

Environment & Heritage Service

Regulation of Water Service Discharges Report 2005

A Report by the Water Management Unit



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Executive Summary

This is the fourth report published by Environment and Heritage Service (EHS) detailing the compliance of Water Service discharges with relevant European and EHS discharge standards. The report presents changes and trends in compliance with these standards up to the end of 2005. Information on progress with capital works schemes, as at December 2005, is also included.

Compliance with the standards set for discharges from 279 Waste Water Treatment Works (WWTW), serving a population equivalent (pe) greater than 250, and the effluents from 28 Water Treatment Works (WTW) is presented. Compliance with the requirements of the Urban Waste Water Treatment (UWWT) Regulations (Northern Ireland) 1995 is also included for the 34 WWTWs that qualified under the Regulations in 2005. For information about the regulatory system that is employed by EHS, readers may wish to refer to the 2001 Report, available at: www.ehsni.gov.uk/pubs/publications/Reg_WSD.pdf, which provides further details of the discharge standards applied and how compliance is determined.

Compliance of WWTWs with EHS Standards

A summary of compliance with the Registered Standards set by EHS, on the public register for the period 2000 to 2005, is set out in **Table 1**.

Table 1: Summary of Compliance with WWTW Registered Discharge Standards

	2000	2001	2002	2003	2004	2005
Number of WWTWs on the Public Register	160	268	270	274	276	279
Percentage of discharges complying with numeric standards	77%	54%	66%	67%	77%	80%
Percentage of discharges complying with descriptive standards	100%	100%	100%	100%	100%	100%
Overall Compliance with discharge standards	81%	58%	69%	70%	80%	82%

The sustained improvement in compliance with EHS standards since 2001 can be attributed to the commissioning of a number of new WWTWs and to continuing improvement schemes carried out by Water Service.

Compliance with UWWT Regulations

The compliance of WWTW effluent discharges with the UWWT Regulations is shown in **Table 2**.

In 2005, 34 discharges qualified under the Regulations. As can be seen in **Table 2**, compliance has increased in 2005 to 62%, the highest level over the six year period since 2000.

Table 2: Summary of Compliance for all UWWT Regulation WWTWs

Percentage Compliance					
2000	2001	2002	2003	2004	2005
53%	35%	46%	60%	43%	62%

Table 3 shows compliance for the 16 WWTWs serving a pe greater than 10,000 discharging to Sensitive Areas (Eutrophic). These works require more stringent treatment. The marked improvement in compliance from 2004 was due largely to better performance by Water Service in meeting the sampling requirements of the Regulations, and 2005 demonstrated the highest level of compliance over the six-year period 2000-2005.

Table 3: Summary of Compliance for WWTWs Discharging to Sensitive Areas

Percentage Compliance					
2000	2001	2002	2003	2004	2005
53%	60%	60%	79%	29%	75%

Future WWTW Compliance

The UWWT Regulations require all WWTWs in Northern Ireland to provide levels of treatment that will adequately protect the waterways to which they discharge. To meet this requirement, EHS has determined environmental needs standards (ENS) for all WWTWs and will place these standards on the public register. There are over 800 WWTWs with pe less than 250 in Northern Ireland, the majority of which will have a descriptive standard, outlining the level of treatment and maintenance requirements.

Figure 1: Primary Settlement Tanks at Strabane WWTW



Sewerage Systems

Information on improvements to the sewerage systems (termed “collection systems” in the Regulations) serving the major towns in Northern Ireland is presented in **Section 3**.

EHS and Water Service are currently working together on a number of project groups to identify and rectify unsatisfactory Combined Sewer Overflows (CSOs), and to both rationalise sewer systems and limit the pollution of receiving waters by storm water overflows.

By the end of August 2006, 6 sewerage system upgrades had been completed with construction ongoing at a further 9. Agreement in principle has been reached on the upgrading requirements of another 14 sewerage systems, and a further 50 upgrades are currently under discussion as part of a formal process through which the upgrading requirements will be determined. Negotiations on proposals for sewerage systems serving a further 26 WWTWs will take place in 2006/2007 as part of the planned programme of work provided by Water Service.

Compliance of WTWs with EHS Standards

The treatment of water at WTW for public supply as drinking water generates effluents that are often discharged to nearby waterways. EHS determines discharge standards for Water Service WTW effluents to protect the receiving water.

The compliance of WTW effluents with their EHS Registered Standards is presented for the years 2000 to 2005 in **Table 4**. Compliance increased from 46% in 2000 to 50% in 2002 and has since leveled out to around 40%.

Table 4: Summary of WTWs Compliance 2000-2005

	2000	2001	2002	2003	2004	2005
Number of WTW discharges monitored	24	27	26	27	30	28
Percentage of WTW discharges complying	46%	48%	50%	44%	40%	43%

Figure 2: Dunore Point Water Treatment Works





Section 1 **Waste Water Treatment Works**

Compliance 2005

Although Water Service discharges are not currently subject to control under the Water Order (Northern Ireland) 1999, they are, by administrative arrangement, regulated by conditions similar to those that would apply under that legislation. The standards and conditions for each discharge are set out in Registered Standard documents. Details of compliance with the standards are available on the Public Register, which holds information on all WWTWs.

This section summarises compliance during 2005 for 279 works serving a population greater than 250 and identifies trends in compliance since 2000. These works serve more than 98% of the sewered NI population and compliance for the period 2000 to 2005 is summarised in **Table 5** and presented in **Figure 4**.

As can be seen from Table 5, compliance of 81% in 2000 was followed by a sharp decline in 2001 to 58%. The reduced percentage compliance figure in 2001 has been discussed in previous reports. However, since 2001, compliance has steadily improved, and in 2005 it reached 82%. The sustained improvement in compliance with EHS standards can be attributed to the commissioning of a number of new WWTWs and continuing improvement schemes carried out by Water Service.

Details of compliance with the standards in the UWWT Regulations can be found in **Section 2**.

