

Annual Environmental Report

2023



Lower Liffey Valley Regional Sewerage Scheme -

D0004-02

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1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2023 AER

This Annual Environmental Report has been prepared for D0004-02, Lower Liffey Valley Regional Sewerage Scheme, in Kildare 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.

There were no capital works, significant changes or operational changes undertaken in 2023.

1.2 TREATMENT SUMMARY

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

- Leixlip/Lower Liffey Valley WWTP with a Plant Capacity PE of 150000, 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 |
|---------------------------|----------------------------------|----------------|-------------------|--------------------------------|
| TPEFF1400D0004SW001 | Leixlip/Lower Liffey Valley 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 LEIXLIP/LOWER LIFFEY VALLEY WWTP - TREATED DISCHARGE

2.1.1 INFLUENT MONITORING SUMMARY - LEIXLIP/LOWER LIFFEY VALLEY 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 |
|---|-------------------|------------|-------------|
| Ammonia-Total (as N) mg/l | 26 | 45 | 28 |
| Total Phosphorus (as P) mg/l | 26 | 4.63 | 2.77 |
| Suspended Solids mg/l | 25 | 332 | 160 |
| pH pH units | 25 | 7.63 | 7.29 |
| COD-Cr mg/l | 26 | 470 | 281 |
| BOD, 5 days with Inhibition (Carbonaceous) mg/l | 25 | 304 | 158 |
| Total Nitrogen mg/l | 26 | 53 | 35 |
| ortho-Phosphate (as P) - unspecified mg/l | 26 | 4.15 | 2.32 |
| Hydraulic Capacity | N/A | 54593 | 37408 |

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'. The design of the wastewater treatment plant allows for peak values and therefore the peak loads have not impacted on compliance with Emission Limit Values.

2.1.2 EFFLUENT MONITORING SUMMARY - TPEFF1400D0004SW001

| 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 | 15 | Pass |
| Suspended Solids mg/l | 35 | 87.5 | N/A | 26 | N/A | N/A | 3.34 | Pass |
| pH pH units | 6 | 9 | N/A | 27 | N/A | N/A | 6.75 | Pass |
| BOD, 5 days with Inhibition (Carbonaceous) mg/l | 4 | 8 | N/A | 27 | N/A | N/A | 1.00 | Pass |
| Total Phosphorus (as P) mg/l | 1 | 1.2 | N/A | 27 | N/A | N/A | 0.082 | Pass |
| Ammonia-Total (as N) mg/l | 0.5 | 1 | N/A | 27 | N/A | N/A | 0.099 | Pass |
| ortho-Phosphate (as P) - unspecified mg/l | 0.1 | 0.2 | N/A | 27 | 1 | N/A | 0.053 | 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) |
|---|-----------------------|---|---|--------------------------|-----------------------|--|-------------|--------------------------------|
| Fluoride mg/l | N/A | N/A | N/A | 27 | N/A | N/A | 2.13 | |
| Nitrate (as N) mg/l | N/A | N/A | N/A | 27 | N/A | N/A | 19 | |
| Nitrite (as N) mg/l | N/A | N/A | N/A | 27 | N/A | N/A | 0.016 | |
| True Colour PtCo Units | N/A | N/A | N/A | 26 | N/A | N/A | 20 | |
| Alkalinity-total (as CaCO ₃) mg/l | N/A | N/A | N/A | 1 | N/A | N/A | 61 | |
| Total Nitrogen mg/l | N/A | N/A | N/A | 27 | N/A | N/A | 19 | |
| Total Oxidised Nitrogen (as N) mg/l | N/A | N/A | N/A | 26 | N/A | N/A | 18 | |
| Appearance (on Sampling) Descriptive | N/A | N/A | N/A | 26 | N/A | N/A | N/A | |

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):

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 TPEFF1400D0004SW001

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 | 301516, 235804 | RS09L011940 | No | No | No | No | Poor |
| Downstream | 302295, 235190 | RS09L012040 | No | No | No | No | Poor |

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

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

The discharge from the wastewater treatment plant does not have an observable impact on the water quality.

