# Snells -Algies Wastewater Treatment Plant

# 2024-2025 Annual Report

Final - September 2025

Watercare

An Auckland Council Organisation

# QUALITY INFORMATION

| | |
|---|---|
| **Document** | Annual Report |
| **Date** | 30 September 2025 |
| **Name and position of originator** | Laurent Daghdevirenian, Senior Environmental Scientist |

## Revision History

| Rev | Revision Date | Name | Position | Signature |
|---|---|---|---|---|
| 1 | 08/09/2025 | Michiel Jonker | Environmental Care Manager |  |
| 3 | 30/09/2025 | Jonathan Piggot | Head of Wastewater |  |

## Approved

| Date | Name | Position | Signature |
|---|---|---|---|
| 30/09/2025 | Michiel Jonker | Environmental Care Manager |  |

# CONSENT CHANGE AND MONITORING HISTORY

| Change type | Description | Effective date | Reference / condition | Reporting / monitoring implications |
|---|---|---|---|---|
| Consent variation | Land use consent (s9) – REG67909 (DIS60069253) (as varied by DIS60069253-A)- extension of time for the short term discharge to for an extra 3 years from the commencement of the consent | 01/11/2021 | Condition 6 | Aligned consent deadline for Short-term/Long-term transition |
| Consent variation | Land use consent (s9) – REG67909 (DIS60069253) (as varied by DIS60069253-A and DIS60069253- B)- extension of time for the short term discharge no later than 31 March 2025. | 09/03/2022 | Condition 6 updated<br>Condition 6 (d) removed | Aligned consent deadline for Short-term/Long-term transition |
| Consent variation | Land use consent (s9) – REG67909 (DIS60069253) (as varied by DIS60069253-A, DIS60069253-B and DIS60069253-C)- extension of time for the short term discharge no later than 31 December 2025. | 29/11/2024 | Condition 6<br>Reference to “new” WWTP was removed across the consent | Aligned consent deadline for Short-term/Long-term transition |

# EXECUTIVE SUMMARY

The 2024-2025 Annual Compliance Report for the Snells-Algies Wastewater Treatment Plant (WWTP) outlines the plant's operational performance, environmental compliance, and monitoring results from July 1, 2024, to June 30, 2025.

The Snells-Algies WWTP is responsible for treating wastewater from the Snell's and Algies communities and discharging treated effluent to the Hauraki Gulf via an outfall pipe that extends 600 m into the marine environment.

This report evaluates the plant's performance against resource consent conditions, particularly in terms of effluent quality, discharge volumes, and environmental impact.

Key highlights from the reporting year include:

- Effluent discharge and quality: The Snells-Algies WWTP maintained compliance with its effluent quality parameters.
- Effluent volumes: The plant's discharge volume did not exceed the consented limit of 4000 $m^3$/day and the average 12-month dry weather daily flow limit of 995 $m^3$/day.
- Receiving Environment Monitoring Programme (REMP): Routine coastal monitoring did not identify measurable adverse effects attributable to the discharge. Elevated suspended solids at some sites were assessed wider catchment influences rather than WWTP effects.
- Incidents: Two treated-effluent leaks from the ageing outfall (21 Aug 2024 ~110 $m^3$; 18–19 Sep 2024 ~150 $m^3$) were notified and remediated. Follow-up sampling did not indicate more than minor effects. A new outfall was commissioned in late June/July 2025 to prevent recurrence.
- Air quality: Weekly odour walkovers recorded no noxious, offensive, or objectionable effects beyond the boundary.
- Plant upgrades and future changes: The construction of the Snells WWTP upgrade, which will replace the current facility, is expected to be completed in late 2025.It will address potential future growth in the area and lead to higher environmental standards.
- Compliance summary: The plant met most of its compliance obligations, with no significant incidents or complaints reported during the year. Air quality monitoring confirmed full compliance with consent conditions for odour and emissions. The plant received a Category 1 compliance rating for the period.
- Overall compliance: Category 1 across most conditions. The two outfall leaks constitute Category 2 (technical) non-compliances under the discharge-to-water consent. Risk is mitigated by the new outfall and forthcoming commissioning of the upgraded WWTP by end-2025

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# LIST OF ABBREVIATIONS AND ACRONYMS

| Abbreviation | Description |
|---|---|
| $cBOD_5$ | 5-day carbonaceous biochemical oxygen demand |
| DO | Dissolved oxygen |
| DRP | Dissolved reactive phosphorus or dissolved soluble phosphorus (synonyms) |
| *E. coli* | *Escherichia coli* |
| $NH_3$-N | Ammonia and ammonium in milligrams of nitrogen |
| $NO_2$-N | Nitrite, in milligrams of nitrogen |
| $NO_3$-N | Nitrate, in milligrams of nitrogen |
| TN | Total nitrogen |
| TP | Total phosphorus |
| TSS | Total suspended solids |
| UV | Ultra-violet |
| Watercare | Watercare Services Limited |
| WWTP | Wastewater treatment plant |

# 1 Introduction

## 1.1 Outline

This report covers resource consent compliance for the Snells-Algies Wastewater Treatment Plant (WWTP) from 1 July 2024 to 30 June 2025. The report includes:

- Description of the WWTP
- Relevant consents and management plans
- Plant performance
- Summary of compliance.

## 1.2 Consents and plans

Table 1 lists the active resource consents for the Snells-Algies WWTP. DIS6009253 was varied in 2021-2022 and 2024 to extend the period for the short-term discharges through to 31 December 2025.

The Snells-Algies WWTP has five management plans that relate to its active resource consents.

Table 2 lists these plans.

***Table 1: Snells-Algies WWTP resource consents***

| Consent type | Consent number | Expiration date |
|---|---|---|
| Discharge to Air | REG-67908 / DIS60050273 | 21/3/2052 |
| Discharge to Water | REG-67909 / DIS60069253-A-B-C | 21/3/2052 |

***Table 2: Snells-Algies WWTP management plans***

| Plan | Revision Date |
|---|---|
| Receiving Environmental Water Quality Monitoring Programme – Short Term and Long-Term Discharges | September 2017 |
| Shellfish Monitoring Programme – Short-Term and Long-Term Discharges | December 2017 |
| Odour Management Plan | July 2017 |
| WWTP Operations Management Plan | February 2018 |
| Ecological Monitoring Plan | December 2017 |

# 2 Treatment Plant

## 2.1 Current operation

The Snells-Algies WWTP is on Hamatana Road in Snells Beach. The treatment system includes:

- Influent splitter chamber
- Biofilter (air discharges from splitter pass through the biofilter)
- Two aerated lagoons
- Two oxidation ponds.

Treated effluent discharges to the Hauraki Gulf via an outfall pipe that extends 600 m into the marine environment. This outfall is 2 km south of Martins Bay.

## 2.2 Changes in 2024-2025

No major changes occurred in the short-term operation of the Snells-Algies WWTP in 2024-2025. The facility began a full upgrade to meet long-term effluent standards, with construction increasing during this period.

## 2.3 Future changes

Upgrades to the WWTP are in progress. The new outfall pump station and pipe works began operation in late June 2025. Commissioning of the remaining new process areas is ongoing, with completion anticipated by the end of 2025.

# 3 Compliance

## 3.1 Introduction

The assessment of WWTP performance considers:

- Results of required WWTP monitoring
- Recorded incidents and complaints
- REMP results for Snells-Algies annual receiving environment monitoring.

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

***Table 3: Compliance assessment criteria***

| Rating | Detail |
|---|---|
| Category 1 | Watercare has complied with the consent condition. Where a 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 effects. |
| Category 3 | Watercare has not complied with the consent condition. Watercare has assessed non-compliance as 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. |

## 3.2 Plant performance

### 3.2.1 Effluent volumes

Figure 1 shows the daily effluent discharge volumes and rainfall during the reporting year. The results indicate that the WWTP complied with the wet weather discharge limit of 4,000 $m^3$/day throughout the reporting year. The total discharge volume for the year was 355,751 $m^3$, which is consistent with the 2023-2024 year, which had similar weather conditions (357,940 $m^3$).

