

Annual Environmental Report

2022



Dundalk

D0053-01

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1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2022 AER

This Annual Environmental Report has been prepared for D0053-01, Dundalk, in Louth in accordance with the requirements of the wastewater discharge licence for the agglomeration. Specified reports where relevant are included as an appendix to the AER.

1.1 ANNUAL STATEMENT OF MEASURES

A summary of any improvements undertaken is provided where applicable.

In April 2022 ferric dosing was reintroduced at the WwTP.

1.2 TREATMENT SUMMARY

The agglomeration is served by a wastewater treatment plant(s)

- Dundalk WWTP with a Plant Capacity PE of 61000, the treatment type is 3NP - Tertiary N&P removal.

1.3 ELV OVERVIEW

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.

Discharge Point Reference	Treatment Plant	Discharge Type	Compliance Status	Parameters failing if relevant
TPEFF2100D0053SW001	Dundalk WWTP	Treated	Non-Compliant	Total Phosphorus (as P) mg/l

1.4 LICENCE SPECIFIC REPORTING

Assessment / Report

There are no Licence Specific Reports included in this AER.

2 TREATMENT PLANT PERFORMANCE AND IMPACT SUMMARY

2.1 DUNDALK WWTP - TREATED DISCHARGE

2.1.1 INFLUENT MONITORING SUMMARY - DUNDALK WWTP

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

Parameters	Number of Samples	Annual Max	Annual Mean
Total Nitrogen mg/l	26	42	18
BOD, 5 days with Inhibition (Carbonaceous) mg/l	26	586	116
Suspended Solids mg/l	26	2193	204
Total Phosphorus (as P) mg/l	26	14	3.63
COD-Cr mg/l	26	2150	360
Hydraulic Capacity	N/A	47520	25675

If other inputs in the form of sludge / leachate are added to the WWTP then these are included in Section 2.1.5 if applicable.

Significance of Results:

The annual mean hydraulic loading is less than the peak Treatment Plant Capacity. The annual maximum hydraulic loading is less than the peak Treatment Plant Capacity. Further details on the plant capacity and efficiency can be found under the sectional 'Operational Performance Summary'.

2.1.2 EFFLUENT MONITORING SUMMARY - TPEFF2100D0053SW001

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 exceedances with Condition 2 Interpretation included	Annual Mean	Overall Compliance (Pass/Fail)
COD-Cr mg/l	125	250	N/A	26	N/A	N/A	38	Pass
Suspended Solids mg/l	35	87.5	N/A	26	2	N/A	22	Pass
BOD, 5 days with Inhibition (Carbonaceous) mg/l	25	50	N/A	26	N/A	N/A	5.66	Pass
Total Nitrogen mg/l	10	12	N/A	26	N/A	N/A	5.07	Pass
pH pH units	6.00	9.00	N/A	26	N/A	N/A	7.69	Pass
Total Phosphorus (as P) mg/l	1.00	1.20	N/A	26	12	9	1.08	Fail
Ammonia-Total (as N) mg/l	N/A	N/A	N/A	26	N/A	N/A	2.06	
ortho-Phosphate (as P) - unspecified mg/l	N/A	N/A	N/A	26	N/A	N/A	0.728	
Conductivity @20°C µS/cm	N/A	N/A	N/A	26	N/A	N/A	2689	

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 exceedances with Condition 2 Interpretation included	Annual Mean	Overall Compliance (Pass/Fail)
Dissolved Inorganic Nitrogen (as N) mg/l	N/A	N/A	N/A	26	N/A	N/A	5.07	

Notes:

1 – This represents the Emission Limit Values after the Interpretation provided for under Condition 2 of the licence is applied

2 – For pH the WWDA specifies a range of pH 6 - 9

Cause of Exceedance(s):

Inadequate Operational Procedures/Training.

Significance of Results:

The WWTP is non compliant with the ELV's set in the Wastewater Discharge Licence. The impact on receiving waters is assessed further in Section 2.

2.1.3 AMBIENT MONITORING SUMMARY FOR THE TREATMENT PLANT DISCHARGE TPEFF2100D0053SW001

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.

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	River Station Code	Bathing Water	Drinking Water	FWPM	Shellfish	WFD Status
Upstream (CN030)	307227.17, 307718.49	TW21006031CN3003	No	No	No	Yes	Poor
Downstream (CN040)	308206.9, 307908.33	TW21006031CN3004	No	No	No	Yes	Poor
Downstream (CN110)	308745.37, 307876.19	TW21006030CN2004	No	No	No	Yes	Moderate

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 for the following: Total Phosphorus (as P) mg/l.

The coastal/transitional ambient monitoring results do not meet the required EQS. The EQS relates to the Oxygenation and Nutrient Conditions set out in the Surface Water Regulations 2009.