Table 5: WWTWs Registered Discharge Standard Compliance

	2000	2001	2002	2003	2004	2005
Number of WWTW discharges on the Public Register	160	268	270	274	276	279
Number of discharges with numeric standards	133	247	249	254	256	259
Number of discharges complying with numeric standards	102	134	165	171	197	207
Percentage of discharges complying with numeric discharge standards	77%	54%	66%	67%	77%	80%
Number of discharges with descriptive standards	27	21	21	20	20	20
Number of discharges complying with descriptive standards	27	21	21	20	20	20
Total number of compliant WWTWs	129	155	186	192	217	227
Percentage of discharges complying with descriptive standards	100%	100%	100%	100%	100%	100%
Overall Compliance with discharge standards	81%	58%	69%	70%	80%	82%

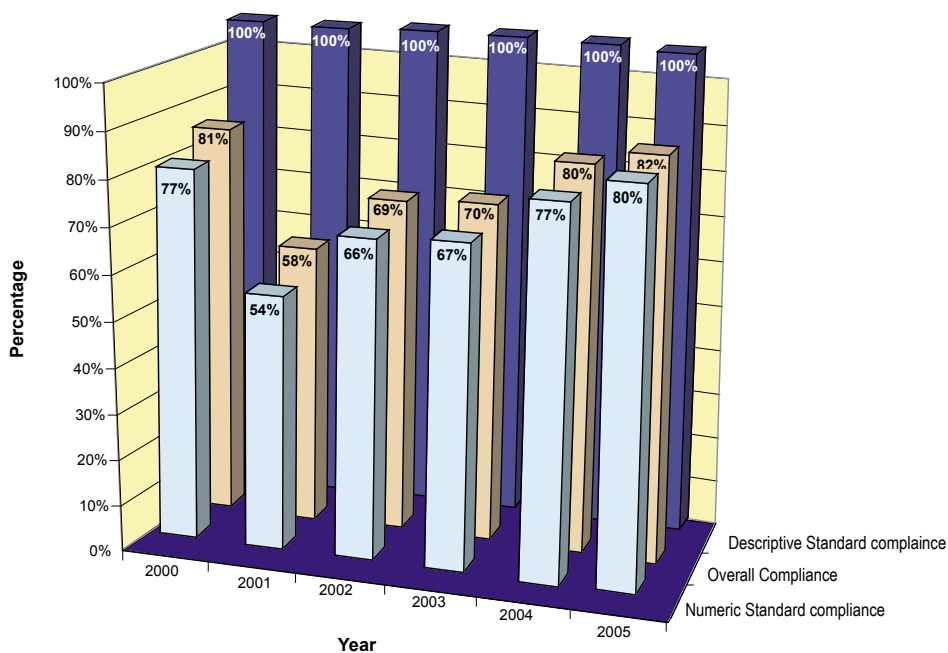
Information on the WWTWs that were non-compliant with their numeric discharge standards in 2005 is tabulated in **Appendix A**.

Specific details on the performance of non-compliant works and information on improvements, updated to the end of August 2006, can be found in **Appendix B**. Where no reference is made to a particular WWTW, the comments in the 2001 Report are still relevant.

Figure 3: Crossmaglen WWTW Aeration Ditch



Figure 4: Summary of WWTW Compliance 2000-2005



Priority Pollutants (Dangerous Substances) and other Standards

Aghanloo 2 is currently the only WWTW that must comply with effluent quality standards set for what are now known as "priority pollutant" parameters. **Table 6** summarises compliance with these standards in 2005.

Table 6: Priority Pollutant Compliance in 2005

Name of WWTW	Standard Compliance*				
	Soluble Chromium mg/l	Soluble Copper mg/l	Soluble Lead mg/l	Soluble Nickel mg/l	Soluble Zinc mg/l
Aghanloo 2		X	X	X	

* Standards compliance is absolute i.e. must be met for all samples. (X - Non-compliant parameter)

Monitoring

Compliance with the standards set by EHS is assessed using monitoring data provided by Water Service in accordance with an agreed sampling programme. The Water Service Laboratories carrying out the analysis are accredited under the United Kingdom Accreditation Service (UKAS) and samples are analysed for a wide range of parameters. EHS determines compliance based on the results generated by this self-monitoring regime. EHS periodically carries out audit checks on the processing of samples taken and the analytical procedures employed to ensure consistent and acceptable performance.

Figure 5: Water Service Laboratory



Flow Data and Measurement

Registered standards for WWTW effluents are largely based on flow discharged and the dilution available in the receiving water. It is therefore important that the flow discharged is monitored in addition to the effluent quality to ensure that works operate within their design capacity so that the receiving water quality is not adversely affected.

The provision of flow monitoring is a key aspect of the regulatory process, and considerable investment is required to produce reliable and consistent flow measurement at WWTWs. Such investment should ensure compliance with regulatory requirements and assist in the management of available resources and planning for sustainable development.

In 2005, Water Service provided flow measurement data for 22 major WWTWs. This is a reduction on the previous year and, although this may have been caused by the closure of some works and the disruption of others by capital works, the situation with providing flow data on a regular basis is being addressed. **Appendix C** lists the works for which flow measurement data was provided.

Water Service is carrying out a programme of improvements to flow measurement facilities at existing, as well as new or upgraded WWTWs. This programme should enable Water Service to provide the flow information that EHS requires to fully assess WWTW performance in the future.

Figure 6: Flume and Ultrasonic Sensor for Measuring Flow at Moira WWTW



Planning “Hotspots”

In May 2002, the determination of a number of planning applications was temporarily deferred. This was a precautionary measure as a result of concerns expressed by EHS about the level of compliance with the Urban Waste Water Treatment (UWWT) Directive and the impact of waste water discharges. This situation resulted from a combination of inadequate investment in sewerage infrastructure and increasingly stringent European and national environmental standards for waste water discharges. Fifty seven locations were identified as “Planning Hotspots” because existing sewage infrastructure was causing or contributing to one or more of the following: non-compliance with the requirements of EU Directives (including the UWWT Directive), non-compliance with EHS standards, or adverse environmental effects on waterways.

The Northern Ireland Environment Committee assessed the situation, and subsequently the Environment Minister made a statement to the Northern Ireland Assembly on 7 October 2002. This stated that a pragmatic approach would be adopted, to ensure continued economic growth and social progress in Northern Ireland, based on Water Service’s commitment to deliver the Capital Works Programme (CWP) as scheduled, while acknowledging that further development could lead to deterioration in water quality until the necessary improvements were completed.

Since the time of that statement, significant progress has been made to address shortcomings in the sewage infrastructure in the areas identified. By December 2005, the number of Hotspot areas had been reduced to 37, from the original 57, as a result of upgrades or new WWTWs.

By the end of 2005, upgrades had been completed at Kircubbin, Greyabbey, Banbridge, Newry and Strabane.

Ballymena, Bessbrook, Whiterock and Crossgar WWTWs have been closed with the flows diverted to alternative, compliant WWTWs.

