.  
For inspection purposes only.

## EXTERNAL LABORATORY ANALYSIS

Discharge Point: Derrintum Inlet 15/11/08

Parameter	Unit	Results	Sampling method	Limit of Quantitation	Analysis Method
pH		7.6	Composite	<0.01	Electrometry
Electrical Conductivity	µS/cm	741	Composite	<0.06	Electrometry
Suspended Solids	mg/l	270	Composite	<3	Filtration/Drying @ 104
Ammonia as N	mg/l N	7.98	Composite	<0.09	Colorimetry
BOD	mg/l	76	Composite	<2	Electrometry
COD	mg/l	319	Composite	<5	Colorimetry
Hardness as CaCO3	mg/l CaCO3	313	Composite	<2.58	Colorimetry
Total Nitrogen as N	mg/l N	9.6	Composite	<1	Calculation
Nitrite as N	mg/l N	0.23	Composite	<0.003	Colorimetry
Nitrate as N	mg/l N	0.4	Composite	<0.09	Colorimetry
Total Phosphorous as P	mg/l P	5	Composite	<0.006	Digestion/Colorimetry
Orthophosphate as P	mg/l P	1.39	Composite	<0.005	Colorimetry
Anions	Fluoride mg/l Sulphate mg/l	0.14 34.7	Composite Composite	<0.09 <2.11	Ion Chromatography Ion Chromatography
Phenols (sum)	mg/l	0.14	Composite	<0.1	GC/MS 2

Composite for inspection purposes only.  
 Consent required for any other use.

## EXTERNAL LABORATORY ANALYSIS

Discharge Point: Derrinturn Outlet 15/11/08

Parameter	Unit	Results	Sampling method	Limit of Quantitation	Analysis Method
pH		7.6	Composite	<0.01	Electrometry
Electrical Conductivity	µS/cm	882	Composite	<0.06	Electrometry
Suspended Solids	mg/l	82	Composite	<3	Filtration/Drying @ 104
Ammonia as N	mg/l N	9.7	Composite	<0.09	Colorimetry
BOD	mg/l	25	Composite	<2	Electrometry
COD	mg/l	121	Composite	<5	Colorimetry
Hardness as CaCO3	mg/l CaCO3	323	Composite	<2.58	Colorimetry
Total Nitrogen as N	mg/l N	13	Composite	<1	Calculation
Nitrite as N	mg/l N	<0.02	Composite	<0.003	Colorimetry
Nitrate as N	mg/l N	<0.2	Composite	<0.09	Colorimetry
Total Phosphorous as P	mg/l P	5.6	Composite	<0.006	Digestion/Colorimetry
Orthophosphate as P	mg/l P	1.09	Composite	<0.005	Colorimetry
Fluoride	mg/l	0.15	Composite	<0.09	Ion Chromatography
Sulphate	mg/l	38.9	Composite	<2.11	Ion Chromatography
Phenols (sum)	mg/l	<0.1	Composite	<0.1	GC/MS 2

Consent to publish for inspection purposes only.  
 Copyright reserved. No further use required for any other use.

## EXTERNAL LABORATORY ANALYSIS

Discharge Point: Derrinturn Upstream 15/11/08

Parameter	Unit	Results	Sampling method	Limit of Quantitation	Analysis Method
pH		7.8	Composite	<0.01	Electrometry
Electrical Conductivity	µS/cm	883	Composite	<0.06	Electrometry
Suspended Solids	mg/l	<5	Composite	<3	Filtration/Drying @ 104
Ammonia as N	mg/l N	0.17	Composite	<0.09	Colorimetry
BOD	mg/l	<2	Composite	<2	Electrometry
COD	mg/l	18	Composite	<5	Colorimetry
Hardness as CaCO3	mg/l CaCO3	398	Composite	<2.58	Colorimetry
Total Nitrogen as N	mg/l N	2.7	Composite	<1	Calculation
Nitrite as N	mg/l N	0.02	Composite	<0.003	Colorimetry
Nitrate as N	mg/l N	2.4	Composite	<0.09	Colorimetry
Total Phosphorous as P	mg/l P	0.21	Composite	<0.006	Digestion/Colorimetry
Orthophosphate as P	mg/l P	0.08	Composite	<0.005	Colorimetry
Anions	Fluoride mg/l	<0.1	Composite	<0.09	Ion Chromatography
	Sulphate mg/l	23.34	Composite	<2.11	Ion Chromatography
Phenols (sum)	mg/l	<0.1	Composite	<0.1	GC/MS 2

For inspection purposes only.  
 Consent of copyright owner required for any other use.

