



comhairle chontae na mí
meath county council

Athboy

Waste Water Works



Annual Environmental Report

For

EPA Waste Water Discharge Licence D0124-01

01/01/2013 to 31/12/2013

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Section 1:

Introduction & Background

Section 1.1: Executive Summary.

Introduction:

The Waste Water Treatment Plant (WwTP) at Athboy was commissioned in 2010 and is now operated and maintained by EPS as part of a 20 year DBO (design build, operate) contract. The waste water treatment plant was built to serve the agglomeration of Athboy, Rathcairn and their Environs and the facility is licensed for a population equivalent (PE) of 5,800.

The following Annual Environmental Report (AER) has been prepared as per Condition 6.10 of Meath County Council's Discharge Licence D0124-01 and includes all information requested under schedule D of this licence.

Plant Details:

The treatment plant consists of preliminary treatment and secondary biological treatment with nutrient removal and is designed to cater for a population equivalent of 5,800.

The treatment process at Athboy WwTP includes screening & degritting, anoxic & aerobic treatments, phosphorus removal, sludge dewatering and storm tanks. The primary discharge from the WwTP is to the Athboy River.

Compliance Issues:

Meath County Council's Environmental Services Section carried out the compliance monitoring testing of the Waste Water Treatment Plant in accordance with the schedules of the Waste Water Discharge Licence.

The following breach of the Emission Limit Values (ELV) set out by the Waste Water Discharge Licence was recorded:

2 No. Breaches of the Ortho Phosphate (OP) ELV

1 No. Breach of the Total Phosphate (Tp) ELV

2 No. Breaches of the Ammonia (NH₄) ELV.

The incidents were reported to the EPA via the Edenireland website using the Licence Management Application. Incident reports are also available for inspection at the Environment & Water Services Offices in Navan, Co. Meath.

Complaints Received:

There were no complaints received during the reporting period 01/01/13 to 31/12/13.

Projects Completed:

There were no significant improvements works or project carried out at the Treatment Works during the reporting period 01/01/13 to 31/12/13.

Section 2:

Monitoring Reports Summary

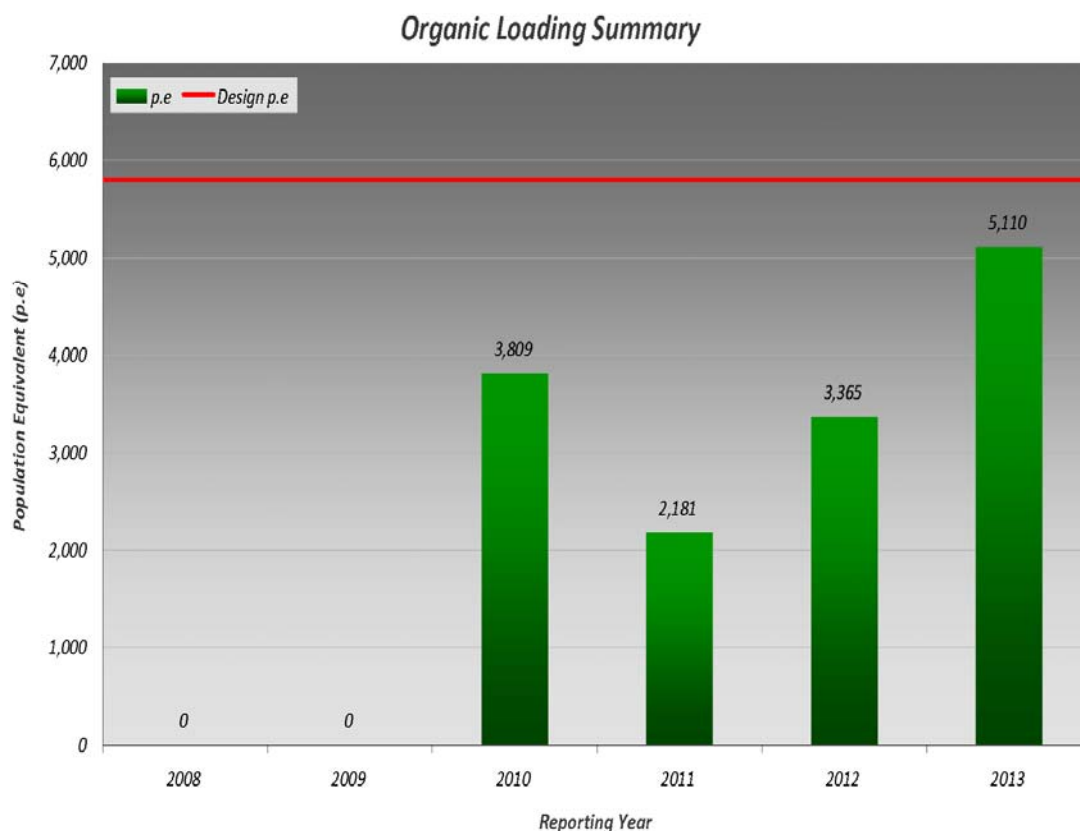
Section 2.1: Summary report on monthly influent monitoring

Influent Results Table:

	Influent Results (mg/l)					Hydraulic Loading (m3/d)	Organic Loading (p.e/d)
	BOD	COD	TSS	TP	TN		
No. Samples	12	12	12	12	12		
Max. Result	520	1047	578	18	78	3,699	
Avg. Result	289	557	286	9	43	1,061	5,110

Summary of Results:

As can be seen from the 'Influent Results Table' and the 'Organic Loading Summary' chart below Athboy WwTP continues to operate within its design capacity of 5,800 pe. There is currently a spare capacity of 690 pe.



Section 2.2: Discharges from the agglomeration

Parameter:	Flow	BOD	COD	SS	Total P	Ortho P	Total N	NH4	Nitrite	Nitrate	Total Organic Nitrogen
Units:	m3/d	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	kg/d
Average Results for 2013	1,061	4.854	18.528	4.545	0.454	0.428	6.037	0.798	0.161	4.093	N/A
WWDL ELV	N/A	20	125	35	1	0.6	N/A	1.1	N/A	N/A	N/A
ELV (Condition 2)	N/A	40	250	87.5	1.2	0.72	N/A	1.32	N/A	N/A	N/A
Annual Mean ELV	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No. of Results	N/A	12	12	12	12	12	N/A	12	N/A	N/A	N/A
WWDL ELV Exceedances	N/A	0	0	0	1	2	N/A	2	N/A	N/A	N/A
Annual Mean Exceedances	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Allowable Exceedances	N/A	2	2	2	2	2	N/A	2	N/A	N/A	N/A
Overall Compliance	N/A	Pass	Pass	Pass	Pass	Pass	N/A	Pass	N/A	N/A	N/A

Section 2.3: Ambient monitoring summary

In 2013 Meath County Council sampled the receiving waters namely the Athboy River on ten occasions. The results of this sampling are highlighted in the tables below - as per Schedule B of the waste water discharge licence.

Date	Ammonia (NH ₄) Mg/l		Ortho P mg/l		DO % Sat	
	u/s	d/s	u/s	d/s	u/s	d/s
07/03/2013	0.064	0.059	0.011	0.006	90.8	93.3
17/04/2013					92.4	94.7
21/05/2013	0.017	0.015	0.006	0.006	101.2	110
28/06/2013	0.050	0.041	0.012	0.018	85.1	96.5
24/07/2013	0.032	0.022	0.021	0.023	81.3	94
12/08/2013	0.026	0.019	0.017	0.016	92.8	107.3
11/09/2013	0.023	0.017	0.016	0.012	84	92.7
30/10/2013	0.027	0.029	0.019	0.021	89.1	92.6
13/11/2013	0.030	0.026	0.018	0.019	99.9	101.9
18/12/2013	0.032	0.036	0.019	0.020	90.7	92.8
Mean	0.033	0.029	0.015	0.016	90.730	97.580
95% ile	0.058	0.052	0.020	0.022	100.615	108.785

Date	BOD (mg/L)		TN (mgN/L)	
	u/s	d/s	u/s	d/s
07/03/2013	0.99	0.92	2.11	2.12
17/04/2013	1.27	1.12	2.66	1.55
21/05/2013	1.25	1.59	0.917	0.843
28/06/2013	1.18	1.25	1.02	0.856
24/07/2013	0.98	1.34		
12/08/2013	0.94	1.23		
11/09/2013	1.76	1.44		
30/10/2013	1.63	4.78		
13/11/2013	1.59	2.73	1.31	1.43
18/12/2013	1.6	1.51	1.19	0.985
Mean	1.319	1.791	1.535	1.297
95% ile	1.702	3.858	2.523	1.978

Assessment of the impact of the discharge over this period of time is made using the Environmental Quality Standards set out in the EC Environmental Objectives (Surface Water) Regulations 2009, as follows:

1. Ammonia

High status $\leq 0.040 \text{ mgN/L}$ (mean) or $\leq 0.090 \text{ mgN/L}$ (95%ile)

Good status $\leq 0.065 \text{ mgN/L}$ (mean) or $\leq 0.140 \text{ mgN/L}$ (95%ile)

2. Molybdate Reactive Phosphorous (MRP)

High status $\leq 0.025 \text{ mgP/L}$ (mean) or $\leq 0.045 \text{ mgP/L}$ (95% ile)

Good status $\leq 0.035 \text{ mgP/L}$ (mean) or $\leq 0.075 \text{ mgP/L}$ (95% ile)

3. Biochemical Oxygen Demand (B.O.D.)

High status $\leq 1.3 \text{ mgO}_2/\text{L}$ (mean) or $\leq 2.2 \text{ mgO}_2/\text{L}$ (95% ile)

Good status $\leq 1.5 \text{ mgO}_2/\text{L}$ (mean) or $\leq 2.6 \text{ mgO}_2/\text{L}$ (95% ile)

4. Dissolved Oxygen (D.O.)

D.O. Lower limit $> 80\%$ saturation (95 %ile)

D.O. Upper limit $< 120\%$ saturation (95 %ile)

The existing discharge from the Athboy WwTP is having little or no impact on the receiving waters. Background concentrations of sampling parameters Ammonia and Total Nitrogen are actually lower downstream of the Athboy plant.

Background BOD concentrations, both mean and 95 percentile are slightly higher downstream. Meath County Council are of the opinion that the Athboy plant is not the cause of this slight increase in BOD.

Meath County Council will continue to monitor the receiving waters in 2014.

Ambient Monitoring Point from WWDL (or as agreed with EPA)	Irish Grid Reference	EPA Feature Coding Tool code	Does assessment of the ambient monitoring results indicate that the discharge is impacting on water quality?
Downstream Monitoring Point	271818,264149	aSW-1d	Yes BOD
Upstream Monitoring Point	272512,263247	aSW-1u	No

Section 2.4: Data collection and reporting requirements under the Urban Waste Water Treatment Directive

The Environmental Section of Meath County Council is responsible for all the data collection and reporting requirement under the Urban Waste Water Treatment Directive. All results have been submitted via EDEN and the Online Urban Waste Water System.

Section 2.5: Pollutant Release and Transfer Register (PRTR)



Environmental Protection Agency

| PRTR# : D0124 | Facility Name : Athboy Waste Water Treatment Plant | Filename : D0124_2013.xls | Return Year : 2013 |

[Guidance to completing the PRTR workbook](#)

AER Returns Workbook

Version 1.1.17

REFERENCE YEAR	2013
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1. FACILITY IDENTIFICATION

Parent Company Name	Meath County Council
Facility Name	Athboy Waste Water Treatment Plant
PRTR Identification Number	D0124
Licence Number	D0124-01

Waste or IPPC Classes of Activity

No.	class_name
30.4	General

Address 1	County Hall
Address 2	Railway Street
Address 3	Navan
Address 4	County Meath
	Meath
Country	Ireland
Coordinates of Location	-6.91101 53.6179
River Basin District	IEEA
NACE Code	3700
Main Economic Activity	Sewerage
AER Returns Contact Name	Kealan McMoreland
AER Returns Contact Email Address	kmcmoreland@meathcoco.ie
AER Returns Contact Position	Technician
AER Returns Contact Telephone Number	0469097915
AER Returns Contact Mobile Phone Number	0872782899
AER Returns Contact Fax Number	N/A
Production Volume	0.0
Production Volume Units	m3
Number of Installations	1
Number of Operating Hours in Year	8760
Number of Employees	1
User Feedback/Comments	
Web Address	www.meathcoco.ie

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
5(f)	Urban waste-water treatment plants

3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)

Is it applicable?	No
Have you been granted an exemption ?	No
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

4. WASTE IMPORTED/ACCEPTED ONTO SITE

[Guidance on waste imported/accepted onto site](#)

Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ?	No
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4.1 RELEASES TO AIR

[Link to previous years emissions data](#)

| PRTR# : D0124 | Facility Name : Athboy Waste Water Treatment Plant | Filename : D0124_2013.xls | Return Year : 2013 |

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SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

POLLUTANT		RELEASES TO AIR			Please enter all quantities in this section in KGs			
No. Annex II	Name	M/C/E	METHOD		Emission Point 1	QUANTITY		
			Method Code	Designation or Description		T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
01	Methane (CH4)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
02	Carbon monoxide (CO)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
03	Carbon dioxide (CO2)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	77529.0	0.0	77529.0
05	Nitrous oxide (N2O)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
07	Non-methane volatile organic compounds (NMVOC)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
08	Nitrogen oxides (NOx/NO2)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
11	Sulphur oxides (SOx/SO2)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

SECTION B - REMAINING PARTY SELECTANTS

RELEASES TO AIR		Please enter all quantities in this section in KGs						
POLLUTANT		METHOD			QUANTITY			
No. Annex II	Name	M/C/E	Method Used		Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
			Method Code	Designation or Description				
						0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
Pollutant No.	Name	M/C/E	Method Used		Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
			Method Code	Designation or Description				
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T (total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Landfill:

Athboy Waste Water Treatment Plant

Please enter summary data on the quantities of methane flared and / or utilised

T (Total) kg/Year	M/C/E	METHOD USED		Facility Total Capacity m3 per hour
		Method Code	Designation or Description	
Total estimated methane generation (as per site model)	0.0			N/A
Methane flared	0.0			0.0 (Total Flaring Capacity)
Methane utilised in engine/s	0.0			0.0 (Total Utilising Capacity)
Net methane emission (as reported in Section A above)	0.0			N/A

4.2 RELEASES TO WATERS

[Link to previous years emissions data](#)

[PRTR# : D0124 | Facility Name : Athboy Waste Water Treatment Plant | Filename : D0124_2013.xls | Return Year : 2013 |

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SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this or

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
No. Annex II	Name	M/C/E	Method Code	Method Used	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
34	1,2-dichloroethane (EDC)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
25	Alachlor	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
26	Aldrin	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
61	Anthracene	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.001	0.001	0.0	0.0
17	Arsenic and compounds (as As)	M	ALT	ISO/IEC 17025:2009	0.542	0.542	0.0	0.0
27	Atrazine	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.004	0.004	0.0	0.0
62	Benzene	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.007	0.007	0.0	0.0
91	Benzo(g,h,i)perylene	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.001	0.001	0.0	0.0
63	Brominated diphenylethers (PBDE)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
18	Cadmium and compounds (as Cd)	M	ALT	ISO/IEC 17025:2010	0.232	0.232	0.0	0.0
28	Chlordane	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
29	Chlordecone	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
30	Chlorfenvinphos	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
79	Chlorides (as Cl)	M	ALT	ISO/IEC 17025:2006	90193.601	90193.601	0.0	0.0
31	Chloro-alkanes, C10-C13	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.081	0.081	0.0	0.0
32	Chlorpyrifos	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
19	Chromium and compounds (as Cr)	M	ALT	ISO/IEC 17025:2011	0.774	0.774	0.0	0.0
20	Copper and compounds (as Cu)	M	ALT	ISO/IEC 17025:2012	3.484	3.484	0.0	0.0
82	Cyanides (as total CN)	M	ALT	ISO/IEC 17025:2007	3.484	3.484	0.0	0.0
33	DDT	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
70	Di-(2-ethyl hexyl) phthalate (DEHP)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.355	0.355	0.0	0.0
35	Dichloromethane (DCM)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.018	0.018	0.0	0.0
36	Dieldrin	M	ALT	ISO/IEC 17025:2005	0.0	0.0	0.0	0.0
37	Diuron	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.01	0.01	0.0	0.0
38	Endosulphan	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
39	Endrin	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
65	Ethyl benzene	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.006	0.006	0.0	0.0
88	Fluoranthene	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.001	0.001	0.0	0.0
83	Fluorides (as total F)	M	ALT	ISO/IEC 17025:2008	77.419	77.419	0.0	0.0
40	Halogenated organic compounds (as AOX)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.924	0.924	0.0	0.0
41	Heptachlor	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0

90	Hexabromobiphenyl	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
42	Hexachlorobenzene (HCB)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
43	Hexachlorobutadiene (HCBd)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
89	Isodrin	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
67	Isoproturon	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.003	0.003	0.0	0.0
23	Lead and compounds (as Pb)	M	ALT	ISO/IEC 17025:2015	2.323	2.323	0.0	0.0
45	Lindane	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
21	Mercury and compounds (as Hg)	M	ALT	ISO/IEC 17025:2013	0.0	0.0	0.0	0.0
46	Mirex	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
68	Naphthalene	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.002	0.002	0.0	0.0
22	Nickel and compounds (as Ni)	M	ALT	ISO/IEC 17025:2014	1.935	1.935	0.0	0.0
64	Nonylphenol and Nonylphenol ethoxylates (NP/NPEs)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.032	0.032	0.0	0.0
87	Octylphenols and Octylphenol ethoxylates	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
69	Organotin compounds (as total Sn)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
48	Pentachlorobenzene	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
49	Pentachlorophenol (PCP)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
71	Phenols (as total C)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.352	0.352	0.0	0.0
50	Polychlorinated biphenyls (PCBs)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
72	Polycyclic aromatic hydrocarbons (PAHs)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.004	0.004	0.0	0.0
51	Simazine	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.005	0.005	0.0	0.0
52	Tetrachloroethylene (PER)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.023	0.023	0.0	0.0
53	Tetrachloromethane (TCM)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
73	Toluene	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.191	0.191	0.0	0.0
12	Total nitrogen	E	ESTIMATE	EPA UWWTP Tool Version 5.0	5527.745	5527.745	0.0	0.0
76	Total organic carbon (TOC) (as total C or COD/3)	M	ALT	ISO/IEC 17025:2005	2516.131	2516.131	0.0	0.0
13	Total phosphorus	E	ESTIMATE	EPA UWWTP Tool Version 5.0	375.629	375.629	0.0	0.0
59	Toxaphene	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
74	Tributyltin and compounds	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
54	Trichlorobenzenes (TCBs)(all isomers)	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
57	Trichloroethylene	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
77	Trifluralin	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
75	Triphenyltin and compounds	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0
60	Vinyl chloride	E	ESTIMATE	EPA UWWTP Tool Version 5.0	0.0	0.0	0.0	0.0

78	Xylenes	E	ESTIMATE	EPA UWWTP Tool Version	0.045	0.045	0.0	0.0
24	Zinc and compounds (as Zn)	M	ALT	ISO/IEC 17025:2016	23.226	23.226	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
No. Annex II	Name	M/C/E	Method Used		Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
			Method Code	Designation or Description				
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
Pollutant No.	Name	M/C/E	Method Used		Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
			Method Code	Designation or Description				
370	Selenium	E	ESTIMATE	EPA UWWTP Tool Version	0.0	0.0	0.0	0.0
205	Antimony (as Sb)	M	ALT	ISO/IEC 17025:2005	2.981	2.981	0.0	0.0
368	Molybdenum	E	ESTIMATE	EPA UWWTP Tool Version	0.0	0.0	0.0	0.0
358	Tin	E	ESTIMATE	EPA UWWTP Tool Version	0.056	0.056	0.0	0.0
373	Barium	E	ESTIMATE	EPA UWWTP Tool Version	5.127	5.127	0.0	0.0
374	Boron	E	ESTIMATE	EPA UWWTP Tool Version	23.656	23.656	0.0	0.0
356	Cobalt	E	ESTIMATE	EPA UWWTP Tool Version	0.068	0.068	0.0	0.0
386	Vanadium	E	ESTIMATE	EPA UWWTP Tool Version	1.056	1.056	0.0	0.0
388	Dichlobenil	E	ESTIMATE	EPA UWWTP Tool Version	0.002	0.002	0.0	0.0
383	Linuron	E	ESTIMATE	EPA UWWTP Tool Version	0.0	0.0	0.0	0.0
385	Mecoprop Total	M	ALT	ISO/IEC 17025:2005	0.0	0.0	0.0	0.0
380	2,4 Dichlorophenol (2,4 D)	E	ESTIMATE	EPA UWWTP Tool Version	0.02	0.02	0.0	0.0
384	MCPA	E	ESTIMATE	EPA UWWTP Tool Version	0.034	0.034	0.0	0.0
382	Glyphosate	M	ALT	ISO/IEC 17025:2005	0.0	0.0	0.0	0.0
389	Benzo[a]pyrene	M	ALT	ISO/IEC 17025:2006	0.0	0.0	0.0	0.0
390	Benzo[b]fluoranthene	M	ALT	ISO/IEC 17025:2007	0.0	0.0	0.0	0.0
391	Benzo[k]fluoranthene	M	ALT	ISO/IEC 17025:2008	0.0	0.0	0.0	0.0
392	Indeno[1,2,3-c,d]pyrene	M	ALT	ISO/IEC 17025:2009	0.0	0.0	0.0	0.0
393	Carbon tetrachloride	M	ALT	ISO/IEC 17025:2010	0.0	0.0	0.0	0.0
394	2,6-Dichlorobenzamide	M	ALT	ISO/IEC 17025:2011	0.0	0.0	0.0	0.0
395	Dicofol	E	ESTIMATE	EPA UWWTP Tool Version	0.0	0.0	0.0	0.0
396	Hexabromocyclodecane (HBCD)	E	ESTIMATE	EPA UWWTP Tool Version	0.0	0.0	0.0	0.0
397	PFOS	E	ESTIMATE	EPA UWWTP Tool Version	0.0	0.0	0.0	0.0
238	Ammonia (as N)	M	OTH	MCC Wastewater Lab	136.258	136.258	0.0	0.0
303	BOD	M	OTH	MCC Wastewater Lab	1695.872	1695.872	0.0	0.0
306	COD	M	OTH	MCC Wastewater Lab	9870.974	9870.974	0.0	0.0
362	Kjeldahl Nitrogen	M	OTH	MCC Wastewater Lab	3270.583	3270.583	0.0	0.0
327	Nitrate (as N)	E	ESTIMATE	EPA UWWTP Tool Version	0.0	0.0	0.0	0.0

372	Nitrite (as N)	E	ESTIMATE	EPA UWWTP Tool Version	0.0	0.0	0.0	0.0
332	Ortho-phosphate (as PO4)	M	OTH	MCC Wastewater Lab	103.742	103.742	0.0	0.0
240	Suspended Solids	M	OTH	MCC Wastewater Lab	1935.485	1935.485	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
No. Annex II	Name	M/C/E	Method Used		Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
			Method Code	Designation or Description				
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
Pollutant No.	Name	M/C/E	Method Used		Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
			Method Code	Designation or Description				
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

| PRTR# : D0124 | Facility Name : Athboy Waste Water Treatment Plant | Filename : D0124_2013.xls | Return Year : 2013 |

06/02/2014 12:58

Please enter all quantities on this sheet in Tonnes

5

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non-Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	19 08 01	No	7.2	screenings	D1	M	Volume Calculation	Offsite in Ireland				
Within the Country	19 08 05	No	332.951	water	D2	M	Weighed	Offsite in Ireland				

* Select a row by double-clicking the Description of Waste then click the delete button

Section 3:

Operational Reports Summary

Section 3.1: Treatment Efficiency Report

Results:	Units	cBOD	COD	TSS	Total P	Total N	Comment
Average Influent Mass Loading	kg/day	306	590	306	9	43	No Comment
Average Effluent Mass Emission	kg/day	5.04	19.15	4.69	0.469	6.24	No Comment
Average Treatment % Efficiency	% reduction on Influent Load	98.35%	96.75%	98.46%	94.78%	85.48%	No Comment
Target Treatment % Efficiency	Minimum % reduction on Influent Load	70-90%	75%	90%	80%	70-80%	Targets taken from the Second Schedule (Part 1 and Part 2) of the Urban Waste Water Treatment Regulations, 2001.

