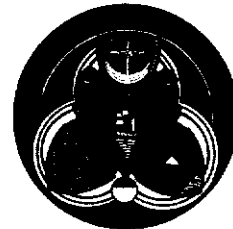
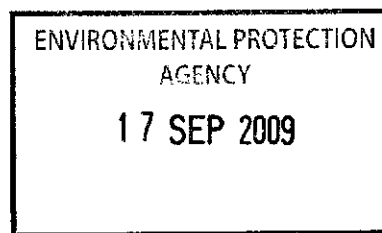


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Administration,  
Office of Climate, Licencing & Resource Use,  
Environmental Protection Agency,  
Headquarters,  
PO Box 3000,  
Johnstown Castle Estate,  
County Wexford.



15<sup>th</sup> September 2009

**Re: Waste Water Discharge Licence for the Midleton Agglomeration  
Application Register No. D0056-01**

To whom it may concern

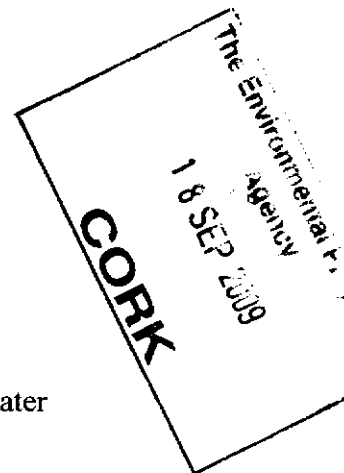
In reply to the Notice in accordance with Regulation 18(3)(b) of the Waste Water (Authorisation) Regulations 2007, I attach the following documentation.

1. Letter detailing each of the items on which you requested further information and our reply to same.
2. Supporting Documentation
3. Revised Non Technical Summary
4. Revised Drawings Attachment B.1 No. 002, Attachment B.4 No. 006 and Attachment B.5 No. 007.

As this Application was submitted in 2007, and some works have been carried out on the network serving the catchment in the meantime, the data currently on file in Section D is incorrect and we are revising this at the moment. Revised Section D tables will be sent on as soon as they are completed.

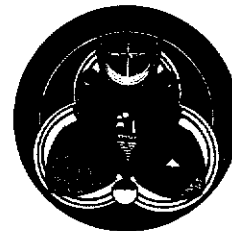
As one item on the Regulation 18 letter referred to information supplied under Section D this item will be answered and sent on with the revised tables.

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As per your original letter I enclose the originals and one hard copy of all the data requested as well as copies of all the data requested in electronic searchable PDF format on CD-ROM.

Please do not hesitate to contact me should you require clarification on any of the issues contained above.

Yours Sincerely

A handwritten signature in black ink, appearing to read 'Patricia Power'.

Patricia Power  
Director of Services  
Area Operations South  
Cork County Council  
Co Hall  
Cork.

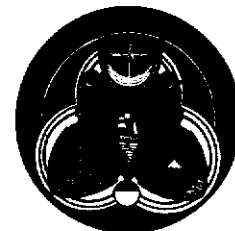
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Ann Marie Donlon  
Licencing Inspector,  
Office of Climate, Licencing and Resource Use,  
EPA Office,  
Inniscarra,  
Co Cork

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4<sup>th</sup> September 2009

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

### Regulation 16 compliance requirements

- *Confirm the name of the agglomeration to which this Waste Water Discharge Licence application relates.*

This application refers to the Midleton Agglomeration.

- *Give the date from which the WWTP was constructed and operating.*

The WWTP began operating on June 30<sup>th</sup> 2000.

- *Where planning permission has been granted for development(s), but said development has not been commenced or completed to date, within the boundary of the agglomeration and this development is being, or is to be, served by the waste water works provide the following:*
  1. *information on the calculated population equivalent (P.E.) to be contributed to the waste water works as a result of those planning permissions granted,*

According to census figure 2006. Midleton Urban and environs had a population of 10,048.

Planning permission (up to and including 2009) has been granted for an additional 6,594 population equivalent units.

Total population equivalent that could be contributing to the WWTP as a result of planning permissions granted is 16,642.

2. *the percentage of the projected P.E. to be contributed by the non-domestic activities, and*

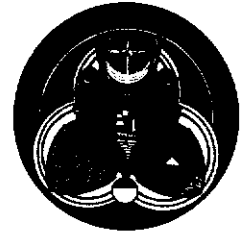
The projected P.E. for the WWTP is 16,642. There is a further pe attributed to Irish Distillers of 2100. Thus the total pe possibly contributing to the agglomeration is 18,742. The percentage of the projected P.E. to be contributed by non-domestic activities is 11%. This figure does not include any contribution of non domestic waste from the WWTP itself. Examination of the planning applications and knowledge of the local area show that the non domestic element entering the WWTP is negligible.



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3. *the ability of the waste water works to accommodate this extra hydraulic and organic loading without posing an environmental risk to the receiving water.*

There are proposals at an advanced stage to upgrade the WWTP to 15,000 p.e. The plant is currently treating waste effectively for a population equivalent of on average 12,000 per month.

Should the population expand to the max projected figure over the next five years the organic loading on the plant would be greater than its design capacity of 15,000.

- *In relation to Regulation 17 (EIS) provide any further information or addendums to the EIS made at any time in the consent process, as these become part of the EIS. Provide the approval for the EIS.*

The approval for the EIS is attached. The EIS was prepared in November 1996 and submitted for certification to the Minister. In July 1997 a Foreshore Licence application was submitted to the Dept of Marine and Natural Resources. An addendum to the EIS dealing specifically with the environmental impacts of the proposed works on the foreshore was included with the application. I attach this document in hard copy and on disc. (The original and the related documentation specifying revisions)

- *Give details of the current estimate of untreated waste water lost from the agglomeration via storm water overflows in terms of mass load or PE.*

See below details of overflows recorded monthly Jan to Aug 2009.

Month	Volume pumped to WWTP cu.m.	Total Vol Generated in Catchment.	Volume overflowed to River cu.m.	Percentage
January	196648	260227.6	63,579.60	24
February	204229	270523	66294	24
March	203391	209422.8	6031.8	2
April	201978	215064	13086	6
May	206926	211415.2	4489.2	2
June	185556	188830.2	3274.2	1
July	186350	199688	13338	6
August	199663	211818.4	12155.4	5

Remedial works were carried out in June/July to repair substantial leaks within the catchment draining to Bailick 1 PS. However it is too early to trend the full effect of works carried out to date.

However records show that similar amounts of rainfall fell in January and July of 2009 and as can be seen the amounts overflowing are reduced substantially.



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- *Update the application in relation to any significant correspondence (Section B11) if any.*

An update on the Section 63 response issued in May 2007 was sent to Dr Suzanne Monaghan in March 2008. I attach a copy of same with this letter.

I note that the last item Recommendation No. 7 states that a trigger alarm of 30% was set on the SCADA to receive alerts on falling uv transmissions. This value is incorrect and should read 60%. I have changed this on the attached copy.

I attach also the up to date records of the river water monitoring as per Recommendation no.2.

- *In relation to Table D.1(i)(a) and (i), provide a breakdown by source of the flow and give the dry weather flow of the primary discharge. In relation to Table D.1(i)(b) give details of the mass load calculations.*

Results submitted with application in 2007 now need to be revised as further infiltration remediation works detailed above plus the projected max population figures have changed and thus all the data in the Table D section need to be revised. These tables are being prepared at the moment and will be forwarded in due course.

- *Give details of microbiological monitoring of the primary discharge (at outfall - MP01SW01 MIDL) and assess for compliance against the Foreshore Licence.*

I attach a record of all samples taken from the tank at Rathcoursey since 2000.

Note: Cork Co Council carried out all the microbiological sampling up to July 2004. Due to staffing constraints the micro sampling and analysis was outsourced at this time but an operator was not in place until end of October 2009.

Samples are not collected weekly because due to the effluent being discharged to coincide with high tide there have been times when there has been no sample available. The Foreshore licence condition states that at an inspection chamber downstream of the WWTP the following should apply

*"The licensee shall provide a level of treatment... which shall ensure the following effluent quality ....*

*The geometric mean of faecal coliforms per 100ml of effluent must be 250fc or less. .... Compliance with this clause shall be measured on the basis of a 50 sample rolling programme, as applicable.*

*95% of all samples shall be less than 1000fc/100ml....."*

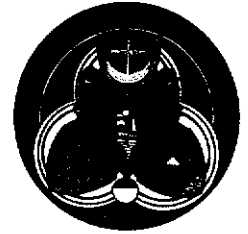
The clause in the licence does not apply to the discharge point at Rathcoursey as the discharge here is a combination of the treated effluent from the WWTP and the IPPC licenced facility at Irish Distillers Ltd.



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However if the same terms of the foreshore licence were to be applied and ignoring the fact that continuous samples are not available, the discharge at Rathcoursey would not meet the requirements of the foreshore licence though the discharge from the WWTP consistently has.

- *In relation to Table D.1(iii)(a) (storm water overflows) explain the difference between the flows recorded in the original application and those provided in the revised application and advise whether there is gravity flow outlet from storm tanks.*

The original Table D.1(iii)(a) showed a figure of 994,594cu.m/yr emitted from the overflow at Bailick 1 pumping station – Code SW03 MIDL.

This figure was incorrect was derived from an incorrect overflow figure being recorded on 1/09/07 of 814,314cu.m. This figure is calculated from a spreadsheet where the hours the pump is running is multiplied by the pump capacity to give a vol. figure. The incorrect figures were entered into the hours run cols (Flow meter readings rather than time) leading to the unrealistic figure shown above. This was a human error that was not picked up at the time the tables were initially calculated.

Please Note: Tables D data is all being revised currently

There is a gravity flow from the storm tanks back into the foul network carrying waste onwards to the WWTP for treatment. There is no gravity flow from the tanks to the river. The storm tanks when full overflow to a pump sump and at a pre determined level the pumps come on and pump the overflow to the river. If in the unlikely situation that all three pumps in the pump sump were to fail simultaneously there is a high level gravity overflow from the sump to the overflow pipes leading to the river.

- *Having regard to submissions made in relation to your waste water discharge licence application, where it is suggested that storm overflows from Bailick No. 2 and Ballinacurra No. 2 pumping stations are pumped to the Ballinacurra No. 1 treated effluent pumping station and forwarded to the tidal tank at Rathcoursey, confirm whether the primary discharge point is also a storm water overflow.*

There is an emergency high level overflow on the Rathcoursey tank in the event of breakdown of the lunar valve. The overflow pipe rejoins the diffuser discharge pipe downstream of the lunar valve. See attached drawing. This is the only overflow arrangement at Rathcoursey.

Overflows from Bailick 2 and Ballinacurra 2 discharge directly to the Owenacurra Estuary

- *Confirm whether there is a flow monitor and composite sampler at the primary discharge monitoring point (MP01SW01 MIDL).*

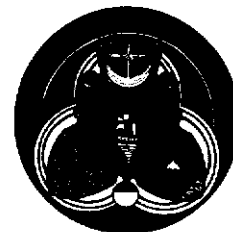
No. There is neither a flow monitor or composite sampler at the primary discharge monitoring point.



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- In relation to the ambient microbiological monitoring, indicate what stage of the tide samples were taken (if known), link the table of results with the specified monitoring points and provide any salinity readings measured during the monitoring programme.

No Salinity readings were taken as part of the monitoring programme.

Attached is spreadsheet of ambient monitoring with time of sample taken and tide times for 2008 and 2009. Tide times shown are those listed in the Tide tables for Cobh.

Drawing No. 007 in attachment B.5 is included with this letter and it shows the ambient monitoring points on the river. These are the locations used for sampling and the results shown are for these locations.

Note : Ambient Monitoring point aMPSW03u has recently become dislodged and it is unknown at this time how long it has been out of position. When it came to our attention the position was downstream of the overflow location though it should be sampling upstream. This has now been rectified.

- *Update the application in relation to the current status and effect of remedial measures, the proposed extension to the WWTP and any other works necessary to meet discharge standards and a timeframe and schedule for such work having particular regard to the storm water overflows.*

All of the items listed for construction and repair in the initial infiltration remediation contract have been completed. (see update to Section 63 response submitted above for list of items included)

Further investigation works including CCTV and flow surveys have been carried out this summer and a number of substantial leaks have been found in the area draining to Bailick 1 pumphouse. A number of these have been repaired by the local Area Office and private landowners. If approval is granted for further funds to be released there is a contractor on site ready to carry out the remainder of the works identified to further reduce the flow entering Bailick 1 PS.

Due to the heavy rain experienced since works were carried out in June/July this summer, and as there are further works scheduled, it is too early to say what the full effect of these infiltration works will be but as can be seen in the table above the works seem to be having a positive effect on the volumes overflowing.

Approximate time frame for the Midleton WWTP upgrade works, assuming that funding is available, is as follows:

Tender submission deadline	02/10/2009
Tender assessment / recommendation	Mid-December
Contract award	March 2010
Contract completion	June 2011



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## Regulation 18 Notice received on 10 September 2009

- *Update the application in relation to new pumping station(s) and associated discharge points (emergency/ storm water) and any other relevant matters.*

A new terminal pumping station is now complete and is operating in Dwyers Road Middleton. There is a storm tank also located at the pumpstation site with a storm overflow to the adjacent stream which flows into the Owenacurra Estuary.

See Revised Drawings Attachment B.1 drawing 002, Attachment B.4 drawing No.006 and Attachment B.4 Drawing No.007

The Dwyers Road Pumpstation came online in mid 2008 and was under construction when the application was originally submitted in December 2007.

The pumpstation was constructed to collect the effluent from the North Western portion of the agglomeration which had been collected in Bailick 1 pumpstation previously. It is pumped from here directly to the WWTP.

The load contributed by the Dwyers Road PS has been directly removed from the load received at Bailick 1 PS so there is no overall increase in volumes being received at the WWTP.

The new PS was built to replace the existing foul sewer line that drained this part of the agglomeration and crossed the Owenacurra River/Estuary to the terminal PS Bailick 1 in order to be pumped back again across the same river to the WWTP. This river crossing was a major source of infiltration.

- *Give details of microbiological monitoring prior to and post the UV disinfection system at the WWTP.*

Attached is all sampling to date pre and post uv since plant began operating.

Note: Cork Co Council carried out all the microbiological sampling up to July 2004. Due to staffing constraints the micro sampling and analysis was outsourced at this time but an operator was not in place until end of October 2009.

- *Provide details of the microbiological standard/ treatment efficiency, which the UV disinfection system was originally designed to achieve.*

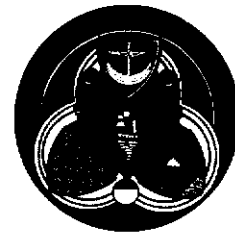


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Attached is the Specification that was used for the UV design and installation.

The design standards contained in this spec are as follows

W.W.T. Design Flows:	Stage 1	Design Population	10,000
		B.O.D. Loading	600 Kg/day
		Flow @ 3 DWF	89.0 l/sec
	Stage 2	Design Population	15,000
		B.O.D. Loading	900 Kg/day
		Flow @ 3 DWF	133.5 l/sec

W.W.T. Discharge Standards	B.O.D. <	= 20 mg/l
	Suspended Solids <	= 30 mg/l
	Total Nitrogen <	= 15 mg/l

Minimum U.V. Kill Rate      Log 3

Minimum U.V. Dose Rate      55W/CM<sup>2</sup>

Please also note the reference to the proposed uv standard in the addendum to the EIS Chapter 6 (pg.19 revised – loose page) where it refers to

“The addition of U.V. disinfection to the effluent from Midleton WWTP will mean that the faecal coliform counts leaving the plant will be reduced by at least a further 99% or two (2) orders of magnitude”





**REVISED SECTION A**  
**NON TECHNICAL SUMMARY**  
**(Second Revision Sept 2009)**

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## **SECTION A: NON-TECHNICAL SUMMARY**

*Advice on completing this section is provided in the accompanying Guidance Note.*

A non-technical summary of the application is to be included here. The summary should identify all environmental impacts of significance associated with the discharge of waste water associated with the waste water works. This description should also indicate the hours during which the waste water works is supervised or manned and days per week of this supervision.

The following information must be included in the non-technical summary:

A description of:

- the waste water works and the activities carried out therein,
- the sources of emissions from the waste water works,
- the nature and quantities of foreseeable emissions from the waste water works into the receiving aqueous environment as well as identification of significant effects of the emissions on the environment,
- the proposed technology and other techniques for preventing or, where this is not possible, reducing emissions from the waste water works,
- further measures planned to comply with the general principle of the basic obligations of the operator, i.e., that no significant pollution is caused;
- measures planned to monitor emissions into the environment.

Supporting information should form **Attachment N° A.1**

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## **A Description of the Waste Water Works and the Activities Carried Out Therein**

The wastewater in Midleton is collected in a partially combined foul and surface water drainage network. Within the sewer network there are 4 No. existing sewage pumping stations (Dungourney Road PS, Rock PS, Bailick 3 PS & Ballinacurra No. 2 Untreated Effluent PS) and three terminal pumping stations (Bailick No. 1, No 2 PS's and Dwyers Road PS) and one final effluent pumping station (Ballinacurra No. 1 Treated Effluent PS). The Midleton WWTP is designed for a Population Equivalent (PE) of 10,000PE and BOD loading of 600Kg/day. Approval has been granted for an upgrade to 15,000PE.

The influent sewage arriving at the plant is a cumulated pumped flow from the three terminal pumping stations. The maximum hydraulic capacity of the Midleton WWTP is 90l/s, which is 3 Dry Weather Flow (3DWF). In order that this capacity is not exceeded the maximum discharge capacity of Bailick No.1 Pump Station and Dwyers Road combined is 75 l/s and Bailick No.2 Pump Station is 15l/s. In practice the breakdown between PS's is usually along the line of Bailick 1 70l/s, Dwyers Road 7 l/s and Bailick 2 PS 13 l/s.

In order to cope with flows above 3DWF storm storage has been provided at all Terminal Pumping Stations. The volume of storm storage at Bailick No. 1 Pumping Station is approximately 1750m<sup>3</sup> and at Bailick No. 2 Pumping Station is approximately 350m<sup>3</sup>. A further 65m<sup>3</sup> has been provided recently at the new storm tank at Dwyers Road PS. Flows in excess of the storage volume are screened to 5mm and then discharge into the adjacent water course.

Bailick No. 1 Pumping Station also receives treated industrial effluent from Irish Distillers Group Ltd. These flows are pumped directly to Ballinacurra No. 1 Treated Effluent Pumping Station.

The influent flow to the Midleton WWTP ranges from between 2 DWF (Dry Weather Flow) and 3DWF even during dry weather periods. Typical influent flow to the plant is 60 -100% of the design flow. The reasons for this are assumed to be significant infiltration/illegal surface water connections within the Midleton catchment. Cork County Council has completed an infiltration project to replace and repair old sections of the sewer network within the Midleton catchment. The Dwyers Road PS was also constructed as part of this work in order to divert some

of the flow crossing the slobbs to the Bailick 1 PS only to be pumped back across again for treatment at the WWTP. Dwyers Road is in operation since mid 2008.

The treatment plant treats all flows that arrive at the works (3DWF) to tertiary treatment standards (UV disinfection).

The main Waste Water Treatment Plant process stages consist of: -

- Inlet works – 2 No. screens, 2 No. macerator pumps and liquid separator, aerated grit and grease removal system, flow measurement and grit classifier with 3 No. grit suction pumps, gas detection system, 2 No. air blowers and skip.
- The screened influent passes directly to the aeration tanks – there is no primary settlement stage. The aeration system comprises 2 separate lanes, with 4 aeration chambers per lane, each chamber having a volume of 406m<sup>3</sup> and a liquid depth 4.5m. The first chamber acts as an anoxic zone, and there is internal sludge recirculation from chamber 4 back to the anoxic zone. Each chamber is equipped with fine bubble membrane disc aeration under dissolved oxygen control. A central mixer in each cell ensures adequate mixing during those periods when the air supply to the diffusers is switched off, due to high Dissolved Oxygen. Aeration equipment comprises of 3 No. blowers, 8 No. mixers, 8 No. DO probes, 2 No. flow meters and 1 No. sampler.
- Final Settlement – There are 2 No. 18.5m diameter final settlement tanks with half bridge scrapers. Surplus Activated Sludge (SAS) is withdrawn between the aeration tank and final settlement tank for each process stream. The SAS is pumped to 1 No. 5.4m diameter picket fence thickener for thickening from 0.5% to 3% Dry Solids. Return Activated Sludge (RAS) is withdrawn from the bottom of each final settlement tank and is pumped back into the inlet of the aeration tank via the RAS Pumping Station.
- UV Disinfection – The final effluent overflows the 2 No. final settlement tanks and combines to the UV disinfection chamber, which comprises 2 No. banks of Ultra-Violet lamps acting in duty/assist mode, and includes flow measurement and final effluent sampler unit.

The sludge treatment process consists of: -

- Raw Sludge Holding Tank – 1 No. mixer and air extraction unit, and raw sludge pump sump equipment with 2 No. Pumps. The plant is currently not receiving any imported sludges from any other Waste Water Treatment Plants.
- Sludge Return Chamber – 2 No. Return Activated Sludge (RAS) pumps, 1 No. sludge drain pump, 1 No. chamber drain pump, 1 No. scum pump, and 2 No. RAS flow meters
- Surplus Activated Sludge Chamber – 2 No. Surplus Activated Sludge (SAS) pumps, 2 No. SAS flow meters.
- Sludge Holding Tank with Picket Fence Thickener – 1 No. sludge blanket detector and air extraction unit.
- Dewatering Room – 2 No. sludge transfer pumps, 1 No. flow meter, 1 No. centrifuge including 2 No. poly dosing and transfer pumps, 1 No. Seepex cake pump and skip.

Ancillary equipment at the WWTP also includes the following:

- Odour Control – 2 No. extractor fans, air flow meter and woodchip scrubber.
- Standby Generator and SCADA system covering all the plant including sludge treatment process.
- Buildings – Inlet and sludge building, electricity transformer building, laboratory and control room building with fire alarm and security alarm systems.
- Telemetry System – WWTP, Bailick No. 1 & No. 2, Ballinacurra No. 1 Treated Effluent Pumping Stations.
- Private access road to WWTP.

Treated Effluent (TE) is then discharged from the WWTP by gravity to a pumping station at Ballinacurra No. 1 Treated Effluent Pumping Station which lifts the treated effluent into the tidal holding tank at Rathcoursey.

The holding tank has a penstock that discharges the treated effluent into Cork Harbour via an outfall pipe at appropriate times during the lunar cycle of the tide. A schematic of the Midleton network catchment is included in **Section C – Infrastructure and Operation.**

The Midleton WWTP is currently operated by a private operator under a 10 year Operation and Maintenance Contract (Commenced September 2006). The plant is manned during the working week 8.00am – 5.30pm (Monday – Friday) by a plant manager and 2 No. operators. During out of hours the SCADA system will send alarms to a mobile phone of the person on standby.

There is provision made in the site general arrangement for the extension of the WWTP to accommodate a future total population of 15,000 P.E by the addition of a further aeration lane and 1 No. final settlement tank. Currently Cork County Council is advertising for tenders to undertake the construction of the upgrade to 15,000PE.

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## The Sources of Emissions from the Waste Water Works

The pollution load for the Midleton agglomeration arises from the following areas:

- The local Population
- Irish Distillers Group Ltd
- Dawn Meats Ltd

The pollution load from these sources varies greatly with daily, weekly and seasonal producers of effluent. Irish Distillers and Dawn Meats have their own treatment plants. Irish Distillers Group discharge into a sump at Bailick No. 1 Pumping Station, from here it is pumped into the gravity treated effluent sewer which goes to Ballinacurra No. 1 Treated Effluent Pumping Station. Here the treated industrial and domestic effluents are pumped to Rathcoursey tidal holding tank and discharged into the Owenacurra River/Estuary. Dawn Meats discharge their treated effluent directly into the Owenacurra River. The sewage from other industries is collected via public sewer and treated in conjunction with domestic waste at the waste water treatment plant.

The domestic population of Midleton has grown over the last three censuses owing to its development as a town within the Cork Metropolitan area. The most recent Census figures show that Midleton Town and environs now has a population in excess of 10,000. (Census, 2006). Other sources of influent that contribute to the sewage scheme would be:

- Commercial premises
- Schools
- Tourism

The treatment plant was designed to be built in two stages. Stage 1 was designed for a population equivalent of 10,000 with Stage 2 increasing the capacity of the WWTP to 15,000PE. This upgrade will accommodate the development area available within Midleton and the possible population which could occupy the designated development area.

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

Prior to the construction of the waste water treatment plant, the sewage from Midleton received only primary treatment in the form of comminution at Ballinacurra pumping station after which it was discharged to the estuary at Rathcoursey Point. As a condition on the granting of the first foreshore license in 1986, a holding tank was constructed at Rathcoursey so that discharge would not occur for one hour at low tide. The second licence was granted in 1999 a copy of which can be found in Section B, Attachment No. B.12.

Sampling was carried out due to the granting of the foreshore license to monitor the receiving waters with particular reference to faecal coliform counts. This was conducted due to the existence of extensive oyster farming in the North Channel. Analysis of this data with particular reference to the Bathing Water Directive and the Shellsan Classification System indicated the installation of a secondary treatment plant for the sewage of Midleton would greatly improve the quality of the effluent from the Rathcoursey Outfall and greatly diminish any contribution from that source to the levels of contamination in the receiving waters as a whole.

Following assessments of the environmental condition of the receiving water by analysis of samples from the North Channel, from assimilation and dispersion characteristics of the receiving water, it was reported that the proposed upgrading of the quality of effluent released was likely to have a beneficial effect on the marine life of the East Passage and the North Channel. The most likely predicted effect was a change in the character of sediments and the species composition of benthic communities close to the outfall, as well as an increase in species diversity.

The wastes treated at the Midleton plant may be broken down into two groupings:

- Sources of faecal coliforms and possible pathogens (human sources).
- Other sources.

The production process at Irish distillers does not give rise to faecal coliforms however its production facility does use water abstracted from the Dungourney River and from underground caverns for cooling purposes which may contain faecal coliforms. This water is then discharged into the council's sewer where it eventually discharged at Rathcoursey.

### **Environmental Impacts**

The Owenacurra Estuary and the North Channel have been designated Sensitive Areas in tidal waters according to the EPA's report on Water Quality in Ireland 2001-2003. The same report highlighted the disimprovement in quality in the Owenacurra Estuary from the period 1995-1999 to the last survey period 1999 - 2003. It has been confirmed that this estuary is eutrophic due to the high levels of Nitrogen in the Owenacurra River. Agricultural practices have been identified as one of the main contributors of pollutants to both the Owenacurra and its Dungourney tributary by the Phosphorus Regulations Implementation Report produced by Cork County Council's Environmental Department in 2004

The waters of the North Channel, East Passage and Owenacurra Estuary are not recognised bathing waters.

Similarly, although the Dungourney and Owenacurra Rivers are not designated salmonid rivers in accordance with the First Schedule of SI293, 1008, Natura Environment Consultants, in their report on the existing environment, refer to runs of sea trout, grilse, and salmon and these should be protected as much as possible.

The main marine life activity in the area is the harvesting of oysters in the North Channel.

The most significant environmental impact to the receiving waters associated with the discharge of wastewater from this plant is potentially that of bacteria counts.

It is necessary to consider a number of standards both European and Irish which relate to the quality of the water into which the sewage for Midleton is discharged.

These standards are – Urban Wastewater Treatment Directive Standards

- Shellfish Standards
- Habitats Directive

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## **The Proposed Technology and Other Techniques for Preventing or, Where This Is Not Possible, Reducing Emissions from the Waste Water Works**

### **Technologies**

The WWTP at Midleton and Dwyers Road, Bailick No. 1 & 2 and Ballinacurra No. 1 Treated Effluent Pumping stations are equipped with duty standby pumps and standby diesel generators or generator sockets in control panels to enable operation of the pumps during mains electric power failure thereby preventing untreated emissions from entering the receiving aqueous environment.