## EXTERNAL LABORATORY ANALYSIS

Discharge Point: Derrinturn Downstream 15/11/08

Parameter	Unit	Results	Sampling method	Limit of Quantitation	Analysis Method
pH		7.5	Composite	<0.01	Electrometry
Electrical Conductivity	µS/cm	800	Composite	<0.06	Electrometry
Suspended Solids	mg/l	26	Composite	<3	Filtration/Drying @ 104
Ammonia as N	mg/l N	0.69	Composite	<0.09	Colorimetry
BOD	mg/l	3	Composite	<2	Electrometry
COD	mg/l	44	Composite	<5	Colorimetry
Hardness as CaCO3	mg/l CaCO3	381	Composite	<2.58	Colorimetry
Total Nitrogen as N	mg/l N	3.8	Composite	<1	Calculation
Nitrite as N	mg/l N	0.47	Composite	<0.003	Colorimetry
Nitrate as N	mg/l N	2.3	Composite	<0.09	Colorimetry
Total Phosphorous as P	mg/l P	0.61	Composite	<0.006	Digestion/Colorimetry
Orthophosphate as P	mg/l P	0.24	Composite	<0.005	Colorimetry
Anions	Fluoride mg/l	<0.1	Composite	<0.09	Ion Chromatography
	Sulphate mg/l	22.87	Composite	<2.11	Ion Chromatography
Phenols (sum)	mg/l	<0.1	Composite	<0.1	GC/MS 2

For internal use only. Consent of copyright owner required for any other use.

## TOXIC SUBSTANCE ANALYSIS

Discharge Point: Derrinturn Inlet 17/11/08

Parameter	Unit	Results	Sampling method	Limit of Quantitation	Analysis Method
Arsenic	µg/l	<0.96	Composite	<0.01	HPLC
Atrazine	µg/l	<0.01	Composite	<1	GC-MS 1
Barium	µg/l	41.5	Composite	<0.1	HPLC
Boron	µg/l	118.4	Composite	<1	GC-MS 1
Cadmium	µg/l	<0.09	Composite	<0.05	GC-MS 1
Chromium	µg/l	<0.93	Composite	<1	GC-MS 1
Copper	µg/l	4.4	Composite	<10	ICPMS
Cyanide	µg/l	<5	Composite	<10	ICPMS
Dichloromethane	µg/l	<1	Composite	<10	ICPMS
Fluoride	µg/l	0.38	Composite	<5	Colorimetry
Lead	mg/l	<0.38	Composite	<0.09	Colorimetry
Mercury	µg/l	<0.2	Composite	<10	ICPMS
Nickel	µg/l	1.9	Composite	<10	ICPMS
Selenium	µg/l	1	Composite	<10	ICPMS
Simazine	µg/l	<0.01	Composite	<10	Electrometry
Toluene	µg/l	<1	Composite	<10	ICPMS
Tributyltin	µg/l	<0.02	Composite	<2.5	ICPMS
Xylene	µg/l	<1	Composite	<10	ICPMS
Zinc	µg/l	38.1	Composite	<10	HPLC