Section 3.2: Treatment Capacity Report

Treatment Capacity		
Hydraulic Capacity (m ³ /day):	Design	3,915
	Current	1,060
	Remaining	2,855
Organic Capacity (PE):	Design	5,800
	Current	5,110
	Remaining	690
Will the capacity be exceeded in the next three years? (Yes / No)		No

Section 3.3: Extent of Agglomeration Summary Report

	% of total load generated in the agglomeration
Load generated in the agglomeration that is collected in the sewer network	100%
Load collected in the agglomerations that enters treatment plant	100%
Load generated in the agglomeration going to individual and appropriate treatment systems	0%
Load generated in the agglomeration that is not collected and not individually treated.	0%

Section 3.4: Complaints Summary

Number	Date &Time	Nature of Complaint	Cause of Complaint	Actions Taken	Closed (Y/N)

There were no complaints recorded in during the reporting period 01/01/13 to 31/12/13

Section 3.5: Reported Incidents Summary

Incident Type	Incident Description	Cause	No. of incidents	Corrective Action	Authorities Contacted	Reported to EPA (Yes/No)	Closed (Y/N)
ELV Exceedance	The exceedances relate to Ammonia (NH ₄) which has an ELV reportable incident limit of 1.3 mg/l under the Athboy waste water treatment plant discharge licence.	Unknown	2	The plant operations contractor, EPS, was informed of the results. The final effluent will be closely monitored by the contractor to provide recommendations for remedial actions if necessary.	Inland Fisheries Ireland	Yes	Y
ELV Exceedance	The exceedances relate to Orthophosphate which has an ELV reportable incident limit of 0.72mg/l	Ferric dosing issues	2	The final effluent will be closely monitored by the contractor in order for them to adjust ferric dosing	Inland Fisheries Ireland	Yes	Y
ELV Exceedance	The exceedances relate to Phosphate which has an ELV reportable incident limit of 1.2mg/l.	Ferric dosing issues	1	The final effluent will be closely monitored by the contractor in order for them to adjust ferric dosing order for them to adjust ferric dosing	Inland Fisheries Ireland	Yes	Y

Number of Incidents in 2013	5
Number of Incidents reported to the EPA via EDEN in 2013	5
Explanation of any discrepancies between the two numbers above	N/A

Section 3.6: Sludge / Other inputs to the WWTP

Input type	m3/year	PE/year	% of load
Domestic /Septic Tank Sludge	N/A	N/A	N/A
Industrial / Commercial Sludge	N/A	N/A	N/A
Landfill Leachate (delivered by tanker)	N/A	N/A	N/A
Landfill Leachate (delivered by sewer network)	N/A	N/A	N/A
Other (specify)	N/A	N/A	N/A

Section 4:

Infrastructural Assessments and Programme of Improvements

Section 4.1: Storm water overflow identification and inspection report

SWO Identification and Inspection Summary Report Table A:

WWDL Name / Code for Storm Water Overflow	Irish Grid Reference	Included in Schedule A4 of the WWDL	Compliance with DoEHLG Criteria	No. of times activated in 2013	Total volume discharged in 2013 (m3)	Total volume discharged in 2013 (P.E.)	Estimated /Measured data
SW2	272048,263611	Yes	Compliant				
Athboy Pumping Station	272048,263611	Yes	Compliant				

A stormwater overflow (SWO) assessment was carried out in May 2011. With respect to the licence for the Athboy agglomeration the next SWO assessment is due to be carried out in 2014.

SWO Identification and Inspection Summary Report Table B:

How much sewage was discharged via SWOs in the agglomeration in the year (m3/yr)?	No flow meter from the SWO.
How much sewage was discharged via SWOs in the agglomeration in the year (pe)?	
What % of the total volume of sewage generated in the agglomeration was discharged via SWOs in the agglomeration in 2013?	No Flow Meter from storm tank. Anything above 3 times DWF fills the tank which has a capacity of 1,100m3. Only during prolonged rainfall will this tank fill to overflow.
Is each SWO identified as non-compliant with DoEHLG Guidance included in the Programme of Improvements?	All Compliant
The SWO assessment includes the requirements of Schedule A3 & C3	Yes
Have the EPA been advised of any additional SWOs / changes to Schedule C3 and A4 under Condition 1.7?	N/A

Section 4.2: Report on progress made and proposals being developed to meet the improvement programme requirements.

Licence Condition 5.1: Programme of Infrastructural Improvements.

There is no planned programme for infrastructure improvements at Athboy WwTP.

Licence Condition 5.2: Assessing the Programme of Infrastructural Improvements.

There is no planned programme for infrastructure improvements at Athboy WwTP.

Licence Condition 5.3: Plan for Implementation of Infrastructural Improvements.

There is no planned programme for infrastructure improvements at Athboy WwTP.

Licence Condition 5.4: Programme of Measures for Gathering, Recording, and Retention of Information

As-Constructed drawings and Mechanical & Electrical drawing are available for inspection at Meath County Council Headquarters. The information includes all the infrastructural components of the waste water works.

Sewer Integrity Risk Assessment Tool Improvement Programme (Works)
summary table:

	Risk Assessment Rating (High, Medium, Low)	Risk Assessment Score	Reference to relevant section of AER
Hydraulic Risk Assessment Score	High	107	Appendix 4 - Sewer Integrity Risk Assessment
Environmental Risk Assessment Score	Low	260	
Structural Risk Assessment Score	Medium	60	
Operation & Maintenance Risk Assessment Score	Low	18	
Overall Risk Score for the agglomeration	High	445	

Section 5:

Licence Specific Reports

Licence Specific Reports Summary Table:

Licence Specific Report	Required in 2013 AER or outstanding from previous AER	Included in 2013 AER	Reference to relevant section of AER (e.g. Appendix 2 Section4.
Priority Substances Assessment	Yes	Yes	Full report in Appendix 1 - Priority Substance Screening Results
Drinking Water Abstraction Point Risk Assessment	No	Yes	Full report in Appendix 2 - Drinking Water Abstraction Point RA
Habitats Impact Assessment	No	No	N/A
Shellfish Impact Assessment	No	No	N/A
Pearl Mussel Report	No	No	N/A
Toxicity/Leachate Management	No	No	N/A
Toxicity of Final Effluent Report	No	No	N/A
Stormwater Overflow Assessment	No	Yes	Full report in Appendix 3 - Stormwater Overflow Assessment

Section 5.1: Priority Substances Assessment

Preferred format for Priority Substance Assessment summary table:

	Licensee self-assessment checks to determine whether all relevant information is included in the Assessment.
Does the assessment use the Desk Top Study Method or Screening Analysis to determine if the discharge contains the parameters in Appendix 1 of the EPA guidance	Screening Analysis
Does the assessment include a review of Trade inputs to the works?	No
Does the assessment include a review of other inputs to the works?	N/A
Does the report include an assessment of the significance of the results where a listed material is present in the discharge? (e.g. impact on the relevant EQS standard for the receiving water)	N/A
Does the assessment identify that priority substances may be impacting the receiving water?	No
Does the Improvement Programme for the agglomeration include the elimination / reduction of all priority substances identified as having an impact on receiving water quality?	No

**Section 5.2: Drinking Water Abstraction Point Risk
Assessment.**

Drinking Water Abstraction Point Risk Assessment summary table:

	Licensee self- assessment checks to determine whether all relevant information is included in the Assessment.
Is a Drinking Water Abstraction Risk Assessment required in the 2013 AER (or outstanding from a previous AER)	No
Does the Drinking Water Abstraction Risk Assessment identify whether any of the discharges in Schedule A of the licence pose a risk to a drinking water abstraction	No - Abstraction point is a borehole. The WwTP discharges to the Athboy river. The RA identifies no significant infiltration into the ground water from the river.
Does the assessment identify if any other discharge(s) from the works pose a risk to a drinking water abstraction (includes emergency overflows)	Yes - Overflow of the sludge blanket from the treatment works into the Athboy River
What is the overall risk ranking applied by the licensee	L
Does the risk assessment consider the impacts of normal operation	Yes
Does the risk assessment consider the impacts of abnormal operation (e.g. incidents /overflows)	Yes
Does the risk assessment include control measures for each risk identified	Yes
Does the risk assessment include operational control measures? E.g. incident notification to DW source	Yes
Does the risk assessment include infrastructural control measures	Yes
Does the Improvement Programme for the agglomeration include control measures / corrective actions to eliminate / reduce priority substances identified as having an impact on receiving water quality?	No

Section 5.3: Shellfish Impact Assessment Report.

Shellfish Impact Assessment summary table:

Is a Shellfish Impact assessment required in the 2013 AER (or outstanding from a previous AER)?	No
List prescribed organisations consulted when preparing the assessment (BIM, SFPA, MI)	
Does the assessment identify that any of the discharges from the works are impacting on the microbiological quality of the shellfish?	
Does the assessment recommend that there is a requirement to install UV/other disinfection equipment on any of the discharges?	
Provide details on disinfection system to be employed	
Has this been completed?	
If not yet complete what is the expected date for completion?	
Where disinfection is required, is there a programme in place to demonstrate the efficiency of any disinfection system in place?	
What is the demonstrated efficiency of the disinfection system?	
Is there a shellfish monitoring programme in place?	
Does the shellfish or shellfish water monitoring programme include results generated by other organisations	
List organisations contributing data to the assessment	
Does the Improvement Programme for the agglomeration include the findings and recommendations of the shellfish impact risk assessment?	

Section 5.4: Toxicity / Leachate Management

Toxicity / Leachate Management Report summary table:

Is a Toxicity / Leachate Management Report required in the 2013 AER (or outstanding from previous AER)	No
What % of the total influent is leachate?	
Does the study identify any constituents of the leachate that present an environmental risk?	
List leachate constituent identified and impact (insert a row for each constituent)	
Has the WWTP suitability to treat the leachate been assessed?	
What are the results of the assessment (Suitable / Not Suitable / Suitable subject to improvement programme works completion)	
Has the study identified the max and operational loadings (mass, volume and rate of addition) for leachate to the WWTP?	
Is there a monitoring programme for the priority substances identified above?	
Have trigger and action levels for the concentration of identified leachate constituents been established to prevent impact on the receiving water?	
Does the Improvement Programme for the agglomeration include any procedural and/or infrastructural works to reduce the impacts of leachate acceptance on the operation of the wwtp?	

Section 5.5: Toxicity of the Final Effluent Report

Toxicity of the final effluent assessment summary table:

Is a Toxicity report required? (Condition 4)	No
Has the study been carried out against 4 species in 3 trophic levels?	
Does the report identify that the discharge is toxic to any of the species in the study?	
List species impacted	
Does the Improvement Programme for the agglomeration include any procedural and/or infrastructural works to reduce the toxicity of the final discharge?	

Section 5.6: Pearl Mussel Measures Report

Pearl Mussel Measure Report summary table

Is a progress report on implementation of the findings of Pearl Mussel Protection Measures report required in the 2013 AER (or outstanding from previous AER)	No
Is there a Pearl Mussel Protection Measures Report for the receiving water body?	
Include hyperlink to internet location of report	
Does this report identify measures relevant to discharges from the works as having a potential impact on the Pearl Mussel water?	
Does the Improvement Programme for the agglomeration include any procedural and/or infrastructural works to reduce the impacts of discharge on pearl mussel populations?	

Section 5.7: Habitats Impact Assessment Report

Habitats Impact Assessment summary table:

	Licensee self-assessment checks to determine whether all relevant information is included in the Assessment.
Is a Habitats Assessment required in the 2013 AER (includes outstanding assessments from previous years)?	No
Was the scope of the study agreed in advance with NPWS	
Does the report include a Stage 1 screening assessment?	
Does the screening identify that discharges are causing an impact on listed sites?	
Does the report require a Stage 2 Appropriate assessment?	
Does the report identify any European Sites (e.g. SPA, SAC, NHA) that discharges from the works could have an impact on?	
List European sites identified (insert a line for each site identified)	
Does the report include mitigation measures for each identified impact?	
Does each measure explain how the adverse impact will be avoided/reduced?	
Does the Improvement Programme for the agglomeration include any procedural and/or infrastructural works to reduce the impacts of discharges on the a listed site (NHA, SAC, SPA)?	

Section 6:


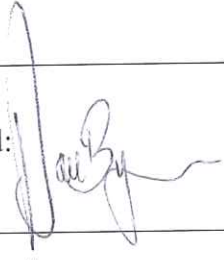
Certification and Sign Off

SECTION 6.1:**REPORT CHECK LIST**

Does the AER include an executive summary?	Yes
Does the AER include an assessment of the performance of the Waste Water Works (i.e. have the results of assessments been interpreted against WWDL requirements and or Environmental Quality Standards)?	Yes
Is there a need to advise the EPA for consideration of a technical amendment / review of the licence?	No
List reason e.g. additional SWO identified (insert lines as required)	N/A
Is there a need to request/advise the EPA of any modifications to the existing WWDL? Refer to Condition 1.7 (changes to works/discharges) & Condition 4 (changes to monitoring location, frequency etc.)	No
List reason e.g. failure to complete specified works within dates specified in the licence, changes to monitoring requirements (insert lines as required)	N/A
Have these processes commenced? (i.e. Request for Technical Amendment / Licence Review / Change Request)	N/A
Are all outstanding reports and assessments from previous AERs included as an appendix to this AER?	Yes
List outstanding reports (insert lines as required)	

Section 6.2: Certification and sign off

As required under EPA Waste Water Discharge Licensing, I certify that the above report is true and accurate.

Prepared By:	Kealan McMoreland Waste Water Services Unit Environment and Water Services Dept. Meath County Council	Signed: 
		Date: 8 th February 2014
Reviewed By:	David Byrne Waste Water Services Unit Environment and Water Services Dept. Meath County Council	Signed: 
		Date: 28 th of March 2014
Approved By:	Gerry Boyle Senior Engineer Environment and Water Services Dept. Meath County Council	 Gerry Boyle Senior Engineer Environment and Water Services Section Meath County Council

Section 7:

Appendices

Appendix 1

Priority Substance Screening Results

ALS Environmental Ltd
Torrington Avenue,
Coventry, CV4 9GU

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F: +44 (0)24 7685 6575

www.alsenvironmental.co.uk

Mr McMoreland
Meath County Council
Meath CoCo. Projects Office
Unit 41/42
Enterprise Centre
Navan Meath

21 October 2013

Test Report: COV/959438/2013

Dear Mr McMoreland

Analysis of your sample(s) submitted on 02 October 2013 is now complete and we have pleasure in enclosing the appropriate test report(s).

An invoice for the analysis carried out will be sent under separate cover.

Should you have any queries regarding this report(s) or any part of our service, please contact Customer Services on +44 (0)24 7642 1213 who will be happy to discuss your requirements.

If you would like to arrange any further analysis, please contact Customer Services. To arrange container delivery or sample collection, please call the Couriers Department directly on 024 7685 6562.

Thank you for using ALS Environmental Ltd and we look forward to receiving your next samples.

Yours Sincerely,

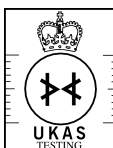
Signed: 

Name: J. Fell

Title: Chemistry Operations Manager



Report Summary



1314
0897
4409



**Mr Kealan McMoreland
Meath County Council
Meath CoCo. Projects Office
Unit 41/42
Enterprise Centre
Navan
Meath**

Date of Issue: **21 October 2013**

Report Number: **COV/959438/2013**

Issue **1**

Job Description: WW Discharge

Number of Samples
included in this report **1**

Job Received: **02 October 2013**

Number of Test Results
included in this report **134**

Analysis Commenced: **04 October 2013**

Signed:

Name: **J. Fell**

Date: **21 October 2013**

Title: **Chemistry Operations Manager**

ALS Environmental Ltd was not responsible for sampling unless otherwise stated. Sampling is not covered by our UKAS accreditation.

Information on the methods of analysis and performance characteristics are available on request.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. The results relate only to the items tested.

Tests marked 'Not UKAS Accredited' in this Report/Certificate are not included in the UKAS Accreditation Schedule for our laboratory.

This communication has been sent to you by ALS Environmental Ltd. Registered in England and Wales. Registration No. 02148934. Registered Office: ALS Environmental Limited, Torrington Avenue, Coventry, CV4 9GU.

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Certificate of Analysis



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4409



Report Number: **COV/959438/2013**

Issue **1**

Laboratory Number: **13724700**

Sample **1** of **1**

Sample Source: **Meath County Council**

Sample Point Description:

Sample Description: **Athboy D0124**

Sample Matrix: **Waste waters**

Sample Date/Time: **01 October 2013**

Sample Received: **02 October 2013**

Analysis Complete: **21 October 2013**

Test Description	Result	Units	Accreditation		Method
Glyphosate	<0.50	ug/l	N	S	SUBCON
Di(2-ethylhexyl)phthalate	<10	ug/l	N	S	SUBCON
2,6-dichlorobenzamide (BAM)	<0.10	ug/l	N	S	SUBCON
Barium, Total as Ba	0.0169	mg/l	Y	Cov	WAS049
Boron, Total as B	<0.23	mg/l	Y	Cov	WAS049
Cadmium , Total as Cd	<0.0006	mg/l	Y	Cov	WAS049
Chromium , Total as Cr	<0.0020	mg/l	Y	Cov	WAS049
Cobalt , Total as Co	<0.0020	mg/l	Y	Cov	WAS049
Copper, Total as Cu	<0.009	mg/l	Y	Cov	WAS049
Lead , Total as Pb	<0.006	mg/l	Y	Cov	WAS049
Mercury, Total as Hg	<0.10	ug/l	Y	Cov	WAS013
Molybdenum , Total as Mo	<0.003	mg/l	Y	Cov	WAS049
Nickel , Total as Ni	0.005	mg/l	Y	Cov	WAS049
Tin , Total as Sn	<0.007	mg/l	Y	Cov	WAS049
Vanadium , Total as V	<0.004	mg/l	Y	Cov	WAS049
Zinc, Total as Zn	0.06	mg/l	Y	Cov	WAS049
pH	7.5	pH units	Y	Cov	WAS039
Conductivity- Electrical 20C	1380	uS/cm	Y	Cov	WAS039
Total Hardness as CaCO3	393	mg/l	Y	Cov	WAS049
Chloride as Cl	233	mg/l	Y	Cov	WAS036
TOC as C	6.5	mg/l	Y	Cov	WAS005
Cyanide, Total as CN	<0.009	mg/l	Y	Cov	WAS018
Fluoride as F	<0.2	mg/l	Y	Cov	WAS029
Diuron	<0.05	ug/l	Y	Cov	GEO37
Isoproturon	Analyst Comment	ug/l	Y	Cov	GEO37
Dichlobenil	<2	ng/l	Y	Cov	GEO47
Dieldrin	<4	ng/l	Y	Cov	GEO47
Isodrin	<4	ng/l	Y	Cov	GEO47
PCB 28	<2	ng/l	Y	Cov	GEO47
Linuron	<0.05	ug/l	Y	Cov	GEO37
PCB 52	<2	ng/l	Y	Cov	GEO47

ALS Environmental Ltd

Torrington Avenue, Coventry, CV4 9GU
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Certificate of Analysis



1314
0897
4409



Report Number: **COV/959438/2013**

Issue **1**

Laboratory Number: **13724700**

Sample **1** of **1**

Sample Source: **Meath County Council**

Sample Point Description:

Sample Description: **Athboy D0124**

Sample Matrix: **Waste waters**

Sample Date/Time: **01 October 2013**

Sample Received: **02 October 2013**

Analysis Complete: **21 October 2013**

Test Description	Result	Units	Accreditation	Method
PCB 101	<2	ng/l	Y Cov	GEO47
PCB 118	<3	ng/l	Y Cov	GEO47
PCB 138	<2	ng/l	Y Cov	GEO47
PCB 153	<2	ng/l	Y Cov	GEO47
PCB 180	<3	ng/l	Y Cov	GEO47
Atrazine	<0.020	ug/l	Y Cov	GEO47
Simazine	<0.020	ug/l	Y Cov	GEO47
2,4 - D	<0.07	ug/l	Y Cov	GEO20
MCPA	<0.08	ug/l	Y Cov	GEO20
Mecoprop	0.05	ug/l	Y Cov	GEO20
2 - Chlorophenol	<1.00	ug/l	Y Cov	GEO18
2 - Methylphenol	<1.00	ug/l	Y Cov	GEO18
2,4 - Dichlorophenol	<1.00	ug/l	Y Cov	GEO18
2,4 - Dimethylphenol	<1.00	ug/l	Y Cov	GEO18
2,4,6 - Trichlorophenol	<1.00	ug/l	Y Cov	GEO18
3,5-Dimethylphenol	<1.00	ug/l	Y Cov	GEO18
4-Chlorophenol	<1.00	ug/l	Y Cov	GEO18
3+4-Methylphenol	<1.00	ug/l	Y Cov	GEO18
Phenol	<5.00	ug/l	Y Cov	GEO18
Acenaphthene	<0.01	ug/l	Y Cov	GEO19
Acenaphthylene	<0.01	ug/l	Y Cov	GEO19
Anthracene	<0.01	ug/l	Y Cov	GEO19
Benzo (a) anthracene	<0.01	ug/l	Y Cov	GEO19
Benzo (g,h,i) perylene	<0.01	ug/l	Y Cov	GEO19
Benzo (a) pyrene	<0.01	ug/l	Y Cov	GEO19
Benzo (b) fluoranthene	<0.01	ug/l	Y Cov	GEO19
Benzo (k) fluoranthene	<0.01	ug/l	Y Cov	GEO19
Chrysene	<0.01	ug/l	Y Cov	GEO19
Dibenz (a,h) anthracene	<0.01	ug/l	Y Cov	GEO19
Fluoranthene	<0.01	ug/l	Y Cov	GEO19
Fluorene	<0.01	ug/l	Y Cov	GEO19
Indeno (1,2,3) cd pyrene	<0.01	ug/l	Y Cov	GEO19

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Report Number: **COV/959438/2013**

Issue **1**

Laboratory Number: **13724700**

Sample **1** of **1**

Sample Source: **Meath County Council**

Sample Point Description:

Sample Description: **Athboy D0124**

Sample Matrix: **Waste waters**

Sample Date/Time: **01 October 2013**

Sample Received: **02 October 2013**

Analysis Complete: **21 October 2013**

Test Description	Result	Units	Accreditation	Method
Naphthalene	<0.01	ug/l	Y Cov	GEO19
Phenanthrene	<0.01	ug/l	Y Cov	GEO19
Pyrene	<0.01	ug/l	Y Cov	GEO19
PAH, Total	<0.01	ug/l	N Cov	GEO19
VOC	Y	ug/l	Y Cov	GEO32
Dichlorodifluoromethane	<1.0	ug/l	Y Cov	GEO32
Chloromethane	<1.0	ug/l	Y Cov	GEO32
Chloroethane	<1.0	ug/l	Y Cov	GEO32
Bromomethane	<1.0	ug/l	Y Cov	GEO32
Trichlorofluoromethane	<1.0	ug/l	Y Cov	GEO32
1,1-Dichloroethene	<1.0	ug/l	Y Cov	GEO32
Dichloromethane	<1.0	ug/l	Y Cov	GEO32
1,1-Dichloroethane	<1.0	ug/l	Y Cov	GEO32
cis-1,2-Dichloroethene	<1.0	ug/l	Y Cov	GEO32
2,2-Dichloropropane	<1.0	ug/l	N Cov	GEO32
Chloroform	<1.0	ug/l	Y Cov	GEO32
Bromochloromethane	<1.0	ug/l	Y Cov	GEO32
1,1,1-Trichloroethane	<1.0	ug/l	Y Cov	GEO32
1,1-Dichloropropene	<1.0	ug/l	Y Cov	GEO32
1,2-Dichloroethane	<1.0	ug/l	Y Cov	GEO32
Benzene	<1.0	ug/l	Y Cov	GEO32
1,2-Dichloropropane	<1.0	ug/l	Y Cov	GEO32
Trichloroethene	<1.0	ug/l	Y Cov	GEO32
Bromodichloromethane	<1.0	ug/l	Y Cov	GEO32
Dibromomethane	<1.0	ug/l	Y Cov	GEO32
cis-1,3-Dichloropropene	<1.0	ug/l	Y Cov	GEO32
Toluene	<1.0	ug/l	Y Cov	GEO32
trans-1,3-Dichloropropene	<1.0	ug/l	Y Cov	GEO32
1,1,2-Trichloroethane	<1.0	ug/l	Y Cov	GEO32
Carbon Tetrachloride	<1.0	ug/l	Y Cov	GEO32
Vinyl Chloride	<0.5	ug/l	Y Cov	GEO32
1,3-Dichloropropane	<1.0	ug/l	Y Cov	GEO32

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Sample **1** of **1**

Sample Source: **Meath County Council**

Sample Point Description:

Sample Description: **Athboy D0124**

Sample Matrix: **Waste waters**

Sample Date/Time: **01 October 2013**

Sample Received: **02 October 2013**

Analysis Complete: **21 October 2013**

Test Description	Result	Units	Accreditation	Method
Tetrachloroethene	<1.0	ug/l	Y Cov	GEO32
Dibromochloromethane	<1.0	ug/l	Y Cov	GEO32
1,2-Dibromoethane	<1.0	ug/l	Y Cov	GEO32
Chlorobenzene	<1.0	ug/l	Y Cov	GEO32
1,1,1,2-Tetrachloroethane	<1.0	ug/l	Y Cov	GEO32
Ethyl Benzene	<1.0	ug/l	Y Cov	GEO32
m&p-Xylene	<1.0	ug/l	Y Cov	GEO32
o-Xylene	<1.0	ug/l	Y Cov	GEO32
Styrene	<1.0	ug/l	Y Cov	GEO32
Bromoform	<1.0	ug/l	Y Cov	GEO32
trans-1,2-Dichloroethene	<1.0	ug/l	Y Cov	GEO32
Isopropylbenzene	<1.0	ug/l	Y Cov	GEO32
1,1,2,2-Tetrachloroethane	<1.0	ug/l	Y Cov	GEO32
1,2,3-Trichloropropane	<1.0	ug/l	Y Cov	GEO32
n-Propylbenzene	<1.0	ug/l	Y Cov	GEO32
Bromobenzene	<1.0	ug/l	Y Cov	GEO32
2-Chlorotoluene	<1.0	ug/l	Y Cov	GEO32
1,3,5-Trimethylbenzene	<1.0	ug/l	Y Cov	GEO32
4-Chlorotoluene	<1.0	ug/l	Y Cov	GEO32
tert-Butylbenzene	<1.0	ug/l	Y Cov	GEO32
1,2,4-Trimethylbenzene	<1.0	ug/l	Y Cov	GEO32
sec-Butylbenzene	<1.0	ug/l	Y Cov	GEO32
p-Isopropyltoluene	<1.0	ug/l	Y Cov	GEO32
1,3-Dichlorobenzene	<1.0	ug/l	Y Cov	GEO32
1,4-Dichlorobenzene	<1.0	ug/l	Y Cov	GEO32
n-Butylbenzene	<1.0	ug/l	Y Cov	GEO32
1,2-Dichlorobenzene	<1.0	ug/l	Y Cov	GEO32
1,2-Dibromo-3-chloropropane	<2.0	ug/l	Y Cov	GEO32
1,2,4-Trichlorobenzene	<1.0	ug/l	Y Cov	GEO32
Hexachlorobutadiene	<1.0	ug/l	Y Cov	GEO32
Naphthalene	<1.0	ug/l	Y Cov	GEO32
1,2,3-Trichlorobenzene	<1.0	ug/l	Y Cov	GEO32

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Report Number: **COV/959438/2013**

Laboratory Number: **13724700**

Issue **1**

Sample **1** of **1**

Sample Source: **Meath County Council**

Sample Point Description:

Sample Description: **Athboy D0124**

Sample Matrix: **Waste waters**

Sample Date/Time: **01 October 2013**

Sample Received: **02 October 2013**

Analysis Complete: **21 October 2013**

Test Description	Result	Units	Accreditation	Method
MTBE	<1.0	ug/l	Y Cov	GEO32
Dibromofluoromethane	102.0	%Recovery	N Cov	GEO32
Toluene-d8	101.4	%Recovery	N Cov	GEO32
4-Bromofluorobenzene	89.2	%Recovery	N Cov	GEO32
Antimony, Total as Sb	0.0077	mg/l	Y Cov	WAS051
Selenium, Total as Se	<0.0016	mg/l	Y Cov	WAS051
Arsenic, Total as As	<0.0014	mg/l	Y Cov	WAS051

Analyst Comments for 13724700:

This sample has been analysed for Pesticides method GEO47, pH outside recommended stability times. It is therefore possible that the results provided may be compromised. The reporting limits for MCPA and 2,4-D have been raised due to interferences. Unable to report Isoproturon due to quality failure.

Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.

Analysed at: Cov = Coventry(CV4 9GU), Run = Runcorn(WA7 1SL), S = Subcontracted, Wak = Wakefield(WF5 9TG).

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. The LOD for the Legionella analysis will increase where the volume analysed is <1000g (1g is approximately equivalent to 1ml for sample volume analysed).

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed:

Name: **J. Fell**

Date: **21 October 2013**

Title: **Chemistry Operations Manager**

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Appendix 2

Drinking Water Abstraction Point RA



Meath County Council

Comhairle Chontae na Mí

ATHBOY WASTEWATER DISCHARGE LICENCE D0124-01

DRINKING WATER RISK ASSESSMENT

April 2011



Nicholas O'Dwyer
CONSULTING ENGINEERS

**ATHBOY WASTEWATER DISCHARGE LICENCE
D0124-01**

DRINKING WATER RISK ASSESSMENT

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

April 2011

Project No. 20285.1					
Revision	Reason for Revision	Prepared by	Reviewed by	Approved by	Issue Date
-	First Issue	F. Lane	N. Delaney	N. Delaney	17/1/2011
A	Updated following Client comments	F. Lane	N. Delaney	N. Delaney	19/4/2011
B					
C					
D					

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1 Background

All of the wastewater and associated discharges from the Athboy catchment are to the Athboy River in County Meath. The Athboy River is a tributary of the River Boyne. The confluence between the Athboy River and the River Boyne is approximately 9km downstream of the Athboy Primary Discharge and stormwater overflow (SW2). The river confluence is approximately 6km upstream of the Trim WTP abstraction.

The main public supply source for Athboy and its surrounds is a borehole located on the Trim Road 1.2 km south of the village, on the eastern bank of the Athboy River. The Production Well (61m deep) is approximately 7.5 metres from the river bank and 1km downstream of the wastewater treatment plant Primary Discharge.

The location of the Athboy Borehole and Trim Water Treatment Plant (WTP) intake from the River Boyne is shown on Figure 1 below.

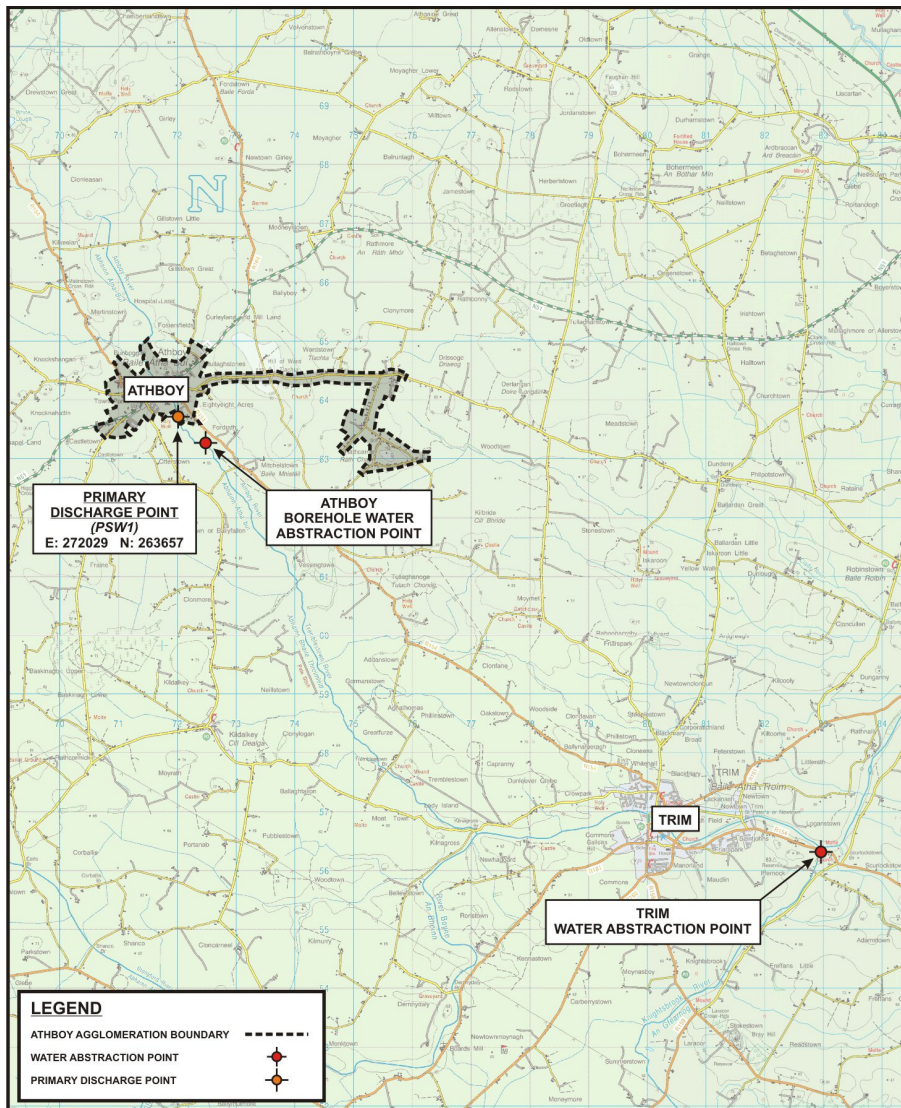


Figure 1 – Drinking Water Abstraction Points

2 Purpose of Report

The purpose of this report is to carry out a risk assessment for the protection of the downstream drinking water abstraction points, in particular the Athboy Borehole and Trim WTP drinking water abstraction points in accordance with Condition 4.16 of the Wastewater Discharge Licence issued by the Environmental Protection Agency (EPA) on 2nd June 2010.

The risk assessment is required to address as a minimum the identification and minimisation of risks to the quality of water abstracted at the downstream drinking water abstraction points from the discharges listed in Schedule A of the wastewater discharge licence and any other relevant storm water overflows and emergency overflows identified.

3 Sampling Results

Raw water monitoring was carried out at the Trim WTP site on the 5/8/2008 and 05/10/10 as part of investigative sampling of raw and treated water. A summary of the bacterial results are included in Table 1 below. The full results are included in **Appendix 1**. Raw water monitoring was carried out in Athboy as part of a report on the Athboy Public Water Supply - Groundwater Source Protection Zones prepared out by Geological Survey of Ireland in June 2004. A copy of this report is included in **Appendix 4**. This report states that "the water quality at Athboy is generally excellent with no bacterial contamination except for occasional small numbers of background Coliforms". Sampling results for coliforms included in this report are summarised in Table 1 below.

Table 1 - Bacterial Results from WTP Raw Water Sampling

Plant	Date	Faecal coliforms cfu/100ml	Coliforms MPN/100ml	Faecal Streptococci cfu/100ml
Trim WTP	5/10/2010	952 ¹	10,920	-
Trim WTP	5/8/2008	1,500	5,475	140
Athboy BH	24/3/95	0	0	-
Athboy BH	13/6/95	0	2	-
Athboy BH	27/9/95	0	0	-
Athboy BH	10/1/96	0	0	-

¹ The measured parameter in the raw water in 2010 was E. Coli. The limit in the legislation (SI 294 of 1989) is for faecal coliforms. A minimum of 90 to 95% of faecal coliforms are assumed to be E. Coli. The measured number has been increased by 10% to give a conservative estimate of the number of faecal coliforms in the sample.

The raw water sampling data in Table 1 indicates an "A2" category of raw water, as defined in SI No. 294 of 1989, European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations, 1989 for the Trim WTP. Full details of the required levels for the categories of surface water abstracted are included in **Appendix 2**. The required treatment for Category A2 water is normal physical treatment, chemical treatment and disinfection. The maximum level of total coliforms, faecal coliforms and faecal streptococci for A2 status is 25,000 MPN/100ml, 5,000 MPN/100ml and 2,000 MPN/100ml respectively. It can be seen from Table 1 above that the samples taken were within the allowable number for an A2 category surface water.

Further sampling data for the River Boyne at Trim is included in **Appendix 3**. The river water quality upstream of the abstraction points at Trim is Q3-4, i.e. Moderate Status. The river water quality upstream of the Athboy WWTP is Q4. The waste quality downstream of the WWTP is Q3-4. The new wastewater treatment plant and upgrades to the sewer network in Athboy were completed in 2010. These works will reduce discharges of pollutant loads from the catchment and contribute to an improvement in the river water quality.

There has been a significant increase in the population in Athboy since 1996. However, the very low coliform levels at this time and the improvements to both the sewerage network and wastewater treatment have ensured that the water quality in the Athboy River has been maintained. It is expected that improvements in the water quality downstream of the wastewater treatment plant and Athboy catchment will be seen over the next year due to the completion of the works in the catchment.

4 Discharges from Athboy Wastewater Catchment

4.1 Outline of Discharges

There are three licensed discharges from the Athboy Wastewater Catchment all discharging to the Athboy River. These are the primary discharge (PSW1) one stormwater overflow SW2 and the overflow from the main pumping station. The discharges are all upstream of the Athboy Borehole and Trim WTP abstraction point. These discharges are examined further in Sections 4.3 to 4.5 below.

The wastewater treatment plant is manned during normal working hours and has a standby generator and dial-out alarms from the SCADA control system in the case of equipment failures thus reducing the risk to the drinking water abstraction point.

4.2 Athboy Borehole Water Supply Source

A report on the Athboy Public Water Supply - Groundwater Source Protection Zones was carried out by Geological Survey of Ireland in June 2004. A copy of this report is included in **Appendix 4**. It is stated in this report that the zone of contribution to the Athboy borehole is controlled primarily by the groundwater divide to the northeast of the source and by the groundwater flow direction. The report also states that the regional groundwater is generally southwards and moving in all directions towards the Athboy River. The report states that indications are there that the river water is not being pumped directly into supply. However, the report also states that since a significant proportion of flow to the well may be from the river, the vulnerability of the source to pollution may be less important than the river water quality and recommends that the water quality is monitored.

4.3 Primary Discharge

The Athboy Wastewater Treatment Plant primary discharge (PSW1) is to the Athboy River upstream of the Athboy Borehole. The Athboy River discharges to the River Boyne upstream of the abstraction point for the Trim Water Treatment Plant.

The dry weather flow to the wastewater treatment plant as detailed in the wastewater discharge licence application is: $1,305\text{m}^3/\text{day}$

Dry weather flow to wastewater treatment plant: $0.01510\text{ m}^3/\text{s}$

Athboy River dry weather flow: $0.07\text{m}^3/\text{s}$

Dilution factor: 4.63

River Boyne dry weather flow (at Trim): $2.43\text{ m}^3/\text{s}^2$

Dilution factor (Athboy River in River Boyne): $(2.43 / 0.07) = 34.7$

Total Dilution factor (Athboy effluent in River Boyne): $(4.63 \times 34.7) = 160$

² The dry weather flow has been taken as the 99th percentile flow from OPW Hydrodata at the Trim hydrometric station on the River Boyne

Table 2 – Summary of Risks from Primary Discharge

Risks for Contamination	Likelihood	Impact	Recommended Measures
Outflow of treated effluent	Definite	Low	None
Overflow of sludge blanket from clarifier	Low	Medium	Inform water treatment plant caretakers in case of significant discharge
Overflow of partially treated effluent	Low	Medium	Inform water treatment plant caretakers in case of significant discharge

The risks associated with the Primary Discharge are summarised in Table 2 above.

The dilution rate prior to the Trim WTP abstraction is a minimum of 160. The contribution of the Athboy River to the groundwater abstracted from the Athboy borehole is unknown as detailed further in Section 4.2 and Appendix No. 4. However, during normal flow conditions testing of the groundwater abstracted has not shown any significant coliform contamination indicating that there is only a small, if any, contribution to the groundwater from the Athboy River.

The risk associated with the normal discharge of treated effluent is very low this is a continuous flow and sampling carried out to date has not indicated any significant ongoing problems with the raw water quality. The treated effluent from the wastewater treatment plant is therefore not considered to contribute to the risk to the drinking water supply.

There is a risk of overflow of sludge blanket from the settlement tanks at the wastewater treatment plant. This risk is low as there are storm tanks at the wastewater treatment plant to control of flows to the works and reduced the potential for high flows causing wash-out of the sludge blanket in the final settlement stage.

There is also a risk of partially treated effluent discharging to PSW1. This could occur if there was a failure in the treatment process. In this case some treatment will be provided in the final clarifiers prior to discharge. The SCADA system at the wastewater treatment plant will identify significant process failures from mechanical failures and instrumentation including dissolved oxygen monitoring and will instigate a dial-out alarm for failures. This risk is low as the plant is operating effectively.

It is recommended that the contact details for the Trim WTP and Athboy Borehole are available at the site to allow the caretakers to be contacted immediately in the case of a significant discharge of sludge from the final clarifiers or significant failure at the wastewater treatment plant. The high dilution prior to the Trim WTP and the distance to the abstraction point means that any impact is likely to be low. The impact on the Athboy borehole is also likely to be low. However, it is recommended that the coliform levels in the water abstracted is tested for coliforms in the case of a significant discharge.

The overall risk to the drinking water supply at Athboy and Trim from the Primary Discharge, based on the above assessment, is considered to be very low.

4.4 Storm Water Overflows

4.4.1 Wastewater Treatment Plant Storm Water Overflow – SW2

SW2 is the wastewater treatment plant storm water overflow from the storm water tanks. The overflow from the storm tanks will normally be partially treated by settlement within the storm tanks. The risk is increased where the storm tanks are not emptied promptly following a storm or where there are storm events on consecutive days. This overflow has been deemed to be in compliance with *Department of the Environment Procedures and Criteria in Relation to Storm Water Overflows* in the wastewater discharge licence.

Level monitoring in the storm tanks indicates whether the storm tanks have overflowed. The SCADA system allows recording of overflow events and their duration.

There have been no overflows from the storm tanks since they were commissioned in December 2009. During periods of extended wet weather the storm tanks may overflow. However, as the storm tanks will take the “first flush” of storm flows during rainfall, this provides a substantial reduction in the concentration of the pollutant loads to the receiving waters, thereby reducing the risk to the drinking water abstraction point. The peak flow to the wastewater treatment plant is 3 DWF. The peak flow to the storm tanks is 5 DWF based on the design maximum flow to the works of 8DWF. The dilution of the stormwater overflows has been estimated based on a maximum flow of 5 DWF. The dry weather flow to the wastewater treatment plant is: $0.0151 \text{ m}^3/\text{s}$. The peak stormwater overflow is therefore: $(0.0151 \times 5) = 0.0755 \text{ m}^3/\text{s}$

Estimated peak stormwater overflow: 0.0755 m³/s
 Athboy River dry weather flow: 0.07m³/s
 Dilution factor in Athboy River: 0.93

River Boyne dry weather flow (at Trim): 2.43 m³/s
 Dilution factor in River Boyne: = $[2.43 / (0.0755 + 0.07)] = 16.7$

The minimum dilution available to stormwater overflows in the Athboy River from SW2 is <1. This is based on very low flows in the river. Normally during storm conditions the flow will be significantly higher. At average flows there will be a dilution factor of $(1.63 / 0.0755) = 21.5$. The dilution in the River Boyne will be a minimum of 16.7 with a dilution of $(17.97 / 0.0755) = 237$ at average flows.

Table 3 - Summary of Risks from Storm Water Overflow SW2

Risks for Contamination	Likelihood	Impact	Recommended Measures
Overflow from SW2	High	Low	<ul style="list-style-type: none"> • SCADA system to monitor stormwater overflows • Inform water treatment plant in case of significant discharge

The risks associated with overflows from SW2 are summarised in Table 3 above. As detailed above, the concentration of any storm water overflows will have reduced substantially prior to discharge. As such the storm water overflow SW2 does not pose a significant risk to the drinking water abstraction. In addition the SCADA system can be used to monitor the duration and frequency of stormwater overflows. Where a stormwater overflow occurs during low flows in the Athboy River or River Boyne, the water treatment plant operator should be informed to allow further monitoring of the raw water abstraction if necessary. In particular further testing of the Athboy raw water may be required as the impact on the water supply from the Athboy River is uncertain.

The use of storm tanks and the SCADA system significantly reduces the risk to the drinking water abstraction and the overall risk is considered to be low. In particular the fact that the storm tanks have not overflowed in over one year of operation indicates that this is a very low risk scenario.

4.5 Main Pumping Station Emergency Overflow

There is one wastewater pumping station in the Athboy catchment. This is the main pumping station which is the main source of wastewater at the plant (approximately 90%) with other contributions from Rathcairn (approximately 8%) with the remainder from an industrial estate effluent which flows directly to the wastewater treatment plant. There are pumping stations within the Rathcairn catchment including a main Rathcairn pumping station which discharges to the Athboy wastewater treatment plant. These pumping stations do not have emergency overflows.

The following measures have been provided at the Athboy main pumping station to reduce the risk of overflow:-

- High levels alarm
- SCADA connection to wastewater treatment plant
- Dial-out alarm system
- Standby pumps
- Provision for connection of a mobile generator

Table 4 - Summary of Risks from Wastewater PS's Emergency Overflows

Risks for Contamination	Likelihood	Impact	Recommended Measures
Emergency overflow from pumping station	Low	Medium - High	<ul style="list-style-type: none"> • SCADA dial-out for high level alarm and pump failure • Immediate response from WWTP operator required in case of pump failure or high level alarm • Inform water treatment plant in case of discharge

It should be noted that the recommended measures in Table 4 are currently in place. The communication to the water treatment plant should be included as a formal procedure at the WWTP site. As the overflow from the pumping station is an unusual event and could potentially occur during dry weather flows in the river any occurrence should normally be reported to the water treatment plants.

5 Cryptosporidium Risk Assessment

A cryptosporidium risk assessment was carried out by Meath County Council for the Trim and Athboy water treatment plants in accordance with the EPA

methodology, "Risk Screening Methodology for Cryptosporidium", issued 22nd January 2008. A copy of these risk assessments is included in **Appendix 5**.

The final weighted risk assessment score for the Trim WTP is **37.52**. This is classified as a *Low* risk.

The total impact of the wastewater discharges on the Surface Water Risk Assessment Score in Trim is: 14. Of this, a score of 6 is related to single house wastewater treatment units. The remaining score of 8 is related to municipal wastewater discharges.

The population weighting for the total score is: 1.63

The overall impact of the wastewater discharges on the Final Weighted Risk Assessment Score is: $(8 \times 1.63) = \mathbf{13.0}$

The final weighted risk assessment score for the Athboy WTP is **23.05**. This is classified as a *Low* risk. As this is a groundwater supply the risk assessment does not examine the impact of the wastewater treatment plant in detail.

The cryptosporidium risks for the Trim and Athboy Water Treatment Plants has been assessed to be *Low* as detailed above. There is a cryptosporidium risk for the water treatment plants associated with wastewater and stormwater discharges including the Athboy catchment. However, as the overall cryptosporidium risk is classified as *Low* and the overall risk due to the discharges is low, as detailed in Section 4, the impacts of the Athboy catchment on the cryptosporidium risk can also be considered to be low.

6 Summary

A review of the discharges to the Athboy River from the Athboy Catchment and the potential impact on the downstream drinking water abstraction point has been carried out. The current water quality, as detailed in Section 3 is moderate.

The distance to the Trim WTP abstraction of 15km and high levels of dilution in the River Boyne of flows from the Athboy River means that the risk to the Trim WTP supply from the Athboy catchment is low.

The impact of the river water quality on the Athboy water supply is uncertain. Testing carried out previously has shown very low levels of coliforms. However, due to the uncertainty it is recommended that the raw water is tested for

coliforms following any significant discharges identified by the wastewater treatment plant operator.

A review of the discharges in Section 3 has evaluated that the risk of each of the discharges is low. The combination of the two main discharges (PSW1 and SW2) in addition to the emergency overflows is also considered to be low. It is likely any discharge from the stormwater overflow will be during periods of wet weather where the dilution available is high. The provision of standby pumps and SCADA control at the pumping station reduces the risk of an overflow contaminating the drinking water supply.

The existing cryptosporidium risk assessment for the Trim and Athboy Water Treatment Plants prepared by Meath County Council in accordance with EPA guidelines identified the risk as *Low*.

The conclusion of the drinking water risk assessment carried out herein is that the risk to the drinking water abstractions at Athboy and Trim is low. The recommendations for maintaining the risk at a low level as detailed in Section 4 are all currently in place at the Athboy Wastewater Treatment Plant. However, it is recommended that these measures are identified in the operating procedures for the wastewater treatment plant. The Athboy drinking water abstraction should be tested for coliforms following any significant discharges.

These recommendations are summarised as follows:

- SCADA system to be used to monitor stormwater overflows from SW2
- SCADA system to be used to monitor equipment failures at wastewater treatment plant
- SCADA system to be used to monitor equipment failures at pumping stations and high levels at pumping stations
- Water treatment plant to be contacted in case of significant discharges
- Athboy water supply to be tested for coliforms following any significant discharges

Appendix 1
Raw Water Abstraction Sampling Results

Certificate of Analysis

Customer: Meath County Council

Report Reference: 08-02435-meathc

Customer Address: Trim WTP
Scurlockstown
Trim
Co Meath

Date Received: 06/08/2008

Customer Contact: Aphra Leavy

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Sample Description: Trim 006
Sample Type: Surface Water
Date Sampled: 05/08/2008
Lab Reference Number: 47324

Site/Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value	Accreditation Status
D/3001	14/08/2008	Boron, Total	<100	ug/l	-	INAB
D/3001	19/08/2008	Cadmium, Total	<0.5	ug/l	-	INAB
D/3000	11/08/2008	Chloride	15.19	mg/l	-	INAB
D/3001	19/08/2008	Chromium, Total	<5	ug/l	-	INAB
D/3010	07/08/2008	Colour, Apparent	66	Hazen	-	NON
D/1201	06/08/2008	Coliforms	5475.0	MPN/100ml	-	INAB
SUB C		Copper	0.022	mg/l	-	UKAS
SUB C		Cyanide, Total	<0.1	mg/l	-	UKAS
Sub C		Detergents, as MBAS	<0.30	mg/l	-	UKAS
D/3206	06/08/2008	Faecal Coliforms	1500	cfu/100ml	-	INAB
D/3205	06/08/2008	Faecal streptococci	140	cfu/100ml	-	INAB
D/3001	19/08/2008	Iron Soluble	137.30	ug/l	-	INAB
D/3001	19/08/2008	Lead, Total	<2.50	ug/l	-	INAB
D/3001	19/08/2008	Manganese, Total	6	ug/l	-	INAB
D/3089	12/08/2008	Total Nitrogen as N	<7	mg/l	-	NON

Pesticides (OPP):

PAH (Polycyclic Aromatic Hydrocarbons):

Pesticides (OCP):

Phenols:

Note:

NAC & ATC - No abnormal change and acceptable to customers.

PV Value is the parametric value, taken from European Communities, (Drinking Water) (No. 2) Regulations, 2007. S.I. No. 278 of 2007, and relates only to drinking water samples.

