

This Report has been cleared  
for submission to the Board by  
the Programme Manager F Clinton  
Signed: *[Signature]* Date: *26/11/09*



OFFICE OF CLIMATE,  
LICENSING & RESOURCE USE.

## INSPECTORS REPORT ON A WASTE WATER DISCHARGE LICENCE APPLICATION

To:	DIRECTORS	
From:	Marie O'Connor	Environmental Licensing Programme
Date:	26 <sup>TH</sup> NOVEMBER 2009	
RE:	Application for a Waste Water Discharge Licence from Cork City and Cork County Council (Southern Division) for the Cork City Agglomeration, Reg. No. D0033-01.	

Application Details	
Schedule of discharge licensed:	Discharges from agglomerations with a population equivalent of more than 10,000.
Licence application received:	14/12/2007
Notices under Regulation 18(3)(b) issued:	04 April 2008
Reminder issued	02 September 2008
Information under Regulation 18(3)(b) received:	28 November 2008
Notification under Regulation 18(4) issued as outstanding information was not received:	18 September 2009
Additional information received:	13 November 2009
Site Notice inspected	21 December 2007
Site and waterworks visits	28 August and 13 October 2009
Submissions Received	None

### 1. Background

Cork City developed from a walled settlement on the central island of the River Lee with wastewater conveyed in a series of culverts to numerous points on the North and South Channels. With development on the north and south of the river the waste water was piped into the main waterways - Rivers Lee, Glasheen, Glen, Bride, Curraheen, Trabeg, Tramore and Kiln.

The first formal drainage scheme for Cork City was submitted in 1867 with proposals to discharge downstream of the Custom House. In the 1960's a report recommended the installation of 6 interceptor sewers to convey all wastewater via a main trunk sewer to a

central pumping station in the Atlantic Pond which would then convey the sewage (after screening and comminution) into the lower harbour near Passage. Flows in excess of 6 times dry weather flow (DWF) would be pumped into the River Lee adjacent to the Atlantic Pond. The construction of the interceptor sewers commenced in the late 1960's.

A review of the wastewater system in 1992 in line with the requirements of the EC Urban Wastewater Directive (1991) recommended:

- Combination of four catchment areas, i.e. Cork City, Tramore Valley, Glanmire/Riverstown, and Glounthane/Little Island;
- Construction of a waste water treatment plant (WWTP) at Carrigrennan, Little Island to provide primary and secondary treatment with sludge treatment and drying;
- Discharge of treated effluent in the vicinity of Marino Point.

The proposals were implemented as the Cork Main Drainage Project and an EIS was prepared for the planning application. In 1994 planning permission was refused by Cork County Council for the construction of a wastewater treatment plant at Carrigrennan. However this was overturned by An Bord Pleanála in 1995 and the plant was completed and commissioned in ca.2004.

## 2. Agglomeration

The information in the original application was clarified in information submitted on 28 November 2008 and the latter data is generally used for the description and detail below.

The application relates to the Cork City agglomeration. The agglomeration comprises of Cork City and adjacent townlands in Cork County such as Glanmire, Little Island, Watergrasshill, Douglas and Rochestown.

A total pipe network of approximately 530 kms is in place with ~ 15% made up of separate foul and surface water sewers. The applicant identified an untreated secondary discharge into the River Lee, North Channel adjacent to St. Patrick's Bridge in the City Centre and thirty four pumping stations (PS) on the waste waterworks, some of which have pumped overflows in the event of extreme storm events or emergencies associated with the operation of the pumps. The Atlantic Pond PS on the Marina is the most significant as it pumps the majority of the effluent to the WWTP via a pipeline under the River Lee. In addition, approximately forty five other stormwater overflow locations were identified.

The wastewater treatment plant is located at Carrigrennan on Little Island with an organic capacity of 413,000 p.e. The industrial loading to the plant was not specified in the application however the design capacity was for 53% of total load. The current organic plant loading is estimated to be 254,000 p.e. The main discharge from the WWTP is located in Lough Mahon. The WWTP is operated by Northumbrian Water Projects Ltd., and the pumping stations and stormwater overflows are maintained and operated by the relevant WSA.