Discharge Point: Derrinturn Inlet 18/11/08

Parameter	Unit	Results	Sampling method	Limit of Quantitation	Analysis Method
Arsenic	µg/l	<0.96	Composite	<0.01	HPLC
Atrazine	µg/l	<0.01	Composite	<1	GC-MS 1
Barium	µg/l	45.6	Composite	<0.1	HPLC
Boron	µg/l	97	Composite	<1	GC-MS 1
Cadmium	µg/l	<0.09	Composite	<0.05	GC-MS 1
Chromium	µg/l	<0.93	Composite	<1	GC-MS 1
Copper	µg/l	6.2	Composite	<10	ICPMS
Cyanide	µg/l	<5	Composite	<10	ICPMS
Dichloromethane	µg/l	<1	Composite	<10	ICPMS
Fluoride	µg/l	0.39	Composite	<5	Colorimetry
Lead	mg/l	<0.38	Composite	<0.09	Colorimetry
Mercury	µg/l	<0.2	Composite	<10	ICPMS
Nickel	µg/l	2.3	Composite	<10	ICPMS
Selenium	µg/l	1	Composite	<10	ICPMS
Simazine	µg/l	<0.01	Composite	<10	Electrometry
Toluene	µg/l	<1	Composite	<10	ICPMS
Tributyltin	µg/l	<0.02	Composite	<2.5	ICPMS
Xylene	µg/l	<1	Composite	<10	ICPMS
Zinc	µg/l	43.5	Composite	<10	HPLC

## TOXIC SUBSTANCE ANALYSIS

Discharge Point: Derrinturn Outlet 17/11/08

Parameter	Unit	Results	Sampling method	Limit of Quantitation	Analysis Method
Arsenic	µg/l	<0.96	Composite	<0.01	HPLC
Atrazine	µg/l	<0.01	Composite	<1	GC-MS 1
Barium	µg/l	55.1	Composite	<0.1	HPLC
Boron	µg/l	92.6	Composite	<1	GC-MS 1
Cadmium	µg/l	<0.09	Composite	<0.05	GC-MS 1
Chromium	µg/l	<0.93	Composite	<1	GC-MS 1
Copper	µg/l	17.5	Composite	<10	ICPMS
Cyanide	µg/l	<5	Composite	<10	ICPMS
Dichloromethane	µg/l	<1	Composite	<10	ICPMS
Fluoride	µg/l	0.34	Composite	<5	Colorimetry
Lead	mg/l	1.3	Composite	<0.09	Colorimetry
Mercury	µg/l	<0.2	Composite	<10	ICPMS
Nickel	µg/l	3.2	Composite	<10	ICPMS
Selenium	µg/l	1	Composite	<10	ICPMS
Simazine	µg/l	<0.01	Composite	<10	Electrometry
Toluene	µg/l	<1	Composite	<10	ICPMS
Tributyltin	µg/l	<0.02	Composite	<2.5	ICPMS
Xylene	µg/l	<1	Composite	<10	ICPMS
Zinc	µg/l	44	Composite	<10	HPLC

Discharge Point: Derrinturn Outlet 18/11/08

Parameter	Unit	Results	Sampling method	Limit of Quantitation	Analysis Method
Arsenic	µg/l	<0.96	Composite	<0.01	HPLC
Atrazine	µg/l	<0.01	Composite	<1	GC-MS 1
Barium	µg/l	38.4	Composite	<0.1	HPLC
Boron	µg/l	64.3	Composite	<1	GC-MS 1
Cadmium	µg/l	<0.09	Composite	<0.05	GC-MS 1
Chromium	µg/l	<0.93	Composite	<1	GC-MS 1
Copper	µg/l	<0.2	Composite	<10	ICPMS
Cyanide	µg/l	<5	Composite	<10	ICPMS
Dichloromethane	µg/l	<1	Composite	<10	ICPMS
Fluoride	µg/l	0.35	Composite	<5	Colorimetry
Lead	mg/l	<0.38	Composite	<0.09	Colorimetry
Mercury	µg/l	<0.2	Composite	<10	ICPMS
Nickel	µg/l	1.6	Composite	<10	ICPMS
Selenium	µg/l	1	Composite	<10	ICPMS
Simazine	µg/l	<0.01	Composite	<10	Electrometry
Toluene	µg/l	<1	Composite	<10	ICPMS
Tributyltin	µg/l	<0.02	Composite	<2.5	ICPMS
Xylene	µg/l	<1	Composite	<10	ICPMS
Zinc	µg/l	25.5	Composite	<10	HPLC

