Annual Environmental Report

2018

Shannon Town

D0045-01

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1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2018 AER

This Annual Environmental Report has been prepared for D0045-01, Shannon Town, in Clare in accordance with the requirements of the wastewater discharge licence for the agglomeration. Specified reports are included as an appendix to the AER as follows:

1.1 Licence specific reporting included in AER

Assessment / Report	Included in AER
There is no Licence Specific Reports included in the AER.	

1.2 Treatment Type

The agglomeration is served by a wastewater treatment plant Shannon Town WWTP with a Plant Capacity PE of 12500.

The treatment process historically consisted of two process streams: a domestic stream and an industrial stream. Since 21 December 2016, both the domestic and industrial streams have been diverted into one stream at the new inlet works and is now being balanced and combined before treatment. The old industrial line now carries supernatant from the centrifuge and leachate, which is discharged to the final effluent lagoon before discharge to the estuary..

The treatment process for the domestic stream comprises the following:

1.2.1 Shannon Town WWTP

Treatment type	Yes / No	Details
Preliminary Treatment	Yes	Screening & Grit Removal
Primary Treatment	Yes	
Secondary Treatment	Yes	Activated Sludge
Nutrient Removal	No	

Treatment type	Yes / No	Details
Tertiary Treatment	No	

The overall compliance of the final effluent with the Emission Limit Values (ELVs) is shown below. More detailed information on the below ELV's can be found in Section 2.2 Discharges from the agglomeration.

1.3 ELV Overview

1.3.1 Shannon Town WWTP

Compliance Status	
Were all parameters compliant for Shannon Town WWTP treatment plant	No
Where noncompliant see table 2.2.1 for details of parameters	

1.4 Sludge Removal

The amount of sludge removed from the wastewater treatment plant is shown below along with the transported destination of the sludge from the treatment plant.

Treatment Plant	Sludge type	Quantity	Unit	% Dry Solids	Destination
Shannon Town WWTP	Dried Sludge	415.57	Weight (Tonnes)	19	Tradaree Landfill
Shannon Town WWTP	Dried Sludge	174.18	Weight (Tonnes)	19	Limerick Main Drainage
Shannon Town WWTP	Cake Sludge	285	Weight (Tonnes)	19	New Doolough

Annual Statement of Measures

A capacity upgrade of the WWTP is planned under Irish Water's Capital Investment Plan. Interim works to address WWDL ELVs are being identified at present.

2 MONITORING REPORTS SUMMARY

2.1 Summary report on monthly influent monitoring

A summary of influent monitoring for the treatment plant is presented in below. This monitoring is primarily undertaken in order to determine the overall efficiency of the plant in removing pollutants from the raw wastewater.

2.1.1 Influent Monitoring Summary - Shannon Town WWTP

Parameters	Number of Samples	Annual Max	Annual Mean
Total Phosphorus (as P) mg/l	21	15	5
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	27	441	197
COD-Cr mg/l	43	1100	369
Total Nitrogen mg/l	34	66.5	29
Suspended Solids mg/l	46	436	207
Hydraulic Capacity	N/A	18340	6085

If other inputs in the form of sludge / leachate are added to the WWTP then these are included in Section 3.5 if applicable

Significance of Results:

The annual mean hydraulic loading is less than the peak Treatment Plant Capacity as detailed further in Section 3.2. The annual maximum hydraulic loading is greater than the peak Treatment Plant Capacity as detailed further in Section 3.2.

2.2 Discharges from the agglomeration

2.2.1 Effluent Monitoring Summary - Shannon Town WWTP

Parameter	WWDL ELV (Schedule A)	ELV with Condition 2 Interpretation included Note 1	Interim % reduction from influent concentration	Number of sample results	Number of exceedances	Number of with Condition 2 Interpretation included	Annual Mean	Overall Compliance (Pass/Fail)
COD-Cr mg/l	125	250	N/A	23	8	2	111.6	Fail
Ammonia-Total (as N) mg/l	35	42	N/A	23	0	0	22.46	Pass
pH pH units	6-9	6-9	N/A	19	0	0	7.6	Pass
Total Oxidised Nitrogen (as N) mg/l	15	18	N/A	11	0	0	0.99	Pass
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	25	50	N/A	16	11	1	37.6	Fail
Suspended Solids mg/l	35	87.5	N/A	23	11	4	67.4	Fail

Notes:
1– This represents the Emission Limit Values after the Interpretation provided for under Condition 2 of the licence is applied
2 - For parameters where a mean ELV applies

Cause of Exceedance(s):

There is a compliance investigation and upgrade underway to manage these non-compliances.