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 - LEIXLIP/LOWER LIFFEY VALLEY WWTP

2.1.4.1 Treatment Efficiency Report - Leixlip/Lower Liffey Valley 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 | 478443 | 262495 | 45 |
| SS | 2203095 | 45553 | 98 |
| COD | 3860444 | 209292 | 95 |
| TP | 38050 | 1118 | 97 |
| cBOD | 2176314 | 13715 | 99 |

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

2.1.4.2 Treatment Capacity Report Summary - Leixlip/Lower Liffey Valley 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.

| Leixlip/Lower Liffey Valley WWTP | |
|---|--------|
| Peak Hydraulic Capacity (m³/day) - As Constructed | 65405 |
| DWF to the Treatment Plant (m³/day) | 48500 |
| Current Hydraulic Loading - annual max (m³/day) | 54593 |
| Average Hydraulic loading to the Treatment Plant (m³/day) | 37408 |
| Organic Capacity (PE) - As Constructed | 150000 |
| Organic Capacity (PE) - Collected Load (peak week)^{Note1} | 141534 |
| Organic Capacity (PE) - Remaining | 8466 |
| 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 - LEIXLIP/LOWER LIFFEY VALLEY WWTP

'Other inputs' to the waste water treatment plant are summarised in the 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) |
|--|----------|--------------------------|--------|-------------------|--|---|--|
| Landfill Leachate (delivered by tanker) | 18835 | Volume (m ³) | 229.35 | 0.14 | Yes | Yes | Yes |
| Other | 2429 | Volume (m ³) | 29.57 | 0.02 | Yes | Yes | Yes |
| Industrial / Commercial Sludge | 6723 | Volume (m ³) | 81.86 | 0.05 | Yes | Yes | Yes |
| Domestic /Septic Tank Sludge | 52193 | Volume (m ³) | 635.53 | 0.38 | 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 |
|----------------------|---------------------|------------------------|--------------------------|
| 1 | Water Pollution | 0 | 1 |
| 1 | Broken Sewer Pipe | 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 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 | Recurring (Y/N) | Closed (Y/N) |
|------------------------------|--|-----------------|--------------|
| Abatement equipment off-line | Plant or equipment maintenance at WWTP | No | No |
| Uncontrolled release | SWO exceptional rainfall and overflow expected | No | Yes |

| Incident Type | Cause | Recurring (Y/N) | Closed (Y/N) |
|------------------------------|--|-----------------|--------------|
| Abatement equipment off-line | Plant or equipment breakdown at WWTP | No | Yes |
| Uncontrolled release | Blocked Sewer | No | Yes |
| Uncontrolled release | SWO exceptional rainfall and overflow expected | No | Yes |
| Abatement equipment off-line | Plant or equipment breakdown at WWTP | No | Yes |
| Uncontrolled release | Broken Sewer Pipe | No | Yes |
| Abatement equipment off-line | Plant or equipment breakdown at WWTP | No | Yes |
| Uncontrolled release | SWO exceptional rainfall and overflow expected | No | Yes |
| Uncontrolled release | Emergency overflow caused by ragging or blocking | No | Yes |