## TOXIC SUBSTANCE ANALYSIS

Discharge Point:      Derrinturn Upstream 17/11/08

Parameter	Unit	Results	Sampling method	Limit of Quantitation	Analysis Method
Arsenic	µg/l	<0.96	Composite	<0.01	HPLC
Atrazine	µg/l	<0.01	Composite	<1	GC-MS 1
Barium	µg/l	71.5	Composite	<0.1	HPLC
Boron	µg/l	86.4	Composite	<1	GC-MS 1
Cadmium	µg/l	<0.09	Composite	<0.05	GC-MS 1
Chromium	µg/l	<0.93	Composite	<1	GC-MS 1
Copper	µg/l	6.1	Composite	<10	ICPMS
Cyanide	µg/l	<5	Composite	<10	ICPMS
Dichloromethane	µg/l	<1	Composite	<10	ICPMS
Fluoride	µg/l	0.24	Composite	<5	Colorimetry
Lead	mg/l	1.8	Composite	<0.09	Colorimetry
Mercury	µg/l	<0.2	Composite	<10	ICPMS
Nickel	µg/l	3.9	Composite	<10	ICPMS
Selenium	µg/l	1	Composite	<10	ICPMS
Simazine	µg/l	<0.01	Composite	<10	Electrometry
Toluene	µg/l	<1	Composite	<10	ICPMS
Tributyltin	µg/l	<0.02	Composite	<2.5	ICPMS
Xylene	µg/l	<1	Composite	<10	ICPMS
Zinc	µg/l	18.8	Composite	<10	HPLC

Discharge Point:      Derrinturn Upstream 18/11/08

Parameter	Unit	Results	Sampling method	Limit of Quantitation	Analysis Method
Arsenic	µg/l	<0.96	Composite	<0.01	HPLC
Atrazine	µg/l	<0.01	Composite	<1	GC-MS 1
Barium	µg/l	71.3	Composite	<0.1	HPLC
Boron	µg/l	28.2	Composite	<1	GC-MS 1
Cadmium	µg/l	<0.09	Composite	<0.05	GC-MS 1
Chromium	µg/l	<0.93	Composite	<1	GC-MS 1
Copper	µg/l	<0.2	Composite	<10	ICPMS
Cyanide	µg/l	<5	Composite	<10	ICPMS
Dichloromethane	µg/l	<1	Composite	<10	ICPMS
Fluoride	µg/l	0.24	Composite	<5	Colorimetry
Lead	mg/l	1.2	Composite	<0.09	Colorimetry
Mercury	µg/l	<0.2	Composite	<10	ICPMS
Nickel	µg/l	2.8	Composite	<10	ICPMS
Selenium	µg/l	1	Composite	<10	ICPMS
Simazine	µg/l	<0.01	Composite	<10	Electrometry
Toluene	µg/l	<1	Composite	<10	ICPMS
Tributyltin	µg/l	<0.02	Composite	<2.5	ICPMS
Xylene	µg/l	<1	Composite	<10	ICPMS
Zinc	µg/l	<4.6	Composite	<10	HPLC