## 2. Discharges to Waters

The primary discharge (WWTP1) is to Lough Mahon, near Marino Point and ca.1km from shore in the channel. It is at a depth of ca.13m under water. In addition the applicant identified secondary discharges and stormwater overflows to the receiving waters outlined in Table 1 below:

**Table 1 Receiving water bodies for Primary, Secondary, CSO and pumping station/emergency discharges -**

Receiving water	Local Authority	Designations
Lough Mahon	Cork County Council and	Nutrient Sensitive (WFD)

	Cork City Council	SPA
Douglas Estuary	Cork County Council and Cork City Council	Nutrient Sensitive & SPA (Cork Harbour)
Glasheen River	Cork County Council and Cork City Council	None
Tramore River	Cork County Council	None
River Lee	Cork City Council	Nutrient Sensitive & SPA
Curraheen River	Cork City Council	None
Trabeg River	Cork City Council	None
Kiln River (Bride tributary)	Cork City Council	None

Although the applicant identified 35 secondary discharges on assessment it is considered that there is only one Secondary Discharge Point and this is located at the St. Patrick's Street combined culvert and discharges to the River Lee close to St Patrick's Bridge. Investigations and surveys are on-going to determine the source of the foul water discharges. The other discharges are considered to be emergency overflows.

There are also approximately 50 combined stormwater overflows (CSO). The applicant has stated that these are subject to routine and planned maintenance with spills being infrequent and generally confined to extreme storm events.

### 3. Receiving waters and impact assessment

*Due to the interaction between the discharges from the Cork Main Drainage (Carrigrennan) Agglomeration and other discharges from agglomerations in Cork Harbour extensive use was made of independent reports submitted in the EIS and applications for other agglomerations in the assessment of the impact of the discharges. This information is publicly available on the EPA website in association with the relevant applications.*

Table 1 above shows that the agglomeration has discharges to various waterbodies. The impact of the secondary discharge at St. Patrick's Bridge was not specifically assessed in the application other than insofar as it formed part of the assessment of untreated discharges in the Cork Main Drainage EIS. It's continued discharge will have an adverse impact on the River Lee and the RL requires that it is ceased and/or brought to operation as a stormwater overflow by 2015.

Similarly the impact of the other discharges to water from the CSO's and emergency overflows was not specifically assessed however the applicant has outlined that they are being addressed in the Programme of Improvements which is incorporated into the RL. All the receiving water bodies in Table 1 were assessed under the WFD classification as being either At Risk or Possibly at Risk of not achieving Good Status.

The RL (Condition 4.18) requires an assessment of the location of the ambient monitoring points for the receiving waters and monitoring at relevant locations to ensure that no deterioration of the water quality occurs.

The Primary discharge is to Lough Mahon and a summary is given in Table 2 below:

**Table 2. Primary discharge receiving water**

Characteristic	Classification	Comment
Receiving water	Lough Mahon	Transitional waters

name and type		
Resource use	Port activities	
Amenity value	Fishing, water sports, bathing	No designated bathing area
Applicable Regulations	UWWT Regs <sup>1</sup>	Sensitive waters
Trophic classification <sup>2</sup>	Eutrophic 1995 –2003 Intermediate 2002-2006 (and 2006-2008)	Improvement likely due to Cork Main Drainage Project with collection and treatment in place.
WFD <sup>3</sup> (Lough Mahon)	Status:	Heavily modified water
	Risk: 1a (at risk)	WWTPs, impact of shipping and dredging and dangerous substances identified as pressures.
	Objective: Restore	Restore by 2015 to achieve Protected Area objective and Reduce Chemical Pollution objective.
WFD Protected areas	Cork Harbour –SPA Code 4030	Water dependant habitat & species
	Lee estuary/ Lough Mahon	Nutrient sensitive area
Other designations	Shellfish Waters <sup>4</sup>	Discharge WWTP1 is ca. 6km from the designated waters in the Cork Great Island North Channel. Rostellan North and South are also in Cork Harbour downstream of the discharge and at a distance of 13 kilometers.