3.2.2 SUMMARY OF OVERALL INCIDENTS

| Question | Answer |
|--|--------|
| Number of Incidents in 2023 | 10 |
| Number of Incidents reported to the EPA via EDEN in 2023 | 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 2023 (No. of events) | Total volume discharged in 2023 (m ³) | Monitoring Status |
|--|---------------------------|----------------------------------|---|----------------------------------|--|---|-------------------|
| SW002 | TBC | Yes | Low Significance | Meeting Criteria | 38,430 | Unknown | Monitored |
| SW003 | 288852 239591 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |
| SW004 | 294407 238711 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |
| SW005 | 293552 237349 | Yes | Low Significance | Not Meeting Criteria | Unknown | Unknown | Not Monitored |
| SW006 | 298236 233802 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Monitored |
| SW007 | 297590 233306 | Yes | Low Significance | Not Meeting Criteria | Unknown | Unknown | Not Monitored |
| SW008 | 297584 233306 | Yes | Low Significance | Not Meeting Criteria | 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 2023 (No. of events) | Total volume discharged in 2023 (m ³) | Monitoring Status |
|--|---------------------------|----------------------------------|---|----------------------------------|--|---|-------------------|
| SW009 | 297379 232919 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |
| SW010 | 298651 233371 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |
| SW011 | 298651 233385 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |
| SW012 | 296932 232421 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |
| SW013 | 301155 TBC | Yes | Low Significance | Not Meeting Criteria | Unknown | Unknown | Not Monitored |
| SW014 | 292832 229607 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |
| SW015 | 300408 235903 | Yes | Low Significance | Not Meeting Criteria | Unknown | Unknown | Not Monitored |
| SW016 | 30653 TBC | Yes | Low Significance | Not Meeting Criteria | Unknown | Unknown | Not Monitored |
| TBC | 297590 233306 | Yes | Low Significance | Not yet Assessed | Unknown | Unknown | Not Monitored |
| TBC | TBC TBC | Yes | Low Significance | Not yet Assessed | Unknown | Unknown | Not Monitored |
| TBC | TBC TBC | Yes | Low Significance | Not yet Assessed | Unknown | Unknown | Not Monitored |
| TBC | TBC TBC | Yes | Low Significance | Not yet Assessed | Unknown | Unknown | Not Monitored |
| TBC | TBC TBC | Yes | Low Significance | Not yet Assessed | 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 2023 (No. of events) | Total volume discharged in 2023 (m ³) | Monitoring Status |
|--|---------------------------|----------------------------------|---|----------------------------------|--|---|-------------------|
| TBC | 298236 233802 | Yes | Low Significance | Not yet Assessed | Unknown | Unknown | Not Monitored |
| TBC | 288434 238610 | Yes | Low Significance | Not yet Assessed | Unknown | Unknown | TBC |
| TBC | 288177 239026 | Yes | Low Significance | Not yet Assessed | Unknown | Unknown | TBC |
| TBC | 287770 240274 | Yes | Low Significance | Not yet Assessed | Unknown | Unknown | TBC |
| TBC | 299292 234119 | Yes | Low Significance | Not yet Assessed | Unknown | Unknown | TBC |
| TBC | 300469 235248 | Yes | Low Significance | Not yet Assessed | Unknown | Unknown | TBC |
| TBC | 293095 238364 | Yes | TBC | Not yet Assessed | Unknown | Unknown | TBC |
| TBC | 296916 232422 | Yes | TBC | Not yet Assessed | Unknown | Unknown | TBC |

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 wastewater discharge by metered SWOs during the year (m3)? | 38430 |
| Is each SWO identified as not meeting DoEHLG Guidance included in the Programme of Improvements? | Yes |

| SWO Summary | |
|---|-----|
| 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? | 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 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 |
|---|---|------------------|-------------------------|------------------------|-------------------|-----------------------------------|--|
| D0004-SIP:01 | Upgrading of Storm Water Overflows to comply with the criteria outlined in the DoECLG "Procedures and Criteria in relation to Storm Water Overflows, 1995". | C | 31/12/2020 | No | At Planning Stage | | Primrose Hill - In construction. (no SWO code) Maynooth WWPS In Design(SW004). Castletown WWPS (Sw006) in Design. All Other SWOS under DAP assessment |

| 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 |
|---|--|------------------|-------------------------|------------------------|-----------------|-----------------------------------|----------|
| D0004-SIP:02 | Waste Water capacity improvement works | C | 08/05/2020 | Yes | Works Completed | | |
| D0004-SIP:03 | Waste Water Treatment plant improvement and ancillary works to meet the requirements of Schedule A.1 and condition 3.4 | C | 31/12/2019 | 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 |
|---|---|--------------------|--------------------------|----------|
| No additional improvements planned at this time. | | | | |