### **Techniques**

A Performance Management System (PMS) is in place at the Midleton Wastewater Treatment Plant. This Performance Management System was developed by the Water Services National Training Group (WSNTG). The PMS provides a uniform approach to dealing with all relevant performance management issues, including Independent Compliance Audits, Management of Change, Dispute Resolution, Public Relations, Emergency Procedures and Reporting Procedures.

The current operator is contractually obliged to perform the Operation of the WWTP in accordance with the Performance Management System and to maintain the design performance capability of the existing treatment plant.

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

These measures apply at the treatment plant operated by the operator (EPS) and not to the network or pump stations.

As part of the operator's contract, failure to meet specified final effluent quality standards results in financial penalties due to non-compliance. The penalties vary depending on the severity of the pollution caused.

**Prevention of pollution**

Any alteration / upgrading of the existing infrastructure undertaken by the operator must not increase the potential to cause pollution in the environment. In particular any alterations to the wastewater treatment plant will be designed to enable any operator of the facility to prevent pollution of the environment by the following potential contaminants:

- Surface water run off
- Spillages
- Solid Waste

**Toxic Substances**

The current operator is to ensure that any modification or alterations to the plant do not increase the impact by any toxic substances. All chemicals and dangerous substances must be stored safely at all times and all appropriate safety measures must be taken to ensure against leakage and spillage in accordance with the relevant Health and Safety Legislation.

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## Measures planned to monitor emissions into the environment

The current operator has developed, using the PMS as a template, procedures and processes for sampling and analysis of the incoming raw sewage and outgoing effluent, so that analytical results are reliable, repeatable, consistent and accurate.

Sampling procedures are in accordance with EU and Irish Regulations, and in particular in accordance with the Environmental Protection Agency's (EPA) monitoring and operating requirements. All laboratory analyses are performed in accordance with the latest edition of the Standard Methods for the Examination of Water and Wastewater, published by the American Public Health Association, and the Water Pollution Control Federation or other methods of comparable accuracy.

Regular independent laboratory analysis is also undertaken to externally monitor the operator's performance. Flow proportional or time based 24 hour samples are collected at the same well defined point at the inlet and outlet of the treatment works in order to monitor compliance with the requirements. A refrigerated sampler minimizes degradation between collection and analysis. Certain heavy metal analyses are also required on an annual basis as identified in 'Code of Good Practice for Use of Biosolids in agriculture'.

The operator is responsible for developing and implementing procedures to remedy defects in his laboratory procedures where the independent checking shows variations of more than  $\pm 10\%$ .

The sampling of the statutory samples is in accordance with the following procedures: -

- All samples are representative of the appropriate stream.
- Composite samples are collected weekly and these are fixed, stored and handled as per standard methods. Analysis of the samples (both operator's and Employer's) are undertaken within 24 hours and reported to the Employer's Representative within 48 hours of the results being made available. Reports on the operation and maintenance of the plant are generated on a monthly basis

The monitoring and recording of the status of all parameters appropriate to proper control and operation of the plant is carried out and documented at all stages.

# **ATTACHMENT No A.1**

## **SUPPORTING INFORMATION – Not**

### **Applicable**

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# **REVISED SECTION B** **GENERAL**

## **(Second Revision Sept 2009)**

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**SECTION B: GENERAL**

*Advice on completing this section is provided in the accompanying Guidance Note.*

**B.1 Applicant's Details\***

**Name and Address for Correspondence**

Only application documentation submitted by the applicant and by the nominated person will be deemed to have come from the applicant.

Provide a drawing detailing the agglomeration to which the licence application relates. It should have the boundary of the agglomeration to which the licence application relates clearly marked in red ink.

<b>Name**:</b>	Cork County Council
<b>Address:</b>	Area Operations South
	Floor 5
	County Hall
	Cork
<b>Tel:</b>	021-4276891
<b>Fax:</b>	021-4276321
<b>e-mail:</b>	Patricia.power@corkcoco.ie

\*This should be the name of the water services authority in whose ownership or control the waste water works is vested.

\*\*Where an application is being submitted on behalf of more than one water services authority the details provided in Section B.1 shall be that of the lead water services authority.

<b>Name*:</b>	J. B. Barry & Partners Consulting Engineers
<b>Address:</b>	3A Eastgate Road
	Eastgate
	Little Island
	Co. Cork
<b>Tel:</b>	021-4524418
<b>Fax:</b>	021-4524419
<b>e-mail:</b>	rkent@jbbarry.ie

\*This should be the name of person nominated by the water services authority for the purposes of the application.

**Co-Applicant's Details**

<b>Name*:</b>	
<b>Address:</b>	
<b>Tel:</b>	
<b>Fax:</b>	
<b>e-mail:</b>	

\*This should be the name of a water services authority, other than the lead authority, where multiple authorities are the subject of a waste water discharge (authorisation) licence application.

**Design, Build & Operate Contractor Details**

<b>Name*:</b>	EPS Limited
<b>Address:</b>	Quartermtown Industrial Estate
	Mallow
	Co Cork
<b>Tel:</b>	022 31200
<b>Fax:</b>	022 31250
<b>e-mail:</b>	info@epsireland.com

\*Where a design, build & operate contract is in place for the waste water works, or any part thereof, the details of the contractor should be provided.

**Attachment B.1** should contain appropriately scaled drawings / maps ( $\leq A3$ ) of the agglomeration served by the waste water works showing the boundary clearly marked in red ink. These drawings / maps should also be provided as geo-referenced digital drawing files (e.g., ESRI Shapefile, MapInfo Tab, AutoCAD or other upon agreement) in Irish National Grid Projection. These drawings should be provided to the Agency on a separate CD-Rom containing sections B.2, B.3, B.4, B.5, C.1, D.2, E.3 and F.2.

Attachment included	Yes	No
	✓	

**B.2 Location of Associated Waste Water Treatment Plant(s)**

Give the location of the waste water treatment plant associated with the waste water works, if such a plant or plants exists.

<b>Name*:</b>	Vincent Browne EPS Limited	
<b>Address:</b>	Midleton WWTP	
	Ballyannan, Garryduff,	
	Midleton	
	Co. Cork	
<b>Grid ref (6E, 6N)</b>	E:187505	N:72801
<b>Level of Treatment</b>	Tertiary (U.V Disinfection)	
<b>Primary Telephone:</b>	021 4634636	
<b>Fax:</b>	021 4634640	
<b>e-mail:</b>	vbrowne@epsireland.com	

\*This should be the name of the person responsible for the supervision of the waste water treatment plant.

**Attachment B.2** should contain appropriately scaled drawings / maps ( $\leq A3$ ) of the site boundary and overall site plan, including labelled discharge, monitoring and sampling points. These drawings / maps should also be provided as geo-referenced digital drawing files (e.g., ESRI Shapefile, MapInfo Tab, AutoCAD or other upon

agreement) in Irish National Grid Projection. These drawings should be provided to the Agency on a separate CD-Rom containing sections B.1, B.3, B.4, B.5, C.1, D.2, E.3 and F.2.

Attachment included	Yes	No

### B.3 Location of Primary Discharge Point

Give the location of the primary discharge point, as defined in the Waste Water Discharge (Authorisation) Regulation, associated with the waste water works.

<b>Type of Discharge</b>	Diffuser operated on a tidal clock
<b>Unique Point Code</b>	SW01 MIDL
<b>Location</b>	Rathcoursey, Midleton
<b>Grid ref (6E, 6N)</b>	E: 186177 N: 069506

**Attachment B.3** should contain appropriately scaled drawings / maps ( $\leq A3$ ) of the discharge point, including labelled monitoring and sampling points associated with the discharge point. These drawings / maps should also be provided as geo-referenced digital drawing files (e.g. ESRI Shapefile, MapInfo Tab, AutoCAD or other upon agreement) in Irish National Grid Projection. This data should be provided to the Agency on a separate CD-Rom containing the drawings and tabular data requested in sections B.1, B.2, B.4, B.5, C.1, D.2, E.3 and F.2.

Attachment included	Yes	No

### B.4 Location of Secondary Discharge Point(s)

Give the location of **all** secondary discharge point(s) associated with the waste water works. Please refer to Guidance Note for information on Secondary discharge points.

<b>Type of Discharge</b>	Emergency Overflow.
<b>Unique Point Code</b>	SW02 MIDL
<b>Location</b>	Ballinacurra No. 1 Pumping Station
<b>Grid ref (6E, 6N)</b>	E: 188366 N: 071791

<b>Type of Discharge</b>	Emergency Overflow.
<b>Unique Point Code</b>	SW03 MIDL
<b>Location</b>	Bailick No. 1 Storm Tank
<b>Grid ref (6E, 6N)</b>	E: 187973 N: 073127

<b>Type of Discharge</b>	Emergency Overflow.
<b>Unique Point Code</b>	SW04 MIDL
<b>Location</b>	Bailick No. 2 Storm Tank
<b>Grid ref (6E, 6N)</b>	E: 188045 N: 072514

<b>Type of Discharge</b>	Emergency Overflow.
<b>Unique Point Code</b>	SW05 MIDL
<b>Location</b>	Ballinacurra No. 2 Storm Tank
<b>Grid ref (6E, 6N)</b>	E: 188520 N: 071783

<b>Type of Discharge</b>	Emergency Overflow.
<b>Unique Point Code</b>	SW06 MIDL
<b>Location</b>	Bailick No. 3 Pump Station
<b>Grid ref (6E, 6N)</b>	E: 188268 N: 072058

<b>Type of Discharge</b>	Emergency Overflow.
<b>Unique Point Code</b>	SW07 MIDL
<b>Location</b>	Dwyers Road Pump Station
<b>Grid ref (6E, 6N)</b>	E: 187481 N: 072925

**Attachment B.4** should contain appropriately scaled drawings / maps ( $\leq A3$ ) of the discharge point(s), including labelled monitoring and sampling points associated with

the discharge point(s). These drawings / maps should also be provided as geo-referenced digital drawing files (e.g. ESRI Shapefile, MapInfo Tab, AutoCAD or other upon agreement) in Irish National Grid Projection. This data should be provided to the Agency on a separate CD-Rom containing sections B.1, B.2, B.3, B.5, C.1, D.2, E.3 and F.2.

<b>Attachment included</b>	<b>Yes</b>	<b>No</b>
	✓	

**B.5 Location of Storm Water Overflow Point(s)**

Give the location of **all** storm water overflow point(s) associated with the waste water works.

<b>Type of Discharge</b>	Storm Overflow
<b>Unique Point Code</b>	SW03 MIDL
<b>Location</b>	Bailick No. 1 Storm Tank
<b>Grid ref (6E, 6N)</b>	E: 187973 N: 073127

<b>Type of Discharge</b>	Storm Overflow
<b>Unique Point Code</b>	SW04 MIDL
<b>Location</b>	Bailick No. 2 Storm Tank
<b>Grid ref (6E, 6N)</b>	E: 188045 N: 072514

<b>Type of Discharge</b>	Storm Overflow
<b>Unique Point Code</b>	SW05 MIDL
<b>Location</b>	Ballinacurra No. 2 Storm Tank
<b>Grid ref (6E, 6N)</b>	E: 188520 N: 071783

<b>Type of Discharge</b>	Storm Overflow
<b>Unique Point Code</b>	SW07 MIDL
<b>Location</b>	Dwyers Road Storm Tank
<b>Grid ref (6E, 6N)</b>	E: 188520 N: 071783

**Attachment B.5** should contain appropriately scaled drawings / maps ( $\leq A3$ ) of storm water overflow point(s) associated with the waste water works, including labelled monitoring and sampling points associated with the discharge point(s). These drawings / maps should also be provided as geo-referenced digital drawing files (e.g. ESRI Shapefile, MapInfo Tab, AutoCAD or other upon agreement) in Irish National Grid Projection. This data should be provided to the Agency on a separate CD-Rom containing sections B.1, B.2, B.3, B.4, C.1, D.2, E.3 and F.2.

Attachment included	Yes	No
	✓	

**B.6 Planning Authority**

Give the name of the planning authority, or authorities, in whose functional area the discharge or discharges take place or are proposed to take place.

<b>Name:</b>	Cork County Council
<b>Address:</b>	Area Operations South
	Floor 5
	County Hall
	Cork
<b>Tel:</b>	021-4276891
<b>Fax:</b>	021-4867007
<b>e-mail:</b>	planninginfo@corkcoco.ie

Planning Permission relating to the waste water works which is the subject of this application:- (tick as appropriate)

<b>has been obtained</b>	✓	<b>is being processed</b>	
<b>is not yet applied for</b>		<b>is not required</b>	

<b>Local Authority Planning File Reference N<sup>o</sup>:</b>	N/A*
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\*Planning Permission was obtained under the 1994 Planning and Developments Regulations under a Part 10.

**Attachment B.6** should contain **the most recent** planning permission, including a copy of **all** conditions, and where an EIS was required, copies of any such EIS and any certification associated with the EIS, should also be enclosed. Where planning permission is not required for the development, provide reasons, relevant correspondence, etc.

Attachment included	Yes	No
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	✓ (EIS addendum and certification)	
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**B.7 Other Authorities**

B.7 (i) Shannon Free Airport Development Company (SFADCo.) area

The applicant should tick the appropriate box below to identify whether the discharge or discharges are located within the Shannon Free Airport Development Company (SFADCo.) area.

**Attachment B.7(i)** should contain details of any or all discharges located within the SFADCo. area.

Within the SFADCo Area	Yes	No
		✓

B.7 (ii) Health Services Executive Region

The applicant should indicate the **Health Services Executive Region** where the discharge or discharges are or will be located.

<b>Name:</b>	Health Service Executive
<b>Address:</b>	South Lee Local Health Office
	Abbeycourt House
	Georges Quay
<b>Tel:</b>	Cork
<b>Fax:</b>	021-4965511
<b>e-mail:</b>	grettam.crowley@mailp.hse.ie

B.7 (iii) Other Relevant Local Authorities

Regulation 13 of the Waste Water Discharge (Authorisation) Regulations, 2007 requires all applicants, not being the local authority in whose functional area the relevant waste water discharge or discharges, to which the relevant application relates, takes place or is to take place, to notify the relevant local authority of the said application.

<b>Name:</b>	NA
<b>Address:</b>	
<b>Tel:</b>	
<b>Fax:</b>	
<b>e-mail:</b>	

Relevant Authority Notified	Yes	No
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	<b>NA</b>	<b>NA</b>
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**Attachment B.7(iii)** should contain a copy of the notice issued to the relevant local authority.

<b>Attachment included</b>	<b>Yes</b>	<b>No</b>
	<b>NA</b>	<b>NA</b>

## B.8 Notices and Advertisements

Regulations 10 and 11 of the Waste Water Discharge (Authorisation) Regulations, 2007 require all applicants to advertise the application in a newspaper and by way of a site notice. See *Guidance Note*.

**Attachment B.8** should contain a copy of the site notice and an appropriately scaled drawing ( $\leq A3$ ) showing its location. **The original application must include the original page of the newspaper in which the advertisement was placed.** The relevant page of the newspaper containing the advertisement should be included with the original and two copies of the application.

<b>Attachment included</b>	<b>Yes</b>	<b>No</b>

## B.9 (i) Population Equivalent of Agglomeration

**TABLE B.9.1 POPULATION EQUIVALENT OF AGGLOMERATION**

The population equivalent (p.e.) of the agglomeration to be, or being, served by the waste water works should be provided and the period in which the population equivalent data was compiled should be indicated.

<b>Population Equivalent</b>	<b>18,742</b>
<b>Data Compiled (Year)</b>	<b>2006/2009</b>
<b>Method</b>	<b>Pollution Assessment Load</b>

## B.9 (II) FEES

State the relevant Class of waste water discharge as per Column 1 of the Second Schedule, and the appropriate fee as per Columns 2 or 3 of the Third Schedule of the Waste Water Discharges (Authorisation) Regulations 2007, S.I. No. 684 of 2007.

<b>Class of waste water discharge</b>	<b>Fee (in €)</b>
Discharges from agglomerations with a population equivalent of	€30,000

more than 10,000	
------------------	--

<b>Appropriate Fee Included</b>	<b>Yes</b>	<b>No</b>
		<b>No</b>

**B.10 Capital Investment Programme**

State whether a programme of works has been prioritised for the development of infrastructure to appropriately collect, convey, treat and discharge waste water from the relevant agglomeration. If a programme of works has been prioritised provide details on funding, (local or national), allocated to the capital project. Provide details on the extent and type of work to be undertaken and the likely timeframes for this work to be completed.

**Attachment B.10** should contain the most recent development programme, including a copy of any approved funding for the project and a timeframe for the completion of the necessary works to take place.

<b>Attachment included</b>	<b>Yes</b>	<b>No</b>

**B.11 Significant Correspondence**

Provide a summary of any correspondence resulting from a Section 63 notice issued by the Agency in relation to the waste water works under the Environmental Protection Agency Acts, 1992 and 2003, as amended by Section 13 of Protection of the Environment Act, 2003.

**Attachment B.11** should contain a summary of any relevant correspondence issued in relation to a Section 63 notice.

<b>Attachment included</b>	<b>Yes</b>	<b>No</b>
	✓	

**B.12 Foreshore Act Licences.**

Provide a copy of the most recent Foreshore Act licence issued in relation to discharges from the waste water works issued under the Foreshore Act 1933.

**Attachment B.12** should contain the most recent licence issued under the Foreshore Act 1933, including a copy of **all** conditions attached to the licence and any monitoring returns for the previous 12-month period, if applicable.

Attachment included	Yes	No
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# **REVISED SECTION C** **INFRASTRUCTURE &** **OPERATION**

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**SECTION C: INFRASTRUCTURE & OPERATION**

*Advice on completing this section is provided in the accompanying Guidance Note.*

**C.1 Operational Information Requirements**

Provide a description of the plant, process and design capacity for the areas of the waste water works where discharges occur, to include a copy of such plans, drawings or maps, (site plans and location maps, process flow diagrams), and such other particulars, reports and supporting documentation as are necessary to describe all aspects of the area of the waste water works discharging to the aquatic environment. Maps and drawings must be no larger than A3 size.

**Attachment C.1** should contain supporting documentation with regard to the plant and process capacity, systems, storm water overflows, emergency overflows, etc., including flow diagrams of each with any relevant additional information. These drawings / maps should also be provided as geo-referenced digital drawing files (e.g. ESRI Shapefile, MapInfo Tab, AutoCAD or other upon agreement) in Irish National Grid Projection. This data should be provided to the Agency on a separate CD-Rom containing sections B.1, B.2, B.3, B.4, B.5, D.2, E.3 and F.2.

Attachment included	Yes	No

**C.2 Outfall Design and Construction**

Provide details on the primary discharge point & secondary discharge points and storm overflows to include reference, location, design criteria and construction detail.

**Attachment C.2** should contain any supporting documentation on the design and construction of any and all discharge outfalls, including stormwater overflows, from the waste water works.

Attachment included	Yes	No

## C.1 Operational Information Requirements

### ***Provide a description of the process***

The existing Midleton WWTP is designed for a Population Equivalent (PE) of 10,000PE and BOD loading of 600Kg/day. An upgrade to 15,000PE has been approved and will be undertaken in the near future.

The influent sewage arriving at the plant is a cumulated pumped flow from Bailick No.1 Pumping Station and Bailick No.2 Pumping Station and Dwyers Road.

The maximum hydraulic capacity of the Midleton WWTP is 90l/s which is 3 Dry Weather Flow (3DWF). In order that this capacity is not exceeded the maximum discharge capacity of Bailick No.1 Pump Station is now 70 l/s and Bailick No.2 Pump Station is 13l/s and the remaining 7l/s comes from Dwyers Road. In order to cope with flows above 3DWF storm storage has been provided at both Terminal Pumping Stations.

The volume of storm storage at Bailick No. 1 Pumping Station is approximately 1750m<sup>3</sup> and at Bailick No. 2 Pumping Station is approximately 350m<sup>3</sup> and a further 65m<sup>3</sup> from Dwyers Road. Flows in excess of the storage volume are screened to 5mm and then discharge into the adjacent water course. The main Waste Water Treatment Plant process stages consist of: -

- Inlet works – 2 No. screens, 2 No. macerator pumps and liquid separator, aerated grit and grease removal system, flow measurement and grit classifier with 3 No. grit suction pumps, gas detection system, 2 No. air blowers and skip.
- The screened influent passes directly to the aeration tanks – there is no primary settlement stage. The aeration system comprises 2 separate lanes, with 4 aeration chambers per lane, each chamber having a volume of 406m<sup>3</sup> and a liquid depth 4.5m. The first chamber acts as an anoxic zone, and there is internal sludge recirculation from chamber 4 back to the anoxic zone. Each chamber is equipped with fine bubble membrane disc aeration under dissolved oxygen control. A central mixer in each cell ensures adequate mixing during those periods when the air supply to the diffusers is switched

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- off, due to high Dissolved Oxygen. Aeration equipment comprises of 3 No. blowers, 8 No. mixers, 8 No. DO probes, 2 No. flow meters and 1 No. sampler.
- Final Settlement – There are 2 No. 18.5m diameter final settlement tanks with half bridge scrapers. Surplus Activated Sludge (SAS) is withdrawn between the aeration tank and final settlement tank for each process stream. The SAS is pumped to 1 No. 5.4m diameter picket fence thickener for thickening from 0.5% to 3% Dry Solids. Return Activated Sludge (RAS) is withdrawn from the bottom of each final settlement tank and is pumped back into the inlet of the aeration tank via the RAS Pumping Station.
  - UV Disinfection – The final effluent overflows the 2 No. final settlement tanks and combines to the UV disinfection chamber, which comprises 2 No. banks of Ultra-Violet lamps acting in duty/assist mode, and includes flow measurement and final effluent sampler unit.
  - The final effluent then discharges via 1 No. 400mm gravity main (that discharges into the 750mm Irish Distillers Treated Effluent gravity main adjacent to Bailick No. 2 PS which then gravitates to Ballinacorra No. 1 Treated Effluent PS which pumps the flows into Rathcoursey tidal holding tank which is capable of holding 2,120m<sup>3</sup> at low tide then discharges into the Ballynacorra River/Estuary.

The sludge treatment process consists of: -

- Raw Sludge Holding Tank – 1 No. mixer and air extraction unit, and raw sludge pump sump equipment with 2 No. Pumps. The plant is currently not receiving any imported sludges from any other Waste Water Treatment Plants.
- Sludge Return Chamber – 2 No. Return Activated Sludge (RAS) pumps, 1 No. sludge drain pump, 1 No. chamber drain pump, 1 No. scum pump, and 2 No. RAS flow meters
- Surplus Activated Sludge Chambers – 2 No. Surplus Activated Sludge (SAS) pumps, 2 No. SAS flow meters.

- Sludge Holding Tank with Picket Fence Thickener – 1 No. sludge blanket detector and air extraction unit.
- Dewatering Room – 2 No. sludge transfer pumps, 1 No. flow meter, 1 No. centrifuge including 2 No. poly dosing and transfer pumps, 1 No. Seepex cake pump and skip.

Ancillary equipment at the WWTP also includes the following:

- Odour Control – 2 No extractor fans, air flow meter and woodchip scrubber.
- Standby Generator and SCADA system covering all the plant including sludge treatment process.
- Buildings – Inlet and sludge building, electricity transformer building, laboratory and control room building with fire alarm and security alarm systems.
- Telemetry System – WWTP, Ballick No. 1 & No. 2, Ballinacurra No. 1 Treated Effluent Pumping Stations.
- Private access road to WWTP.

The Midleton WWTP is currently operated by a private operator under a 10 year Operation and Maintenance Contract (Commenced September 2006). The plant is manned during the working week 8.00am – 5.30pm (Monday – Friday) by a plant manager and 2 No. operators. During out of hours the SCADA system will send alarms to a mobile phone of the person on standby.

There is provision made in the site general arrangement for the extension of the WWTP to accommodate a future total population of 15,000 P.E by the addition of a further aeration lane and 1 No. final settlement tank.

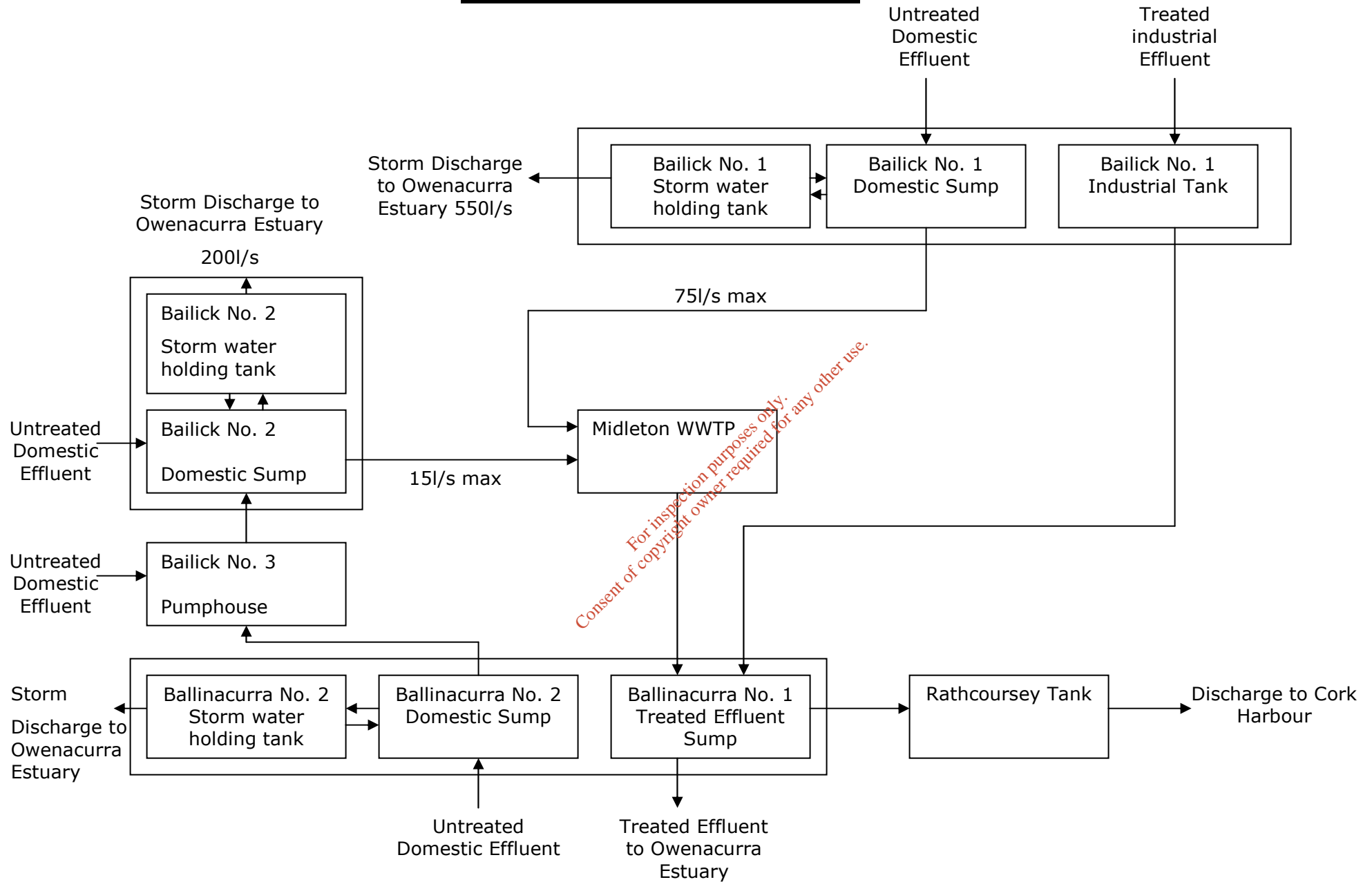


As mentioned above Irish Distillers discharges its treated waste to the council sewers at Baby's Walk for eventual discharge to the Ballynacorra Estuary at Rathcoursey Point. The waste from Irish Distillers does not go through the WWTP but makes its way to the discharge point via the Bailick 1 and Ballinacurra pumping stations. Treated effluent from Midleton is gravity fed to Ballinacurra, it combines on route with the distillery waste and both are pumped from Ballinacurra to Rathcoursey.

