



Kingseat Wastewater Treatment Plant 2025-2026 Annual Report

Final September 2026

QUALITY INFORMATION

Document	Annual Report
Date	1 October 2026
Name and position of originator	Emma Baker, Freshwater Ecologist
Report directory	Te Taiao sharepoint

REVISION HISTORY

Rev	Revision Date	Name	Position	Signature
1	11/09/2026	Michiel Jonker	Environmental Care Manager	
2				
3				

APPROVED

Date	Name	Position	Signature
30/09/2026	Michiel Jonker	Environmental Care Manager	

CONSENT CHANGE AND MONITORING HISTORY

Date	Change/Event	Notes
2021 Spring – 2022 Autumn	First year of REMP monitoring	Baseline ecological and water quality data collected under legacy authorisations.
Dec 2022	Resource consents DIS60401948 (discharge) and DIS60401927 (air) granted	Ten-year term expiring Dec 2032. Established discharge limits and formalised REMP requirements.
2023	Kingseat WWTP Management Plan finalised	Set out operational procedures, monitoring framework, and incident response protocols.
Sep 2025	Installation of new backwash filter system	Upgrade to improve TSS removal and enhance UV disinfection efficiency; no change to consent, but relevant to monitoring interpretation.

EXECUTIVE SUMMARY

This report presents the compliance and environmental monitoring results for the Kingseat Wastewater Treatment Plant (WWTP) for the period 1 July 2025 to 30 June 2026.

Key findings are as follows:

- **Effluent volumes:** The discharge flow volume did not exceed 38 m³/day, in 98% of all daily flow readings, excluding flow readings during or following rainfall events, and is therefore compliant. Peaks in flow occurred as a result of rainfall in the catchment.
- **Compliance:** The WWTP largely complied with all consent conditions. One technical non-compliance was recorded for Total Suspended Solids (TSS), which slightly exceeded the 92nd percentile limit. All other parameters, including BOD₅, ammonia, dissolved oxygen, and *Escherichia coli*, remained within consented thresholds.
- **Seasonality and trends:** Five-year analysis confirmed a seasonal signal in BOD₅, with higher concentrations in winter likely linked to biological processes and/or flow-related effects. Long-term trends showed improving ammonia removal, stable BOD₅ and *E. coli*, and TSS has also ceased to have an increasing long-term trend.
- **Complaints and incidents:** No odour complaints, unauthorised discharges, or bypasses were recorded during the reporting year.
- **Environmental sampling:** Water quality monitoring in spring and autumn showed a localised effect at the mixing zone, with attenuation of nutrients and bacteria within 100–300 m downstream. Faecal contamination is largely associated with agricultural runoff in the catchment rather than effluent. Dry weather and site characteristics continue to constrain sampling.
- **Upgrades:** A new backwash filter was installed in September 2025, enhancing TSS removal and indirectly improving UV disinfection effectiveness for *E. coli* control. Whilst TSS remained non-compliant for 2025-2026, the long-term trend analysis found no significant trend, an improvement from the significant increasing trend in the 2024-2025 report's long-term analysis.

Overall, the plant continues to operate reliably, with generally stable effluent quality and limited environmental effects observed in the receiving stream.

TABLE OF CONTENTS

1	Introduction	7
1.1	Scope	7
2	Operational details.....	8
2.1	Current operations	8
2.2	Changes in reporting year	8
2.3	Future changes	8
3	Methodology.....	9
3.1	Monitoring.....	9
3.2	Data handling and analysis	9
3.3	Compliance criteria.....	9
4	Results.....	11
4.1	Effluent volumes.....	11
4.2	Effluent quality	12
4.2.1	Concentration patterns.....	13
4.2.2	Long term seasonality trends.....	14
4.2.3	Long term temporal trends.....	15
4.2.4	Summary	16
4.3	Complaints and incidents	16
5	Environmental sampling	17
6	Conclusion.....	23
Appendix A.	Assessment of compliance	
Appendix B.	Discharge flows and rainfall	
Appendix C.	Effluent quality results	
Appendix D.	Data Sources	
Appendix E.	Receiving environment photographs (October 2025)	

LIST OF FIGURES

Figure 4-1. Rainfall and daily effluent discharge volumes at Kingseat WWTP for July 2025 – June 2026.	12
Figure 4-2. Seasonal cycles of rainfall (left) and effluent discharges (right) for 2025-2026, showing mean daily values for each month.....	12
Figure 4-3. Temporal variation in effluent quality parameters at Kingseat WWTP (2025-2026).....	14

Figure 4-4. Seasonal variation in BOD ₅ concentrations at Kingseat WWTP (2020–2026).....	15
Figure 4-5. Statistically significant six-year trends in effluent quality parameters at Kingseat WWTP (2020–2026).....	16
Figure 5-1. Seasonal comparison of receiving environment water quality parameters at Kingseat WWTP (2021–2026).....	19
Figure 5-2. Spatial comparison of microbiological water quality (E. coli) at Kingseat WWTP (2021–2026).	20
Figure 5-3. Spatial comparison of nutrient concentrations at Kingseat WWTP (2021–2026).....	21
Figure 5-4. Spatial comparison of physiochemical parameters at Kingseat WWTP (2021–2026).	22

LIST OF TABLES

Table 1-1: Abbreviations.....	vi
Table 3-1: Compliance assessment criteria	10
Table 4-1. Effluent volume and quality compliance summary data (2025-2026)	13
Table 5-1. Receiving environment monitoring results in spring (October 2025)	17
Table 5-2. Receiving environment monitoring results in autumn (March 2026)	18
Table 6-2: Download location of environmental monitoring data used in this report	13

ABBREVIATIONS

For ease of reading, this report uses abbreviations for some technical terms. Table 1-1 lists these abbreviations.

Table 1-1: Abbreviations

Abbreviation	Description
BOD ₅	5-day biochemical oxygen demand
cBOD ₅	5-day carbonaceous biochemical oxygen demand
DO	Dissolved oxygen
E. coli	Escherichia coli
I&I	Inflow and infiltration
IANZ	International Accreditation New Zealand
MST	Microbial Source Tracking
NH ₄ -N	Ammoniacal nitrogen (as NH ₄ ⁺), reported in mg N/L
NO _x	Nitrite + nitrate (NO ₂ ⁻ + NO ₃ ⁻)
PI Historian	Process data historian used to store operational plant data
REMP	Receiving Environment Monitoring Programme
TIN	Total inorganic nitrogen (sum of NH ₄ ⁺ -N, NO ₂ ⁻ -N, and NO ₃ ⁻ -N)
TN	Total nitrogen
TP	Total phosphorus
TSS	Total suspended solids
UV	Ultraviolet disinfection
WWTP	Wastewater treatment plant

1 INTRODUCTION

Kingseat Wastewater Treatment Plant (WWTP) is located at 16A Buchanan Road, Kingseat, serving approximately 44 residential properties in the township and surrounding catchment. The wastewater composition is entirely domestic in nature, conveyed by a small, reticulate network.

The operation of the WWTP is authorised under two resource consents:

- **DIS60401948 – Discharge to water** (treated effluent to an unnamed tributary of the Te Hihi Creek).
- **DIS60401927 – Discharge to air** (odour emissions).

Both consents were granted in December 2022 and expire in December 2032. They require Watercare Services Limited (Watercare) to monitor effluent quality, flows, and receiving environment conditions, and to provide annual and quarterly reporting to Auckland Council. Key obligations include:

- Compliance monitoring of flow and effluent quality against consented limits.
- Receiving environment monitoring to assess ecological effects.
- Incident response and reporting procedures.
- Management of potential odour emissions.

The consents include an annual review condition (Condition 5 review s128 RMA), enabling Auckland Council to vary consent requirements if significant adverse environmental effects are identified or if improvements in treatment technology become available.

1.1 Scope

This report, covering the period 1 July 2025 to 30 June 2026, is in fulfilment with Condition 24 of the resource consents, which requires an annual report. Specifically, the annual report must contain:

- A summary of all plant performance data, environmental monitoring and photographs collected for the year ending 30 June;
- Comparison and analysis of the plant performance data against past and anticipated future plant performance data to provide an overview of plant performance;
- Comparison and provision of an assessment of change in the photographs and stream water quality analyses (as required by conditions 19 and 20) against previous photographic records and stream monitoring records;
- Recommendations of measures to mitigate any significant adverse effects of the discharge on the receiving environment;
- Inclusion of an update of any remedial works done to address inflow and infiltration to the network.

A full assessment of compliance is included within Appendix A.

2 OPERATIONAL DETIALS

2.1 Current operations

The treatment process comprises the following stages:

- Influent pumping.
- Flow balancing: a 30 m³ balance tank attenuates inflow variations, reducing shock loads.
- Biological treatment: a 49 m³ aeration tank where microorganisms degrade organic matter, supported by blower-supplied aeration and nitrification.
- Clarification: solids settle in a clarifier, with return activated sludge recirculated to maintain process stability.
- Disinfection: clarified effluent passes through a UV disinfection system (Wedeco LBX10), designed to achieve a 4-log pathogen reduction.
- Final storage and reaeration: a treated effluent tank and reaeration chamber provide final buffering and oxygenation before discharge to an unnamed tributary of Te Hihi Creek.
- Sludge management: waste activated sludge is periodically removed and transported off-site (to Pukekohe WWTP) for further treatment.

A magnetic flowmeter continuously records effluent discharge volumes to demonstrate compliance with the consented daily maximum of 38 m³/day.

2.2 Changes in reporting year

A major operational upgrade was completed with the installation of a new backwash filter system, commissioned on 2 September 2025. The system improved removal of Total Suspended Solids (TSS), which provides a twofold benefit: reduced particulate loading to the receiving environment and enhanced UV disinfection efficiency. With fewer suspended particles shielding bacteria from UV exposure, the treatment process can achieve more effective inactivation of *E. coli*.

Compared with the previous fixed filter, the backwash design offered clear advantages. Periodic reverse-flow flushing prevents clogging, maintains consistent flow, and extends media life. This self-cleaning feature ensures more reliable solids removal over time, reducing operational downtime and maintaining stable effluent quality.

2.3 Future changes

No changes are planned for the 2026-2027 reporting period.

3 METHODOLOGY

3.1 Monitoring

Monitoring comprised operational, effluent quality and receiving environment monitoring, with data obtained from online instrumentation, SCADA, laboratory analyses and field observations. Detailed monitoring results and source information are provided in Appendix B and C.

Daily discharge volumes were recorded using a magnetic flow meter linked to the SCADA system for continuous logging, in accordance with Condition 16. Monthly samples were collected from the final effluent in accordance with Condition 17. Samples were analysed by the Watercare Laboratory, an IANZ-accredited laboratory, using the methods specified under Condition 19. Parameters monitored included biochemical oxygen demand (BOD₅), total suspended solids (TSS), ammonia (NH₄-N), dissolved oxygen (DO), and *Escherichia coli*.

Receiving environment assessments, including photographs were undertaken at the prescribed upstream and downstream monitoring locations in March and September, in accordance with Conditions 20–21. Water samples within the receiving environment were collected and analysed for nutrients, BOD₅, DO and *E. coli*.