Significance of Results:

The WWTP was non-compliant with the ELV's set in the wastewater discharge licence for BOD, COD and TSS. There were 30 samples non-compliant with the ELV's in relation to BOD (11), COD (8) and Suspended Solids (11).

2.3 Ambient monitoring summary

A summary of monitoring from ambient monitoring points associated with the wastewater discharge is provided in the sections below. For discharges to rivers upstream (U/S) and downstream (D/S) location data is provided. For other ambient points in lakes, coastal or transitional waters, monitoring data from the most appropriate monitoring station is selected.

2.3.1 Ambient Monitoring Report Summary - Shannon Town WWTP

The table below provides details of ambient monitoring locations and details of any designations as sensitive areas.

Ambient Monitoring Point from WWDL (or as agreed with EPA)	Irish Grid Reference	Code	Bathing Water	Drinking Water	FWPM	Shellfish	WFD Status
Downstream - Traderee Bunratty Buoy station(upstream SN310)	143671, 159425	TW03004128SN2005	No	No	No	No	Poor
Downstream - Carraig Bank Buoy station (downstream SN330)	138528, 159128	TW03004128SN2005	No	No	No	No	Poor

2.3.2 Ambient Monitoring Parameter Summary - Shannon Town WWTP

The results for ambient results and / or additional monitoring data sets are included in the **Appendix 7.1 - Ambient monitoring summary**

Significance of Results:

The WWTP discharge was not compliant with the ELV's set in the wastewater discharge licence.

The discharge from the wastewater treatment plant may be a contributory factor on the Water Framework Directive status, which has been assigned a WFD status of Poor.

The Ambient monitoring used are EPA's Coastal & Estuarine Dataset 2016 (this is the most recent dataset available for the locality). Results from the two sampling stations proximate to the WWTP (Traderee Bunratty Buoy station and Carraig Bank Buoy station) are detailed in Appendix 7.1.

3 OPERATIONAL REPORTS SUMMARY

3.1 Treatment Efficiency Report

Treatment efficiency is based on the removal of key pollutants from the influent wastewater by the treatment plant. In essence the calculation is based on the balance of load coming into the plant versus the load leaving the plant. The efficiency is presented as a percentage removal rate.

A summary presentation of the efficiency of the treatment process including information for all the parameters specified in the licence is included below:

3.1.1 Treatment Efficiency Report Summary - Shannon Town WWTP

Parameter	Influent mass loading (kg/year)	Effluent mass emission (kg/year)	Efficiency (% reduction of influent load)	Comment
cBOD	398,518	74,499	81%	
COD	733,103	213,315	71%	
SS	419,192	133,692	68%	
Total P	9,633	5,892	39%	
Total N	57,013	45,838	20%	

Note: The above data is based on sample results for the number of dates reported

3.2 Treatment Capacity Report Summary

Treatment capacity is an assessment of the hydraulic (flow) and organic (the amount of pollutants) load a treatment plant is designed to treat versus the current loading of that plant.

Shannon Town WWTP	
Peak Hydraulic Capacity (m3/day) - As Constructed	13686

DWF to the Treatment Plant (m3/day)	6312
Current Hydraulic Loading - annual max (m3/day)	18340
Average Hydraulic loading to the Treatment Plant (m3/day)	6085
Organic Capacity (PE) - As Constructed	12500
Organic Capacity (PE) - Collected Load (peak week)	18197
Organic Capacity (PE) - Remaining	0
Will the capacity be exceeded in the next three years? (Yes/No)	Yes

3.3 Complaints Summary

A summary of complaints of an environmental nature is included below.

Number of Complaints	Nature of Complaint	Number Open Complaints	Number Closed Complaints
13	Blocked Sewer	0	13
1	Burst rising main	0	1

3.4 Reported Incidents Summary

Environmental incidents that arise in an agglomeration are reported on an on-going basis in accordance with our waste water discharge licences. Where an incident occurs and it is reportable under the licence, it is reported to the Environmental Protection Agency through their Environmental Data Exchange Network, or in some instances by telephone. Some incidents which arise in the agglomeration are recorded by Irish Water but may not be reportable under our licence for example where the incident does not have an impact on environmental performance.