Site D = Analysed at City Analysts Dublin. Site L = Analysed at City Analysts Limerick

Template 1146
Revision 008

Certificate of Analysis

Customer: Meath County Council

Report Reference: 08-02435-meathc

Customer Address: Trim WTP
Scurlockstown
Trim
Co Meath

Date Received: 06/08/2008

Customer Contact: Aphra Leavy

Page 9 of 13

Sample Description: Trim 006
Sample Type: Surface Water
Date Sampled: 05/08/2008
Lab Reference Number: 47324

Site/Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value	Accreditation Status
D/3209	06/08/2008	Salmonella	Not Detected	-	-	NON
SUB C		Selenium, Total as Se	<0.0010	mg/l	-	UKAS
D/1049	07/08/2008	TSS	3	mg/l	-	INAB
D/3001	19/08/2008	Zinc, total	<20	ug/l	-	INAB
D/1003	06/08/2008	CBOD5	6	mg/l	-	INAB
D/1009	07/08/2008	COD	14	mg/l	-	INAB

Pesticides (Acid Herbicides):

Pesticides Triazines:

Note:

NAC & ATC - No abnormal change and acceptable to customers.

PV Value is the parametric value, taken from European Communities, (Drinking Water) (No. 2) Regulations, 2007. S.I. No. 278 of 2007, and relates only to drinking water samples.

Site D = Analysed at City Analysts Dublin. Site L = Analysed at City Analysts Limerick

Template 1146
Revision 008

Certificate of Analysis

Customer: Ward and Burke Construction Ltd.

Report Reference: 10-03836-WB

Customer Address: c/o Carnhill Agriculture
Ward and Burke Offices
Alexander Reid
Navan
Co Meath

Date Received: 05/10/2010

Customer Contact: David O'Reilly

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Sample Description: Trim Raw
Sample Type: Raw Water
Date Sampled: 05/10/2010
Lab Reference Number: 91114

Site/Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value	Accreditation Status
D/3001	14/10/2010	Aluminium, Total	427	ug/l	-	INAB
D/3000	11/10/2010	Alkalinity as CaCO ₃	394	mg/l	-	INAB
D/3000	11/10/2010	Ammonia as N	<0.1	mg/l	-	INAB
D/1220	05/10/2010	Clostridium perfringens	>100	cfu/100ml	-	NON
D/1220	05/10/2010	Clostridium perfringens	800	cfu/100ml	-	NON
D/3010	07/10/2010	Colour, True	42	Hazen	-	INAB
D/1201	05/10/2010	Coliforms	>2419.2	MPN/100ml	-	INAB
D/1201	05/10/2010	Coliforms	10920.0	MPN/100ml	-	INAB
D/1201	05/10/2010	E. coli	866.4	MPN/100ml	-	INAB
D/3001	09/10/2010	Hardness as CaCO ₃	496.07	mg/l	-	NON
D/3001	14/10/2010	Iron, Total	1395	ug/l	-	NON
D/3080	13/10/2010	Kjeldahl Nitrogen	<5	mg/l	-	NON
D/3001	14/10/2010	Manganese, Total	310	ug/l	-	NON
D/3000	11/10/2010	Nitrite as N	0.03	mg/l	-	INAB
D/1041	05/10/2010	pH	8.10	pH Units	-	INAB
D/3116	07/10/2010	Sulphide as H ₂ S	<0.02	mg/l	-	NON
SUB C		Total organic carbon	9.39	mg/l	-	NON
D/1049	05/10/2005	TSS	25	mg/l	-	INAB
D/3054	07/10/2010	Turbidity	15.40	NTU	-	INAB
D/3000	11/10/2010	Alkalinity as HCO ₃	481	mg/l	-	INAB

Note:

NAC & ATC - No abnormal change and acceptable to customers.

PV Value is the parametric value, taken from European Communities, (Drinking Water) (No. 2) Regulations, 2007. S.I. No. 278 of 2007, and relates only to drinking water samples.

Site D = Analysed at City Analysts Dublin. Site L = Analysed at City Analysts Limerick

Template 1146
Revision 009

Appendix 2

Surface Water Quality Standards

Surface Water Quality Standards from SI 294 of 1989

	Parameters	Unit of measurement	Standards for Categories		
			A1	A2	A3
1.	pH	pH Unit	5.5-8.5	5.5-9.0	5.5-9.0
2.	Colouration (after simple filtration)	mg/l Pt scale	20 (o)	100 (o)	150 (o)
3.	Total suspended solids	mg/l SS	50		
4.	Temperature	°C	25 (o)	25 (o)	25 (o)
5.	Conductivity	µs/cm ⁻¹ at 20 °C	1000	1000	1000
6.	Odour	(dilution factor at 25°C)	5	10	20
7.	Nitrates	mg/l NO ₃	50 (o)	50 (o)	50 (o)
8.	Fluorides	mg/l F	1	1.7	1.7
9.	Dissolved iron	mg/l Fe	0.2	2	2
10.	Manganese	mg/l Mn	0.05	0.3	1
11.	Copper	mg/l Cu	0.05 (o)	0.1 (o)	1 (o)
12.	Zinc	mg/l Zn	3	5	5
13.	Boron	mg/l B	2	2	2
14.	Arsenic	mg/l As	0.05	0.05	0.1
15.	Cadmium	mg/l Cd	0.005	0.005	0.005
16.	Total chromium	mg/l Cr	0.05	0.05	0.05
17.	Lead	mg/l Pb	0.05	0.05	0.05
18.	Selenium	mg/l Se	0.01	0.01	0.01
19.	Mercury	mg/l Hg	0.001	0.001	0.001
20.	Barium	mg/l Ba	0.1	1	1
21.	Cyanide	mg/l CN	0.05	0.05	0.05
22.	Sulphates	mg/l SO ₄	200	200 (o)	200 (o)
23.	Chlorides	mg/l Cl	250	250	250
24.	Surfactants (reacting with methylene blue)	mg/l (laurylsulphate)	0.2	0.2	0.2
25.	Phosphates	mg/l P ₂ O ₅	0.5	0.7	0.7
26.	Phenols (phenol index) paranitraniline 4-aminoantipyrine	mg/l C ₆ H ₅ CH	0.0005	0.005	0.1
27.	Dissolved or emulsified hydrocarbons (after extraction by petroleum ether)	mg/l	0.01	0.2	1
28.	Polycyclic aromatic hydrocarbons	mg/l	0.0002	0.0002	0.001
29.	Total pesticides (parathion, BHC, dieldrin)	mg/l	0.0005	0.0025	0.005
30.	Chemical oxygen demand (COD)	mg/l O ₂			40
31.	Dissolved oxygen saturation rate	% O ₂	>60%	>50%	>30%
32.	Biochemical oxygen demand (BOD ₅) (at 20 °C without nitrification)	mg/l O ₂	5	5	7
33.	Nitrogen by Kjeldahl method (except in NO ₂ and NO ₃)	mg/l N	1	2	3
34.	Ammonium	mg/l NH ₄	0.2	1.5	4 (o)
35.	Substances extractable with chloroform	mg/l SEC	0.2	0.4	1
36.	Total coliforms 37°C	/100 ml	5,000	25,000	100,000
37.	Faecal coliforms	/100 ml	1,000	5,000	40,000
38.	Faecal streptococci	/100 ml	200	2,000	10,000
39.	Salmonella		Not present in 500 ml	Not present in 100 ml	

Appendix 3
River Sampling Results

The sampling data for grab samples at Athboy Bridge and Newtown Bridge in Trim are detailed below. All samples are grab samples.

Athboy River Sampling Data 2010

Parameter	Date of Sampling						
	18/02/2009	19/05/2009	18/08/2009	10/11/2009	09/02/2010	19/05/2010	24/08/2010
DO_Sat_(%Sat)	90	115	87.6	80.7	88.9	119.3	98
DO_(mg/L)	10.8	12.24	8.71	9.3	11.18	12.68	10.15
Temperature_(degC)	7.6	12	15.3	9	5.6	12.9	13.1
pH_Units	7.95	8.03	7.89	7.9	8.03	8.11	8
Conductivity_(uS/cm,25DegC)	760	647	747	570	763	756	717
BOD_(mg/L)	0.78	3.94	1.61	2.21	0.70	0.88	1.07
Suspended_Solids_(mg/L)	NT	NT	NT	NT	NT	NT	NT
Ammonia_(mgN/L)	0.031	0.075	0.02	0.057	0.038	0.019	0.018
MRP_(mgP/L)	0.021	0.032	0.041	0.049	0.020	0.018	0.027
TON_(mgN/L)	2.46	1.67	1.27	1.19	1.80	1.57	1.15
NO2_(mgN/L)	0.011	0.03	0.027	0.019	0.010	0.016	0.008
Chloride_(mgCl/L)	14.5	13	16.6	12.4	14.9	18.0	19.3
Alkalinity_(mg/LCaCO3)	380	324	360	288	384	356	356
Total Hardness_(mg/LCaCO3)	408	336	388	314	422	400	356
Colour_(Pt/CoUnits)	11	33	14		12	8	23

Newtown Bridge Trim Sampling Data 2010

Parameter	Date of Sampling									
	27/01/10	17/02/10	24/03/10	21/04/10	26/05/10	30/06/10	29/07/10	31/08/10	28/09/10	21/10/10
SampleDate										
DO_Sat_(%Sat)	89.2	92.4	109.1	105.9	113.4	112.4	93.2	122.8	98.1	95.2
DO_(mg/L)	11.26	11.4	12.25	11.89	10.84	10.11	8.75	12.62	9.86	11.17
Temperature_(degC)	5.9	5.2	9.6	10.5	17.1	20.3	18.6	14.5	14.9	8.5
pH_Units	8.19	8.18	8.28	8.19	8.2	8.12	8.18	8.24	7.99	8.02
Conductivity_(uS/cm,25DegC)	746	703	742	755	728	670	680	713	725	755
BOD_(mg/L)	1.35	1.97	1.18	1.36	1.52	1.94	1.54	0.95	1.04	1.10

Suspended_Solids_(mg/L)	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Ammonia (mgN/L)	0.084	0.085	0.014	0.009	0.011	0.013	0.014	0.012	0.012	0.008
MRP_(mgP/L)	0.029	0.034	0.024	0.019	0.004	0.009	0.039	0.008	0.029	0.023
TON_(mgN/L)	2.03	2.17	1.82	1.92	1.28	1.29	1.21	1.02	1.46	1.56
NO2_(mgN/L)	0.025	0.023	0.017	0.012	0.013	0.011	0.011	0.004	0.010	0.006
Chloride_(mgCl/L)	NT	18.6	NT	NT	20.0	NT	NT	20.8	NT	NT
Alkalinity_(mg/LCaCO3)	NT	364	NT	NT	352	NT	NT	332	NT	NT
Total Hardness_(mg/LCaCO3)	NT	404	NT	NT	390	NT	NT	376	NT	NT
Colour_(Pt/CoUnits)	NT	NT	NT	NT	28	NT	NT	30	NT	NT

NT = not tested

Appendix 4

Athboy Public Supply - Groundwater Source Protection Zones

ATHBOY PUBLIC SUPPLY

GROUNDWATER SOURCE PROTECTION ZONES

Prepared for:
Meath County Council,
County Hall,
Navan.

Prepared by:
Louise Woods,
Meath County Council / Geological Survey of Ireland,
Beggars Bush,
Haddington Road,
Dublin 4.

Revised June 2004
by Geoff Wright

ATHBOY PUBLIC SUPPLY

1. LOCATION AND SITE DESCRIPTION

This main public supply source for Athboy and its surrounds is located on the Trim Road 1.2 km south of the village, on the eastern bank of the Athboy River. The Production Well (61m deep), drilled in 1985, is approximately 7.5 metres from the river bank and is completed 1 metre below ground level, with two manholes covering the well. The well is located beside the pump house and both are fenced off (see sketch, page 9). There is no backup supply for this production well at present, but surface water is pumped from the River Tully, a tributary of the Athboy River, to supplement the water supply from the well. The surface water intake point is overgrown. The Athboy groundwater is chlorinated in the pump house before being pumped to the Hill of Ward reservoir, which has a capacity of 100,000 gallons.

In 1995 an unsuccessful trial well was drilled in the old quarry adjacent to the Hill of Ward. In June 1995 a GSI observation borehole 58.8 m deep was drilled approximately 17 m from the production well (see site sketch). In May 1996 two trial boreholes were drilled by Dunnes Water Services Ltd. close to Athboy, the first at the Hill of Ward and the second in the Council yard at Athboy. The yields of these wells were estimated to be less than 40m³/d. The Hill of Ward borehole was backfilled immediately after drilling.

2. WELL DETAILS

GSI no.:	2625NW001
Grid ref.:	27249 26327
Owner:	Meath Co. Co.
Well type:	Borehole
Elevation (top of casing):	63.83m OD (Poolbeg). Ground level is 64.80m OD.
Depth:	61m
Depth of casing:	11m
Diameter:	200 mm (8")
Depth-to-rock:	6.5m
Static water level:	3.75m b.g.l. (10-10-95)
Pumping water level:	4.85m b.g.l. (after 12 hrs continuous pumping)
Drawdown:	1.10m (after 12 hrs continuous pumping)
Pumping rate:	1080m ³ /d (9,900 gal/hr)
Normal consumption:	1080m ³ /d (240,000gal/d on average, over 24 hrs)
Pumping test summary:	
(i) abstraction rate:	1080m ³ /d
(ii) specific capacity:	980m ³ /d/m (12 hours); 800m ³ /d/m (extrapolated to 1 week)
(iii) transmissivity:	100 - 1000m ² /d

3. METHODOLOGY

The assessment involved three stages: (a) detailed desk study, (b) site visits and fieldwork, and (c) analysis of the data. The desk study included compilation of the geology from all available data sources. Basic public supply well details were obtained from County Council personnel, including all relevant borehole, chemistry and pumping test data available.

The second stage comprised site visits and fieldwork in the area. A GSI observation borehole 58.8 m deep (Athboy D/H 104) was drilled near the production well. A twelve hour pumping test was carried out to examine the aquifer characteristics. The area within 1km radius (later extended to 1.5 km

upgradient) was surveyed with regard to geology, hydrogeology, vulnerability to pollution and current pollution loading. Raw water samples were taken in March, June, and September 1995 and January 1996 for full suites of chemical and bacterial analyses. Conductivity measurements were taken at regular intervals throughout the study.

The assessment stage utilised analytical equations and hydrogeological mapping to delineate protection zones.

4. TOPOGRAPHY, DRAINAGE AND LAND USE

The Athboy source is located beside the Athboy River (Tremblestown River), a tributary of the River Boyne. The topography is slightly undulating, ranging from 64 m OD (210 ft) to 73 m OD (240 ft).

The Athboy River flows in a south-southeasterly direction, with numerous small streams draining the area. Drainage is good and there is an absence of drainage ditches.

Agriculture is the principal land use activity in the area, with most of the land around the source being used primarily for tillage and pasture. The field around the well was in tillage during 1994-6.

5. GEOLOGY

5.1 Bedrock geology

A borehole log (61 m) for the Athboy production well indicates 54.5 m of black limestone with shale bands. The upper 4.5 m were reported to be highly broken. The GSI observation borehole (58.8 m deep) encountered 47.9 m of dark grey to black limestone and shales. The limestone was not regarded as highly broken or fractured and fracturing decreased with depth. No cavities were encountered, although the drilling circulation was lost between 38 m and 48 m below ground, suggesting higher permeabilities in this zone although the core did not indicate excessive fracturing at this depth. Volcanic tuff bands were met at 36.3 m and 44 m depth. The bedrock geology is shown in Figure 1.

5.2 Quaternary (subsoils) geology

Three types of Quaternary deposits are present in the vicinity of the Athboy source (Figure 2).

Along the river, to the west of the well, is a narrow strip of alluvium varying in width from 10 m to 75 m across. The alluvium is generally sandy in texture and 1 m – 2 m deep, generally thinning away from the river. Some gravel lenses occur within the alluvium.

To the northwest of the well, stretching beyond Athboy town, is an area of fluvioglacial gravels, generally less than 3 m deep, overlying till. The gravels are well sorted but poorly bedded, and were deposited as part of an outwash system during deglaciation. The gravels are pebble to cobble grade, mostly of Carboniferous limestone, with a sandy matrix. Sand lenses and interbeds are common.

East of the well and flanking the alluvial deposits to the south is an extensive area of limestone-dominated till which is gravelly to stony or sandy in texture, with fairly high proportions of clay present. The till is interpreted as a melt-out till deposited towards the end of the last glacial period.

5.3 Soils

Information is taken from the soils map of County Meath (Finch *et al*, 1983). The soils of the area are primarily derived from a parent material of river alluvium. The soils are very immature with poor profile development. The Great Soil Group is the Boyne Alluvium Complex. The lithological composition of this alluvium is mainly limestone and shale.

Away from the river the soils are derived from the limestone and shale dominated tills. The dominant soils in the north are the Grey Brown Podzolic Group, the Rathowen Soil Series. These soils are well to moderately drained and are best suited to grassland.

5.4 Depth to rock

Depth to rock in the public supply borehole is 6.5 metres and in the GSI observation borehole, 10.9 metres of clays, sand and gravels were encountered. Outcrop on the Hill of Ward indicates that the hill is rock cored although there is a some overlying thin cover. A Council trial well indicated 1.2 metres of subsoil. Other rock outcrops occur at quarries in Mullaghstones and Mitchelstown.

To the west the subsoils are on average much thicker (generally around 5 metres) than to the east and northeast. The depth to rock is very variable throughout the area. In Figure 3 the depth-to-rock contours are shown but are based on limited data points and may need refining as further records become available (see). The well drilled in the Council yard (a disused gravel pit) indicated 8.8 metres of clay, sand and gravels.

6. HYDROGEOLOGY

6.1 Data availability

Hydrogeological data for the Athboy area are reasonably good, although lacking in the area of interest around the public supply. A 12 hour pumping test with a recovery test was carried out in October 1995 and a survey of wells and pollution sources was conducted around the source (Figure 4.). Water levels from private wells were collected and a water table map drawn to determine the groundwater flow direction. Some of these water level readings were used with caution as the well heads were not all accurately levelled in and some dug wells may be tapping a perched water table within the till. Most of the wells in the vicinity of the production well are disused shallow dug wells.

The production well was drilled and tested in March 1985, after a geophysical survey in 1984 suggested the valley of the Athboy River was infilled with alluvial sands and gravels (7-10 m thick) overlying limestone bedrock. A short report on the drilling and testing was prepared by K.T. Cullen.

The two trial boreholes drilled by Dunnes Water Services, at the Hill of Ward and in the Council yard at Athboy, yielded less than 40m³/d.

The hydrogeological survey data collected during the course of this project is shown in Figure 4.

The GSI drilled a monitoring borehole (June 1995) with an open hole diameter of 75.7mm (47.6mm core) and 60mm plastic pipes were installed in the borehole. The bottom pipes were slotted to allow water entry. The core is stored in the GSI core store. This well is labelled GSI OW No.1.

6.2 Groundwater levels

Groundwater is generally less than 5 m from surface. The static water level in the production well on 10/10/95, following overnight recovery, was 3.75 m b.g.l. (60.95 m OD), and in the observation well 3.60 m b.g.l. (60.84 m OD).

The pumping water level in the production well on 9/10/95 was 4.90 m b.g.l. and 3.92 m b.g.l. in the observation well.

6.3 Groundwater flow directions and gradients

Regional groundwater flow is generally southwards, but locally it depends on topography, moving in all directions to the Athboy River. It is inferred that the river is in hydraulic continuity with the water table, at least near the well, as the pumping water level in the well is equivalent to the river level. The exact flow direction is difficult to assess due to the relative flat lying ground near the well.

Groundwater gradients in the general area may range from approximately 0.015 to 0.022. The steep gradients occur from the Hill of Ward, while along the river the gradients are quite shallow.

6.4 Rainfall, Evaporation and Recharge

Rainfall data for the area are taken from the nearest rainfall station in Athboy, 1 km northwest. Mean annual rainfall as recorded by Met Eireann for 1951 - 1980 was 839 mm. Potential evapotranspiration (P.E.) is estimated from a Met Eireann contoured map as 500 mm/yr. Actual evapotranspiration (A.E.) is estimated at 475 mm (95% of P.E.) allowing for soil moisture deficits for part of the year.

Using the above figures the effective rainfall (E.R.) is taken as approximately 364 mm/yr. As there are no drainage ditches or streams in the immediate area of the source and the subsoils are generally thin and free draining, a high proportion of the effective rainfall infiltrates to the water table. Estimating run-off to be around 10%, the actual recharge to the aquifer is estimated to be 328 mm/yr.

These calculations are summarised below:

Average annual rainfall	839 mm
Estimated P.E.	500 mm
Estimated A.E. (95% P.E.)	475 mm
Effective rainfall	364 mm
Recharge (90% E.R.)	328 mm

6.5 Hydrochemistry and Water Quality

The hydrochemical analyses of groundwater at the Athboy source indicate a very hard water (345-380 mg/l CaCO_3), with a high alkalinity (255-360 mg/l CaCO_3). Conductivities are also high, ranging from 500-790 $\mu\text{S/cm}$. (Table 1). This groundwater can be classed as a calcium bicarbonate water. The groundwater analyses are included in the Appendices.

The water quality at Athboy is generally excellent with no bacterial contamination except for occasional small numbers of background Coliforms, and all the major cations, anions and trace elements are within the Irish Drinking Water Standards. Nitrates range between 9-20mg/l which are higher than background levels for County Meath.

6.6 Aquifer coefficients

Analysis of the 1995 pumping test indicated an apparent transmissivity of around 1000 m^2/d . The specific capacity calculated was 980 $\text{m}^3/\text{d}/\text{m}$ after 12 hours pumping. After an initial drawdown in the well of 0.90 metres during the first minute, drawdown was only 0.2 metres over the next 10 hours.

However, analysis of the original 72 hour pumping test (1985) with a pumping rate of 1385 m^3/d and a drawdown of 7.3 metres indicated a transmissivity of around 100-230 m^2/d and a specific capacity of 190 $\text{m}^3/\text{d}/\text{m}$. These figures are much lower than those obtained from the 12 hour test, apparently because of the higher pumping rate. More comprehensive tests would be needed to confirm the sustainable maximum yield of the well. The pumping test data are in the Appendices.

The specific yield of 0.075 was calculated from data from the observation well and indicates that the aquifer is unconfined. This value is high for a bedrock aquifer and is thus a composite value which probably relates only to the upper broken part of the bedrock aquifer.

Table 1. Conductivity readings from the Athboy Source

	Production Well		River	
Date	Conductivity	Temperature	Conductivity	Temperature
	($\mu\text{S/cm}$)	($^{\circ}\text{C}$)	($\mu\text{S/cm}$)	($^{\circ}\text{C}$)
*16-3-95	784	6.6		
+24-3-95	492	8.5		
15-5-95	561	10.2		
+13-6-95	572	10.3		
13-9-95	598	12.4		
+27-9-95	579	11.4		
10-10-95	582 - 594	11 - 12.1	586 - 605	12.9 - 13.4
2-11-95	590	12	555	10.1
30-11-95	562	10.9	445	8.5
+10-1-96	617	10.3		
26-2-96	618	9.7	630	6.3
2-4-96	635	10	641	8.8
3-5-96	626	8.9	632	7.4

* Reading taken using a different conductivity meter

+ Full Analyses

6.7 Conceptual Model

The aquifer feeding the Athboy source is the Calp Limestone. This is overlain by up to 11 metres of highly permeable sands and gravels, therefore the aquifer is considered to be unconfined. Permeabilities within the bedrock are increased by joints and fractures. When drilling the production well a major inflow of groundwater was recorded in broken limestone at 10m depth (54.8 m O.D.).

Groundwater flow is influenced by topography. A groundwater mound can be deduced along the top of the ridge at the Hill of Ward. The groundwater flow to the source is therefore from the north-northeast.

In the production well, the upper 10.5 metres (6 m of sand and gravel, overlying broken limestone) were lined with 200mm steel casing. The well is open hole to a depth of 61 metres (3.8 m O.D.) The main inflow into the well is at the base of the steel casing, which prevents inflow from the subsoils.

Raw water samples from the well analysed in March 1985 indicated that the groundwater from the well was of excellent quality. There has been no significant change in the hydrochemistry, although the nitrates were much higher (40 mg/l as NO_3). The chemical analysis from the river was similar, suggesting they are interconnected, although the differences in some parameters indicate that the river water is not being pumped directly into supply. Further comparative analyses are required to establish the degree of connection between the river and the supply well.

The 1985 pumping test indicated a maximum yield of $1385\text{m}^3/\text{d}$ with a drawdown of 7.3m (pumping level of 11.2m b.g.l.). Increasing the pumping rate lowered the water level to the pump intake at 30m. The 1995 test showed a drawdown of 1.1 m with a pumping level of 5.0m b.g.l., for a discharge of $1080\text{ m}^3/\text{d}$. The comparison suggests increasing the pumping rate above $1080\text{ m}^3/\text{d}$ produces disproportionate increases in drawdown, as the more permeable upper zones are dewatered.

6.8 Aquifer category

The aquifer supplying the Athboy source is the Calp Limestone and the overlying alluvial sand and gravel deposits, which may be receiving additional recharge from the river. In this area this aquifer is classed as a **locally important aquifer which is generally moderately productive (Lm)**.

7. GROUNDWATER VULNERABILITY

Most of the catchment area for the Athboy source is mapped as highly vulnerable to pollution. The subsoils are generally highly permeable, subject to detailed investigation. However, since a significant proportion of flow to the well may be from the river, the vulnerability of the source to pollution may be less important than the river water quality.

Areas where rock is less than 3 m below surface are mapped as ‘extreme vulnerability’; areas around the Hill of Ward and Mullaghstones fall into this category. The remaining area, including all of the Inner protection Area (SI) is classified as ‘highly vulnerable’ due to the high permeability of the subsoil and/or the shallow cover. The vulnerability zones are shown on Figure 5.