A deterioration in water quality has been identified (see Appendix 7.1) however it is not known if it or is not caused directly by the WWTP.

Based on the above and the effluent compliance results, the discharge from the wastewater treatment plant may be having an observable negative impact on the water quality and the WFD status of the Castletown Estuary and Inner Dundalk Bay.

Shellfish Water – Dundalk Bay

It was noted in the 2013 Shellfish Assessment and a 2018 Stage 2 Scoping Assessment Report prepared by IW, that Dundalk WWTP is the most likely of the WWTPs in the environs to have an effect on the Shellfish waters on Dundalk Bay due to outflow levels and oceanography of the bay. The results from these reports show that in general the microbiological results of shellfish flesh of species collected within Dundalk Bay Shellfish Waters are good, but that on occasion levels may be above the Class B standard. It is likely that discharge from Dundalk WWTP may contribute to these high microbiological levels in the shellfish, however, these levels are within acceptable limits and the shellfish remain fit for human consumption after appropriate treatment. It is most likely that the high microbiological values occur during periods of heavy rainfall as it is during such periods that waters from Dundalk town have the greatest chance of reaching and affecting the shellfish production areas.

In 2019, the Stage 3 - Site Survey Report validates the assumption that Dundalk WwTP consistently generates effluent of a secondary treated standards. No changes to the existing overall process or current unit processes could be identified which would ensure a reduction in the concentrations of faecal coliform or E.coli in the plant final effluent discharged. No further information was available to confirm that Dundalk WwTP plant has a negative effect on the receiving waters. The progression to Stage 4 - Detailed Assessment of Discharges has been agreed.

2.1.4 OPERATIONAL PERFORMANCE SUMMARY - DUNDALK WWTP

2.1.4.1 Treatment Efficiency Report - Dundalk WWTP

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:

Parameter	Influent mass loading (kg/year)	Effluent mass emission (kg/year)	Efficiency (% reduction of influent load)
cBOD	1066083	48647	95
SS	1871537	185224	90
TP	33265	9332	72
TN	162160	43613	73
COD	3300627	325966	90

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

2.1.4.2 Treatment Capacity Report Summary - Dundalk WWTP

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.

Dundalk WWTP	
Peak Hydraulic Capacity (m³/day) - As Constructed	56706
DWF to the Treatment Plant (m³/day)	18902
Current Hydraulic Loading - annual max (m³/day)	47520
Average Hydraulic loading to the Treatment Plant (m³/day)	25675
Organic Capacity (PE) - As Constructed	61000
Organic Capacity (PE) - Collected Load (peak week)^{Note1}	55507
Organic Capacity (PE) - Remaining	5493
Will the capacity be exceeded in the next three years? (Yes/No)	No

Note 1: Nominal design capacities can be based on conservative design principles. In some cases assessment of existing plants has shown organic capacities significantly higher than the nominal design capacity. Accordingly plants that appear to be overloaded when comparing a collected peak load with the nominal design capacity can be fully compliant due to the safety factors in the original design.

2.1.5 SLUDGE / OTHER INPUTS - DUNDALK 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)?	Is there a leachate/sludge acceptance procedure for the WWTP?	Is there a dedicated leachate/sludge acceptance facility for the WWTP? (Y/N)
Domestic /Septic Tank Sludge	768.41	Volume (m3)	9.4	0.01	Yes	Yes	Yes
Other	26737.5	Weight (Tonnes)	326	0.28	Yes	Yes	Yes
Industrial / Commercial Sludge	151.76	Weight (Tonnes)	1.9	0.002	Yes	Yes	Yes

3 COMPLAINTS AND INCIDENTS

3.1 COMPLAINTS SUMMARY

A summary of complaints of an environmental nature related to the discharge(s) to water from the WWTP and network is included below.

Number of Complaints	Nature of Complaint	Number Open Complaints	Number Closed Complaints
There were no relevant environmental complaints in 2022.			

3.2 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 Uisce Éireann 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.

3.2.1 SUMMARY OF INCIDENTS

Incident Type	Cause	No. of incident occurrences	Recurring (Y/N)	Closed (Y/N)
Abatement Equipment offline	Plant or equipment breakdown at WWTP	1	No	Yes
Abatement Equipment offline	Plant or equipment breakdown at WWTP	1	No	Yes
Abatement Equipment offline	Plant or equipment breakdown at WWTP	1	No	Yes

