

# Annual Environmental Report

2021



Carlow

D0028-01

## **CONTENTS**

### **1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2021 AER**

- 1.1 ANNUAL STATEMENT OF MEASURES
- 1.2 TREATMENT SUMMARY
- 1.3 ELV OVERVIEW
- 1.4 LICENSE SPECIFIC REPORT INCLUDED IN AER

### **2 TREATMENT PLANT PERFORMANCE AND IMPACT SUMMARY**

- 2.1 CARLOW WWTP - TREATED DISCHARGE
  - 2.1.1 INFLUENT SUMMARY - CARLOW WWTP
  - 2.1.2 EFFLUENT MONITORING SUMMARY - CARLOW WWTP -
  - 2.1.3 AMBIENT MONITORING SUMMARY FOR THE TREATMENT PLANT DISCHARGE -
  - 2.1.4 OPERATIONAL REPORTS SUMMARY FOR CARLOW WWTP
  - 2.1.5 SLUDGE/OTHER INPUTS TO CARLOW WWTP

### **3 COMPLAINTS AND INCIDENTS**

- 3.1 COMPLAINTS SUMMARY
- 3.2 REPORTED INCIDENTS SUMMARY
  - 3.2.1 SUMMARY OF INCIDENTS
  - 3.2.2 SUMMARY OF OVERALL INCIDENTS

### **4 INFRASTRUCTURAL ASSESSMENT AND PROGRAMME OF IMPROVEMENTS**

- 4.1 STORM WATER OVERFLOW IDENTIFICATION AND INSPECTION REPORT
  - 4.1.1 SWO IDENTIFICATION AND INSPECTION SUMMARY REPORT
- 4.2 REPORT ON PROGRESS MADE AND PROPOSALS BEING DEVELOPED TO MEET THE IMPROVEMENT PROGRAMME REQUIREMENTS
  - 4.2.1 SPECIFIED IMPROVEMENT PROGRAMME SUMMARY
  - 4.2.2 IMPROVEMENT PROGRAMME SUMMARY
  - 4.2.3 SEWER INTEGRITY RISK ASSESSMENT

### **5 LICENCE SPECIFIC REPORTS**

### **6 CERTIFICATION AND SIGN OFF**

- 6.1 SUMMARY OF AER CONTENTS

### **7 APPENDIX**

# 1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2021 AER

This Annual Environmental Report has been prepared for D0028-01, Carlow, in Carlow 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.

No capital works were completed in 2021, there is a planned upgrade to the plant, the project is currently at detailed design stage and is scheduled to go through the Planning Process as a Strategic Infrastructure Development in 2022 with a view of beginning construction phase of the project in 2023 pending the relevant approvals

## 1.2 TREATMENT SUMMARY

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

- CARLOW WWTP with a Plant Capacity PE of 36000, 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
TPEFF0100D0028SW001	CARLOW WWTP	Treated	Compliant	N/A

## 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 CARLOW WWTP - TREATED DISCHARGE

#### 2.1.1 INFLUENT MONITORING SUMMARY - CARLOW 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 Phosphorus (as P) mg/l	12	36	20
Total Nitrogen mg/l	12	93	34
Suspended Solids mg/l	12	1873	1327
pH units	12	7.72	7.41
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	12	950	456
COD-Cr mg/l	12	2520	1639
ortho-Phosphate (as P) - unspecified mg/l	12	15	4.66
Ammonia-Total (as N) mg/l	12	42	20
Hydraulic Capacity	N/A	23612	14279

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 greater 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 - TPEFF0100D0028SW001

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)
<b>COD-Cr mg/l</b>	125	250	N/A	12	N/A	N/A	24	Pass
<b>Suspended Solids mg/l</b>	35	87.5	N/A	12	N/A	N/A	7.93	Pass
<b>BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l</b>	15	30	N/A	12	N/A	N/A	4.78	Pass
<b>pH units</b>	9.00	9.00	N/A	12	N/A	N/A	7.43	Pass
<b>Ammonia-Total (as N) mg/l</b>	2.00	2.40	N/A	12	N/A	N/A	0.106	Pass
<b>Total Phosphorus (as P) mg/l</b>	1.00	1.20	N/A	12	N/A	N/A	0.208	Pass
<b>ortho-Phosphate (as P) - unspecified mg/l</b>	0.800	0.960	N/A	12	N/A	N/A	0.078	Pass