4.2.3 SEWER INTEGRITY RISK ASSESSMENT

N/A

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 | Included in this AER |
|--------------------------------|---------------------|----------------------|
| Priority Substances Assessment | Yes | No |
| Toxicity/Leachate Management | Yes | 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? | Yes |
| List reason e.g. additional SWO identified | Additional SWOs |
| 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? | 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: 28/02/2024

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

Lower Liffey Valley WWTP Ambient Monitoring Summary 2023

| Ambient Monitoring Point from WWDL (or as agreed with EPA) | Irish National Grid Reference (Easting, Northing) | EPA Feature Coding Tool code | Receiving Waters Designation (Yes/No) | | | | Current WFD Status | Mean (mg/l) | | |
|--|---|------------------------------|---------------------------------------|----------------|------|-----------|--------------------|-------------|--------------------|----------------|
| | | | Bathing Water | Drinking Water | FWPM | Shellfish | | cBOD | o-Phosphate (as P) | Ammonia (as N) |
| Upstream Monitoring Point | 301516, 235804 | RS09L011940 | No | No | No | No | Poor | 1.004 | 0.0370 | 0.1307 |
| Downstream Monitoring Point | 302295, 235190 | RS09L012040 | No | No | No | No | Poor | 0.996 | 0.0359 | 0.1252 |
| <i>Difference</i> | | | | | | | | -0.0074 | -0.0011 | -0.0056 |
| EQS | | | | | | | | 1.500 | 0.035 | 0.065 |
| % of EQS | | | | | | | | -0.494% | -3.175% | -8.547% |