Any limitations affecting the completion of monitoring, including unsuitable or dry stream conditions, missing data or equipment issues, were documented and considered during assessment.

3.2 Data handling and analysis

Daily discharge volumes were assessed against the applicable flow requirements, with the rainfall exclusion of ≥ 10 mm in 24 hours applied. Effluent quality compliance was assessed using the rolling 92nd percentile and minimum limits, as applicable to each parameter under Conditions 18 and 18b.

Statistical analyses were undertaken to assess temporal variation and longer-term patterns in the monitoring data. Seasonal differences were assessed using non-parametric Kruskal–Wallis tests. Where applicable, long-term trends were assessed using the Mann–Kendall test and Sen slope estimator. Trend analyses incorporated monitoring data from 2020–2026, where sufficient data were available, and were interpreted with consideration of record length and data completeness.

3.3 Compliance criteria

The assessment of the WWTP performance considers:

- Results of compliance monitoring
- Recorded incidents and complaints.

Watercare assesses compliance with the consent using the same compliance rating system utilised by Auckland Council (Table 3-1).

Table 3-1: Compliance assessment criteria

Rating	Detail
Category 1	Watercare has complied with the consent condition. Where a resource consent condition refers to a provision in a Management Plan, then the plan has been referred to in assessing consent compliance.
Category 2	Watercare has not complied with the consent condition. Watercare has assessed the non-compliance as technical or having no more than minor adverse effect.
Category 3	Watercare has not complied with the consent condition. Watercare has assessed the non-compliance having the potential to result in more than minor adverse effects on the environment. Alternatively, since the last audit, there is evidence of repeat Category 2 non-compliance.
Category 4	Watercare has not complied with the consent condition. Watercare has assessed the non-compliance as having the potential to cause significant adverse effects on the environment. Alternatively, since the last audit, there is evidence of repeat Category 3 non-compliance.

4 RESULTS

4.1 Effluent volumes

The WWTP is authorised to discharge up to 38 m³/day (for 98% of the time) of treated effluent to an unnamed tributary under Condition 7 of consent DIS60401948.

During the reporting period, effluent discharges remained within the consented maximum daily limit. The annual mean daily discharge was approximately 27.5 m³/day, with higher flows recorded during wet-weather months. No flow-related exceedances were observed.

Figure 4-1 shows the daily effluent discharge volumes and rainfall for 2025–2026, with the consent limit (38 m³/day) indicated by the red line. The 98th percentile daily discharge volume, calculated across all days irrespective of rainfall, was 55.9 m³/day. Discharge volumes exceeded 38 m³/day on 14 days during the reporting period. Of these, nine days coincided with rainfall of ≥10 mm or occurred within 24 hours of such rainfall. Under Condition 7 of the consent, these days are excluded from the compliance assessment.

Discharge volumes exceeded 38 m³/day on 13 and 14 July 2025, 31 July 2025 and 1 October 2025 following periods of heavy rainfall. However, the discharge volumes did not decrease sufficiently within the 24-hour period following the rainfall to meet the requirements of Condition 7. On 12 April 2026, the discharge volume was 39.3 m³/day, despite no rainfall of ≥10 mm on that day or in the preceding 24 hours, and no elevated discharge volumes in the preceding days. Ongoing monitoring and review of inflow and infiltration and treatment performance were therefore undertaken in response.

Excluding discharge volumes recorded on days of, or within 24 hours following, rainfall of ≥10 mm, the 98th percentile daily discharge volume was 37.5 m³/day. This is below the consented 98th percentile maximum of 38 m³/day, demonstrating compliance with Condition 7 over the reporting period.

Figure 4-2 presents seasonal polar plots of rainfall and effluent discharge, highlighting winter–spring peaks and lower flows during summer–autumn. The plots show a substantially wetter July 2025, and the discharge volumes proportionally increasing, indicating that inflow and infiltration (I and I) influence the discharge volumes. This pattern is also exhibited during other months, albeit the remainder of the reporting period had lesser rainfall and therefore lesser I and I into the plant. Overall, the reporting period had 177 days where rainfall occurred, with a maximum of 79 mm on 26 March 2026, and a total of 1,529.5 mm accumulated across the year.

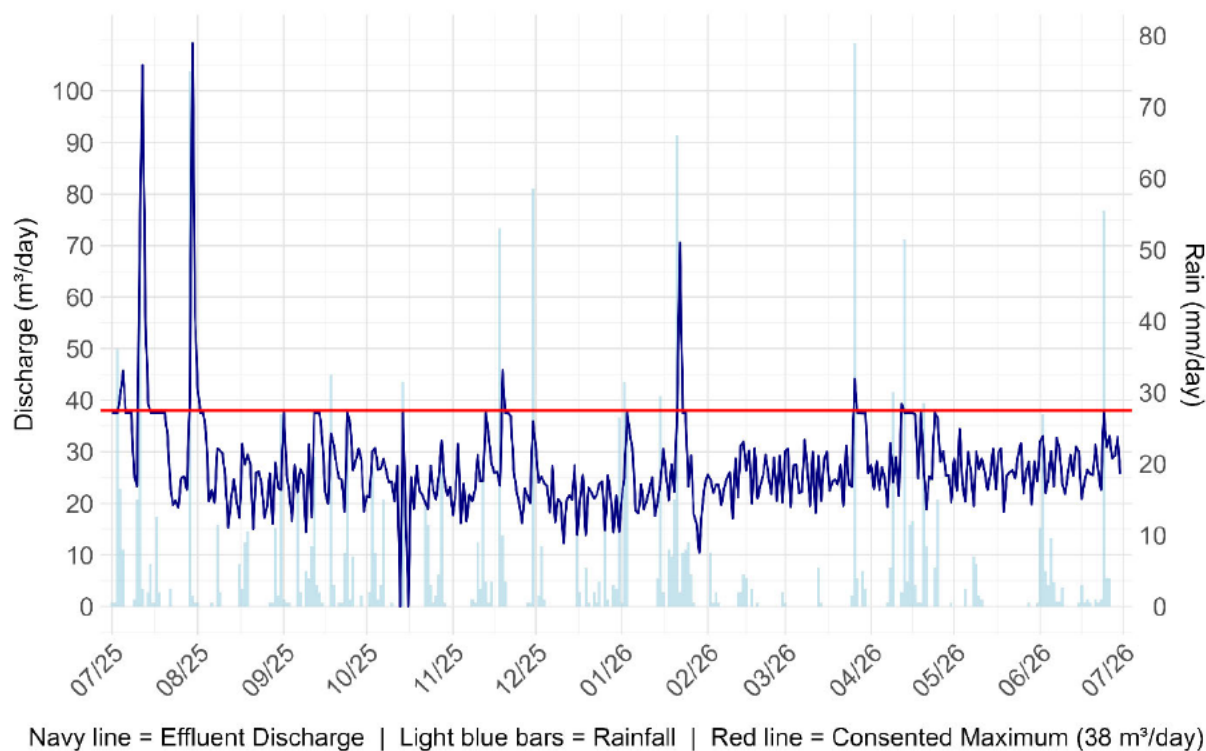


Figure 4-1. Rainfall and daily effluent discharge volumes at Kingseat WWTP for July 2025 – June 2026.

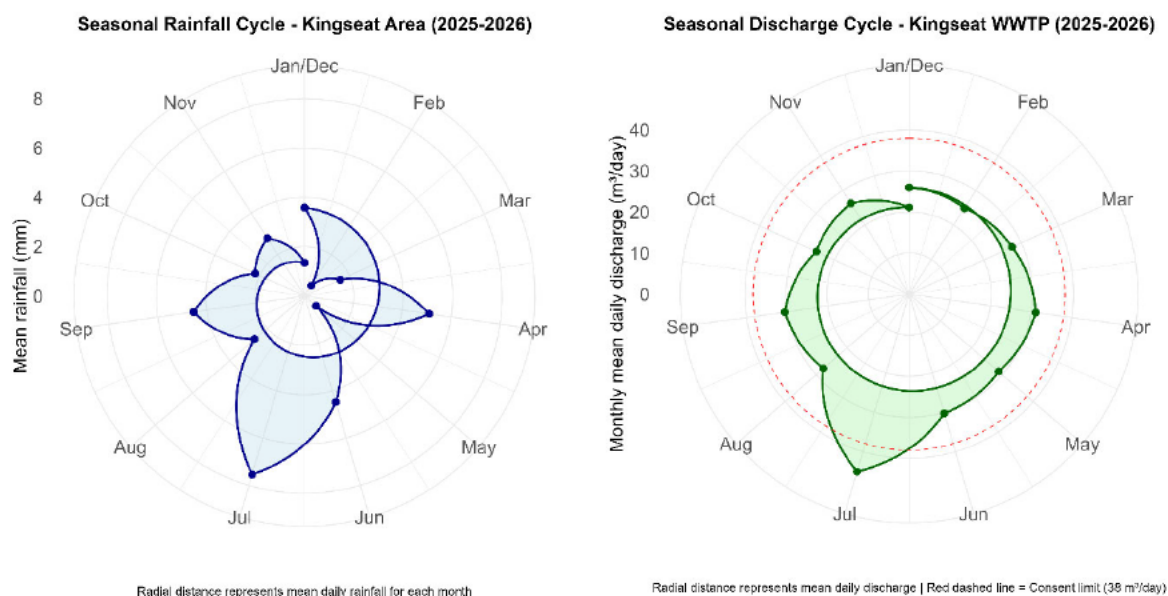


Figure 4-2. Seasonal cycles of rainfall (left) and effluent discharges (right) for 2025-2026, showing mean daily values for each month.

4.2 Effluent quality

The results of the effluent quality samples, taken at the post-UV discharge point are presented in Table 4-1. Within the 2025-2026 reporting period, TSS was non-compliant with the 92nd percentile limit of 30 mg/L. All other results were compliant. These results are consistent with the previous 2024-2025 reporting period.

Temperature and pH were also measured, and showed normal operational ranges, but are not subject to consent limits.

With regard to TSS, elevated results during the reporting period, together with historical elevated results remaining within the rolling 12-month dataset, resulted in the 92nd-percentile criterion exceeding 30 mg/L. Notably in July 2025, when TSS of 91.5 mg/L was recorded following high plant inflows and solids loading associated with heavy rainfall. The existing filter became blocked and required removal to maintain treatment flow, which reduced solids removal performance. Further elevated TSS results were subsequently recorded, including 34 mg/L (April 2026), 34 mg/L and 32.2 mg/L (June 2026).

A backwash filter was installed during the reporting period to improve solids removal and reduce the operational limitations associated with the previous filtration system. Following subsequent elevated TSS results, the filter backwash frequency was increased, and additional in-house monitoring was undertaken to confirm treatment performance.