Peaks generally corresponded to periods of heavy or prolonged rainfall (refer to Figure 3-1). The average daily dry weather flow during the 2024-2025 year was 799 $m^3$/day, below the maximum consented value of 995 $m^3$/day. However, this represents a slight increase compared to previous years (761 $m^3$/day in 2023-2024).

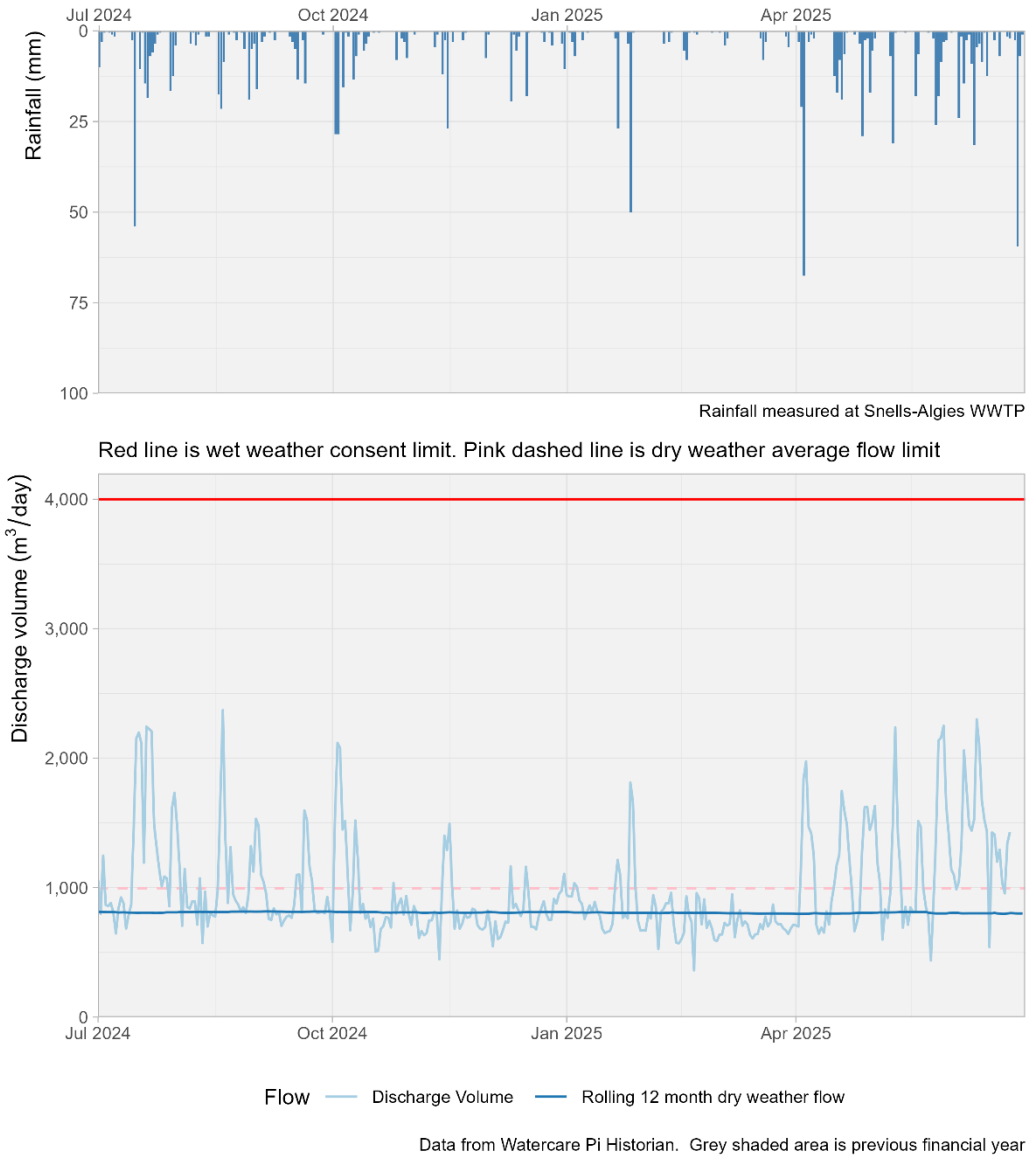


***Figure 1 Snells-Algies discharge volumes and rainfall (July 2024-June 2025).***

### 3.2.2 Effluent quality

Table 4 summarises effluent monitoring results for 2024-2025**.** Discharge standards for effluent are on a rolling annual basis. The WWTP met all effluent quality limits for the period. Appendix A -1 has the raw data for these parameters.

Appendix A – 2 lists the results of six-monthly sampling for organic pesticides, heavy metals, and total oil and grease for September 2024 and March 2025. All determinants in most cases, where below analytical limits of detection. With the following notable points:

- Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc) were consistently below detection or at trace levels typical of domestic wastewater.
- Organochlorine pesticides and PAHs were not detected.
- Total oil and grease concentrations were well below consented thresholds, confirming effective solids and scum removal.

Overall, the results demonstrate that toxic and persistent contaminants are not being discharged at levels of concern, and effluent quality is consistent with previous years. These findings support the conclusion that the discharge poses a low risk of chronic toxic effects in the receiving environment.

***Table 4: Summary of effluent monitoring for the Snells-Algies WWTP (2024-2025)***

| Parameter | Units | n | Minimum | Maximum | Consented Maximum | Average +SE | Median | Consented Median/Mean | 92nd Percentile | Consented 92nd Percentile | Compliant |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Discharge Volume | $m^3$/day | 365 | 361 | 2,372 | 4,000* | 780** | 774** | 995** | 1,612** | | Yes |
| pH | - | 53 | 6.6 | 8.5 | | 7.7-0.2 | 8.32 | | 8.80 | | |
| Temp | OC | 55 | 11.8 | 25.3 | | 18.6-0.62 | 18.8 | | 24.9 | | |
| DO | mg $O_2$/L | 55 | 3.9 | 36.0 | | 13.5-0.43 | 11.0 | | 24.0 | >2 | Yes |
| Conductivity | mS/m | 52 | 1.9 | 4.7 | | 3.0 | 3.1 | | 3.8 | | |
| Salinity | ppt | 52 | 0.4 | 2.0 | | 1.6-0.06 | 1.6 | | 2.1 | | |
| Escherichia coli | cfu/100 mL | 52 | 630 | 11,000 | | 2,400-880 | 1,700 | | 5,544 | 10,000 | Yes |
| Faecal Coliforms | cfu/100 mL | 52 | 700 | 12,000 | | 3,370-1,480 | 2700 | 7,500 | 6568 | 50,000 | Yes |
| Enterococci spp. | cfu/100 mL | 52 | 210 | 10,000 | | 1,744-250 | 880 | | 4,000 | | |
| TN | mg/L | 52 | 7.0 | 43.0 | | 24.0-1.3 | 23.0 | | 42.0 | | |
| NO2-N | mg/L | 52 | 0.02 | 5.00 | | 0.4 -0.03 | 0.2 | | 1.00 | | |
| NO3-N | mg/L | 52 | 0.02 | 9.00 | | 1.7-0. 24 | 1.2 | | 1 | | |
| cBOD5 | mg $O_2$/L | 52 | 3.9 | 36.0 | | 13.5-0.5 | 11.0 | | 24.0 | 80 | Yes |
| TSS | mg/L | 52 | 9.0 | 111.0 | | 40.5-3.8 | 31.3 | | 84.4 | 100 | Yes |
| TP | mg/L | 12 | 3.6 | 17.7 | | 8.4-0.8 | 8.5 | | 11.0 | | |
| DRP | mg/L | 12 | 3.2 | 16.2 | | 7.0-0.3 | 7.3 | | 9.3 | | |

**Note:** *Wet weather flow. **Dry weather flow (mean consent limit). Results are mean values ± standard error (rounded up to 2 significant figures). Yellow indicate consent limits and green indicate compliance.

### 3.2.3 Air quality

Watercare conducts routine walkovers and odour inspections. In 2023-2024, a trial was initiated using new software and reporting tools (Infrastructure Data). Weekly inspections and reporting were introduced to align air quality reporting requirements with those of other treatment plants within the Warkworth hub.