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# Midleton Schematic of Network

WWD Application Form V3/07



**Provide a description of the plant**

**Picket Fence Thickener**

Volume: 91m<sup>3</sup>  
Internal Dimensions: 5.4m $\phi$  x 4m (d)

**Raw Sludge Holding Tank**

Volume: 60m<sup>3</sup>  
Internal Dimensions: 5.4m $\phi$  x 2.625m (d)

**Aeration Chambers:**

No. of: 8  
Volume of Each: 406m<sup>3</sup>  
Liquid Depth: 4.5m  
Internal Dimensions: 9.5m (l) x 9.5m (d)

**Clarifiers**

No. of: 2  
Sidewall Height: 2.0m  
Internal Diameter: 18.5m

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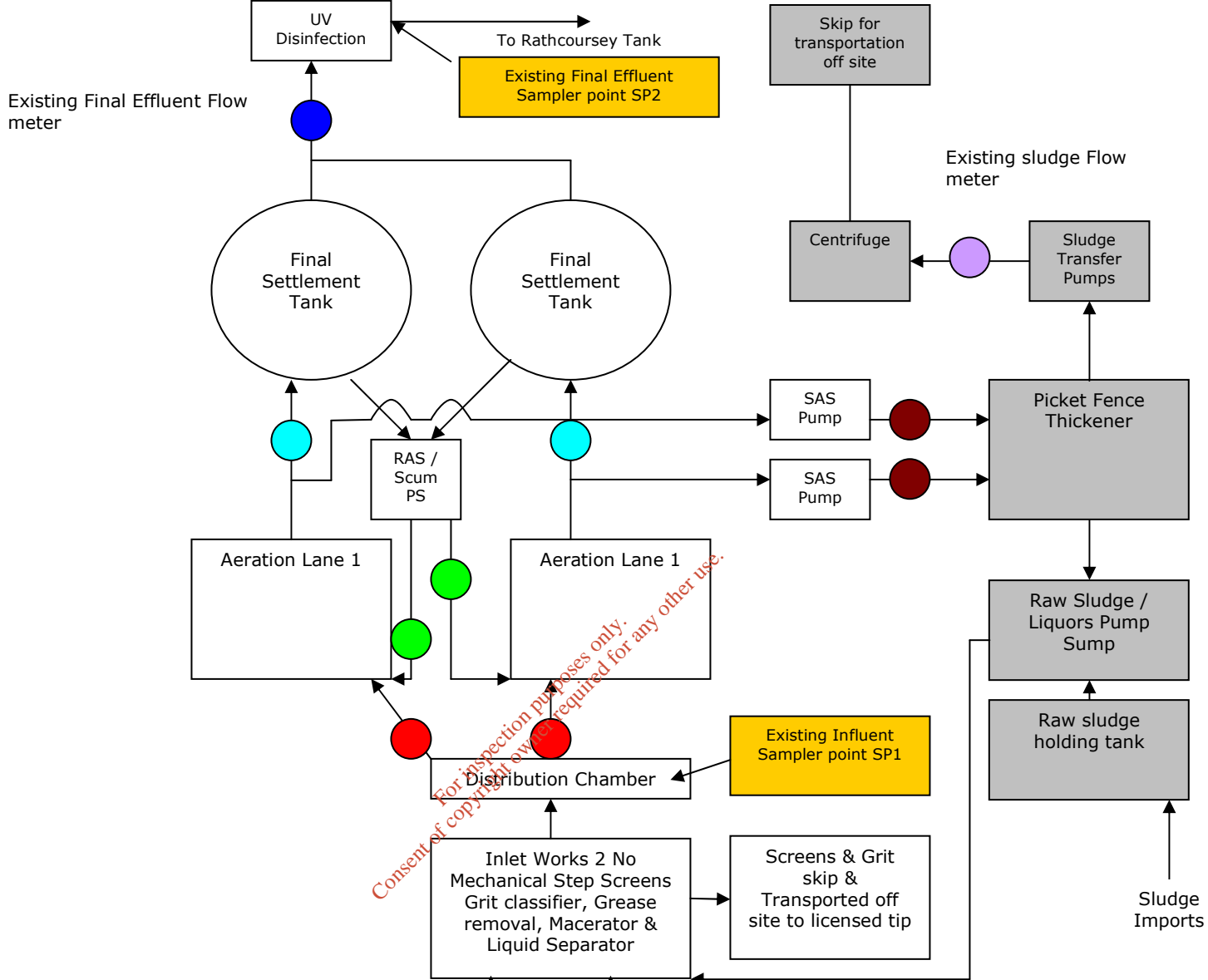
**Sludge Return Pumps**

Pumping Capacity: 33lt/sec








**Surplus Sludge Pumps**

Pumping Capacity: 1 – 4lt/sec

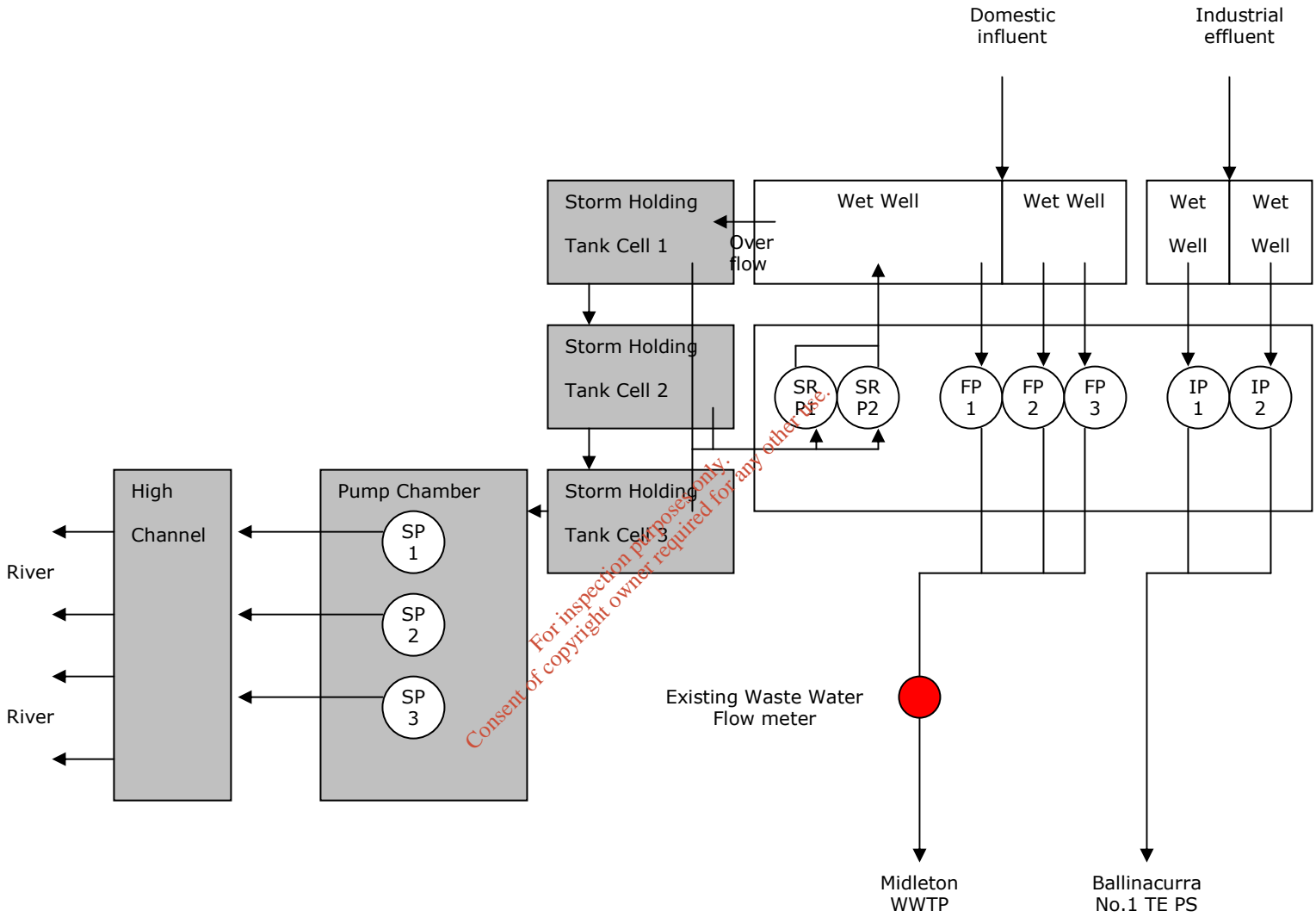
### Midleton WWTP Process Diagram




Note:-

-  Existing Final Effluent Flow meter point
-  Existing Flow meters measuring flow to Settlement Tanks
-  Existing Flow meters measuring RAS/Scum return to Aeration Lanes
-  Existing Flow meters measuring flow to Aeration Lanes
-  Existing Flow meters measuring SAS to Picket Fence Thickener
-  Existing Flow meter measuring flow into Centrifuge
- 

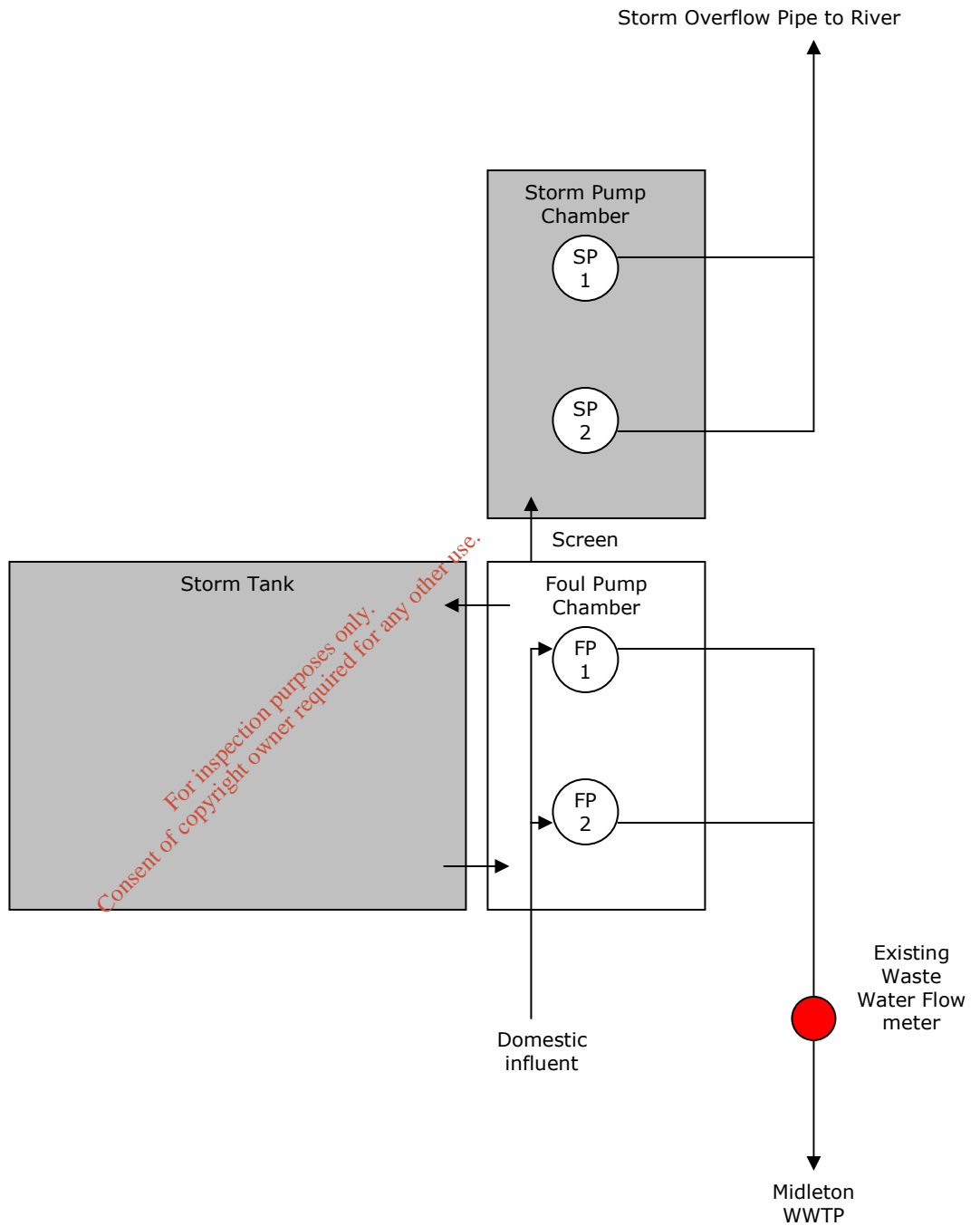
### Inlet Sample point SP1 - Outlet Sample Point SP2 Baillick No 1 Pumping Station Process Diagram




Note:-

 Existing Flow meter to measure flows pumped forward to Midleton WWTP

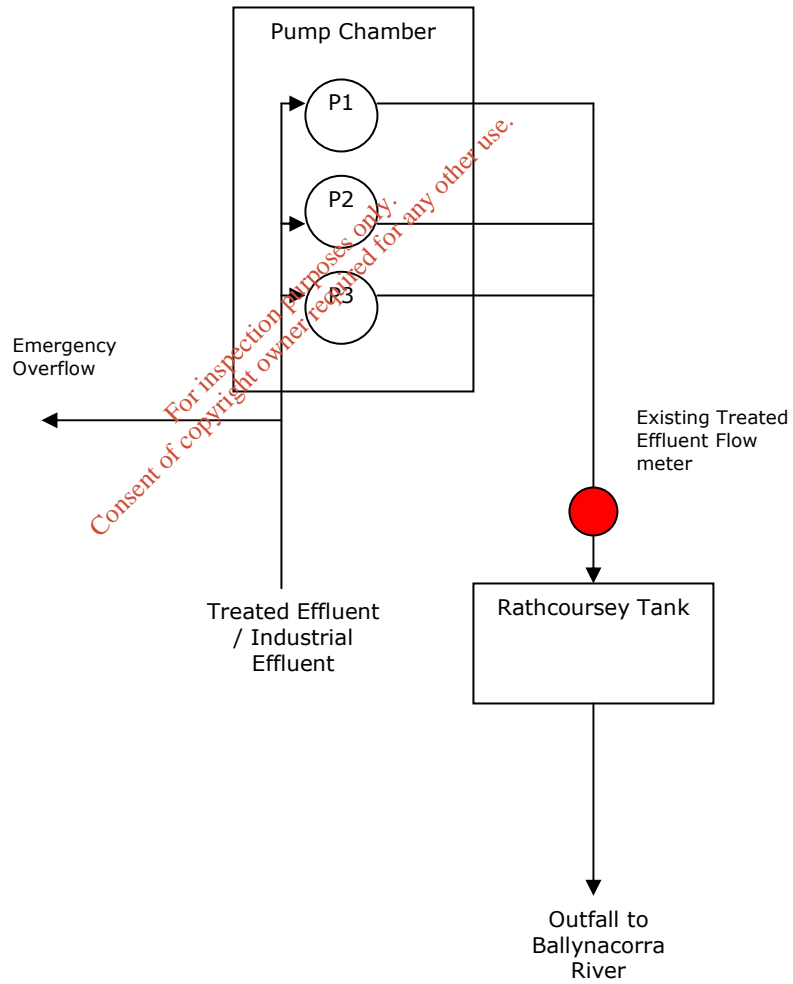
### Bailick No 2 Pumping Station Process Diagram




Note:-

 Existing Flow meter to measure flows pumped forward to Midleton WWTP

### Ballinacurra No. 1 Treated Effluent Pumping Station Process Diagram



Note:-

 Proposed Flow meter to measure flows pumped forward to Rathcoursey Tank

**Design Capacity for the areas of the waste water works where discharge occurs:**

**Design of the plant:**

The flow (hydraulic load) to the sewage treatment plant is pumped and is therefore fixed at the pumping capacity of the pumps. Up to 3 D.W.F. is pumped to the sewage treatment plant with a storm water balancing tank being provided at the terminal pumping stations.

The treatment plant is designed to treat a hydraulic load of 3 D.W.F. with another 3 D.W.F. held for a minimum of 2 hours retention in the storm tanks.

By holding 3 D.W.F. for 2 hours it is ensured that any overflow gets at least primary sedimentation, thereby reducing the B.O.D.<sub>5</sub> of the overflow by between 30% and 50% of the diluted overflow, thus giving an overflow B.O.D.<sub>5</sub> of between 28 and 20mg/l at worst. In addition the overflow from the holding tanks at the existing pumping stations on the Bailick Road which enters the Ballinacurra River is fine screened so that the B.O.D.<sub>5</sub> of the overflow liquid is well below 20mg/l.

Pumping all the effluent to the treatment plant has the effects of liquidising the faecal matter which then passes through fine screens at the treatment plant.

Balancing the flow at the pumping station supersedes the need for flow balancing the treatment plant.

The following stages occur at the treatment plant:

- a) Screening
- b) Grit removal
- c) Aeration
- d) Sedimentation
- e) Sludge Settlement and Thickening
- f) Sludge Dewatering

Below are the current agreed treatment capacities which have been contractually agreed with the current operator.



<b>Midleton WWTP</b>	<b>Unit</b>		
Design Dry Weather Flow	l/s	30	
Maximum Instantaneous Flow	l/s	90	
Maximum Duration of Instantaneous Flow	Hours	0.5	say every 3 hours
Maximum Daily Flow Volume	m <sup>3</sup> /day	3248	18 hours HRT
Maximum BOD Load	Kg/day	1200	

### **Irish Distillers Limited**

Irish Distillers Limited Reg **No. P0442-01** discharges its treated waste to the council's sewer at Baby's Walk, Grid Ref: E18879 N: 07346. From here it is taken to Rathcoursey point for eventual discharge to Cork Harbour. According to the IPPC Licence the maximum permissible volumes to be emitted by Irish Distillers are as follows:

Recent Technical Amendments to the IPPC Licence (18<sup>th</sup> March 2008) have allowed for an increase in the process volume to be emitted from 750m<sup>3</sup> to 1,250m<sup>3</sup> per day. The total emission volume granted under the licence for Irish Distillers, including waters used for cooling during the process, has increased to a maximum of 5,000m<sup>3</sup> per day. This discharge volume has a population equivalent of 2,100 and a BOD load of 125kg/day.

<b>Irish Distillers</b>	<b>Unit</b>	
Maximum volume in one day	m <sup>3</sup> /day	5,000
Maximum rate per hour	m <sup>3</sup> /hr	270
Maximum BOD Load	kg/day	125

## C.2 Outfall Design and Construction

*Provide details on the primary discharge point & secondary discharge points and storm overflows to include reference, location, design criteria and construction detail.*

### Primary Discharge Point

The final effluent then discharges via 1 No. 400mm gravity main (that discharges into the 750mm main adjacent to Bailick No. 2 PS which then gravitates to Ballinacurra No. 1 Treated Effluent PS which pumps the flows into Rathcoursey tidal holding tank which is capable of holding 2,120m<sup>3</sup> at low tide then discharges into the Ballinacurra River/Estuary.

### Secondary Discharge Point

At Ballinacurra No. 1 Treated Effluent PS which pumps forward treated effluent flows to Rathcoursey tidal holding tank there is a high level emergency overflow that operates in the event of mechanical breakdown of the pumps. The overflow to the river contains a coarse screen.

### Storm Overflow Discharge Points

#### Bailick No. 1 Pumping Station

Bailick No. 1 Pumping Station comprises the following equipment: -

- 2 No. Industrial Pumps;
  - 3 No. Foul Pumps;
  - 1 No macerator screen;
  - 3 No. Storm Pumps and 3 No Storm holding tanks with 6 No. tipping bucket cleaning systems;
  - 2 No Storm Return Pumps;
  - 1 No. 300mm Foul Rising Main to Midleton WWTP;
  - 1 No. 300mm Industrial Rising Main to Ballinacurra No. 1 Treated Effluent PS;
  - 4 No. 525mm Storm Overflow Pipes with penstocks to Ballynacorra River;
  - Flow meter, generator, fuel store, gas detection system, odour control Telemetry System;
  - Odour Control – 2 No extractor fans air flow meter and woodchip scrubber;
- and

- Buildings – foul/industrial/storm pumping station building, Storm Overflow pumping station building with fire alarm and security alarm systems.

The combined foul and storm water influent which arrives into Bailick No.1 Pumping Station is pumped via 3 No. dry well centrifugal foul pumps operating on a duty/assist/standby basis via a 300mm rising main to Midleton WWTP. The dry well centrifugal pumps are equipped with variable speed drives and the total output of the pumping station is approx. 70l/s to match the hydraulic capacity of the WWTP (in conjunction with the flows received from Bailick No.2 Pumping Station and Dwyers Road).

Influent Flows in excess of 70l/s are diverted to the storm water storage facilities (3 No. storm storage tanks acting in series) and subsequently screened to 5mm and pumped to the Ballynacorra River if the volumes of storm water are greater than the storage capacity.

Storm overflow to the Ballynacorra River is by 3 No. Storm pumps (acting duty/assist/standby) pumping through 3 No. 525mm diameter outfall pipelines located below the Ballynacorra River low water mark. The discharge volume to the river outfall can thus be directly monitored by the capacity of the storm pumps and the number of hours of operation of the storm pumps.

On cessation of the storm event, the accumulated storm volume in the storm tanks flows back to the pump station wet-well for on-ward pumping to Midleton WWTP. Under normal dry weather conditions the Storm cells remain empty and are flushed clean with a tipping bucket arrangement using water from the drinking water mains, after each storm event.

### **Bailick No, 2 Pumping Station**

Bailick No. 2 Pumping Station comprises the following equipment: -

- 2 No. Foul Pumps;
- 1 No. Screen;
- 2 No. Storm Pumps and 1 No storm holding tanks with 2 No. tipping bucket cleaning systems;
- 1 No. 250mm Foul Rising Main to Midleton WWTP;

- 1 No. 600mm Storm Overflow to the Ballynacorra River;
- Flow meter and Telemetry System; and
- GRP Kiosk housing control panels and transformer.

The Bailick No 2 Pumping Station is a pre-fabricated Pumping Station and receives all the wastewater collected in the local sewerage network and pumps it forward via 2 No. submersible pumps (1 duty/ 1 standby) to the Midleton WWTP. All flows in excess of the designated Pumping Station capacity of 15 l/s are treated as storm water and receive preliminary treatment and 5mm screening prior to being discharged to the Ballynacorra River.

There is 1 No. storm tank and 2 No. storm pumps operating in duty/standby mode discharging to the river via a 600mm diameter outfall pipe. The discharge volume to the river outfall can thus be directly monitored by the capacity of the storm pumps and the number of running hours of each pump.

There are no storm return pumps and on cessation of a storm event, the storm water is returned by gravity to the foul wet well, for onward pumping via the 250mm diameter rising main to Midleton WWTP. Under normal dry weather conditions the Storm cell remains empty and is flushed clean with a tipping bucket arrangement using water from the drinking water mains, after each storm event.

### **Ballinacurra No. 2, Untreated Effluent Pumping Station**

Ballinacurra No. 2 Untreated Effluent Pumping Station contains the following equipment: -

- 2 No. Storm Pumps;
- 1 No. 6mm stainless steel mesh Screen;
- 1 No. 450mm overflow pipe to manhole;
- 1 No. 450mm outfall pipe to river with flap valve;

Ballinacurra No. 2 untreated effluent outfall is designed to be used in the event of a power failure. The capacity of the storm tank is approximately 275m<sup>3</sup>.

### **Bailick No. 3, Pumping Station**

Bailick No. 3 pumping station is an emergency overflow which is utilised in the event of pump failure.

### **Dwyers Road Pumping Station**

Dwyers Road pumping station contains the following equipment

- 2 No Storm Pumps
- 1 No stainless steel mesh screen
- 1 no storm tank with 65m<sup>3</sup> capacity
- 1 no wet well with 85m<sup>3</sup> capacity
- 1 No 225mm dia overflow pipe with tideflex valve

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**NOTES:**  
 Figured dimensions only to be taken from this drawing.  
 All dimensions to be checked on site.

**LEGEND:**  
 AGGLOMERATION BOUNDARY



Rev.	Description	MM	MH	Date
A	Under Construction Removed Dywers Road	MM	MH	08.09.09

Client: CORK COUNTY COUNCIL

Client Representative:  
**BARRY & PARTNERS**  
 CONSULTING ENGINEERS  
 J. B. Barry & Partners Limited  
 3A Fair Gate Road, Loughare  
 Little Island, Co. Cork,  
 Ireland.  
 Phone: +353(21)4524418  
 Fax: +353(21)4524419  
 E-mail: cork@barryp.ie

Project: MIDDLETON WWTP EPA LICENCE APPLICATION

Drawing Title: ATTACHMENT B.1 (REVISED) AGGLOMERATION BOUNDARY SERVED BY WASTE WATER TREATMENT WORKS

Drawn by: M.H. Date: 20.08.07  
 Checked by: R.K. Date: 20.08.07  
 Approved by: R.K. Date: 20.08.07

Scales: 1:15,000 @ A3  
 Stage: REVISED

Drawing No.: Y7 334 / PR / 002  
 Revision: A

**NOTES:**  
 Figured dimensions only to be taken from this drawing.  
 All dimensions to be checked on site.



Rev.	Description	Drawn	Chkd	Date
B	Storm Overflow & Dwyers Road PS added	M.H.	M.H.	08.09.09
A	MINOR AMENDMENTS	M.H.	B.A.	10.04.08

Client: CORK COUNTY COUNCIL

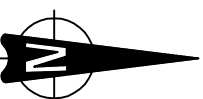
Client Representative:  
**BARRY & PARTNERS**  
 CONSULTING ENGINEERS  
 J. B. Barry & Partners Limited  
 3A East Gate Road, Faslane  
 Little Island, Co. Cork,  
 Ireland.  
 Phone: +353(21)4534418  
 Fax: +353(21)4534419  
 E-mail: cork@bbarry.ie

Project: MIDDLETON WWTP EPA LICENCE APPLICATION

Drawing Title: REVISED ATTACHMENT B.4 LOCATION OF SECONDARY DISCHARGE POINTS ON THE BALLYNACORRA RIVER, MIDDLETON

Drawn by:	M.H.	Date:	20.08.07
Checked by:	R.K.	Date:	20.08.07
Approved by:	R.K.	Date:	20.08.07
Scales:	1:7500 @ A3		
Stage:	REVISED		

Drawing No.:	Y7 334 / PR / 006	Revision:	A
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# MIDLETON SEWAGE TREATMENT PLANT

## ADDENDUM

TO

## ENVIRONMENTAL IMPACT STATEMENT

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APPENDIX II	Volume of Grit Associated with Storm Water Outfall
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**INTRODUCTION**

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# INTRODUCTION

## BACKGROUND

An Environmental Impact Statement on Midleton Sewage Treatment Plant was prepared and submitted to Cork County Council in November 1996.

Following a detailed consideration of the Environmental Impact Statement, M.C. O'Sullivan & Co. Ltd. were directed to report individually on the various impacts of a number of proposed pipelines crossing the Owennacurra River and Ballynacorra River and a number of outfalls to the river estuary.