Table 4-1. Effluent volume and quality compliance summary data (2025-2026)

Statistic	Volume (m ³ /day)	DO (mg O ₂ /L)	BOD ₅ (mg/L)	TSS (mg/L)	NH ₃ -N (mg N/L)	<i>E. coli</i> (MPN/100 mL)
Samples	365	55	25	25	25	25
Minimum	0	4.73	1.1	2.4	0.03	1.6
Mean	27.1	6.83	3.3	19.4	0.30	15.7
Maximum	109.3	8.87	6.9	91.5	2.20	130
Median	25.5	6.83	2.8	14.0	0.12	4.9
92%ile	37.5	8.22	5.6	34.0	0.82	48.5
92%ile limit	-	≥5	≤20	≤30	≤5	≤200
Maximum limit	≤38 ¹	–	–	–	–	–
Compliant	Yes	Yes	Yes	No	Yes	Yes

4.2.1 Concentration patterns

Time-series plots (Figure 4-3) of effluent quality parameters show that BOD₅ and ammonia remain consistently low throughout the reporting period. TSS had intermittent spikes, with exceedances contributing to the overall 92nd percentile compliance exceedance.

E. coli remained low, at or near the detection limit. Dissolved oxygen was typically high, however there was one occurrence where it dropped to 4.73 mg/L on 20th April 2026, however this did not bring the overall 92nd percentile below 5 mg/L. With the exception of this one low result, levels remained consistently high (≥5 mg/L), and combined with the ammonia results, this indicated that

¹ In 96% of all daily flow readings, excluding all flow readings on days of or within 24 hours of 10 mm rainfall or greater.

effective nitrification is occurring and no substantial changes in treatment processes occurred in this period. pH and temperature were within expected seasonal ranges.

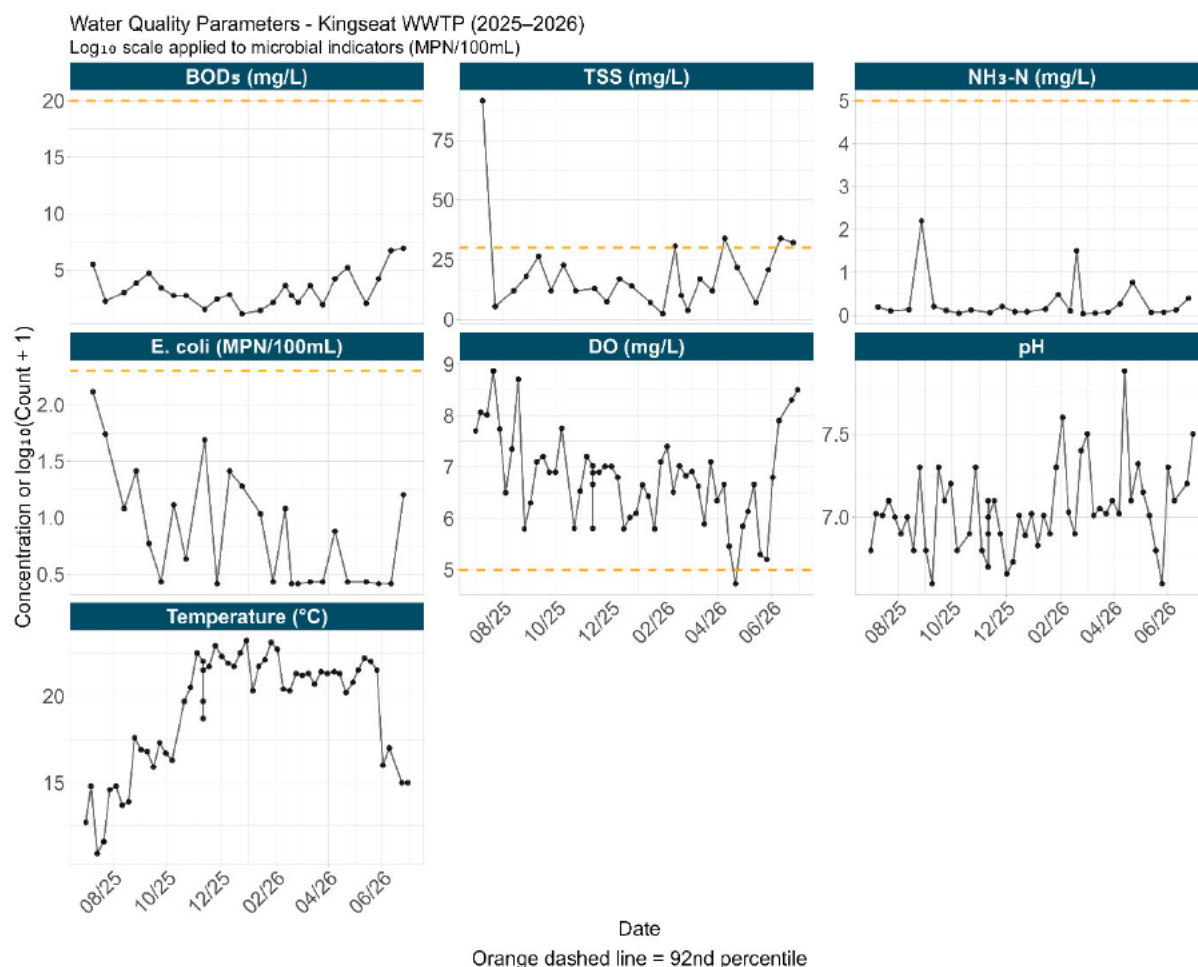


Figure 4-3. Temporal variation in effluent quality parameters at Kingseat WWTP (2025-2026).

4.2.2 Long term seasonality trends

Seasonal analysis was undertaken using a six-year dataset (1 July 2020 – 31 June 2026) for BOD₅, TSS, NH₃-N and *E. coli*. DO, pH and temperature were excluded due to shorter available data records (electronic data available from May 2023).

Kruskal–Wallis tests identified a significant seasonal signal in BOD₅ ($p < 0.001$), with higher concentrations during winter (Figure 4-4). Likely drivers include a combination of temperature-related reductions in biological activity and seasonal changes in hydraulic loading/process conditions, as the peak effluent volumes also peak in winter.

No other parameters exhibit significant trends between seasons.

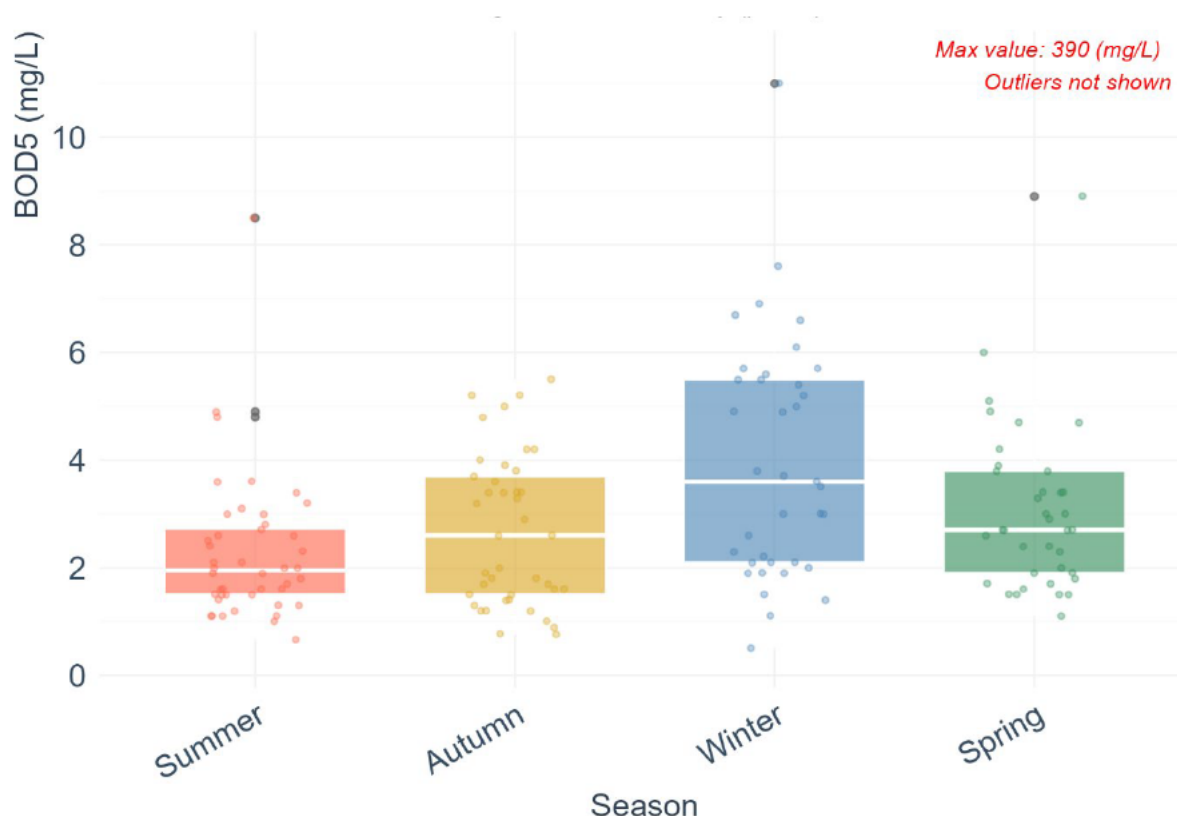


Figure 4-4. Seasonal variation in BOD₅ concentrations at Kingseat WWTP (2020–2026).
Boxes show median and interquartile range (IQR), points represent individual results.

4.2.3 Long term temporal trends

Trend analysis over the past six years (2020–2026) was undertaken using Mann–Kendall tests with Sen slope estimation to identify monotonic² changes in parameter concentrations. Parameters such as DO, pH, and temperature were excluded from this analysis. Results indicate:

- **NH₃-N:** Strong decreasing trend ($p < 0.001$), suggesting sustained improvement in nitrification performance.
- **TSS:** No significant trend. Previously, TSS had a weak but statistically significant increasing trend ($p < 0.05$) when considering the 2020–2025 dataset, indicating that solids removal has remained consistent, if not marginally improved, in 2025–2026.
- **BOD₅ and *E. coli*:** Stable with no significant trend.