Weekly odour checks found no offensive effects beyond the site. Weak odours near biofilters were noted and addressed. All strong odours originated from bird waste, not the treatment plant.

Following the completion of the WWTP upgrade, the air quality management plan will be updated to incorporate the new reporting process and new process areas.

Appendix B includes the results for the 2024-2025 reporting period.

### 3.2.4 Receiving environment monitoring

Appendix C includes a copy of the REMP Report for 2024-2025. This report did not identify any significant environmental issues associated with the WWTP. The main findings of the report were:

- There were no significant differences in water quality between outfall monitoring sites.
- Except for high suspended solids at Martins Bay and the Outfall, water quality near the outfall was comparable to other coastal sites. No link was found between suspended solids and discharge impact. Wider catchment data suggested a larger-scale cause for higher suspended solids at Martins Bay Outfall.
- Water quality monitoring at six sites showed no material differences between the outfall sites, except for high suspended solids, which were identified as a laboratory artefact.
- Bacterial indicators near the outfall were higher than before, but no enteroviruses or adenoviruses were found in shellfish samples.
- Long-term trends in effluent quality were analysed, showing increases in salinity, total suspended solids, and nitrogen concentrations, likely linked to population growth and saline intrusion.

On balance, and given concurrent catchment signals, no measurable adverse effects attributable to the WWTP discharge were identified in 2024–2025.

### 3.2.5 Complaints and incidents

The WWTP received no complaints in 2024-2025. No complaints were received in 2024–2025. Two treated-effluent leaks from the legacy outfall occurred on 21 Aug 2024 (~110 $m^3$) and 18–19 Sep 2024 (~150 $m^3$). Both were notified to Auckland Council and stakeholders the same day, areas were isolated and disinfected, and repairs were completed. Follow-up water quality sampling at control and downstream sites did not indicate more than minor environmental effects. A new outfall was commissioned in late June/July 2025 to prevent recurrence.

## 3.3 Summary of compliance

Table 5 (air) and Table 6 (water) in Appendix D list condition-by-condition assessments of compliance for the Snells-Algies WWTP. Category 1 for air (REG-67908) and for all effluent quality and monitoring conditions under water (REG-67909). Two Category 2 (technical) non-compliances were recorded for unauthorised discharge events associated with outfall leaks in Aug and Sep 2024.

# 4 Conclusion

Overall, the WWTP met all effluent quality limits and achieved Category 1 for air and discharge monitoring conditions. Two Category 2 (technical) non-compliances arose from legacy outfall leaks; risk has been mitigated by commissioning the new outfall and the ongoing upgrade, due for completion by end-2025. Saline intrusion remains a network issue; the upgrade programme and inflow control actions are expected to reduce salinity-related variability in bacterial indicators.

# Appendix A-1 Effluent Quality Data

| Date | cBOD$_5$ (mg $O_2$/L) | DO (mg $O_2$/L) | *Escherichia coli* (cfu/100 mL) | Faecal coliforms (cfu/100 mL) | TSS (mg/L) |
|---|---|---|---|---|---|
| 2/07/2024 | 8.0 | 8.3 | 840 | 980 | 16.0 |
| 9/07/2024 | 7.1 | 9.1 | 910 | 1100 | 22.0 |
| 16/07/2024 | 8.0 | 7.8 | 3700 | 3900 | 17.0 |
| 23/07/2024 | 6.8 | 8.1 | 810 | 890 | 12.0 |
| 30/07/2024 | 7.6 | 8.4 | 3200 | 5700 | 19.0 |
| 6/08/2024 | 7.4 | 9.6 | 870 | 3100 | 18.0 |
| 13/08/2024 | 9.4 | 9.0 | 1100 | 3200 | 15.0 |
| 20/08/2024 | 8.6 | 5.7 | 2400 | 3600 | 17.0 |
| 27/08/2024 | 7.4 | 7.8 | 1100 | 2400 | 12.0 |
| 3/09/2024 | 6.4 | 5.5 | 1200 | 770 | 11.0 |
| 10/09/2024 | 3.9 | 7.6 | 780 | 1000 | 9.0 |
| 17/09/2024 | 8.7 | 7.9 | 990 | 2100 | 12.0 |
| 24/09/2024 | 8.1 | 7.4 | 2300 | 5100 | 26.0 |
| 1/10/2024 | 9.5 | 7.8 | 1100 | 2800 | 19.0 |
| 8/10/2024 | 8.8 | 7.4 | 1200 | 970 | 19.0 |
| 15/10/2024 | 10.0 | 8.3 | 2000 | 4100 | 29.0 |
| 22/10/2024 | 13.0 | 8.0 | 2800 | 3100 | 37.0 |
| 29/10/2024 | 10.0 | 6.7 | 860 | 2000 | 32.0 |
| 5/11/2024 | 8.9 | 6.6 | 1100 | 2400 | 17.0 |
| 12/11/2024 | 8.4 | 5.4 | 1400 | 2300 | 28.0 |
| 19/11/2024 | 11.0 | 7.5 | 1100 | 2500 | 23.0 |
| 26/11/2024 | 13.0 | 7.2 | 810 | 700 | 36.8 |

| Date | cBOD$_5$ (mg $O_2$/L) | DO (mg $O_2$/L) | *Escherichia coli* (cfu/100 mL) | Faecal coliforms (cfu/100 mL) | TSS (mg/L) |
|---|---|---|---|---|---|
| 3/12/2024 | 14.0 | 7.2 | 850 | 2000 | 50.0 |
| 10/12/2024 | 13.0 | 11.6 | 3400 | 4200 | 59.2 |
| 17/12/2024 | 27.0 | 8.0 | 3100 | 6600 | 71.5 |
| 24/12/2024 | 35.0 | 6.9 | 1800 | 2000 | 84.6 |
| 31/12/2024 | 18.0 | 8.0 | 6800 | 8100 | 66.8 |
| 7/01/2025 | 16.0 | 7.3 | 5700 | 4900 | 43.2 |
| 14/01/2025 | 16.0 | 6.3 | 2700 | 1000 | 87.0 |
| 21/01/2025 | 24.0 | 7.3 | 4200 | 5700 | 101.0 |
| 28/01/2025 | 22.0 | 8.0 | 11000 | 12000 | 70.8 |
| 4/02/2025 | 16.0 | 7.8 | 2200 | 1500 | 71.0 |
| 11/02/2025 | 18.0 | 8.4 | 2100 | 3500 | 111.0 |
| 18/02/2025 | 36.0 | 5.9 | 3300 | 3100 | 93.6 |
| 25/02/2025 | 24.0 | 6.2 | 2400 | 2300 | 82.8 |
| 4/03/2025 | 19.0 | 6.6 | 3000 | 2800 | 61.4 |
| 11/03/2025 | 11.0 | 7.6 | 950 | 1200 | 40.4 |
| 18/03/2025 | 12.0 | 2.7 | 840 | 1100 | 54.4 |
| 25/03/2025 | 26.0 | 7.5 | 1000 | 1300 | 65.8 |
| 1/04/2025 | 21.0 | 7.4 | 1200 | 830 | 78.0 |
| 8/04/2025 | 14.0 | 6.9 | 1500 | 2300 | 48.0 |
| 15/04/2025 | 8.0 | 7.1 | 2700 | 5800 | 28.6 |
| 22/04/2025 | 8.3 | 7.2 | 820 | 2100 | 22.8 |
| 29/04/2025 | 8.9 | 8.0 | 4600 | 6200 | 20.0 |