Incident Type	Cause	No. of incident occurrences	Recurring (Y/N)	Closed (Y/N)
Abatement Equipment offline	Plant or equipment breakdown at WWTP	1	No	Yes
Abatement Equipment offline	Plant or equipment maintenance at WWTP	1	No	Yes
Abatement Equipment offline	Plant or equipment breakdown at WWTP	1	No	No
Breach of ELV	Inadequate Operational Procedures / Training	1	Yes	No
Spillage	WWTP upgrade required to meet ELV	1	No	Yes
Spillage	WWTP upgrade required to meet ELV	1	No	Yes
Spillage	Tank Overflow	1	No	Yes

3.2.2 SUMMARY OF OVERALL INCIDENTS

Question	Answer
Number of Incidents in 2022	10
Number of Incidents reported to the EPA via EDEN in 2022	10
Explanation of any discrepancies between the two numbers above	N/A

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:

4.1.1 SWO IDENTIFICATION

WWDL Name / Code for Storm Water Overflow (chamber) where applicable	Irish Grid Ref. (outfall)	Included in Schedule of the WWDL	Significance of the overflow(High / Medium / Low)	Assessed against DoEHLG Criteria	No. of times activated in 2022 (No. of events)	Total volume discharged in 2022 (m ³)	Monitoring Status
SWO-8	306263 306860	Yes	Low Significance	Not Meeting Criteria	Unknown	Unknown	Not Monitored
SWO-9	307652 307278	Yes	Low Significance	Not Meeting Criteria	Unknown	Unknown	Not Monitored
SW011	306284 307740	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	Not Monitored
TBC	304348 306476	No	Low Significance	Meeting Criteria	Unknown	Unknown	Not Monitored
TBC	TBC TBC	No	Low Significance	Not yet Assessed	Unknown	Unknown	TBC
TBC	TBC TBC	No	Low Significance	Not yet Assessed	Unknown	Unknown	TBC

WWDL Name / Code for Storm Water Overflow (chamber) where applicable	Irish Grid Ref. (outfall)	Included in Schedule of the WWDL	Significance of the overflow(High / Medium / Low)	Assessed against DoEHLG Criteria	No. of times activated in 2022 (No. of events)	Total volume discharged in 2022 (m ³)	Monitoring Status
TBC	303214 309006	No	Low Significance	Meeting Criteria	Unknown	Unknown	Not Monitored
SWO-1	308183 307800	Yes	Low Significance	Not Meeting Criteria	Unknown	Unknown	Not Monitored
SWO-3	305504 307942	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	Not Monitored
SWO-5	304291 308446	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	Not Monitored
SWO-6	303214 309006	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	Not Monitored
SWO-7	304053 306069	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	Not Monitored

Any TBC SWO(s) were identified as part of the on-going National SWO programme and will be updated in subsequent AER(s) once the information is confirmed.

SWO Summary	
How much sewage was discharged via monitored SWOs in the agglomeration in the year (m ³)?	Unknown
Is each SWO identified as not 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 / changes to Schedule C3 and A4 under Condition 1.7?	N/A

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 a 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)	Description	Licence Schedule	Licence Completion Date	Date Expired? (N/NA/Y)	Status of Works	Timeframe for Completing the Work	Comments
D0053-SIP:01	Installation of nutrient removal (nitrogen and phosphorus) processes at WWTP	C	31/12/2013	Yes	Works Completed		
D0053-SIP:02	SW8 - Installation of 1,500 m3 storm water balancing tank at Coe's Road Pumping Station	C	31/12/2020	No	At Planning Stage		DAP underway. Completion date 2024+

A summary of the status of any other improvements identified by under Condition 5 assessments- is included below.

4.2.2 IMPROVEMENT PROGRAMME SUMMARY

Improvement Identifier	Improvement Description / or any Operational Improvements	Improvement Source	Expected Completion Date	Comments
No additional improvements planned at this time.				

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 Tables 4.2.1 and 4.2.2.

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 a list of the various reports required for this agglomeration and a brief summary of their recommendations.

Licence Specific Report	Required by licence	Year included in AER	Included in this AER
Priority Substances Assessment	Yes	2014	No
Shellfish Impact Assessment	Yes	2016	No

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	N/A
Is there a need to request/advise the EPA of any modification to the existing WWDL with respect to condition 4 changes to monitoring location, frequency etc	No
List reason e.g. changes to monitoring requirements	N/A
Have these processes commenced?	N/A
Are all outstanding reports and assessments from previous AERs included as an appendix to this AER	N/A

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

Date: 28/02/2023

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

Eleanor Roche

Head of Environmental Regulation.