Lower Liffey Valley WWTP Ambient Monitoring Summary 2023

| Upstream Results | | | | | | | | | | | | | | |
|------------------|-----|---------------|----------------|--------------|---------------|--------------------------|---------------------------|-----------------------------|-----------------|------------------------------|-----------------|-----------------|---------------|----------------|
| Date | | Temp oC | pH pH units | BOD mg/l | COD mg/l | Suspended solids mg/l | Total Nitrogen mg/l | Total Phosphorus mg/l | Ammonia mg/l | Ortho- Phosphat e mg/l | Nitrite mg/l | Nitrate mg/l | DO mg/l | DO % sat |
| 25/01/2023 | U/S | 10.4 | 7.38 | 1 | 5 | 4 | 2.5 | 0.09 | 0.2 | 0.04 | 0.01 | 2.54 | 10.4 | 83.3 |
| 31/01/2023 | U/S | 10.4 | 7.38 | 1 | 9 | 1 | 3.1 | 0.08 | 0.11 | 0.06 | 0.01 | 3.02 | 10.4 | 83.3 |
| 08/02/2023 | U/S | 10.2 | 7.7 | 1 | 10 | 1 | 3.1 | 0.05 | 0.14 | 0.04 | 0.02 | 2.85 | 10.4 | 91 |
| 22/02/2023 | U/S | 11.9 | 7.71 | 1 | 5 | 2 | 3.4 | 0.03 | 0.07 | 0.02 | 0.01 | 3.32 | 10.4 | 93.1 |
| 01/03/2023 | U/S | 10.4 | 7.55 | 1 | 14 | 2 | 2.8 | 0.02 | 0.13 | 0.01 | 0.01 | 2.64 | 11.2 | 98 |
| 22/03/2023 | U/S | 12.4 | 7.57 | 1 | 16 | 7 | 2.76 | 0.05 | 0.07 | 0.02 | 0.01 | 2.57 | 9.7 | 93.5 |
| 27/04/2023 | U/S | 13.2 | 7.69 | 1 | 2 | 2 | 2.5 | 0.05 | 0.09 | 0.03 | 0.01 | 2.44 | 10.1 | 97 |
| 10/05/2023 | U/S | 16.6 | 7.69 | 1 | 30 | 3 | 2.1 | 0.04 | 0.14 | 0.02 | 0.01 | 1.98 | 9.2 | 94.74 |
| 18/05/2023 | U/S | 15.3 | 7.64 | 1 | 13 | 1 | 2.1 | 0.12 | 0.06 | 0.09 | 0.01 | 1.97 | 10.8 | 106 |
| 25/05/2023 | U/S | 16.7 | 7.99 | 1 | 9 | 1 | 2.1 | 0.04 | 0.01 | 0.02 | 0.01 | 1.94 | 10.4 | 105 |
| 31/05/2023 | U/S | 19.3 | 8.04 | 1 | 16 | 4 | 1.7 | 0.04 | 0.16 | 0.01 | 0.01 | 1.71 | 9.6 | 102 |
| 14/06/2023 | U/S | 20.7 | 7.72 | 1 | 3 | 1 | 1.7 | 0.03 | 0.11 | 0.02 | 0.01 | 1.65 | 9.2 | 102 |
| 21/06/2023 | U/S | 21.1 | 7.97 | 1 | 20 | 2 | 1.8 | 0.05 | 0.09 | 0.03 | 0.01 | 1.73 | 10.6 | 107 |
| 28/06/2023 | U/S | 18.5 | 7.81 | 1 | 6 | 4 | 1.7 | 0.02 | 0.1 | 0.01 | 0.01 | 1.65 | 8 | 85 |
| 12/07/2023 | U/S | 19.9 | 7.98 | 1 | 22 | 2 | 1.6 | 0.02 | 0.17 | 0.01 | 0.01 | 1.58 | 8.4 | 92 |
| 19/07/2023 | U/S | 17.5 | 7.46 | 1 | 16 | 2 | 1.6 | 0.04 | 0.17 | 0.02 | 0.01 | 1.63 | 9.4 | 103 |
| 16/08/2023 | U/S | 19.4 | 7.29 | 1 | 18 | 4 | 1.5 | 0.03 | 0.21 | 0.02 | 0.02 | 1.14 | 8.7 | 93.5 |
| 23/08/2023 | U/S | 18.5 | 7.04 | 1 | 20 | 3 | 1.5 | 0.05 | 0.17 | 0.01 | 0.02 | 1.44 | 8.5 | 91 |
| 06/09/2023 | U/S | 20 | 7.14 | 1 | 11 | 1 | 1.3 | 0.03 | 0.16 | 0.02 | 0.01 | 1.28 | 8.8 | 96.6 |
| 13/09/2023 | U/S | 18.3 | 7.61 | 1 | 10 | 1 | 1.8 | 0.14 | 0.09 | 0.1 | 0.01 | 1.8 | 9.1 | 96 |
| 21/09/2023 | U/S | 16.9 | 7.52 | 1 | 24 | 4 | 1.5 | 0.1 | 0.13 | 0.07 | 0.01 | 1.53 | 8.7 | 92 |
| 27/09/2023 | U/S | 14.5 | 7.1 | 1 | 20 | 5 | 2.1 | 0.04 | 0.15 | 0.02 | 0.01 | 2.06 | 9.1 | 92 |
| 04/10/2023 | U/S | 13.3 | 7.23 | 1 | 10 | 1 | 1.9 | 0.07 | 0.16 | 0.05 | 0.01 | 1.91 | 9.6 | 93 |
| 25/10/2023 | U/S | 10.5 | 7.2 | 1 | 6 | 3 | 2.8 | 0.15 | 0.11 | 0.11 | 0.01 | 2.8 | 12 | 110 |
| 08/11/2023 | U/S | 10.2 | 7.09 | 1 | 22 | 4 | 2 | 0.06 | 0.22 | 0.04 | 0.01 | 1.9 | 10.1 | 90.8 |
| 15/11/2023 | U/S | 10.6 | 7.19 | 1 | 22 | 2 | 1.9 | 0.11 | 0.17 | 0.09 | 0.01 | 1.9 | 10.1 | 90.2 |
| 06/12/2023 | U/S | | 7.22 | 1.1 | 7 | | 2.01 | 0.04 | 0.14 | 0.02 | 0.01 | 1.99 | 10.9 | |
| Mean | | 15.258 | 7.515 | 1.004 | 13.556 | 2.577 | 2.106 | 0.059 | 0.1307 | 0.0370 | 0.011 | 2.036 | 9.770 | 95.425 |
| 95%ile | | 20.525 | 7.987 | 1.000 | 23.400 | 4.750 | 3.100 | 0.134 | 0.207 | 0.097 | 0.020 | 2.969 | 11.110 | 106.750 |