A summary of reported incidents is included below.

3.4.1 Summary of Incidents

Incident Type	Cause	No. of incident occurrences	Recurring (Y/N)	Closed (Y/N)
Spillage	Other	1	No	Yes
Non-compliance	Inadequate Infrastructure	3	Yes	No

3.4.2 Summary of Overall Incidents

Question	Answer
Number of Incidents in 2018	4
Number of Incidents reported to the EPA via EDEN in 2018	4
Explanation of any discrepancies between the two numbers above	All results of monitoring submitted as quarterly reports to the Agency in compliance with CI000044.

3.5 Sludge / Other inputs to the WWTP

'Other inputs' to the waste water treatment plant are summarised in table below

Input type	Quantity	Unit	P.E.	% of load to WWTP	Included in Influent Monitoring (Y/N)?[3]	Is there a leachate/sludge acceptance procedure for the WWTP?	Is there a dedicated leachate/sludge acceptance facility for the WWTP?[2](Y/N)
There is no Sludge and Other Input data for the Treatment Plant included in the AER.							

4 INFRASTRUCTURAL ASSESSMENTS AND PROGRAMME OF IMPROVEMENTS

4.1 Storm Water Overflow Identification and Inspection Report

A summary of the operation of the storm water overflows and their significance where known is included below:

No Appendix Included

4.1.1 SWO Identification

WWDL Name / Code for Storm Water Overflow	Irish Grid Ref.	Included in Schedule A4 of the WWDL	Significance of the overflow(High / Medium / Low)	Assessed against DoEHLG Criteria	No. of times activated in 2018 (No. of events)	Total volume discharged in 2018 (m3)	Monitoring Status
SW2	143381, 159426	Yes	High	Not Meeting	Unknown	Unknown	Not Monitored

4.1.2 Inspection Summary Report

SWO Summary	
How much sewage was discharged via SWOs in the agglomeration in the year (m3)?	Unknown
Is each SWO identified as non meeting DoEHLG Guidance included in the Programme of Improvements?	No
The SWO Assessment included the requirements of relevant of WWDL schedules?	Yes
Have the EPA been advised of any additional SWOs / charges to Schedule C3 and A4 under Condition 1.7?	No

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

4.2.1 Specified Improvement Programme Summary

A wastewater discharge licence may require a number of reports on specific subject areas to be prepared for the agglomeration in question. These reports are submitted to the EPA as part of the Annual Environmental Report. This section provides list of the various reports required for this agglomeration and a brief summary of their recommendations.

Specified Improvement Programmes (under Schedule A and C of WWDL)	Licence Schedule	Licence Completion Date	Date Expired? (N/NA/Y)	Status of Works	Timeframe for Completing the Work	Comments
Refurbish the existing WWTP and upgrade it, resulting in a capacity to treat a population equivalent of 35,000.	C	31/12/2015	Yes	Not Started	A capacity upgrade of the WWTP is planned under Irish Water's Capital Investment Plan. Interim works to address WWDL ELVs are being identified at present.	

A summary of the status of any improvements identified by under Condition 5.2 is included below.

4.2.2 Improvement Programme Summary

Improvement Identifier	Improvement Description	Improvement Source	Expected Completion Date	Comments
There are no Improvements Programme for this Agglomeration.				

4.2.3 Sewer Integrity Risk Assessment

The utilisation of multiple capital maintenance programmes and the outputs of the workshops with the Local Authority Operations Staff held under the programme can be used to satisfy the requirements of Condition 5 regarding network integrity. Improvement works identified by way of these programmes and workshops will be included in the Improvements Summary Table".

5 LICENCE SPECIFIC REPORTS

A wastewater discharge licence may require a number of reports on specific subject areas to be prepared for the agglomeration in question. These reports are submitted to the EPA as part of the Annual Environmental Report. This section provides list of the various reports required for this agglomeration and a brief summary of their recommendations.

5.a Licence Specific Reports Summary Table

Licence Specific Report	Required by licence	Year included in AER	Included in this AER	Reference to relevant section of AER (e.g. Appendix X).
There is no Licence Specific Report Required in this AER Annual Review.				