New or upgraded WWTWs are currently operational at the following locations:

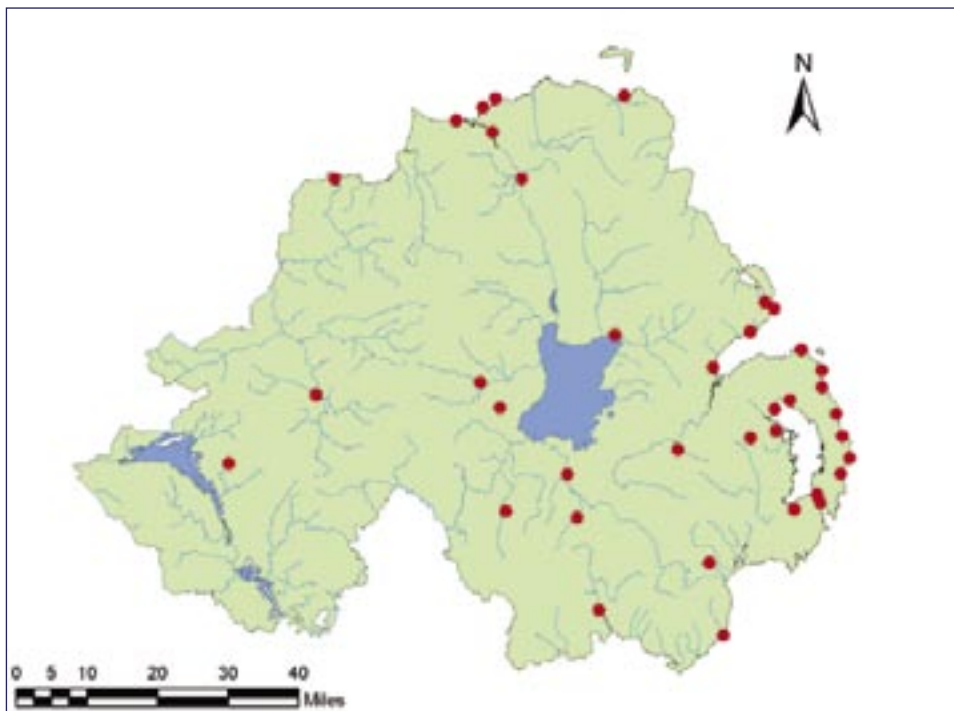
Ballyclare	Dunloy	Moneyreagh
Castleberg	Fivemiletown	Omagh
Cookstown	Glenavy	Rathfriland
Culmore	Larne	Tullaghgarley

Although the works are at various stages of commissioning, it can be considered that appropriate waste water treatment provision is now being provided at these locations. However, in line with the reasons for their original inclusion on the ‘Hotspots’ list, EHS requires further improvements to the sewerage systems serving Newry, Londonderry, Cookstown and Omagh before they can finally be removed from the list. As Antrim has been identified as a Hotspot solely on the basis of an unsatisfactory sewer system, it will remain on the list until sewerage system improvements have been completed.

Satisfactory interim measures were also carried out at Annahilt, Ardglass and Carrowdore WWTWs allowing those WWTWs to be removed from the "Hotspots" list.

Figure 7 shows the distribution of the 37 remaining Hotspots, identified in **Appendix D**. There is a high concentration of coastal Hotspots, especially around Belfast and the Ards Peninsula. Historically, more than 50% of sewage in Northern Ireland was treated by large coastal works with only primary treatment. This is being addressed by Water Service through their CWP and Public Private Partnership (PPP) schemes which are currently concentrating on upgrading all Hotspot areas.

Figure 7: Distribution of Current Hotspots

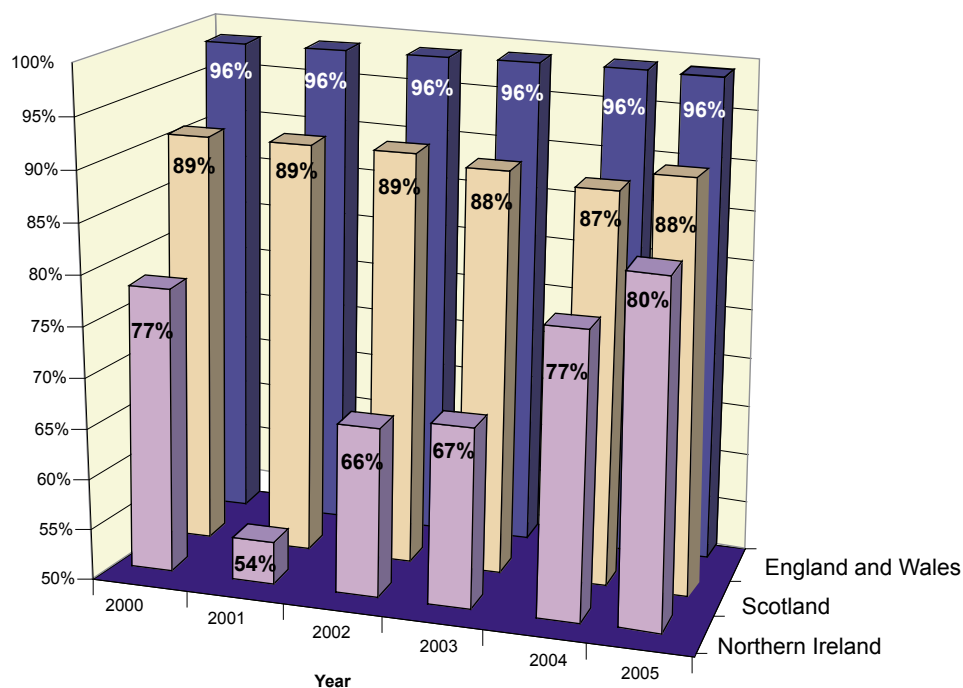


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United Kingdom Compliance

Figure 8 shows the compliance trends for WWTWs in England and Wales, Scotland and Northern Ireland. While compliance in Northern Ireland remains lower than in other parts of the UK, recent capital schemes and works improvements carried out by Water Service have resulted in a significant and sustained improvement since 2001.

Figure 8: WWTW Compliance in the United Kingdom (UK) 2000-2005



WWTWs with Population Equivalents less than 250

The public register for all works with a pe less than 250 was completed in 2005. Those WWTWs with pe greater than 250 have numeric discharge standards. WWTWs with pe less than 250 will be issued primarily with descriptive standards detailing the level of treatment and maintenance required to ensure good performance and effluent quality. An example of the information available on the register can be found in **Appendix E**. In 2005, EHS inspected 850 of these works to determine the appropriate level of treatment necessary at each of them as required by the UWWT (NI) 1995 Regulations. Some of these works are due for upgrading and are included in the Water Service CWP.

Section 2

Compliance with the Urban Waste Water Treatment Directive in 2005

The Urban Waste Water Treatment (UWWT) Regulations (Northern Ireland) 1995 implement the UWWT Directive (91/271/EEC). The Regulations set minimum standards for the treatment of waste water from urban areas before discharge to the aquatic environment. Compliance with the requirements of the Directive is reported to the European Commission under Article 15 of the Directive, through the Department of the Environment Food and Rural Affairs (DEFRA), as part of the UK submission. DEFRA also publishes a 'situation' report under Article 16 of the Directive. The last report, 'Sewage Treatment in the UK,' was published in March 2002. This report summarises the situation in Northern Ireland under the Regulations that apply locally.

Figure 9: Jackup Rig for Construction of the New Briggs Rock Outfall, Bangor



In 2005, 34 qualifying WWTWs were required to comply with the Regulations (see **Figure 10**). Of these WWTWs, 16 discharge to Sensitive (Eutrophic) Areas, these include Belfast, Newtownabbey and Carrickfergus which are now required to have nitrogen reduction as the 7 year lead in period following the designation of Inner Belfast Lough as Sensitive (Eutrophic) had ended on 1 January 2005. Out of the 34 qualifying works, 21 complied under the Regulations (**Table 7**). There are a number of the works serving populations that currently do not have the treatment required under the Regulations; however, these works will be upgraded under Water Service CWP or Public Private Partnership (PPP) Schemes.