## TOXIC SUBSTANCE ANALYSIS

Discharge Point: Derrinturn Downstream 17/11/08

Parameter	Unit	Results	Sampling method	Limit of Quantitation	Analysis Method
Arsenic	µg/l	<0.96	Composite	<0.01	HPLC
Atrazine	µg/l	<0.01	Composite	<1	GC-MS 1
Barium	µg/l	66.5	Composite	<0.1	HPLC
Boron	µg/l	164.5	Composite	<1	GC-MS 1
Cadmium	µg/l	<0.09	Composite	<0.05	GC-MS 1
Chromium	µg/l	<0.93	Composite	<1	GC-MS 1
Copper	µg/l	1.3	Composite	<10	ICPMS
Cyanide	µg/l	6	Composite	<10	ICPMS
Dichloromethane	µg/l	<1	Composite	<10	ICPMS
Fluoride	µg/l	0.27	Composite	<5	Colorimetry
Lead	mg/l	1.7	Composite	<0.09	Colorimetry
Mercury	µg/l	<0.2	Composite	<10	ICPMS
Nickel	µg/l	3.3	Composite	<10	ICPMS
Selenium	µg/l	1	Composite	<10	ICPMS
Simazine	µg/l	<0.01	Composite	<10	Electrometry
Toluene	µg/l	<1	Composite	<10	ICPMS
Tributyltin	µg/l	<0.02	Composite	<2.5	ICPMS
Xylene	µg/l	<1	Composite	<10	ICPMS
Zinc	µg/l	26.1	Composite	<10	HPLC

Discharge Point: Derrinturn Downstream 18/11/08

Parameter	Unit	Results	Sampling method	Limit of Quantitation	Analysis Method
Arsenic	µg/l	<0.96	Composite	<0.01	HPLC
Atrazine	µg/l	<0.01	Composite	<1	GC-MS 1
Barium	µg/l	70.4	Composite	<0.1	HPLC
Boron	µg/l	80.1	Composite	<1	GC-MS 1
Cadmium	µg/l	<0.09	Composite	<0.05	GC-MS 1
Chromium	µg/l	<0.93	Composite	<1	GC-MS 1
Copper	µg/l	0.8	Composite	<10	ICPMS
Cyanide	µg/l	<5	Composite	<10	ICPMS
Dichloromethane	µg/l	<1	Composite	<10	ICPMS
Fluoride	µg/l	0.28	Composite	<5	Colorimetry
Lead	mg/l	<0.38	Composite	<0.09	Colorimetry
Mercury	µg/l	<0.2	Composite	<10	ICPMS
Nickel	µg/l	3.4	Composite	<10	ICPMS
Selenium	µg/l	1	Composite	<10	ICPMS
Simazine	µg/l	<0.01	Composite	<10	Electrometry
Toluene	µg/l	<1	Composite	<10	ICPMS
Tributyltin	µg/l	<0.02	Composite	<2.5	ICPMS
Xylene	µg/l	<1	Composite	<10	ICPMS
Zinc	µg/l	24.8	Composite	<10	HPLC

## Results for Derrinturn Sewage Treatment works

### Inlet

Date	BOD	COD	SS	pH	NH <sub>3</sub>	TON	NO <sub>3</sub> -N	NO <sub>2</sub> -N	Total P	PO <sub>4</sub> <sup>3-</sup>	PO <sub>4</sub> <sup>3-</sup> -P	Comments
22/01/2008	40	153	154	7.41	3.09	5.311	4.88	0.431	2.2	5.34	1.73	Composite
21/02/2008	157	330	200	6.68	23	<0.1	<0.1	<0.1	NT	4.52	1.47	Composite
27/03/2008	184	218	128	7.26	14.1	<0.1	<0.1	<0.1	2.99	9.21	3	Composite
21/04/2008	238	482	332	7.35	12.71	<0.1	<0.1	<0.1	5.64	22.42	7.31	Composite
23/06/2008	233	257	222	7.59	17.5	<0.1	<0.1	<0.1	3.75	7.94	2.59	Composite
13/08/2008	173	106	21	7.76	2	15.12	14.83	0.29	1.08	3.16	1.03	Composite
13/11/2008	140	110	183	7.5	8.9	<0.1	<0.1	<0.1	1.47	1.16	0.38	Composite
14/11/2008	140	124	139	7.4	7.4	1.93	1.93	<0.1	1.4	1.04	0.34	Composite
16/11/2008	130	89	98	7.4	8.3	<0.1	<0.1	<0.1	1.38	0.6	0.2	Composite
17/11/2008	144	98	99	7.6	9.1	<0.1	<0.1	<0.1	1.98	1.01	0.33	Composite
18/11/2008	189	478	89	7.39	10.5	<0.1	<0.1	<0.1	2.1	0.86	0.28	Composite
19/11/2008	166	516	130	7.5	11	<0.1	<0.1	<0.1	2.3	0.78	0.25	Composite