**Note 1:** Urban Waste Water Treatment Regulations, (S.I. 254 of 2001 amended by S.I. 440 of 2004)

**Note 2:** EPA (2008) Water Quality in Ireland 2004 – 2006

**Note 3:** Draft River Basin Management Plan for the South Western River Basin District and interactive maps, December 2008.

**Note 4:** EC (Quality of Shellfish Waters) Regulations 2006 (S.I. 268 of 2006) and 2009 amendment (S.I. 55 of 2009) implementing Directive 2006/113/EC of the European Parliament and of the Council of 12 December 2006 on the quality required of shellfish waters

### **Water Framework Directive (WFD)**

The Primary discharge is to Lough Mahon which is classified as ‘Transitional’ waters under the WFD classification. The Lee Estuary (Lower), Lough Mahon and Cork Harbour were considered ‘heavily modified’ waters in the draft River Basin Management Plan for the South Western RBD, December 2008<sup>1</sup> and its status was given as ‘1a - at risk of not achieving good status’. The draft plan sets out a broad range of basic and supplementary measures that are to be undertaken to achieve the core objectives of restoring protected areas objectives, preventing deterioration, achieving ‘good status’ and reducing chemical pollution by 2015. The measures identified include reducing priority pollutants, increasing the WWTP capacity and the licencing of UWW discharges.

The **EC Environmental Objectives (Surface Waters) Regulations 2009** in Part III allows for extended deadlines for the phased achievement of the environmental objectives provided no deterioration occurs however the plan is currently in draft and the timelines for achieving ‘good status’ have not been extended.

<sup>1</sup> Draft South Western River Basin Management Plan, December 2008 and interactive maps (www.WFD.ie).

## **BOD and Suspended Solids**

In monitoring data of Lough Mahon the 2006-2008 background BOD levels, which include the discharge, are in the range 0.5-6mgBOD/l with the summer median being 1.6mg BOD/l. These are not significantly different from the levels in the River Lee upstream of the discharge. The dissolved oxygen levels in Lough Mahon have improved since monitoring began in 1995 and are now within acceptable levels. In a recent EPA report <sup>2</sup> it is stated that the improvements in the water quality in Lough Mahon are most likely to be a result of the Cork Harbour Main Drainage scheme and the treatment of the municipal wastewater at Carrigrennan WWTP.

The summary of the monitoring data for 2007 during which 261 samples were analysed indicates that the treated effluent from the WWTP at Carrigrennan has an average BOD/COD/SS of 13/88/16mg/l and that it meets the quality standards for BOD, COD, SS specified in the UWW Regulations. The applicant has indicated that the discharge can contain levels of BOD and SS of 40 and 68mg/l respectively, with a maximum BOD loading of 5,712kg/day. The average BOD load on the environment for 2007 from WWTP1 was 1,187kg/day BOD.

The design specification of the WWTP in Attachment C1 of the application indicates that flows in excess of 2.06m<sup>3</sup>/sec (177,984m<sup>3</sup>/day) would be treated as stormwater, i.e., stored if capacity available and re-routed for treatment, otherwise discharged untreated. It is stated that the capacity of the primary and secondary treatment would be 2.06m<sup>3</sup>/sec and 1.83m<sup>3</sup>/s respectively. This discharge rate is consistent with the data submitted in the initial application but significantly less than that submitted in the additional data received on 28/11/08. The applicant, in the Assessment of Needs Report 2007-2014, indicated that there is infiltration and inflow into the waterworks that is above the expected levels. This can lead to a decrease in the efficiency of the WWTP.

In Attachment B6 of the application, the modelling undertaken for the EIS on the Cork Main Drainage Scheme used a maximum discharge rate of 4,686 kg/day (BOD<sub>ult</sub>). A predicted maximum increase in BOD was 0.5mg/l which appears to relate to a dry weather flow of 112,630 m<sup>3</sup>/day.

The Recommended Licence (RL) specifies ELV's for BOD, COD and SS in line with the UWW regulations. In addition, Condition 5.2 of the RL includes an assessment of the effectiveness of the treatment plant, incorporating a review of the frequency of discharge of the partially treated effluent and a programme for the minimisation of such occurrences. In addition a programme of improvements, which will address the infiltration and inflow to the waterworks amongst other issues, is required.