Table 7: WWTWs Compliant with the UWWT Regulations in 2005

Compliant WWTWs 2005	
Antrim	Limavady
Armagh	Magherafelt
Ballymoney Ballybrakes	Moygashel
Ballinacor	New Holland
Ballyrickard	Newcastle
Banbridge	Newry
Belfast	Newtownbreda
Bullay's Hill	Seagoe
Dunmurry	Strabane
Enniskillen	Tullaghgarley
Kilkeel	

UWWT Regulations Performance Results for 2005

Table 8 shows compliance of qualifying WWTWs with the UWWT Regulations for the period 2000-2005. The decline in compliance in 2004 can be attributed to an internal Water Service reorganisation which resulted in non-compliance with the sampling requirements of the Regulations. However in 2005 the highest level of compliance (62%) was achieved since 2000 and the sampling requirements were fully met. As a consequence, compliance for discharges to sensitive areas more than doubled between 2004 and 2005 (**Table 9**).

Table 8: Compliance for all UWWT Directive WWTWs 2000-2005

Year	2000	2001	2002	2003	2004	2005
Number of discharges	15	37	35	35	35	34
Percentage compliance	53%	35%	46%	60%	43%	62%

Table 9: Compliance for UWWT Directive WWTWs Discharging to Sensitive Areas 2000-2005

Year	2000	2001	2002	2003	2004	2005
Number of discharges	15	15	14	14	14	16
Percentage compliance	53%	60%	60%	79%	29%	75%

Reasons for Non-Compliance

A number of WWTWs do not have the level of treatment necessary to comply with the Regulations. All these WWTWs are the subject of Water Service CWP or PPP schemes to provide the required level of treatment, with the work scheduled to be completed at all of them by the end of 2007. Other works failed to comply with the effluent emission standard as set out in the Regulations, and are detailed in **Table 10**.

Table 10: WWTWs Non-Compliant with the Standards of the UWWT Regulations in 2005

Name of Works	Failing Parameter				
	Biochemical Oxygen Demand 95%ile Limit (25mg/l)	Biochemical Oxygen Demand Upper Tier (50mg/l)	Chemical Oxygen Demand 95%ile Limit (125mg/l)	Chemical Oxygen Demand Upper Tier (250mg/l)	Total Phosphorus Annual Average
Ballyclare					X
Ballymoney (Glenstall)		X		X	
Bangor*					
Carrickfergus*					
Coleraine		X			
Cookstown			X	X	X
Culmore*					
Donaghadee*					
Larne*					
Newtownabbey*					
Omagh	X	X		X	
Portrush*					
Tandragee		X		X	

* Does not have required level of treatment

 Standard does not apply



Section 3 **Collection Systems**

In Northern Ireland, many of the 'collection' or sewerage systems date back to the 1800s. They have suffered from a lack of investment, and this, in conjunction with increased sewage flows from domestic and industrial sources over time, has resulted in an increase in the number of CSOs (Combined Sewer Overflows) that are considered to be unsatisfactory. The hydraulic capacity of 'collection' or sewerage systems serving our cities, towns and villages is finite, and CSOs exist as safety valves in those systems to prevent out of sewer flooding of properties. However, EHS considers a number of existing CSOs to be unsatisfactory because they either discharge during dry weather; cause a deterioration in the quality classification of a receiving water-body; cause failures to meet environmental standards; cause visible pollution or have a history of public complaints.

Figure 11: An Unsatisfactory CSO Discharge



Unsatisfactory CSOs need to be dealt with through the upgrading of the sewer systems to ensure that they operate effectively, and EHS is working closely with Water Service to this end. Currently, we are working together to identify and rectify unsatisfactory CSOs, to rationalise sewer systems and to reduce the total number of CSOs. However, it is not feasible to provide the sewerage systems with hydraulic capacity to prevent overflows associated with the most extreme rainfall events, so a number of CSOs may be required, even on upgraded systems to ensure the efficient operation of sewer networks. Where CSOs cannot be eliminated, EHS issues performance standards that are set to control the spill frequency, volume of discharge and associated pollutant loads in such a way that the water quality objectives and the desired amenity value of receiving waters are not compromised.

Any proposals Water Service makes to extend or upgrade its collection systems are assessed to determine whether they will meet the requirements of both EHS and the Urban Waste Water Treatment Directive (UWWTD). EHS has a responsibility for the implementation of the UWWT Directive through the Urban Waste water Treatment Regulations (NI) 1995. Schedule 2 of the Regulations requires the design, construction and maintenance of collecting systems to be undertaken in accordance with the best technical knowledge not entailing excessive costs, notably with regard to, the volume and characteristics of urban waste water, the prevention of leaks, and the limitation of pollution of receiving waters due to storm water overflows.

As part of the 'collection' or sewerage system upgrading process, Water Service is developing Drainage Area Plans (DAPs) for each settlement in Northern Ireland with a population above 1000. These DAPs provide information on the location and operation of CSOs within sewerage systems. EHS evaluates this information, in conjunction with field investigations, to assess the environmental impact, to determine which CSOs are unsatisfactory, to verify the discharge location and to identify the complexity of study required.

In common with the rest of the environmental regulators and water industry in the UK, EHS and Water Service have agreed to adopt the Foundation for Water Research Urban Pollution Management (UPM) Manual methodology in assessing the performance of collection systems and any proposed upgrade solutions. UPM methodology provides a waste water planning framework and adopts a holistic approach in relation to setting the required performance standards for CSOs, taking account of the interaction between CSOs and other polluting discharges, such as those from sewage treatment works, surface water outfalls and diffuse sources. Information gathered is used to specify the degree of sophistication of the UPM study and the environmental objectives to be met.

By the end of August 2006, upgrading of the sewerage systems serving WWTWs in 6 areas had been completed, with construction on-going in a further 9 areas. Detailed UPM studies have been completed in respect of a number of sewerage systems including Belfast (Duncrue Street system), Belfast (Kinnegar system), Enniskillen, Omagh, Cookstown, Ballymena, Newcastle and Portadown/Craigavon with construction in progress at both Belfast (Duncrue Street) and Enniskillen. A detailed UPM study is on-going in respect of the sewerage system serving Lisburn. **Appendix F** gives an update of progress to the end of August 2006.

Agreement, in principle, has been reached on the upgrading requirements for another 14 sewerage systems, and a further 50 upgrades are currently under discussion as part of a formal process. Negotiations on proposals for sewerage systems serving a further 26 WWTWs will take place in 2006/2007 as part of the planned programme of work provided by Water Service. Preliminary fieldwork and data gathering for a number of these sewer systems have taken place, but further work will depend on the information obtained from initial DAPs provided by Water Service.