7 APPENDIX

Appendix

Appendix 7.1 - Ambient Monitoring Summary

D0053-01 Dundalk Ambient Monitoring Data 2022

Ambient Monitoring Report Summary Table

Ambient Monitoring Point from WWDL (or as agreed with EPA)	Irish Grid Reference	EPA Feature Coding Tool code	Bathing Water	Drinking Water	FWPM	Shellfish	Current WFD Status
Castletown Estuary (Transitional Water) (CN030)	307227.17, 307718.49	TW21006031 CN3003	N	N	N	Y	Poor
Castletown Estuary (Transitional Water) (CN040)	308206.9, 307908.33	TW21006031 CN3004	N	N	N	Y	Poor
Dundalk Bay Inner (Transitional Waters) (CN110)	308745.37, 307876.19	TW21006030 CN2004	N	N	N	Y	Moderate

The results for the monitoring data sets are included below. This assessment is based on the 2018-2021 EPA TraC datasets. The 2022 EPA TraC dataset was being quality checked by the EPA and therefore was not available at the time of preparing this Ambient Monitoring Summary document.

Ambient Monitoring Summary

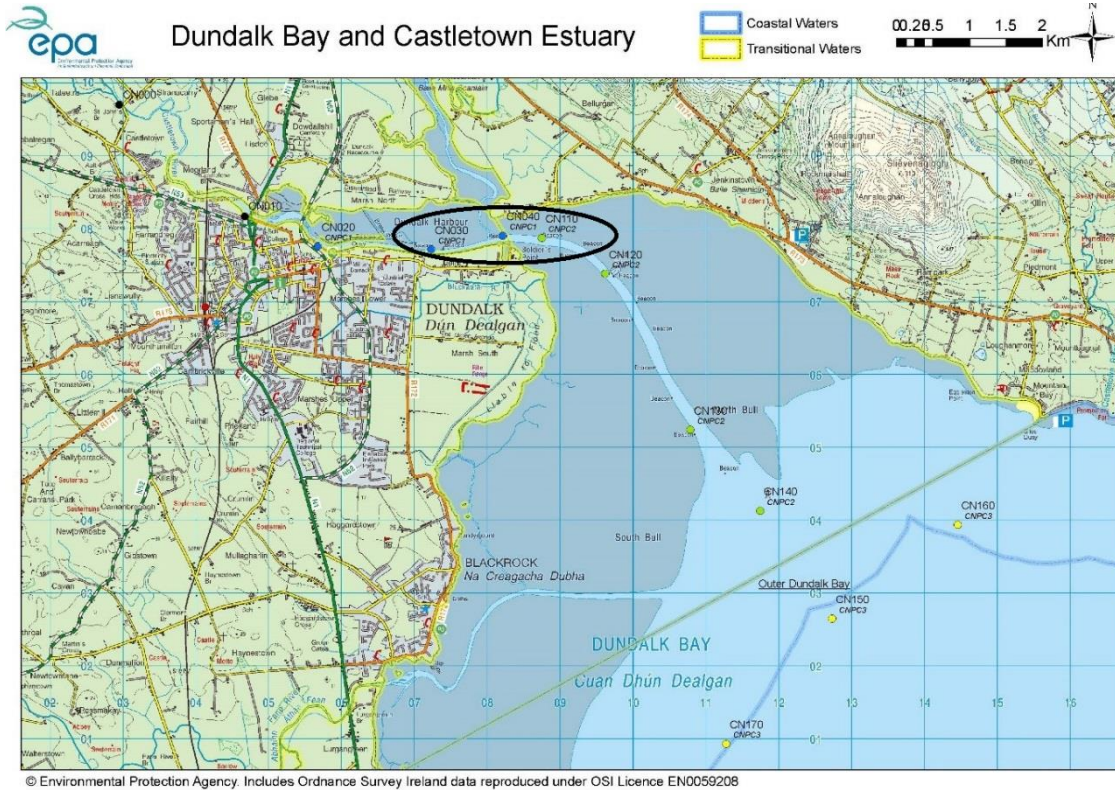


Figure 1: Location of the three transitional water sampling stations in the Castletown Estuary (CN030 and CB040) and Inner Dundalk Bay (CN110)