| Date | cBOD$_5$ (mg $O_2$/L) | DO (mg $O_2$/L) | *Escherichia coli* (cfu/100 mL) | Faecal coliforms (cfu/100 mL) | TSS (mg/L) |
|---|---|---|---|---|---|
| 6/05/2025 | 9.3 | 7.7 | 630 | 2100 | 26.6 |
| 13/05/2025 | 19.0 | 7.1 | 1000 | 2600 | 35.2 |
| 20/05/2025 | 20.0 | 7.8 | 5600 | 9300 | 32.8 |
| 27/05/2025 | 12.0 | 7.7 | 2800 | 3200 | 38.4 |
| 3/06/2025 | 11.0 | 8.0 | 1600 | 3800 | 33.4 |
| 10/06/2025 | 12.0 | 9.2 | 2900 | 3900 | 24.2 |
| 17/06/2025 | 9.2 | 8.8 | 4900 | 5400 | 28.4 |
| 24/06/2025 | 13.0 | 7.2 | 7500 | 9900 | 30.5 |

| Date | *Enterococci* (cfu/100 mL) | pH | Temperature (°C) | Salinity (‰) | Conductivity (mS/m at 25 °C) | TN (mg/L) | $NO_2$ (mg N/L) | $NO_3$ (mg N/L) | TP (mg/L) | DRP (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2/07/2024 | 360 | 7.7 | 13.3 | 1.2 | 2.3 | 34.0 | 0.2 | 0.8 | 4.4 | 4.2 |
| 9/07/2024 | 290 | 7.9 | 12.6 | 1.2 | 2.5 | 40.0 | 0.2 | 1.0 | | |
| 16/07/2024 | 210 | 7.8 | 14.3 | 1.2 | 2.5 | 41.0 | 0.1 | 0.8 | | |
| 23/07/2024 | 720 | 7.8 | 14.7 | 0.9 | 1.9 | 36.0 | 0.1 | 0.4 | | |
| 30/07/2024 | 680 | 7.7 | 15.6 | 0.9 | 1.9 | 34.0 | 0.2 | 0.8 | | |
| 6/08/2024 | 410 | 7.8 | 12.5 | 1.3 | 2.1 | 37.0 | 0.2 | 1.2 | 4.1 | 3.3 |
| 13/08/2024 | 350 | 8.0 | 13.8 | 1.1 | 2.2 | 37.0 | 0.2 | 1.5 | | |
| 20/08/2024 | 660 | 7.6 | 14.0 | 1.1 | 2.1 | 39.0 | 0.2 | 0.9 | | |
| 27/08/2024 | 310 | 7.6 | 16.3 | 0.9 | 2.1 | 38.0 | 0.2 | 0.7 | | |
| 3/09/2024 | 250 | 7.5 | 19.6 | 0.9 | 2.2 | 43.0 | 0.1 | 0.4 | 3.6 | 3.2 |
| 10/09/2024 | 210 | 7.6 | 17.2 | 1.1 | 2.1 | 41.0 | 0.1 | 0.3 | | |
| 17/09/2024 | 880 | 7.6 | 14.5 | 1.0 | 2.2 | 37.0 | 0.1 | 0.4 | | |
| 24/09/2024 | 990 | 7.2 | 18.5 | 1.5 | 2.9 | 38.0 | 0.2 | 0.6 | | |

| Date | *Enterococci* (cfu/100 mL) | pH | Temperature (°C) | Salinity (‰) | Conductivity (mS/m at 25 °C) | TN (mg/L) | $NO_2$ (mg N/L) | $NO_3$ (mg N/L) | TP (mg/L) | DRP (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1/10/2024 | 410 | 7.5 | 16.2 | 1.3 | 4.7 | 35.0 | 0.3 | 2.0 | 4.3 | 3.9 |
| 8/10/2024 | 310 | 7.4 | 19.0 | 1.4 | 4.5 | 32.0 | 0.2 | 0.7 | | |
| 15/10/2024 | 640 | 7.5 | 16.5 | 1.8 | 3.6 | 32.0 | 0.1 | 0.6 | | |
| 22/10/2024 | 290 | 7.5 | 18.8 | 1.6 | 3.2 | 22.0 | 0.2 | 1.2 | | |
| 29/10/2024 | 240 | 7.3 | 19.7 | 1.5 | 3.1 | 19.0 | 0.1 | 0.7 | | |
| 5/11/2024 | 370 | 7.3 | 19.2 | 1.6 | 3.2 | 17.0 | 0.1 | 1.1 | 8.0 | 7.4 |
| 12/11/2024 | 310 | 7.4 | 20.9 | 1.8 | 3.9 | 20.0 | 0.2 | 1.3 | | |
| 19/11/2024 | 550 | 7.4 | 20.1 | 1.7 | 3.5 | 14.0 | 0.1 | 1.5 | | |
| 26/11/2024 | 760 | 7.4 | 22.3 | 2.0 | 3.3 | 7.9 | 0.2 | 1.7 | | |
| 3/12/2024 | 720 | 7.5 | 24.5 | 1.7 | 3.2 | 15.0 | 0.1 | 0.5 | 17.7 | 16.2 |
| 10/12/2024 | 1100 | 8.0 | 24.2 | 1.5 | 3.0 | 8.4 | 0.1 | 0.6 | | |
| 17/12/2024 | 2200 | 7.8 | 24.2 | 1.4 | 2.9 | 8.4 | 0.1 | 0.4 | | |
| 24/12/2024 | 1900 | 7.9 | 23.1 | 1.6 | 3.1 | 7.2 | 0.0 | 0.6 | | |
| 31/12/2024 | 2000 | 7.8 | 23.0 | 1.7 | 3.3 | 9.9 | 0.1 | 0.7 | | |
| 7/01/2025 | 5300 | 8.1 | 22.2 | 1.7 | 3.3 | 19.0 | 0.3 | 1.1 | 14.8 | 10.0 |
| 14/01/2025 | 2300 | 8.1 | 23.3 | 1.7 | 3.4 | 24.0 | 0.6 | 1.8 | | |
| 21/01/2025 | 3100 | 8.2 | 20.0 | 1.7 | 3.4 | 21.0 | 0.6 | 1.8 | | |
| 28/01/2025 | 3100 | 8.1 | 22.7 | 1.6 | 3.2 | 17.0 | 0.6 | 1.8 | | |
| 4/02/2025 | 2200 | 7.9 | 25.3 | 1.5 | 3.0 | 12.0 | 0.3 | 1.2 | 10.1 | 8.3 |
| 11/02/2025 | 2500 | 8.5 | 24.4 | 1.6 | 3.2 | 8.6 | 0.2 | 1.1 | | |
| 18/02/2025 | 7800 | 8.2 | 23.3 | 1.7 | 3.4 | 8.4 | 0.1 | 0.6 | | |
| 25/02/2025 | 3700 | 8.1 | 23.3 | 1.8 | 3.5 | 7.1 | 0.0 | 0.3 | | |
| 4/03/2025 | 6200 | 7.7 | 19.5 | 1.8 | 3.5 | 7.6 | 0.0 | 0.3 | 10.0 | 7.6 |
| 11/03/2025 | 710 | 7.7 | 21.5 | 1.9 | 3.7 | 9.3 | 0.1 | 1.4 | | |
| 18/03/2025 | 1100 | 7.9 | 23.1 | 2.0 | 3.3 | 12.0 | 0.3 | 3.1 | | |
| 25/03/2025 | 1700 | 7.6 | 19.6 | 2.0 | 4.0 | 14.0 | 0.5 | 5.0 | | |