The following aspects are considered in this Addendum in various chapter numbered as set out below:-

1. Impact of construction of a 300 mm. rising main from the Bailick Road pumphouse to Riversfield Estate and a 200 mm. diameter duct which is to be laid in parallel with the rising main.
2. The impact of construction of a 400 mm. diameter outfall pipe from the treatment works at Garryduff to the 750 mm. diameter outfall pipe on the Bailick Road.
3. Impact of construction of 4 no. 525 mm. diameter overflow pipes from the Bailick Road pumphouse to the Owennacurra River.
4. The construction of a 450 mm. diameter stormwater outfall pipe to the Ballynacorra River.
5. The construction of a 450 mm. diameter overflow pipe to the mud flats adjacent to Ballynacorra Village.
6. The continued operation of the existing outfall at Rathcoursey.

A meeting was convened with the Department of the Marine to ascertain the various impacts which they felt could also be of concern. This addendum to the Environmental Impact Statement takes the discussions of the above meeting into consideration.

## DRAWINGS

The relevant drawings from the 1993 Preliminary Report on Midleton Sewage Treatment Plant are included in this Addendum to The Environmental Impact Statement. The drawings included are as follows:-

- |             |  |
|-------------|--|
| Drg No. 004 | 1:1000 Layout Plan Showing Existing and Proposed Sewers (Sheet 3 of 6).                              |
| Drg No. 006 | 1:1000 Layout Plan Showing Existing and Proposed Sewers and Proposed Treatment Plant (Sheet 5 of 6). |
| Drg No. 007 | 1:1000 Layout Plan showing Existing and Proposed Sewers (Sheet 6 of 6).                              |
| Drg No. 019 | 1:2500 Layout Plan showing Proposed Sewers and Treatment Plant.                                      |
| Drg No. 040 | Proposed Storm Tank at Bailick Road Pumphouse.   |
| Drg No. 044 | Details of Proposed Submersible Pumping Station at Ballynacorra.                                     |

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**CHAPTER 1**

**Pipe Crossing from Bailick Road to Riversfield Estate**

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## CHAPTER 1

### Pipe Crossing From Bailick Road to Riversfield Estate

#### INTRODUCTION

Combined sewage from the northern side of Midleton gravitates to the northern end of the Bailick Road. Here, the sewage flows into a sump at the existing Bailick Road pumphouse and it is pumped from here to a header manhole, E2/420. The sewage then gravitates in a 750 mm. diameter pipe southwards to an existing pumping station at Ballynacorra. At Ballynacorra, the sewage is again pumped into a header manhole and from there gravitates to a tidal holding tank and then to its ultimate discharge location at Rathcoursey Point.

The present scheme is to provide treatment of the sewage at the new treatment works site before discharging it to the estuary at Rathcoursey Point.

A site at Garryduff has been identified as being the most suitable location for the treatment plant. This site is approximately 600 m. south west of the existing Bailick Road pumphouse.

It is proposed to refurbish the existing pumphouse at the Bailick Road so that sewage entering the sump is pumped to the site of the new treatment works, instead of southwards to the existing header manhole at E2/420.

A new rising main will be required to convey the sewage flows to the new treatment works. An emergency stand-by generator is to be installed at the treatment plant to cater for a power failure. An electrical link is to be established between the Bailick Road pumphouse and the treatment plant so that a back-up power supply can be provided at the pumphouse. This will avoid overflows to the adjacent river which would occur if pumping could not continue during and E.S.B. power outage. It is also desirable to establish a telemetry link between the existing pumphouse and the proposed treatment plant to ensure satisfactory operation of the integral parts of the scheme.

The rising main is to be of 300 mm. diameter and a 200 mm. diameter duct is proposed as an electrical and telemetry conduit.

This section deals with the various impacts associated with the construction and operation of these pipes under various headings.

The location of this pipework is shown on Drg. Nos. 004 and 019. The 200mm diameter industrial rising main is no longer required. The 200mm diameter service duct will be constructed along the route identified for the industrial rising main and onwards to the treatment plant site.

#### THE EXISTING ENVIRONMENT

The route of the proposed pipes crosses the Owennacurra River immediately downstream of the Mill Stream (Dungourney River) and traverses slob land along its length towards Riversfield Estate.

The Owennacurra River is quite wide at this location and an island occurs in the middle of the river at low flows and low tides.

The slob land is generally above the high water median level, but will be covered by spring tides.

### **WASTE PRODUCTION AND DISPOSAL**

The rising main conveys sewage to the proposed treatment plant site and no discharges will occur along its length. The 200 mm. diameter duct allows for electricity and telemetry supply for SCADA control of the sewage system to be implemented.

Therefore, no waste is produced along these length of pipework which would require any form of proper disposal system to be implemented.

### **AIR EMISSIONS IMPACT**

The construction of these pipes will not result in any air emissions occurring.

### **EXISTING FISH SPECIES**

Salmon, sea-trout and brown trout are the principal fish species which exist in the Owennacurra River. Sea trout progress up-river as far as the Mill Stream at the northern end of the Bailick Road.

Occasional flounder and eel can also be found in these rivers, but they are not present to the same significant extent as salmon and trout.

The main migration of salmon and sea trout occurs during the months March to September.

During the months June to September, up-stream migration of adult salmon and sea trout occurs during the spawning season.

During the following March to May period down-stream migration of the salmon and sea-trout smolts occurs.

Resident brown trout have a limited movement only within the system. The brown trout generally confine themselves to short river stretches up-stream and down-stream of deep pools which occur along the river bed.

As the construction works associated with the laying of the various pipes under the river bed are short-term, they are not expected to impede the migration of young eel elvers.

The avoidance of an anoxic condition in the river is critical. An anoxic condition can be created when sediment in the river bed is sufficiently agitated and goes into suspension within a reach of the river.



Therefore, it is recommended that:-

- Excavation be contained within a bounded area which will control the movement of sediment in suspension.
- Issue an advance notice of the intention to commence construction to the South Western Regional Fisheries Board to allow them an opportunity to evaluate the situation then prevailing in the river and to determine if it is satisfactory to carry out the work at that particular time.
- The river bed be restored to the same height as the existing river bed.

Intercepting the river flow for a few hours at a time and creating a pond upstream would be acceptable and it would not significantly interfere with the progress of fish travelling upstream or downstream.

Due to the occurrence of an island at low flows and tides, it would also be feasible to direct the river to either side to allow the construction of both the 300 mm. diameter rising main and the 200 mm. diameter service duct. Sediment would be controlled by the river diversion works.

#### **EXISTING BIRD LIFE**

Generally, trees and other vegetation are present along both sides of the Owennacurra River. Sufficient bankside cover is present to sustain a roosting habitat for bird life and duck and other smaller species of water birds can be seen swimming along this stretch of the Owennacurra River.

At the location of the pipe crossings the river is relatively open and is not an ideal roosting ground for birds. Therefore, the construction of these pipes would not have a significantly adverse affect on existing bird life.

In the short term, the construction of these pipes would limit the ability of birds to swim along this stretch of river.

The slob land, which will also be traversed, is not suitable as a roosting habitat for either land or water based birds.

Therefore, the construction of these pipes across the slob land and Owennacurra River will have minimal impact on bird life.

#### **NOISE IMPACT**

The construction of the pipes would not require any special construction equipment which could give rise to exceptional noise levels.

The Contractor for the construction of these works would be required to maintain all silencers etc. on plant to be functional at all times.

Noise will only occur during construction and it is envisaged that the level of noise will be sufficiently low as not to be intrusive.

### VISUAL IMPACT

The construction of these pipes will involve open trench excavation and subsequent backfilling. This will create an interim visual impact while nature takes its course and the existing vegetation is restored.

The area is not highly visible and the significance of this short term visual impact is minimal.

### CONSTRUCTION IMPACT

The construction of these pipelines will require the use of excavators and various other machinery.

Due to the heavy nature of the soil which will be excavated, it is unlikely that there will be any dust problems.

The transportation of mud and spoil onto public roads could occur as machinery leaving the site will inevitably have soil attached to the wheels/tracks. It is anticipated that machinery will enter onto the pipeline route and carry out the work before leaving the site. Therefore, the number of occasions when mud is transported onto the road will be very small. Proper site supervision will ensure that road surfaces are properly cleaned, if mud is transported onto them.

### ARCHAEOLOGICAL IMPACT

It is not envisaged that any archaeological impact will occur.

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**CHAPTER 2**

**400mm. Diameter Outfall from the Treatment Works**

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**CHAPTER 2**

**400mm. Diameter Outfall from the Treatment Works**

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## CHAPTER 2

### 400 mm. Diameter Outfall Pipe from the Treatment Works

#### INTRODUCTION

Treated effluent from the proposed treatment works site at Garryduff will discharge by gravity through a 400 mm. diameter outfall pipe to connect into the existing 750 mm. diameter outfall pipe on the Bailick Road. It is proposed that this 400 mm. outfall pipe would connect into the existing outfall pipework immediately south of the Midleton By-pass road at its junction with the Bailick Road.

This pipeline is proposed along an undulating route and under the Ballynacorra River. The pipe will act as an inverted syphon and it is proposed to construct a scour valve chamber at its lowest point adjacent to the Ballynacorra River.

The focus of this chapter is to consider the environmental impact of the construction of this main along the length from the Bailick Road to the western side of the Ballynacorra River.

The location of this pipework can be determined with reference to Drg Nos. 006, 007 and 019.

#### THE EXISTING ENVIRONMENT

This 400 mm. diameter outfall pipe is to be constructed along the southern toe of the embankment on which the Midleton By-pass has been constructed. A bridge carries the Midleton By-pass over the Ballynacorra River at this location. The bridge span has been dictated by a consideration of headlosses through the bridge and the economics of bridges of various spans.

Downstream of this bridge, the Ballynacorra River changes direction significantly eastwards. A deep pool occurs at this change of direction.

Between the Ballynacorra River and the Bailick Road, the route of the 400 mm. diameter pipeline traverses mud flats.

#### WASTE PRODUCTION AND DISPOSAL

This outfall pipe conveys fully treated effluent from the treatment works to the system of pipework which will ultimately allow it be discharged at Rathcoursey Point. Along this length, the pipework is a sealed pressure pipe and no discharges occur from the pipe, and therefore, no waste will be produced.

A scour valve is to be provided adjacent to the Ballynacorra River to guard against the eventuality of a malfunction in this section of pipe. In this situation, treated effluent in the pipeline would be allowed discharge into the adjacent river under controlled conditions.

This would be an extremely isolated circumstance, and in any event, the effluent has undergone its full treatment process.

Any such discharge which will occur, as a result of this pipe requiring to be scoured out, will have insignificant consequence to the area, as the effluent will already have been treated to EU Directive standards.

### AIR EMISSIONS IMPACT

The construction of this outfall pipe will not result in any air emissions occurring.

### EXISTING FISH SPECIES

The Owennacurra River is a tributary of the Ballynacorra River.

The previous chapter described existing fish life in the Owennacurra River. The various species such as the salmon, sea trout, flounder and eel, travel up the Ballynacorra River from the sea to reach the Owennacurra River.

Resident brown trout inhabit various reaches of the river channel, particularly adjacent to deep pools which occur along the river bed. These trout tend to remain close to their initial spawning ground.

The provisions outlined in Chapter No. 1 to protect fish life are equally important at this location, and should be adhered to.

A deep pool occurs in the Ballynacorra River just downstream of the line of the intended river crossing for the 400 mm. outfall pipe. This deep pool occurs at the change of direction of the river and significant numbers of brown trout inhabit this location.

The proximity of the pipe crossing and the deep pool dictates that it is imperative to avoid the generation of sediment which could be transferred into this pool area and create an anoxic condition which would be hazardous to the native brown trout. The exact method of construction for the pipeline across the Ballynacorra River at this location would be discussed with the South Western Regional Fisheries Board prior to the commencement of construction.

### EXISTING BIRD LIFE

As previously stated, the route of the proposed outfall pipe is immediately south of the Midleton By-pass Road. In addition, the road overlooks the route.

There is very limited cover for wildlife and it is not known to be a feeding or roosting habitat for bird life.

The construction of this outfall pipe will have negligible impact on bird life.

## NOISE IMPACT

The construction of this outfall pipe will not require any special construction equipment which could give rise to exceptional noise levels.

The Contractor will be required to maintain all silencers etc. on plant to be fully functional at all times.

Noise will only occur during construction and it is envisaged that the level of noise will not be significantly noticeable above the noise level of the adjacent dual carriageway.

## VISUAL IMPACT

The construction of this outfall pipe will involve open trench excavation along the mud flats and the Ballynacorra River. This will create an interim visual impact and it is most likely that the Contractor will require to construct a hard standing along the mud flats to facilitate his construction.

On completion, any hardstanding or other temporary works constructed by the Contractor will be removed. The hardstanding will be lowered to a level corresponding to the adjacent mud flats and tidal action will very quickly restore the visual impact of the mud flats to their original condition.

The river bed and bank side armour will be restored to its existing condition on completion of the pipeline.

The general area is not particularly visible and the significance of this short term visual impact is minimal.

## CONSTRUCTION IMPACT

The construction of this outfall pipe will require the use of excavators and other machinery.

It is not expected that dust will be generated to any significant extent. It is possible that mud and spoil could be transported onto the Bailick Road during construction. Through traffic will not occur along the route of this pipeline, and therefore, there will be very limited entry and exit of construction machinery onto the Bailick Road. No direct movement of traffic will be possible from the Bailick Road onto the existing by-pass road.

Proper site supervision will ensure that road surfaces are properly cleaned if mud is transported onto them.

Therefore, it is not envisaged that any significant construction impacts will occur.

## ARCHAEOLOGICAL IMPACT

It is not envisaged that any archaeological impact will occur as a result of the construction of this outfall pipe.

## NOISE IMPACT

The construction of this outfall pipe will not require any special construction equipment which could give rise to exceptional noise levels.

The Contractor will be required to maintain all silencers etc. on plant to be fully functional at all times.

Noise will only occur during construction and it is envisaged that the level of noise will not be significantly noticeable above the noise level of the adjacent dual carriageway.

## VISUAL IMPACT

The construction of this outfall pipe will involve open trench excavation along the mud flats and the Ballynacorra River. This will create an interim visual impact and it is most likely that the Contractor will require to construct a hard standing along the mud flats to facilitate his construction.

On completion, any hardstanding or other temporary works constructed by the Contractor will be removed. The hardstanding will be lowered to a level corresponding to the adjacent mud flats and tidal action will very quickly restore the visual impact of the mud flats to their original condition.

The river bed and bank side armour will be restored to its existing condition on completion of the pipeline.

The general area is not particularly visible and the significance of this short term visual impact is minimal.

## CONSTRUCTION IMPACT

The construction of this outfall pipe will require the use of excavators and other machinery.

It is not expected that dust will be generated to any significant extent. It is possible that mud and spoil could be transported onto the Bailick Road during construction. Through traffic will not occur along the route of this pipeline, and therefore, there will be very limited entry and exit of construction machinery onto the Bailick Road. No direct movement of traffic will be possible from the Bailick Road onto the existing by-pass road.

Proper site supervision will ensure that road surfaces are properly cleaned if mud is transported onto them.

Therefore, it is not envisaged that any significant construction impacts will occur.

## ARCHAEOLOGICAL IMPACT

It is not envisaged that any archaeological impact will occur as a result of the construction of this outfall pipe.



**CHAPTER 3**

**Proposed Overflow Pipes from the Bailick Road Pumphouse**

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## CHAPTER 3

### PROPOSED OVERFLOW PIPES FROM THE BAILICK ROAD PUMPHOUSE

#### INTRODUCTION

Combined sewage flows from the northern side of Midleton gravitates to the existing Bailick Road pumphouse. Ordinarily, this sewage flow will be pumped directly to the proposed treatment plant at Garryduff. In times of storm, any flow in excess of 3 DWF will be overflowed to a proposed storm water balancing tank adjacent to the pumphouse. The storm water tank is designed to have a minimum two hour retention time and all sewage entering the stormwater balancing tank will receive primary sedimentation as a minimum treatment.

After the storm event, sewage in the stormwater balancing tank gravitates back into the pumphouse, where it is then pumped to the proposed treatment site.

For storms of duration in excess of two hours, overflow from the stormwater balancing tank will occur to the river estuary. The quality of the discharge will be better than 20mg per litre B.O.D and 30mg per litre S.S. and therefore will exceed the treatment standards laid down by the 'Urban Waste Water Treatment Directive (91/271/EEC)'. The discharge will achieve this standard because of the high proportion of storm water which will contain dissolved oxygen and also the fact that the retention time in the balancing tank will allow settlement of suspended solids.

Fine screens and baffle plates provide a further safeguard and prevent floating solids being discharged through these overflow pipes.

Overflow to the river from the storm water balancing tank will only occur on 5 - 6 occasions/annum and the volumes discharged will be no more than 1 - 1.5% of the total storm water collected in the catchment. Overflow to the river will be by means of 4 No. 525mm diameter pipelines. The crown of these pipes can be maintained below the top water level of the river.

To further safeguard against any adverse effects it is suggested that:

- Cork County Council inform the South Western Regional Fisheries Board if an overflow has occurred from the combined system to the estuary.
- An alert system to be set up so that shellfish operators can be notified of the occurrence of an overflow from the combined system to the estuary.

These overflow pipes are to be constructed from the proposed storm water balancing tank to the river nearby. The location of the Bailick Road Pumphouse is identified on Drg Nos. 004 and 019. Details of the modifications to pipework and new pipework are shown on Drg No. 040 together with details of the proposed storm water balancing tank.

## THE EXISTING ENVIRONMENT

The location of these overflow pipes is just immediately downstream of the proposed 300mm diameter rising main from this pumphouse to Riversfield Estate and the associated 200mm diameter duct. As previously described, the Owennacurra River is quite wide at this location and an island occurs in the middle of the river at low flows and low tides.

## WASTE PRODUCTION AND DISPOSAL

Overflow through these 4 No. 525mm diameter pipes will discharge effluent which achieves or exceeds the standards required by the Urban Waste Water Treatment Directive.

Overflows will only occur during storm periods and, hence, higher river flows. Dilution will further assist in ensuring that no unfavourable waste is produced which would require disposal at a later date.

The quantities of grit removed from combined sewerage systems usually amounts to 3.8 - 11.4m<sup>3</sup>/1000 person/annum, the lower figure applying to densely built-up sewerage areas. Appendix 1 at the back of this report estimates the maximum volume of grit which could be discharged as 1.6m<sup>3</sup>/annum. This is an upper bound figure based on the larger value for grit production.

In Appendix 1 it has been estimated that the total volume of discharge to the estuary will be of the order of 2,973m<sup>3</sup>/annum. Assuming the discharged effluent to have 30mg/l S.S., then 89kg of suspended solids is discharged through these overflow pipes per annum. Using a S.G. of 1.6 for suspended solids then the volume of suspended solids is discharged is 0.05m<sup>3</sup>/annum.

In any event, grit production will not present a problem at this location.

## AIR EMISSIONS IMPACT

Effluent discharging through these overflow pipes will have had a maximum retention time of two hours in the stormwater balancing tanks. Because of this relatively short duration, dissolved oxygen levels in the effluent will not be reduced and anoxic conditions which could give rise to smells will not have developed.

River flows, during these overflow occasions, will be higher than normal and river velocities will ensure that further agitation of the effluent will occur immediately it enters the river system. The effluent will then begin to take up oxygen and again increase the dissolved oxygen level.

The operation of these pipes will not result in any significant air emissions.

The construction of these pipes will not result in any air emissions occurring.

## EXISTING HABITAT

Existing fish and bird life at this location has been described in Chapter 1, dealing with the construction of the adjacent 300mm diameter rising main and service duct.

The construction of these overflow pipes will not have any impact on existing fish or bird life.

Because of the quality of the discharged effluent, the operation of these overflow pipes will not present any impact to bird life and the impact on fish life will be insignificant.

### **NOISE IMPACT**

The construction of these pipes will not require any special construction equipment which would give rise to exceptional noise levels.

The Contractor for the construction of these works would be required to ensure that all plant is fully serviced and all silencers be functional at all times.

Noise will only occur during construction and it is envisaged that the level of noise will be insignificant.

### **VISUAL IMPACT**

The construction of these pipes will require excavation and subsequent backfilling. An interim visual impact will result while grass and other vegetation is being restored.

Flap valves or gratings will be constructed at the outlet of all the outfalls. In addition, the bank will be carefully restored to its original condition.

The local Angling Club have dredged out a pool area in the Owennacurra River downstream of this location. The construction of these outfalls in the manner outlined above should not present an adverse visual impact to anglers fishing along the river. No riverside walks exist along the river banks, but the construction outlined above would not militate against they being developed at a future date.

### **CONSTRUCTION IMPACT**

The construction of these overflow pipes could result in mud and spoil being transported onto public roads. However, due to the limited vehicle movements, the quantities thus transported would be extremely small. Proper site supervision would ensure that road surfaces are properly cleaned, if mud is transported onto them.

It is unlikely that dust production will be a problem during the construction of these outfall pipes.

### **ARCHAEOLOGICAL IMPACT**

It is not envisaged that any archaeological impact will occur as a result of the construction of these overflow pipes.

**CHAPTER 4**

**450mm Stormwater Outfall Pipe to Ballynacorra River**

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## CHAPTER 4

### 450mm Stormwater Outfall Pipe to Ballynacorra River

#### Introduction

Immediately north east of Ballynacorra village there are large areas of undeveloped land which can be serviced by the proposed sewage treatment works.

It is now mandatory to separate storm and foul sewage flows from future developments.

Storm water thus collected does not have a pollution load and is discharged directly to existing water courses.

The most favourable location for a stormwater outfall has been identified close to Commissioners Quay, just north of Ballynacorra. A 450mm diameter outfall pipe is proposed discharging to the Ballynacorra River. A flap valve is proposed at the mouth of the outfall and its proposed location is shown on Drg. No. 019.

The river is tidal at this location and at low tides considerable mud flats are evident on the western side of the river channel. The location of the river channel is along the eastern side of the estuary and close to Commissioners Quay.

Both masonry quay walls and stone pitching exist at this location.

#### THE EXISTING ENVIRONMENT

In former times boats and smaller ships sailed up the estuary to this point at high tides. Many stores and warehouses were constructed and the area served as a distribution centre of produce to the adjacent towns and villages. These store and warehouses still exist but they are no longer operational. The fact that boats could only enter or leave at high tides, and the advent of improved road transportation, meant that this area could not survive long-term as a port.

Improved sewage facilities could assist in the revitalisation of this area as a holiday marina.

#### WASTE PRODUCTION AND DISPOSAL

Rain water on the catchment area contributing to this outfall will flow across paved surfaces to road gullies. This will have the effect of washing these surfaces free of a certain amount of grit. This grit is then transported to the adjacent road gullies. Grit chambers are provided at all road gullies and this will allow some grit to settle out while the storm water continues through the storm system to the outfall. The efficiency with which grit is settled out in the grit chambers of road gullies depends on the intensity of the storm and the retention time within the road gullies.

The quantity of grit removed from combined sewage systems usually amounts to between 3.8 - 11.4m<sup>3</sup>/ 1000 persons/annum. Appendix II at the back of this report quantifies the maximum grit production associated with the catchment area contributing to this outfall pipe as 11.8m<sup>3</sup>.

Generally the catchment area contributing to this outfall is relatively flat and large velocities will not occur in the storm sewer network which could transport larger grit particles. The full velocity in the final outfall pipe is 1.1m/s and this velocity will have limited capability for transport of sediment.

All road gullies will be trapped and grit which settles out in the associated grit chambers will be disposed of separately in the course of maintenance of the storm sewer system.

It is difficult to determine the exact volume of grit which will be discharged through this outfall pipe. However, the grit will not have a pollution load. Notwithstanding this, it would appear unsightly if a mound of grit were to develop at the mouth of the outfall pipe.

Cork County Council will have acquired a wayleave to facilitate the construction of this outfall pipe. Alternatively, Cork County Council could purchase this strip of ground and this would allow easier access to the mouth of the outfall. With high reach equipment, it would now be possible to dredge away any deposition of grit which occurred at the mouth of the outfall pipe.

It is concluded that the above scenario is an extremely pessimistic evaluation of the quantity of grit produced at the mouth of the outfall because experience has shown that grit rarely, if ever, builds up around similar outfall pipes.

### AIR EMISSIONS IMPACT

The construction and operation of this outfall pipe will not result in any occurrence of air emissions.

### EXISTING HABITAT

This reach of the river facilitates the migration of fish of the sea variety up and down the river. The river is tidal along this section and resident fish are rare at this location.

The construction of this outfall pipe will be carried out from the land and the impact of its construction on fish life would be minimal. However, liaison with the South Western Regional Fisheries Board would take place well in advance of this construction.

The continued operation of this outfall pipe would not impact on any fish life as the discharge will be non-polluting.

Should it be necessary to dredge silt from the mouth of this outfall pipe this would be done at low tide and the transfer of sediment into solution would be adequately controlled in this manner. This work could essentially be carried out in the dry.

It is not envisaged that the construction or operation of this outfall pipe would have any impact on bird life in the area.

## NOISE IMPACT

The construction of this outfall pipe will not require any special equipment which could give rise to any exceptional noise levels. However, it may be desirable to temporarily sheetpile around the outfall so that the washing action of the rising and falling tide will not occur. The required pile driving equipment would give rise to noise. This would be of short duration and noise criteria laid down in the contract would be adhered to. Pile driving outside of normal social hours should not occur.

Satisfactory maintenance of all plant and particularly the silencers associated with the plant should result in well controlled noise levels which would not impact significantly on local residents.

## VISUAL IMPACT

A short term visual impact will occur during the construction of this outfall pipe. However, proper restoration and the replacement of stone pitching to the foreshore will substantially restore the visual aspect of the area. A flap valve or grating will be constructed at the outlet from the outfall which will further camouflage the outfall pipe and reduce any visual impact.

## CONSTRUCTION IMPACT

Substantial amounts of pipework are proposed in this area. The construction of this pipework will impact on traffic movements and also result in mud and spoil being transported onto the public roads. Proper site supervision will ensure that these impacts are minimised.

The construction of this outfall pipe will have an minimal impact over and above the construction of the other pipework in this vicinity.

## ARCHAEOLOGICAL IMPACT

It is not envisaged that any archaeological impact will occur.



**CHAPTER 5**

**Overflow Pipe from Proposed Submersible Pumping Station  
at Ballynacorra**

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## CHAPTER 5

### OVERFLOW PIPE FROM PROPOSED SUBMERSIBLE PUMPING STATION AT BALLYNACORRA

#### INTRODUCTION

At present sewage flows from the Bailick Road pumphouse gravitate into a comminutor and pumping station at Ballynacorra. In addition, combined sewage flows from the Ballynacorra area gravitate to this pumping station and are comminuted. The combined flow is then pumped through a 600mm diameter rising main to a header manhole and gravitates from there to the outfall at Rathcoursey.

The present scheme proposes to isolate untreated sewage from the combined sewerage system at Ballynacorra and to pump it to a header manhole from where it will gravitate towards the refurbished Bailick Road pumphouse and then onto the treatment plant at Garryduff.

Therefore, sewage from the Ballynacorra area will be directed towards a new submersible pumping station. This will necessitate modification to the sewerage system in the vicinity of the existing pumphouse and comminutor station.

The capacity of the proposed submersible pumping station is such that it provides a minimum two hour retention time for all flows in excess of 6 DWF. Flows up to 6 DWF are pumped towards the treatment plant site. The proposed submersible pumping station at Ballynacorra incorporates a stormwater balancing tank.

As in the case of the stormwater balancing tank attached to the Bailick Road pumphouse effluent from this submersible pumping station will have received primary sedimentation as a minimum treatment. This basic treatment, combined with the high storm water content, will ensure that all discharges shall conform to the Urban Waste Water Treatment Directive, and B.O.D. values of 20mg/l and S.S. values of 30mg/l are anticipated.

The settlement afforded by the two hour retention time in the submersible pump sump and the provision of baffle plates will ensure that carry over of solids will be kept to an absolute minimum.