The Water Service Belfast Sewer Project commenced in September 2004 and involves construction and improvements to the existing sewerage system, with the aim to improve water quality in the Lagan catchment. In September 2006, the Chief Executive of Water Service announced the award of the £100 million Belfast Sewers (Tunnel) Project. This scheme, a major element of the Belfast Sewer Project will significantly improve water quality in the Lagan and Blackstaff rivers,

reduce the risk of flooding in the Belfast area and deliver compliance with EHS's environmental standards. Further details of the Belfast Sewers Project can be found on the Water Service website at www.waterni.gov.uk.

Figure 12: Upper Bann River above Portadown.



Figure 13 shows those urban areas that have been or will be assessed in relation to the design and operation of their sewer system to meet the requirements of the Urban Waste Water Treatment Directive. The areas identified are those with p.e. greater than 1000 for which Water Service is developing Drainage Area Plans (DAPs).

The DAPs require the development of hydraulic models of the systems in order to assess performance and to develop and test improvements. The performance of such systems is tested using expected rainfall patterns to predict the volume and frequency of overflows to the receiving waterways. The overflow information generated is used to compare the predicted environmental impact on the receiving waters with the water quality objectives established by EHS.

Figure 13: Map of Drainage Area Studies Being Assessed by EHS



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Section 4 **Water Treatment Works**

The treatment of water at Water Treatment Works (WTWs) for public supply as drinking water generates effluents that are often discharged to nearby waterways. EHS determines discharge standards for Water Service WTW effluents which are set to protect the receiving water by ensuring that compliance with Environmental Quality Standards (EQS) set for those waters is not put at risk.

The data in **Table 11** follows a trend of improved compliance from 46% in 2000 to 50% in 2002 and has since leveled out around 40%. The reduced compliance for 2003-2005 can in part be attributed to inadequacies within the Water Service sampling and reporting arrangements. Water Service is actively making improvements to their processes and systems for both sampling and reporting in respect of Water Treatment Works. However, due to the intermittent nature of discharges from WTW's there will continue to be difficulties in adhering to a prescheduled sampling programme.

Table 11: Summary of WTWs Compliance 2000-2005

	2000	2001	2002	2003	2004	2005
Number of WTW discharges monitored	24	27	26	27	30	28
Percentage of WTW discharges complying	46%	48%	50%	44%	40%	43%

Details of compliant and non-compliant WTW discharges for 2005 can be found in **Appendix G**.

Figure 14: Lough Island Reavy Reservoir





Section 5 **Pollution Incident Investigation**

The Water Management Unit of EHS is responsible for investigating and monitoring pollution incidents caused by unauthorised discharges. Water Pollution Incident and Prosecution Statistics reports are published each year.

In 2001 (**Figure 15**), there were 305 confirmed pollution incidents attributed to Water Service. This increased to 364 in 2003, but fell to 289 in 2004. The number of incidents attributed to Water Service in 2005 was 308, representing the largest number of pollution incidents by source in that year (**Figure 16**). However, only two of these were high severity incidents with 42 as medium and 264 as low severity incidents.

Figure 15: Substantiated Pollution Incidents Attributed to Water Service 2000-2005

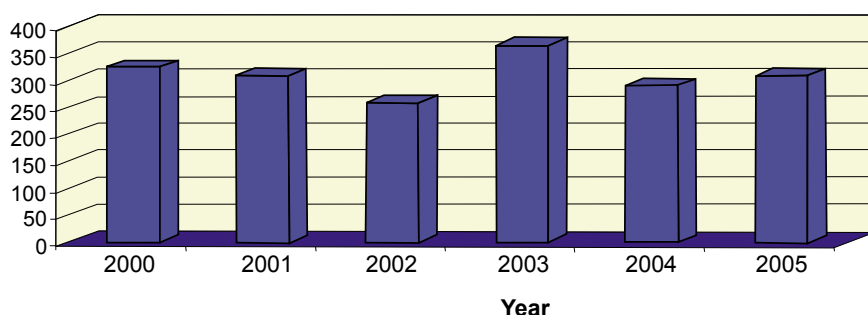


Figure 16: Substantiated Pollution Incidents by Source in 2005

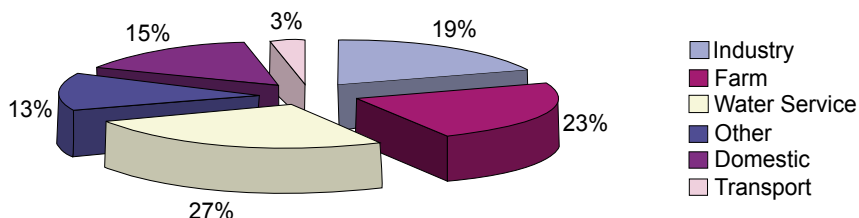
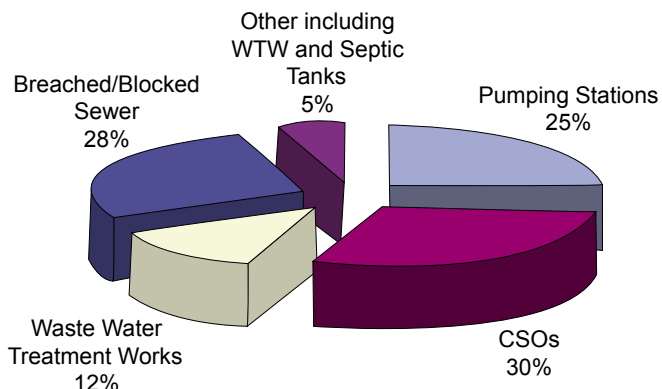


Figure 17 shows the percentage distribution of Water Service activities which resulted in pollution incidents in 2005.

Figure 17: Sources of Pollution Arising from Water Service Activities in 2005





Section 6

Current and Future Performance

Current and Future Performance

In May 2006, draft legislation introducing changes to the way water and sewerage services are delivered in Northern Ireland was published for consultation, The Water and Sewerage Services (Northern Ireland) Order 2006 provides for the appointment of a government-owned company to deliver water and sewerage services; establishes a regulatory regime to ensure compliance with environmental, consumer protection and efficiency standards; sets out new rights for consumers; and enables charges to be levied on the principle of fairness and affordability.

Water Service is set to become the government-owned company on 1 April 2007. The new company will have more freedom and flexibility, including an income stream to maintain capital expenditure at the high level required to meet environmental requirements.

The new status of the government-owned company will fundamentally change the way in which water utility regulation is undertaken in Northern Ireland. One of Water Reform's policy objectives is to introduce the water and sewerage undertaker to the normal environmental regulatory regime provided by the Water Order (NI) 1999. Currently, Water Service discharges are not subject to control by the Water Order (NI) 1999 and do not require a consent, but are required to meet requirements similar to those applied to private discharges. These are set out in "registered standards" which take into account the requirements of EU Directives and which are placed on a public register held by EHS.