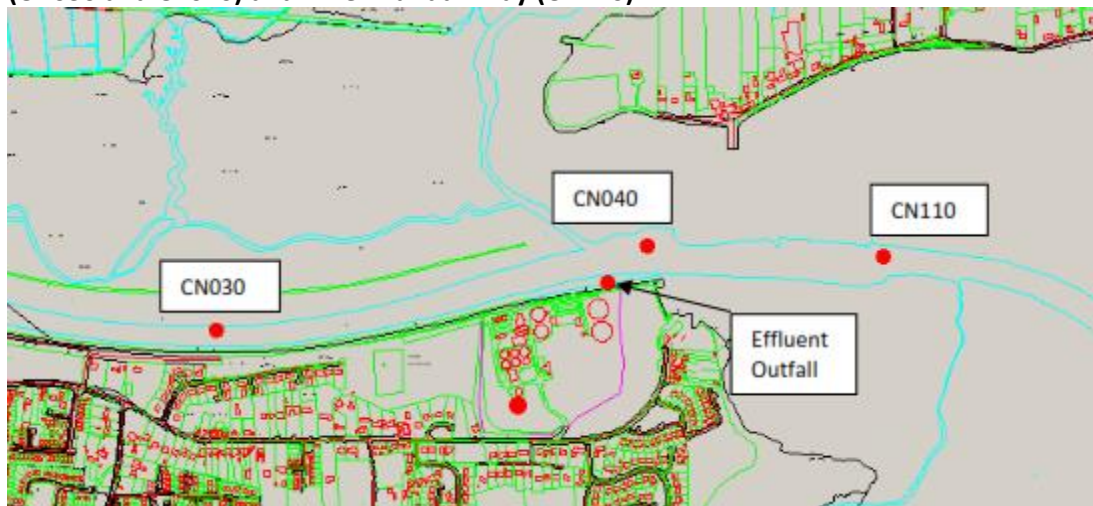


Figure 2: Location of the three transitional water sampling stations in the Castletown Estuary (CN030 and CB040) and Inner Dundalk Bay (CN110) in relation to the effluent outfall.

Based on the above and the effluent compliance results, the discharge from the wastewater treatment plant may be having an observable negative impact on the water quality of the Castletown Estuary and Inner Dundalk Bay.

The discharge from the wastewater treatment plant may be contributing to the WFD status of the Castletown Estuary and Inner Dundalk Bay.

Dundalk Shellfish Waters are located *ca.* 3.5km south of the primary discharge. It was noted in the 2013 Shellfish Assessment and the Stage 2 Scoping Assessment Report prepared by IW that Dundalk WWTP is the most likely of the WWTPs in the environs to have an effect on the Shellfish waters on Dundalk Bay due to outflow levels and oceanography of the bay. The results from this study show that in general the microbiological results of shellfish flesh of species collected within Dundalk Bay Shellfish Waters are good, but that on occasion levels may be above the Class B standard. It is likely that discharge from Dundalk WWTP may contribute to these high microbiological levels in the shellfish, however, these levels are within acceptable limits and the shellfish remain fit for human consumption after appropriate treatment. It is most likely that the high microbiological values occur during periods of heavy rainfall as it is during such periods that waters from Dundalk town have the greatest chance of reaching and affecting the shellfish production areas. Detailed assessments of impacts are currently ongoing to confirm any impacts.

It is important to have an understanding of the physical oceanographic processes that regulate the dispersion of both marine and fresh waters in Dundalk Bay. Sea water circulation in Dundalk Bay is driven primarily by tidal forcing: the flooding tide rises from the south and fills the bay from the southeast at Dunany Point. The tide flows in a clockwise direction flowing eastwards by Giles Quay and then heads north past Carlingford Lough. The ebbing tide follows the reverse order to this flow pattern. This pattern can be altered by both wind direction and fresh water inflow rates of the main rivers into the bay e.g. the Castletown, Fane and Glyde Rivers. Strong Easterly winds will increase surface flows and keep the freshwater close to the shore while strong Westerly winds will reduce flow rates but force fresh water in an Easterly direction. The outfall from the Dundalk Waste Water Treatment Plant (WWTP) is located in the Castletown River and dilution and dispersion of the effluent into the sea will depend on the stage of the tide, tidal height, freshwater flows and wind speed and direction. Summer river flows are typically less than Winter flows and the spatial extent of the plume (and therefore the distribution of bacteria and nutrients) will therefore be smaller in Summer months. Specifically, in relation to bacteria, Summer conditions are also less favourable to bacteria in that suspended solids (to which bacteria can attach) loadings are lower and because of this, water transparency levels are better thereby allowing ultraviolet (UV) rays to penetrate deeper into the water column. Bacteria are very sensitive to UV rays and are killed by even small dosages. It is apparent therefore that during later Spring through to late Summer/early Autumn, water chemistry in the eastern part of Dundalk Bay is unlikely to be affected by water from the WWTP. As most of the conditions during the remaining part of the year are more suitable for water from the WWTP to affect a greater area of Dundalk Bay. The only condition that will be less suitable during this part of the year is the fact that there is more freshwater being delivered to the coast thereby increasing the dilution factor. Clearly Stations (EPA CODE) CN030 and CN040 are much more under the influence of the Castletown River rather than a marine influence – this only applies during flood tide periods. However, the opposite is the case for CN110 which may be only seasonally affected by the Castletown River.