6 CERTIFICATION AND SIGN OFF

6.1 Summary of AER Contents

Parameter	Answer
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	
Is there a need to request/advise the EPA of any modifications to the existing WWDL?	No
List reason e.g. changes to monitoring requirements	
Have these processes commenced?	
Are all outstanding reports and assessments from previous AERs included as an appendix to this AER	No

I certify that the information given in this Annual Environmental Report is truthful, accurate and complete:

Signed: Date: 08/03/2019

This AER has been produced by Irish Water's Environmental Information System (EIMS) and has been electronically signed off in that system for and on behalf of ,

Eleanor Roche

Acting Head of Environmental Regulation.

7 APPENDIX

In the appendix include all the detailed or site specific reports that are relevant to the AER. Reports omitted from previous AERs should also be appended here.

Appendix
Appendix 7.1 - Ambient monitoring summary

SN310 - TRADREE (Bunratty Buoy)

MonitoringStationCode	MonitoringStationName	SampleDate	SampleMethod	ParameterName	ParameterUnitShortCode	Result	TextResult	ReportResult
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Bottom	Ammonia-Total (as N)	mg/l	0.041		0.041
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Surface	Ammonia-Total (as N)	mg/l	0.038		0.038
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Surface	Ammonia-Total (as N)	mg/l	0.06		0.06
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Bottom	Ammonia-Total (as N)	mg/l	0.079		0.079
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Bottom	Ammonia-Total (as N)	mg/l	0.088		0.088
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Surface	Ammonia-Total (as N)	mg/l	0.075		0.075
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Surface	BOD - 5 days (Total)	mg/l		<1	0.5
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Bottom	BOD - 5 days (Total)	mg/l		<1	0.5
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Surface	BOD - 5 days (Total)	mg/l		<1	0.5
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Bottom	BOD - 5 days (Total)	mg/l		<1	0.5
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Surface	BOD - 5 days (Total)	mg/l		<1	0.5
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Bottom	BOD - 5 days (Total)	mg/l		<1	0.5
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Bottom	Chlorophyll	µg/l		<1	0.5
TW03004128SN2005	SN310 - TRADREE	04/02/2016	TRaC Surface	Chlorophyll	µg/l		<1	0.5

MonitoringStationCode	MonitoringStationName	SampleDate	SampleMethod	ParameterName	ParameterUnitShortCode	Result	TextResult	ReportResult
	(Bunratty Buoy)	00:00						
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Bottom	Chlorophyll	µg/l	5.6		5.6
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Surface	Chlorophyll	µg/l	5.2		5.2
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Surface	Chlorophyll	µg/l	9.4		9.4
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Bottom	Chlorophyll	µg/l	8.7		8.7
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Bottom	Depth	m		nm	
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Surface	Depth	m		nm	
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Bottom	Depth	m		nm	
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Surface	Depth	m	0		0
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Bottom	Depth	m	0.2		0.2
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Surface	Depth	m	3.1		3.1
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Surface	Dissolved Oxygen	% Saturation	100		100
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Bottom	Dissolved Oxygen	% Saturation	100		100
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Bottom	Dissolved Oxygen	% Saturation	98		98
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Surface	Dissolved Oxygen	% Saturation	98		98
TW03004128SN2005	SN310 - TRADREE	18/08/2016	TRaC Surface	Dissolved	% Saturation	93		93

MonitoringStationCode	MonitoringStationName	SampleDate	SampleMethod	ParameterName	ParameterUnitShortCode	Result	TextResult	ReportResult
	(Bunratty Buoy)	13:17		Oxygen				
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Bottom	Dissolved Oxygen	% Saturation	93		93
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Surface	ortho-Phosphate (as P) - unspecified	mg/l	0.034		0.034
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Bottom	ortho-Phosphate (as P) - unspecified	mg/l	0.034		0.034
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Surface	ortho-Phosphate (as P) - unspecified	mg/l	0.029		0.029
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Bottom	ortho-Phosphate (as P) - unspecified	mg/l	0.042		0.042
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Surface	ortho-Phosphate (as P) - unspecified	mg/l	0.055		0.055
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Bottom	ortho-Phosphate (as P) - unspecified	mg/l	0.065		0.065
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Surface	pH	pH units	8.3		8.3
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Bottom	pH	pH units	8.3		8.3
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Surface	pH	pH units	8.1		8.1
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Bottom	pH	pH units	8		8
TW03004128SN2005	SN310 - TRADREE	18/08/2016	TRaC Surface	pH	pH units	8.2		8.2