| Date | *Enterococci* (cfu/100 mL) | pH | Temperature (°C) | Salinity (‰) | Conductivity (mS/m at 25 °C) | TN (mg/L) | $NO_2$ (mg N/L) | $NO_3$ (mg N/L) | TP (mg/L) | DRP (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1/04/2025 | 390 | 7.6 | 20.6 | 1.9 | 3.8 | 11.0 | 0.3 | 4.8 | 9.5 | 8.2 |
| 8/04/2025 | 10000 | 7.6 | 19.5 | 1.8 | 3.4 | 19.0 | 0.1 | 3.0 | | |
| 15/04/2025 | 980 | 7.5 | 20.2 | 1.6 | 3.3 | 19.0 | 0.1 | 3.4 | | |
| 22/04/2025 | 880 | 7.7 | 20.7 | 1.4 | 3.0 | 31.0 | 0.1 | 0.5 | | |
| 29/04/2025 | 2600 | 7.7 | 19.9 | 1.3 | 2.6 | 30.0 | 0.1 | 2.1 | | |
| 6/05/2025 | 540 | 7.6 | 16.1 | 1.3 | 2.6 | 34.0 | 0.6 | 3.3 | 8.9 | 7.3 |
| 13/05/2025 | 1100 | 7.4 | 16.1 | 1.3 | 2.6 | 34.0 | 3.4 | 4.3 | | |
| 20/05/2025 | 6400 | 7.3 | 16.2 | 1.2 | 2.5 | 30.0 | 5.1 | 4.0 | | |
| 27/05/2025 | 3000 | 7.3 | 16.4 | 1.2 | 2.6 | 32.0 | 1.9 | 8.8 | | |
| 3/06/2025 | 760 | 7.6 | 14.6 | 1.5 | 2.5 | 33.0 | 0.8 | 3.8 | 5.8 | 5.0 |
| 10/06/2025 | 1100 | 6.6 | 11.8 | 1.3 | 2.6 | 28.0 | 0.4 | 2.7 | | |
| 17/06/2025 | 1300 | 7.4 | 14.3 | 0.4 | 2.3 | 27.0 | 0.3 | 3.5 | | |
| 24/06/2025 | 3800 | 7.8 | 14.2 | 1.2 | 2.4 | 9.9 | 0.4 | 4.2 | | |

# Appendix A-2 Six-monthly effluent contaminant sampling

| Class | Parameter | Units | 3 Sep 2024 | 4 Mar 2025 |
|---|---|---|---|---|
| Organochlorine | Aldrin | mg/L | <0.001 | <0.0004 |
| Organochlorine | BHC alpha | mg/L | <0.001 | <0.0004 |
| Organochlorine | BHC beta | mg/L | <0.002 | <0.0008 |
| Organochlorine | BHC delta | mg/L | <0.002 | <0.0008 |
| Organochlorine | Alpha-Chlordane | mg/L | <0.002 | <0.0008 |
| Organochlorine | Gamma-chlordane | mg/L | <0.002 | <0.0008 |
| Organochlorine | 4-4-DDD | mg/L | <0.002 | <0.0008 |
| Organochlorine | 4-4-DDE | mg/L | <0.001 | <0.0004 |
| Organochlorine | 4-4-DDT | mg/L | <0.002 | <0.0008 |
| Organochlorine | Dieldrin | mg/L | <0.001 | <0.0004 |
| Organochlorine | Endosulfan I | mg/L | <0.001 | <0.0004 |
| Organochlorine | Endosulfan II | mg/L | <0.001 | <0.0004 |
| Organochlorine | Endosulfan sulphate | mg/L | <0.002 | <0.0008 |
| Organochlorine | Endrin | mg/L | <0.002 | <0.0008 |
| Organochlorine | Endrin aldehyde | mg/L | <0.005 | <0.002 |
| Organochlorine | Heptachlor | mg/L | <0.002 | <0.0008 |
| Organochlorine | Heptachlor epoxide | mg/L | <0.002 | <0.0008 |
| Organochlorine | Lindane (BHC gamma) | mg/L | <0.001 | <0.0008 |
| Organochlorine | Methoxychlor | mg/L | <0.002 | <0.0008 |
| Organochlorine | cis-permethrin | mg/L | <0.002 | <0.0008 |
| Organochlorine | trans-permethrin | mg/L | <0.002 | <0.0008 |
| Polycyclic aromatic hydrocarbon | Acenaphthylene | mg/L | <0.001 | <0.0004 |
| Polycyclic aromatic hydrocarbon | Acenaphthene | mg/L | <0.001 | <0.0004 |
| Polycyclic aromatic hydrocarbon | Anthracene | mg/L | <0.002 | <0.0008 |
| Polycyclic aromatic hydrocarbon | Benzo(a)anthracene | mg/L | <0.001 | <0.0004 |
| Polycyclic aromatic hydrocarbon | Benzo(a)pyrene | mg/L | <0.001 | <0.0004 |
| Polycyclic aromatic hydrocarbon | Benzo(b)fluoranthene | mg/L | <0.001 | <0.0004 |
| Polycyclic aromatic hydrocarbon | Benzo(ghi)perylene | mg/L | <0.001 | <0.0004 |
| Polycyclic aromatic hydrocarbon | Benzo(k)fluoranthene | mg/L | <0.001 | <0.0004 |
| Polycyclic aromatic hydrocarbon | Chrysene | mg/L | <0.001 | <0.0004 |
| Polycyclic aromatic hydrocarbon | Dibenzo(ah)anthracene | mg/L | <0.001 | <0.0004 |
| Polycyclic aromatic hydrocarbon | Fluoranthene | mg/L | <0.001 | <0.0004 |
| Polycyclic aromatic hydrocarbon | Fluorene | mg/L | <0.001 | <0.0004 |
| Polycyclic aromatic hydrocarbon | Indeno(1-2-3-c-d)pyrene | mg/L | <0.001 | <0.0004 |
| Polycyclic aromatic hydrocarbon | Naphthalene | mg/L | <0.001 | <0.0004 |
| Polycyclic aromatic hydrocarbon | Phenanthrene | mg/L | <0.001 | <0.0004 |
| Polycyclic aromatic hydrocarbon | Pyrene | mg/L | <0.001 | <0.0004 |
| Polycyclic aromatic hydrocarbon | BAP Equivalent | mg/L | <0.0001 | <0.0001 |
| Polychlorinated biphenyl | PCB206 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB194 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB170 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB128 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB180 | ng/L | <20 | 4 |

| Class | Parameter | Units | 3 Sep 2024 | 4 Mar 2025 |
|---|---|---|---|---|
| Polychlorinated biphenyl | PCB138 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB141 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB149 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB86 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB151 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB44 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB153 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB101 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB49 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB52 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB157 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB189 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB156 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB105 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB159 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB110 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB123 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB118 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB167 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB114 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB60 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB121 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB28 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB31 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB169 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB126 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB77 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB81 | ng/L | <20 | 4 |
| Polychlorinated biphenyl | PCB209 | ng/L | <20 | 4 |
| Metals (total) | Arsenic | mg/L | <0.2 | <0.2 |
| Metals (total) | Cadmium | mg/L | <0.001 | <0.001 |
| Metals (total) | Chromium | mg/L | <0.01 | <0.01 |
| Metals (total) | Copper | mg/L | <0.01 | <0.01 |
| Metals (total) | Lead | mg/L | <0.002 | <0.002 |
| Metals (total) | Nickel | mg/L | <0.01 | <0.01 |
| Metals (total) | Zinc | mg/L | <0.02 | <0.02 |
| Metals (dissolved) | Arsenic | mg/L | <0.2 | <0.2 |
| Metals (dissolved) | Cadmium | mg/L | <0.001 | <0.001 |
| Metals (dissolved) | Chromium | mg/L | <0.01 | <0.01 |
| Metals (dissolved) | Copper | mg/L | <0.01 | <0.01 |
| Metals (dissolved) | Lead | mg/L | <0.002 | <0.002 |
| Metals (dissolved) | Nickel | mg/L | <0.01 | <0.01 |
| Metals (dissolved) | Zinc | mg/L | <0.02 | <0.02 |

| Class | Parameter | Units | 3 Sep 2024 | 4 Mar 2025 |
|---|---|---|---|---|
| Oils | Oil and Grease | mg/L | 7.8 | 6.6 |