D0053-01 Dundalk - 2018-2021 TrAC Data

Water Body Name	Station No	Sample Label	Data Source	Date_Surveyed	Salinity	DO_saturation	DO_mgl	BOD	MRP (µg/l)	chl_a	DIN
Castletown Estuary	CN030	CN030B	EPA Data	29/05/2018	32.69	106.9	8.7	0.5	17	0.5	0.158
Castletown Estuary	CN030	CN030S	EPA Data	29/05/2018	32.29	110.3	8.8	0.5	27	1.2	0.339
Castletown Estuary	CN030	CN030B	EPA Data	11/07/2018	33.66	100	7.5	0.5	31	15	0.031
Castletown Estuary	CN030	CN030S	EPA Data	11/07/2018	33.33	102.4	7.6	1.4	43	17	0.028
Castletown Estuary	CN030	CN030B	EPA Data	26/09/2018	31.93	95.9	8.5	0.5	43	21	0.037
Castletown Estuary	CN030	CN030S	EPA Data	26/09/2018	31.5	96.9	8.5	0.5	35	15	0.041
Castletown Estuary	CN030	CN030S	EPA Data	21/05/2019	21.65	104.2	9.3	0.5	12	5.2	0.079
Castletown Estuary	CN030	CN030B	EPA Data	21/05/2019	32.31	104.3	8.8		13	5.3	0.037
Castletown Estuary	CN030	CN030S	EPA Data	31/07/2019	31.82	95.8	7.7	1.6	37	25	0.031
Castletown Estuary	CN030	CN030B	EPA Data	31/07/2019	32.46	95.8	7.7	1	49	21	0.028
Castletown Estuary	CN030	CN030B	EPA Data	28/08/2019	29.96	82.3	6.6	1.3	32	16	0.135
Castletown Estuary	CN030	CN030S	EPA Data	28/08/2019	27.82	95.8	7.8	1.9	39	24	0.222
Castletown Estuary	CN030	CN030S	EPA Data	10/02/2021	14.48	99.8	12.2	0.5	66		3.24
Castletown Estuary	CN030	CN030SR	EPA Data	10/02/2021	15.58	100.1	12.2	0.5	60		3.67
Castletown Estuary	CN030	CN030BR	EPA Data	10/02/2021	22.5	99.9	11.5	0.5	56		2.06
Castletown Estuary	CN030	CN030B	EPA Data	10/02/2021	23.17	98.9	11.3	1.1	69		2.82
Castletown Estuary	CN030	CN030S	EPA Data	23/06/2021	33.52	98.2	8	1	62		0.175
Castletown Estuary	CN030	CN030BR	EPA Data	23/06/2021	33.05	98.4	8	1.6	49		0.172
Castletown Estuary	CN030	CN030BR	EPA Data	23/06/2021	33.05	98.4	8	1.6	49		0.172
Castletown Estuary	CN030	CN030B	EPA Data	23/06/2021	33.63	98.6	8	1	23		0.015
Castletown Estuary	CN030	CN030B	EPA Data	20/07/2021	30.52	96.9	7	3.5	2.5		0.196
Castletown Estuary	CN030	CN030S	EPA Data	20/07/2021	20.91	132.7	9.8	4	2.5		0.357
Castletown Estuary	CN030	CN030BR	EPA Data	20/07/2021	26.77	133.9	9.8	4.6	2.5		0.422
Castletown Estuary	CN030	CN030SR	EPA Data	20/07/2021	22.42	160.6	11.7	4.5	2.5		0.442
Castletown Estuary	CN030	CN030S	EPA Data	16/09/2021	28.1	87	7.1	1.8	98		0.4
Castletown Estuary	CN030	CN030B	EPA Data	16/09/2021	31.57	90.1	7.2	1.3	51		0.126
	MEDIAN				31.5	98.75	8.5	1.1	38	15.5	0.172
	95%ile				33.6025	133.6		4.4			
	5%ile				16.9125	87.775					
	90%ile									23.7	

	Salinity Based Threshold	CN030 Result	
Salinity =	31.5		
DIN-	0.506	0.172	Pass
MRP-	44	38	Pass
Chloro. Median	11.1	15.5	Fail
Chloro 90 percentile	22.2	23.7	Fail
DO%sat 5 percentile	78	87.775	Pass
DO%sat 95 percentile	122	133.6	Fail
BOD	4	4.40	Fail