8. DELINEATION OF SOURCE PROTECTION AREAS

Source protection areas are delineated for the output currently abstracted (1080 m³/d), and allows for expansion of the zone of contribution during dry weather by including a buffer zone.

8.1 Inner Source Protection Area (SI)

The Inner Protection Area is the area defined by a 100 day time of travel to the source and is drawn to protect against the effects of potentially contaminating activities which may have an immediate influence on water quality at the source, in particular from microbial contamination.

As a result of the inferred highly permeable zone close to the surface (upper 10 metres) in the vicinity of the source, high aquifer coefficients are used to determine the 100 day time of travel distance.

Using the following aquifer coefficients: permeability (k) = 30 m/d, porosity = 0.075, and hydraulic gradient (i) = 0.02, the 100 day time of travel distance to the well is estimated to be approximately 800 metres (Figure 6). The actual 100 day time of travel distance may be more or less than this, depending on the true parameter values used and the amount of recharge induced from the river.

8.2 Outer Protection Area (SO)

The Outer Protection Area includes the remainder of the catchment area to the source, (or zone of contribution (ZOC)), and is defined by the area required to support abstraction from long-term recharge. The zone of contribution at Athboy is derived from hydrogeological mapping techniques and is controlled primarily by the groundwater divide to the northeast of the source (Hill of Ward) and by the groundwater flow direction. The zone of contribution is shown in Figure 6.

The size of the zone of contribution is based largely on the Recharge Equation. If average annual recharge is 328 mm, the area needed to supply 1080 m³/d is 1.2 km². The null point or down gradient boundary of the ZOC (beyond which water does not contribute to the well) extends to the Athboy River. A buffer (safety margin) is included in the final ZOC by incorporating a $\pm 20^\circ$ error margin in the inferred groundwater flow direction.

9. GROUNDWATER SOURCE PROTECTION ZONES

Combining the Inner and Outer Source Protection Areas with the vulnerability ratings produces three Groundwater Source Protection Zones (Figure 7), listed in order of decreasing degree of protection required:

- Inner Protection Area / High (SI/H)
- Outer Protection Area / Extreme (SO/E)
- Outer Protection Area / High (SO/H)

10. POTENTIAL POLLUTION SOURCES

As the pumping well is drawing water from the Athboy River, the primary threat to the Athboy source is the quality of the river water upstream of the source, which may be affected in particular, by septic tanks and/or leaky sewers (if present) in the village. This may also account for the slightly elevated background levels of nitrates.

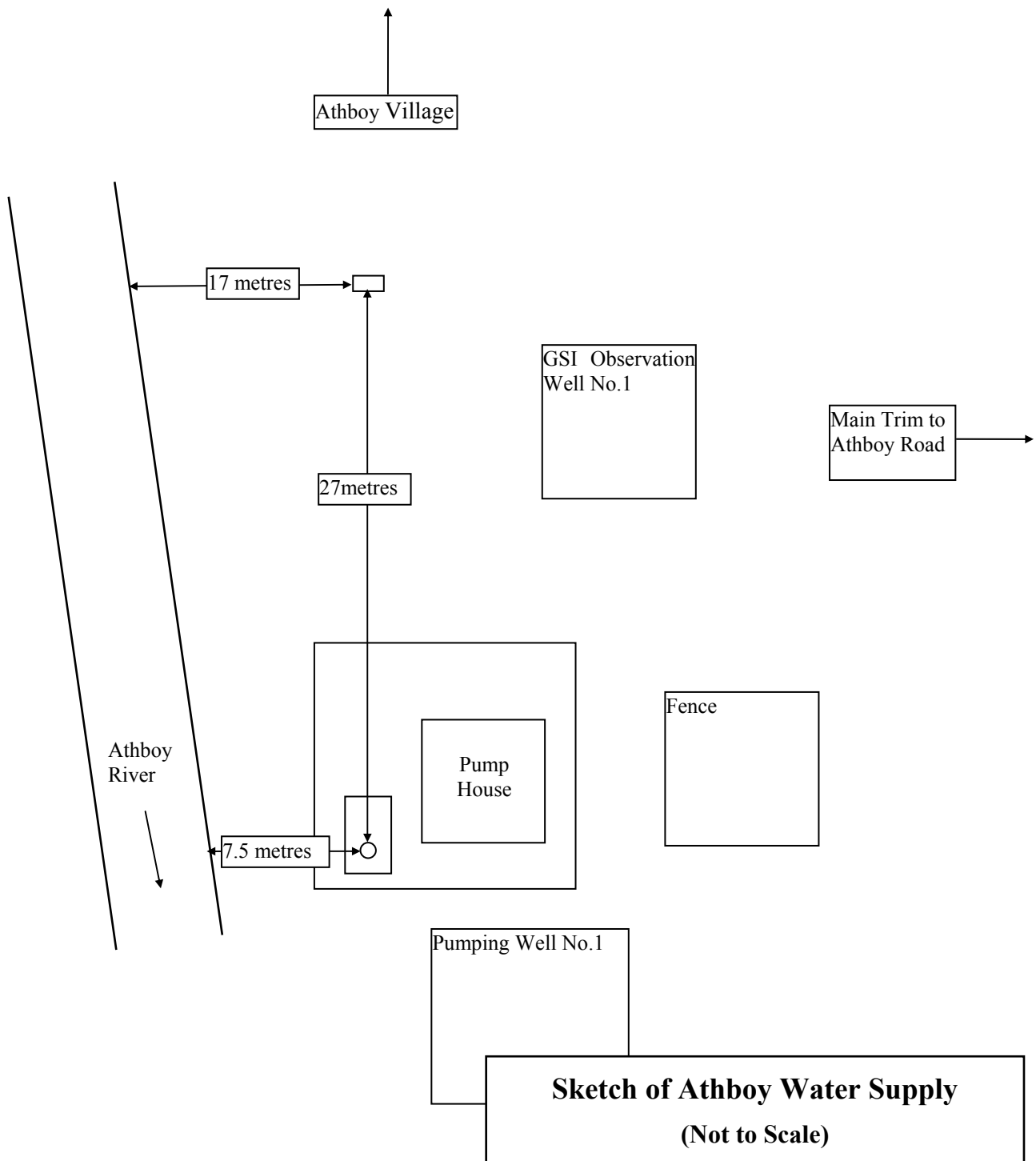
A small number of houses and farmyards exist around the well. One farmyard in particular, located approximately 500 metres up-gradient of the well, stores silage and has cattle feeding yards which would pose a significant risk to the well if the present farmyard management deteriorated. The commercial vehicle test centre in Athboy is located within the Outer Protection area, and spillages of hydrocarbons could pose a significant risk to the Athboy source.

11. CONCLUSIONS AND RECOMMENDATIONS

Overall the source at Athboy is a very good well which should be able to support an increased yield. The water analyses indicated no serious water quality problems at this source, but the ZOC is highly vulnerable to pollution due to the shallow thickness and permeability of the subsoils.

The Council are recommended to monitor the raw water from the source and the river, to control and monitor potentially polluting activities within the source protection zones, particularly the farmyard uphill from the well and the commercial vehicle test centre, and to control activities along the river.

The borehole drilled in May 1996 in the Council yard in Athboy should be secured and locked or backfilled, to prevent pollutants entering the groundwater system.



Appendix 1

Pump Test Data

PUMPING TEST DATA SHEET

page 1 of 10

Location : ATHBOY

Borehole name : PW No. 1

Date : 19-03-85

Test : Drawdown data from PW No. 1

Duration : 72 hrs.

Weather : Wet

Height of datum point above ground level : 1m

Well depth : 61m

Date	Time	Time since pumping began (min.)	Water level below datum (metres)	Drawdown (metres)	Discharge m ³ /d	Temperature C	Remarks
19/03/85		0	3.89	0			
		1	7.89	4			
		1.5	8.07	4.18			
		2	8.5	4.61			
		2.5	8.68	4.79			
		3	8.88	4.99			
		4	9.2	5.31			
		4.5	9.33	5.44			
		5	9.5	5.61			
		6	9.77	5.88	1650		
		7	9.7	5.81			
		8	9.84	5.95			
		9	9.98	6.09	2415		
		10	10.1	6.21			
		12	13.02	9.13			
		14	12.89	9			
		16	21	17.11			cut down
		30	10.5	6.61	1575		
		35	10.5	6.61			
		40	10.57	6.68			
		45	10.64	6.75			
		50	10.82	6.93			
		55	10.88	6.99			
		60	10.92	7.03			
		75	10.98	7.09			
		90	11.04	7.15			
		105	11.1	7.21			
		120	11.11	7.22	1625		
		150	11.3	7.41			
		180	11.45	7.56	1650		
		210	11.49	7.6			
		240	11.55	7.66	1610		
		300	11.2	7.31			
		360	11.01	7.12			
		420	10.72	6.83	1500		
		720	10.9	7.01	1500		
		1200	11.2	3.31	1500		
		1440	14.47	6.4	1500		
		1560	18.31	9.81	1520		
		1680	10.75	2.07	1370		
		1800	10.66	1.78	1400		
		1920	10.78	1.58	1365		
		2040	10.83	1.5	1365		
		2160	10.92	1.42	1365		
		2520	10.87	1.1	1400		
		3240	11.1	1.4	1365		
		3600	11.25	1.41	1365		
		3960	11.09	1.11	1365		
22/03/85		4320	11.2	1.1	1400		

PUMPING TEST DATA SHEET

page 2 of 10

Location : ATHBOY

Borehole name : PW No. 1

Date: 22-03-85

Test : Recovery data from PW No. 1

Duration : 40 minutes

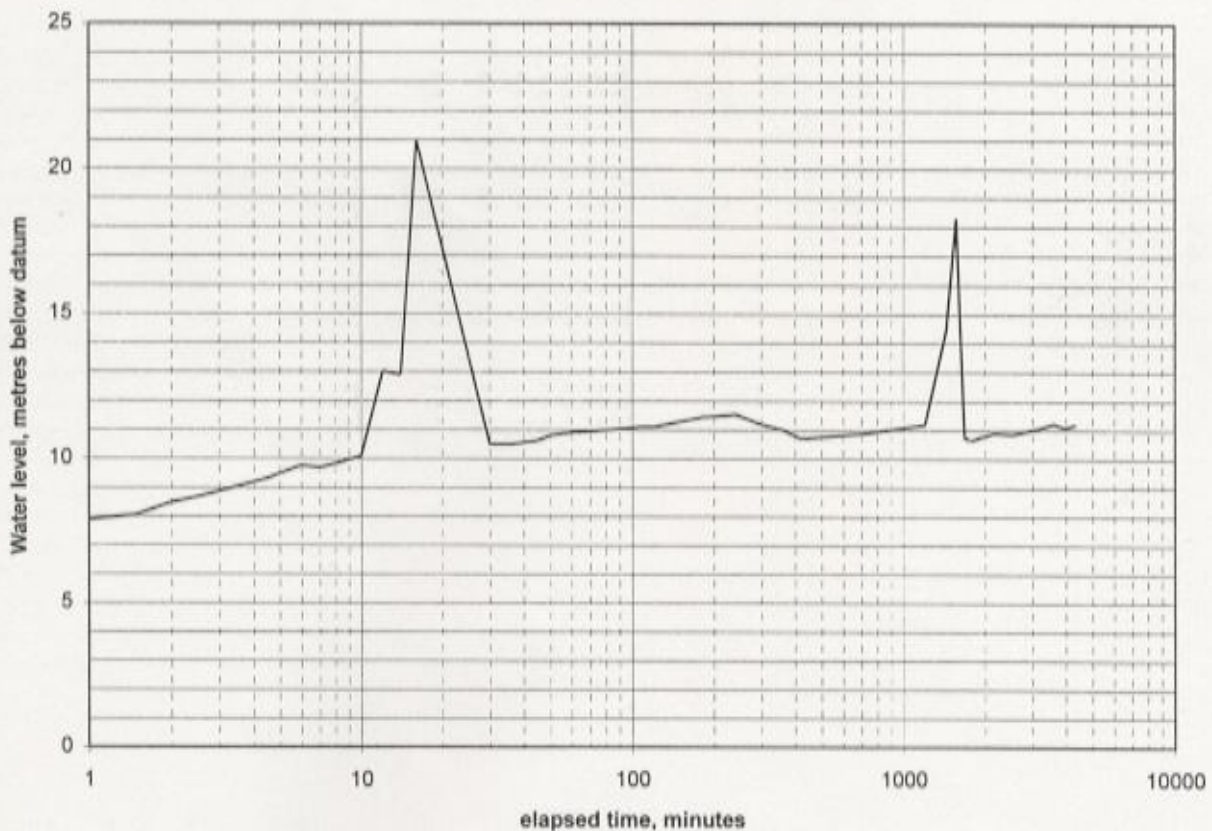
Weather : Wet

Height of datum point above ground level : 1m

Well depth : 61m

Date	Time	Time since pumping ended (min.)	Water level below datum (metres)	Drawdown (metres)	Discharge m ³ /d	Temperature C	Remarks
22/03/85		0	11.2	7.31			
		1	4.4	0.51			
		2	4.37	0.48			
		4	4.63	0.74			
		7	4.63	0.74			
		26	4.56	0.67			
		40	4.54	0.65			

Athboy Pumping Test, PW No. 1, 19-22 March 1985



PUMPING TEST DATA SHEET

Location : ATHBOY

Borehole name : PW No.1

Date : 10-10-95

Test : Drawdown Data from PW No.1

Weather :

Duration : 12hrs.

Well depth : 61m.

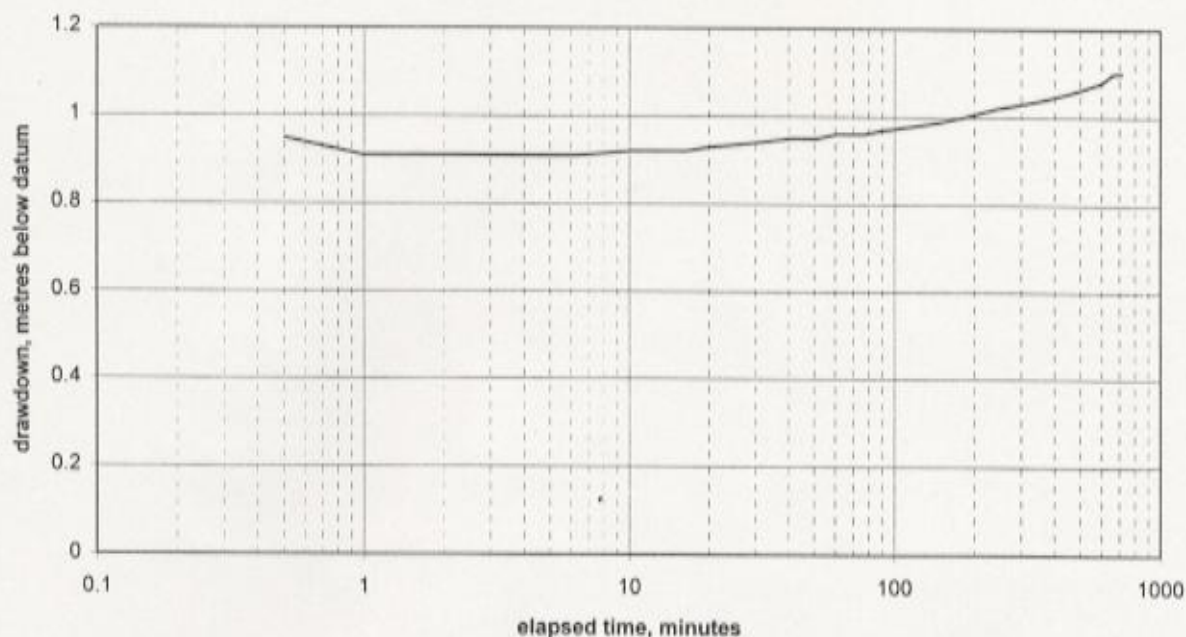
Depth of Pump :

Height of datum point above ground level :

Datum Point :

Date	Time	Time since pumping began (min.)	Water level below datum (metres)	Drawdown (metres)	Discharge m3/d	Temperature C	Conductivity uS/cm @20 C
10-10-95	07:00	0	3.85	0			
		0.5	4.8	0.95			
		1	4.76	0.91			
		1.5	4.76	0.91			
		2	4.76	0.91			
		3.5	4.76	0.91			
		6	4.76	0.91			
		10	4.77	0.92		11.9	585
		16	4.77	0.92		12	588
		20	4.78	0.93			
		30	4.79	0.94		12	586
		40	4.8	0.95			
		50	4.8	0.95			
	08:00	60	4.81	0.96		12.1	589
		75	4.81	0.96			
		90	4.82	0.97		12.1	593
	09:00	120	4.83	0.98		11.9	584
		150	4.84	0.99			
	10:00	180	4.85	1		12	586
		210	4.86	1.01			
	11:00	240	4.87	1.02		11	584
	12:00	300	4.88	1.03		11.7	586
	13:00	360	4.89	1.04			
	14:00	420	4.9	1.05		11.7	594
	15:00	480	4.91	1.06		11.6	582
	16:00	540	4.92	1.07		11.7	586
	17:00	600	4.93	1.08			
	18:00	660	4.95	1.1			
	19:00	720	4.95	1.1			

Athboy PW No. 1, 10/10/95



PUMPING TEST DATA SHEET

Location : ATHBOY

Borehole name : OW No.1

Date : 09-10-95

Test : Recovery Data from OW No.1

Duration : 4hrs.

Weather :

Distance from Pumping Well : 17m

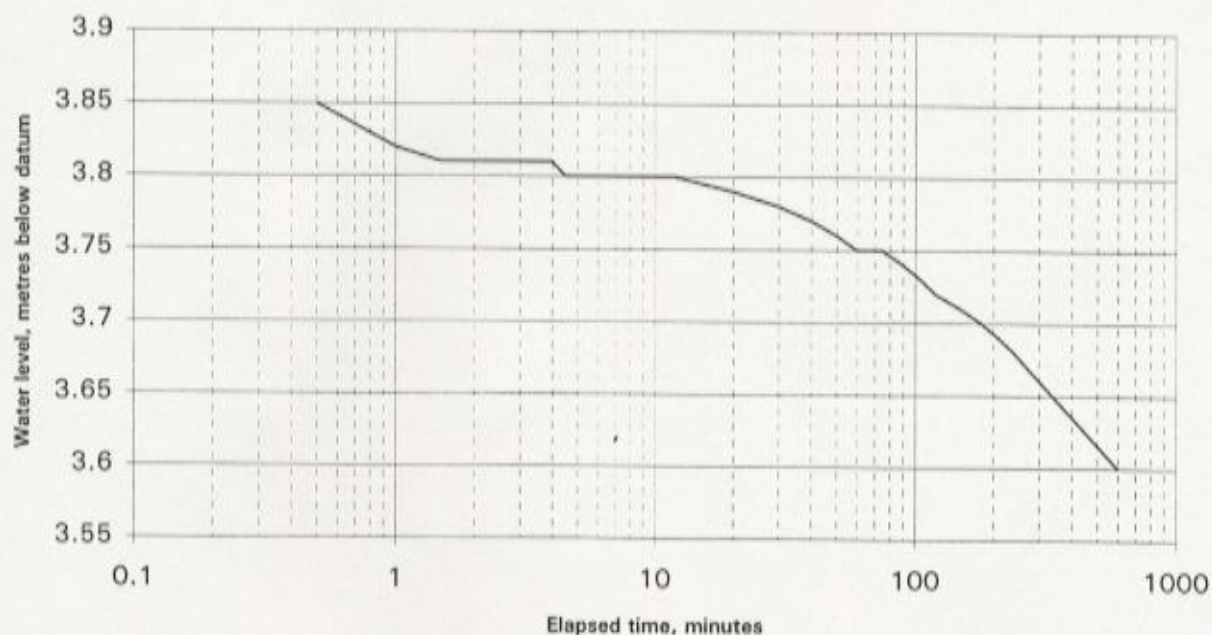
Well depth : 58.8m

Height of datum point above ground level : 0m

Datum Point : top of casing

Date	Time	Time since pumping ended (min.)	Water level below datum (metres)	Drawdown (metres)	Discharge m ³ /d	Temperature C	Conductivity uS/cm @20 C
09-10-95	09:00	0	3.92	0.32			
		0.5	3.85	0.25			
		1	3.82	0.22			
		1.5	3.81	0.21			
		2	3.81	0.21			
		2.5	3.81	0.21			
		3	3.81	0.21			
		3.5	3.81	0.21			
		4	3.81	0.21			
		4.5	3.8	0.2			
		5	3.8	0.2			
		6	3.8	0.2			
		7	3.8	0.2			
		8	3.8	0.2			
		9	3.8	0.2			
		10	3.8	0.2			
		12	3.8	0.2			
		20	3.79	0.19			
		30	3.78	0.18			
		40	3.77	0.17			
		50	3.76	0.16			
	10:00	60	3.75	0.15			
		75	3.75	0.15			
		90	3.74	0.14			
		105	3.73	0.13			
	11:00	120	3.72	0.12			
	11:30	150	3.71	0.11			
	12:00	180	3.7	0.1			
	12:30	210	3.69	0.09			
	13:00	240	3.68	0.08			
	19:00	600	3.6	0			

Athboy recovery test OW No. 1, 10 October '95



PUMPING TEST DATA SHEET

Location : ATHBOY

Borehole name : OW No.1

Date : 10-10-95

Test : Drawdown Data from OW No.1 while PW No.1 is pumping.

Duration : 12hrs.

Weather : Fine

Distance from Pumping Well : 17m

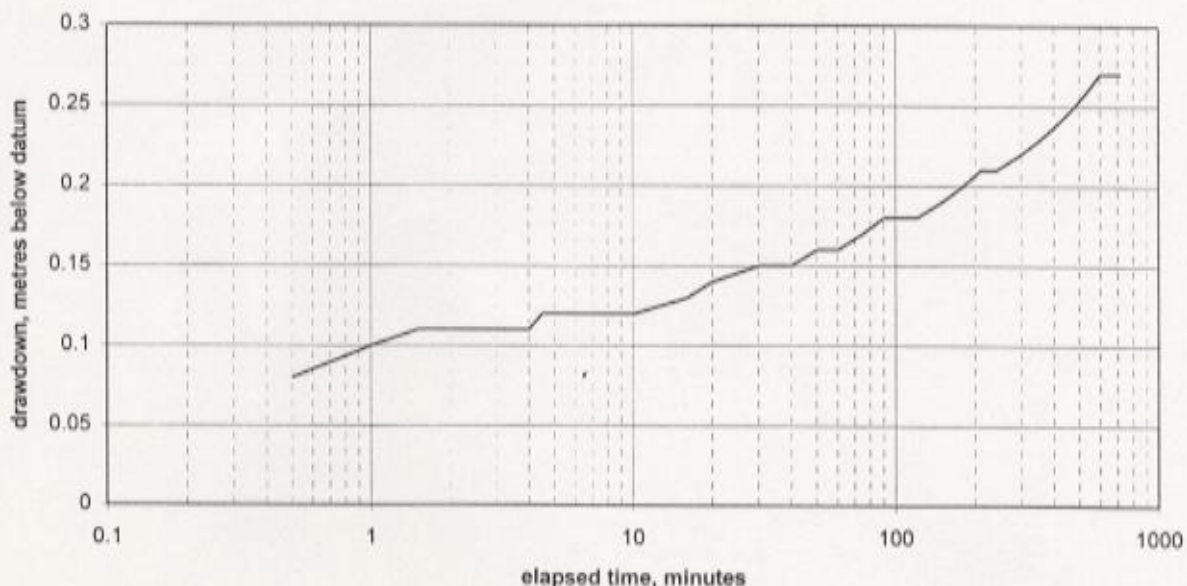
Well depth : 58.8m

Height of datum point above ground level : 0m

Datum Point : top of casing

Date	Time	Time since pumping began (min.)	Water level below datum (metres)	Drawdown (metres)	Discharge m3/d	Temperature C	Conductivity uS/cm @20 C
10-10-95	07:00	0	3.6	0			
		0.5	3.68	0.08			
		1	3.7	0.1			
		1.5	3.71	0.11			
		2	3.71	0.11			
		2.5	3.71	0.11			
		3	3.71	0.11			
		3.5	3.71	0.11			
		4	3.71	0.11			
		4.5	3.72	0.12			
		10	3.72	0.12			
		16	3.73	0.13			
		20	3.74	0.14			
		30	3.75	0.15			
		40	3.75	0.15			
		50	3.76	0.16			
	08:00	60	3.76	0.16			
		75	3.77	0.17			
		90	3.78	0.18			
	09:00	120	3.78	0.18			
		150	3.79	0.19			
	10:00	180	3.8	0.2			
		210	3.81	0.21			
	11:00	240	3.81	0.21			
	12:00	300	3.82	0.22			
	13:00	360	3.83	0.23			
	14:00	420	3.84	0.24			
	15:00	480	3.85	0.25			
	16:00	540	3.86	0.26			
	17:00	600	3.87	0.27			
	18:00	660	3.87	0.27			
	19:00	720	3.87	0.27			

Athboy OW No. 1, 10/10/95



Location : ATHBOY

Borehole name : PW No.1

Date : 03-07-96

Test : Drawdown Data from PW No.1.

Duration : 96hrs

Weather : Fine

Height of datum point above ground level : 1m.

Well depth : 61m.