The new company will be required to have discharge consents under the Water Order (NI) 1999 in the same way as any other discharger. It will also cease to enjoy "crown immunity" and will be liable to enforcement action, as permitted by the legislation.

The consents issued to the company will require it to provide appropriate treatment for waste water, to provide flow monitoring facilities where necessary, to operate the works in a manner that enables it to meet its consent conditions, and to take and analyse samples at times prescribed by EHS. They will contain numeric standards for works serving equivalent populations greater than 250. Most smaller works will have descriptive consents unless they are having a significant environmental impact, in which case they will also have numeric standards.

EHS accepts that there is still much to be done in terms of discharge compliance, and will continue to strive for higher levels of investment in sewerage infrastructure in order to deliver water quality standards that are consistent with the rest of the UK and Europe.

Investment in WWTWs

Over the three year period to 2008/09, some £200 million will be invested in upgrading WWTWs to ensure compliance with EU Directive standards. Work has commenced on the new North Coast WWTW to meet compliance requirements at Portrush, Portstewart and Coleraine. This £47.4 million project is in addition to other recently completed work at Omagh, Londonderry, Strabane, Banbridge and elsewhere. Considerable

progress has already been made with treatment works such as Larne, Cookstown and Ballyclare, which were completed in 2006. **Appendix B** shows the status at a number of works as of August 2006.

In addition, Water Service is actively pursuing the use of Public Private Partnership (PPP) investment to complement conventionally funded programmes. Initial PPP programmes for waste water and sludge treatment, currently estimated at some £122 million, are being taken forward for detailed planning and procurement.

Sewerage Systems

Investment is also planned to upgrade the sewerage network in Northern Ireland. It is estimated that more than £400 million will be required over the next 10 years. This is being managed via a programme of 107 Drainage Area Studies and the production of Drainage Area Plans leading to the inclusion of projects in Water Service's capital investment programme. Included in this programme is the recently commenced Belfast Sewer Project, a £127 million contract to upgrade the Victorian sewerage network in Belfast. **Appendix F** shows the status of the sewerage system upgrades as of August 2006.

Future WTW Compliance

It is expected that further improvements in the quality of effluent discharges from WTWs will be achieved as these are upgraded to meet the requirements of the various EU directives which apply to drinking water. To achieve this, Water Service plans to invest some £190 million on its WTWs and distribution systems in the 3-year period to 2008/09.

Recently commissioned, new treatment plants, such as the Mourne Works at Drumaroad, are ensuring steady progress towards full compliance with EU Directive standards. Work is also under way at Carran Hill WTW, near Crossmaglen, and substantially complete at Fofanny WTW, located beside Fofanny Dam in the Mournes area. This is in addition to work already completed to upgrade the water treatment facilities at Lough Fea (Cookstown area), Derg (Castlederg area), and Lough Macrory (Omagh area).

In addition, Water Service is pursuing the use of Public Private Partnership investment to complement conventionally funded programmes. Initial PPP programmes for water treatment, currently estimated at some £110 million, are being taken forward for detailed planning and procurement.

Appendices

Appendix A

Summary of WWTWs that did not meet their Registered Standard in 2005

Station	Biochemical Oxygen Demand mg/l		Suspended Solids mg/l		Ammonia mg/l		Total Phosphorus mg/l
	95%ile	U/T	95%ile	U/T	95%ile	U/T	Annual Average
Aghanloo 2	×				×		
Annaghmore			×				
Antrim					×		
**Ardglass	% Red		% Red				
Aughnacloy	×		×	×			
Ballybogey					×		
Ballyclare							×
Ballykinler				×			
Ballymoney Ballybrakes		×					
Ballymoney Glenstall	×	×	×				
Ballynahinch						×	
Ballynure					×		
*Bangor	×	×	×				
Belleeks (Armagh)			×				
Bonnanaboigh					×		
Campsie	×		×				
*Carrickfergus	×	×	×				
Coagh	×						
Coleraine	×	×					
Cookstown	×	×	×				×
Corkey					×		
*Culmore	×	×	×				
Derryvale	×						
*Donaghadee	×	×	×				
Drumintee					×		
Dundrum, Co. Down			×				
Dunloy	×		×				
Feeny	×						
Gravel Hill					×		

Station	BOD		Suspended Solids		Ammonia		Total Phosphorus
	95%ile	U/T	95%ile	U/T	95%ile	U/T	Annual Average
Hillsborough	×						
Kilkeel		×					
*Larne	×	×	×	×			
Lisbarnet			×		×		
Lisnaskea				×			
Maghera, Co. Londonderry	×						
Magherafelt					×		
*Newtownabbey	×	×	×				
Omagh	×	×	×				
*Portrush	×	×	×				
Raholp	×		×				
Rathfriland	×	×	×	×	×	×	
Sandholes	×		×				
Savalbeg					×		
Seaforde	×		×				
Spa					×		
**Strangford							
Tandragee	×	×	×	×			×
Tempo		×					
Toome	×		×				
Waringstown		×		×			
Whiterock	×						

* Does not have required level of treatment

** Insufficient data provided to assess compliance

Key:

× non-compliance with standard

Standard does not apply

95% ile 95-percentage standard

U/T Upper tier standard

% Red Percentage reduction standard

Appendix B

Capital Works programme (CWP) as of August 2006 and Reasons for Non-Compliance by WWTWs

Name WWTW	Details
AGHANLOO	This works receives trade effluent that needs to be more strictly regulated to ensure compliance. Work by the trade discharger to provide treatment to meet the trade effluent consent standards is to be completed in April 2007. This should improve compliance at this works.
ANNAGHMORE	The works is part of a rationalization scheme due to be completed in April 2007.
ANTRIM	This works is not designed to nitrify and a new works has been planned for completion by 2008.
ARDGLASS	The works has been provided with a preliminary treatment stage to assist the primary treatment until the works is upgraded in early 2007.
AUGHNACLOY	The upgraded works was commissioned in 2004 and its environmental needs standard has applied since April 2005 onwards.
BALLYBOGEY	The works is in the CWP and due to be replaced in 2008.
BALLYCLARE	A new membrane bioreactor was commissioned in December 2005 and a more restrictive standard now applies.
BALLYKINLER	The works is on the CWP with upgrading due by April 2008.
BALLYMONEY/BALLYBRAKES/GLENSTALL	Construction commenced in late 2005 at Glenstall on a new WWTW to serve the greater Ballymoney area.
BALLYNAHINCH	The works failed in 2005 because of a single upper tier failure for ammonia and has operated well otherwise.
BALLYNURE	The works is due to be closed and the influent is to be pumped to the new works at Ballyclare.
BANGOR	Upgrade is due for completion by the end of 2007 as part of the North Down Waste Water Treatment Works PPP scheme.
BELLEEK (ARMAGH)	Approval and a feasibility study to replace the works with a pump away solution to Newry is being finalised.
BONNANABOIGH	This works is part CWP rationalisation scheme and, subject to funding, will be complete in 2009.

