8. **CONTINUOUS DISCHARGES**

8.1 **Introduction**

This chapter deals with continuous discharges to receiving waters. For the purposes of this chapter continuous discharges are defined as final effluent discharge from municipal wastewater treatment works (WwTW) and discharges from trade and industrial premises.

These discharges are subject to regulation/licensing as discussed in section 8.3 below. Enforcement of the regulations/licences is a key element in protecting receiving waters from damage due to continuous discharges.

Historically the licensing/regulation of discharges to watercourses has been based on the ‘assimilative capacity’ and ‘beneficial uses’ of the watercourse. The uses identified as being most likely to be affected by such discharges are river aquatic life, bathing, general amenity and water abstraction. However, implementation of the Water Framework Directive (WFD), which requires all surface waters to achieve ‘good ecological status’, will require a reassessment of all continuous discharges to watercourses.

8.2 **Policy Objectives**

The aim of the regional policy is to establish a consistent approach to the management and improvement of continuous discharges to ensure that the needs of the region’s receiving waters are met in a cost-effective manner.

8.3 **Legislation**


Discharges from trade and industrial premises are licensed by either Local Authorities under Section 4 of the Local Government (Water Pollution) Act, 1977 and Amended Act, 1990; or in the case of scheduled trades and industries by the Environmental Protection Agency (EPA) under Integrated Pollution Control (IPC) Licensing, (EPA (Licensing) Regulations S.I. 85 of 1994). Licence conditions generally require the Licensee to return monitoring data on a regular basis and this data can be subject to audit.

The UWWT Regulations place a responsibility on Sanitary Authorities to provide treatment of urban wastewater, to monitor discharges from agglomerations (communities); and to transmit the results of such monitoring to the EPA.

The Regulations require a scheduled provision of collection systems and wastewater treatment plants depending on the size of the agglomeration and on the type of water body to which the wastewater is discharged. The type of treatment required for individual agglomerations and the date by which it is to be provided by the relevant Sanitary Authority is dependent on the size of the agglomeration as defined by population equivalent (p.e.); the type of receiving waters (fresh, estuarine or coastal); and whether the receiving waters are sensitive (or normal) to eutrophication, as defined by the Regulations.
When considering the impact of WwTW discharges on watercourses and their compliance with the Regulations it is important to note that wastewater discharges from the majority of agglomerations (i.e. population equivalents between 2,000 and 15,000) are not required under the Regulations to have secondary treatment until 31 December 2005. All agglomerations with a population equivalent greater than 15,000 should under the Regulations have been treating wastewater to secondary treatment standards since 31 December 2000. All agglomerations with a population equivalent greater than 10,000 discharging into ‘sensitive’ waters should under the Regulations have had secondary treatment and nutrient reduction facilities since 31 December 1998. For agglomerations less than 2,000 p.e. discharging to freshwaters or estuaries ‘appropriate treatment’ is required, again not until 31 December, 2005.

Key criteria in the Regulations are:

- 1 p.e. is equivalent to 60g BOD/day.

- Standards of treated effluents (over 10,000 p.e.)
  - BOD = 25mg/L (70-90% reduction)
  - COD = 125 mg/L (90% reduction)
  - Total SS = 35 mg/L (90% reduction)

- Additional Standards to “Sensitive” Waters
  - Total Phosphorus = 2mg/L P (80% reduction) 10,000 to 100,000 p.e.
    = 1 mg/L P over 100,000 p.e.
  - Total Nitrogen = 15 mg/L N, 10,000 to 100,000 p.e.
    = 10 mg/L N, over 100,000 p.e.

The Regulations also specify the type of parameters to be monitored in the outflow from all treatment plants and emission limit values for these parameters. However, monitoring of nutrients (Total Phosphorus and/or Total Nitrogen) is only required where the treatment plant discharges to a ‘sensitive’ water body. The required type and frequency of sampling is only specified in the Regulations for plants of population equivalent greater than or equal to 2,000 p.e. Flow proportional or time-based 24-hour sampling is stipulated as the only acceptable type of sampling; grab samples are not sufficient to establish compliance.