² “Monotonic” means a variable consistently increases or decreases over time, without requiring the change to be linear. The Mann–Kendall test detects a persistent upward or downward direction in the data, even if year-to-year values fluctuate

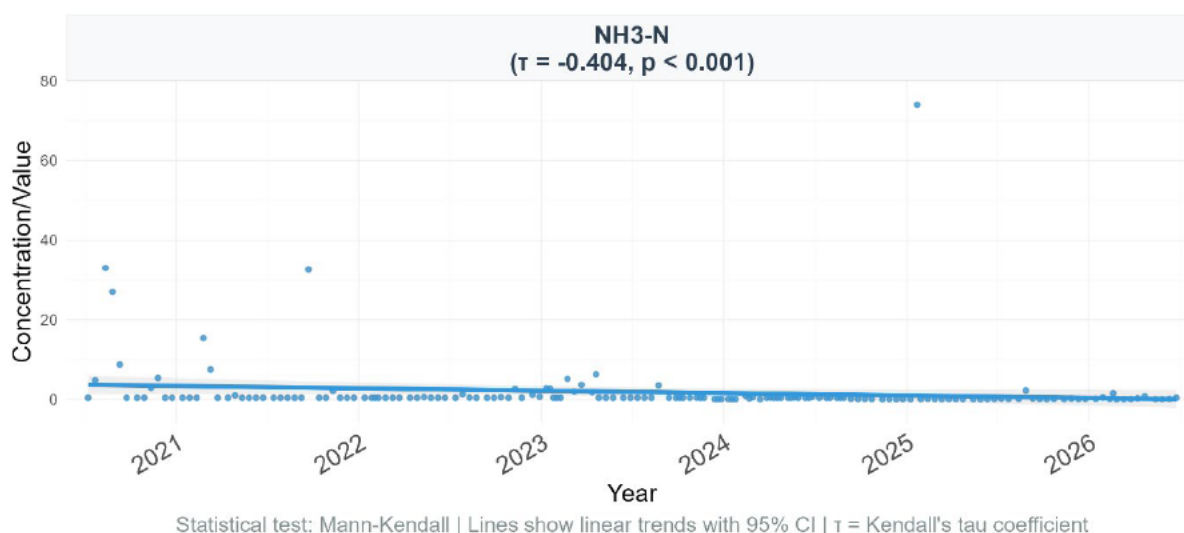


Figure 4-5. Statistically significant six-year trends in effluent quality parameters at Kingseat WWTP (2020–2026).

4.2.4 Summary

Overall, effluent quality at Kingseat WWTP in 2025–2026 was compliant with consent requirements, except for TSS which slightly exceeded the 92nd percentile limit. BOD₅, NH₃-N, DO, and *E. coli* remained well within consented thresholds, and ammonia showed a clear improving trend over the five-year record. Seasonality analyses confirmed elevated BOD₅ in cooler months, likely linked to biological processes and/or flow-related effects. All other parameters were stable over time and across seasons. These results indicate generally stable plant performance with one area of ongoing operational focus (TSS).

4.3 Complaints and incidents

No odour complaints were recorded under the air discharge consent (DIS60401927) during the 2025–2026 reporting period.

No unauthorised discharges, spills, or bypass events occurred.

5 ENVIRONMENTAL SAMPLING

Monitoring of the receiving environment was undertaken in spring (22 October 2025) and autumn (17 March 2026). In addition to the required monitoring sites (upstream (U/S), discharge mixing zone, and downstream (10 m, 50 m, 100 m, 300 m), post-UV results samples were taken for reference. The photographic record of the October 2025 survey is in Appendix E. A photographic record for March 2026 was not obtained.

Results from the 2025-2026 receiving environment sampling are presented in Table 5-1 and Table 5-2. Boxplot comparisons of long-term seasonal and spatial trends are illustrated in Figure 5-1 to Figure 5-3, for the period 2021-2026. Temperature measurements were not recorded during the sampling.

Sampling in both spring and autumn were constrained by dry conditions. Several upstream and mid-reach sites were dry, and water was manually extracted from sediments and vegetation to obtain a sample, which limits confidence in the TSS and bacterial measurements. This is a persistent issue across reporting periods due to the characteristics of the receiving environment.

The key findings were:

- Nutrients (NH₄-N, NO_x, TIN) were consistently higher in autumn than in spring, reflecting reduced dilution and low-flow conditions (Figure 4-2).
- *E. coli* concentrations downstream of the discharge point more closely reflect upstream concentrations than the quality of the effluent at the WWTP. Most results, excluding the post-UV samples, are above the safe thresholds for human contact (NPS-FM 2020, amended 2025). An investigation, detailed in the 2024-2025 annual report, indicated that the dominant source of *E. coli* is non-human, and is likely attributed to the surrounding agricultural land use.
- Concentrations of nutrients were elevated at the discharge mixing zone but declined downstream, signalling that the effluent is a localised source of nutrient input. The reducing downstream concentrations indicate some attenuation processes are occurring.
- pH and dissolved oxygen were typically higher in the post-UV, discharge mixing zone, and all downstream sites compared to the upstream site. The range is typical in small lowland streams.

Overall, the receiving environment continues to reflect the combined influence of treated wastewater effluent inputs and catchment land use, with a localised impact with increased nutrient concentrations because of the plant. These findings are consistent with previous years.

Table 5-1. Receiving environment monitoring results in spring (October 2025)

Arrows indicate changes compared to 2024–2025 (↑ increase, ↓ decrease, = no change).

Parameter	Post-UV	U/S	Discharge mixing zone	10 m D/S	50 m D/S	100 m D/S	300 m D/S
pH	7.5 (=)	6.4 (=)	6.9 (=)	6.8 (=)	6.6 (=)	6.8 (=)	6.8 (=)
cBOD ₅ (mg/L)	2 (=)	1.5 (↑)	2.5 (↓)	0.64 (↓)	1.5 (↑)	0.54 (↓)	0.66 (↓)
NH _x (mg/L)	0.08 (=)	0.006 (↓)	0.09 (↓)	0.01 (↓)	0.01 (=)	0.01 (↓)	0.01 (↓)

Parameter	Post-UV	U/S	Discharge mixing zone	10 m D/S	50 m D/S	100 m D/S	300 m D/S
NO _x (mg/L)	53 (↑)	1.3 (↓)	9.4 (↓)	3.8 (=)	3.2 (↓)	3.9 (=)	3.3 (↓)
TIN (mg/L)	53 (↑)	1.3 (↓)	9.5 (↓)	3.8 (=)	3.2 (↓)	3.9 (↓)	3.3 (↓)
TP (mg/L)	53 (↑)	1.3 (↓)	9.5 (↓)	3.8 (=)	3.2 (↓)	3.9 (↓)	3.3 (↓)
<i>E. coli</i> (MPN/100 mL)	1.6 (↓)	3,900 (↑)	55,000 (↓)	1,600 (↑)	4,100 (↑)	1,300 (↑)	1,400 (↑)
DO (%)	94 (↑)	48	64 (↓)	56	62	75	97 (=)

Table 5-2. Receiving environment monitoring results in autumn (March 2026)

Arrows indicate changes compared to 2024–2025 (↑ increase, ↓ decrease, = no change).

Parameter	Post-UV	U/S	Discharge mixing zone	10 m D/S	50 m D/S	100 m D/S	300 m D/S
pH	7.6 (=)	6.6 (=)	7.7 (=)	7.2 (↑)	7.3 (=)	7.3 (=)	7.5 (=)
cBOD ₅ (mg/L)	2.2 (=)	71 (↑)	18 (↑)	63 (↑)	0.51 (↑)	0.69 (=)	2 (↑)
NH _x (mg/L)	0.1 (↑)	0.56 (↑)	0.05 (↓)	0.26 (↑)	0.003 (↓)	0.007 (↓)	0.009 (↓)
NO _x (mg/L)	39 (=)	0.24 (↓)	43 (↑)	22 (↑)	23 (↑)	22 (↑)	14 (↑)
TIN (mg/L)	39 (=)	0.8 (↓)	43 (↑)	22 (↑)	23 (↑)	22 (↑)	14 (↑)
TP (mg/L)	39 (=)	0.8 (↓)	43 (↑)	22 (↑)	23 (↑)	22 (↑)	14 (↑)
<i>E. coli</i> (MPN/100 mL)	0.8 (↓)	21,000 (↑)	410 (↓)	9,600 (↑)	500 (↑)	430 (↑)	750 (↑)
DO (%)	87 (↑)	52	87 (↓)	67	81	74	95 (=)

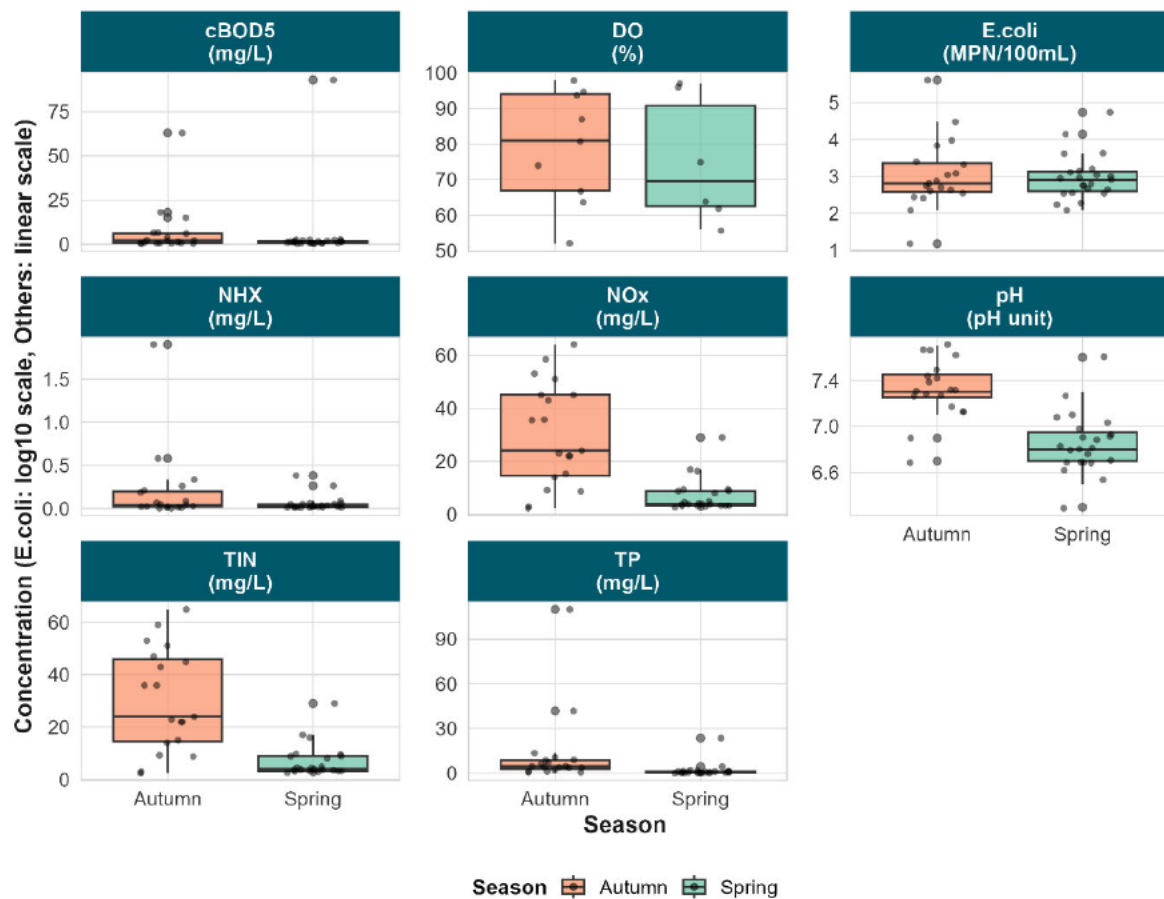


Figure 5-1. Seasonal comparison of receiving environment water quality parameters at Kingseat WWTP (2021–2026).