### Effluent

Date	BOD	COD	SS	pH	NH <sub>3</sub>	TON	NO <sub>3</sub> -N	NO <sub>2</sub> -N	Total P	PO <sub>4</sub> <sup>3-</sup>	PO <sub>4</sub> <sup>3-</sup> -P	Comments
22/01/2008	7	91	306	7.57	2.21	2.886	2.67	0.216	1.33	4.01	1.31	Composite
21/02/2008	16	35	31	6.93	19	0.46	0.46	<0.1	NT	4.04	1.32	Composite
27/03/2008	4	115	26	7.29	11.8	4.67	4.67	<0.1	3.99	12.4	4.04	Composite
21/04/2008	2	49	30	7.34	3.49	41.69	41.27	0.42	4.2	14.2	4.63	Composite
05/05/2008	10	78	36	7.35	3.57	<0.1	<0.1	<0.1	4.36	15.64	5.1	Composite
15/05/2008	10	78	36	7.35	3.57	<0.1	<0.1	<0.1	4.36	15.64	5.1	Composite
23/06/2008	7	101	38	7.41	2.5	1.47	1.47	<0.1	3.89	9.72	3.17	Composite
13/08/2008	7	89	2	8.03	3	1.87	1.28	0.59	0.94	1.59	0.52	Composite
13/11/2008	13	87	23	7.4	7.3	<0.1	<0.1	<0.1	1.65	1.31	0.43	Composite
14/11/2008	7	23	20	7.5	6.8	1.27	0.13	1.14	0.86	0.56	0.18	Composite
16/11/2008	11	40	8	7.4	6.4	<0.1	<0.1	<0.1	3.04	2.4	0.13	Composite
17/11/2008	8	12	3	7.7	2.3	<0.1	<0.1	<0.1	1.82	1.36	0.44	Composite
18/11/2008	6	19	20	7.28	6	<0.1	<0.1	<0.1	5.85	1.46	0.48	Composite
19/11/2008	3	35	16	7.8	4.2	4.49	2.58	1.97	1.02	0.81	0.26	Composite

### MLSS

Date	MLSS	pH
22/01/2008	640	7.52
21/02/2008	722	7.46
21/04/2008	688	7.32
05/05/2008	642	7.35
13/08/2008	304	7.41

### Jpstream

Date	B.O.D	C.O.D	SS	pH	NH <sub>3</sub>	TON	NO <sub>3</sub> -N	NO <sub>2</sub> -N	Total P	PO <sub>4</sub> -P	PO <sub>4</sub> -P	Comments
29/05/2008	4	36	6	7.64	0.451	NT	NT	NT	0.167	0.395	0.13	Grab
30/06/2008	4	73	2	7.41	3.4	NT	NT	NT	0.214	0.357	0.12	Grab
16/11/2008	2	17	4	7.4	0.2	2.12	NT	NT	0.12	0.11	0.04	Grab
18/11/2008	3	10	1	7.36	0.2	NT	NT	NT	0.17	0.14	0.05	Grab

### ownstream

Date	B.O.D	C.O.D	SS	pH	NH <sub>3</sub>	TON	NO <sub>3</sub> -N	NO <sub>2</sub> -N	Total P	PO <sub>4</sub> -P	PO <sub>4</sub> -P	Comments
29/05/2008	7	42	12	7.25	0.563	NT	NT	NT	0.239	0.477	0.16	Grab
30/06/2008	10	56	6	7.46	10.9	NT	NT	NT	0.597	0.634	0.21	Grab
16/11/2008	3	30	2	7.4	0.4	2.43	NT	NT	0.99	0.62	0.2	Grab
18/11/2008	4	13	2	7.42	0.7	NT	NT	NT	0.96	0.79	0.26	Grab