Water Body_Name	Station_No	Sample Label	Data Source	Date_Surveyed	Salinity	DO_saturation	DO_mgL	BOD	MRP (µg/l)	chl_a	DIN
Castletown Estuary	CN040	CN040B	EPA Data	29/05/2018	33.13	107.8	8.8	0.5	6.3	0.5	0.029
Castletown Estuary	CN040	CN040S	EPA Data	29/05/2018	32.81	111.1	8.9	0.5	10	0.5	0.044
Castletown Estuary	CN040	CN040S	EPA Data	11/07/2018	28.68	100.1	7.7	1.2	400	8.5	1.255
Castletown Estuary	CN040	CN040B	EPA Data	11/07/2018	33.73	102.5	7.7	0.5	20	3.6	0.046
Castletown Estuary	CN040	CN040B	EPA Data	26/09/2018	32.4	99.1	8.7	0.5	27	19	0.023
Castletown Estuary	CN040	CN040S	EPA Data	26/09/2018	0.02	99.4	10.4	0.5	240	22	0.36
Castletown Estuary	CN040	CN040S	EPA Data	21/05/2019	30.48	104.3	8.8	0.5	6.5	3.2	0.074
Castletown Estuary	CN040	CN040B	EPA Data	21/05/2019	32.5	105.3	8.9		2.5	3.8	0.016
Castletown Estuary	CN040	CN040S	EPA Data	31/07/2019	31.54	96.4	7.7	1.4	30	21	0.027
Castletown Estuary	CN040	CN040B	EPA Data	31/07/2019	33.04	98.6	7.9	0.5	28	8.6	0.029
Castletown Estuary	CN040	CN040B	EPA Data	28/08/2019	30.7	93.9	7.5	1.1	29	16	0.1
Castletown Estuary	CN040	CN040S	EPA Data	28/08/2019	27.21	97.7	8	1.1	37	15	0.172
Castletown Estuary	CN040	CN040SR	EPA Data	10/02/2021	17.55	100	11.9	0.5	62		3.5
Castletown Estuary	CN040	CN040S	EPA Data	10/02/2021	19.89	99.9	11.7	0.5	82		3.33
Castletown Estuary	CN040	CN040BR	EPA Data	10/02/2021	25.45	99.7	11.3	0.5	50		1.94
Castletown Estuary	CN040	CN040B	EPA Data	10/02/2021	29.31	98.7	10.8	0.5	57		1.76
Castletown Estuary	CN040	CN040SR	EPA Data	23/06/2021	33.17	98.3	7.9	1.3	38		0.096
Castletown Estuary	CN040	CN040BR	EPA Data	23/06/2021	33.29	99.9	8.1	1.3	32		0.045
Castletown Estuary	CN040	CN040S	EPA Data	23/06/2021	33.4	101.2	8.3	1	20		0.01
Castletown Estuary	CN040	CN040B	EPA Data	23/06/2021	34.07	101.5	8.3	0.5	16		0.01
Castletown Estuary	CN040	CN040B	EPA Data	20/07/2021	27.45	129.4	9.3	3	2.5		0.057
Castletown Estuary	CN040	CN040S	EPA Data	20/07/2021	25.55	142	10.3	3.2	2.5		0.189
Castletown Estuary	CN040	CN040BR	EPA Data	20/07/2021	25.65	175.2	12.5	6.1	2.5		0.062
Castletown Estuary	CN040	CN040SR	EPA Data	20/07/2021	25.51	185.8	13.3	6.3	2.5		0.016
Castletown Estuary	CN040	CN040S	EPA Data	16/09/2021	30.5	94.6	7.6	1.1	67		0.23
Castletown Estuary	CN040	CN040B	EPA Data	16/09/2021	31.49	94.9	7.6	1.1	47		0.101
	MEDIAN				30.6	99.95	8.75	1	28.5	8.55	0.068
	95%ile				33.6475	166.9		5.52			
	5%ile				18.135	94.675					
	90%ile									20.8	

	Salinity Based Threshold	CN040 Result	
Salinity =	30.6		
DIN-	0.506	0.068	Pass
MRP-	44	28.5	Pass
Chloro. Median	11.1	8.55	Pass
Chloro 90 percentile	22.2	20.8	Pass
DO%sat 5 percentile	78	94.675	Pass
DO%sat 95 percentile	122	166.9	Fail
BOD	4	5.52	Fail