In the GDSDS study area only three stretches of water are designated as ‘sensitive’ water bodies in the UWWT Regulations:

- River Liffey, downstream of Osberstown wastewater treatment plant to Leixlip reservoir, Co. Kildare;
- Liffey estuary; from Islandbridge weir to Poolbeg Lighthouse, including the River Tolka basin and South Bull Lagoon;
- Broadmeadow Estuary (Inner); from bridge west of Lissenhall (Broadmeadow River) to the railway viaduct.

The regulations also require Sanitary Authorities to monitor surface waters, which receive discharges from urban wastewater treatment plants where it is anticipated that the receiving waters will be significantly affected, with implications for compliance with other Directives. Relevant Directives and National Regulations, which should be consulted to assess the impact of a discharge on the receiving water, are summarised in Table 24.
In addition to the standards prescribed in the above Regulations, Sanitary Authorities must also have regard to the standards (objectives) outlined in:

- Any relevant Water Quality Management Plan;
- Managing Ireland’s Rivers and Lakes – A Catchment based strategy against Eutrophication;
- Measures Reports for Phosphorus Regulations, 1998 (S.I. No. 258 of 1998);
- Memorandum No. 1: Technical Committee on Effluent and Water Quality Standards;

Article 5 of the UWWT Regulations requires that “more stringent requirements” than those specified in Part 1 and Part 2 of the Regulations “shall” apply where the receiving waters do not satisfy other “relevant Community Directives”.

### 8.4 Investment Programmes in Wastewater Treatment

In response to the ongoing decline in surface water quality the DoEHLG initiated a major national programme of capital investment, co-financed by the EU Cohesion Fund, entailing an estimated expenditure of €1.7 billion by 2005 on new and improved wastewater treatment facilities. The current phase of this investment programme is incorporated in the National Development Plan 2000 – 2006 and aims to complete the construction of all the outstanding major schemes required under the EU Urban Wastewater Treatment Directive. The GDSDS study area is benefiting considerably from this funding and the major treatment plants at Osberstown, Leixlip and Ringsend, for example, have recently been upgraded.

### 8.5 Existing Situation

Municipal wastewater discharges and trade/industrial discharges are a major source of nutrient input to watercourses. The Millennium Report (2000) listed sixty-five locations nationwide as seriously polluted in the period 1995 – 1997 together with the suspected causes of the pollution. Sewage discharges were the most frequently suspected source category identified. Five of these locations are in the GDSDS study area and these are listed in Table 25. The locations of municipal and industrial wastewater discharges within the GDSDS are included in Appendix H.

While the Millennium Report concluded that this nutrient load was smaller than that generated by agricultural activities it noted that sewage and industrial discharges are direct continuous discharges to watercourses in comparison to agriculture, which is typically a diffuse intermittent source. Hence, it was concluded that these discharges may be the dominant factor in the enrichment of rivers during periods of low flow.
The Millennium Report recommended that phosphorus reduction strategies should be implemented on a catchment basis and phosphorus reduction measures should be introduced in all sizeable waste effluents in the public and private sector.

<table>
<thead>
<tr>
<th>River Name</th>
<th>Channel Length (km)</th>
<th>Location</th>
<th>On Record Since</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadmeadow</td>
<td>3.0</td>
<td>Bridge in Ratoath</td>
<td>1988</td>
</tr>
<tr>
<td>Broadmeadow</td>
<td>2.0</td>
<td>Milltown Bridge</td>
<td>1994</td>
</tr>
<tr>
<td>Camac</td>
<td>2.5</td>
<td>Bridge Nth. of Brownsbarn</td>
<td>1988</td>
</tr>
<tr>
<td>Liffey</td>
<td>*</td>
<td>Straffan Turnings Lower (LHS)</td>
<td>1995</td>
</tr>
<tr>
<td>Lyreen</td>
<td>0.5</td>
<td>u/s Ryewater confluence</td>
<td>1971</td>
</tr>
</tbody>
</table>