Parts of Ballynacorra Village are vulnerable to flooding during Spring tides and heavy rainfall. A two stage overflow system has been proposed for this submersible pumping station. The initial overflow will occur to the tide but at times of high tide the flap valve on this outlet will close. This would ultimately cause backpounding of the sewers in Ballynacorra and a further emergency overflow is to be constructed to the existing pumphouse and comminutor station. This will operate only when overflow to the adjacent estuary cannot occur.

The location of this submersible pumping station is shown on Drg No. 019 and the proposed submersible pumping station is detailed on Drg No. 044.

## THE EXISTING ENVIRONMENT

Adjacent to Ballynacorra Village a green park area has been developed adjacent to the existing pumphouse and comminutor station. This park area is relatively narrow and overlooks mud flats at low tides. A stream flows through these mud flats.

This mud flat appears as an inlet of the estuary and across this inlet warehouses and stores, which were formerly in use, can be seen.

## WASTE PRODUCTION AND DISPOSAL

During times of overflow to the tide, effluent which has received primary treatment will be discharged. Appendix III at the back of this report estimates the volume of grit discharged to be  $0.18\text{m}^3/\text{annum}$  based on the conservative figure for grit production of  $11.3\text{m}^3$  grit/1000 persons/annum.

This volume of grit, although it appears insignificant will not be generated and it is most likely that grit production will be negligible based on the  $30\text{mg/l}$  S.S. of the effluent overflowed. Based on a figure of  $30\text{mg/l}$  and a discharge of  $468\text{m}^3/\text{annum}$ , then  $14\text{kg}$  of solids is discharged through this overflow pipe per annum. This amounts to  $0.01\text{m}^3/\text{annum}$  of grit, assuming a S.G. of 1.6 for grit and suspended solids.

To further safeguard against any adverse effects as a result of an overflow occurring it is suggested that:

- Cork County Council inform South western Regional Fisheries Board that an overflow has occurred from the combined system to the estuary.
- An alert system be set up so that shellfish operators can also be notified of the occurrence of an overflow situation.

## AIR EMISSIONS IMPACT

The construction of this outfall pipe will not result in any air emissions occurring.

## EXISTING HABITAT

From the point of view of fish life or bird life this area is relatively insignificant.

Notwithstanding this, it is not envisaged that any adverse impact will occur in the area which would be harmful to wildlife.

## NOISE IMPACT

This outfall pipe is to be constructed in close proximity to the construction of a submersible pumping station and additional pipework. It is not envisaged that the construction of this outfall pipe will have any noise impact over and above that associated with the remaining construction.

### VISUAL IMPACT

The construction of the various works in this area will disturb the green park area which overlooks the mud flats. The area will be reinstated on completion and a long-term visual impact will not occur. A flap valve or grating will be constructed at the outlet of the overflow pipe and this will diminish the visibility of this outlet.

In conclusion the construction of this outfall pipe will have minimal visual impact on this area.

### CONSTRUCTION IMPACT

The construction of the works in this area could result in mud and spoil being transported onto the adjacent public roads. Proper site supervision will ensure that these road surfaces are continually cleaned so that nuisance does not develop.

No significant construction impact is envisaged.

### ARCHAEOLOGICAL IMPACT

It is not envisaged that any archaeological impact will occur as a result of the construction of this overflow pipe.

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**CHAPTER 6**

**Existing Outfall at Rathcoursey Point**

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## CHAPTER 6

### EXISTING OUTFALL AT RATHCOURSEY POINT

This is an existing outfall which presently discharges comminuted sewage flows from the Middleton area to the estuary. It is proposed that these flows will now be treated and receive U.V. Disinfection prior to discharge through this existing outfall pipe. The resulting impacts in the area will be of a beneficial nature and these are covered in detail in the main body of the Environmental Impact Statement.

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**APPENDIX I**

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## APPENDIX II

### VOLUME OF GRIT ASSOCIATED WITH STORM WATER OUTFALL

Total paved area contributing to storm Outfall:-

<u>Drainage Area</u>	<u>Area</u>	<u>Populations</u>
38	2.86 Ha	320
39	2.09 Ha	208
40	1.52 Ha	304
41	0.82 Ha	204
<b>Total</b>	<b>7.29 Ha</b>	<b>1036</b>

Annual Average Rainfall = 1,000mm/annum

Total discharge to storm outfall =  $\frac{7.29 \times 10,000 \times 1,000}{1,000}$

= 72,900m<sup>3</sup>/annum

Using the maximum figure of 11.43m<sup>3</sup> grit/1,000 persons/annum for low density housing

Volume of grit discharged =  $11.4 \times 1,036/1,000$   
= 11.8m<sup>3</sup>/annum

This is an upper bound figure and ordinarily much of this grit will be trapped in road gullies and disposed of separately.

The storm sewer discharging to the estuary at this point is a 450mm pipe at a gradient of 1/300. This would result in a pipe velocity of 1.1m/sec. Therefore, larger grit particles would not be transported within the sewer.



**APPENDIX III**

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### APPENDIX III

#### VOLUME OF GRIT ASSOCIATED WITH SUBMERSIBLE PUMPING STATION AT BALLYNACORRA

It has been estimated that overflow to the tide at this location will occur on 5 to 6 occasions/annum and the total discharge volumes will be 1-1.5% of the total storm water collected in the system.

Annual Average Rainfall	=	1,000mm/annum
Paved Area (contributing to pump sump)	=	3.12 Ha
Total Rainfall collected	=	$\frac{3.12 \times 10,000 \times 1,000}{1,000}$
	=	31,200m <sup>3</sup> /annum

Maximum 1.5% discharged through overflow pipe.

∴ Volume of discharge	=	31,200 x 0.015
	=	468m <sup>3</sup> /annum

Quantity of grit from combined sewage systems based on the maximum value of 11.4m<sup>3</sup>/1,000 persons/annum for low density housing development.

Total population served by pump sum = 1,072 persons.

With 1.5% maximum discharge  
Volume of grit discharged  $11.4 \times 1,072 \times 0.015/1,000$   
0.18m<sup>3</sup>/annum

Even allowing for the fact that the transport of grit would coincide with the larger flows in the network it is extremely unlikely that a volume of grit of this magnitude would be discharged as the pump sump will act as a stilling basin where substantial quantities of grit will be settled.

Tidal movements, and the resulting velocities, would ensure that this grit would be spread over a wide area and would not cause a build up around the pipe outlet.

The inclusion of baffle plates along the weir will prevent floating faecal matter entering the outfall pipe.

Copy Michael Lavelle.

Copy

*[Signature]*

Our Ref: MS 51/8/580A Vol 5

Mr. Derry Hayes,  
Cork County Council,  
County Hall,  
Cork.

**Re: Middleton Sewerage Scheme.**

Dear Mr. Hayes,

I refer to previous correspondence regarding your application on behalf of Cork County Council in respect of the Middleton Sewerage Scheme.

The proposal has been considered by our technical experts who have advised as follows;

1. Please forward a composite map showing the actual pipelines, crossing and discharge point;
2. The EIS should address the case where UV treatment is provided in the Sewerage Treatment Plant, as directed in the High Court settlement. Please forward full details of the proposed UV treatment of all faecal matter and details of how your Council intend to achieve adequate treatment to ensure an A classification for the oyster beds;
3. As the arguments against UV in the EIS are not appropriate they should be removed;
4. The EIS makes reference to other possible E Coli sources but does not deal with them adequately; therefore such claims should be backed up with factual information or omitted from the EIS. Please forward the full document from Hydrodata (not the summary received from M.C. O Sullivan).

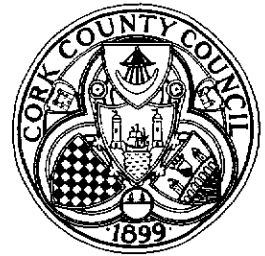
An early reply would be appreciated.

Yours sincerely

*[Signature]*  
THOMAS J. TOBIN,  
PRINCIPAL,  
COASTAL ZONE ADMINISTRATION DIVISION.

19. 1. 98.

# Comhairle Chontae Chorcaí

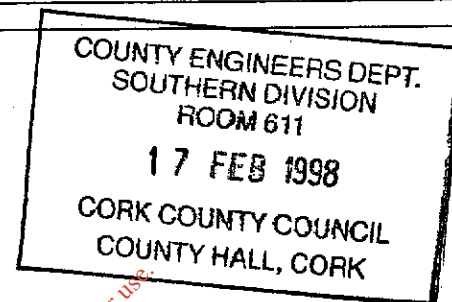


Mr. Thomas Tobin,  
Principal,  
Coastal Zone Administration Division,  
Dept. of the Marine & Natural Resources,  
Leeson Lane,  
Dublin 2.

Cork County Council  
County Hall  
Cork  
Telephone: 021-276891  
Fax: 021-276321

16th February, 1998.

**Re: Midleton Sewerage Scheme  
Application for Foreshore License**



Dear Sir,

I refer to Cork County Council's application for a Foreshore License in respect of the above Scheme and to your request dated 19/1/98 for clarification on a number of items and the submission of amended maps.

I enclose the following for your attention:-

1. (a) Revised pages 6 and 6a to be inserted in lieu of page 6 of the application for a Foreshore License.
- (b) Revised page 19 - altered chapter 6 of the Addendum to the Environmental Impact Statement - to be substituted accordingly.

It is felt that the above alterations adequately address the issues raised by your technical experts. I can confirm that changes made to the text were undertaken following discussions with Mr. John O'Keeffe, Divisional Engineer, Dept. of the Marine.

2. 9 (nine) No. sets of revised drawings to be substituted for maps already submitted with our application in November 1997.

Drawing No. 1 is amended to show only those items relevant to the proposed Midleton Main Drainage Scheme.

Drawing No. 2 details the items, highlighted in red, proposed to be constructed on the foreshore, consisting of:-

Gaeilge agat?... Labhair í

1. Two foreshore crossings by the proposed 300 mm. dia. rising main from Bailick Road to the Treatment Plant.
2. Proposed 4 no. 525 mm. dia. overflow pipes from the Bailick Road Pumphouse to the Ballynacorra River.
3. One foreshore crossing by the proposed 400 mm. dia. outfall from the Treatment Plant.
4. The construction of a Submersible Pumping Station at Bailick Road.
5. Proposed 600 mm. dia. overflow pipe from the proposed Submersible Pumping Station at Bailick Road to the Ballynacorra River.
6. Proposed 600 mm. dia. storm water outfall to the Ballynacorra River adjacent to Commissioner's Quay.
7. Proposed 600 mm. dia. overflow pipe from the proposed Submersible Pumping Station at Ballynacorra Quay to the Ballynacorra River.

I would like to point out that, before finalising the maps, our own Technical Staff and Consulting Engineers had discussed the necessary changes with John O'Keeffe.

You will be aware that Cork County Council are obliged to complete construction of a Sewerage Treatment Plant in Midleton by June 2000 under the terms of the High Court Agreement with Atlantic Shellfish. The Council have initiated a Planning/Construction Programme which we feel will enable us achieve this target. Regular monthly meetings are taking place involving our Assistant County Manager, County Engineer and Technical Staff, our Consulting Engineers and Department of the Environment Officials, and progress has been noted. However, it is crucial to the Planning aspects of this Scheme that the Foreshore License issue be resolved as quickly as possible. I would be obliged, therefore, if you would treat the Midleton Application with some degree of urgency.

Please contact me if you have any further queries on this matter.

In conclusion, I wish to advise you that Council Staff will be available at very short notice to meet with your Technical Experts should the need arise.

Yours faithfully,

  
**DERRY HAYES,**  
**STAFF OFFICER,**  
**HOUSING & SANITARY DEPARTMENT.**

c.c. **J. Matson, Divisional Engineer.**  
**M. Lavelle, Senior Executive Engineer.**  
**S. O'Breasail, Executive Engineer.**  
**M.C. O'Sullivan & Co. Ltd., Consulting Engineers.**

## ENVIRONMENTAL IMPACT STATEMENT

An Environmental Impact Statement for the wastewater treatment plant was prepared in November, 1996 and submitted for certification to the Minister for the Environment. The Minister for the Environment certified the E.I.S. in July, 1997 with modifications which were as follows:-

- I. The impact of the discharge on the water quality in the licensed oyster areas of the North Channel shall be reduced by either of the following means:-
  - a) Secondary treated effluent containing faecal micro-organisms shall be discharged through an alternative outfall upstream of the present outfall. This new discharge, subject to necessary licensing, shall be located in an appropriate area to the north-east of the existing discharge such that the incoming tide carries the discharge into the Owenacurra Estuary. The selection of this location shall have due regard to available dilutions,

or

  - b) Alternative additional treatment as may be proved to be effective and capable of providing equivalent water quality in the vicinity of the licensed oyster beds in the North Channel shall be provided subject to the necessary licensing.
- II. Untreated storm flows contaminated with faecal matter shall not be discharged at either of the above outfalls. Any such stormwater discharged at this location shall be subject to the full treatment provided at the treatment plant.
- III. Testing of treated effluent samples should include for the determination of faecal coliform concentration at a frequency no less than required for sampling by the Urban Waste Water Treatment Directive.

This Addendum to the Environmental Impact Statement was prepared for the Foreshore Licence application and also addresses the changes necessitated by the modifications in the Minister for the Environment's certification. The latter are listed below.

Modification I. The second alternative proposed by the Minister will be undertaken. It is proposed to treat the effluent from the secondary effluent treatment plant with ultra violet light. Chapter 6 of the Addendum addresses this issue.

The statements regarding the non-provision of UV treatment in the EIS are superseded by the Minister's certification.

Modification II. It is not proposed to discharge any untreated storm flows contaminated with faecal matter at the discharge point referred to in Modification I. It is proposed to provide stormwater holding tanks at each of three pumping stations to retain stormwater when the capacity of the pumps at the pumping stations is beaten. The retained stormwater will be pumped to the treatment plant when the storm abates. If the capacity of the holding tanks is beaten, the stormwater will be discharged to the Owenacurra Estuary immediately adjacent to the respective pumping stations. No stormwater will be discharged to the treated effluent pipeline. Chapters 2 and 5 in the Addendum address these issues.

Modification III. The testing programme will meet the Minister's requirements and those of the Urban Waste Water Treatment Directive.

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## CHAPTER 6

### EXISTING OUTFALL AT RATHCOURSEY POINT

This is an existing outfall which discharges comminuted sewage flows from the Midleton area to the estuary. There will be no physical changes to the outfall. It is proposed that the quality of the effluent will be changed through the treatment of the raw sewage in an extended aeration secondary effluent treatment plant and an ultra-violet disinfection plant prior to it being discharged at Rathcoursey Point.

The introduction of an extended aeration secondary treatment plant will have the automatic effect of reducing the faecal coliforms counts of the Midleton discharge at Rathcoursey by 99% or two (2) orders of magnitude (i.e., 100 times).

The Mathematical Model prepared by Irish Hydrodata predicts a peak E.Coli concentration over the oyster beds of 35 fc./100 ml. lasting for 1 hour with average values of 18 fc./100 ml. All these calculations are based on T90s of 12 hours. This is quite conservative.

Following the decision of the Minister for the Environment to require that either the outfall location be changed or disinfection be included, the application for the Foreshore Licence and the Addendum to the E.I.S. were adjusted to reflect these decisions.

The addition of U.V. disinfection to the effluent from Midleton Wastewater Treatment Plant will mean that the faecal coliform counts leaving the plant will be reduced by at least a further 99% or two (2) orders of magnitude. The impact of this will be to reduce the peak E.Coli concentrations over the oyster beds arising from the outfall to 0.35 fc./100 ml. for 1 hour with an average of 0.18 fc./100 ml. Such values would be undetectable and would guarantee an A Classification for the oyster beds. However, Cork County Council could not give an unqualified undertaking to achieve this as the Midleton discharge is just one of several factors contributing to the present high E.Coli levels in the North Channel.

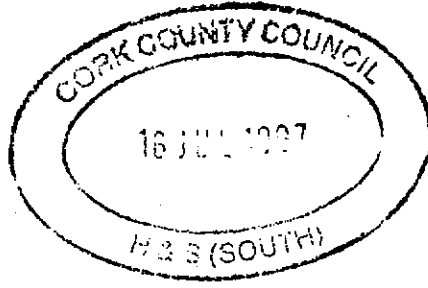
The requirements of the Public Procurement Directive mean that the contract for U.V. disinfection must go to public tender and so the full details of the proposed system will not be available until after the tender procedure. However, the Specification will require a guaranteed 99% removal of E.Coli at 30 mg./l. S.S. and it is expected that the actual achieved performance will be in the order of 99.9% removal. This latter figure could not be guaranteed.

The full Irish Hydrodata Report, giving details of the mathematical modelling of the North Channel Area is included in the E.I.S. proper and its Technical Appendices. It is proposed that the tidal holding tank at Rathcoursey West be taken out of service and that the discharge takes place on a continuous basis.



15 July 1997

County Secretary,  
Cork County Council  
County Hall  
Cork



Re: Midleton Sewerage Scheme  
Environmental Impact Statement

A Chara,

I am directed by the Minister for the Environment and Rural Development to refer to the application by the County Council for certification by the Minister under Part IX of the Local Government (Planning and Development) Regulations, 1994 in respect of the Midleton Sewage Treatment Works

I am to inform you that the Minister has, in accordance with the said regulations, certified that, subject to the modifications detailed below the proposed development will, in his opinion, embody the best practicable means to prevent or limit significant adverse effects on the environment,

Modifications

I. The impact of the discharge on the water quality in the licensed oyster areas of the North Channel shall be reduced by either of the following means:

(a) Secondary treated effluent containing faecal micro-organisms shall be discharged through an alternative outfall upstream of the present outfall. This new discharge, subject to necessary licensing, shall be located in an appropriate area to the north east of the existing discharge such that the incoming tide carries the discharge into the Owenacurra Estuary. The selection of this location shall have due regard to available dilutions,

or

(b) alternative additional treatment as may be proved to be effective and capable of providing equivalent water quality in the vicinity of the licensed oyster beds in the North Channel shall be provided subject to the necessary licensing

II. Untreated storm water flows contaminated with faecal matter shall not be discharged at either of the above outfalls. Any such stormwater discharged at this location shall be subject to the full treatment provided at the treatment plant.

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III. Testing of treated effluent samples should include for the determination of faecal coliform concentration at a frequency no less than required for sampling by the Urban Waste Water Treatment Directive.

A notice outlining the Minister's decision on the application will be published by the Department in the Irish Independent, Irish Times and Cork Examiner newspapers

Mise le meas,

Michael McGloughlin

Michael McGloughlin,  
Water Services Section,  
Extn.2151.

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Environmental Impact Statement  
Midleton Sewage Treatment Plant

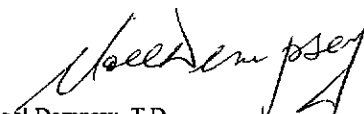
DEPARTMENT OF  
THE ENVIRONMENT  
AN ROINN COMHSHAOIL

CUSTOM HOUSE, DUBLIN 1  
TEACH AN CHUSTAIM  
BAILE ÁTHA CLIATH 1

TEL 01 679 3377  
FAX 01 671 2378  
GTN 7 1 08

I hereby certify that the works proposed for the construction of a sewage treatment plant at Midleton embody the best practicable means to prevent or limit significant adverse effects on the environment subject to the following:

- I The impact of the discharge on the water quality in the licensed oyster areas of the North Channel shall be reduced by either of the following means:
- (a) Secondary treated effluent containing faecal micro-organisms shall be discharged through an alternative outfall upstream of the present outfall. This new discharge, subject to necessary licensing, shall be located in an appropriate area to the north east of the existing discharge such that the incoming tide carries the discharge into the Owenacurra Estuary. The selection of this location shall have due regard to available dilutions;
  - or
  - (b) alternative additional treatment as may be proved to be effective and capable of providing equivalent water quality in the vicinity of the licensed oyster beds in the North Channel shall be provided subject to the necessary licensing.
- II Untreated storm water flows contaminated with faecal matter shall not be discharged at either of the above outfalls. Any such stormwater discharged at this location shall be subject to the full treatment provided at the treatment plant.
- III Testing of treated effluent samples should include for the determination of faecal coliform concentration at a frequency no less than required for sampling by the Urban Waste Water Treatment Directive.

  
Noel Dempsey, T.D.,  
Minister for the Environment and Rural Development.  
14 July 1997.

AREA OPERATIONS  
SOUTH  
2 SEP 2009  
CORK COUNTY COUNCIL  
COUNTY HALL - CORK

# **SPECIFICATION FOR MIDDLETON MAIN DRAINAGE MECHANICAL & ELECTRICAL CONTRACT NO. 2**

## **UV DISENFECTION**

### **Contents/Appendices**

- 1. Introduction**
- 2. Scope of Works**
- 3. Drawings Provided**
- 4. Works Provided by Others**
- 5. Contract Drawings and Information**
- 6. UV Plant Duty**
- 7. Mechanical**
- 8. Electrical**
- 9. Instrumentation/Control and Automation**
- 10. Plc Watchdog**
- 11. Control**
- 12. Optional Provisions**
- 13. Equipment References + Tagging**
- 14. Testing + Commissioning**
- 15. Schedule of Technical Information**

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## SPECIFICATION FOR ULTRAVIOLET DISINFECTION EQUIPMENT

### **INTRODUCTION**

The Ultra Violet (UV) disinfection equipment specified in this document is an integral part of the Midleton Main Drainage Scheme, being constructed for Cork County Council (Southern Division). Upon completion, Cork County Council, (the Client) will be both the owner and operator of the scheme. The UV equipment will be provided as a sub-contracted part of the main Mechanical Contract, which is being undertaken by E.P.S. Pumping and Treatment Systems Ltd. The successful tenderer therefore, shall be employed by EPS as a Nominated Sub-Contractor.

The UV equipment shall be supplied to and installed at the new Municipal Waste Water Treatment Plant at Garryvoe, Midleton, Co. Cork, Ireland. It shall be provided as a complete plant package. The point of disinfection shall be at the plant outlet works in a purpose-built, gravity flow, open channel system. The UV plant shall disinfect the final effluent from the treatment process, prior to marine discharge.

The UV lamp assemblies, ancillary equipment and instrumentation shall be installed within the open channels. All panel work shall be located in the adjacent plant house or local composite housing.

The UV system shall be of the low pressure high intensity or medium pressure lamp type. It shall be complete with automatic cleaning systems. It shall be designed to permit automatic variations in UV dose rate to be effected by either modulating UV lamp output or switching lamp banks. Additionally, the system shall be designed to permit variations to the scope of supply with no additional design costs being incurred. To this end, one unit shall be defined as one channel with its associated UV lamp banks, etc,. The Client may require additional units following the results of the initial installation, dependent on final effluent quality.

### **TIMESCALE**

Tenders shall provide for an overall 21 week programme, with week 1 commencing from the date of appointment. Tenders shall comply in full with the following programme milestone requirements:-

<u>Item</u>	<u>Delivery</u>
Approval of detailed design	Week 2
Drawings and Civil works details required	Week 4
Delivery to Site	Week 14
Installation Complete	Week 16
Testing Complete	Week 17
Commissioning Complete	Week 18
Performance Testing Complete	Week 21

The entire system shall be designed, delivered, installed, tested and commissioned no later than the 30<sup>th</sup> of June 2000. Performance testing shall be carried out in the three weeks immediately following that date. Tenders shall note that initially the UV plant will be used initially as part of an advance installation of the treatment works. These works

will comprise temporary 6 mm. inlet screening, full permanent activated sludge process and half of the permanent final settlement.

## SCOPE OF WORKS

The general scope of the works to be provided shall include at minimum the design, manufacture, supply, delivery, installation, testing and commissioning of the following:-

1. UV lamps and modules, sensors, cleaning systems and all support steelwork to complete the installation.
2. Actuated adjustable penstock outlet weirs.
3. log-stop inlet gates.
4. Aluminium decking system for UV Channels.
5. Electrical power supply, control panel and starters for the UV system.
6. Composite building to house control panel and ancillary equipment (if required)
7. All power cabling between the UV disinfection plant and the control panel and starters.
8. All instrumentation, (UV intensity, effluent transmissivity, level and flow).
9. All instrumentation and control cabling.
10. Lifting system, permitting safe removal and storage of UV system components and assembles for maintenance and cleaning. (note:- items of 25 Kg. And above shall be lifted by electric or hydraulic hoist).

The scope of works shall also include at minimum the provision of the following services and documentation:-

11. Testing and commissioning of the completed system.
12. Performance testing of the completed system when in operation.
13. Certification of testing, commissioning and performance testing.
14. Operating and maintenance manuals.
15. Working drawings.
16. Training for operatives.
17. Proposals for ongoing maintenance, calibration and certification services

## **DRAWINGS PROVIDED**

The following outline drawings are provided with the Specification, for assistance in tendering:-

UV1	Treatment Plant Layout	1:250
UV2	Outlet Channel Plan and Section	1:20

These drawings are provisional and the arrangements shown may not reflect those to be adopted at the detailed design stage. Dimensions therefore, are indicative only. Levels given for pipe inverts, top water, ground, path and channel wall height are final and must be incorporated into any detailed design proposal.

## **WORKS PROVIDED BY OTHERS**

The Civil Contractor will provide all reinforced concrete channels, inlet and outlet pipework, paths, ducts, opes and access to the UV Plant.

The Mechanical Contractor will provide a power feeder switch at the control building motor control centre, any other necessary services and shall collect all telemetry signalling from a single interface at the UV control panel.

The Sub-Contractor shall provide all details necessary to both the Civil and Mechanical Contractors, so that the necessary works and provisions can be completed without delay to the specified programme.

## **CONTRACT DRAWINGS**

The Sub-Contractor shall supply all the necessary drawings and supplementary information to allow the Civil Contractor to design and detail any reinforced concrete structure, ductwork, opes etc, and to allow the Mechanical Contractor to make provisions for the services required. Drawings shall be submitted for approval with 4 weeks of award of the Sub-Contract.

The drawings required shall include but not be limited to following:-

- a) General arrangement drawing of the complete installation clearly identifying all interfaces with civil and mechanical contracts and showing areas where access for maintenance will be required and weights of items requiring maintenance.
- b) Channel configuration, dimension, ope, rebate and access requirements details together with any specific material requirement to the application.
- c) Electrical loading details to enable power distribution design to be completed.
- d) Details of any other services required.
- e) Control and starter panel G.A. drawings and electrical schematic drawings.
- f) The operators control philosophy for the plant.
- g) Process and instrumentation single line diagram.

The Sub-Contractor shall submit the following documentation within 4 weeks of award of the Sub-Contract.

- a) Control philosophy of the ultraviolet disinfection plant, including detailed description of manual and automatic operation and sequence, failure modes, inhibits, start up and shutdown modes.
- b) A list of alarm, status, analogue input and output (I/O) signals from the MCC for collection by the on-site SCADA system.

**UV PLANT DUTY**

The Waste Water Treatment Plant development will be constructed in two phases, the first phase having two stages. A summary of development sizes, given in population equivalent, (pe) is as follows:-

Phase	Stage	pe	Total pe
<b>Phase 1</b>	<b>Stage 1</b>	<b>10,000</b>	
	<b>Stage 2</b>	<b>5,000</b>	<b>15,000</b>
<b>Phase 2</b>		<b>15,000</b>	<b>15,000</b>
		<b>Ultimate size</b>	<b>30,000</b>

To allow for the ultimate development, a twin channel system is proposed for UV treatment. Each channel will cater for one phase of plant development. The UV plant to be provided under this Specification shall be sized on the full Phase1, Stage 2 duty, (i.e. 15,000 pe) and shall occupy one of the channels to be constructed. Particular details relevant to the design are as follows:-

W.W.T. Design Flows:	Stage 1	Design Population	10,000
		B.O.D. Loading	600 Kg/day
		Flow @ 3 DWF	89.0 l/sec
	Stage 2	Design Population	15,000
		B.O.D. Loading	900 Kg/day
		Flow @ 3 DWF	133.5 l/sec

W.W.T. Discharge Standards	B.O.D. < or	= 20 mg/l
	Suspended Solids <	= 30 mg/l
	Total Nitrogen <	= 15 mg/l



Minimum U.V. Kill Rate	Log 3
Minimum U.V. Dose Rate	55W/CM <sup>2</sup>

The system shall be upgradeable to 30,000 P.E. in a second stream.