Date	Time	Time since pumping began (min.)	Water level below datum (metres)	Drawdown (metres)	Discharge m3/d	Temperature C	Remarks
03-07-96	11:30	0	4.12	0			Step 1
		0.5	4.28	0.16			
		1	4.3	0.18			
		1.5	4.29	0.17			
		2	4.31	0.19			
		2.5	4.32	0.2			
		3	4.32	0.2			
		3.5	4.33	0.21			
		4	4.33	0.21			
		4.5	4.34	0.22			
		5	4.34	0.22	1229		
		6	4.34	0.22			
		7	4.34	0.22			
		8	4.34	0.22			
		9	4.34	0.22			
		10	4.35	0.23	1229		
		12	4.35	0.23			
		14	4.35	0.23			
		16	4.35	0.23	1229		
		18	4.35	0.23			
		20	4.35	0.23			
		22	4.36	0.24			
		24	4.36	0.24			
		26	4.36	0.24	1229		
		28	4.36	0.24			
		30	4.37	0.25			
		35	4.37	0.25			
		40	4.37	0.25			
		45	4.37	0.25			
		50	4.38	0.26	1229		
		55	4.38	0.26			
	12:30	60	4.38	0.26			
		75	4.39	0.27			
		90	4.4	0.28			Step 2
		90.5	5.1	0.98			
		91	5.19	1.07			
		91.5	5.25	1.13			
		92	5.28	1.16			
		92.5	5.3	1.18			
		93	5.31	1.19			
		93.5	5.32	1.2			
		94	5.33	1.21			
		94.5	5.33	1.21			
		95	5.34	1.22	2884		
		96	5.34	1.22			
		97	5.35	1.23			
		98	5.35	1.23			
		99	5.35	1.23	2884		
		100	5.36	1.24			
		102	5.37	1.25			
		104	5.37	1.25			
		106	5.37	1.25			
		108	5.38	1.26			
		110	5.38	1.26			
		112	5.39	1.27			
		114	5.4	1.28			
		116	5.4	1.28			
		118	5.4	1.28			

Location : ATHBOY

Borehole name : PW No.1

Date : 03-07-96

Test : Drawdown Data from PW No.1.

Duration : 96hrs

Weather : Fine

Height of datum point above ground level : 1m.

Well depth : 61m.

Date	Time	Time since pumping began (min.)	Water level below datum (metres)	Drawdown (metres)	Discharge m3/d	Temperature C	Remarks
	13:30	120	5.41	1.29	2884		
		125	5.41	1.29			
		130	5.42	1.3			
		135	5.42	1.3			
		140	5.43	1.31	2884		
		145	5.44	1.32			
		150	5.44	1.32	2884		
		165	5.46	1.34			
	14:30	180	5.48	1.36			Step 3
		180.5	5.61	1.49			
		181	5.73	1.61			
		181.5	5.75	1.63			
		182	5.79	1.67			
		182.5	5.81	1.69	3388		
		183	5.83	1.71			
		183.5	5.83	1.71			
		184	5.83	1.71			
		184.5	5.84	1.72			
		185	5.84	1.72			
		186	5.84	1.72			
		187	5.85	1.73			
		188	5.85	1.73			
		189	5.85	1.73			
		190	5.86	1.74	3388		
		192	5.86	1.74			
		194	5.86	1.74			
		196	5.86	1.74	3388		
		198	5.87	1.75			
		200	5.87	1.75			
		202	5.87	1.75			
		204	5.88	1.76			
		206	5.88	1.76			
		208	5.89	1.77			
		210	5.89	1.77			
		215	5.89	1.77			
		220	5.9	1.78			
		225	5.9	1.78			
		230	5.91	1.79			
		235	5.92	1.8			
	15:30	240	5.92	1.8			
		255	5.94	1.82	3388		
		270	5.96	1.84			
		285	5.97	1.85			
	16:30	300	6	1.88			
		330	6.02	1.9			
	17:30	360	6.04	1.92			
		390	6.07	1.95	3388		
	18:30	420	6.1	1.98			
	19:30	480	6.15	2.03	3388		
	20:30	540	6.19	2.07	3216		
	21:30	600	6.22	2.1	3216		
	22:30	660	6.27	2.15	3216		
	23:30	720	6.31	2.19	3216		
04-07-96	00:30	780	6.35	2.23	3216		
	02:30	900	6.42	2.3	3216		
	04:30	1020	6.5	2.38	3216		
	06:30	1140	6.56	2.44	3216		
	08:30	1260	6.63	2.51	3216		

Location : ATHBOY

Borehole name : PW No.1

Date : 03-07-96

Test : Drawdown Data from PW No.1.

Duration : 96hrs

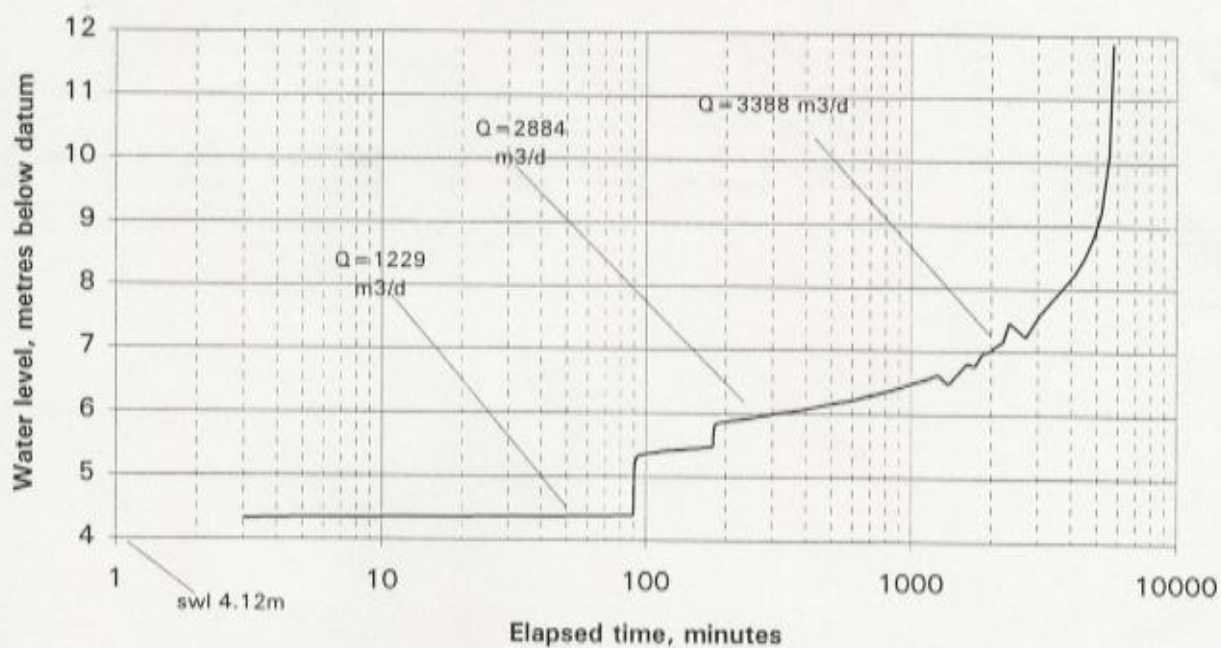
Weather : Fine

Height of datum point above ground level : 1m.

Well depth : 61m.

Date	Time	Time since pumping began (min.)	Water level below datum (metres)	Drawdown (metres)	Discharge m ³ /d	Temperature C	Remarks
	10:30	1380	6.48	2.36	3388		
	14:30	1620	6.81	2.69	3216		
	16:30	1740	6.77	2.65	3388		
	18:30	1860	6.97	2.85	3216		
	20:30	1980	7	2.88	3216		
	22:30	2100	7.1	2.98	3388		
05-07-96	00:30	2220	7.16	3.04	3216		
	02:30	2340	7.46	3.34	3216		
	08:30	2700	7.23	3.11	3216		
	14:30	3060	7.59	3.47	3047		
	20:30	3420	7.83	3.71	3216		
06-07-96	02:30	3780	8.04	3.92	3216		
	08:30	4140	8.23	4.11	3216		
	14:30	4500	8.48	4.36	3216		
	20:30	4860	8.81	4.69	3216		
07-07-96	02:30	5220	9.22	5.1	3047		
	08:30	5580	10.12	6	3047		
	11:30	5760	11.87	7.75	2884		

Athboy pumping test, 3-7 July 1996



Groundwater Quality Analyses

Groundwater Source :

Athboy

Sample Location :

PW No1 Athboy R. PW No.1 PW No.1 PW No.1 PW No.1

Date :

22/03/85 22/03/85 24/03/95 13/06/95 27/09/95 10/01/96

Parameters

Units

Alkalinity	mg/l	310	296	358	358	254	306
Aluminium	mg/l			<0.02	<0.02	<0.02	<0.02
Ammonium	mg/l	0.1	0.26				
Ammonium as Nitrogen	mg/l			<0.01	<0.01	<0.015	<0.015
Arsenic	mg/l			<0.25		<0.05	<0.05
Barium	mg/l			0.078	0.088	0.09	0.076
Bicarbonate	mg/l	378	361				
Boron	mg/l			0.032	<0.02	0.035	0.031
Cadmium	mg/l			<0.025	<0.025	<0.005	<0.005
Calcium	mg/l	136	138	143	138	139	136.4
Calcium Hardness	mg/l			357	345	347	340
Total Hardness	mg/l			395	387	395	377
Chloride	mg/l	24	22	21.2	21.1	21.3	19.8
Chromium	mg/l			<0.025	<0.025	<0.005	<0.005
Copper	mg/l			<0.01	<0.01	0.005	<0.005
Cyanide	mg/l			<0.01	<0.01	<0.01	<0.01
Electrical Conductivity	mg/l	0.62	0.64	0.723	0.794	0.638	0.708
Fluoride	mg/l			<0.25	<0.25	<0.25	<0.25
Iron (total)	mg/l		0.1	0.011	<0.01	0.007	<0.005
Lead	mg/l			0.24	<0.25	<0.02	<0.02
Magnesium	mg/l	6	9	9	10.3	11.5	8.838
Magnesium Hardness	mg/l			37	42	47	36
Manganese	mg/l			<0.005	<0.005	<0.005	<0.005
Mercury	mg/l					<0.02	<0.02
Nickel	mg/l			<0.05	<0.05	<0.01	<0.01
Nitrate	mg/l	39.9	31	14.8	13.9	8.9	19.9
Nitrite	mg/l	<0.01	0.38	<0.01	<0.01	<0.1	<0.1
pH		7.4	7.9	7.2	7.3	7.2	7.1
Phosphate	mg/l			<0.5	<0.5	<0.5	<0.5
Phosphorus	mg/l			0.444	<0.25	<0.025	<0.25
Potassium	mg/l	1.3	2.3	1.5	2.2	2.457	1.527
Selenium	mg/l					<0.05	<0.05
Silver	mg/l			<0.01	<0.01	<0.005	<0.005
Sodium	mg/l	7	7	7.8	9.2	10.83	8.75
Strontium	mg/l			0.725	0.747	0.778	0.737
Sulphate	mg/l	25.5	56	21.6	50.9	52.7	24.4
Temperature	C			8.5	10.3	11.6	10.6
Total dissolved solids	mg/l			562	590	492	505
Zinc	mg/l			0.02	0.037	0.012	0.016
Total Coliforms	/100 ml	0	0	0	2	0	0
E. coli	/100 ml	0	0	0	0	0	0

Groundwater Quality Analyses

Groundwater Source :

Athboy

Sample Location :

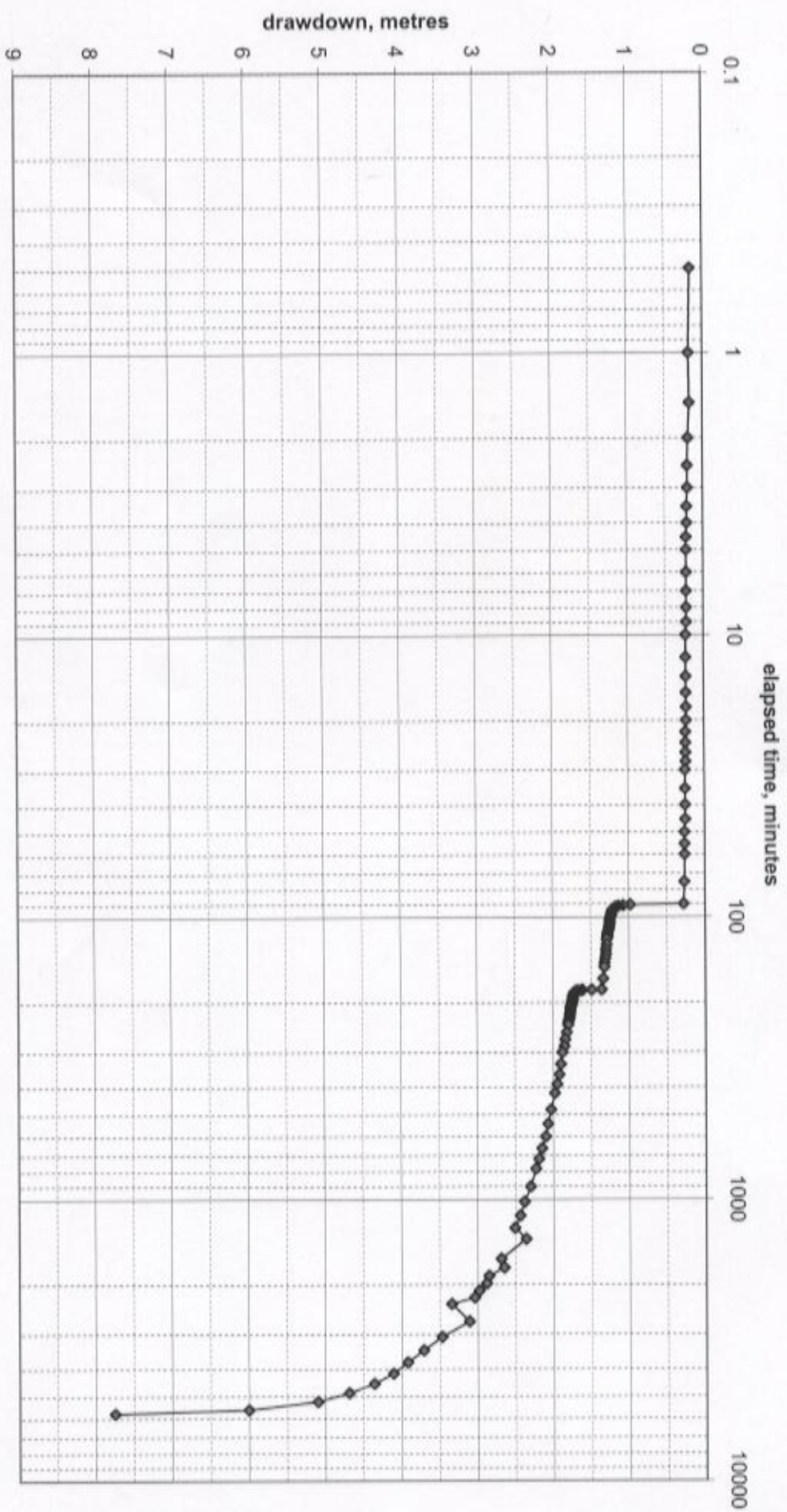
PW No1 Athboy R. PW No.1 PW No.1 PW No.1 PW No.1

Date :

22/03/85 22/03/85 24/03/95 13/06/95 27/09/95 10/01/96

Parameters	Units						
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Barium	mg/l			0.078	0.088	0.09	0.076
Bicarbonate	mg/l	378	361				
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Cadmium	mg/l			<0.025	<0.025	<0.005	<0.005
Calcium	mg/l	136	138	143	138	139	136.4
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Chromium	mg/l			<0.025	<0.025	<0.005	<0.005
Copper	mg/l			<0.01	<0.01	0.005	<0.005
Cyanide	mg/l			<0.01	<0.01	<0.01	<0.01
Electrical Conductivity	mg/l	0.62	0.64	0.723	0.794	0.638	0.708
Fluoride	mg/l			<0.25	<0.25	<0.25	<0.25
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Lead	mg/l			0.24	<0.25	<0.02	<0.02
Magnesium	mg/l	6	9	9	10.3	11.5	8.838
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Nitrate	mg/l	39.9	31	14.8	13.9	8.9	19.9
Nitrite	mg/l	<0.01	0.38	<0.01	<0.01	<0.1	<0.1
pH		7.4	7.9	7.2	7.3	7.2	7.1
Phosphate	mg/l			<0.5	<0.5	<0.5	<0.5
Phosphorus	mg/l			0.444	<0.25	<0.025	<0.25
Potassium	mg/l	1.3	2.3	1.5	2.2	2.457	1.527
Selenium	mg/l					<0.05	<0.05
Silver	mg/l			<0.01	<0.01	<0.005	<0.005
Sodium	mg/l	7	7	7.8	9.2	10.83	8.75
Strontium	mg/l			0.725	0.747	0.778	0.737
Sulphate	mg/l	25.5	56	21.6	50.9	52.7	24.4
Temperature	C			8.5	10.3	11.6	10.6
Total dissolved solids	mg/l			562	590	492	505
Zinc	mg/l			0.02	0.037	0.012	0.016
Total Coliforms	/100 ml	0	0	0	2	0	0
E. coli	/100 ml	0	0	0	0	0	0

Athboy WSS, pumping test 3-7 July 1996
Drawdown in Pumped Well PW1



PUMPING TEST DATA SHEET

Location : **ATHBOY**

Borehole name : **PW No.1**

Date : **03-07-96**

Test : Drawdown Data from PW No.1.

Duration Time : 96hrs

Weather : Fine

Distance from Pumping Well :

Well depth : 61m.

Height of datum point above ground level : 1m.

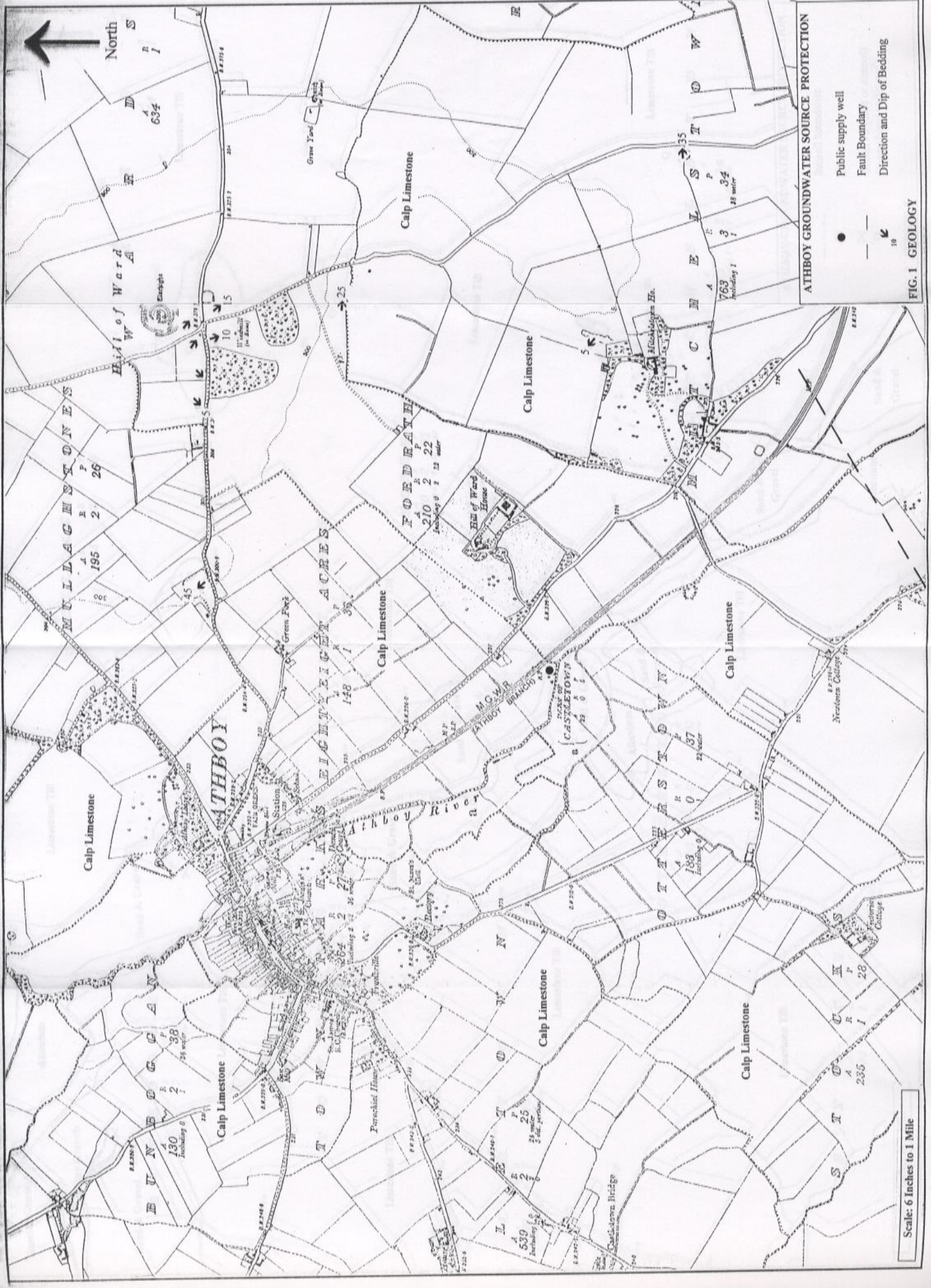
Datum Point : ?

Date	Time	Time since pumping began/ended	Water level below datum (metres)	Drawdown (metres)	Discharge m3/d	Temperature C	
03-07-96	11:30	0	4.12	0			Step 1
		0.5	4.28	0.16			
		1	4.3	0.18			
		1.5	4.29	0.17			
		2	4.31	0.19			
		2.5	4.32	0.2			
		3	4.32	0.2			
		3.5	4.33	0.21			
		4	4.33	0.21			
		4.5	4.34	0.22			
		5	4.34	0.22	1229		
		6	4.34	0.22			
		7	4.34	0.22			
		8	4.34	0.22			
		9	4.34	0.22			
		10	4.35	0.23	1229		
		12	4.35	0.23			
		14	4.35	0.23			
		16	4.35	0.23	1229		
		18	4.35	0.23			
		20	4.35	0.23			
		22	4.36	0.24			
		24	4.36	0.24			
		26	4.36	0.24	1229		
		28	4.36	0.24			
		30	4.37	0.25			
		35	4.37	0.25			
		40	4.37	0.25			
		45	4.37	0.25			
		50	4.38	0.26	1229		
		55	4.38	0.26			
	12:30	60	4.38	0.26			
		75	4.39	0.27			
		90	4.4	0.28			
		90.5	5.1	0.98			
		91	5.19	1.07			
		91.5	5.25	1.13			Step 2
		92	5.28	1.16			
		92.5	5.3	1.18			
		93	5.31	1.19			
		93.5	5.32	1.2			
		94	5.33	1.21			
		94.5	5.33	1.21			
		95	5.34	1.22	2884		
		96	5.34	1.22			
		97	5.35	1.23			
		98	5.35	1.23			
		99	5.35	1.23	2884		
		100	5.36	1.24			
		102	5.37	1.25			
		104	5.37	1.25			
		106	5.37	1.25			
		108	5.38	1.26			
		110	5.38	1.26			
		112	5.39	1.27			
		114	5.4	1.28			
		116	5.4	1.28			
		118	5.4	1.28			
	13:30	120	5.41	1.29	2884		
		125	5.41	1.29			
		130	5.42	1.3			
		135	5.42	1.3			
		140	5.43	1.31	2884		

Date	Time	Time since pumping began/ended	Water level below datum (metres)	Drawdown (metres)	Discharge m3/d	Temperature C	
		145	5.44	1.32			
		150	5.44	1.32	2884		
		165	5.46	1.34			
	14:30	180	5.48	1.36			Step 3
		180.5	5.61	1.49			
		181	5.73	1.61			
		181.5	5.75	1.63			
		182	5.79	1.67			
		182.5	5.81	1.69	3388		
		183	5.83	1.71			
		183.5	5.83	1.71			
		184	5.83	1.71			
		184.5	5.84	1.72			
		185	5.84	1.72			
		186	5.84	1.72			
		187	5.85	1.73			
		188	5.85	1.73			
		189	5.85	1.73			
		190	5.86	1.74	3388		
		192	5.86	1.74			
		194	5.86	1.74			
		196	5.86	1.74	3388		
		198	5.87	1.75			
		200	5.87	1.75			
		202	5.87	1.75			
		204	5.88	1.76			
		206	5.88	1.76			
		208	5.89	1.77			
		210	5.89	1.77			
		215	5.89	1.77			
		220	5.9	1.78			
		225	5.9	1.78			
		230	5.91	1.79			
		235	5.92	1.8			
	15:30	240	5.92	1.8			
		255	5.94	1.82	3388		
		270	5.96	1.84			
		285	5.97	1.85			
	16:30	300	6	1.88			
		330	6.02	1.9			
	17:30	360	6.04	1.92			
		390	6.07	1.95	3388		
	18:30	420	6.1	1.98			
	19:30	480	6.15	2.03	3388		
	20:30	540	6.19	2.07	3216		
	21:30	600	6.22	2.1	3216		
	22:30	660	6.27	2.15	3216		
	23:30	720	6.31	2.19	3216		
04-07-96	00:30	780	6.35	2.23	3216		
	02:30	900	6.42	2.3	3216		
	04:30	1020	6.5	2.38	3216		
	06:30	1140	6.56	2.44	3216		
	08:30	1260	6.63	2.51	3216		
	10:30	1380	6.48	2.36	3388		
	14:30	1620	6.81	2.69	3216		
	16:30	1740	6.77	2.65	3388		
	18:30	1860	6.97	2.85	3216		
	20:30	1980	7	2.88	3216		
	22:30	2100	7.1	2.98	3388		
05-07-96	00:30	2220	7.16	3.04	3216		
	02:30	2340	7.46	3.34	3216		
	08:30	2700	7.23	3.11	3216		
	14:30	3060	7.59	3.47	3047		
	20:30	3420	7.83	3.71	3216		
06-07-96	02:30	3780	8.04	3.92	3216		
	08:30	4140	8.23	4.11	3216		
	14:30	4500	8.48	4.36	3216		
	20:30	4860	8.81	4.69	3216		
07-07-96	02:30	5220	9.22	5.1	3047		
	08:30	5580	10.12	6	3047		
	11:30	5760	11.87	7.75	2884		