# Appendix B. Air quality monitoring results

| Date | Wind direction | Wind Speed | Cloud cover | Comments - Optional | Odour intensity - North of plant | Comments - Optional - North of Plant | Odour intensity - Inlet Splitter | Comments - Optional - Inlet Splitter | Odour intensity - East of plant | Comments - Optional - East of plant | Odour intensity - South of plant | Comments - Optional - South of plant | Odour intensity - West of plant | Comments - Optional - West of plant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27/06/2025 | N | Strong wind | Raining | | No odour | | No odour | | No odour | | No odour | | No odour | |
| 10/06/2025 | NW | Calm / Light air | Overcast | Foggy | Very weak | | Very weak | | No odour | | No odour | | No odour | |
| 3/06/2025 | SW | Calm / Light air | Overcast | | No odour | | Very weak | | No odour | | No odour | | No odour | |
| 29/05/2025 | N | Moderate breeze | Mixed Sun / Overcast | | Weak | | Weak | | No odour | | No odour | | No odour | |
| 19/05/2025 | SW | Moderate breeze | Clear / Sunny | | No odour | | Very weak | | No odour | | No odour | | No odour | |
| 16/05/2025 | SW | Calm / Light air | Clear / Sunny | | No odour | | No odour | | No odour | | No odour | | No odour | |
| 5/05/2025 | SE | Calm / Light air | Clear / Sunny | | No odour | | Very weak | | No odour | | No odour | | No odour | |
| 29/04/2025 | NE | Moderate breeze | Overcast | | Very weak | | Very weak | | No odour | | No odour | | No odour | |
| 23/04/2025 | SW | Moderate breeze | Mixed Sun / Overcast | | Very weak | | Very weak | | No odour | | No odour | | No odour | |
| 15/04/2025 | SE | Calm / Light air | Overcast | | Very weak | | Very weak | | Distinct | Geese crap | Distinct | Geese crap | Distinct | Geese crap |
| 8/04/2025 | NW | Moderate breeze | Mixed Sun / Overcast | | Very weak | | Very weak | | No odour | | No odour | | No odour | |
| 1/04/2025 | NE | Moderate breeze | Mixed Sun / Overcast | | No odour | | Very weak | | Weak | Bio filter bit smelly.. limed and watered | No odour | | No odour | |
| 19/03/2025 | W | Calm / Light air | Mixed Sun / Overcast | | Very weak | | Very weak | | No odour | | No odour | | No odour | |
| 12/03/2025 | E | Calm / Light air | Clear / Sunny | | No odour | | Very weak | | No odour | | No odour | | No odour | |
| 12/03/2025 | SW | Calm / Light air | Mixed Sun / Overcast | | Very weak | | Very weak | | Weak | Geese crap ðŸ'© | Distinct | Geese crap | Very weak | Geese crap |
| 5/03/2025 | SW | Strong wind | Clear / Sunny | | No odour | | No odour | | No odour | | No odour | | No odour | |
| 25/02/2025 | SE | Calm / Light air | Mixed Sun / Overcast | | Very weak | | Very weak | | Weak | Geese crap | Weak | Geese ðŸ'© | Weak | Geese crap |
| 18/02/2025 | N | Calm / Light air | Mixed Sun / Overcast | | Very weak | | Very weak | | Distinct | Geese crap | No odour | | Weak | Geese crap |
| 11/02/2025 | SW | Calm / Light air | Clear / Sunny | | Very weak | | Very weak | | No odour | | No odour | | No odour | |
| 5/02/2025 | SW | Calm / Light air | Clear / Sunny | | Distinct | Influent | Distinct | Influent | Distinct | Duck and geese shit everywhere | Distinct | Duck and geese shit | Distinct | Duck and geese shit |
| 28/01/2025 | E | Moderate breeze | Mixed Sun / Overcast | | Very weak | | Weak | | No odour | | No odour | | No odour | |
| 21/01/2025 | E | Strong wind | Raining | | Very weak | | Very weak | | No odour | | No odour | | No odour | |
| 14/01/2025 | SW | Calm / Light air | Clear / Sunny | | Very weak | | Weak | | Strong | Geese shit everywhere | No odour | | Distinct | Geese shit |
| 9/01/2025 | S | Moderate breeze | Mixed Sun / Overcast | | Distinct | Holiday inflows | Distinct | As above | No odour | | No odour | | No odour | |
| 3/01/2025 | SW | Strong wind | Mixed Sun / Overcast | | Very weak | | Strong | Holiday load coming in | No odour | | No odour | | No odour | |
| 31/12/2024 | SW | Moderate breeze | Mixed Sun / Overcast | Showers | Distinct | Holiday inflows, lagoon #1 overloaded and smelly | Strong | As previous | No odour | | No odour | | No odour | |
| 24/12/2024 | SW | Moderate breeze | Mixed Sun / Overcast | | Distinct | Higher holiday influent load | Weak | | No odour | | No odour | | No odour | |
| 17/12/2024 | S | Moderate breeze | Mixed Sun / Overcast | | No odour | | Very weak | | No odour | | No odour | | No odour | |
| 10/12/2024 | SW | Calm / Light air | Mixed Sun / Overcast | | No odour | | No odour | | Distinct | Geese shit everywhere | No odour | | No odour | |
| 3/12/2024 | NW | Calm / Light air | Clear / Sunny | | No odour | | Very weak | | Weak | Bio filter a bit odourous..watered | No odour | | No odour | |
| 25/11/2024 | SW | Moderate breeze | Clear / Sunny | | No odour | | Very weak | | No odour | | No odour | | No odour | |
| 19/11/2024 | SE | Moderate breeze | Clear / Sunny | | Very weak | | Very weak | | No odour | | No odour | | No odour | |
| 13/11/2024 | E | Moderate breeze | Raining | | No odour | | No odour | | No odour | | No odour | | No odour | |
| 7/11/2024 | NE | Calm / Light air | Mixed Sun / Overcast | | Very weak | | Weak | | No odour | | No odour | | No odour | |
| 29/10/2024 | NW | Strong wind | Overcast | | Very weak | | Weak | | No odour | Bio filter whiffy ..limed and watered | No odour | | No odour | |
| 22/10/2024 | SW | Moderate breeze | Mixed Sun / Overcast | | No odour | | No odour | | No odour | | No odour | | No odour | |
| 16/10/2024 | E | Moderate breeze | Mixed Sun / Overcast | | No odour | | Very weak | | No odour | | No odour | | No odour | |
| 8/10/2024 | SW | Calm / Light air | Mixed Sun / Overcast | | No odour | | No odour | | No odour | | No odour | | No odour | |
| 1/10/2024 | NW | Moderate breeze | Mixed Sun / Overcast | | Weak | | Weak | | No odour | | No odour | | No odour | |
| 24/09/2024 | SW | Strong wind | Mixed Sun / Overcast | | No odour | | No odour | | No odour | | No odour | | No odour | |
| 17/09/2024 | SW | Moderate breeze | Raining | | Very weak | | Very weak | | No odour | | No odour | | No odour | |
| 10/09/2024 | SW | Moderate breeze | Overcast | | No odour | | Very weak | | No odour | | No odour | | No odour | |
| 3/09/2024 | N | Moderate breeze | Overcast | | No odour | | Very weak | | No odour | | No odour | | No odour | |
| 27/08/2024 | NW | Moderate breeze | Mixed Sun / Overcast | | No odour | | No odour | | No odour | | No odour | | No odour | |
| 21/08/2024 | NW | Calm / Light air | Clear / Sunny | NA | Very weak | Normal Lagoon smells | Very weak | Normal Lagoon Smells | No odour | NA | No odour | NA | No odour | NA |
| 14/08/2024 | S | Moderate breeze | Clear / Sunny | | No odour | | Very weak | | No odour | | No odour | | No odour | |
| 6/08/2024 | SW | Calm / Light air | Mixed Sun / Overcast | | Very weak | | Weak | | No odour | | No odour | | No odour | |
| 30/07/2024 | NW | Calm / Light air | Overcast | | Very weak | | Very weak | | No odour | | No odour | | No odour | |
| 23/07/2024 | SW | Moderate breeze | Mixed Sun / Overcast | Showers | No odour | | Very weak | | No odour | | No odour | | No odour | |
| 16/07/2024 | SW | Calm / Light air | Mixed Sun / Overcast | | Weak | Higher inflows/ rain yest | Weak | High inflows/ rain yest | No odour | | No odour | | No odour | |
| 9/07/2024 | S | Calm / Light air | Mixed Sun / Overcast | | No odour | | No odour | | No odour | | No odour | | No odour | |
| 2/07/2024 | SW | Moderate breeze | Mixed Sun / Overcast | Showers | Very weak | | Very weak | | No odour | | No odour | | No odour | |