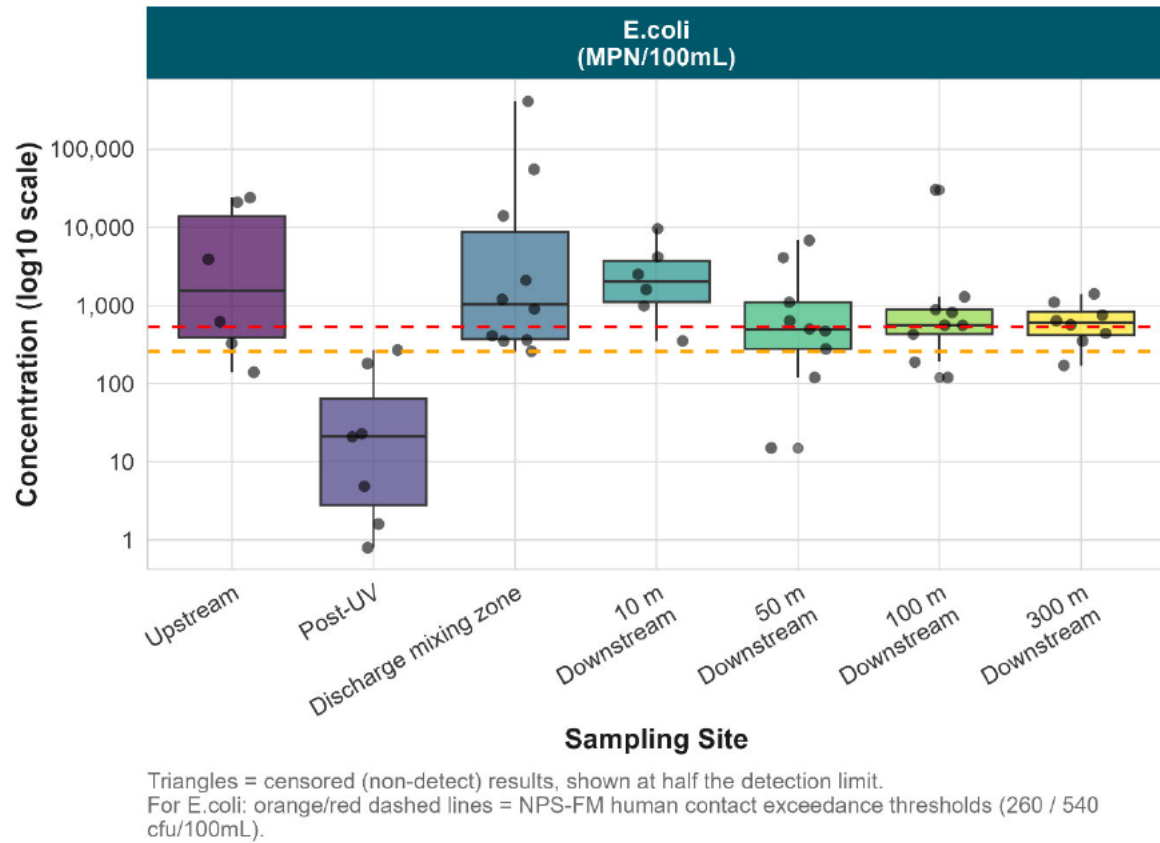


Figure 5-2. Spatial comparison of microbiological water quality (E. coli) at Kingseat WWTP (2021–2026).

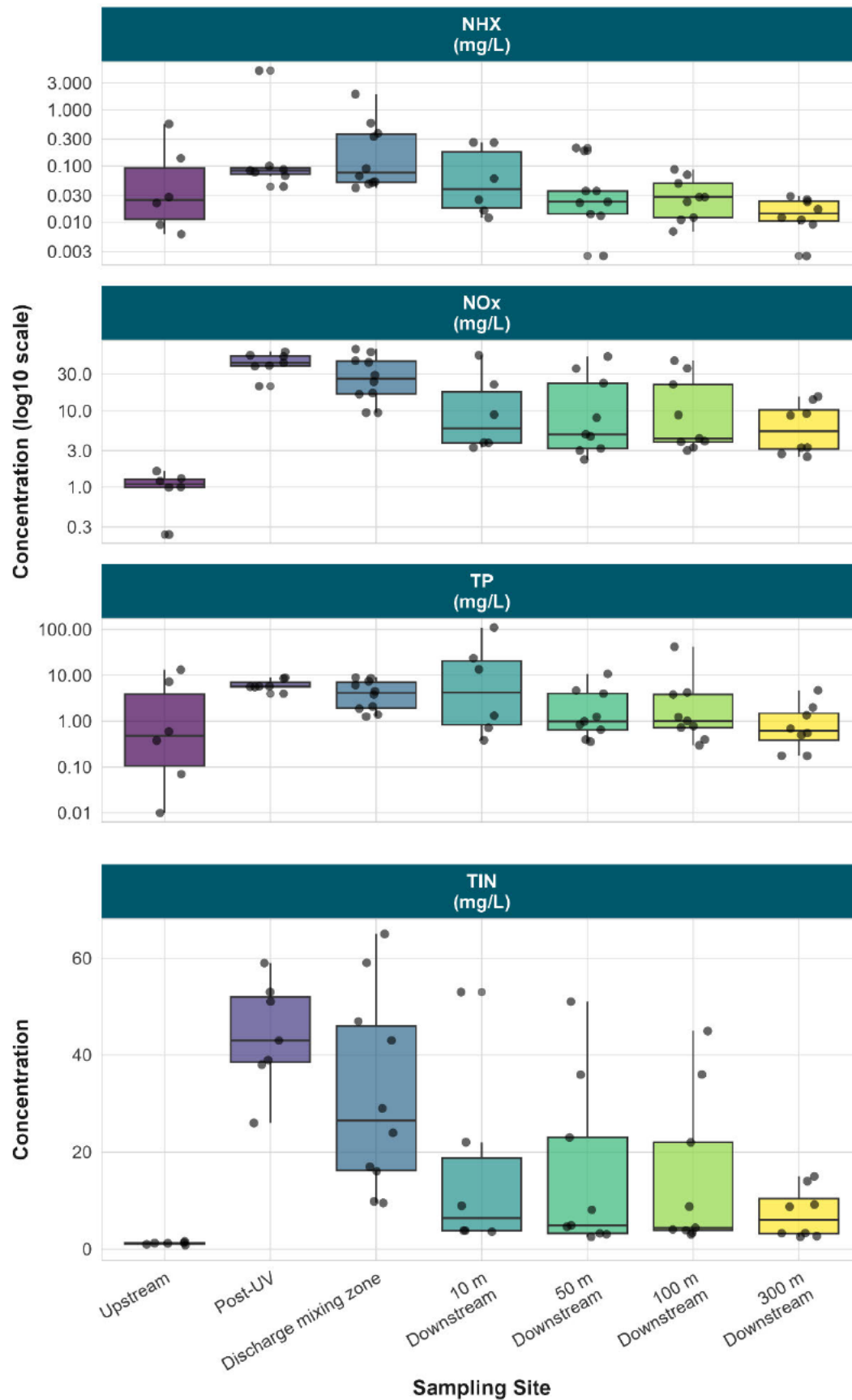


Figure 5-3. Spatial comparison of nutrient concentrations at Kingseat WWTP (2021–2026).

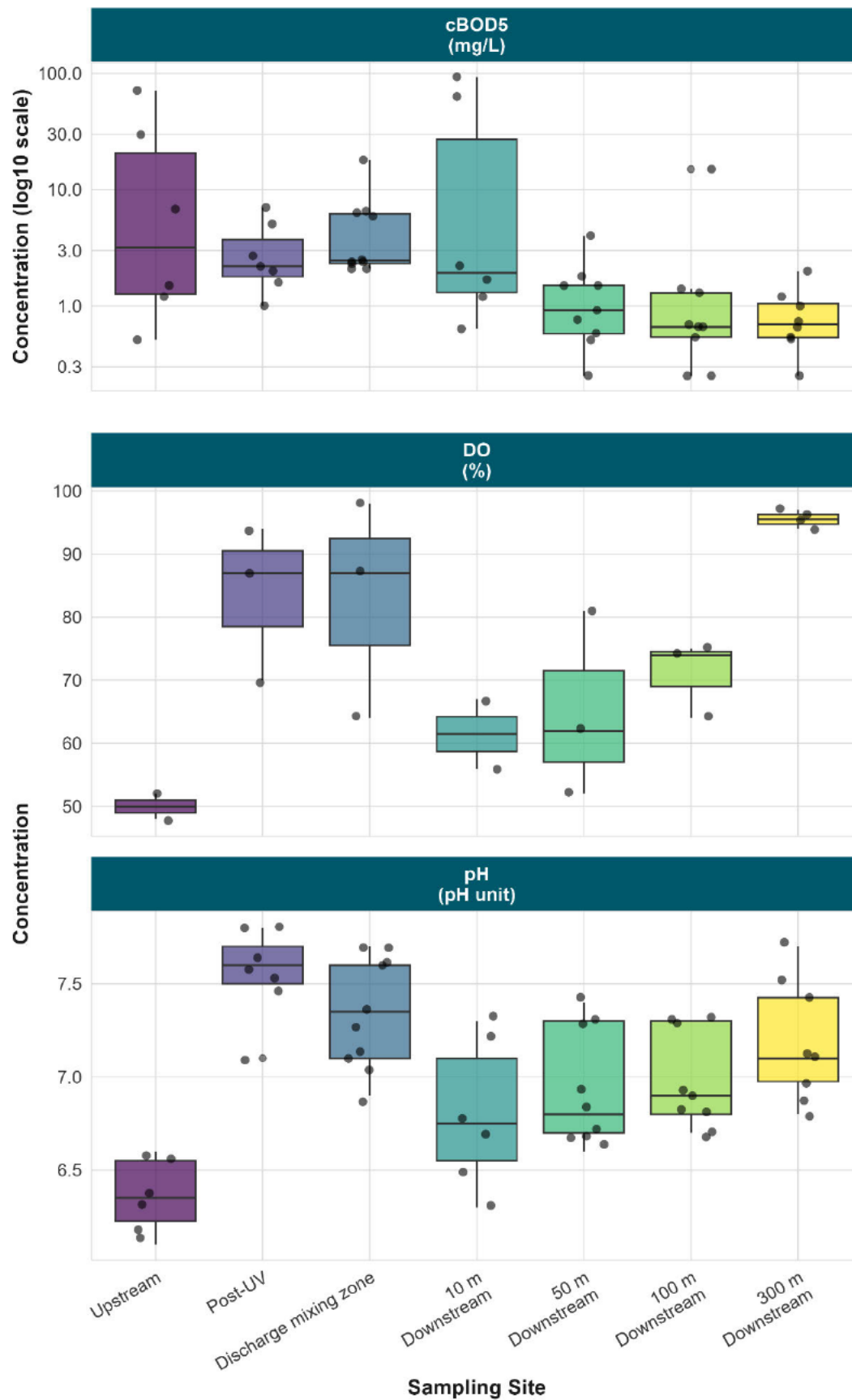


Figure 5-4. Spatial comparison of physiochemical parameters at Kingseat WWTP (2021–2026).