## **MECHANICAL**

U.V. lamps shall be provided in banks such that modules (groups) of lamps are removed together for maintenance and replacement of either individual lamps or groups.

Each bank shall comprise a number of modules, each unit shall comprise a number of banks such that lamp replacement is possible without interruption the disinfection process with the unit.

The module assemblies shall ensure accurate location of the lamps relative to each other and their location in the channel relative to the sidewall to obtain optimum UV disinfection.

Lamps shall be either medium pressure or low pressure, high intensity, including an automatic wiping system for each lamp. The Sub-Contractor shall submit details of lamp life, UV production efficiencies with respect to time and a spectral analysis from the manufacturer of the lamp with supporting data in support of his tender.

Materials of construction shall be stainless steel and quartz.

Plug and socket electrical connections shall be provided to enable safe removal of modules from the bank.

At minimum, sensors shall be provided to measure received UV irradiation within each bank of lamps. A separate proposal shall also be forwarded with the tender for the inclusion of sensors for each lamp. The proposal shall indicate the benefits of including individual sensors with regard to point source ????.

Irradiation sensors shall be non-ageing with a special sensitivity of 254 nm and shall provide a 4-20 mA signal to the controller for control and measurement purposes.

Materials of construction shall be stainless steel and quartz.

The Sub-Contractor shall detail his provisions for preventing system failure through lamp failure outside sensor range or during sensor failure.

A continuous lamp cleaning system shall be provided which shall clean organic and inorganic deposits from the lamp sleeves. Lamp cleaning shall take place automatically without manual intervention.

A trolley type frame shall be provided to accept lamp modules for secure and safe relocation during any storage or maintenance.

## ELECTRICAL

The equipment outlined below shall comply with the requirements of the relevant Standard Specifications.

A 380 V ac supply will be provided by others to the UV Plant Control Panel mains incoming ACB from a 1000k VA transformer which will be supplied and installed by others. The Panel shall have a 1600A rated incoming supply circuit breaker, with overcurrent and earth fault protection.

The complete electrical power and control system shall be provided comprising the following as a minimum,

- Control Panel

The UV Disinfection Control Panel shall copy in spec. Each compartment door shall be lockable and fitted with a Yale type lock operated by key reference C2. The panel shall be complete with a 110Vac hand tool socket. The panel shall incorporate an incoming supply section, distribution section, drive starters where necessary, ballast relay section (if required), control section, PLC and MMI and telemetry marshalling section.

The UV Disinfection Control Panel shall supply all plant associated with the UV plant supplied under this Sub Contract and shall provide one additional 500A TP&N fuse switch for affording power to the Secondary Treatment Plant Miscellaneous MCC.

All control voltages shall be 110Vac.

Manual and automatic mode of operation shall be by a common Hand/Off/Auto selector switch mounted at the MCC.

Indication lamps shall be provided at the MCC to indicate any load running, stopped, available and fault status. Start and stop pushbuttons shall be provided for each load. A common reset pushbutton shall be provided to reset all load drives following a fault.

A lamp test pushbutton shall be provided.

Details of the appropriate pushbuttons, selector switches and indication lamps location diagrams shall be provided for approval prior to construction.

- Monitoring requirements

The UV Disinfection Control Panel shall incorporate monitoring equipment for the following:

- i. Received UV radiation per sensor.
- ii. UV output per sensor or derived.
- iii. Effluent transmissivity (derived).
- iv. Water level per channel.
- v. Flow per channel.

vi. Total flow (summed)

All of the above items shall be displayed on the MCC and items (i) to (iv) shall be available as 4-20 mA signals for display on the site SCADA system.

- Lamp Ballast Panel/s

Lamp starting shall be effected by electronic ballasts, which may form part of the UV Disinfection Control Panel or may be housed within separate enclosures, including the lamp housings.

- Plug and Socket connections

Mechanically interlocked plug and socket connection boxes shall be provided for each lamp bank.

- Channel Cover Interlocks

Suitable limit switches shall be provided to the channel cover supports to prevent uncovering of channel while the unit is in operation. Suitable provision shall be made within the Sub-Contractor's Panel for this.

- Ultrasonic level detectors and Controllers

Ultrasonic level detectors shall be provided as required to measure flow, low and high channel level and to enable automatic channel level control where necessary. Controllers shall be locally mounted and shall be suitably rated for ingress protection.

- Cabling (Power, Control and Instrumentation)

The Sub-Contractor shall provide all cabling between the Control Panel and the UV Plant including ultrasonic devices and sensor.

DATE	UPSTREAM OF BAILICK 1 OVERFLOW				Overflows at Bailick 1	DOWNSTREAM OF BAILICK1/UPSTREAM OF BAILICK2 OVERFLOWS				Overflows at Bailick 2	DOWNSTREAM OF BAILICK2 OVERFLOW				
	Sample A		Sample B			Sample A		Sample B			Sample A		Sample B		
	Total	Faecal	Total	Faecal		Total	Faecal	Total	Faecal		Total	Faecal	Total	Faecal	
30/03/07	6,000	4,800			Yes (29/03/07)	5,800	4,600			Yes (29/03/07)	2,800	2,800			
02/04/07	410	250				3,700	3,000				140,000	84,000			
13/04/07	>200,000	>120,000				200,000	40,000				Yes (12/04/07)	>200,000	>40,000		
19/04/07	6,100	4,900				30,000	6,000				Yes (18/04/07)	34,000	<10,000		
25/04/07	16,000	6,400	12,000	7,200		17,000	10,000				Yes (24/04/07)	41,000	25,000		
01/05/07	21,000	17,000	26,000	16,000		19,000	11,000					23,000	14,000		
09/05/07	4,500	3,600	4,000	3,200		2,600	2,100				yes (8/05/07)	3,800	3,800		
14/05/07	19,000	6,300	5,100	3,400		15,000	11,000								
24/05/07	4,700	4,700	4,100	4,100		200	200	200	200			380	380	260	170
29/05/07	24,000	26,000	38,000	<10,000		2,200	1,100	1,900	1,900						
05/06/07	12,000	9,000	15,000	3,000	48,000	<1,000	38,000	<1,000	Yes (4/06/07)	1,300	260				
15/06/07	>200,000	>120,000			140,000	56,000			Yes (14/06/07)	180,000	72,000				
21/06/07	36,000	22,000	42,000	17,000	Yes (20/06/07)	70,000	1,000	98,000	59,000	Yes (20/06/07)	90,000	18,000			
27/06/07	46,000	9,200			48,000	9,600			Yes (26/06/07)	21,000	17,000	18,000	3,600		
02/07/07	4,800	2,400			19,000	<1,000	19,000	<1,000	Yes (1/07/07)	6,000	3,000				
13/07/07	49,000	39,000	47,000	19,000	34,000	17,000	30,000	6,000		9,000	9,000	4,000	<10		
19/07/07	45,000	27,000			34,000	14,000	4,100	2,500	Yes (18/07/07)	19,000	<100	6,700	5,400		
25/07/07	16,000	11,000	26,000	<10	60,000	<1,000	70,000	<1,000	Yes (24/07/07)	150,000	30,000	90,000	<1,000		
31/07/07	4,200	4,200	3,300	3,300	Yes (30/07/07)	54,000	<1,000	47,000	9,400	Yes (30/07/07)	2,600	1,700	4,100	4,100	
10/08/07	9,600	9,600	33,000	13,000	Yes (9/08/07)	7,000	2,300			5,400	<1,000	3,800	<1,000		
13/08/07	5,000	3,000	1,800	<100	Yes (12/08/07)	4,700	<100			Yes (12/08/07)	4,200	<100	4,100	<100	
24/08/07	11,000	4,400	30,000	24,000		31,000	25,000			1,900	760	2,700	1,600		
30/08/07	49,000	20,000			44,000	18,000	42,000	25,000		1,400	1,100	1,100	660		
05/09/07	3,000	<10			3,500	3,500	3,200	3,200		3,700	2,200	2,200	1,300		
10/09/07	36,000	36,000			29,000	<10	22,000	17,000		8,500	4,300	7,500	<10		
18/09/07	13,000	4,000	27,000	5,400	7,800	<100				220	55	120	<10		
27/09/07	11,000	4,400	13,000	10,000		45,000	<1,000	26,000	<1,000	9,600	3,800	10,000	8,000		
05/10/07	16,000	<1,000	11,000	<1,000		18,000	<1,000	7,600	3,800	Yes (4/10/07)	3,800	1,500	3,600	720	
12/10/07	7,200	2,900	5,400	1,300		4,200	2,500			Yes (11/10/07)	9,600	9,600	4,700	1,900	
19/10/07	22,000	8,800	21,000	8,400		20,000	6,700			Yes (18/10/07)	14,000	3,500	11,000	8,800	
26/10/07	200,000	80,000	15,000	10,000		19,000	<1,000	14,000	9,300	Yes (25/10/07)	120,000	<1,000	86,000	22,000	
02/11/07	14,000	3,600	17,000	10,000		6,000	<1,000	7,200	2,900	Yes (1/11/07)	600	360	430	430	

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DATE	UPSTREAM OF BAILICK 1 OVERFLOW				Overflows at Bailick 1	DOWNSTREAM OF BAILICK1/UPSTREAM OF BAILICK2 OVERFLOWS				Overflows at Bailick 2	DOWNSTREAM OF BAILICK2 OVERFLOW			
	Sample A		Sample B			Sample A		Sample B			Sample A		Sample B	
	Total	Faecal	Total	Faecal		Total	Faecal	Total	Faecal		Total	Faecal	Total	Faecal
09/11/07	7,900	7,900	5,200	5,200		5,800	4,300	6,200	2,500		4,600	3,700	5,000	5,000
16/11/07	9,100	9,100	12,000	4,800		<u>2,000</u>	<u>400</u>				3,100	<100	1,800	<100
23/11/07	51,000	38,000	31,000	16,000		<u>2,200</u>	<u>&lt;1,000</u>			<b>Yes (22/11/07)</b>	20,000	7,000	19,000	13,000
30/11/07	29,000	<1,000	24,000	9,600		<u>5,600</u>	<u>3,400</u>			<b>Yes (29/11/07)</b>	10,000	2,000	9,700	5,800
07/12/07	4,400	880	1,000	<100		3,700	740	3,900	780					
14/12/07	18,000	<1,000	9,600	6,400		7,800	2,600	11,000	<1,000		4,900	2,400	6,200	1,500
19/12/07	17,000	<1,000	6,600	4,400		900	300	570	<10		<u>2,600</u>	<u>880</u>		
04/01/08	<u>13,000</u>	<u>5,200</u>			<b>Yes (3/01/08)</b>	<u>5,400</u>	<u>2,700</u>				<u>17,000</u>	<u>5,700</u>		
11/01/08	<u>36,000</u>	<u>&lt;1,000</u>			<b>Yes (10/01/08)</b>	10,000	10,000	7,800	6,200	<b>Yes (10/01/08)</b>	5,600	<100	6,000	6,000
18/01/08	>200,000	160,000	>200,000	120,000	<b>Yes (17/01/08)</b>	12,000	7,200	24,000	<1,000	<b>Yes (17/01/08)</b>	28,000	<1,000	18,000	<1,000
25/01/08	22,000	4,400	23,000	14,000	<b>Yes (24/01/08)</b>	<u>6,700</u>	<u>&lt;100</u>			<b>Yes (24/01/08)</b>	<u>13,000</u>	<u>&lt;1,000</u>		
01/02/08	120,000	60,000	71,000	36,000	<b>Yes (31/01/08)</b>	<u>5,000</u>	<u>3,000</u>				4,600	1,200	3,900	1,300
08/02/08	8,400	<1,000	34,400	<1,000	<b>Yes (7/02/08)</b>	<u>4,200</u>	<u>1,100</u>			<b>Yes (7/02/08)</b>	10,900	2,200	5,900	<100
15/02/08	21,000	11,000	16,000	5,400		4,700	1,600	5,600	2,200	<b>Yes (14/02/08)</b>	3,400	1,100	4,600	3,100
22/02/08	6,400	1,300	7,600	2,500		6,000	<100	2,500	<100	<b>Yes (21/02/08)</b>				
29/02/08	3,200	<100	4,400	<100		4,000	1,800	6,600	2,200	<b>Yes (28/02/08)</b>	3,000	600	2,000	700
07/03/08	2,000	<100	3,700	1,500		20,000	<1,000	53,000	<1,000		70,000	23,000	70,000	47,000
14/03/08	10,000	10,000	770	<100		4,700	1,900	4,700	940	<b>Yes (13/03/08)</b>	<u>16,000</u>	<u>16,000</u>		
20/03/08	8,900	<100	8,000	6,400		8,200	1,600	8,800	5,300	<b>Yes (19/03/08)</b>	47,000	19,000	52,000	<1,000
28/03/08	170,000	34,000	85,000	57,000		940	940	2,800	940	<b>Yes (27/03/08)</b>	8,400	4,200	25,000	13,000
04/04/08	11,000	<1,000	22,000	<1,000		<u>5,000</u>	<u>&lt;100</u>	2,200	700		3,600	<100	1,600	800
11/04/08	10,000	2,000	12,000	<100		5,900	1,200	4,500	900	<b>Yes (10/04/08)</b>	<u>9,200</u>	<u>&lt;1,000</u>		
18/04/08	6,200	<100	6,300	6,300		5,200	1,700	7,100	1,800					
25/04/08	4,600	2,800	4,600	3,700		12,600	7,600	7,600	4,600	<b>Yes (24/04/08)</b>	<u>3,100</u>	<u>1,900</u>		
02/05/08	4,200	3,200	5,000	3,000		3,200	1,100	4,700	4,700					
09/05/08	29,000	12,000	26,000	16,000		11,000	4,400	12,000	9,600		<u>1,200</u>	<u>960</u>		
16/05/08	7,200	2,400	10,000	<100		46,000	15,000	71,000	<1,000					
23/05/08	120,000	<1,000	86,000	<1,000	<b>Yes (22/05/08)</b>	<u>69,000</u>	<u>&lt;1,000</u>			<b>Yes (22/05/08)</b>	<u>55,000</u>	<u>&lt;1,000</u>		
30/05/08	3,000	<100	3,700	1,500		4,000	1,000	4,600	1,500					
06/06/08	<u>4,200</u>	<u>2,500</u>				<u>2,400</u>	<u>1,900</u>				<u>990</u>	<u>790</u>		
13/06/08	1,000	500	1,800	900		<u>4,300</u>	<u>2,600</u>							
20/06/08	6,800	6,800	7,700	3,100		<u>7,000</u>	<u>5,600</u>							
27/06/08	48,000	9,600	35,000	14,000		<u>28,000</u>	<u>28,000</u>				<u>22,000</u>	<u>18,000</u>		
04/07/08	>200,000	>80,000	>200,000	>80,000	<b>Yes (03/07/08)</b>	<u>82,000</u>	<u>&lt;1,000</u>			<b>Yes (03/07/08)</b>	25,000	<1,000	27,000	1,100
11/07/08	15,000	12,000	48,000	29,000	<b>Yes (10/07/08)</b>	<u>3,200</u>	<u>3,200</u>			<b>Yes (10/07/08)</b>	<u>5,500</u>	<u>&lt;100</u>		
18/07/08	44,000	44,000	41,000	8,200		<u>5,600</u>	<u>&lt;100</u>				<u>3,800</u>	<u>&lt;100</u>		

Consent of copyright owner required for any other use.

DATE	UPSTREAM OF BAILICK 1 OVERFLOW				Overflows at Bailick 1	DOWNSTREAM OF BAILICK1/UPSTREAM OF BAILICK2 OVERFLOWS				Overflows at Bailick 2	DOWNSTREAM OF BAILICK2 OVERFLOW			
	Sample A		Sample B			Sample A		Sample B			Sample A		Sample B	
	Total	Faecal	Total	Faecal		Total	Faecal	Total	Faecal		Total	Faecal	Total	Faecal
25/07/08	34,000	6,800				7,200	7,200			5,300	3,200			
01/08/08	>200,000	>200,000			Yes (310708)	>200,000	>160,000			Yes (310708)				
08/08/08	200,000	80,000	200,000	160,000	Yes (070808)	6,900	5,500			Yes (070808)	6,300	6,300		
15/08/08	>200,000	>200,000	>200,000	>200,000	Yes (140808)	>200,000	>200,000							
22/08/08	>200,000	>120,000	>200,000	>120,000	Yes (210808)	120,000	24,000			Yes (210808)	92,000	<1,000		
29/08/08	>200,000	>200,000	190,000	110,000	Yes (280808)	5,100	4,100				7,200	<100		
05/09/08	>200,000	>200,000	>200,000	>200,000	Yes (040908)	>200,000	>200,000			Yes (040908)	43,000	43,000		
	MPN/100 ml	MPN/100 ml	MPN/100 ml	MPN/100 ml		MPN/100 ml	MPN/100 ml	MPN/100 ml	MPN/100 ml		MPN/100 ml	MPN/100 ml	MPN/100 ml	MPN/100 ml
12/09/08	460,000	24,000	2,400,000	460,000	Yes (110908)	11,000	4,600			Yes (110908)				
19/09/08	460,000	240,000	110,000	110,000	Yes (180908)	4,600	4,600			Yes (180908)	2,400	2,400		
26/09/08	460,000	110,000	240,000	46,000		4,600	4,600							
03/10/08	46,000	11,000	24,000	11,000	Yes (021008)	1,100	1,100			Yes (021008)	2,400	1,100		
10/10/08	46,000	24,000	24,000	24,000	Yes (091008)	4,600	2,400							
17/10/08	1,100,000	11,000	110,000	46,000	Yes (181008)	4,600	1,100			Yes (181008)	2,400	2,400		
24/10/08	110,000	46,000	110,000	24,000	Yes (231008)	2,400	2,400							
31/10/08	2,400	2,400	24,000	24,000	Yes (301008)	4,600	1,100			Yes (301008)	11,000	1,100	2,400	1,100
07/11/08	110,000	46,000	460,000	240,000		1,100,000	46,000				460	23	460	43
14/11/08	46,000	4,600	460,000	46,000	Yes (131108)	46,000	4,600			Yes (131108)	2,400	2,400	4,600	210
21/11/08	24,000	24,000	46,000	46,000	Yes (201108)	46,000	46,000				2,400	2,400	2,400	1,100
28/11/08	4,600	1,100	11,000	460		4,600	460			Yes(271108)	4,600	460	2,400	1,100
05/12/08	240,000	46,000	110,000	46,000	Yes(041208)	46,000	4,600			Yes (041208)	2,400	2,400	4,600	4,600
12/12/08	4,600	2,400	46,000	2,400		2,400	240			Yes (111208)	2,400	460		
19/12/08	4,600	2,400	11,000	2,400		460	240				2,400	1,100		
02/01/09	4,600	240	1,100	240		4,600	240			Yes (010109)	1,100	460		
09/01/09	240	93	240	43		240	93			Yes(080109)				
16/01/09	4,600	4,600			Yes (150109)	1,100	240			Yes (150109)	240	240		
23/01/09	24,000	1,500			Yes (220109)	46,000	4,600			Yes (220109)	46,000	9,300		
30/01/09	110,000	46,000	110,000	46,000	Yes (290109)	4,600	4,600	24,000	4,600	Yes (290109)	1,100	460	2,400	1,100
06/02/09	24,000	24,000	4,600	2,400	Yes (050209)	2,400	2,400			Yes(050209)	11,000	2,400		
13/02/09	110,000	4,600	110,000	11,000	Yes (120209)	4,600	2,400	4,600	2,400	Yes (120209)	2,400	2,400		
20/02/09	110,000	46,000	24,000	24,000	Yes (190209)	4,600	1,500	4,600	930		2,400	460		
27/02/09	4,600	1,500	2,400	460	Yes (260209)	1,100	460	460	240	Yes (260209)	460	240		
06/03/09	11,000	4,600	46,000	9,300	Yes (050309)	2,400	460	2,400	1,100	Yes (050309)	46,000	24,000		
13/03/09	24,000	24,000	46,000	4,600		4,600	460	460	460	Yes (120309)	4,600	4,600		
20/03/09	24,000	4,600	11,000	2,400		460	460	1,100	1,100	Yes (190309)	240	93	93	43
27/03/09	4,600	1,100	4,600	2,400		1,100	240	2,400	1,100	Yes (260309)	240	240	1,100	240

Consent of copyright owner required for any other use.

DATE	UPSTREAM OF BAILICK 1 OVERFLOW				Overflows at Bailick 1	DOWNSTREAM OF BAILICK1/UPSTREAM OF BAILICK2 OVERFLOWS				Overflows at Bailick 2	DOWNSTREAM OF BAILICK2 OVERFLOW			
	Sample A		Sample B			Sample A		Sample B			Sample A		Sample B	
	Total	Faecal	Total	Faecal		Total	Faecal	Total	Faecal		Total	Faecal	Total	Faecal
03/04/09	2,400	240	2,400	240		2,400	1,100	2,400	240		460	9	460	4
10/04/09	<u>11,000</u>	<u>2,400</u>				<u>24,000</u>	<u>4,600</u>			<b>Yes (090409)</b>	11,000	11,000	2,400	2,400
17/04/09	24,000	4,600	4,600	2,400	<b>Yes (160409)</b>	11,000	4,600	2,400	2,400	<b>Yes (160409)</b>	2,400	1,100		
24/04/09	11,000	2,400	110,000	1,100		1,100	1,100	24,000	1,100	<b>Yes (230409)</b>	<u>11,000</u>	<u>11,000</u>		
01/05/09	4,600	1,100	11,000	4,600	<b>Yes (300409)</b>	4,600	1,100	1,100	1,100	<b>Yes (300409)</b>	<u>11,000</u>	<u>4,600</u>		
08/05/09	46,000	2,400	4,600	1,100		2,400	240	1,100	240		4,600	460		
15/05/09	110,000	11,000	110,000	2,400		<u>4,600</u>	<u>1,100</u>				<u>4,600</u>	<u>2,400</u>		
22/05/09	46,000	46,000	11,000	11,000		<u>4,600</u>	<u>4,600</u>			<b>Yes (210509)</b>	<u>1,100</u>	<u>1,100</u>		
29/05/09	4,600	4,600	46,000	2,400		<u>4,600</u>	<u>240</u>			<b>Yes (280509)</b>	<u>1,100</u>	<u>460</u>		
05/06/09	11,000	460	2,400	210		<u>4,600</u>	<u>4,600</u>				240,000	240,000	1,100,000	1,100,000
12/06/09	11,000	2,400	4,600	4,600		<u>2,400</u>	<u>1,100</u>			<b>Yes (110609)</b>	460,000	460,000	240,000	240,000
19/06/09	110,000	240	110,000	11,000	<b>Yes (180609)</b>	4,600	2,400	4,600	2,400	<b>Yes (180609)</b>	46,000	46,000	240,000	240,000
26/06/09	24,000	2,400	24,000	24,000		2,400	460	460	240		24,000	24,000	11,000	11,000
03/07/09	460,000	110,000	1,100,000	110,000		110,000	46,000	46,000	24,000		<u>24,000</u>	<u>24,000</u>		
10/07/09	<u>46,000</u>	<u>46,000</u>				7,500	2,300	24,000	2,100		<u>15,000</u>	<u>9,300</u>		
17/07/09	24,000	9,300				240,000	1,600	46,000	24,000	<b>Yes (160709)</b>	<u>46,000</u>	<u>9,300</u>		
24/07/09	46,000	24,000				9,300	9,300	4,300	400	<b>Yes (230709)</b>	<u>110,000</u>	<u>4,300</u>		

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Time sample  
taken

Tide times

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**Time sample  
taken**

**Tide times**

0930-1000	0829 low water 1430 high water
0930-1000	0710 high water 1330 low water
0930-1000	0709 low water 1306 high water
0930-1000	0714 high water 1345 low water
0930-1000	0628 low water 1218 high water
0930-1000	0615 high water 1236 low water
0930-1000	0523 low water 1121 high water
0930-1000	0615 high water 1246 low water
0930-1000	0428 low water 1018 high water
0930-1000	0513 high water 1135 low water
0930-1000	0403 low water 0957 high water
0930-1000	0516 H 1147 L
0930-1000	0855H 1521L
0930-1000	0457H 1121L
0930-1000	0954H 1622L
0930-1000	0507 H 1141 L
0930-1000	0852 H 1519L
0930-1000	0952L 1549H
0930-1000	0858H 1528L
0930-1000	1016H
0930-1000	0800H 1427L
0930-1000	0810L 1402H
0930-1000	0800H 1432L
0930-1000	0833L 1422H
0930-1000	0714H 1338L
0930-1000	0621L 1217H
0930-1000	0700H 1333L
0930-1000	0640L 1223H
0930-1000	0624H 1246L

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Time sample taken	Tide times
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0930-1000	0450L 1047H
0930-1000	0600H 1232L
0930-1000	0459L 1044H
0930-1000	0523H 1148L
0930-1000	0932H 1602L
0930-1000	0457H 1131L
0930-1000	0924H 1551L

0930-1000	0410H 1032L
0930-1000	0828H 1456L
0930-1000	0347H 1023L
0930-1000	0817H 1440L
0930-1000	0850L 1501H
0930-1000	0730H 1359L
0930-1000	0856L 1458H
0930-1000	0621H 1243L
0930-1000	0549L 1144H
0930-1000	0532H 1204L
0930-1000	0609L 1209H
0930-1000	0530H 1152L
0930-1000	0403L 1003H
0930-1000	0428H 1106L
0930-1000	0430L 1026H
0930-1000	0848H 1510L
0930-1000	0958L 1546H
0930-1000	0903H 1535L
0930-1000	0955L 1548H
0930-1000	0744H 1404L
0930-1000	0831L 1424H
0930-1000	0751H 1421L
0930-1000	0811L 1425H
0930-1000	0645H 1304L
0930-1000	0645L 1245H
0930-1000	0646H 1316L
0930-1000	0608L 1156H
0930-1000	0545H 1205L

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**Time sample  
taken**

**Tide times**

0930-1000	0612L 1209H
0930-1000	0646H 1315L
0930-1000	0522L 1103H
0930-1000	0536H 1200L
0930-1000	0503L 1057H
0930-1000	0541H 1211L
0930-1000	0951H 1626L
0930-1000	0411H 1042L
0930-1000	0402L 0955H
0930-1000	0424H 1058L
0930-1000	0853H 1521L
0930-1000	0909L 1500H
0930-1000	0853H 1523L
0930-1000	0929L 1521H
0930-1000	0800H 1422L
0930-1000	0716L 1313H
0930-1000	0748H 1418L

*For inspection purposes only.  
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CFU/100ml	DB4 taken from c
CFU/100ml	DB4A and DB6 u
CFU/100ml	DB4A unavailabl
CFU/100ml	DB4A unavailabl
CFU/100ml	DB4A and DB6 u