## **Nutrients**

As Lough Mahon is classified as a 'Transitional' water, the parameters Total Ammonia and DIN are not used in the assessment of its status under the WFD. Molybdate reactive phosphorus (MRP) is a parameter with limits specified for the receiving water.

The Lee Estuary/Lough Mahon area is classified 'intermediate' under the EPA Trophic Status Assessment Scheme (TSAS) because of breaches in the winter DIN (dissolved inorganic nitrogen) criterion<sup>3</sup>. This is an improvement on previous classifications since 1999 where the status was 'Eutrophic'. The level of phosphorus (MRP) in the receiving water is below the TSAS threshold value.

The **Urban Waste Water Directive (91/271/EEC as amended)** requires that a water body is identified as a 'sensitive area' if the waters are eutrophic or which may become eutrophic if protective action is not taken. Secondary treatment is required under the UWWT Regulations

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<sup>2</sup> EPA Water Quality in Ireland 2004 to 2006

<sup>3</sup> EPA data (2004-2008)

by 31/12/05 for an agglomeration of greater than 10,000 p.e. The regulations stipulate that more stringent treatment was required by 31 May 2008 to meet the additional emission limit values for the relevant parameter for the areas designated as 'sensitive' in the 2001 Regulations. Lough Mahon was designated in 2004 by amending regulations.

Regulation 4.4(b) of the UWWT Regulations 2001 also allows for derogations from these requirements where the WSA is satisfied that 'such reduction will have no effect on the level of eutrophication in the receiving waters'.

No derogations are in place for this discharge point, additional treatment to bring about nutrient removal is not in place at the Carrigrennan WWTP and there are no proposals outlined in the application. The applicant indicated levels of 20-30mg/l Total N in the discharge. At the WWTP design stage and in the EIS it is stated that nutrient removal could be retrofitted if required however the application and WSIP 2007-2009 does not include any such proposals.

As shown by EPA monitoring and the trophic status there has been an improvement in the water quality in the area which can be attributed in part to the improved collection system and new WWTP at Carrigrennan.

The RL sets ELV's for total nitrogen in line with the UWW regulations and the licensee is likely to have problems in achieving compliance from date of grant of the licence. The RL requires the monitoring of total oxidised nitrogen and ammonia in the discharge and an ELV for total nitrogen in the discharge will also provide for the limitation of DIN in the receiving waters as it takes account of the inorganic and organic nitrogen loading in the discharge.

An ELV for total phosphorus consistent with the current discharge is specified in the RL and this will ensure that no deterioration of Lough Mahon will occur as a result of the discharge, consistent with the WFD and Waste Water Discharge (Authorisation) Regs 2007.

### **General requirements**

The RL requires an annual report on ambient water quality. In relation to demonstrating compliance with water quality standards the monitoring of the receiving waters for this agglomeration is undertaken by a number of agencies. The RL (Condition 4.17) requires Cork City Council, as the Lead Authority, to co-ordinate the preparation of a report on the chemical and ecological status of the all the receiving waters which will collate the monitoring information available from the other agencies and WSA and submit it with the AER. If deterioration in the status is noted Condition 2.2 of the RL requires that the relevant WSA takes 'such measures as are necessary' to prevent such deterioration.

### **Shellfish Designation**

The primary discharge is located near Marino Point in Lough Mahon which is not a designated shellfish water. However the discharge is approximately 6km from an area in the North Channel which is designated as an area to which the EC (Quality of Shellfish Waters) Regulations 2006 & 2009 apply.

Since November 2008 the responsibility for the Shellfish Waters Directive (2006/113/EC) transferred to the Department of Environment Heritage and Local Government (DoEHLG). The regulations implementing the directive outline that the Minister has the responsibility to ensure that the waters comply with the standards set out in Schedule 2 to the Regulation including the sampling regime to be undertaken. The Marine Institute will carry out monitoring for the relevant parameters. No results from the monitoring in the North Channel are available as yet. In addition, it is the responsibility of the Minister, in consultation with prescribed public bodies, to establish a programme to provide that the waters comply with the Regulations. The Pollution Reduction Plans are currently being drafted by the DEHLG for consultation but are not yet available for the Cork Harbour area.