8.5.1 Monitoring

While monitoring of sewage effluent discharges has improved in recent years it still falls short of the requirements specified in the Regulations at numerous plants throughout the country. The report "Urban Wastewater Discharges in Ireland – A Report for the years 1998 and 1999" found non-compliance with the Regulations in respect of ‘type of sampling’, frequency of sampling and failure to meet emission limit values, with ‘type of sampling’ being the most common non-compliance issue. The ‘type of sampling’ most favoured by Sanitary Authorities is grab sampling. Of the 2,883 samples for BOD in 1999 over sixty percent were grab samples. The Regulations are quite specific that grab sampling is not sufficient to demonstrate compliance with the Regulations. In addition over 60 plants with population equivalent greater than 2,000 sampled the effluent less than the specified 12 times per annum in 1999. The report requested Sanitary Authorities to review their monitoring programmes to ensure that the requisite monitoring is undertaken at all plants. It should be noted that Dublin City Council through the Central Laboratory, implements a sampling programme in accordance with the Regulations.

The Three Rivers Project, which includes studies of the Liffey, the Boyne and the Suir, found that little information was available on inflow concentrations or on flows into or out of WwTW in their study area. In most cases data was insufficient to determine the load discharged by a treatment plant or the efficiency of the plant or to determine the impact of the discharge on the receiving water and its compliance with other Directives (e.g. Freshwater Fish Directive;78/659/EEC) as required by the Regulations. The Three Rivers Project concluded that the UWWT Regulations as they currently stand and their application by Sanitary Authorities generally were inadequate to protect surface waters from eutrophication and recommended that they be reviewed with regard to agglomeration size threshold, sampling frequency, parameters to be monitored and the discharge concentration limit in the light of the standards set in the Phosphorus Regulations.

In respect of licensed industrial discharges a desk study undertaken by the Three Rivers Project of monitoring returns from licensed trade / industrial effluents discharging directly to watercourses, revealed that in the majority of cases pollution loading from these industries could not be quantified, particularly with regard to nutrients. In the case of Section 4 licensed facilities there was little or no monitoring data which allowed accurate quantification of loads. While data exists for IPC licensed facilities, it is currently in a format that does not readily allow assessment. A major deficit of the majority of monitoring returns was the lack of accurate flow measurement. The Three Rivers Project recommended that Local Authorities and EPA reassess Section 4 and IPC licences (effluent standards, monitoring and reporting frequency) against water quality objectives and Standards for the receiving water and to impose controls appropriate to the attainment of EQOs.
Reporting on audits undertaken by the EPA on municipal wastewater treatment plants in 1998, 1999 and 2000, the report “Urban Wastewater Discharges in Ireland – A Report for the years 1998 and 1999” states that the approach adopted to the licensing and enforcement of trade / industrial effluent discharges to sewer under the Water Pollution Acts in particular needs to be reviewed in a number of Sanitary Authorities. It was noted that the monitoring of some parameters was not consistent with licence requirements and in some cases trade / industrial discharges were not licensed by the Sanitary Authority. Other observations noted during the audits include:

- Absence of a scheduled trade effluent monitoring programme;
- Breaches of discharge licences not pursued;
- Inconsistency between the limits set in trade effluent discharge licences and the follow up enforcement monitoring;
- The discharge of a significant quantity of unlicensed trade effluent.

Experience in the GDSDS study shows that the terms and conditions of discharge licences are readily available but that data relating to monitoring returns from Local Authorities is very limited. Dublin City Council have reported the total annual flows discharged by licensed premises. From this, there appears to be little correlation between licensed flows and measured water use. While this may be explained on the basis that the licence sets a maximum flow value, monitoring is needed to validate the “water in/water out” relationship both to measure load and as a basis for charging under the Water Charging Policy.

8.6 Climate Change

The predicted long-term effects of climate change will also influence the degree of environmental impact caused by continuous discharges. The potential for lower summer flows in watercourses will reduce the available dilution for these discharges. These long-term effects need to be understood as part of the licensing process for discharges to watercourses. Climate change is covered in detail in Volume 6 of the Regional Policies.