MonitoringStationCode	MonitoringStationName	SampleDate	SampleMethod	ParameterName	ParameterUnitShortCode	Result	TextResult	ReportResult
	(Bunratty Buoy)	13:17						
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Bottom	pH	pH units	8.2		8.2
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Bottom	Salinity	PSU		<0.1	0.05
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Surface	Salinity	PSU		<0.1	0.05
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Surface	Salinity	PSU	10.5		10.5
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Bottom	Salinity	PSU	14.8		14.8
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Surface	Salinity	PSU	4.3		4.3
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Bottom	Salinity	PSU	2.9		2.9
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Bottom	Salinity(Lab)	0/oo		<0.1	0.05
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Surface	Salinity(Lab)	0/oo		<0.1	0.05
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Bottom	Salinity(Lab)	0/oo	13.7		13.7
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Surface	Salinity(Lab)	0/oo	8.9		8.9
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Bottom	Salinity(Lab)	0/oo	4.2		4.2
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Surface	Salinity(Lab)	0/oo	2.6		2.6
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Surface	Silica (as SiO2)	mg/l	4.1		4.1
TW03004128SN2005	SN310 - TRADREE	04/02/2016	TRaC Bottom	Silica (as SiO2)	mg/l	4.1		4.1

MonitoringStationCode	MonitoringStationName	SampleDate	SampleMethod	ParameterName	ParameterUnitShortCode	Result	TextResult	ReportResult
	(Bunratty Buoy)	00:00						
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Bottom	Silica (as SiO2)	mg/l	1.3		1.3
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Surface	Silica (as SiO2)	mg/l	1.5		1.5
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Surface	Silica (as SiO2)	mg/l	2.2		2.2
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Bottom	Silica (as SiO2)	mg/l	2.1		2.1
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Bottom	StationDepth	m		nm	
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Surface	StationDepth	m		nm	
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Bottom	StationDepth	m		nm	
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Surface	StationDepth	m		nm	
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Surface	StationDepth	m	3.5		3.5
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Bottom	StationDepth	m	3.5		3.5
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Surface	Temperature	°C	7		7
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Bottom	Temperature	°C	7		7
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Surface	Temperature	°C	15.5		15.5
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Bottom	Temperature	°C	14.9		14.9
TW03004128SN2005	SN310 - TRADREE	18/08/2016	TRaC Surface	Temperature	°C	18.4		18.4

MonitoringStationCode	MonitoringStationName	SampleDate	SampleMethod	ParameterName	ParameterUnitShortCode	Result	TextResult	ReportResult
	(Bunratty Buoy)	13:17						
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Bottom	Temperature	°C	18.3		18.3
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Bottom	TOC (as NPOC)	mg/l	11		11
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Surface	TOC (as NPOC)	mg/l	11		11
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Surface	TOC (as NPOC)	mg/l	7		7
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Bottom	TOC (as NPOC)	mg/l	8.5		8.5
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Surface	TOC (as NPOC)	mg/l	8.2		8.2
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Bottom	TOC (as NPOC)	mg/l	19		19
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Bottom	Total Oxidised Nitrogen (as N)	mg/l	0.97		0.97
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Surface	Total Oxidised Nitrogen (as N)	mg/l	0.92		0.92
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Surface	Total Oxidised Nitrogen (as N)	mg/l	0.7		0.7
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Bottom	Total Oxidised Nitrogen (as N)	mg/l	0.59		0.59
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Surface	Total Oxidised Nitrogen (as N)	mg/l	0.61		0.61
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Bottom	Total Oxidised Nitrogen (as N)	mg/l	0.6		0.6
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	04/02/2016 00:00	TRaC Surface	Transparency	m	0.9		0.9
TW03004128SN2005	SN310 - TRADREE	04/02/2016	TRaC Bottom	Transparency	m	0.9		0.9

MonitoringStationCode	MonitoringStationName	SampleDate	SampleMethod	ParameterName	ParameterUnitShortCode	Result	TextResult	ReportResult
	(Bunratty Buoy)	00:00						
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Bottom	Transparency	m	0.5		0.5
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	16/05/2016 00:00	TRaC Surface	Transparency	m	0.5		0.5
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Surface	Transparency	m	0.2		0.2
TW03004128SN2005	SN310 - TRADREE (Bunratty Buoy)	18/08/2016 13:17	TRaC Bottom	Transparency	m	0.2		0.2