CAMPSIE	This works is now closed and the sewage is being pumped to Donnybrewer.
CARRICKFERGUS	This is a primary sedimentation works with no secondary treatment. A contractor is on site constructing a new works designed to meet the UWWT Directive standards. Work is expected to be completed by November 2006.
COAGH	This works was non compliant with its registered standard in 2005 because of a number of BOD failures. Water Service was unable to explain the exceedences.
COLERAINE	This works is overloaded both hydraulically and biologically and is to be replaced by the North Coast scheme scheduled to be in place by mid-2007. Construction has started on the new transfer pipework.
COOKSTOWN	The works is being replaced by a Sequential Batch Reactor (SBR) and is due to be completed in late Autumn 2006.
CORKEY	Water Service will continue to operate this works as designed until a pump away solution to Loughguile WWTW is completed in 2006.
CULMORE	A new works was completed in 2006 providing secondary treatment to meet environmental needs standards.
DERRYVALE	The works failed to meet its BOD standard for the year.
DONAGHADEE	This works does not provide the required level of treatment and will be addressed by the new North Down and Ards WWTW under the PPP scheme to be completed at the end of 2007.
DRUMINTEE	This works has been experiencing shock loadings of sewage from the sewer system network during upgrading by contractors. This has adversely affected its performance.
DUNDRUM	This works is overloaded both hydraulically and biologically and is currently being replaced by a Membrane Bioreactor (MBR) treatment system designed to meet tighter environmental needs standards. Work is scheduled to be completed by the end of 2006. In the interim, Water Service has installed a temporary treatment system.
DUNLOY	This works has been the subject of rogue discharges during the construction of the new works in 2005.
FEENEY	This filter works was upgraded during 2005 by the replacement of the media. Re-establishment of treatment was slower than expected, and washout of solids caused a slight increase in BOD. After settling down the works produced effluent BODs of under 10mg/l and suspended

	solids of under 20mg/l, well within discharge standards.
GRAVEL HILL	New aeration equipment has been installed that should improve nitrification within the works.
HILLSBOROUGH	This filter works is operating to design and it is not known why four samples failed the BOD standard.
KILKEEL	The single upper tier exceedence in December was associated with civil engineering work being carried out on the works.
LARNE	Construction of the new Larne WWTW is complete and the works was commissioned in January 2006.
LISBARNET	A balancing tank was added at the end of 2004 to try to regulate flow as an interim measure. This has improved the treatment but frequent increases in hydraulic load still cause periodic problems at the works.
LISNASKEA	A single upper tier exceedence resulted in non compliance. This was due to a faulty decant valve which prevented proper desludging of the system. The works complied with all other consented parameters during 2005.
MAGHERAFELT	Water Service will continue to operate the plant as designed. To date in 2006, the works has met all standards including the 10mg/l ammonia (NH ₄ -N).
NEWTOWNABBEY	An upgrade of the works to provide tertiary treatment commenced in April 2005 with an expected completion date of March.
OMAGH	The new works was commissioned in December 2005.
PORTRUSH	The required level of sewage treatment has still to be provided for this works. This will be addressed by the North Coast scheme scheduled for completion by mid 2007.
RAHOLP	The operation of the works is being reviewed, and a possible pump away solution to Downpatrick WWTW is being considered.
RATHFRILAND	A new Membrane Bioreactor (MBR) system designed to meet tighter environmental needs standards is currently being commissioned.
SANDHOLES	This works was overloaded biologically and hydraulically and has now been replaced by a pump away solution to Cookstown WWTW.
SAVELBEG	This works is overloaded due to continued housing development and the sewage is now pumped to Newry.

SEAFORDE	Water Service has installed new inlet screens, refurbished the filter with no-head filter arms and added tertiary treatment to augment the treatment process. This is an interim measure as it is proposed to close this works and pump the sewage to an upgraded works at Clough by mid 2007.
SPA	The works is overloaded hydraulically and biologically. It is a biological filter not designed to nitrify to under 5 mg/l. It is being replaced by a pump away solution to the new Drumaness works.
STRANGFORD	Work on a new treatment plant is due to be completed in early 2007.
TANDRAGEE	A new works is currently being constructed and is due for completion early in 2007.
TEMPO	The works was experiencing difficulties with desludging in 2005.
TOOME	Water Service will continue to operate the works as designed until replacement in 2008. To date in 2006, the works has met its consent standards.
WARINGSTOWN	The upper tier exceedence in 2005 was due to a seasonal problem with sludge settlement.

Appendix C

WWTWs for which flow data was provided in 2005

WWTW	
Antrim	Greenisland
Ballyclare	Kilkeel
Ballynacor	Kircubbin
Ballynahinch	Limavady
Banbridge	Moira
Belfast	New Holland
Bullays Hill	Newcastle
Carrickfergus	Newry
Coleraine	Newtownabbey
Dunmurry	Spencetown
Glenstall	Tullaghgarley

Appendix D

Listed below are the 37 'Hotspot' locations

ANNALONG	LISABARNET
ANTRIM	LOUGHRIES
#ARMAGH	#MILLISLE
BALLYCASTLE	*NEWRY
BALLYGOWAN	NEWTOWNABBEY
BALLYHALBERT	#NEWTOWNARDS / COMBER
BALLYMONEY GLENSTALL	*OMAGH
BALLYSTRUDDER	PORTAFERRY
BALLYWALTER	PORTAVOGIE
#BANGOR / GROOMSPORT	PORTRUSH
CARRICKFERGUS	PORTSTEWART
CASTLEROCK	RAHOLP
CASTLEWELLAN	RAVARNET
CLOUGHY	#SEAGOE
COLERAINE	STEWARTSTOWN
*COOKSTOWN	STRANGFORD
*CULMORE	TANDRAGEE
#DONAGHADEE	WHITEHEAD / ISLANDMAGEE
IRVINESTOWN	

Denotes new WWTW to be constructed and operated as a Public Private Partnership (PPP) Scheme.

* New WWTWs have been constructed at these locations. However, their original inclusion on the 'hotspots' list is also related to problems with the sewerage systems, which have not yet been resolved.