8.7 Recommendations

The WFD was adopted in September, 2000 sets a framework for comprehensive management of water resources in the European Union as has been outlined in Chapter 2. The objectives of the WFD include:

- The protection and enhancement of aquatic ecosystems
- The provision of enhanced protection and improvement of the aquatic environment by reducing / phasing out of discharges, emissions and losses of priority substances, and
- The achievement of ‘good ecological status’ in surface waters and groundwaters within a 15 year timeframe generally.

In Ireland implementation of the Directive is being facilitated by the identification and establishment of River Basin Districts (RBDs), which will form the basis for integrated water management. The GDSDS study area falls entirely within the boundary of the Eastern River Basin District (ERBD). The WFD requires that a River Basin Management Plan be drawn up. The GDSDS proposes the following recommendations for inclusion in such a plan.
Recommendations

The following recommendations should be implemented across the region:

82. All discharges to surface waters, including WwTW discharges, should be licensed.

83. Licensing of all discharges to surface waters should be undertaken by a single body. This body to be adequately funded and resourced to facilitate the increased work load.

84. Discharge licences should be reviewed with respect to flow and load, with the objective of minimising load having regard to good housekeeping practice.

85. Existing licences should be reassessed, as appropriate, against Water Quality Objectives and Standards for the receiving water controls imposed appropriate to the attainment of EQOs, particularly in light of the standards set in the Phosphorus Regulations.

86. For large effluent loads (>1,000 p.e. licensed load), the licence should specify the requirement for continuous flow monitoring and provision for independent composite sampling (linked to flow monitoring) at an accessible location on the sewer. Larger users should, in time, be linked to the drainage telemetry system.

87. Licence standards for new industry discharges to municipal sewers should in general not exceed standards equivalent to domestic sewage and should be subject to effective monitoring of flow and concentrations, with typical standards as follows:

88. COD < 600mg/L
89. BOD < 200mg/L
90. SS < 250 mg/L
91. pH range 6-9
92. Temperature < 35 degrees Celcius
93. An integrated central database of all licence information, monitoring returns, audit data and resone actions to breaches of discharge licence should be maintained on a Regional basis.
94. The impact of climate change should be assessed as part of the licensing process.
95. The management and reporting of WwTW performance should comply with the Water Services National Training Group ‘Performance Management’.
96. UWWT Regulations provide a minimum monitoring regime which may be inadequate for water quality management. The suggested minimum frequency of monitoring of WwTW's is set out in Table 26 below. The management and reporting of WwTW performance should comply with the Water Services National Training Group ‘Performance Management System’ (PMS).
## Municipal Wastewater Treatment Plant Monitoring

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Population Equivalent (p.e.)</th>
<th>Sample type and Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD (Biochemical Oxygen Demand)</td>
<td>Up to 500</td>
<td>Minimum 6 times per year evenly spaced of a type sufficient to determine load</td>
</tr>
<tr>
<td>COD (Chemical Oxygen Demand)</td>
<td>500 - 1000</td>
<td>Minimum 6 times per year evenly spaced</td>
</tr>
<tr>
<td>TSS (Total Suspended Solids)</td>
<td>1000 - 2000</td>
<td>Minimum 12 times per year evenly spaced</td>
</tr>
<tr>
<td>TP (Total Phosphorus)</td>
<td>2000 - 25,000</td>
<td>Minimum 24 times per year evenly spaced</td>
</tr>
<tr>
<td>MRP (Molybdate Reactive Phosphate)</td>
<td>Over 25,000</td>
<td>Minimum 52 times per year evenly spaced</td>
</tr>
<tr>
<td>TN (Total Nitrogen)</td>
<td>&gt;500</td>
<td>Automatic – continuous monitoring</td>
</tr>
<tr>
<td>TON (Total Oxidised Nitrogen)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 26: Recommended Sampling Frequencies

## 8.8 References


EPA (Environmental Protection Agency), 2000. *Ireland’s Environment; A Millennium Report.*