SN330 - Carraig Bank Buoy

MonitoringStationCode	MonitoringStationName	SampleDate	SampleMethod	ParameterName	ParameterUnitShortCode	Result	TextResult	ReportResult
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Surface	Ammonia-Total (as N)	mg/l	0.035		0.035
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Bottom	Ammonia-Total (as N)	mg/l	0.05		0.05
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Bottom	Ammonia-Total (as N)	mg/l	0.056		0.056
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Surface	Ammonia-Total (as N)	mg/l	0.055		0.055
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Surface	Ammonia-Total (as N)	mg/l	0.057		0.057
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Bottom	Ammonia-Total (as N)	mg/l	0.06		0.06
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Surface	Ammonia-Total (as N)	mg/l	0.053		0.053
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Bottom	Ammonia-Total (as N)	mg/l	0.063		0.063
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Surface	Chlorophyll	µg/l		<1	0.5
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Bottom	Chlorophyll	µg/l		<1	0.5
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Bottom	Chlorophyll	µg/l	5.1		5.1
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Surface	Chlorophyll	µg/l	3.4		3.4
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Bottom	Chlorophyll	µg/l	11		11
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Surface	Chlorophyll	µg/l	12		12
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Bottom	Chlorophyll	µg/l	9.8		9.8

MonitoringStationCode	MonitoringStationName	SampleDate	SampleMethod	ParameterName	ParameterUnitShortCode	Result	TextResult	ReportResult
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Surface	Chlorophyll	µg/l	15		15
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Surface	Depth	m		nm	
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Bottom	Depth	m		nm	
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Bottom	Depth	m	9.1		9.1
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Surface	Depth	m	0		0
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Bottom	Depth	m	3.6		3.6
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Surface	Depth	m	0.2		0.2
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Bottom	Depth	m	0.2		0.2
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Surface	Depth	m	4		4
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Surface	Dissolved Oxygen	% Saturation	101		101
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Bottom	Dissolved Oxygen	% Saturation	101		101
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Bottom	Dissolved Oxygen	% Saturation	97		97
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Surface	Dissolved Oxygen	% Saturation	98		98
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Bottom	Dissolved Oxygen	% Saturation	92		92
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Surface	Dissolved Oxygen	% Saturation	91		91
TW03004128SN2006	SN330 - Carraig Bank	18/08/2016	TRaC Surface	Dissolved	% Saturation	93		93

MonitoringStationCode	MonitoringStationName	SampleDate	SampleMethod	ParameterName	ParameterUnitShortCode	Result	TextResult	ReportResult
	Buoy	12:55		Oxygen				
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Bottom	Dissolved Oxygen	% Saturation	93		93
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Surface	ortho-Phosphate (as P) - unspecified	mg/l	0.029		0.029
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Bottom	ortho-Phosphate (as P) - unspecified	mg/l	0.038		0.038
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Bottom	ortho-Phosphate (as P) - unspecified	mg/l	0.036		0.036
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Surface	ortho-Phosphate (as P) - unspecified	mg/l	0.034		0.034
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Bottom	ortho-Phosphate (as P) - unspecified	mg/l	0.031		0.031
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Surface	ortho-Phosphate (as P) - unspecified	mg/l	0.035		0.035
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Surface	ortho-Phosphate (as P) - unspecified	mg/l	0.042		0.042
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Bottom	ortho-Phosphate (as P) - unspecified	mg/l	0.049		0.049
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Bottom	pH	pH units	8.3		8.3
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Surface	pH	pH units	8.3		8.3

MonitoringStationCode	MonitoringStationName	SampleDate	SampleMethod	ParameterName	ParameterUnitShortCode	Result	TextResult	ReportResult
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Bottom	pH	pH units	8		8
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Surface	pH	pH units	8		8
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Bottom	pH	pH units	8.1		8.1
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Surface	pH	pH units	8.1		8.1
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Surface	pH	pH units	8.1		8.1
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Bottom	pH	pH units	8.1		8.1
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Surface	Salinity	PSU	0.4		0.4
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Bottom	Salinity	PSU	2.6		2.6
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Bottom	Salinity	PSU	20.8		20.8
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Surface	Salinity	PSU	15.7		15.7
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Bottom	Salinity	PSU	8.8		8.8
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Surface	Salinity	PSU	8		8
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Surface	Salinity	PSU	12		12
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Bottom	Salinity	PSU	11.6		11.6
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Surface	Salinity(Lab)	0/oo	0.2		0.2
TW03004128SN2006	SN330 - Carraig Bank	04/02/2016	TRaC Bottom	Salinity(Lab)	0/oo	0.2		0.2