Appendix E

Example of Information Placed on the Public Register for WWTWs with p.e. less than 250 in 2005

Public Register Information	
Name of Works	Abbacy
EHS Station Code	51035
Population Equivalent served by works	42
Irish Grid Reference (discharge)	J5970 5567
Irish Grid Reference (works)	J5971 5556
Dry Weather Flow from works (m ³ /Day)	27
Receiving Water	Stream Strangford Lough
Discharge Standard	Descriptive (refer to consent)
EHS File ref	WR187/05/1

Appendix F

Status of Sewerage System Upgrades -August 2006

Construction Complete	Construction On-going	Agreement Reached in Principle on Drainage Area Study	Drainage Area Study Ongoing	Due in Future
Cushendall Cushendun Glenarm Helen's Bay Larne Portstewart	Ballyclare Ballymoney Banbridge Belfast (Duncrue System) Downpatrick Enniskillen Newry Portrush Rostrevor	Cookstown Dundrum Dunmurry Hillsborough Limavady Londonderry Maghera Magheralin Millisle Moir Newcastle Portadown/Craigavon Strabane Whitehead	Annalong Antrim Ardglass Armagh Ballycastle Ballyhalbert Ballymena Ballywalter Bangor Belfast (Kinnegar System) Bessbrook Carrickfergus Castleberg Castlerock Castlewellan Cloghy Coalisland Coleraine Donaghadee Draperstown Dromore Gilford Greencastle Greenisland Greyabbey Kilkeel Kircubbin Lisburn Lurgan Maghaberry Magherafelt/Castledawson Markethill Moneymore New Buildings Newtownstewart Newtownbreda Omagh Portaferry Portavogie Portglenone Randalstown Rathfriland Richill Seahill Sion Mills Tandragee	Annahilt Ballycarry Ballygowan Ballykelly Ballynahinch Ballyrickard Ballystrudder Bellaghy Bushmills Crossgar Crossmaglen Dungannon Dungiven Eglinton Fintona Fivemiletown Garvagh Glenavy Greysteel Irvinestown Keady Killyleagh Kilrea Lisnaskea Portballintrae Saintfield

Appendix F cont...

Construction Complete	Construction On-going	Agreement Reached in Principle on Drainage Area Study	Drainage Area Study Ongoing	Due in Future
			Upper Falls Warringstown Warrenpoint Whitehouse	

Appendix G

WTW Non-Compliant with their Discharge Standards in 2005

Name or Works	Suspended Solids	Total Aluminium	Chlorine	BOD	pH	Insufficient Sample Results
Altmore						×
Altnahinch	×					
Ballinrees	×	×				
Ballymaconaghy						×
Ballysallagh Upper			×		×	×
Castor Bay Lagoon	×		×			×
Castor Bay Sand Washer						×
Caugh Hill						×
Conlig	×					×
Dongonnell						×
Dunore Point Settlement Tank	×		×	×		×
Dunore Point Sludge Beds	×		×			×
Forked Bridge Backwash	×					×
Forked Bridge Sand Washer	×			×	×	×
Killyhevlin	×					
Lough Cowey	×	×				×

WTW Complying with their Discharge Standards in 2005

WTW	
Ballintemple	Dorisland
Belleek	Glenhordial
Carnmoney	Killylane
Clay Lake	Lough Fea
Creightons Green	Silent Valley
Derg	Seagahan

Church Road and Killea were out of service in 2005

Foffanybane and Ballysallagh had no discharge during 2005

Foffanybane consent is for an emergency discharge only as supernatant is returned to the head of the works.

Lough Island Reavy has an intermittent discharge and was not sampled.

Glossary

Ammonia/Ammonium (NH ₄)	A chemical found in water often as a result of pollution by sewage effluents. High levels can adversely affect fish.
Biochemical Oxygen Demand (BOD)	A measure of polluting potential – BOD is a measure of the amount of oxygen required by bacteria or algae to break down the organic biodegradable material in sewage or effluent.
Combined Sewer Overflow (CSO)	Channels which act as sewers during normal flow conditions. Under high flow conditions, such as during or after storms, these channels can either direct increased flows to storm-water storage tanks to prevent sewage treatment works being overloaded or to allow storm waste water to flow into surface waters.
Discharge Standard	A standard issued by EHS to permit discharge of effluent to a water body. The standards lay down conditions in order to minimise effects on the receiving water. Registered standards usually specify the location of the discharge and the total volume of effluent permitted together with the appropriate quality conditions, such as the effluent's biochemical demand and where relevant may include suspended solids, ammonia, metals or certain toxic substances.
Effluent	Discharge from a sewage or water treatment works.
Eutrophic	Waters which have been affected by eutrophication.
Eutrophication	Enrichment of waters through the presence of nutrients, especially nitrogen and/or phosphorus compounds, causing accelerated growth of algae and higher forms of plant life to produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned.
mg/l	milligrams per litre – a measure of the concentration of a substance in liquid.
Outfall	Sewage discharge point – the structure or pipe that conveys the effluent to the receiving water for discharge.
Percentile Limit	A numeric limit that must be achieved or bettered for at least some stated percentage of time over a specified assessment period. A 95-percentile limit must be met for at least 95-percent of a specified time period, for example, 1 year.
Population Equivalent (pe)	A measure of the organic biodegradable load where a population equivalent (1 pe) is equal to a biochemical oxygen demand of 60g of oxygen per day.

Preliminary treatment.	The most basic treatment that sewage can receive, employing screening to remove visible solids and grit removal.
Primary treatment	Treatment of sewage by physical and/or chemical processes involving the settlement of suspended solids, or other processes in which the biochemical oxygen demand of the incoming sewage is reduced by at least 20% before discharge, and total suspended solids of the incoming sewage are reduced by at least 50%.
Public Register	Record of consents and analysis of effluents and waters that are available for inspection by any member of the public. The Register can be viewed at 17 Antrim Road, Lisburn.
Receiving Water	Body of water receiving effluent.
Secondary Treatment	A higher level of treatment (than provided by primary treatment) of sewage by a method generally involving a biological process followed by clarification or other process, in which the UWWT Directive's treatment standards for biochemical oxygen demand, chemical oxygen demand and suspended solids are respected. Secondary treatment is the normal standard for treatment of discharges under the UWWT Regulations.
Sewage Treatment Works / Waste Water Treatment Works	Plant where sewage/waste water is received for treatment.
Sewage (or Urban Waste Water)	Generally a mixture of domestic waste water (from toilets, baths, sinks, and washing machines) with industrial waste water and/or run-off.
Sewage or sewerage collection system	A system of pipes and ducting which collects and transports sewage.
Suspended Solids	Solid matter, including food waste, faeces, condoms and sanitary items found in sewage that can be removed by settlement.
Tertiary or "more stringent" treatment.	A further level of treatment to secondary, involving the removal of specific polluting matter, such as nutrients (nitrogen and/or phosphorus), micro-organisms or toxic substances.
Treatment levels	Sewage is treated to various levels, namely: preliminary, primary, secondary and tertiary. Each level of treatment following preliminary treatment builds on the previous treatment level.
UKAS	United Kingdom Accreditation Service. An accreditation body that ensures that quality standards are met for both analysis and measurement.

Upper Tier Standard

An absolute limit, generally a multiple of the 95-percentile limit, that may be included with the 95-percentile in the discharge standard for WWTWs.

Water Treatment Works (WTW)

Plant where a natural water source is treated to provide drinking water for domestic consumption.

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Water Management Unit
Environment and Heritage Service
17 Antrim Road
Lisburn
BT28 3AL

Tel 028 9262 3139 - Fax 028 9267 6054
Website <http://www.ehsni.gov.uk>

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