| Downstream Results | | | | | | | | | | | | | | |
|--------------------|-----|---------------|----------------|--------------|---------------|--------------------------|---------------------------|-----------------------------|-----------------|------------------------------|-----------------|-----------------|---------------|----------------|
| Date | | Temp oC | pH pH units | BOD mg/l | COD mg/l | Suspended solids mg/l | Total Nitrogen mg/l | Total Phosphorus mg/l | Ammonia mg/l | Ortho- Phosphat e mg/l | Nitrite mg/l | Nitrate mg/l | DO mg/l | DO % sat |
| 25/01/2023 | D/S | 11 | 7.46 | 1 | 5 | 3 | 2.9 | 0.1 | 0.2 | 0.06 | 0.01 | 2.88 | 10.12 | 89.9 |
| 31/01/2023 | D/S | 11 | 7.46 | 1 | 9 | 2 | 4.5 | 0.09 | 0.07 | 0.07 | 0.01 | 4.6 | 10.1 | 89.9 |
| 08/02/2023 | D/S | 8.1 | 7.71 | 1 | 2 | 1 | 4.6 | 0.02 | 0.14 | 0.01 | 0.02 | 4.48 | 11.1 | 92.4 |
| 22/02/2023 | D/S | 10.7 | 7.81 | 1 | 3 | 3 | 4.1 | 0.05 | 0.06 | 0.03 | 0.02 | 4.08 | 10.3 | 93 |
| 01/03/2023 | D/S | 9.3 | 7.58 | 1 | | 3 | 3.2 | 0.03 | 0.13 | 0.01 | 0.01 | 3.22 | 11.5 | 98 |
| 22/03/2023 | D/S | 10.6 | 7.66 | 1 | 11 | 10 | 3.1 | 0.05 | 0.08 | 0.02 | 0.01 | 3.01 | 10.3 | 94.8 |
| 27/04/2023 | D/S | 11.4 | 7.91 | 1 | 3 | 2 | 2.9 | 0.06 | 0.09 | 0.03 | 0.01 | 2.8 | 10.6 | 98 |
| 10/05/2023 | D/S | 15.5 | 7.88 | 1 | 8 | 4 | 3.2 | 0.04 | 0.13 | 0.02 | 0.01 | 3.12 | 9.9 | 99.6 |
| 18/05/2023 | D/S | 15.3 | 7.8 | 1 | 14 | 2 | 3.7 | 0.1 | 0.04 | 0.06 | 0.01 | 3.67 | 10.6 | 104 |
| 25/05/2023 | D/S | 16.5 | 8.01 | 1 | 21 | 1 | 3.6 | 0.04 | 0.03 | 0.02 | 0.01 | 3.52 | 10.4 | 105 |
| 31/05/2023 | D/S | 17.8 | 8.01 | 1 | 11 | 1 | 3.7 | 0.03 | 0.19 | 0.01 | 0.01 | 3.61 | 10.2 | 105 |
| 14/06/2023 | D/S | 20.3 | 7.93 | 1 | 3 | 1 | 3.2 | 0.03 | 0.09 | 0.02 | 0.01 | 3.2 | 9.2 | 101 |
| 21/06/2023 | D/S | 20 | 7.9 | 1 | 9 | 2 | 3.1 | 0.06 | 0.06 | 0.03 | 0.01 | 3.04 | 9.3 | 103 |