6 CONCLUSION

The WWTP generally complied with its consent requirements during 2025–2026, with the principal exception being the rolling 92nd-percentile total suspended solids limit. Operational improvements implemented during the year appear to have improved solids-management performance, although continued monitoring is required to confirm sustained compliance as earlier elevated results roll out of the 12-month assessment period. Seasonal and trend analyses highlighted the importance of biological and/or hydraulic factors influencing BOD₅, while ammonia showed improvement over the six-year record.

The plant complied with the discharge-volume requirement (with at least 98% of applicable daily discharge volumes remaining at or below 38 m³/day) after applying the rainfall exclusions. However, elevated daily discharge volumes occurred during the year, including individual non-excluded days above 38 m³/day, indicating potential future capacity constraints. Discharge volumes also showed a clear response to rainfall, consistent with ongoing inflow and infiltration within the wastewater network. While these elevated flows did not result in a non-compliance, continued management of inflow and infiltration is important to maintain compliance, particularly during wet-weather periods.

No complaints or incidents were recorded. The commissioning of a new backwash filter in September 2025 has strengthened solids removal and UV disinfection performance. In previous reporting periods, TSS had an increasing trend over the years, however there is no longer an increasing trend in 2025–2026.

Receiving environment monitoring indicated that the discharge exerts a localised influence on the nutrient concentration within the stream, with some downstream attenuation. Elevated *E. coli* within the stream is strongly linked to the surrounding agricultural land use, and the WWTP is not a dominant contributor.

In summary, the Kingseat WWTP is performing effectively with only one non-compliance. Robust compliance and monitoring systems are in place to manage potential effects on the receiving environment.

Receiving-environment monitoring did not identify evidence of significant adverse effects attributable to the discharge, although interpretation is constrained by the intermittent nature of the receiving stream and other catchment influences.

Appendix A. Assessment of compliance

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
01	The consents must be carried out in accordance with the documents and drawings and all supporting additional information submitted with the application, as detailed in the consent, and all referenced by the council as resource consent numbers DIS60401948 and DIS60401927.	1	Compliant
02	Under section 125 of the RMA, these consents lapse five years after the date they have been granted unless: a. The consents are given effect to; or b. The council extends the period after which the consents lapse.	1	Compliant
03	The consent holder must pay the council an initial consent compliance monitoring charge of \$1,026 (inclusive of GST), plus any further monitoring charge or charges to recover the actual and reasonable costs incurred to ensure compliance with the conditions attached to this consent.	1	Compliant
04	Wastewater Discharge Permit DIS60401948 and Air Discharge Permit DIS60401927 must expire on 31 December 2032 unless they have lapsed, been surrendered or been cancelled at an earlier date pursuant to the RMA.	1	Compliant
05	Under section 128 of the RMA, the conditions of these consents may be reviewed by the council at the consent holder's cost: In October 2023 and every year thereafter following commencement of consent in order: i. To vary the size or design of the treatment system and method of discharge in light of increased understanding of the system or further information, changed circumstances, or the results of monitoring; and/or ii. To alter monitoring requirements in light of previous monitoring results and/or changed environmental conditions or circumstances; and/or	1	Compliant

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
	iii. To deal with any significant adverse effect on the environment which may arise from the exercise of the consent and which was not apparent at the time of the granting of the consent; and/or iv. To require the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment, including measures to improve influent quality or influent volume and/or to make alterations to improve treatment plant efficiency and/or to reduce I&I into the plant and/or to improve discharge quality and/or discharge regime.		
06	Access to the relevant parts of the site properties must be maintained and be available at all reasonable times to enable the servants or agents of the council to carry out inspections, surveys, investigations, tests, measurements or take samples.	1	Compliant
07	Authorised Discharge Quantity - The discharge flow volume shall not exceed 38 cubic metres per day, in 98% of all daily flow readings, excluding all flow readings on days of or within 24 hours of 10mm rainfall or greater.	1	Compliant
08	The key system components shall be of at least the following dimensions and standards, or better: (a) Aerated Wastewater Treatment System comprising of: (1x) Lift Station; (1x) 30 m3 Flow Balancing Tank (1x) 49m3 Activated Sludge Aeration Tank; (1X) 2.5m Diameter Clarifier; (1x) UV Disinfection system (self cleaning and including intensity sensor with digital output); (1X) 30 m3 Activated Sludge Storage Tank (WAS Tank) (1x) Remote Telemetric Unit (within an enclosed cabinet) (b) Discharge Structure comprising:	1	As designed

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
	(1x) Discharge outlet pipe discharging into an intermittent stream at 1759450mE 5890190mN;		
09	The installation of wastewater treatment system upgrades shall be carried out under the supervision of a chartered professional engineer or appropriately qualified person, experienced in wastewater treatment and land disposal systems.	1	As supervised
10	The design and installation of any new system components must be carried out under the supervision of a chartered professional engineer or other appropriately qualified person experienced in the design and installation of wastewater treatment systems. Within three months of commencement of this consent, and within three months following the completion of any additional or replacement key system components, the supervising engineer/person must inspect all the new works and must certify in writing to the council that all additional components of the wastewater treatment system have been designed, inspected and installed in accordance with standard engineering practice and with the plans provided pursuant to condition 1 and any other plans or specifications required by the conditions of this consent.	1	Completed
11	Within three months of commencement of this consent, the consent holder must confirm whether any changes to the wastewater network have been made and provide the council with an updated plan of the wastewater network connected to the plant, indicating properties connected to the wastewater reticulation system draining to the treatment plant.	1	Plan updated and provided to Council.
Plant Operation Conditions			

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
12	Trade Waste - No trade waste or non-domestic wastes shall be discharged to the treatment plant at any time.	1	Covered by Trade Waste bylaw.
13	Contingency Provisions - All complaints received and system malfunctions regarding the wastewater treatment system must be logged by the consent holder. The consent holder must report this information to the council with the annual report required by condition 24 and must include an outline of action taken and any further action(s) proposed to remedy any such problems.	1	Compliant
14	Management Plan Conditions 14. A management plan for the wastewater treatment and disposal system must be prepared to enable compliance with the conditions of these consents and as necessary to ensure that any adverse effects on the environment are minimised. The plan must be forwarded to the council for approval within 3 months of commencement of these consents. The Management Plan must be in accordance with the conditions of these consents and is to cover the following: a. Reticulated Area – detailing the current and proposed future reticulated areas which the plant will service; b. UV Operations Plan - explaining how the UV system is designed and operated to achieve a 4-log reduction of bacteria and viruses through the wastewater treatment plant; c. Plant Operation – specifications of the discharge regime which must cover how the discharge will be managed to ensure compliance with consent conditions; d. Inspection and Maintenance – outlining the practices and procedures with respect to inspection and maintenance to be adopted to ensure compliance with the conditions of consent;	1	The Kingseat WWTP has a single management plan that relates to its resource consent. Watercare recently updated the plan in July 2023 and provided a copy to Auckland Council.

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
	e. Effluent and Receiving Environment Monitoring and Reporting – outlining the practices and procedures to be adopted with respect to monitoring and reporting to demonstrate on-going compliance with the conditions of consent; and f. Contingency Plans – outlining the practices and procedures to be adopted with respect to contingency and incident response planning in order to avoid non-compliance with conditions of consent. g. Procedures to minimise discharges of odour, including details of the inspection, maintenance, monitoring, and contingency procedures in place. The Management Plan must be prepared under the supervision of an engineer or other person experienced in wastewater engineering for the wastewater treatment and disposal system.		
15	The consent holder must comply with the requirements of the approved management plan. All subsequent significant updates to the approved plan throughout the term of this consent must be submitted to Auckland Council for review and feedback.	1	Compliant.
Monitoring and Reporting Conditions			
16	Flow Monitoring - The consent holder must measure effluent discharge flow volume from the plant continuously. The flow measuring device must be capable of providing cumulative measurements to an accuracy of plus or minus 5%. The meter must be installed in accordance with the manufacturer's specifications and must be maintained in good working order at all times. The flow meter must be read on the same time of each consecutive day and the results recorded.	1	Ongoing.

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
17	Sample Monitoring - The consent holder must collect a sample of the discharge on the same day and time of each consecutive month, in accordance with the date specified in the approved management plan and the samples must be analysed for the following parameters specified in condition 18.	1	Ongoing.
18	Discharge Quality Standards - The consent holder must ensure that the quality of the wastewater discharged is equal to or better than the following parameter concentrations: Parameter Maximum 92 Percentile (Rolling Limit)¹ Biochemical Oxygen Demand(BOD5) 20 mg/L Total Suspended Solids (TSS) 30 mg/L Dissolved Oxygen (DO) 5 mgO/L Ammonia (NH3) 5 mgN/L Escherichia Coli (E.coli) 200 MPN (or CFU) /100ml 1 The rolling limit is based on the past 12 monthly samples (taken over the previous 12 months).	2	92 nd percentile TSS limits not achieved during reporting year. Non-compliance was identified through routine monitoring; ongoing operational improvements (e.g. installation of backwash filter in September 2025) are expected to reduce exceedances.
19	Monitoring Methods 19. Samples required by condition 18 and condition 21 must be collected and analysed in accordance with the latest edition of “Standard Methods for the Examination of Water and Wastewater”, published by the American Public Health Association, the Water Environment Federation, and the American Water Works Association or to an equivalent standard approved in writing by Auckland Council. Sample analysis must be undertaken by an IANZ accredited laboratory.	1	Compliant.
20	Environmental Monitoring - The consent holder shall collect photographic records in March and September each year of the watercourse and surrounding vegetation, at the following locations: i. 1 site 10m or less upstream of the discharge point; ii. 3 sites along the stream in the 62a McRobbie Road property, at	2	Monitoring undertaken in October 2025 and March 2026. A photographic record of the 300 m downstream site was missed in

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
	approximately 10m, 50m and 100m downstream of the discharge point, and iii. 1 site approximately 300m downstream of the discharge point where the stream approaches McRobbie Road.		October 2025, and no photographic record was obtained in March 2026.
21	On the same day that the discharge sample is collected in March each year, the consent holder shall undertake sampling to determine stream water quality at one point upstream and at other points approximately 10 m, 50 m and 100 m downstream of the discharge point (equivalent to the four points defined in items i. and ii. in the above condition for the collection of photographic records). Samples shall be monitored for the following parameters: i. pH ii. Temperature iii. Biochemical Oxygen Demand (BOD5) mg O₂/L iv. Dissolved Oxygen (DO) mg O₂/L v. Ammonia (NH₃) mg N/L vi. Total inorganic nitrogen mg N/L vii. Total Phosphorus mg P/L viii. <i>Escherichia coli</i> (<i>E.coli</i>) MPN (or CFU)/100ml	2	Stream sampling completed on 17 March 2026. It is noted that very low or no flows at 10 m upstream and 10 m downstream sites often limit sampling, consistent with previous years. No temperature results were recorded.
22	In the event of two consecutive results within twelve months for any single parameter not complying with the limits specified above, the consent holder must notify the council as soon as practicable of the exceedance in writing, outline the mitigation measures taken and advise any further measures proposed to ensure compliance. If so instructed by the Council, the consent holder must increase the frequency of monitoring for that parameter to weekly for a specified period.	1	Compliant

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
23	The results of the monitoring required by the conditions in this consent must be reported to the council by the consent holder in a quarterly monitoring report within 20 working days of the period ending 31 March, 30 June, 30 September and 31 December each year.	1	Compliant
24	The consent holder must also provide an annual report by 30 September each year to the council that: a) Summarises all plant performance data, environmental monitoring and photographs collected for the year ending 30 June; b) Compares and analyse the plant performance data against past and anticipated future plant performance data to provide an overview of plant performance; c) Compares and provide an assessment of change in the photographs and stream water quality analyses (as required by conditions 19 and 20) against previous photographic records and stream monitoring records; d) Recommends measures to mitigate any significant adverse effects of the discharge on the receiving environment. e) Includes an update of any remedial works done to address inflow and infiltration to the network.	1	This report has been provided to Council in September 2026, meeting the consent requirement.
25	A copy of the annual report must be sent by the consent holder to Ngāti Tamaoho and Te Ākitai Waiohū by 30 September each year.	1	A copy of this report was sent to mana whenua in September 2026.
26	Odour Conditions - Beyond the boundary of the site, there must be no odour caused by discharges from the site, which in the opinion of an enforcement officer, is the cause of a noxious, dangerous, offensive or objectionable effect.	1	Compliant.