# Appendix C. Snells WWTP – Receiving Environmental Monitoring Programme Report

# Snells-Algies Wastewater Treatment Plant
# Receiving Environment Monitoring Report 2024-2025
# Final - September 2025

Watercare
An Auckland Council Organisation

# QUALITY INFORMATION

| | |
|---|---|
| **Document** | Receiving Environmental Monitoring Report |
| **Date** | 26 September 2025 |
| **Name and position of originator** | Laurent Daghdevirenian, Senior Environmental Scientist |
| **Report directory** | C:\Users\ldaghdevirenian\OneDrive - Watercare Services Limited\Documents\6 - Wastewater\Annual Reports 2024-2025\SnellsWWTP |

## Revision History

| Rev | Revision Date | Name | Position | Signature |
|---|---|---|---|---|
| 1 | 29/30/2025 | Michiel Jonker | Environmental Care Manager |  |
| 2 | | | | |
| 3 | | | | |

## Approved

| Date | Name | Position | Signature |
|---|---|---|---|
| 30/09/2025 | Michiel Jonker | Environmental Care Manager |  |

# EXECUTIVE SUMMARY

Watercare Services Limited (Watercare) discharges treated wastewater from its Snells-Algies Wastewater Treatment Plant (WWTP) into the inner Hauraki Gulf. The permit for this discharge requires receiving environment monitoring, including water quality and shellfish quality. This report summarises the results of this programme for the July 2024 to June 2025 operating year.

The monitoring programme includes:

- Water quality at six sites (five sites around the outfall, and a sentinel site 2 km north of the outfall at Martin's Bay).
- Microbiological quality results for shellfish from the beach north and south of the outfall.

Key findings are summarised below:

- **Receiving waters:**

  There were no significant differences in water quality between outfall monitoring sites.
  Except for high suspended solids at Martins Bay and the Outfall, water quality near the outfall was comparable to other coastal sites. No link was found between suspended solids and discharge impact. Wider catchment data suggested a larger-scale cause.

- **Contact recreation and shellfish gathering:** Bacterial indicators near the outfall were higher than before, but no enteroviruses or adenoviruses were found in shellfish samples.

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# LIST OF ABBREVIATIONS AND ACRONYMS

| Abbreviation | Description |
|---|---|
| $cBOD_5$ | 5-day carbonaceous biochemical oxygen demand |
| DO | Dissolved oxygen |
| DRP | Dissolved reactive phosphorus or dissolved soluble phosphorus (synonyms) |
| E. coli | Escherichia coli |
| $NH_x$ | Ammonia and ammonium, reported in milligrams nitrogen |
| $NO_2$ | Nitrite, reported in milligrams nitrogen |
| $NO_3$ | Nitrate, reported in milligrams nitrogen |
| TIN | Total inorganic nitrogen ($NH_x$-N + $NO_2$-N + $NO_3$-N) |
| TN | Total nitrogen |
| TP | Total phosphorus |
| TSS | Total suspended solids |
| UF | Ultra-filtration system |
| UV | Ultra-violet |
| Watercare | Watercare Services Limited |
| WWTP | Wastewater treatment plant |

# 1 Introduction

## 1.1 Background

The Snells-Algies Wastewater Treatment Plant (WWTP) is on Lot 3 DP 193583 Hamatana Road. The WWTP services 4,300 people. The plant has two ponds, two oxidation lagoons, and a small pump station. Treated effluent discharges via an outfall pipe across the neighbouring estuary to its ultimate discharge point south of Martins Bay into the Hauraki Gulf.

Discharge Permit DIS60069253-B ("the consent") enables this discharge. To allow for delays in construction, Watercare has extended the short-term discharge period allowed under Permit DIS60069253-C through to 2024-2025.

## 1.2 Consent requirements

As per the consent requirements, treated effluent is analysed on a weekly, monthly, and six-monthly basis. The consent also has a requirement to sample the receiving environment and develop a Receiving Environment Water Quality Monitoring Programme, a Shellfish Monitoring Programme, and an Ecological Monitoring Plan.

Diffuse Solutions (2017) created the Receiving Environment Water Quality Monitoring Programme (WQMP), and Kelly & James (2017) introduced the Ecological and Shellfish Monitoring Programme (ESMP). The Snells receiving environment monitoring report includes findings from both programmes.

A new monitoring plan was certified in September 2025 to replace the current environmental monitoring for the long-term consent period starting in 2025-2026.

## 1.3 Scope

The purpose of this report is to summarise the results of the water quality and shellfish monitoring undertaken between 1 July 2024 to 30 June 2025 (inclusive) and review any longer-term trends (2017-2025) in the data. In doing so, this report includes:

- A description of the monitoring programmes
- A summary of effluent volumes and quality for 2024-2025
- An assessment of water quality and shellfish quality results for 2024-2025
- Statistical analysis of any longer-term trends in the receiving environment data.

Watercare is planning to replace the existing Snells-Algies WWTP with a new WWTP. Ecological monitoring will not commence until Watercare commissions the new plant. Consequently, this report does not include any assessment of those data.

# 2 Sampling plan

## 2.1 Locations

Figure 1 shows the treatment plant and the water quality monitoring sites around the outfall (environmental monitoring test sites) and the Martin's Bay "sentinel" site- which serves as an environmental control site. Monitoring of the five sites around the outfall began in July 2018. The Martin's Bay site is a "sentinel" site away from the outfall and has a long data record. This site was part of the monitoring plan associated with the earlier consent.

Shellfish sampling occurs onshore of the outfall, 300-500 m north and 300-500 m south along the beach. Sampling access depends on tidal conditions and occurs in patches of relative abundances. Therefore, exact sampling locations for shellfish vary between monitoring rounds.


***Figure 1 Sampling locations.***

## 2.2 Parameters

Table 1 lists the parameters that Watercare measures in the WQMP water samples. Field staff measure temperature, salinity, pH, and dissolved oxygen in situ using calibrated hand-held meters. Watercare Laboratories Services analyse the rest of the parameters in their laboratory.

***Table 1: Water quality parameters measured for the Snells-Algies WQMP***

| Parameter* | Relevance |
|---|---|
| Physico-chemical | |
| Temperature | Ecological health |
| Salinity | Wastewater/seawater indicator |
| pH | Ecological health |
| Dissolved oxygen | Ecological health |
| Carbonaceous 5-day biochemical oxygen demand ($cBOD_5$) | Sewage fungus indicator/Ecological health |
| Total suspended solids | Ecological health/Recreational contact |
| Turbidity | Ecological health/Recreational contact |
| Chemicals and nutrients | |
| Ammoniacal nitrogen | Ecological health |
| Nitrite | Ecological health |
| Nitrate | Eutrophication |
| Total nitrogen | Eutrophication |
| Dissolved reactive phosphorus | Eutrophication |
| Total phosphorus | Eutrophication |
| Bacterial/planktonic indicators | |
| Chlorophyll *a* | Plankton growth |
| Escherichia coli | Human health |
| Enterococci spp. | Human health |
| Faecal coliforms | Human health |

*Conductivity is listed in the REMP, but salinity is used and a surrogate.

Table 2 lists the shellfish parameters. Adenoviruses can cause ailments associated with the common cold and gastroenteritis. Enteroviruses are a family of viruses related to faecal matter and can cause illness in human hosts.

***Table 2: Shellfish flesh parameters measured for the Snells-Algies ESMP***

| Parameter | Unit | Relevance |
|---|---|---|
| Enterococci spp. | MPN/100 mg | Human health |
| Faecal coliforms | MPN/100 mg | Human health |
| Total coliforms | MPN/100 mg | Human health |
| Adenoviruses | MPN/ 100 mg | Human health |
| Enteroviruses | pfu/100 mg | Human health |

## 2.3 Frequencies

Table 3 summarises the monitoring timetable. All sampling was completed on time in the 2024-2025 reporting year. However, historically a COVID lockdown prevented sampling from August to October 2021 (longer term trend analysis).