The Sea Fisheries Protection Authority is the competent authority (CA) for the classification of live bivalve mollusc production areas. The Food Safety Authority is the CA for the co-ordination of food legislation and as such it co-ordinates the monitoring and enforcement of shellfish production areas for the presence of biotoxins. The North Channel is currently closed for mussel production due to biotoxins and it is classified as a Class B area for oyster production (purification required before sale) based on bacteriological quality.

A report in the EIS submitted with the application outlined the modelling that was undertaken and the impact of the discharge of total coliforms on the North Channel which at that time was a proposed designated area. On the basis of the decay rate of the coliforms and water movement to the channel from Lough Mahon it concluded that the discharge would have no impact on background levels to the east of Weir Island in the North Channel.

A more recent report in the Midleton application (D0056-01) by UCC commissioned for Cork County Council (2006) details the relative impact of the discharges in Cork Harbour on the water quality in the North Channel with particular reference to the *Norovirus* (Winter vomiting bug). It outlines that there is movement of water between Lough Mahon and the North Channel through the Belvelly Channel. The report concludes that in certain weather conditions, particularly when the wind is from the west, that the impact of the Carrigrennan discharge relative to the other discharges in the harbour is in the range 13-15%. The model indicates however that this is a significant improvement on the scenario prior to 2003 when the discharges from Cork City were untreated. The relative impacts will also alter when the Ringaskiddy discharge is treated and proposed improvements to stormwater overflows is undertaken.

Some parameters have specified limits in the Shellfish Regulations in relation to the impact of a discharge, i.e., suspended solids, coloration and salinity. No specific assessment was carried out in relation to the impact of the discharge from Carrigrennan (WWTP1) on the North Channel. The RL does not specify emission limit values for the parameters specified in the Shellfish Waters Regulations due to the distance to the shellfish waters (~6km and 13Km) however Condition 4.17 in the RL does require a report on the chemical and ecological status of the receiving water having regard to the Shellfish Waters Regulations and the impact of the discharge on it.

The Foreshore Licence granted to Cork City Council in 2005 states that *'The Licensee shall agree to the future installation of ultra violet treatment should such treatment become necessary and shall make provision for such treatment.'*

The RL (Condition 5.6 and 5.7) requires the licensee to carry out a review of the assessments of the impact of discharges in the Lough Mahon/Cork Harbour area on the shellfish in the designated areas in consultation with the relevant authorities and the implementation of any recommendations regarding the provision of further treatment of the discharge that may be specified in the report. This may mean that disinfection will be required in future.

#### **Birds Directive [79/409/EEC] & Habitats Directive [92/43/EEC]**

The Cork Harbour SPA site (4030) comprises most of the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas Estuary, inner Lough Mahon, Lough Beg, Whitegate Bay and the Rostellan inlet. The discharge from the WWTP1 is to the deep water area of Lough Mahon and although adjacent is not within a designated area.

The application and related documents contain a significant assessment of the impact of the discharge on the SPA. The application included the Cork Main Drainage Scheme EIS, which was completed in 1994, and assessed as part of the Planning process. This sets out an assessment of the impact of the Cork Main Drainage Scheme and the Carrigrennan WWTP discharge and concluded that there would be an overall improvement in the quality of the receiving waters due to the removal of significant untreated discharges and the secondary treatment provided by the WWTP. The assessment included details of the flora and fauna in the Lough Mahon and Douglas Estuary area and concluded that there would be no adverse

impact from the discharge. No comments or submissions were received from the National Parks and Wildlife Service (NPWS) in relation to this application.

In the preparation of the EIS (2008) for the Cork Lower Harbour Sewerage Scheme (Ringaskiddy/Shanbally WWTP) a more up to date assessment of the impacts of the discharges into the harbour was undertaken.

The main conclusions were that the provision of the proposed Ringaskiddy WWTP in combination with the Carrigrennan WWTP and the elimination of the untreated discharges would result in a significant improvement in water quality within Cork Harbour and contribute to a reduction in the nitrogen levels in Lough Mahon and the North Channel. The secondary treatment of the wastewater in the two WWTP plants will not have a significant adverse effect on the SPA but will have a positive effect through the reduction in nutrients, faecal coliforms, heavy metal and persistent organic pollutants released to the harbour.