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
27	The meteorological conditions and proximity of sensitive receptors must be considered prior to undertaking any potentially odorous activities at the site.	1	Compliant.

Appendix B. Discharge flows and rainfall

Date	Discharge Volume (m ³)	Rainfall (mm)	Date (continued)	Discharge Volume (m ³)	Rainfall (mm)
1/07/2025	37.5	0.5	1/01/2026	21.3	0.5
2/07/2025	37.5	0.5	2/01/2026	25.1	31.5
3/07/2025	37.5	36.0	3/01/2026	37.5	27.0
4/07/2025	41.2	16.5	4/01/2026	33.4	0.0
5/07/2025	45.7	8.0	5/01/2026	29.9	0.0
6/07/2025	37.5	0.0	6/01/2026	18.6	0.0
7/07/2025	37.5	0.0	7/01/2026	18.1	0.0
8/07/2025	37.5	0.0	8/01/2026	23.6	0.0
9/07/2025	25.6	1.0	9/01/2026	18.9	0.0
10/07/2025	23.3	15.0	10/01/2026	20.5	0.0
11/07/2025	70.8	51.5	11/01/2026	22.6	0.0
12/07/2025	105.0	2.5	12/01/2026	25.0	0.0
13/07/2025	56.5	0.0	13/01/2026	17.6	0.0
14/07/2025	39.4	2.0	14/01/2026	20.5	4.0
15/07/2025	37.5	6.0	15/01/2026	24.4	29.5
16/07/2025	37.5	0.5	16/01/2026	30.6	2.0
17/07/2025	37.5	12.5	17/01/2026	25.2	0.0
18/07/2025	37.5	2.0	18/01/2026	20.6	8.0
19/07/2025	37.5	0.0	19/01/2026	27.5	7.0
20/07/2025	37.5	0.0	20/01/2026	22.3	15.0
21/07/2025	33.3	0.0	21/01/2026	37.5	66.0
22/07/2025	23.4	2.5	22/01/2026	70.5	2.0
23/07/2025	19.6	0.0	23/01/2026	37.5	7.5
24/07/2025	20.6	0.0	24/01/2026	37.5	8.0
25/07/2025	19.1	0.0	25/01/2026	23.3	9.0
26/07/2025	24.9	0.0	26/01/2026	29.3	4.5
27/07/2025	25.3	0.0	27/01/2026	17.9	0.5
28/07/2025	22.6	0.0	28/01/2026	16.3	0.0
29/07/2025	39.0	75.0	29/01/2026	10.4	0.0
30/07/2025	109.3	1.5	30/01/2026	18.9	0.0
31/07/2025	56.0	0.5	31/01/2026	23.7	0.0
1/08/2025	42.3	0.5	1/02/2026	25.6	0.0
2/08/2025	37.5	0.0	2/02/2026	24.7	7.5

Date	Discharge Volume (m ³)	Rainfall (mm)	Date (continued)	Discharge Volume (m ³)	Rainfall (mm)
3/08/2025	37.5	0.0	3/02/2026	22.0	0.5
4/08/2025	33.6	0.0	4/02/2026	23.6	2.0
5/08/2025	20.5	0.0	5/02/2026	23.6	0.5
6/08/2025	22.5	0.5	6/02/2026	19.7	0.0
7/08/2025	20.2	0.0	7/02/2026	23.0	0.0
8/08/2025	30.7	11.5	8/02/2026	25.0	0.0
9/08/2025	30.2	2.0	9/02/2026	26.0	0.0
10/08/2025	29.7	0.0	10/02/2026	17.1	0.0
11/08/2025	24.7	0.0	11/02/2026	28.7	0.0
12/08/2025	15.3	0.0	12/02/2026	21.2	2.0
13/08/2025	20.9	0.0	13/02/2026	31.1	2.0
14/08/2025	24.7	0.0	14/02/2026	31.9	4.5
15/08/2025	20.3	0.0	15/02/2026	26.3	4.0
16/08/2025	17.3	6.0	16/02/2026	30.3	0.0
17/08/2025	31.5	2.5	17/02/2026	20.0	2.5
18/08/2025	27.6	9.0	18/02/2026	30.7	0.0
19/08/2025	29.5	10.5	19/02/2026	20.9	0.5
20/08/2025	27.5	0.0	20/02/2026	23.5	0.0
21/08/2025	15.1	0.0	21/02/2026	25.5	0.0
22/08/2025	25.9	0.0	22/02/2026	29.4	0.0
23/08/2025	26.2	0.0	23/02/2026	25.3	0.0
24/08/2025	23.5	0.0	24/02/2026	21.9	0.0
25/08/2025	17.2	0.0	25/02/2026	28.9	0.0
26/08/2025	19.2	0.0	26/02/2026	20.5	0.0
27/08/2025	25.9	0.5	27/02/2026	29.3	0.0
28/08/2025	16.0	0.5	28/02/2026	20.3	2.0
29/08/2025	27.9	11.0	1/03/2026	30.2	0.5
30/08/2025	23.0	1.5	2/03/2026	30.6	0.0
31/08/2025	22.6	27.0	3/03/2026	19.3	0.0
1/09/2025	37.5	1.0	4/03/2026	27.4	0.0
2/09/2025	25.8	0.5	5/03/2026	27.4	0.0
3/09/2025	21.7	0.5	6/03/2026	22.0	0.0
4/09/2025	16.5	0.0	7/03/2026	22.3	0.0

Date	Discharge Volume (m ³)	Rainfall (mm)	Date (continued)	Discharge Volume (m ³)	Rainfall (mm)
5/09/2025	27.4	0.0	8/03/2026	32.3	0.0
6/09/2025	22.2	18.0	9/03/2026	26.5	0.0
7/09/2025	26.6	2.0	10/03/2026	19.5	0.0
8/09/2025	25.6	0.0	11/03/2026	30.0	0.0
9/09/2025	14.4	5.0	12/03/2026	18.1	0.0
10/09/2025	31.4	4.0	13/03/2026	29.3	5.5
11/09/2025	17.3	8.5	14/03/2026	20.5	0.5
12/09/2025	37.5	21.0	15/03/2026	28.4	0.0
13/09/2025	37.5	3.0	16/03/2026	30.1	0.0
14/09/2025	37.5	2.0	17/03/2026	22.4	0.0
15/09/2025	31.9	0.5	18/03/2026	24.2	0.0
16/09/2025	22.1	0.0	19/03/2026	24.7	0.0
17/09/2025	19.9	0.0	20/03/2026	23.7	0.0
18/09/2025	33.6	32.5	21/03/2026	27.4	0.0
19/09/2025	31.2	3.0	22/03/2026	19.5	0.0
20/09/2025	27.5	0.0	23/03/2026	31.2	0.0
21/09/2025	24.9	0.5	24/03/2026	23.6	0.0
22/09/2025	24.6	0.5	25/03/2026	23.2	1.5
23/09/2025	18.4	7.5	26/03/2026	44.1	79.0
24/09/2025	37.5	26.0	27/03/2026	37.5	4.0
25/09/2025	35.4	1.0	28/03/2026	37.5	0.0
26/09/2025	26.4	7.0	29/03/2026	37.5	5.0
27/09/2025	28.4	0.0	30/03/2026	37.5	2.5
28/09/2025	30.7	0.0	31/03/2026	25.9	0.0
29/09/2025	28.3	1.5	1/04/2026	27.4	0.0
30/09/2025	18.5	0.0	2/04/2026	22.8	0.0
1/10/2025	21.5	0.0	3/04/2026	28.1	0.0
2/10/2025	21.3	2.0	4/04/2026	22.6	0.0
3/10/2025	30.1	19.5	5/04/2026	27.0	0.0
4/10/2025	30.8	7.5	6/04/2026	24.9	0.0
5/10/2025	26.6	1.0	7/04/2026	19.3	0.5
6/10/2025	26.8	3.0	8/04/2026	31.7	5.5
7/10/2025	28.6	15.0	9/04/2026	24.1	30.0

Date	Discharge Volume (m ³)	Rainfall (mm)	Date (continued)	Discharge Volume (m ³)	Rainfall (mm)
8/10/2025	26.5	0.0	10/04/2026	29.0	0.0
9/10/2025	24.0	0.0	11/04/2026	21.4	0.0
10/10/2025	24.1	0.5	12/04/2026	39.3	2.0
11/10/2025	20.4	0.0	13/04/2026	37.5	51.5
12/10/2025	27.2	0.0	14/04/2026	37.5	3.5
13/10/2025	0.0	0.5	15/04/2026	37.5	11.5
14/10/2025	37.5	31.5	16/04/2026	37.5	12.0
15/10/2025	17.1	0.0	17/04/2026	37.2	3.0
16/10/2025	0.0	0.5	18/04/2026	24.9	0.5
17/10/2025	25.1	0.0	19/04/2026	37.5	0.5
18/10/2025	18.9	0.0	20/04/2026	26.5	28.5
19/10/2025	27.3	0.0	21/04/2026	18.9	8.5
20/10/2025	22.4	0.0	22/04/2026	25.3	0.0
21/10/2025	21.7	0.0	23/04/2026	24.7	0.0
22/10/2025	20.2	14.0	24/04/2026	37.5	5.5
23/10/2025	18.9	11.5	25/04/2026	36.6	15.0
24/10/2025	27.3	3.0	26/04/2026	28.1	0.0
25/10/2025	22.5	0.5	27/04/2026	30.2	0.0
26/10/2025	20.8	1.5	28/04/2026	25.4	0.0
27/10/2025	25.2	4.5	29/04/2026	25.5	0.0
28/10/2025	32.2	19.5	30/04/2026	20.3	0.5
29/10/2025	24.4	0.5	1/05/2026	28.6	0.0
30/10/2025	21.5	0.0	2/05/2026	22.4	0.0
31/10/2025	23.1	0.0	3/05/2026	34.5	0.0
1/11/2025	17.7	0.0	4/05/2026	23.6	0.0
2/11/2025	21.8	0.0	5/05/2026	20.4	2.5
3/11/2025	31.5	0.0	6/05/2026	30.0	0.0
4/11/2025	16.2	0.0	7/05/2026	25.9	0.0
5/11/2025	23.8	0.0	8/05/2026	19.5	7.0
6/11/2025	16.5	0.0	9/05/2026	30.1	6.0
7/11/2025	21.7	0.0	10/05/2026	26.7	1.5
8/11/2025	20.4	1.0	11/05/2026	28.6	1.0
9/11/2025	22.5	0.5	12/05/2026	26.3	0.0