Water Body_Name	Station_No	Sample Label	Source	Date_Surveyed	Salinity	DO_saturation	DO_mgL	BOD	MRP (ug/l)	chl_a	DIN mg/l N
Inner Dundalk Bay	CN110	CN110B	EPA Data	29/05/2018	33.11	105.8	8.6		6.1	1	0.04
Inner Dundalk Bay	CN110	CN110S	EPA Data	29/05/2018	33.08	107.4	8.6		7.7	1.5	0.036
Inner Dundalk Bay	CN110	CN110C	EPA Data	11/07/2018	33.53	103.3	7.7		7.4	3.2	0.026
Inner Dundalk Bay	CN110	CN110C	EPA Data	11/07/2018	33.72	103.6	7.8		7.4	3.2	0.026
Inner Dundalk Bay	CN110	CN110B	EPA Data	26/09/2018	32.52	100.9	8.8		22	29	0.02
Inner Dundalk Bay	CN110	CN110S	EPA Data	26/09/2018	31.76	101	8.9		22	25	0.02
Inner Dundalk Bay	CN110	CN110C	EPA Data	21/05/2019	32.54	106.2	8.9	0.5	2.5	2.5	0.01
Inner Dundalk Bay	CN110	CN110C	EPA Data	21/05/2019	32.7	106.5	9	0.5	2.5	2.5	0.01
Inner Dundalk Bay	CN110	CN110S	EPA Data	31/07/2019	32.75	98.3	7.9		91	8.5	0.038
Inner Dundalk Bay	CN110	CN110B	EPA Data	31/07/2019	33.19	98.9	7.9		30	8.8	0.028
Inner Dundalk Bay	CN110	CN110B	EPA Data	28/08/2019	31.2	96.2	7.7		24	17	0.088
Inner Dundalk Bay	CN110	CN110S	EPA Data	28/08/2019	29.29	99.8	8.1		30	19	0.128
Inner Dundalk Bay	CN110	CN110SR	EPA Data	10/02/2021	21.33	99.9	11.6		55		3.4
Inner Dundalk Bay	CN110	CN110S	EPA Data	10/02/2021	21.46	98.8	11.5		60		2.55
Inner Dundalk Bay	CN110	CN110B	EPA Data	23/06/2021	34.19	101.9	8.3		2.5		0.01
Inner Dundalk Bay	CN110	CN110SR	EPA Data	23/06/2021	33.1	102.6	8.3		20		0.01
Inner Dundalk Bay	CN110	CN110BR	EPA Data	23/06/2021	33.1	102.8	8.4		18		0.01
Inner Dundalk Bay	CN110	CN110S	EPA Data	23/06/2021	31.14	104.6	8.7		5		0.01
Inner Dundalk Bay	CN110	CN110B	EPA Data	20/07/2021	29.1	122.9	8.9		2.5		0.067
Inner Dundalk Bay	CN110	CN110S	EPA Data	20/07/2021	28.76	128.2	9.2		2.5		0.058
Inner Dundalk Bay	CN110	CN110BR	EPA Data	20/07/2021	29.04	167.8	11.9		2.5		0.01
Inner Dundalk Bay	CN110	CN110SR	EPA Data	20/07/2021	28.76	178.4	12.6		2.5		0.01
Inner Dundalk Bay	CN110	CN110S	EPA Data	16/09/2021	31.08	96.1	7.7		43		0.08
Inner Dundalk Bay	CN110	CN110B	EPA Data	16/09/2021	31.95	97.8	7.8		36		0.056
	MEDIAN				32.24	102.70	8.60	0.5	12.85	5.85	0.027
	95%ile				33.692	161.86		0.50			
	5%ile				22.555	96.44					
	90%ile									24.40	

	Salinity Based Threshold	CN110 Result	
Salinity =	32		
DIN-	0.442	0.027	Pass
MRP-	43	13	Pass
Chloro. Median	10.8	5.9	Pass
Chloro 90 percentile	21.7	24.4	Fail
DO%sat 5 percentile	78	96.44	Pass
DO%sat 95 percentile	122	161.86	Fail
BOD	4	0.5	Pass

IW/LCC Ambient Monitoring Data 2022

Station Reference	Sample Date	mg/l	mg/l	mg/m3	mg/l	% Sat.	mg/l	pH units	ppt	mg/l
CN030	20.06.22	0.73	5.9	45.3	1	79.4	0.1	7.92	12.3	2.3
CN030	14.09.22	0.24	1.6	4.3	2.3	86.9	0.09	7.83	0.7	2.6
		Ammonia N	Biological Oxygen Demand	Chlorophyll	Dissolved Inorganic Nitrogen DIN	Dissolved Oxygen % Saturation	Ortho-Phosphate P	pH	Salinity	Total Nitrogen N
Station Reference	Sample Date	mg/l	mg/l	mg/m3	mg/l	% Sat.	mg/l	pH units	ppt	mg/l
CN040	20.06.22	0.72	4.9	37	1	76	0.12	7.91	11.7	2.4
CN040	14.09.22	0.25	1.8	8.1	2.3	85.3	0.08	8.05	0.8	2.6
		Ammonia N	Biological Oxygen Demand	Chlorophyll	Dissolved Inorganic Nitrogen DIN	Dissolved Oxygen % Saturation	Ortho-Phosphate P	pH	Salinity	Total Nitrogen N
Station Reference	Sample Date	mg/l	mg/l	mg/m3	mg/l	% Sat.	mg/l	pH units	ppt	mg/l
CN110	20.06.22	0.73	5.1	30.4	1	79.4	0.1	7.92	12.3	2.3
CN110	14.09.22	0.25	1.5	8.3	2.3	86.1	0.09	7.89	0.7	2.5