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)
<b>Coliform Bacteria (Total) no./100mls</b>	N/A	N/A	N/A	1	N/A	N/A	4200	
<b>Temperature °C</b>	N/A	N/A	N/A	13	N/A	N/A	14	
<b>E. Coli MPN/100ml</b>	N/A	N/A	N/A	1	N/A	N/A	36540	
<b>E. Coli cfu/100ml</b>	N/A	N/A	N/A	1	N/A	N/A	8000	
<b>Sulphate mg/l</b>	N/A	N/A	N/A	12	N/A	N/A	78	
<b>Total Nitrogen mg/l</b>	N/A	N/A	N/A	12	N/A	N/A	7.70	
<b>Enterococci (Intestinal) cfu/100ml</b>	N/A	N/A	N/A	2	N/A	N/A	3241	
<b>Fats, Oils &amp; Greases mg/l</b>	N/A	N/A	N/A	12	N/A	N/A	5.43	
<b>Fluoride mg/l</b>	N/A	N/A	N/A	12	N/A	N/A	0.364	
<b>Conductivity @20°C µS/cm</b>	N/A	N/A	N/A	12	N/A	N/A	735	
<b>Faecal coliforms MPN/100ml</b>	N/A	N/A	N/A	1	N/A	N/A	241960	

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 pH6 - 9

### Cause of Exceedance(s):

Not applicable

### Significance of Results:

The WWTP is compliant with the ELV's set in the Wastewater Discharge Licence.

## 2.1.3 AMBIENT MONITORING SUMMARY FOR THE TREATMENT PLANT DISCHARGE TPEFF0100D0028SW001

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 Ecological Status
Upstream	271637, 176643	RS14B012310	No	No	No	No	Moderate
Downstream	270576, 174121	RS14B012460	No	No	No	No	Moderate

The table below provides a summary of monitoring results for designated ambient monitoring points. The upstream and downstream annual mean values are shown (mg/l), and the difference between both monitoring stations is given as a percentage of the Environmental Quality Standard (EQS) where relevant.

Parameter Name	Upstream Monitoring Point Location	Upstream Monitoring Point Annual Mean	Downstream Monitoring Point Location	Downstream Monitoring Point Annual Mean	EQS	% of EQS
<b>BOD - 5 days (Total) mg/l</b>	RS14B012310	1.33	RS14B012460	1.58	1.50	16.7
<b>Ammonia-Total (as N) mg/l</b>	RS14B012310	0.063	RS14B012460	0.100	0.065	56.9
<b>ortho-Phosphate (as P) - unspecified mg/l</b>	RS14B012310	0.017	RS14B012460	0.018	0.035	2
<b>Total Nitrogen mg/l</b>	RS14B012310	4.38	RS14B012460	4.57	N/A	
<b>Dissolved Oxygen % Saturation</b>	RS14B012310	89	RS14B012460	91	N/A	
<b>Total Phosphorus (as P) mg/l</b>	RS14B012310	0.033	RS14B012460	0.037	N/A	
<b>COD-Cr mg/l</b>	RS14B012310	19	RS14B012460	20	N/A	
<b>Suspended Solids mg/l</b>	RS14B012310	2.41	RS14B012460	2.91	N/A	
<b>pH units</b>	RS14B012310	7.98	RS14B012460	8.05	N/A	
<b>Temperature °C</b>	RS14B012310	13	RS14B012460	13	N/A	
<b>Dissolved Oxygen mg/l</b>	RS14B012310	9.59	RS14B012460	9.76	N/A	

### Significance of Results:

The WWTP discharge was compliant with the ELV's set in the wastewater discharge licence.

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

Based on ambient monitoring results a deterioration in Ammonia and BOD, concentrations downstream of the effluent discharge is noted.

The discharge from the wastewater treatment plant does not have an observable negative impact on the Water Framework Directive status.

## 2.1.4 OPERATIONAL PERFORMANCE SUMMARY - CARLOW WWTP

### 2.1.4.1 Treatment Efficiency Report - CARLOW 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)
TN	166722	36459	78
TP	96493	987	99
cBOD	2233580	22656	99
COD	8018416	114111	99
SS	6495226	37541	99

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

### 2.1.4.2 Treatment Capacity Report Summary - CARLOW 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.

CARLOW WWTP	
Peak Hydraulic Capacity (m <sup>3</sup> /day) - As Constructed	21168
DWF to the Treatment Plant (m <sup>3</sup> /day)	8467
Current Hydraulic Loading - annual max (m <sup>3</sup> /day)	23612
Average Hydraulic loading to the Treatment Plant (m <sup>3</sup> /day)	14279
Organic Capacity (PE) - As Constructed	36000
Organic Capacity (PE) - Collected Load (peak week) <sup>Note1</sup>	31324
Organic Capacity (PE) - Remaining	4676
Will the capacity be exceeded in the next three years? (Yes/No)	No

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 - CARLOW 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)
Waterworks Sludge	685	Volume (m <sup>3</sup> )	500	0.09	Yes	Yes	No

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)
<b>Landfill Leachate (delivered by tanker)</b>	3241.74	Weight (Tonnes)	500	0.2	Yes	Yes	Yes
<b>Other</b>	8514	Volume (m3)	500	1	Yes	Yes	No
<b>Other</b>	1360.82	Weight (Tonnes)	1	0	No	Yes	No
<b>Domestic /Septic Tank Sludge</b>	77	Weight (Tonnes)	1	0.01	Yes	Yes	No
<b>Domestic /Septic Tank Sludge</b>	260	Volume (m3)	1	0.01	Yes	Yes	No