Date sampled	Influent		Pre UV		Post UV	
	Total coliform per 100 ml	Faecal coliform per 100 ml	Total coliform per 100 ml	Faecal coliform per 100 ml	Total coliform per 100 ml	Faecal coliform per 100 ml
28-Jun-00	100,000		>12,000	7,300	10	0
04-Jul-00	12,000,000	8,800,000	>120,000	11,800	50	10
11-Jul-00	10,000,000	4,200,000	>12,000	8,900	80	2
18-Jul-00	11,800,000	9,500,000		>12,000	164	1
25-Jul-00	4,800,000	800,000	140,000	40,000	30	0
01-Aug-00	75,000,000	19,000,000	444,000	44,000	63	24
08-Aug-00	21,400,000	9,066,667	58,000	1,000	30	0
15-Aug-00	59,000,000	4,000,000	119,000	37,000	4,300	390
22-Aug-00	60,000,000	8,200,000	140,000	30,000	70	0
30-Aug-00	44,000,000	11,850,000	720,000	50,000	120	20
05-Sep-00	9,300,000	2,600,000	300,000	30,000	470	20
12-Sep-00	39,000,000	11,000,000	6,800,000	460,000	220	20
20-Sep-00	35,000,000	5,700,000	70,000	10,000	66	14
26-Sep-00	18,000,000	2,000,000	200,000	10,000	150	20
04-Oct-00	7,100,000	2,300,000	110,000		3,100	20
11-Oct-00	3,900,000	1,000,000	30,000	7,000	40	2
18-Oct-00	9,200,000	2,400,000	68,000	16,000	90	8
24-Oct-00	16,000,000	1,000,000	870,000	120,000	13	1
31-Oct-00	5,100,000	1,180,000	60,000	17,000	19	7
07-Nov-00	4,000,000	810,000	40,000	6,000	190	37
15-Nov-00	18,000,000	2,500,000	158,000	27,000	2	0
21-Nov-00	5,100,000	2,150,000	1,270,000	470,000	15	5
29-Nov-00	2,800,000	1,060,000	76,000	11,000	101	25
05-Dec-00	2,800,000	1,000,000	73,000	13,000	15	3
12-Dec-00	1,300,000	90,000	80,000	20,000	18	8
03-Jan-01	3,100,000	810,000	90,000	25,000	69	30
09-Jan-01	840,000	520,000	82,000	33,000	400	140
16-Jan-01	3,800,000	1,400,000	66,000	28,000	20	7
24-Jan-01	870,000	320,000	59,000	28,000	690	90
30-Jan-01	4,200,000	2,300,000	100,000	9,000	5	0
08-Feb-01	670,000	290,000	20,000	6,000	9	4
13-Feb-01	1,270,000	970,000	20,000	5,000	12	0
20-Feb-01	1,900,000	510,000	40,000	7,000	19	2
28-Feb-01	4,000,000	1,080,000	22,000	3,000	9	3
07-Mar-01	3,200,000	960,000	28,000	5,000	4	3
14-Mar-01	1,500,000	900,000	80,000	20,000	170	10
21-Mar-01	2,200,000	500,000	460,000	80,000	45	27
27-Mar-01	12,000,000	4,000,000	130,000	100,000	100	27
05-Apr-01	10,000,000	1,000,000	16,000		46	6
09-Apr-01	6,700,000	1,100,000	25,000	2,000	89	2
18-Apr-01	8,600,000	180,000	1,080,000	90,000	50	2
25-Apr-01	21,000,000	3,200,000	2,600,000	350,000	2,000	230
02-May-01	36,000,000	2,000,000	3,300,000	230,000	86	10
09-May-01	38,000,000	4,300,000	33,000	38,000	26	2
15-May-01	14,130,000	1,660,000	52,000		17	3
22-May-01	41,000,000	2,900,000	320,000	30,000	34	4

28-May-01	9,200,000	2,100,000	600,000	64,000	53	5
05-Jun-01	5,600,000	3,800,000	550,000	50,000	560	23
11-Jun-01	1,800,000	700,000	>24,000	11,199	4,604	155
18-Jun-01	7,100,000	3,400,000	45,000	3,000	73	23
25-Jun-01	77,000,000	22,000,000	111,667	6,000	4,000	290
02-Jul-01	35,000,000	13,300,00	290,000	39,500	185	31
09-Jul-01	21,000,000	2,300,000	68,000	17,500	20	4
17-Jul-01	3,000,000	700,000	105,000	33,000	31	1
23-Jul-01	190,000	190,000	74,000	41,000	35	13
31-Jul-01	10,100,000	3,300,000	91,000	26,000	31	3
07-Aug-01	5,600,000	1,000,000	52,000	5,000	3,900	800
13-Aug-01	6,200,000	1,500,000	83,000	17,000	510	84
21-Aug-01	26,000,000	4,000,000	300,000	40,000	17	2
28-Aug-01	43,000,000	5,500,000	72,000	69,000	4	3
11-Sep-01	56,000,000	14,000,000	75,000	30,000	33	7
18-Sep-01						
26-Sep-01						
01-Oct-01	3,900,000	650,000	180,000	50,000	13	6
10-Oct-01	4,400,000	2,500,000	80,000	12,000	110	30
15-Oct-01	17,000,000	4,200,000	243,000	57,000	82	24
24-Oct-01	15,000,000	2,400,000	400,000	53,000	6	3
30-Oct-01	29,000,000	480,000	1,400,000	370,000	830	129
06-Nov-01	9,800,000	2,800,000	680,000	130,000	1,550	700
12-Nov-01	1,100,000	220,000	300,000	34,000	350	41
20-Nov-01	7,500,000	3,500,000	860,000	250,000	490	62
29-Nov-01	11,950,000	2,000,000	232,000	73,000	610	104
04-Dec-01	30,000,000	8,100,000	465,000	28,000	70	9
11-Dec-01	720,000	170,000	103,000	39,000	4,900	500
07-Jan-02	730,000	520,000	29,000	6,000	14	12
15-Jan-02	2,800,000	1,800,000	6,000	3,500	8	6
22-Jan-02	910,000	680,000	22,000	8,000	31	15
29-Jan-02	3,680,000	2,840,000	1,120,000	1,600,000	490	80
06-Feb-02	2,100,000	625,000	16,000	3,000	5	1
11-Feb-02	8,400,000	800,000	100,000	9,000	48	5
18-Feb-02	4,550,000	1,200,000	81,000	9,000	23	11
26-Feb-02	5,900,000	1,020,000	920,000	45,000	310	90
06-Mar-02	6,000,000	5,100,000	25,000	7,000	8	4
13-Mar-02	3,700,000	2,400,000	285,000	55,000	39,000	17,000
19-Mar-02	5,800,000	2,750,000	61,000	8,000	4	2
25-Mar-02	5,600,000	3,500,000	510,000	220,000	85	44
03-Apr-02	5,700,000	1,390,000	210,000	20,000	71	17
09-Apr-02	8,800,000	3,200,000	39,000	1,000	440	30
16-Apr-02	12,000,000	4,350,000	66,000	2,000	3	1
23-Apr-02	7,700,000	2,900,000	260,000	30,000	68	18
01-May-02	5,400,000	2,300,000	32,000	4,000	13	5
07-May-02	32,000,000	4,500,000	163,000	54,000	5	1
14-May-02	10,800,000	3,300,000	39,000	3,000	97	17
20-May-02	8,050,000	895,000	54,300	<1,000	39	5
29-May-02	46,000,000	5,700,000	91,670	2,000	14	2
06-Jun-02	7,200,000	3,700,000	33,000	1,000	72	19
11-Jun-02	2,100,000	290,000	26,000	1,000	1	0
17-Jun-02	70,000	10,000	26,000	2,000	26	1

Consent of EPA is for non-purposes only. For any other use, consent of EPA is required.

25-Jun-02	7,200,000	6,050,000	86,000	15,500	60	17
03-Jul-02	36,000,000	1,653,333	104,667	40,000	67	11
09-Jul-02	7,700,000	1,500,000	21,500	5,500	6	1
16-Jul-02	7,100,000	2,600,000	235,000	6,000	210	35
24-Jul-02	25,000,000	6,750,000	82,000	8,000	5,700	2,600
29-Jul-02	40,000,000	7,350,000	130,334	17,500	61	12
06-Aug-02	87,000,000	10,150,000	119,500	6,000	120	24
15-Aug-02	12,100,000	5,300,000	107,000	24,000	26	9
21-Aug-02	18,000,000	800,000	81,000	9,000	49	10
26-Aug-02	40,000,000	6,200,000	80,000	23,000	40	15
03-Sep-02	27,000,000	4,550,000	634,000	42,000	830	88
10-Sep-02	86,000,000	4,500,000	855,000	104,500	374	221
16-Sep-02	40,000,000	2,550,000	26,667	3,000	55	11
24-Sep-02	21,400,000	7,100,000	60,000	20,000	26	11
03-Oct-02	28,000,000	7,450,000	141,000	30,500	100	36
09-Oct-02	5,450,000	2,500,000	390,000	240,000	53	24
16-Oct-02	7,300,000	1,700,000	26,000	15,500	7	5
22-Oct-02	23,600,000	7,200,000	57,300	5,500	11	1
30-Oct-02	21,300,000	4,100,000	33,500	4,000	4	0
06-Nov-02	7,550,000	1,763,333	42,000	2,000	28	6
12-Nov-02	6,100,000	2,200,000	327,333	5,000	544	6
20-Nov-02	5,700,000	1,700,000	44,000	7,000	5	1
26-Nov-02	1,300,000	760,000	21,000	4,000	4	2
04-Dec-02	13,800,000	1,373,333	39,500	6,500	50	9
10-Dec-02	5,600,000	953,333	21,000	7,000	12	5
18-Dec-02	10,000,000	2,700,000	122,500	21,000	11	11
02-Jan-03	3,800,000	3,500,000	49,000	12,500	8	1
08-Jan-03	1,350,000	1,350,000	49,000	3,000	1	0
16-Jan-03	17,700,000	2,726,667	157,500	22,500	60	20
21-Jan-03	180,000	65,000	20,500	14,000	11	9
29-Jan-03	17,700,000	4,200,000	77,500	16,500	50	8
05-Feb-03	18,250,000	5,800,000	111,500	13,000	29	5
12-Feb-03	3,250,000	2,800,000	55,000	12,000	93	4
19-Feb-03	2,583,000	1,013,000	150,000	13,000	51	10
26-Feb-03	6,550,000	765,000	68,000	12,000	81	2
05-Mar-03	13,400,000	2,146,500	19,500	1,000	11	1
11-Mar-03	4,900,000	1,513,000	243,000	94,000	18	5
19-Mar-03	7,450,000	950,000	196,667	22,000	23	2
25-Mar-03	6,650,000	2,490,000	299,000	47,000	120	41
02-Apr-03	7,033,000	2,976,000	185,000	55,000	80	16
09-Apr-03	6,500,000	1,623,000	51,000	7,000	245	9
15-Apr-03	46,000,000	1,250,000	57,000	1,000	68	30
22-Apr-03	8,700,000	1,780,000	30,500	1,000	192	12
30-Apr-03	8,150,000	2,500,000	21,000	5,000	35	6
08-May-03	4,187,000	3,507,000	120	60	500	461
15-May-03	7,127,500	1,087,500	49,000	8,400	71	8
20-May-03	3,510,000	1,175,000	33,400	8,733	15	3
26-May-03	345,000	90,000	8,000	1,000	13	2
05-Jun-03	12,550,000	5,300,000	37,800	0	52	1
10-Jun-03	7,300,000	1,500,000	30,800	1,300	15	10
18-Jun-03	9,570,000	1,170,000	64,000	3,000	1,190	54
25-Jun-03	168,000,000	132,000,000	110,000	57,000	1,400	1,815

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

01-Jul-03	41,500,000	3,600,000	50,000	14,000	72	3
07-Jul-03	13,800,000	3,475,000	111,500	8,000	61	12
15-Jul-03	18,700,000	4,400,000	89,000	18,500	505	18
23-Jul-03	34,000,000	3,550,000	103,000	27,500	1,100	152
30-Jul-03	8,930,000	2,100,000	176,000	11,650	168	6
06-Aug-03	32,760,000	5,670,000	240,000	79,000	158	1
12-Aug-03	70,000,000	13,400,000	593,000	23,500	2,000	170
19-Aug-03	16,700,000	2,200,000	118,000	10,000	150	11
26-Aug-03	29,500,000	5,366,667	205,500	73,500	112	14
03-Sep-03	11,000,000	3,850,000	82,000	33,000	10	10
10-Sep-03	14,700,000	5,450,000	62,000	16,000	310	45
16-Sep-03	10,700,000	3,300,000	<10,000	2,000	90	5
23-Sep-03	8,500,000	4,700,000	95,000	20,000	19	10
01-Oct-03	8,300,000	4,000,000	110,000	42,000	440	55
07-Oct-03	21,550,000	7,650,000	232,000	29,500	267	49
13-Oct-03	21,500,000	12,100,000	68,000	58,000	3,500	450
21-Oct-03	19,000,000	2,800,000	100,333	22,000	57	18
29-Oct-03	12,050,000	3,600,000	535,000	92,000	40	16
04-Nov-03	8,733,333	2,033,333	190,000	44,000	61	6
12-Nov-03	33,500,000	5,270,000	450,000	42,000	109	18
26-Nov-03	2,666,666	1,700,000	91,000	17,500	44	14
02-Dec-03	5,550,000	1,750,000	110,000	20,000	10	6
11-Dec-03	21,525,000	6,566,666	270,500	28,333	1,070	90
16-Dec-03	2,200,000	510,000	62,500	7,000	27	5
22-Dec-03	6,633,333	2,300,000	126,333	18,000	61	26
08-Jan-04	584,250	204,000	163,000	11,500	110	28
14-Jan-04	5,750,000	1,603,333	69,000	8,000	15	4
22-Jan-04	655,000	330,000	52,500	10,000	44	5
27-Jan-04	2,900,000	1,755,000	13,000	12,000	6	4
05-Feb-04	7,966,667	1,800,000	36,500	8,500	23	10
12-Feb-04	16,150,000	3,600,000	64,000	10,000	150	30
18-Feb-04	7,800,000	2,500,000	60,000	9,000	20	1
25-Feb-04	7,200,000	2,500,000	42,000	10,500	22	4
04-Mar-04	2,650,000	1,500,000	220,000	29,500	38	13
10-Mar-04	8,350,000	1,680,000	320,000	69,000	72	70
18-Mar-04	7,250,000	1,074,000	1,050,000	150,000	460	60
30-3-004	4,700,000	1,000,000	190,000	23,000	72	18
07-Apr-04	4,800,000	1,000,000	167,500	18,000	316	7
14-Apr-04	6,150,000	1,500,000	190,000	19,000	32	5
21-Apr-04	7,160,000	2,470,000	200,000	50,000	38	7
28-Apr-04			615,000	263,333	615	30
06-May-04			345,000	68,300		
13-May-04	7,250,000	1,700,000	230,000	31,300	550	53
19-May-04	19,250,000	1,650,000	360,000	27,000	150	24
09-Jun-04	8,700,000	4,700,000	50,000	24,000	14	8
16-Jun-04		3,750,000	175,000	20,500	1,200	40
23-Jun-04	9,300,000	4,550,000	142,000	8,000	50	24
01-Jul-04			72,333	10,667	1,755	33
08-Jul-04		5,700,000	78,333	12,500	190	12

## Results from Outside Consultants



29/10/04	36,000	6,200	800	0	0	0
04/11/04	14,000	9,500	4,100	230		
04/11/04	>1,100,000	>1,100,000	460,000	460,000	<30	<30
12/11/04	49,000	8,200	2,100	350	0	0
18/11/04	>1,100,000	>1,100,000	29,000	29,000	<30	<30
25/11/04	>11,000,000	4,600,000	2,400,000	2,400,000	400	<30
02/12/04	4,600,000	1,500,000	7,500	<30	<30	<30
10/12/04	11,000,000	11,000,000	150,000	11,000	<30	<30
16/12/04	2,400,000	240,000	110,000	15,000	<30	<30
07/01/05	110,000,000	4,600,000	460,000	24,000	<30	<30
14/01/05	24,000,000	1,500,000	46,000	900	2,300	<30
20/01/05	7,500,000	900,000	24,000	2,400	1,100	90
28/01/05	11,000,000	280,000	21,000	11,000	93	7
03/02/05	4,600,000	240,000	110,000	24,000	23	9
10/02/05	2,100,000	1,500,000	150,000	24,000	4	4
17/02/05	2,100,000	1,500,000	150,000	75,000	93	9
24/02/05	1,100,000	1,100,000	11,000	11,000	460	150
03/03/05	4,600,000	<1	75,000	<1	460	21
14/03/05	4,600,000	150,000	110,000	1,100	1,500	48
18/03/05	11,000,000	110,000	460,000	460	4,600	4
24/03/05	4,600,000	120,000	110,000	15,000	48	<3
01/04/05	4,600,000	3,000	1,100,000	<3	48	<3
07/04/05	4,600,000	150,000	240,000	11,000	23	<3
14/04/05	>20,000	>2000	3,400	<100	>20,000	>20,000
21/04/05	22,000,000	11,000,000	>100,000	<100,000	<10,000	<10,000
28/04/05	10,000,000	6,000,000	86,000	69,000	<100	<100
05/05/05	4,000,000	2,000,000	100,000	<100,000	<1,000	<1,000
12/05/05						
19/05/05	8,600,000	5,200,000	390,000	<10,000	5	<1
26/05/05	7,300,000	5,840,000	160,000	40,000	140	<10
02/06/05	3,120,000	1,040,000	17,000	17,000	330	80
09/06/05	6,000,000	6,000,000	36,000	7,200	130,000	78,000
16/06/05	13,000,000	8,700,000	130,000	43,000	110	36
20/06/05	54,400,000	13,600,000	80,000	32,000	<10	<10
30/06/05	33,000,000	<10,000,000	35,000	<1,000	130	43
07/07/05	51,000,000	34,000,000	22,000	22,000	<1	<1
14/07/05	20,400,000	12,240,000	201,800	100,900	<10	<10
21/07/05	92,000,000	55,200,000	66,000	66,000	500	<10
28/07/05	24,000,000	12,000,000	180,000	<10,000	44,000	17,600
04/08/05	36,000,000	27,000,000	112,000	28,000	20	<10
11/08/05	85,000,000	68,000,000	240,000	<100,000	24	<10
18/08/05	<10,000	<10,000	<1,000	<1,000	<10	<10
25/08/05	26,000,000	26,000,000	1,300,000	330,000	340	170
01/09/05	180,000,000	110,000,000	84,000	42,000	20	<10
08/09/05	61,000,000	24,000,000	5,000,000	4,000,000	160	80
15/09/05	16,800,000	<1,000,000	1,200,000	400,000	2,500	<100
22/09/05	16,800,000	4,200,000	<100,000	<100,000	230	120

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

29/09/05	6,500,000	5,200,000	300,000	74,000	370	74
06/10/05	4,300,000	2,200,000	660,000	328,000	760	600
13/10/05	2,700,000	540,000	760,000	304,000	840	170
20/10/05	10,500,000	8,400,000	3,800,000	2,300,000	490	490
27/10/05	15,600,000	15,600,000	220,000	220,000	30	10
03/11/05	12,000,000	9,600,000	71,000	43,000	60	12
10/11/05	4,900,000	2,900,000	220,000	<54,000	<10	<10
17/11/05	8,200,000	3,300,000	160,000	110,000	30	20
24/11/05	2,900,000	1,900,000	260,000	64,000	10	10
01/12/05	2,500,000	2,000,000	210,000	100,000	20	10
08/12/05	3,000,000	2,400,000	34,000	20,000	10	<10
15/12/05	4,800,000	2,400,000	22,000	11,000	68	34
05/01/06	4,300,000	3,400,000	87,000	52,000	20	20
12/01/06	6,500,000	2,600,000	41,000	16,000	60	24
19/01/06	3,200,000	1,600,000	160,000	120,000	72	<10
26/01/06	4,100,000	1,640,000	330,000	66,000	10	<10
02/02/06	21,000,000	<1,000,000	160,000	64,000	30	20
09/02/06	6,400,000	5,100,000	110,000	<10,000	30	20
13/02/06	13,000,000	7,800,000	88,000	35,000	60	<10
23/02/06	9,200,000	7,400,000	270,000	110,000	10	<10
27/02/06	11,000,000	8,800,000	59,000	35,000	440	88
09/03/06	7,500,000	3,000,000	50,000	40,000	66	26
13/03/06	16,000,000	9,600,000	100,000	<10,000	130	130
23/03/06	4,500,000	2,700,000	44,000	8,800	43	17
27/03/06	2,400,000	1,800,000	26,000	5,200	16	<1
06/04/06	11,000,000	3,700,000	800,000	<1,000	22	<1
10/04/06	23,000,000	9,200,000	7,000,000	200,000	120	90
20/04/06	32,000,000	19,000,000	130,000	44,000	23	<1
24/04/06	11,000,000	2,200,000	260,000	52,000	31	12
04/05/06	6,000,000	3,600,000	36,000	14,400	110	88
08/05/06	3,400,000	2,600,000	37,000	<1,000	240	<10
15/05/06	22,000,000	4,400,000	110,000	22,000	380	150
25/05/06	38,000,000	<10,000	81,000	49,000	72	<10
31/05/06	<10,000	<10,000	<1,000	<1,000	230	140
07/06/06	23,000,000	13,800,000	220,000	88,000	370	150
16/06/06	30,000,000	12,000,000	190,000	110,000	480	480
22/06/06	17,000,000	7,000,000	96,000	77,000	77	31
30/06/06	9,300,000	9,300,000	68,000	41,000	82	16
04/07/06	16,000,000	11,000,000	110,000	<10,000	2,200	550
14/07/06	69,000,000	55,000,000	160,000	96,000	410	160
17/07/06	72,000,000	14,000,000	230,000	46,000	210	42
26/07/06	1,300,000	330,000	1,800,000	360,000	31	<1
03/08/06	100,000,000	60,000,000	740,000	300,000	190	76
11/08/06	34,000,000	27,000,000	1,200,000	240,000	85	<1
16/08/06	67,000,000	40,000,000	180,000	180,000	60	48
23/08/06	31,000,000	6,200,000	2,600,000	520,000	4,800	2,400
31/08/06	33,000,000	25,000,000	510,000	310,000	120	<10
08/09/06	40,000,000	32,000,000	210,000	170,000	1,700	<100
11/09/06	30,000,000	6,000,000	3,300,000	2,600,000	940	560

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

19/09/06	4,400,000	2,900,000	110,000	22,000	<1	<1
27/09/06	55,000,000	33,000,000	730,000	150,000	73	37
04/10/06	40,000,000	30,000,000	220,000	73,000	3,100	620
10/10/06	32,000,000	13,000,000	360,000	72,000	420	170
20/10/06	12,000,000	4,000,000	64,000	32,000	80	40
26/10/06	5,700,000	4,600,000	11,000	2,200	180	36
31/10/06	7,700,000	7,700,000	84,000	50,000	27	17
09/11/06	5,500,000	4,400,000	56,000	34,000	7	4
16/11/06	8,200,000	3,300,000	67,000	<1,000	26	21
23/11/06	3,200,000	640,000	120,000	<10,000	3	<1
01/12/06	210,000	210,000	55,000	13,800	11	<1
08/12/06	890,000	530,000	5,000	2,000	<1	<1
11/12/06	990,000	792,000	76,000	3,800	2	<1
19/12/06	2,200,000	440,000	43,000	26,000	<1	<1
05/01/07	5,700,000	4,600,000	96,000	96,000	11	4
10/01/07	4,600,000	2,300,000	73,000	29,000	3	<1
15/01/07	3,200,000	3,200,000	35,000	21,000	2	1
25/01/07	3,300,000	2,600,000	42,000	42,000	40	16
30/01/07	33,000,000	6,600,000	170,000	<10,000	64	26
09/02/07	4,700,000	4,700,000	32,000	<1,000	68	41
12/02/07	9,600,000	2,400,000	21,000	15,800	3,200	800
22/02/07	430,000	340,000	35,000	35,000	4	2
28/02/07	11,000,000	2,800,000	100,000	<10,000	13	3
05/03/07	38,000,000	19,000,000	10,000	<1,000	<1	<1
15/03/07	7,000,000	4,200,000	38,000	23,000	2	<1
20/03/07	11,200,000	2,800,000	88,000	22,000	36	29
30/03/07	6,300,000	3,800,000	160,000	96,000	110	22
02/04/07	48,000,000	29,000,000	42,000	25,000	5	5
13/04/07	30,000,000	<1,000,000	54,000	11,000	2,800	560
19/04/07	41,000,000	8,200,000	25,000	<1,000	38	10
25/04/07	22,000,000	4,400,000	180,000	120,000	2	2
01/05/07	19,000,000	7,600,000	360,000	290,000	18	4
09/05/07	4,900,000	3,900,000	380,000	76,000	20	12
14/05/07	1,400,000	<100,000	280,000	110,000	27	14
24/05/07	32,000,000	19,000,000	1,700,000	<100,000	32	13
29/05/07	27,000,000	18,000,000	54,000	54,000	10	3
05/06/07	78,000,000	47,000,000	180,000	<10,000	5	1
15/06/07	32,000,000	6,400,000	220,000	44,000	80	32
21/06/07	25,000,000	10,000,000	57,000	<1,000	52	10
27/06/07	15,000,000	<1,000,000	120,000	<10,000	480	<100
02/07/07	52,000,000	<1,000,000	130,000	<10,000	400	<100
13/07/07	13,000,000	3,300,000	110,000	54,000	240	180
19/07/07	39,000,000	16,000,000	390,000	<10,000	17	3
25/07/07	19,000,000	<1,000,000	56,000	<10,000	3,300	830
31/07/07	18,000,000	14,000,000	37,000	74,000	3,100	1,200
10/08/07	6,800,000	3,400,000	90,000	30,000	56	<10
13/08/07	1,800,000	<100,000	35,000	7,000	14	10
24/08/07	10,000,000	6,000,000	300,000	150,000	48	38
30/08/07	34,000,000	26,000,000	560,000	450,000	81	54

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05/09/07	4,600,000	2,800,000	220,000	44,000	17,000	14,000
10/09/07	75,000,000	<1,000,000	540,000	<10,000	66	<10
18/09/07	31,000,000	16,000,000	84,000	<10,000	180	<10
27/09/07	2,000,000	400,000	1,200,000	<10,000	93	56
05/10/07	53,000,000	21,000,000	930,000	186,000	14,000	5,400
12/10/07	24,000,000	12,000,000	140,000	28,000	1,100	1,100
19/10/07	46,000,000	9,200,000	290,000	120,000	310	62
26/10/07	19,000,000	<1,000,000	640,000	260,000	1,800	720
02/11/07	15,000,000	15,000,000	690,000	140,000	640	320
09/11/07	150,000,000	119,200,000	320,000	320,000	520	310
16/11/07	61,000,000	37,000,000	620,000	<10,000	1,600	640
23/11/07	25,000,000	<1,000,000	360,000	<100,000	1,100	1,100
30/11/07	76,000,000	<1,000,000	100,000	<10,000	110	27
07/12/07	25,000,000	<1,000,000	130,000	88,000	640	640
14/12/07	14,000,000	9,200,000	32,000	11,000	44	22
19/12/07	3,900,000	2,300,000	46,000	18,000	160	94
04/01/08	11,000,000	7,000,000	210,000	110,000	280	280
11/01/08	860,000	520,000	19,000	15,000	76	30
18/01/08	<1,000,000	<1,000,000	110,000	110,000	34	<1
25/01/08	5,300,000	2,100,000	48,000	9,600	11	7
01/02/08	5,100,000	2,500,000	200,000	68,000	30	<1
08/02/08	3,700,000	<100,000	39,000	<10,000	7	<1
15/02/08	33,000,000	<1,000,000	370,000	20,000	29	<1
22/02/08	11,000,000	7,000,000	210,000	53,000	9	2
29/02/08	9,600,000	5,800,000	72,000	29,000	570	230
07/03/08	6,800,000	3,400,000	140,000	<10,000	41	<1
14/03/08	42,000,000	<1,000,000	270,000	110,000	48	29
20/03/08	6,600,000	5,300,000	53,000	32,000	120	98
28/03/08	44,000,000	8,800,000	41,000	16,000	13	8
04/04/08	33,000,000	8,200,000	170,000	42,000	230	<10
11/04/08	10,000,000	5,000,000	690,000	280,000	5,800	<100
18/04/08	5,800,000	2,900,000	480,000	360,000	4	1
25/04/08	22,000,000	13,000,000	400,000	80,000	21	<1
02/05/08	8,200,000	4,100,000	370,000	93,000	17	<1
09/05/08	21,000,000	8,400,000	600,000	240,000	89	18
16/05/08	15,000,000	6,000,000	420,000	110,000	14	<1
23/05/08	50,000,000	<1,000,000	410,000	<10,000	200	<10
30/05/08	16,000,000	16,000,000	340,000	170,000	52	26
06/06/08	30,000,000	7,500,000	340,000	260,000	760	<10
13/06/08	90,000,000	36,000,000	2,800,000	1,400,000	10	5
20/06/08	21,000,000	8,400,000	640,000	380,000	420	340
27/06/08	33,000,000	20,000,000	62,000	25,000	7	3
04/07/08	30,000,000	12,000,000	16,000	4,000	320	60
11/07/08	12,000,000	12,000,000	250,000	200,000	42	8
18/07/08	<u>34,000,000</u>	<u>20,000,000</u>	630,000	250,000	5	<1
25/07/08	<u>64,000,000</u>	<1,000,000	270,000	54,000	15	3
01/08/08	<u>54,000,000</u>	<u>11,000,000</u>	270,000	160,000	210	42
08/08/08	16,000,000	16,000,000	310,000	62,000	4	<1
15/08/08	71,000,000	14,000,000	97,000	78,000	2	1