Appendix 2

Maps

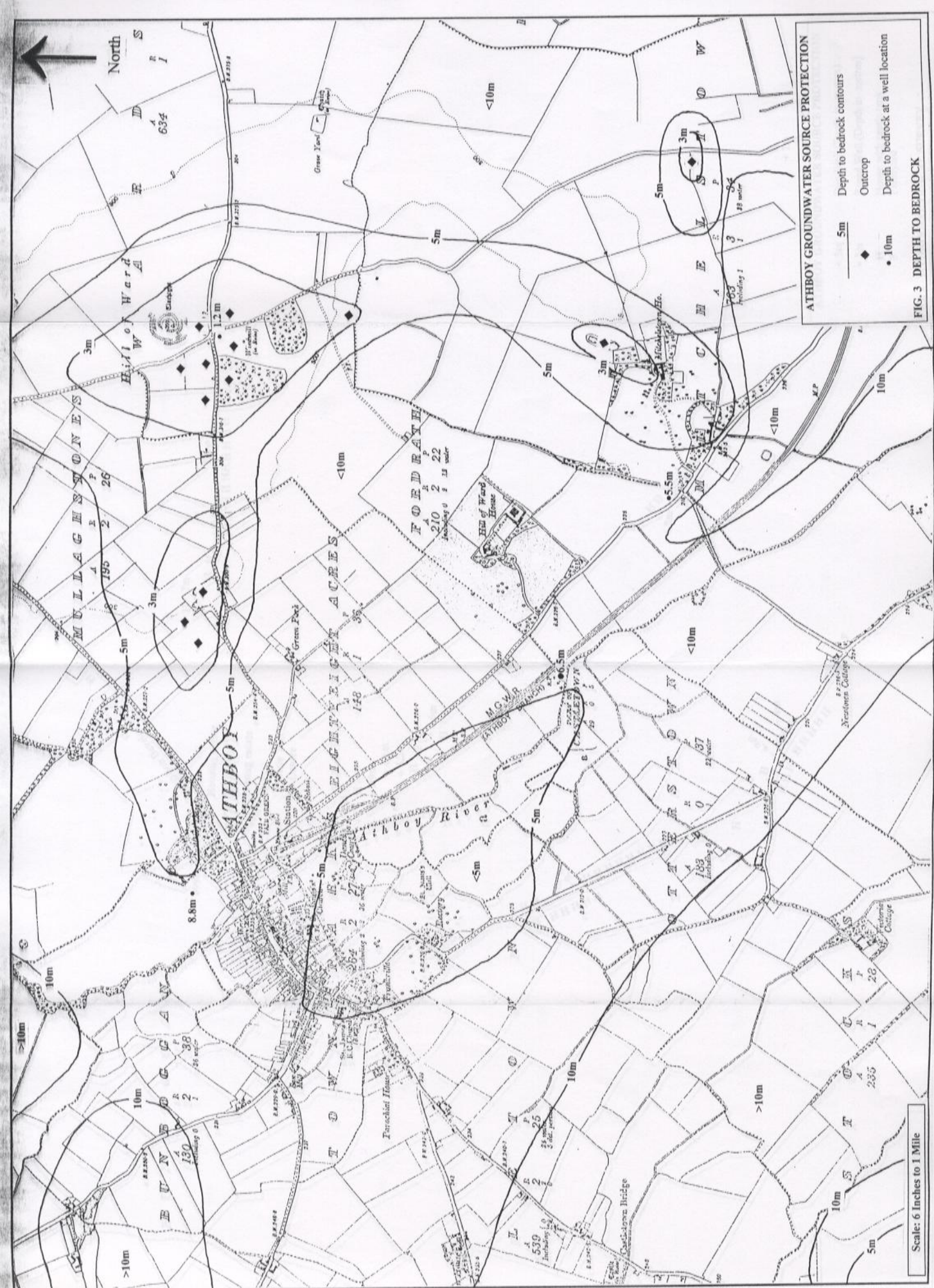


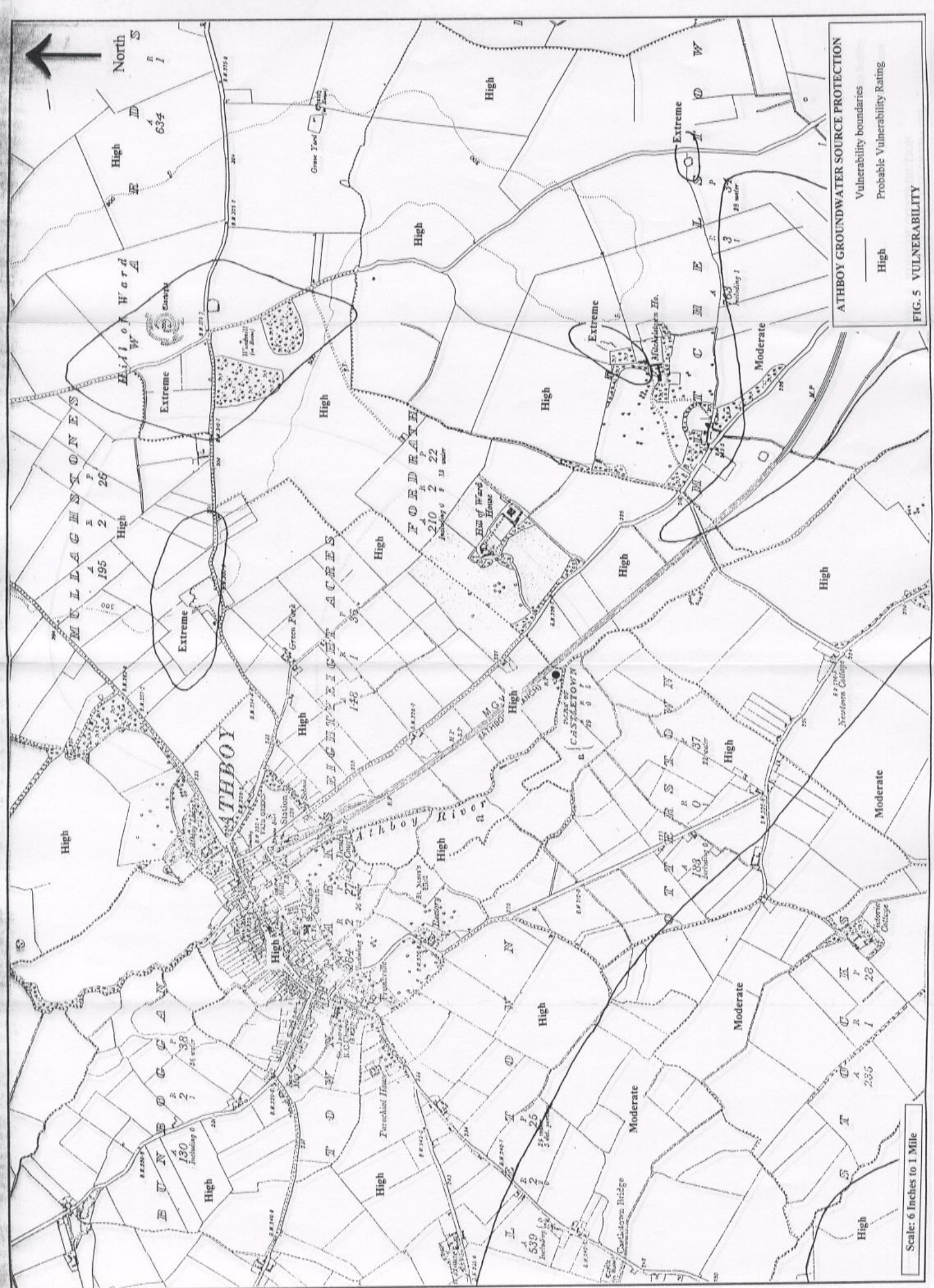
ATHBOY GROUNDWATER SOURCE PROTECTION

- Public supply well
- Fault Boundary
- Direction and Dip of Bedding

FIG. 1 GEOLOGY

Scale: 6 Inches to 1 Mile



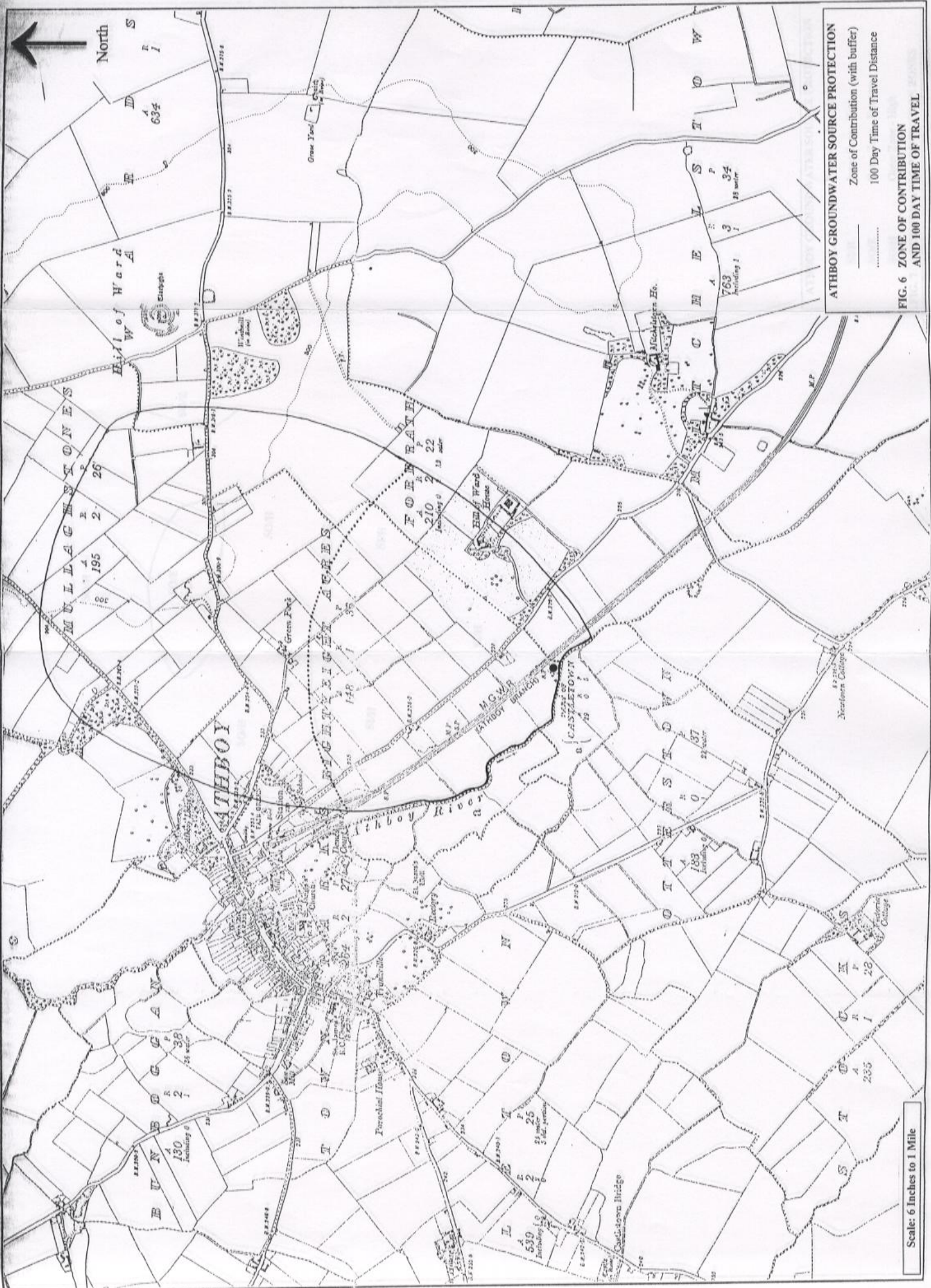


ATHBOY GROUNDWATER SOURCE PROTECTION

Vulnerability boundaries

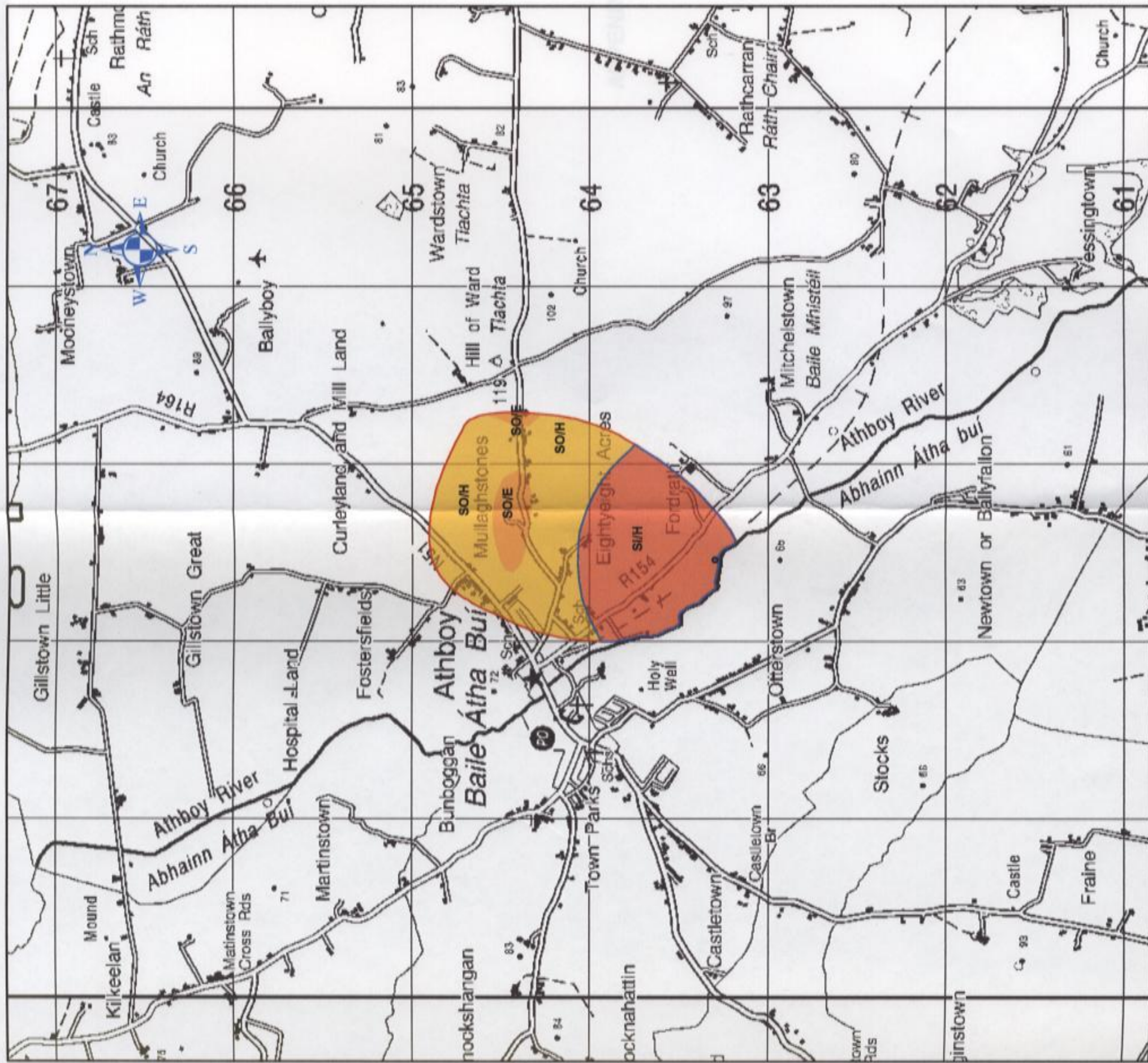
Probable Vulnerability Rating

FIG. 5 VULNERABILITY

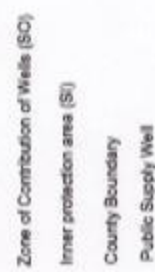


Scale: 6 Inches to 1 Mile

FIG. 6 ZONE OF CONTRIBUTION AND 100 DAY TIME OF TRAVEL



COUNTY MEATH GROUNDWATER PROTECTION SCHEME SOURCE PROTECTION ZONES



Project Hydrogeologist: Coran Kelly
Project Manager: Geoff Wright
Digital Map Production: Silvia Caloca

This Source Protection Zone map is designed for general information and strategic planning usage. The boundaries are based on the available evidence and local details have been generalised to fit the map scale. Evaluation of specific sites and circumstances will normally require further and more detailed assessments and will frequently require site investigations to determine the risk to groundwater. The map is intended for use in conjunction with groundwater protection responses for potentially polluting activities, which lists the degree of acceptability of these activities in each zone and describes the control measures necessary to prevent pollution.

The topographic base is reproduced with the permission of the Ordnance Survey of Ireland



GEOLOGICAL SURVEY
OF IRELAND
Subsidiary: Geological Survey
Beggan Bush, Huddington Rd,
Dublin 4

DATE	BY	REVISION	REASON
1/1/2000	Coran Kelly	1	Initial
1/1/2001	Coran Kelly	2	Update
1/1/2002	Coran Kelly	3	Update
1/1/2003	Coran Kelly	4	Update
1/1/2004	Coran Kelly	5	Update
1/1/2005	Coran Kelly	6	Update
1/1/2006	Coran Kelly	7	Update
1/1/2007	Coran Kelly	8	Update
1/1/2008	Coran Kelly	9	Update
1/1/2009	Coran Kelly	10	Update

Athboy

Scale 1:25,000



Appendix 5
Cryptosporidium Risk Assessment

Athboy Drinking Water Supply - Athboy Water Treatment Plant Cryptosporidium Risk Assessment (June 2008)

GROUNDWATER RISK SCREENING - Introduction

Scores should be inserted (where appropriate) into the blue boxes in Sections 1 to 10. The scores for each section will be automatically totalled (in the yellow box) and a summary of the scores for each section will appear on this sheet. The section scores will be totalled automatically on this summary sheet. The population of supply should be entered into the blue box below on this page and the overall Cryptosporidium Risk Assessment Score will be automatically calculated for the supply.

	Section Score	Total Score
Groundwater Catchment Risk Scores		
Section 1 - Animals within the Catchment		27
Section 2 - Agricultural Practices within the Catchment		22
Section 3 - Discharges to the Catchment/Water Source		7
Section 4 - Catchment/Source Protection Area Inspections		-6
Section 5 - Geology/Hydrogeology		-30
Section 6 - Rapid By-pass of unsaturated zone		0
Section 7 - Water Source Type		2
Section 8 - Sanitary Protection of Groundwater Supply		-16
Total Groundwater Catchment Risk Score		6
Groundwater - Water Treatment Risk Score		
Section 9 - Water Treatment Processes		16
Section 10 - Treatment Works Monitoring Filtration and UV		0
Section 11 - Treatment Works Operation		-6
Total Groundwater - Treatment Risk Score		10
Groundwater Risk Assessment Score		16
Population		4000
Population Weighting Factor (0.4 x log10(population))		1.440824
Final Weighted Risk Assessment Score		23.053184
Water Supply Risk Classification		Low

Cryptosporidium Risk Assessment

Completed By: _____ (Helen McDonnell - Exec. Env Tech)

Approved By: _____ (Gerry Boyle - Senior Engineer)

Section 1 - Animals Within the Catchment

Section No.	Pressure Risk Factor	RA Score	Actual Score
1.1	Cattle/calves at less than or equal to one livestock unit per hectare of forage area *	5	10
	Cattle/calves at more than one one livestock unit per hectare of forage area*	10	
	No cattle/calves in the catchment	0	
1.2	Sheep/lambs at less than or equal to one one livestock unit per hectare of forage area *	5	10
	Sheep/lambs at more than one one livestock unit per hectare of forage area *	10	
	No sheep/lambs in the catchment	0	
1.3	Wild or farmed deer in the catchment	2	0
	No wild or farmed deer in the catchment	0	
1.4	Pig farms in the catchment	2	0
	No pig farms in the catchment	0	
1.5	Animals have direct access to water sources including feeder streams	4	4
	Fencing prevents access to water sources including feeder streams	-2	
1.6	High numbers of birds	2	2
1.7	Any other farmed animals or birds	1	1
Total for Section 1			27

Section 2 - Agricultural Practices Within the Catchment

Section No.	Risk Factor	RA Score	Actual Score
2.1	Slurry spraying within the catchment	6	6
2.2	Dung spreading within the catchment	3	3
2.3	Slurry or dung stores	3	3
2.4	Sheep pens or cattle sheds	6	6
2.5	Lambing or calving on the catchment	8	8
2.6	Full compliance with the Good Agricultural Practice Regulations verified by catchment inspection	-4	-4
Total for Section 2			22

Section 3 - Discharges to the Catchment/Water Source

Section No.	Risk Factor	RA Score	Actual Score
3.1	Population equivalent served by individual on-site wastewater treatment systems < 100 PE	4	6
	Population equivalent served by individual on-site wastewater treatment systems > 100 PE	6	
	On-site wastewater treatment systems all known to be functioning properly	-2	
3.2	Population equivalent served by all wastewater works discharging to GW <500	6	0
	Population equivalent served by all wastewater works discharging to GW 500 to 5,000	8	
3.3	Storm water overflows discharging to GW	2	2
3.4	Section 4 or Integrated Pollution Prevention Control (IPPC) Licence discharge from intensive agricultural activity or agriculturally related discharge	2	0
3.5	All wastewater treatment plants discharging to GW complying with the UWWT Regulations quality standards	-1	-1
Total for Section 3			7

Section 4 - Catchment Inspections

Section No.	Risk Factor	RA Score	Actual Score
4.1	SPA inspections carried out at least monthly	-3	-3
	SPA inspections carried out less frequently	6	
4.2	Procedures in place to deal with irregularities on the SPA	-3	-3
Total for Section 4			-6

Section 5 - Geology/Hydrogeology

Section No. 5	Pathway Factor						
	Section 5a		Section 5b				
Vulnerability	Source Protection Area		Aquifer Categories (for supplies with no source protection areas delineated)				
Rating	(SI)	(SO)	Karst (Rk & Lk)	Fissured (Rf & Lm)	Sand/ gravel[1] (Rg &	LI	Poor (Pu & Pl)
Extreme (0-1 m soil/subsoil)	4	2	4	2	0	2	2
Extreme (1-3 m subsoil)	2	0	2	0	0	0	0
High	-30	-30	-30	-30	-30	-30	-30
Moderate	-45	-45	-45	-45	-45	-45	-45
Low	-50	-50	-50	-50	-50	-50	-50
Total for Section 5							-30

Section 6 - Rapid By-pass of Unsaturated Zone

Section No.	Risk Factor	RA Score	Actual Score
6.1	Presence of karst features such as swallow holes, sinking streams	6	0
	Likelihood of karst features or direct transmission of surface water run-off to groundwater	3	
	Direct transmission of surface water run-off unlikely	0	
Total for Section 6			0

Section 7 - Water Source Type

Section No.	Risk Factor	RA Score	Actual Score
7.1	Spring	6	2
	Well (<3m depth of well)	4	
	Borehole(>3m depth of well)	2	
	Well field	2	
Total for Section7			2

Section 8 - Sanitary Protection of Groundwater Supply

Section	Receptor Factor	RA	Actual
8.1	Inadequate protection of spring source	12	0
	Spring receptor with adequate protection	6	
8.2	Borehole with known or suspected poor casing integrity or no grouting	12	-8
	Borehole with suspected, not proven good casing integrity or grouting	4	
	Borehole with proven good casing integrity and good grouting	-8	
8.3	Headworks below ground level - liable to flooding or leaking structure	12	-8
	Headworks in sealed and dry chamber	9	
	Head works with cover flush to floor or imperfectly sealed	6	
	Headworks with completely sealed raised cover	-8	
Total for Section 8			-16

Section 9 - Water Treatment Processes

Water Treatment Processes			
Section No. 9	Risk Management Factor	RA Score	Actual Score
9.1	Disinfection (not including UV)	16	16
	UV Inactivation	-15	
	Membrane Filtration (DWI approved)	-16	
	Membrane Filtration (Not DWI approved)	-2	
Total for Section 9			16

Section 10 - Treatment Works Monitoring of Coagulation and Filtration

Membrane Filtration			
Section No. 10a	Risk Management Factor	RA Score	Actual Score
10.1	Plant monitored and alarmed for integrity	-10	
	Plant monitored for integrity but not alarmed	-3	
	Plant not monitored for integrity	10	
10.2	Particle counter used continuously to monitor filter performance	-5	
Total for Section 10a			0

Section 10 - Treatment Works Monitoring of Filtration

UV Inactivation			
Section No. 10b	Risk Management Factor	RA Score	Actual Score
10.3	Plant monitored for integrity and correct UV dosage	-3	
	Plant monitored and alarmed for integrity and correct UV dosage	-10	
	Plant neither monitored nor alarmed	10	
10.4	Influent turbidity consistently < 0.2 NTU	-6	
	Influent turbidity consistently < 1.0 NTU	-3	
	Influent turbidity consistently > 1.0 NTU	-1	
Total for Section 10b			0

Section 11 - Treatment Works Operation

Item No.	Risk Factor	RA Score	Actual Score
11.1	Process control manuals specific to works available	-2	-2
	Process control manuals specific to works not available	1	
11.2	Auditable action plans available for dealing with deviations in quality and evidence of implementation of the plan	-2	-2
	Auditable action plans not available for dealing with deviations in quality	1	
11.3	Water flow through works when operating has not increased by >10% in <30 minutes in last 12 months	-2	-2
	Water flow through works when operating has increased by >10% in <30 minutes in last 12 months	2	
11.4	Flow through works above design flow for >10% of time in last 12 months	4	0
	Flow through works above design flow for ≤10% of time in last 12 months	0	
	Flow through works >130% above design flow for >50% of time in last 12 months	6	
11.5	Membrane or UV filters by passed during the year	6	0
Total for Section 11			-6

Appendix 3

Stormwater Overflow Assessment



Meath County Council
Comhairle Chontae na Mí

ATHBOY WASTEWATER DISCHARGE LICENCE

LICENCE NUMBER: D0124-01

STORMWATER OVERFLOW ASSESSMENT

May 2011



Nicholas O'Dwyer
CONSULTING ENGINEERS

ATHBOY WASTEWATER DISCHARGE LICENCE

LICENCE NUMBER: D0124-01

STORMWATER OVERFLOW ASSESSMENT

**Nicholas O'Dwyer Ltd.,
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May 2011

Project No. 20285.1					
Revision	Reason for Revision	Prepared by	Reviewed by	Approved by	Issue Date
-		P.McAree	F. Lane	N. Delaney	18/05/2011
A					
B					
C					
D					

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1 Purpose of Report

The purpose of this report is to carry out an assessment of the storm water overflows within the Athboy agglomeration, as specified in the Wastewater Discharge Licence (WWDL), in accordance with Condition 4.11 of the Wastewater Discharge Licence issued by the Environmental Protection Agency (EPA) on 2nd June 2010. Condition 4.11 of the licence states:-

4.11 Storm water overflows

4.11.1 The licensee shall, prior to the date for submission of the second AER (required under Condition 6.11, carry out an investigation for the identification and assessment of storm water overflows. A report on the stormwater overflows shall be submitted to the Agency as part of the second AER. The assessment shall include a determination of compliance with the criteria for storm water overflows, as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995 and any other guidance as may be specified by the Agency.