## 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
1	Discharge to waters	0	1

### 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 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.

#### 3.2.1 SUMMARY OF INCIDENTS

Incident Type	Cause	No. of incident occurrences	Recurring (Y/N)	Closed (Y/N)
<b>Abatement Equipment offline</b>	Plant or equipment breakdown at WWTP	0	No	Yes
<b>Uncontrolled release</b>	EO caused by power failure	0	No	Yes
<b>Uncontrolled release</b>	Network Infrastructure	0	No	Yes

Incident Type	Cause	No. of incident occurrences	Recurring (Y/N)	Closed (Y/N)
Uncontrolled release	Blocked Sewer	0	No	Yes

### 3.2.2 SUMMARY OF OVERALL INCIDENTS

Question	Answer
Number of Incidents in 2021	4
Number of Incidents reported to the EPA via EDEN in 2021	4
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 2021 (No. of events)	Total volume discharged in 2021 (m3)	Monitoring Status
TBC	271618, 175593	No	Low	Meeting	Unknown	Unknown	Not Monitored
TBC	271171, 174880	No	Medium	Meeting	Unknown	157626	Not Monitored
TBC	273926, 175192	No	Low	Meeting	Unknown	Unknown	Not Monitored
P - Out 1	28138, 166470	Yes	Low	Meeting	Unknown	Unknown	Not Monitored
P - Out 2	271684, 176814	Yes	Low	Meeting	Unknown	Unknown	Not Monitored
P - Out 3	271937, 117137	Yes	Low	Meeting	Unknown	Unknown	Not Monitored

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 2021 (No. of events)	Total volume discharged in 2021 (m3)	Monitoring Status
P - Out 4	271832, 176828	Yes	Low	Meeting	Unknown	Unknown	Not Monitored
P - Out 5	271752, 176531	Yes	Low	Meeting	Unknown	Unknown	Monitored
P - Out 6	271693, 176255	Yes	Medium	Meeting	Unknown	Unknown	Monitored
P - Out 7	271617, 175634	Yes	Medium	Meeting	Unknown	Unknown	Not Monitored
P - Out 8	272322, 176369	Yes	Low	Meeting	Unknown	Unknown	Not Monitored
SW11	271598, 176731	Yes	Low	Meeting	Unknown	Unknown	Not Monitored
SW12	271857, 177166	Yes	Low	Meeting	Unknown	Unknown	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 SWOs in the agglomeration in the year (m3)?	Unknown
Is each SWO identified as not meeting DoEHLG Guidance included in the Programme of Improvements?	N/A
The SWO Assessment included the requirements of relevant of WWDL schedules?	Yes

## SWO Summary

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
D0028-SIP:01	Carlow Surface Water Drainage scheme	C	31/12/2011	Yes	Works Completed		
D0028-SIP:02	Discharge events from Burrin Bridge Overflow (E-SWO8) to cease	A	31/12/2011	Yes	Works Completed		
D0028-SIP:03	Discharge events from Hanover Bridge Overflow Chamber (E-SWO5) to cease	A	31/12/2011	Yes	Works Completed		

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
<b>D0028-SIP:04</b>	Discharge events from Kilkenny Road Overflow (E-SWO2) to cease	A	31/12/2011	Yes	Works Completed		
<b>D0028-SIP:05</b>	Discharge events from Pembroke Overflow Chamber (E-SWO3) and IT Carlow Overflow (E-SWO4) to cease	A	31/12/2011	Yes	Works Completed		
<b>D0028-SIP:06</b>	Discharge events from Pembroke Overflow Chamber (E-SWO3) to cease	A	31/12/2011	Yes	Works Completed		
<b>D0028-SIP:07</b>	Discharge events from Skinners Lane Overflow (E-SWO7) to cease	A	31/12/2011	Yes	Works Completed		
<b>D0028-SIP:08</b>	Discharge events from Walls Forge Pumping Station Overflow (E-SWO6) to cease	A	31/12/2011	Yes	Works Completed		
<b>D0028-SIP:09</b>	E-Out 1 discharge shall revert to an emergency overflow	A	31/12/2011	Yes	Works Completed		
<b>D0028-SIP:10</b>	Henry Street Overflow (E-SWO11) to cease from 31st December 2011.	A	31/12/2011	Yes	Works Completed		
<b>D0028-SIP:11</b>	Maryborough P.S. Overflow (E-SWO9)	A	31/12/2011	Yes	Works Completed		

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
D0028-SIP:12	Morris Lane Overflow (E-SWO10)	A	31/12/2011	Yes	Works Completed		

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
<b>No additional improvements planned at this time.</b>				

## 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
<b>There is no Licence Specific Report Required in this AER Annual Review.</b>			

## 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
Has a Technical amendment/licence review application been submitted to the Agency by IW?	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	Yes
List reason e.g. changes to monitoring requirements	Ambient monitoring location changes
Have these processes commenced?	No
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: 07/04/2022

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,

Katherine Walshe

Acting Head of Environmental Regulation

## **7 APPENDIX**

There are no Appendices included