It is considered that as the application is a joint application with Cork County Council that the EIS and more updated appropriate assessment in the Ringaskiddy application provide an adequate assessment for the purposes of the directive.

#### **Dangerous Substances Directive (2006/11/EC)**

In the screening carried out for the application no significant levels of dangerous/priority substances were detected in the discharge from WWTP1 although it is stated that industrial effluent could account for up to approximately 50% of the loading. In addition, a discharge of 25m<sup>3</sup>/day of treated landfill leachate enters the water works from the Kinsale Road Landfill under the Waste Management Act licence (W0012-02).

There are several reports on the levels of dangerous substances in the Cork Harbour water and sediments which indicated that there were high levels of many substances including tributyl tin, lead and mercury<sup>4&5</sup>. More recent data was collected under the Water Framework Directive and the Dangerous Substances Screening Monitoring Programme TNO reports, 2008 which indicated significant levels of mercury and di-n-butylphthalate in the water. The same survey observed elevated PCB levels in sediments and mussels within the harbour.

However there is no evidence of an on-going impact on the SPA and the site synopsis states '*polluted conditions may not be having significant impacts on the bird populations*'.

Given the level of industrial effluent and landfill leachate which flows to the water works it is considered that the RL should include monitoring of the discharge for priority pollutants and toxicity testing of the primary discharge. An ELV of 10 Toxic Units is set in the RL which is consistent with requirements for industrial discharges to the waterworks. In addition, Condition 4.17 requires the submission of a report on the assessment of the impact of the discharge on the receiving waters and the priority substances will be addressed.

The RL requires a pollutant release and transfer register (PRTR) and a Programme of Improvements that includes a requirement to reduce priority substances in the discharge and cease discharges and losses of priority hazardous substances.

## **5. Programme of Improvements**

No information is available in the application on the conformance of the existing storm water overflows and emergency overflows with the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows, 1995'. However €1,051,000 has been approved in the Water Services Investment Programme (WSIP) 2007-2009 to provide telemetry to enable operational information and alarms with a view to improving maintenance regimes and thus eliminate the occurrence of discharges from pumping stations. The systems are expected to be

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<sup>4</sup> EPA Dangerous Substances Regulations - National Implementation Report 2005

<sup>5</sup> Ireland's Marine and Coastal Areas and Adjacent Seas: An Environmental Assessment, 1999.



in place in 2010. The RL requires an assessment to be undertaken and reported by the second AER and improvements to be completed by December 2015.

The Cork City Council WSIP Assessment of Needs Report 2007 – 2014 indicated that a further €3million would be required to carry out a programme of sewer renewal, relining and enhancement to reduce the impact of infiltration on the capacity of the plant and efficiency of the WWTP.

No data was supplied in the application on any proposals for nutrient removal.

## **6. Compliance with EU Directives**

In considering the application, as outlined above, regard was had for the requirements of Regulation 6(2) of the Waste Water (Discharge) Authorisation, Regulations, 2007 (S.I. No. 684 of 2007) notably;

- Water Framework Directive [2000/60/EC]
- Urban Waste Water Treatment Directive [91/271/EEC]
- Dangerous Substances Directive [2006/11/EC]
- Birds Directive [79/409/EEC] & Habitats Directive [92/43/EEC]

These have been dealt with individually above.

## **7. Submissions**

No submissions were received on this application.

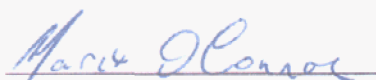
## **8. Charges**

The RL sets an annual charge for the installation at €7,056 and is reflective of the monitoring and enforcement regime being proposed for the agglomeration.

## **Recommendation**

I recommend that a Final Decision be issued subject to the conditions and for the reasons as set out in the attached Recommended Decision. The discharge is unlikely to be compliant with the requirements of the licence (in particular with the ELV for Total N) from the date of grant.

Signed



Marie O'Connor

Office of Climate, Licensing and Resource Use

Figure 1: Nutrient Sensitive Areas and Shellfish Waters



Figure 2: Cork Harbour SPA