4.11.2 The licensee shall carry out an assessment of storm water overflows at least once every three years thereafter and report to the Agency on each occasion as part of the AER. The assessment shall include a determination of compliance with the criteria for storm water overflows, as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995 and any other guidance as may be specified by the Agency. The licensee shall maintain a written record of all assessments and remedial measures arising from the assessment.

As a minimum, the stormwater overflow assessment is required to fully assess each stormwater overflow identified in the Athboy WWDL and determine if it complies with the criteria, as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995.

2 Stormwater Overflows present in Athboy

2.1 General Description

The Athboy Wastewater Treatment Plant (WWTP), located off the Trim road in Athboy, Co. Meath, is the treatment plant for municipal wastewater arising from the agglomeration of Athboy, Rathcairn and their environs. The catchment area is shown on Drawing No. 20285-DL-AY-01 in Appendix 1. A new WWTP was constructed on the site of the existing WWTP and was completed in December 2009. The plant has a design capacity of 5,800 P.E. Following treatment, the effluent is pumped to a discharge location in the Athboy River, via a diffuser type outlet, adjacent to the works.

The Athboy Wastewater Discharge Licence (WWDL), D0124-01, identifies one stormwater overflow within the catchment, SW2. This stormwater

overflow is located at the treatment works site. The following sections describe the stormwater overflow within the catchment.

3 Stormwater Overflow SW2

3.1 General Description

There is one stormwater overflow in the Athboy catchment, identified in the WWDL as SW2. This is the stormwater overflow located at the WWTP and discharges any overflow from the storm water tanks to the Athboy River via the final effluent outfall. All overflows are screened.

When flows to the inlet works exceed the capacity of the peak design flow to full treatment (3 DWF at stage 1) of 163.1m³/hr, excess sewage spills to the storm tank via a storm overflow weir in the inlet works channel. The flow rate to the storm tank is calculated by the PLC by comparing values from the influent and flow to storm flowmeters. If the retention capacity of the storm tank is exceeded then the screened sewage overflows via a bellmouth to the outlet manhole. This storm water overflow sewer connects into the final effluent sewer before it discharges to the Athboy River. The location of SW2 is at the manhole where the overflow connects to the final effluent sewer as shown on Drawing No. 20285-DL-AY-05 in Appendix 1.

When the storm abates wastewater retained in the tank is drawn off and rejoins the main process at the Grit removal stage. There are 2 No. variable speed drive (VSD) delivery storm return pumps located in a hopper in the floor of the storm tank. They operate in a duty/standby configuration. Under prolonged storm conditions where the storm tank capacity is exceeded, storm water will overflow to the outlet manhole. Here it combines with flow from the final effluent chamber and continues to the Athboy River via an outfall. A Piping and Instrumentation Drawing detailing the overflow and return arrangements is shown on Drawing No. 20285-DL-AY-10 in Appendix 1.

3.2 Recent Overflows

Although there is no flowmeter on the overflow line after the stormwater tank, the stormwater overflow activation can be monitored via the SCADA on site. There is a high level alarm in the stormwater tank to alert the operators. There have been no recorded high level alarms and therefore

no stormwater overflows at the Athboy WWTP in the 12 months from December 2009 to December 2010.

It should be noted that, in general, the stormwater overflow will only be activated in times of prolonged wet weather. The stormwater holding tank has a total volume of 1,100m³. Any overflow from the inlet works to the storm tanks will be screened. Therefore, the stormwater receives partial treatment. The storm water tank will not overflow during times of normal weather and plant activity.

3.3 Current Condition

The stormwater overflow was inspected in November 2010. During this inspection there was no stormwater in the storm tank and no indication of any storm overflows from the storm tank. As detailed in Section 3.2 the stormwater tanks have not overflowed since being commissioned in December 2009. The storm tanks will only overflow during periods of extended rainfall. The outfall from SW2 goes to the primary discharge (PSW1) to the Athboy River. The outfall point is submerged below the normal river level and as such cannot be readily inspected. However, this outfall was recently constructed and tested during the commissioning of the new WWTP in 2009 and was deemed to be acceptable. There is no indication of any deterioration in the condition of the outfall since this date.

3.4 SW2 Compliance with the Procedures and Criteria in Relation to Storm Water Overflows

The storm overflow, SW2 has been reviewed to determine if it complies with the criteria, as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows'. Storm tanks have been provided at the site in accordance with the recommendations in these procedures. Formula A, as detailed in the 'Procedures and Criteria in Relation to Storm Water Overflows', relates to storm overflows within the sewerage network rather than at wastewater treatment plants. There are no storm overflows within the sewerage network. Formula A is therefore not applicable. All flows are transferred to the wastewater treatment plant in Athboy.

A peak flow of three times the dry weather flow (3DWF) receives full treatment at the wastewater treatment plant. Flows in excess of 3DWF

are transferred to the storm tanks. Stormwater in the storm tanks is returned for full treatment when the storm abates as detailed in Section 3.1. During periods of extended or heavy rainfall the capacity of the storm tank may be exceeded and the storm tank will overflow to SW2.

There is a Storm tank at the wastewater treatment plant to reduce the potential for overflow to SW2. It has a total volume of 1,100m³. The storage volumes stated in the 'Procedures and Criteria in Relation to Storm Water Overflows' have been used to provide an evaluation of the adequacy of the storm tanks provided for Athboy.

The design domestic population for Athboy is approximately 4,350 PE and the non-domestic population equivalent is 1,450. The flows are based on a flow of 225 litres per PE per day. The daily domestic and non-domestic flows are 978.75m³/day and 326.75m³/day respectively.

The flowrate in the Athboy River at the discharge point of the overflow from the storm tanks is: 0.17m³/s

The Dry Weather Flow to the wastewater treatment plant is 15.10l/s = 0.0151m³/s. The dilution factor in the Athboy River is: $0.17 / 0.0151 = 11.25$

There is no required storage volume based on a dilution rate of >8.

The volume of the stormwater tanks as detailed above is 1,100m³. The size of the stormwater tanks is deemed to be adequate and therefore SW2 is in compliance with Department of the Environment 'Procedures and Criteria in Relation to Storm Water Overflows'.

4 Conclusions and Recommendations

There is only one stormwater overflow within the Athboy catchment, SW2, located at the Athboy WWTP. There are no stormwater overflows within the sewer network in Athboy or Rathcairn. The stormwater overflow, SW2, was inspected in November 2010. No overflows had occurred up to this date since the WWTP and the associated stormwater overflow (SW2) was commissioned in December 2009. Overflows from the storm tank are only likely to occur during periods of prolonged or heavy rainfall.

The adequacy of the stormwater overflow, SW2, was evaluated in terms of the 'Procedures and Criteria in Relation to Storm Water Overflows' and has been deemed to be in compliance with these procedures. No further works are deemed to be necessary at this stage. A review will be carried out every three years in accordance with the requirements of Condition 4.11 of the wastewater discharge licence.

**APPENDIX 1
DRAWINGS**

Appendix 4

Sewer Integrity Risk Assessment

Section 2.1 Hydraulic Risk Assessment					
Query	Description	Prompt	Risk Score	Short Commentary by the Local Authority	Comment or Action to be Taken
2.1	<u>Has a Hydraulic Performance Assessment been undertaken for the Sewer Network (e.g., Computer Model or other Engineering Design or Design Review) ?</u>	No	40		If the answer is No assess the need and cost benefit of developing a computer model or engineering design assessment of the Sewer Network and complete Query 2.12. If the answer is Yes proceed to Queries 2.1.1 to 2.1.4 inclusive
2.1.1	If Answer to Query 2.1 is Yes, what % of the Network is covered by the hydraulic assessment ?	N/A	0		The % coverage of the Network by the Hydraulic Assessment can be estimated by the area assessed against the area served by the Network. ENTER "N/A" IF COMPUTER MODEL or DESIGN DOES NOT EXIST. DO NOT LEAVE BLANK OR ENTER "0".
2.1.2	How many years has it been since the completion of the hydraulic assessment ?	N/A	0		Select N/A response if no design assessment or design exists.
2.1.3	Are the outcomes of the Hydraulic Assessment being implemented ?	N/A	0		Select N/A response if no design assessment or design exists.
2.1.4	How many years has it been since the outcomes of the hydraulic assessment have been implemented ?	N/A	0		Select N/A response if no hydraulic performance assessment or design exists. For onging works select "less than 5".
2.2	<u>Has a Dynamic Computer Model been used to Assess the Hydraulic Performance of the Sewer Network ?</u>	No	10		Computer Model means a Hydroworks/Infoworks Model, Micro-Drainage Model or equivalent.
2.3	<u>Has a Manhole Survey been undertaken in accordance with WRc Documentation "Model Contract Document for Manhole Location Surveys and the Production of Record Maps" ?</u>	No	10		If the answer is No assess the need and cost benefit of undertaking a Manhole Survey and complete Query 2.12. If the answer is Yes proceed to Query 2.2.1
2.3.1	If yes, how many years has it been since the survey was undertaken or updated?	N/A	0		Select N/A if no Manhole Survey has been undertaken. Enter N/A value for Confidence Grade if Prompt Box is "N/A"
2.4	<u>Has a Flow Survey been undertaken in accordance with WRc Documentation "A Guide to Short Term Flow Surveys of Sewer Systems" and "Contract Documents for Short Term Sewer Flows" ?</u>	No	20		If the answer is No assess the need and cost benefit of undertaking a Flow Monitoring Survey and complete Query 2.12. If answer is Yes Proceed to Query 2.5
2.5	<u>What was this Flow Survey Information Used for ?</u>				
2.5.1	To Determine the extent of Problematic Sewer Catchments	N/A	0		Select N/A if no Flow Survey has been undertaken.
2.5.2	To Verify a Computer or Mathematical Model of the Network	N/A	0		Select N/A if no Flow Survey has been undertaken.
2.6	<u>Have Performance Criteria been developed to determine the short, medium or long term capacity of the sewer network ?</u>	No	10		If the answer is No assess the Future Needs of the Sewer Network and complete Query 2.12. If the answer is Yes proceed to Query 2.8
2.7	<u>How many flood events resulting from surcharge in the network have occurred in the past 3 years?</u>	3 to 6	7		Flood events in this context means water/sewage backing up from the Network causing flooding of properties or causing disruption of traffic
2.8	<u>Are there deficiencies in performance criteria within the sewer network ?</u>	No	0		If the answer is No , Proceed to Query 2.10 and complete Query 2.12. If the answer is Yes proceed to Query 2.9
2.9	<u>Have the causes of these deficiencies in the Performance Criteria been identified and rectified ?</u>	N/A	0		If the answer is No , consider further examination of the hydraulic model (if available) and complete Query 2.12. If the answer is Yes proceed to Query 2.10
2.10	<u>Can the Hydraulic Assessment (defined in Query 2.1 above) be used to determine the benefit of reducing the contributory Impermeable Areas or extent of surface water contributions</u>	N/A	0		If the answer is No , consider further development of the Hydraulic Assessment (or model if available) and complete Query 2.12. If the answer is Yes proceed to Query 2.11
2.11	<u>Has an Impermeable Area Survey been carried out for the agglomeration or parts of the agglomeration ?</u>	No	10		If the answer is No , consider the need and cost benefit of undertaking an Impermeable Survey for parts of the agglomeration which are under hydraulic pressure and complete Query 2.12. .
Total Risk Assessment Score (RAS)			107		
2.12	<u>Prepare Assessment of Needs & Sewer Upgrade Implementation Plan</u>	In the AER Attach Assessment of Needs and Rehabilitation Implementation Plan as separate documents			
2.13	In the AER provide Summary of Proposed Works or Direction to be taken to improve hydraulic efficiency				

Section 3.1 Environmental Risk Assessment					
Query	Description	Prompt	Risk Score	Short Commentary by the Local Authority	Comment or Action to be Taken
3.1	What Environmental or Discharge Quality Data is available with regard to the sewer network ?	up-to-date electronic or paper database exists	0		Select N/A if no discharges, secondary discharges or overflows from network; if discharges do exist complete Query 3.12
3.1.1	Do trade effluents discharge to the sewer network?	No	0		If the answer is No , proceed to Query 3.1.2. If the answer is Yes , Proceed to Query 3.2
3.1.2	Are there Storm Water Overflows within the network ?	Yes	20		If the answer is No , proceed to Query 3.1.3. If the answer is Yes , Proceed to Query 3.3
3.1.3	Are there Secondary Discharges within the network (excluding Emergency Overflows at Pump Stations)?	No	0		If the answer is No , proceed to Query 3.1.4.
3.1.4	Is there any evidence that exfiltration is occurring from the network ?	No	0		If the answer is No , does all wastewater enter a wastewater treatment plant (insert summary details in the AER)? If Yes , Proceed to Query 3.6
3.2	If Answer to Query 3.1.1 is "Yes", what % of trade effluents have a licence to Discharge to the Public Sewer ?	0 - 10%	40		Select N/A if answer to Query 3.1.1 is No . If not all trade effluents are licenced, Local Authority should consider issuing and controlling such discharges under the appropriate Legislation.
3.2.1	Are all licenced trade Discharges compliant with their relevant licence and associated conditions	Yes	0		Answer N/A if none of the trade effluents are licenced. Answer No if this information is unknown. If the answer is Unknown or No , consider issuing a direction to the relevant Licencee. If the answer is Yes , no further action is needed.
3.2.2	If Answer to Query 3.2.1 is "No", state what % of Trade Discharges are NOT compliant with their relevant licence and associated conditions (where that non-compliance led to enforcement action)	0 - 10%	0		Select N/A if answer to Query 3.2.1 is Yes. If N/A is selected as answer to Query 3.2.2
3.3	In accordance with the DoEHLG paper "Procedures & Criteria in relation to Storm Water Overflows", what % of storm water overflows in the system have been classified for their significance?	N/A	0		If the answer is No , consider a review of each discharge within the sewer network complete and Query 3.11. If the answer is Yes , proceed to Query 3. 6
3.4	Have samples from any Secondary Discharges within the system been analysed ?	No	30		Select N/A if no secondary discharges in system. If the answer to Query 3.4 is No , consider examining the quality of each secondary discharge within the sewer network complete Query 3.11. If the answer is Yes , proceed to Query
3.5	What percentage of discharges from the system are known to cause environmental pollution of the receiving waters ?	< 10%	100		If the answer is greater than 50% then detail, in the AER, the Improvement Programme necessary to reduce this percentage.
3.6	In relation to possible exfiltration has a risk analysis of ground water contamination or pollution been undertaken ?	No	20		Select N/A if answer to Query 3.1.4 is No . If the answer is No , consider undertaking ground water risk analysis and complete Query 3.12 If the answer is Yes , proceed to Query 3.6
3.6.1	If Answer to Query 3.6 is "Yes", have any groundwater aquifers been identified in the area of the Network and/or Discharge Points?	N/A	0		Select N/A if no risk analysis of groundwater contamination has been undertaken.
3.6.2	If Answer to Query 3.6.1 is "Yes", state the classification of groundwater aquifer identified in the area?	N/A	0		Select N/A if no risk analysis of groundwater contamination has been undertaken.
3.6.3	In relation to Query 3.6.1, is the aquifer used as a source for Public, Private or Group Water Supply Schemes?	Yes	0		Select N/A if no risk analysis of groundwater contamination has been undertaken.
3.7	Has an Impact Assessment of each Storm Water Overflow been undertaken in accordance with the DoEHLG paper "Procedures & Criteria in relation to Storm Water Overflows" including setting performance criteria?	No	40		If the answer is No , consider assessing the risk category of the receiving waters. If the answer is Yes , proceed to Query 3.8 and provide summary details of the assessment in the AER.
3.8	What percentage of storm water overflows comply with the performance criteria referred to in Query 3.7?	> 80%	10		Select N/A if answer to Query 3.7 is No or if there are no SWOs in system. (Risk Score is locked at 0 if no SWOs in system is stated in Agglomeration Details)
3.9	Have the causes of these Capacity Deficiencies (storm water overflows & Secondary Discharges) been identified ?	N/A	0		Select N/A if answer to Query 3.7 is No or if there are no SWOs in system. If the answer to Query 3.9 is No , consider further examination of the environmental model as a qualitative model.
Total Risk Assessment Score (RAS)			260		
3.10	Prepare Assessment of Needs & Sewer Upgrade Implementation Plan	In the AER Attach Assessment of Needs and Rehabilitation Implementation Plan as separate documents			
3.11	Provide Summary Details (in the AER) of records upstream and downstream of licenced discharges with regard to Environmental Performance of the network. These details can be included as part of the AER submitted for the agglomeration.				

Section 4.1 Structural Risk Assessment					
Query	Description	Prompt	Risk Score	Short Commentary by the Local Authority	Comment or Action to be Taken
4.1	Has a CCTV Survey been undertaken in accordance with WRC Documentation "Model Contract Document for Sewer Condition Inspections" and "Manual of Sewer Condition Classification" ?	Yes	0		If the answer is No assess the need and benefit of undertaking CCTV Survey. If Yes Proceed to Query 4.2
4.1.1	How many years has it been since the completion of the CCTV Survey?	5 to 10	5		If no CCTV has been undertaken, select "N/A" response
4.2	What was this CCTV Survey Information Used for?	Determine full extent of Sewer Rehab Works to be undertaken within Network	0		Select N/A if answer to Query 4.1 is NO.
4.3	Has the CCTV Survey been used to Assess the Structural Condition of the Sewer Network or targeted sections of the Sewer Network?	Yes	0		If no CCTV has been undertaken, select "No" response. If the answer is No assess the need and benefit of undertaking an assessment of the Structural Condition of the Sewer Network. If the answer is Yes proceed to Q
4.4	Have Performance Criteria been developed to determine the short, medium or long term structural condition of the sewer network ?	No	5		If the answer is No , enter "unknown" in response to Queries 4.4.1 to 4.4.5; consider assessing the Future Needs of the Sewer Network. If the answer is Yes proceed to Queries 4
4.4.1	What % of the Total Sewer Length contains Collapsed or Imminent Collapse of Sewers (Grade 5)	0%	0		Insert Percentage of Overall Network Length; If a sewer length contains a Grade 5 collapse, include the total length of that sewer in calculating the %. If information is not available type "Unknown" into Prompt Box
4.4.2	What % of Total Sewer Length contains Sewers Likely to Collapse (Grade 4)	0%	0		Insert Percentage of Overall Network Length; If a sewer length contains a Grade 4 condition, include the total length of that sewer in calculating the %. If information is not available type "Unknown" into Prompt Box
4.4.3	What % of Total Sewer Length contains sewers with Further Possible Deterioration (Grade 3)	0%	0		Insert Percentage of Overall Network Length; If a sewer length contains a Grade 3 deterioration, include the total length of that sewer in calculating the %. If information is not available type "Unknown" into Prompt Box
4.4.4	What % of Total Sewer Length contains sewers with Minimal Collapse (Grade 2)	0%	5		Insert Percentage of Overall Network Length; If a sewer length contains a Grade 2 feature, include the total length of that sewer in calculating the %. If information is not available type "Unknown" into Prompt Box
4.4.5	What % of Total Sewer Length contains sewers of Acceptable Structural Condition (Grade 1)	100%	0		Insert Percentage of Overall Network Length. If information is not available type "Unknown" into Prompt Box
If all % lengths are known, Check Total Length = 100%		100%	5		If answers to Queries 4.4.1, 4.4.2 or 4.4.3 are above a set level, the RAS for Query 4 is automatically set at the maximum of 140.
4.5	What % of the deficiencies, as detailed in Items 4.4.1, 4.4.2 and 4.4.3, have been rectified ?	0 - 10%	35		Select N/A if answer to Query 4.4 is No . If the answer is No , Proceed to Query 4.6 If the answer is Yes , what monitoring is in place to ensure continued acceptance of structural condition? Proceed to Query 4.7
4.6	Have the causes of the Structural Deficiencies (Grades 3, 4 and 5) been identified or is there a Preventative Maintenance Programme in place?	No	10		If the answer is No , consider further examination of the sewer network, the structural loading conditions, gradients and possible H ₂ S Formation. If Yes completed Query 4.7
Total Risk Assessment Score (RAS)			60		
4.7	Prepare Assessment of Needs & Sewer Rehabilitation Implementation Plan	In the AER Attach Assessment of Needs and Rehabilitation Implementation Plan as separate documents			

Section 5.1 O&M Risk Assessment					
Query	Description	Prompt	Risk Score	Short Commentary by the Local Authority	Comment or Action to be Taken
5.1	<u>Are complaints of an environmental nature recorded and held in a central database?</u>	Yes	0		Consider setting up Central Database for Complaints
5.2	<u>Is there an emergency response procedure in place?</u>	Yes	0		Consider setting up target response times for dealing with Complaints
5.3	<u>What has been the highest frequency of flooding in the network due to hydraulic inadequacy, over the past 5 years?</u>	Once/yr	4		Refers to flooding from the Network only, not natural flooding from rivers/streams/high tides. Select the highest number of events in any 12 month period.
5.4	<u>What has been the highest frequency of flooding in the network due to operational causes over the past 5 years?</u>	None	0		Refers to flooding from the Network only, not natural flooding from rivers/streams/high tides. Select the highest number of events in any 12 month period.
5.5	<u>What has been the highest frequency of surcharging of critical sewers in the network, over the past 5 years?</u>	Once/yr	2		Select the highest number of events in any 12 month period.
5.6	<u>What has been the highest frequency of reportable incidents in the network, over the past 5 years?</u>	None	0		Select the highest number of events in any 12 month period.
5.7	<u>What has been the highest frequency of reportable incidents due to discharges, for whatever reason, from Pumping Station Emergency Overflows in the network, over the past 5 years?</u>	None	0		Select the highest number of events at any given Pumping Station in any 12 month period.
5.8	<u>What has been the highest frequency of blockages in sewers in the network over the past 5 years?</u>	0.05 - 0.1/km/yr	12		Select the highest number of events per km of sewer network in any 12 month period.
5.9	<u>What has been the highest frequency of collapses in sewers in the network over the past 5 years?</u>	None	0		Select the highest number of events in any 12 month period.
5.10	<u>What has been the highest frequency of bursts in rising mains in the network over the past 5 years?</u>	None	0		Select the highest number of events in any 12 month period.
Total Risk Assessment Score (RAS)			18		
5.11	<u>Prepare Up Dated Operational and Maintenance Plan</u>				

Section 6.1 Summary of Risk Assessment Scores

Element	Risk Assessment Score	Risk Category	% Risk Score	Maximum Risk Score
Section 2.1 Hydraulic Risk Assessment	107	High Risk	71%	150
Section 3.1 Environmental Risk Assessment	260	Low Risk	52%	500
Section 4.1 Structural Risk Assessment	60	Medium Risk	40%	150
Section 5.1 O&M Risk Assessment	18	Low Risk	9%	200
Total RAS for Network	445	High Risk	45%	1000

If the total RAS is greater than 750, or if any of the individual RASs are greater than 75% of the Maximum Available Score, the Risk category for the Network is graded "High Risk"