Date	Discharge Volume (m ³)	Rainfall (mm)	Date (continued)	Discharge Volume (m ³)	Rainfall (mm)
10/11/2025	29.4	9.0	13/05/2026	22.6	0.0
11/11/2025	24.3	2.5	14/05/2026	25.5	0.0
12/11/2025	24.4	20.5	15/05/2026	30.6	0.0
13/11/2025	37.5	3.5	16/05/2026	22.8	0.0
14/11/2025	33.0	0.5	17/05/2026	29.9	0.0
15/11/2025	27.7	3.5	18/05/2026	30.7	0.0
16/11/2025	25.9	0.0	19/05/2026	18.4	0.0
17/11/2025	26.1	0.0	20/05/2026	25.4	0.0
18/11/2025	23.4	53.0	21/05/2026	26.0	0.0
19/11/2025	45.9	10.0	22/05/2026	26.4	0.0
20/11/2025	37.5	3.5	23/05/2026	24.9	0.0
21/11/2025	37.5	0.0	24/05/2026	29.4	0.0
22/11/2025	36.9	0.0	25/05/2026	31.7	0.0
23/11/2025	26.5	0.0	26/05/2026	21.9	0.0
24/11/2025	22.4	0.0	27/05/2026	26.1	0.0
25/11/2025	19.9	0.0	28/05/2026	28.0	0.5
26/11/2025	16.2	0.0	29/05/2026	19.8	0.0
27/11/2025	23.0	0.0	30/05/2026	28.1	0.0
28/11/2025	21.5	0.5	31/05/2026	24.3	0.5
29/11/2025	20.1	0.5	1/06/2026	32.0	11.0
30/11/2025	35.9	58.5	2/06/2026	33.0	27.0
1/12/2025	30.8	0.0	3/06/2026	22.0	5.0
2/12/2025	24.0	1.5	4/06/2026	24.6	3.0
3/12/2025	25.2	8.5	5/06/2026	30.2	9.6
4/12/2025	23.9	1.0	6/06/2026	23.3	3.4
5/12/2025	23.4	0.0	7/06/2026	32.7	0.7
6/12/2025	18.3	0.0	8/06/2026	30.5	0.7
7/12/2025	27.3	0.0	9/06/2026	23.9	2.6
8/12/2025	16.4	0.0	10/06/2026	21.9	0.0
9/12/2025	20.9	0.0	11/06/2026	25.9	0.0
10/12/2025	20.1	0.0	12/06/2026	29.4	0.0
11/12/2025	12.3	0.0	13/06/2026	25.4	0.0
12/12/2025	20.5	0.0	14/06/2026	31.0	0.0

Date	Discharge Volume (m ³)	Rainfall (mm)	Date (continued)	Discharge Volume (m ³)	Rainfall (mm)
13/12/2025	21.6	0.0	15/06/2026	30.1	0.5
14/12/2025	20.8	0.0	16/06/2026	20.9	3.0
15/12/2025	27.4	0.0	17/06/2026	24.2	0.5
16/12/2025	13.9	14.0	18/06/2026	26.5	1.0
17/12/2025	20.8	2.0	19/06/2026	25.8	0.5
18/12/2025	25.5	0.0	20/06/2026	25.6	0.0
19/12/2025	13.8	5.5	21/06/2026	31.4	1.0
20/12/2025	23.0	0.5	22/06/2026	26.4	0.5
21/12/2025	22.1	0.0	23/06/2026	22.6	1.0
22/12/2025	21.0	2.0	24/06/2026	37.5	55.5
23/12/2025	21.7	0.5	25/06/2026	30.9	4.0
24/12/2025	23.8	3.5	26/06/2026	33.0	4.0
25/12/2025	24.2	0.0	27/06/2026	28.7	0.0
26/12/2025	14.8	11.5	28/06/2026	29.3	0.0
27/12/2025	25.4	1.0	29/06/2026	32.9	0.0
28/12/2025	21.5	0.0	30/06/2026	25.7	0.0
29/12/2025	14.4	3.0			
30/12/2025	21.6	2.5			
31/12/2025	14.5	26.5			

Appendix C. Effluent quality results

Date	TSS (mg/L)	cBOD5 (mg/L)	NHX-N (mg/L)	E. coli (MPN/100mL)	Dissolved Oxygen (mg/L)	Temperature (°C)	pH
1/07/2025					7.7	12.7	6.8
7/07/2025					8.06	14.8	7.02
9/07/2025	91.5	5.5	0.19	130			
14/07/2025					8.01	10.9	7.01
21/07/2025					8.87	11.6	7.1
21/07/2025					8.87	11.6	7.1
23/07/2025	5.4	2.2	0.097	54			
28/07/2025					7.74	14.6	7
4/08/2025					6.5	14.8	6.9
11/08/2025					7.35	13.7	7
13/08/2025	12	3	0.13	11			
18/08/2025					8.7	13.9	6.8
25/08/2025					5.8	17.6	7.3
27/08/2025	18	3.8	2.2	25			
1/09/2025					6.3	16.9	6.8
8/09/2025					7.1	16.8	6.6
10/09/2025	26.4	4.7	0.2	4.9			
15/09/2025					7.2	15.9	7.3
22/09/2025					6.9	17.3	7.1
24/09/2025	12	3.4	0.11	1.7			
29/09/2025					6.9	16.7	7.2
6/10/2025					7.75	16.3	6.8
8/10/2025	22.8	2.7	0.041	12			
20/10/2025					5.81	19.7	6.9
22/10/2025	12	2.7	0.12	3.3			
27/10/2025					6.53	20.5	7.3
3/11/2025					7.2	22.5	6.8
10/11/2025					7.02	22	6.7
10/11/2025					6.66	18.7	7.1

Date	TSS (mg/L)	cBOD5 (mg/L)	NHX-N (mg/L)	E. coli (MPN/100mL)	Dissolved Oxygen (mg/L)	Temperature (°C)	pH
10/11/2025					5.81	19.7	6.9
10/11/2025					6.89	21.5	7
12/11/2025	13	1.5	0.058	48			
17/11/2025					6.9	21.7	7.1
24/11/2025					7.01	22.9	6.9
26/11/2025	7.4	2.4	0.2	1.6			
1/12/2025					7.01	22.3	6.66
8/12/2025					6.8	21.9	6.73
10/12/2025	17	2.8	0.078	25			
15/12/2025					5.8	21.7	7.01
22/12/2025					6.02	22.5	6.89
24/12/2025	14	1.1	0.078	18			
29/12/2025					6.1	23.2	7.02
5/01/2026					6.65	20.3	6.83
12/01/2026					6.43	21.7	7.01
14/01/2026	7	1.4	0.14	9.8			
19/01/2026					5.8	22.1	6.9
26/01/2026					7.1	23.1	7.3
28/01/2026	2.4	2.1	0.48	1.7			
2/02/2026					7.4	22.7	7.6
9/02/2026					6.51	20.4	7.03
11/02/2026	30.8	3.6	0.096	11			
16/02/2026					7.02	20.3	6.9
18/02/2026	10	2.7	1.5	1.6			
23/02/2026					6.83	21.3	7.4
25/02/2026	3.8	2.1	0.031	1.6			
2/03/2026					6.91	21.2	7.5
9/03/2026					6.62	21.3	7.01
11/03/2026	17	3.6	0.047	1.7			

Date	TSS (mg/L)	cBOD5 (mg/L)	NHX-N (mg/L)	E. coli (MPN/100mL)	Dissolved Oxygen (mg/L)	Temperature (°C)	pH
16/03/2026					5.89	20.7	7.05
23/03/2026					7.1	21.4	7.02
25/03/2026	12	1.9	0.07	1.7			
30/03/2026					6.35	21.3	7.1
7/04/2026					6.66	21.4	7.02
8/04/2026	34	4.2	0.26	6.6			
13/04/2026					5.46	21.3	7.88
20/04/2026					4.73	20.2	7.1
22/04/2026	21.8	5.2	0.76	1.7			
28/04/2026					5.85	20.8	7.32
4/05/2026					6.13	21.5	7.15
11/05/2026					6.66	22.2	7.01
13/05/2026	7	2	0.065	1.7			
18/05/2026					5.3	22	6.8
25/05/2026					5.2	21.5	6.6
27/05/2026	20.8	4.2	0.068	1.6			
1/06/2026					6.8	16	7.3
8/06/2026					7.9	17	7.1
10/06/2026	34	6.7	0.12	1.6			
22/06/2026					8.3	15	7.2
24/06/2026	32.2	6.9	0.39	15			
29/06/2026					8.5	15	7.5

Appendix D. Data Sources

Table 6-1: Download location of environmental monitoring data used in this report

Category	Parameter	Source platform	Tag/ID
Effluent volume	Daily effluent discharge	Pi	DTKGS_55_FQI_001_VOLUME24H
Environmental – External	Rainfall	Auckland Council Environmental Data Portal	Location – Karaka (Waitangi @ Diver Road, reference site)
Effluent quality	cBOD ₅	Pi	DTKGS_48_13_UVE_BOD
Effluent quality	TSS	Pi	DTKGS_48_13_UVE_TSS
Effluent quality	NH ₄ -N (Ammoniacal N)	Pi	DTKGS_48_13_UVE TNH3N
Effluent quality	E. Coli	Pi	DTKGS_48_13_UVE_ECOLI
Effluent quality	DO	Infrastructure Data – Field Data Form	DTKGS Field data
Effluent quality	pH	Infrastructure Data – Field Data Form	DTKGS Field data
Effluent quality	Temperature	Infrastructure Data – Field Data Form	DTKGS Field data
Receiving environment quality	All parameters	Labware	DTKGS Post-UV Effluent DTKGS Upstream DTKGS Discharge mix zone DTKGS 10m Downstream DTKGS 50m Downstream DTKGS 100m Downstream DTKGS 300m Downstream

Appendix E. Receiving environment photographs (October 2025)



Upstream sampling location, with minimal surface water.



Discharge mixing zone.



10 m downstream.



50 m downstream.



100 m downstream.