MonitoringStationCode	MonitoringStationName	SampleDate	SampleMethod	ParameterName	ParameterUnitShortCode	Result	TextResult	ReportResult
	Buoy	00:00						
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Surface	Salinity(Lab)	0/oo	14.5		14.5
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Bottom	Salinity(Lab)	0/oo	21.2		21.2
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Bottom	Salinity(Lab)	0/oo	8.8		8.8
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Surface	Salinity(Lab)	0/oo	8.1		8.1
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Surface	Salinity(Lab)	0/oo	11.8		11.8
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Bottom	Salinity(Lab)	0/oo	12.2		12.2
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Bottom	Silica (as SiO2)	mg/l	3.9		3.9
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Surface	Silica (as SiO2)	mg/l	4.1		4.1
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Surface	Silica (as SiO2)	mg/l	1.3		1.3
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Bottom	Silica (as SiO2)	mg/l	0.85		0.85
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Bottom	Silica (as SiO2)	mg/l	1.4		1.4
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Surface	Silica (as SiO2)	mg/l	1.5		1.5
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Bottom	Silica (as SiO2)	mg/l	1.5		1.5
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Surface	Silica (as SiO2)	mg/l	1.5		1.5
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Surface	StationDepth	m		nm	

MonitoringStationCode	MonitoringStationName	SampleDate	SampleMethod	ParameterName	ParameterUnitShortCode	Result	TextResult	ReportResult
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Bottom	StationDepth	m		nm	
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Bottom	StationDepth	m	9.1		9.1
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Surface	StationDepth	m	9.1		9.1
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Surface	StationDepth	m	6.5		6.5
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Bottom	StationDepth	m	6.5		6.5
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Surface	StationDepth	m	4.2		4.2
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Bottom	StationDepth	m	4.2		4.2
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Bottom	Temperature	°C	6.8		6.8
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Surface	Temperature	°C	7		7
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Bottom	Temperature	°C	14.3		14.3
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Surface	Temperature	°C	15.6		15.6
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Bottom	Temperature	°C	16.7		16.7
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Surface	Temperature	°C	16.7		16.7
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Bottom	Temperature	°C	18.2		18.2
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Surface	Temperature	°C	18.2		18.2
TW03004128SN2006	SN330 - Carraig Bank	04/02/2016	TRaC Surface	Total Oxidised	mg/l	0.92		0.92

MonitoringStationCode	MonitoringStationName	SampleDate	SampleMethod	ParameterName	ParameterUnitShortCode	Result	TextResult	ReportResult
	Buoy	00:00		Nitrogen (as N)				
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Bottom	Total Oxidised Nitrogen (as N)	mg/l	0.92		0.92
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Surface	Total Oxidised Nitrogen (as N)	mg/l	0.57		0.57
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Bottom	Total Oxidised Nitrogen (as N)	mg/l	0.41		0.41
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Bottom	Total Oxidised Nitrogen (as N)	mg/l	0.49		0.49
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Surface	Total Oxidised Nitrogen (as N)	mg/l	0.5		0.5
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Surface	Total Oxidised Nitrogen (as N)	mg/l	0.44		0.44
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Bottom	Total Oxidised Nitrogen (as N)	mg/l	0.44		0.44
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Bottom	Transparency	m	0.8		0.8
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/02/2016 00:00	TRaC Surface	Transparency	m	0.8		0.8
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Surface	Transparency	m	0.4		0.4
TW03004128SN2006	SN330 - Carraig Bank Buoy	16/05/2016 13:02	TRaC Bottom	Transparency	m	0.4		0.4
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Bottom	Transparency	m	0.2		0.2
TW03004128SN2006	SN330 - Carraig Bank Buoy	04/07/2016 13:27	TRaC Surface	Transparency	m	0.2		0.2
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Surface	Transparency	m	0.2		0.2
TW03004128SN2006	SN330 - Carraig Bank Buoy	18/08/2016 12:55	TRaC Bottom	Transparency	m	0.2		0.2