| 28/06/2023 | D/S | 18 | 7.88 | 1 | 7 | 3 | 2.7 | 0.04 | 0.07 | 0.02 | 0.01 | 2.66 | 8 | 87 |
| 12/07/2023 | D/S | 19.6 | 8.07 | 1 | 22 | 2 | 3.1 | 0.02 | 0.13 | 0.01 | 0.02 | 3.07 | 9.4 | 103 |
| 19/07/2023 | D/S | 17.1 | 7.63 | 1 | 28 | 6 | 2.5 | 0.12 | 0.14 | 0.09 | 0.01 | 2.51 | 8.9 | 91.9 |
| 16/08/2023 | D/S | 17.3 | 7.43 | 1 | 28 | 6 | 2 | | 0.2 | 0.03 | 0.02 | 1.44 | 9.2 | 95.7 |
| 23/08/2023 | D/S | 17.9 | 7.26 | 1 | 11 | 3 | 1.5 | 0.05 | 0.17 | 0.04 | 0.02 | 1.44 | 8.8 | 92.8 |
| 06/09/2023 | D/S | 19.7 | 7.26 | 1 | 6 | 1 | 3.8 | 0.04 | 0.14 | 0.02 | 0.01 | 3.76 | 8.6 | 96.6 |
| 13/09/2023 | D/S | 17.9 | 7.64 | 1 | 13 | 1 | 3.3 | 0.09 | 0.08 | 0.07 | 0.02 | 3.3 | 9.3 | 95 |
| 21/09/2023 | D/S | 16.6 | 7.58 | 1 | 23 | 6 | 2.3 | 0.11 | 0.14 | 0.08 | 0.01 | 2.21 | 8.8 | 92 |
| 27/09/2023 | D/S | 14.9 | 7.35 | 1 | 16 | 2 | 2.6 | 0.04 | 0.14 | 0.02 | 0.01 | 2.48 | 9.2 | 92.1 |
| 04/10/2023 | D/S | 14 | 7.36 | 1 | 18 | 2 | 2.2 | 0.06 | 0.16 | 0.03 | 0.01 | 2.14 | 9.6 | 92.6 |
| 25/10/2023 | D/S | 11.5 | 7.51 | 1 | 8 | 3 | 3.3 | 0.14 | 0.1 | 0.09 | 0.01 | 3.2 | 10.2 | 96 |
| 08/11/2023 | D/S | 11.2 | 7.27 | 1 | 21 | 2 | 2.19 | 0.05 | 0.18 | 0.03 | 0.01 | 2.13 | 9.8 | 90.5 |
| 15/11/2023 | D/S | 10.9 | 7.32 | 1 | 27 | 2 | 2.2 | 0.05 | 0.16 | 0.02 | 0.01 | 2.08 | 10.08 | 90.9 |
| 06/12/2023 | D/S | | 7.39 | 0.9 | 3 | | 3.11 | 0.05 | 0.26 | 0.03 | 0.01 | 3.03 | 10.5 | |
| Mean | | 14.773 | 7.632 | 0.996 | 12.692 | 2.846 | 3.059 | 0.060 | 0.1252 | 0.0359 | 0.012 | 2.988 | 9.778 | 95.758 |
| 95%ile | | 19.925 | 8.010 | 1.000 | 27.800 | 6.000 | 4.400 | 0.118 | 0.198 | 0.088 | 0.020 | 4.380 | 10.975 | 104.750 |

Note: Where the concentration in the result is less than the limit of detection (LOD), a value of LOD/sqrt(2) was used in calculating the mean and 95%ile concentrations.