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22/08/08	52,000,000	<1,000,000	98,000	20,000	5	<1
29/08/08	12,000,000	4,800,000	64,000	16,000	8	3
05/09/08	5,600,000	4,200,000	30,000	24,000	34	11
	CFU/100 ml	CFU/100 ml	CFU/100 ml	CFU/100 ml	CFU/100 ml	CFU/100 ml
12/09/08	37,000,000	22,000,000	300,000	120,000	61	37
19/09/08	<u>13,000,000</u>	<u>2,600,000</u>	160,000	<10,000	30	<10
26/09/08	21,000,000	<1,000,000	60,000	<1,000	100	<10
03/10/08	27,000,000	16,000,000	67,000	26,000	60	30
10/10/08	45,000,000	18,000,000	73,000	15,000	15	<1
17/10/08	99,000,000	60,000,000	300,000	120,000	360	<10
24/10/08	3,300,000	2,000,000	25,000	8,000	18	11
31/10/08	11,000,000	11,000,000	37,000	37,000	5,700	5,700
07/11/08	72,000,000	43,000,000	260,000	210,000	37	30
14/11/08	19,000,000	3,800,000	500,000	200,000	98	20
21/11/08	8,500,000	8,500,000	83,000	83,000	14	14
28/11/08	10,000,000	4,000,000	600,000	360,000	120	50
05/12/08	3,500,000	1,400,000	102,000	61,000	110	88
12/12/08	3,600,000	1,400,000	59,000	48,000	110	22
19/12/08	8,400,000	6,700,000	82,000	66,000	6	3
02/01/09	8,700,000	8,700,000	760,000	760,000	16	16
09/01/09	<u>9,900,000</u>	<u>7,900,000</u>	280,000	110,000	13	3
16/01/09	3,800,000	760,000	390,000	160,000	78	31
23/01/09	4,300,000	2,600,000	57,000	11,000	27	15
30/01/09	6,600,000	2,600,000	28,000	14,000	28	14
06/02/09	3,700,000	925,000	48,000	19,200	16	8
13/02/09	5,800,000	3,500,000	300,000	240,000	19	10
20/02/09	6,600,000	<100,000	200,000	<10,000	19	8
27/02/09	47,000,000	9,400,000	530,000	<10,000	240	48
06/03/09	15,000,000	3,000,000	80,000	32,000	27	11
13/03/09	8,900,000	5,300,000	1,000,000	200,000	210	84
20/03/09	13,000,000	13,000,000	74,000	44,000	24	14
27/03/09	6,600,000	2,600,000	450,000	<10,000	2,700	<100
03/04/09	3,600,000	2,200,000	390,000	230,000	270	160
10/04/09	8,900,000	7,000,000	220,000	55,000	390	195
17/04/09	4,800,000	4,800,000	30,000	30,000	32	32
24/04/09	20,000,000	8,000,000	520,000	110,000	110	88
01/05/09	13,000,000	3,300,000	90,000	36,000	110	22
08/05/09	44,000,000	35,000,000	58,000	46,000	280	280
15/05/09	110,000,000	68,000,000	130,000	78,000	77	46
22/05/09	20,000,000	16,000,000	40,000	8,000	6	4
29/05/09	46,000,000	46,000,000	250,000	100,000	14	6
05/06/09	330,000,000	66,000,000	5,100,000	3,100,000	240	120
12/06/09	82,000,000	33,000,000	210,000	130,000	860	340
19/06/09	72,000,000	29,000,000	88,000	53,000	1,800	1,100
26/06/09	48,000,000	19,000,000	700,000	420,000	2,100	1,300
03/07/09	55,000,000	33,000,000	270,000	110,000	1,800	360
10/07/09	110,000,000	66,000,000	95,000	57,000	430	260
17/07/09	54,000,000	43,000,000	96,000	32,000	550	440
24/07/09	<u>110,000,000</u>	<u>88,000,000</u>	36,000	36,000	<u>25</u>	<u>25</u>

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31/07/09	64,000,000	51,000,000	96,000	96,000	380	230
07/08/09	8,000,000	3,200,000	88,000	35,000	5	2
14/08/09	6,300,000	6,300,000	40,000	40,000	80	64
21/08/09	11,000,000	2,200,000	55,000	11,000	29	<1
28/08/09	44,000,000	44,000,000	66,000	40,000	130	52
04/09/09	13,000,000	5,200,000	47,000	19,000	60	<10

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**Rathcoursey tank**

Date sampled	Total coliform per 100 ml	Faecal coliform per 100 ml
28-Jun-00		
04-Jul-00	>12,000*	>12,000*
11-Jul-00	700,000	0*
18-Jul-00	0*	0*
25-Jul-00		28,000
01-Aug-00	>120,000	55,000
08-Aug-00		
15-Aug-00	10,000	
22-Aug-00	>120,000	70,000
30-Aug-00		
05-Sep-00		
12-Sep-00		
20-Sep-00		
26-Sep-00		
04-Oct-00		
11-Oct-00		
18-Oct-00		
24-Oct-00		
31-Oct-00		
07-Nov-00		
15-Nov-00		
21-Nov-00		
29-Nov-00		
05-Dec-00		
12-Dec-00		
03-Jan-01		
09-Jan-01		
16-Jan-01		
24-Jan-01		
30-Jan-01		
08-Feb-01		
13-Feb-01		
20-Feb-01		
28-Feb-01		
07-Mar-01		
14-Mar-01		
21-Mar-01		
27-Mar-01		
05-Apr-01		
09-Apr-01		
18-Apr-01		
25-Apr-01		
02-May-01		
09-May-01		
15-May-01		
22-May-01		
28-May-01		
05-Jun-01		
11-Jun-01	24,192	2,400
18-Jun-01	5,000	0

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25-Jun-01	14,500	6,500
02-Jul-01	4,000	0
09-Jul-01		
17-Jul-01		
23-Jul-01		
31-Jul-01		
07-Aug-01	270,000	50,000
13-Aug-01	52,000	4,000
21-Aug-01	1	0
28-Aug-01	140,000	40,000
11-Sep-01	68,000	20,000
18-Sep-01	53,000	7,000
26-Sep-01	570,000	80,000
01-Oct-01	29,000	8,000
10-Oct-01	1,600,000	45,000
15-Oct-01	62,500	2,000
24-Oct-01	19,000	15,000
30-Oct-01	4,000	1,000
06-Nov-01	460,000	240,000
12-Nov-01	115,000	20,000
20-Nov-01	20,000	10,000
29-Nov-01	<10,000	<10,000
04-Dec-01	25,000	5,500
11-Dec-01	48,000	5,000
07-Jan-02	10,000	5,000
15-Jan-02		
22-Jan-02	<1,000	<1,000
29-Jan-02	<10,000	<10,000
06-Feb-02	3	3
11-Feb-02	5,600	610
18-Feb-02	20,000	10,000
26-Feb-02		
06-Mar-02	4,000	1,000
13-Mar-02	100,000	20,000
19-Mar-02	20,000	0
25-Mar-02	10,000	
03-Apr-02	18,000	2,000
09-Apr-02		
16-Apr-02	26,500	8,000
23-Apr-02	3,300	1,000
01-May-02	50,000	<10,000
07-May-02		
14-May-02	42,000	2,000
20-May-02	30,000	<10,000
29-May-02	31,500	<1,000
06-Jun-02	5,000	1,000
11-Jun-02		
17-Jun-02		
25-Jun-02		
03-Jul-02	10,500	6,000
09-Jul-02	9,000	1,000
16-Jul-02	4,000	<1,000
24-Jul-02		
29-Jul-02	31,500	2,000
06-Aug-02	84,500	8,000
15-Aug-02	240,000	20,000

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21-Aug-02	21,000	5,000
26-Aug-02	10,000	
03-Sep-02		
10-Sep-02	139,500	14,000
16-Sep-02	4,184	296
24-Sep-02	50,000	<10,000
03-Oct-02	38,000	15,500
09-Oct-02	10,000	4,000
16-Oct-02		
22-Oct-02	19,500	3,000
30-Oct-02	281,000	82,000
06-Nov-02	19,000	5,500
12-Nov-02	135,000	10,000
20-Nov-02		
26-Nov-02	40,000	10,000
04-Dec-02		
10-Dec-02	20,500	2,000
18-Dec-02		
02-Jan-03		
08-Jan-03	9,000	3,000
16-Jan-03		
21-Jan-03	2,000	1,000
29-Jan-03		
05-Feb-03	2,900	300
12-Feb-03	2,417	162
19-Feb-03	3,500	500
26-Feb-03	1,262	400
05-Mar-03		
11-Mar-03	105	0
19-Mar-03		
25-Mar-03	1,113	620
02-Apr-03		
09-Apr-03	339	60
15-Apr-03	17,000	1,215
22-Apr-03	1,660	100
30-Apr-03		
08-May-03		
15-May-03		
20-May-03	667	160
26-May-03		
05-Jun-03	1,710	360
10-Jun-03	5,300	3,200
18-Jun-03	10	0
25-Jun-03	3,400	3,500
01-Jul-03	4,350	750
07-Jul-03	2,910	180
15-Jul-03	3,480	300
23-Jul-03	3,500	236
30-Jul-03		
06-Aug-03	19,600	2,300
12-Aug-03		
19-Aug-03	56,500	3,000
26-Aug-03		
03-Sep-03	810	100 <sup>4</sup>
10-Sep-03	4,300	2,200
16-Sep-03	7,000	<1,000

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23-Sep-03		
01-Oct-03	23,000	15,000
07-Oct-03	8,000	4,000
13-Oct-03	12,000	3,000
21-Oct-03		
29-Oct-03	50,500	22,500
04-Nov-03	30,000	10,000
12-Nov-03	13,000	11,000
26-Nov-03		
02-Dec-03	3,000	1,000
11-Dec-03		
16-Dec-03	1,800	300
22-Dec-03		
08-Jan-04	9,000	< 1000
14-Jan-04	2,000	< 1000
22-Jan-04	295,000	117,333
27-Jan-04	52,500	1,000
05-Feb-04		
12-Feb-04	48,000	20,000
18-Feb-04	57,000	3,000
25-Feb-04	1,243,000	100,000
04-Mar-04	98,500	6,000
10-Mar-04	58,000	<1000
18-Mar-04	11,000	1,000
30-3-004	50,000	<10000
07-Apr-04	17,500	4,000
14-Apr-04	1,000	<1000
21-Apr-04	13,000	600
28-Apr-04	83,500	4,000
06-May-04	2,700	500
13-May-04	18,750	90
19-May-04	10,950	3,400
09-Jun-04	6,850	1,200
16-Jun-04	1,900	630
23-Jun-04	8,400	1,050
01-Jul-04	7,983	230
08-Jul-04	2,650	935

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DATE	DB6 RATHCOURSEY TOTAL	DB6 RATHCOURSEY FAECAL
29/10/04	0	0
04/11/04	30,000	1,200
04/11/04	110,000	300
12/11/04		
18/11/04	1,500	400
25/11/04	24,000	9,300
02/12/04	1,500	<30
10/12/04		
16/12/04		
07/01/05		
14/01/05		
20/01/05	750	48
28/01/05		
03/02/05		
10/02/05	4,600	<3
17/02/05	460	23
24/02/05	11,000	390
03/03/05	21,000	<1
14/03/05	1,100	240
18/03/05		
24/03/05		
01/04/05	4,600	<3
07/04/05		
14/04/05		
21/04/05		
28/04/05	4,900	4,900
05/05/05		
12/05/05		
19/05/05	1,300	1,300
26/05/05	33,000	8,200
02/06/05		
09/06/05	450	96
16/06/05	9,000	<1,000
20/06/05		
30/06/05	2,000	400
07/07/05		
14/07/05	>200000	>200000
21/07/05		
28/07/05	79,000	79,000
04/08/05		
11/08/05	3,200	<100
18/08/05		
25/08/05	1,600	540
01/09/05		
08/09/05	1,800	900
15/09/05		
22/09/05	3,600	<100
29/09/05		
06/10/05	20,000	<1,000
13/10/05		

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20/10/05	7,500	7,500
27/10/05	720	180
03/11/05		
10/11/05	4,300	<100
17/11/05		
24/11/05	370	<10
01/12/05		
08/12/05		
15/12/05		
05/01/06	640	260
12/01/06		
19/01/06	360	270
26/01/06		
02/02/06	2,800	<100
09/02/06		
13/02/06		
23/02/06	690	410
27/02/06		
09/03/06		
13/03/06		
23/03/06	1,700	340
27/03/06		
06/04/06		
10/04/06		
20/04/06	400	200
24/04/06		
04/05/06	400	<10
08/05/06		
15/05/06		
25/05/06		
31/05/06	20,000	16,000
07/06/06		
16/06/06	30,000	12,000
22/06/06		
30/06/06	130,000	10,000
04/07/06	49,000	29,000
14/07/06		
17/07/06	34,000	<100
26/07/06		
03/08/06		
11/08/06		
16/08/06	61,000	61,000
23/08/06		
31/08/06	2,400	480
08/09/06		
11/09/06	14,000	2,800
19/09/06		
27/09/06	5,400	1,400
04/10/06		
10/10/06	5,400	2,200
20/10/06		
26/10/06	11,000	6,600
31/10/06	630	130

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09/11/06		
16/11/06	890	890
23/11/06		
01/12/06	720	290
08/12/06		
11/12/06	450	270
19/12/06		
05/01/07		
10/01/07	570	230
15/01/07		
25/01/07	1,300	<100
30/01/07		
09/02/07	800	640
12/02/07	1,400	350
22/02/07	3,400	680
28/02/07		
05/03/07		
15/03/07		
20/03/07		
30/03/07		
02/04/07		
13/04/07		
19/04/07		
25/04/07	14,000	11,000
01/05/07		
09/05/07	650	<10
14/05/07		
24/05/07	38,000	13,000
29/05/07		
05/06/07	10,000	<100
15/06/07		
21/06/07	13,000	2,600
27/06/07		
02/07/07		
13/07/07		
19/07/07	2,400	3
25/07/07	<1000	<1000
31/07/07		
10/08/07		
13/08/07		
24/08/07		
30/08/07	88,000	70,000
05/09/07	1,600	1,000
10/09/07		
18/09/07	16,000	<1,000
27/09/07		
05/10/07		
12/10/07		
19/10/07	5,600	<100
26/10/07		
02/11/07	6,400	<1,000
09/11/07		
16/11/07	1,100	<100

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23/11/07		
30/11/07	4,100	820
07/12/07		
14/12/07		
19/12/07		
04/01/08		
11/01/08		
18/01/08	600	<100
25/01/08		
01/02/08	3,600	1,800
08/02/08		
15/02/08	700	420
22/02/08		
29/02/08		
07/03/08		
14/03/08	2,100	1,500
20/03/08		
28/03/08	5,200	<100
04/04/08		
11/04/08		
18/04/08		
25/04/08	570	230
02/05/08		
09/05/08	2,600	<100
16/05/08		
23/05/08		
30/05/08		
06/06/08		
13/06/08		
20/06/08		
27/06/08		
04/07/08		
11/07/08	240	190
18/07/08		
25/07/08	4,900	980
01/08/08		
08/08/08	4,900	3,900
15/08/08		
22/08/08		
29/08/08		
05/09/08	23,000	23,000
	MPN/100 ml	MPN/100 ml
12/09/08		
19/09/08		
26/09/08		
03/10/08	4,600	460
10/10/08		
17/10/08	2,400	240
24/10/08		
31/10/08		
07/11/08		
14/11/08		
21/11/08		

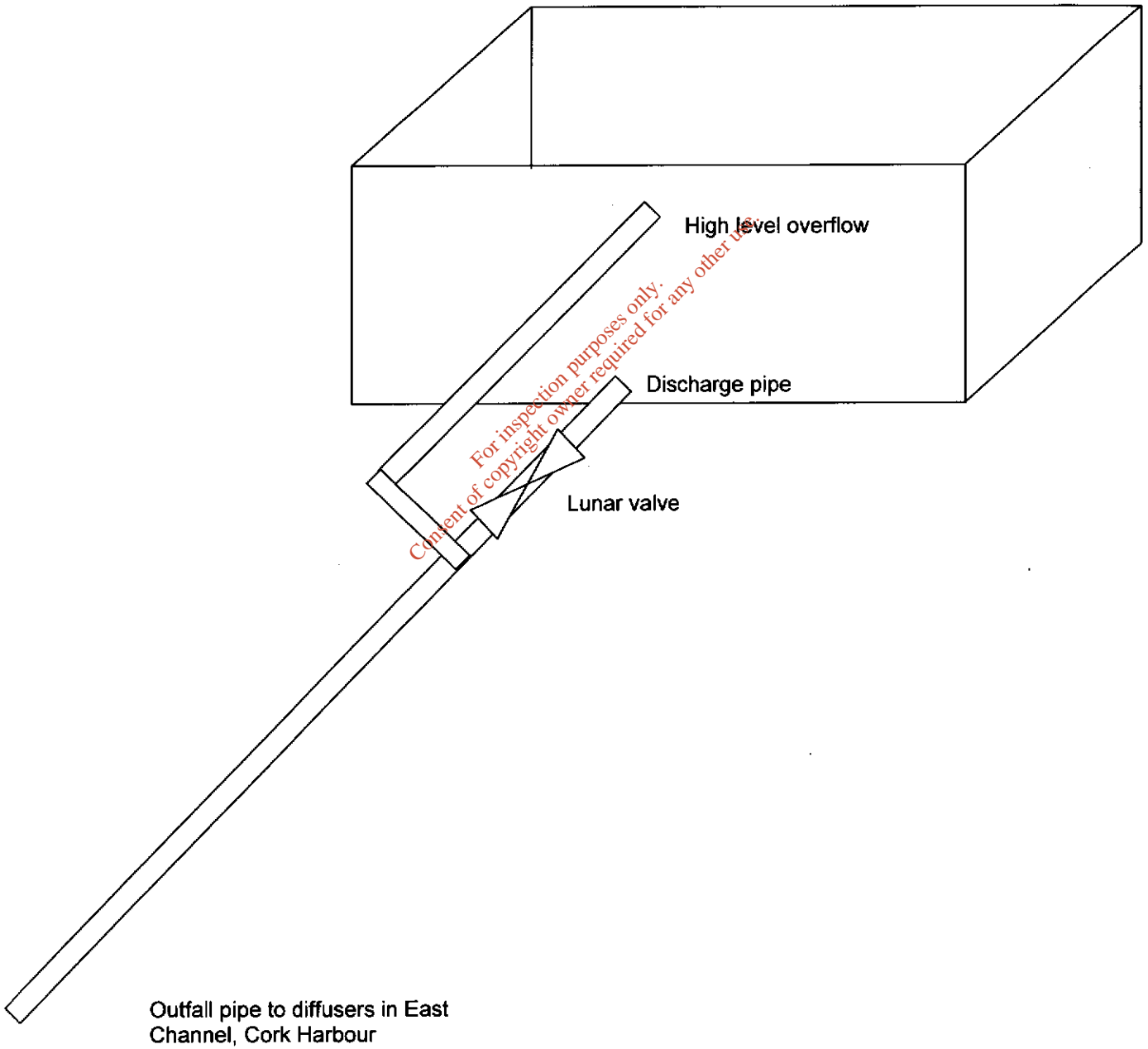
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28/11/08		
05/12/08		
12/12/08		
19/12/08		
02/01/09	2,400	93
09/01/09		
16/01/09	240	23
23/01/09		
30/01/09		
06/02/09		
13/02/09	240	23
20/02/09		
27/02/09	460	240
06/03/09		
13/03/09		
20/03/09		
27/03/09		
03/04/09	240	93
10/04/09		
17/04/09	240	9
24/04/09		
01/05/09	240	23
08/05/09		
15/05/09	2,400	240
22/05/09		
29/05/09	1,100	150
05/06/09		
12/06/09		
19/06/09		
26/06/09	4,600	1,100
03/07/09		
10/07/09	4,300	4,300
17/07/09	400	400
24/07/09	4,300	2,300
31/07/09	4,600	150
07/08/09		
14/08/09	400	<3
21/08/09		
28/08/09		
04/09/09		

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# Midleton Sewerage Scheme

## Schematic diagram of Rathcoursey tidal tank





## MIDDLETON WWTP

### UPDATE ON RECOMMENDATIONS MADE IN AUDIT REPORT MAY 2007

March 31<sup>st</sup> 2008

#### **Recommendation No. 1**

*Cork County Council should progress works without delay to prevent untreated wastewater overflowing to the Owenacurra Estuary and must ensure that the collecting system in place meets the requirements of the First Schedule of the Urban Waste Water Treatment Regulations, 2001 (S.I. No. 254 of 2001). Details on the planned improvement works and a timeframe for such works should be submitted to the EPA. The EPA should also be kept informed of the progress of the works.*

As stated in the reply to the Section 63 issued in May 2007 the wastewater overflowing to the Estuary receives primary treatment.

The Infiltration remediation Contract is substantially complete. Below is a breakdown of progress to date.

- *Replacement of sewers at The Green and Connolly Street – now completed*
- *Partial relining of industrial main serving Irish Distillers – now completed*
- *Relining of sewers identified as defective – now completed*
- *Construction of new pump station and storm holding tank at Dwyer's Road serving west bank of Owenacurra River – now constructed and due to be commissioned April 2008.*
- *Localised repairs in network serving Bailick 1 pumping station including manhole serving IDL – to be completed May 2008.*

*The proposed new sewer at Thomas Street was not done as part of the Contract. However it is envisaged that this will be done as part of the local area works in the near future.*

*The old ductile iron gravity sewer conveying flows from the Dwyers Road area across the river to bailick 1 pumphouse is still in **partial operation** pending commissioning of the new foul sewer and pump station on the western bank of the estuary on Dwyers Road. There was a delay on the tunnelling section of the new foul sewer but this expected to be completed during April 2008. As this sewer was one of the main sources of infiltration within the network we will not be able to assess fully the benefits of the works until this line is decommissioned.*

A mechanical muncher has been installed in Bailick 2 pump station as reported and the volumes overflowing there have reduced and will hopefully reduce further once further modifications are carried out.

## **Recommendation No. 2**

*In view of the regular occurrences of storm overflows, Cork County Council should develop a monitoring programme and carry out an assessment of the impact of the storm water overflows on the Owenacurra Estuary and Cork Harbour.*

I attach a table of results showing the monitoring done for precisely this reason. As you can see we began sampling upstream and downstream of the overflow locations on 30<sup>th</sup> March 2007.

We installed three composite samplers one upstream of the overflow site at Bailick 1 pumphouse, Downstream of B1 Overflow site/upstream of the overflow site at Bailick 2 overflow site and finally downstream of Bailick 2 overflow site.

We take three samples from each site weekly. Two are sent directly for analysis and the third is frozen in case retesting is required. Samples are always gathered by 10.00 am on the day of sampling and are taken to the lab in a cooler box for testing by 12.30 on the same day.

We have had ongoing problems with vandalising of the samplers which means on occasion the line filling the sample bucket has been interfered with and thus no composite sample has been obtained. On these occasions we take a grab sample and the results are underlined on the table.

I have inserted into the table a column showing when overflows occurred over the previous 24hrs from when a sample was taken.

With regard to the effect the overflows have had on the Greater Cork Harbour, a copy of a recent study carried out on modelling the discharges from various discharge locations around the Harbour to assess possible norovirus contamination of a shellfish Farm in the North Channel has been recently completed and forwarded to your Director General. The Overflow locations are included in this study.

**Recommendations 3 and 4** – data requested was submitted as part of the response to the Audit report and subsequent Section 63 notice in May 2007.

## **Recommendation No. 5**

*“ In relation to split samples Cork County Council should develop a procedure for comparing the results from these samples. The on site Laboratory should join the EPA inter calibration scheme.”*

The private operator EPS running the plant contacted the EPA in early 2007 about joining the inter calibration scheme. However due to over subscription to the scheme at that time they were advised to defer joining to a later date. EPS, as well as their

own operational sampling, send samples for testing to Consultus laboratories who are already part of the inter calibration scheme.

EPS have since established their own internal calibration procedure which involves monthly recalibration as part of internal auditing.

#### **Recommendation No. 6**

*The outlets used for sewage sludge should be assessed to ensure the appropriate analysis of the sludge prior to disposal at landfill or for use on Willow Plantations.*

As of June 2007 sludge from Midleton is taken to a licenced operator McGill Environmental Ltd.in Castletownroch Co. Cork. This company further treats the sludge for use as fertiliser in the Agricultural sector. McGill are licenced for this operation and supply Cork Co. Council with an up to date record of the final location of all sludge collected. They also carry out the necessary testing of all sludges prior to use for landspreading.

#### **Recommendation No. 7**

*In relation to the uv treatment of the treated effluent the Council should consider adding trigger level alarms for transmission to the SCADA system*

A trigger level of 60% transmission has been incorporated into the SCADA system in Midleton. This level was set after consultation with the uv system supplier.

This is the up to date position on all the recommendations made by you as per your audit report

Should you require further information please do not hesitate to contact the undersigned.

---

Madeleine Healy SEE  
Area Operations South  
Floor 5 Co. Hall  
Tel 021 4285233

**From:** Madeleine Healy  
**Sent:** 04 November 2008 12:23  
**To:** 'S.Monaghan@epa.ie'  
**Cc:** Catherine Cahalane; Noel O'Keeffe  
**Subject:** River Monitoring at Owenacurra Midleton.  
Dr Monaghan

Following on from your visit and subsequent report on Midleton Sewerage scheme last year, I enclose up to date results of monitoring done on the Owenacurra River u/s and d/s of the overflow locations at Bailick 1 and Bailick 2 PS's.

Please note the following

We have three composite samplers in situ for this work, however they are being regularly vandalised and thus for reasons beyond our control there are occasions when we cannot get a composite sample. We take grab samples at these times and these are denoted on the spreadsheet by being underlined.

The samples have been analysed at Microchem Laboratories in Dungarvan from March 07 when we began this work to Sept 08 when we switched to Consultus Laboratories in Cork.

The procedure used by both labs is different. Microchem use the filtration method (Coliform units (CFU)/100ml) whereas Consultus use MPN method (most probable number).

I attach the results to date including when an overflow occurred within the previous 24hours.

Madeleine Healy SEE  
Area Operations South  
Cork County Council  
Floor 5  
Co Hall  
Cork

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