***Table 3: Sampling frequencies***

| Sample type | Frequency |
|---|---|
| Treated wastewater – phosphorus analytes | Monthly |
| Treated wastewater – all other parameters | Weekly |
| REMP – Water quality | Monthly |
| REMP – Shellfish | Twice per year |

## 2.4 Data processing and statistical analyses

All data were processed and analysed using Microsoft Excel. Effluent and receiving environment results were screened for transcription errors, and non-detects were substitute with half the analytical detection limit for statistical purposes.

Descriptive statistics (mean ± standard error, median, minimum, maximum, and 92$^{nd}$ percentile) were calculated for each parameter in accordance with Auckland Council compliance reporting practice. Where applicable, rolling annual statistics were used to align with consent conditions.

Correlations between parameters were explored using Pearson correlation coefficients, with statistical significance set at $p < 0.05$. Graphical outputs (scatter plots, boxplots, correlation matrices) were produced to illustrate patterns and relationships across sites and years.

All analyses were performed on untransformed data unless otherwise stated. Results were rounded to two significant figures for presentation.

# 3 Results

### 3.1.1 Effluent quality

Watercare is required to monitor the effluent as per the discharge consent for Snells WWTP.

Table 4 summarises effluent monitoring results 2024-2025**.** Discharge standards for effluent are calculated on a rolling annual basis. The effluent is monitored:

- Daily for: discharge flow and rainfall
- Weekly for: salinity, total suspended solids, dissolved oxygen, Escherichia coli, Enterococci, faecal coliforms, nitrate, nitrite, temperature, total nitrogen, five-day biochemical oxygen demand ($cBOD_5$), pH
- Monthly for: dissolved reactive phosphorus and total phosphorus.

All parameters were compliant with the consent limits for the reporting period.

***Table 4: Summary of effluent monitoring for the Snells-Algies WWTP (2024-2025)***

| Parameter | Units | n | Average ± SE | Median | 92nd Percentile | Historical Mean ±SE (2017-2025) | Consent limit |
|---|---|---|---|---|---|---|---|
| Discharge Volume | $m^3$/day | 365 | 991** | 842*/ 775** | 1,612** | 993±0.27 | 4000*** 995**** |
| pH | - | 53 | 7.7-0.2 | 8.32 | 8.80 | 8.21±0.04 | |
| Temp | OC | 55 | 18.6-0.62 | 18.80 | 24.90 | 18.71±0.21 | |
| DO | mg $O_2$/L | 55 | 13.5-0.43 | 11 | 24 | 12.82±2.8 | >2 |
| Salinity | ppt | 52 | 1.63-0.06 | 1.58 | 2.11 | 1.32±0.04 | |
| Escherichia coli | cfu/100 mL | 52 | 2,400-880 | 1,700 | 5,544 | 2095±168 | 10,000 |
| Faecal Coliforms | cfu/100 mL | 52 | 3,370-1,480 | 2,700 | 6,568 | 3480±395 | 50,000 |
| Enterococci spp. | cfu/100 mL | 52 | 1,744-250 | 880 | 4,154 | 3085±1,150 | |
| TN | mg/L | 52 | 24-1.3 | 23.0 | 42 | 26.9±0.78 | |
| cBOD5 | mg $O_2$/L | 52 | 13.5-0.5 | 11.0 | 24 | 14.2±0.27 | <80 |
| TSS | mg/L | 52 | 40.5-3.8 | 31.3 | 84.4 | 46±0.9 | <100 |
| TP | mg/L | 12 | 8.4-0.8 | 8.5 | 11 | 7.8±0.34 | |
| DRP | mg/L | 12 | 7.0-0.32 | 7.3 | 9.3 | 6.4±0.25 | |

*Results are mean values ± standard error (rounded up to 2 significant figures), Historical means are ± standard error (data for Jul 2017 - Jun 2025 inclusive), *Median limit and median value presented– 92 %ile limit is 50,000 cfu/100mL, ** Historical rain data (Aug 2019 – Jun 2023), *** Maximum (wet weather flow), **** Average (dry weather flow)*

### 3.1.2 Effluent trends

To provide context for interpreting recent monitoring results, historical mean values (2017–2025) are presented alongside current averages, medians, and 92$^{nd}$ percentiles (Table 4). These values reflect longer-term performance of the WWTP discharge and receiving environment, allowing comparison of present conditions against established trends and consent limits. This helps identify whether observed results are consistent with past performance or indicate emerging changes in plant operation or environmental response. Key observations against the historical means include:

- Discharge volume remains well below the consent limit (≤4,000 m³/day), and in line with the long-term mean (~993 m³/day).
- pH and temperature are consistent with historical values, showing stable performance.
- Dissolved oxygen is slightly elevated compared with the historical mean, indicating good aeration.
- Salinity is marginally higher than the long-term mean, likely reflecting seasonal or inflow variability.
- Microbiological indicators (E. coli, faecal coliforms, Enterococci) remain well below consent limits, though Enterococci are higher during 2024/2025 than the long-term mean. This is consistent with higher saline inflow.
- Nutrients (TN, TP, DRP) are comparable with historic means, suggesting stable nutrient removal.
- cBOD5 and TSS remain significantly below consent limits and close to historical averages, indicating effective solids and organic load removal.

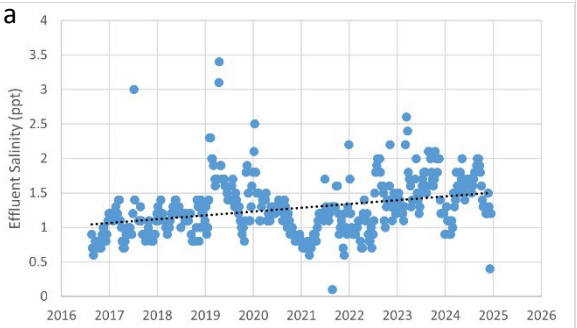
Figure 2a-3p show temporal trends in effluent parameters over the period July 2017 – June 2025.

Key points to note are:

- The most recent results from the last quarter of the monitoring period were affected by commissioning activities related to the treatment plant upgrade. These results were not included in this study.
- Effluent flow has increased over the seven-year period consistent with the increase in population growth within the Snells-Algies area.
- The increase in salinity suggests saline intrusion to the WWTP as salts cannot be removed by the treatment process.
- There is seasonal variation in temperature as expected with a trend of increasing temperature over the seven-years analysed. Showing raising temperatures.
- The rainfall trend is relatively constant with clear outliers indicating heavy rainfall events.
- An increasing trend is observed in total suspended solids, dissolved reactive phosphorus, Escherichia coli, faecal coliforms and total nitrogen. The significance of the observed trends will be evaluated after a full 10-year monitoring period. This timeframe will provide sufficient data to ensure robust conclusions and allow for more reliable assessment of long-term patterns and variations
- A decreasing trend is observed for dissolved oxygen, Enterococci, nitrate, nitrite, total phosphorus, biological oxygen demand and pH.

k

a

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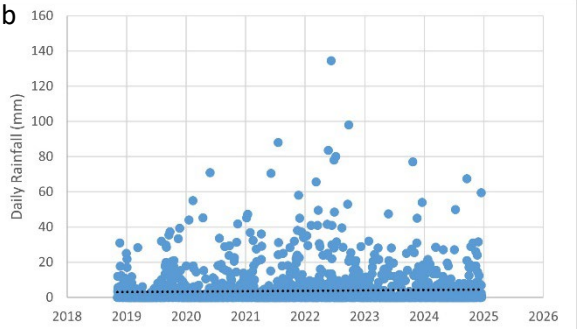


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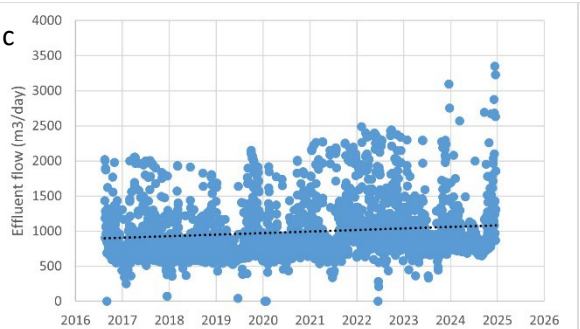


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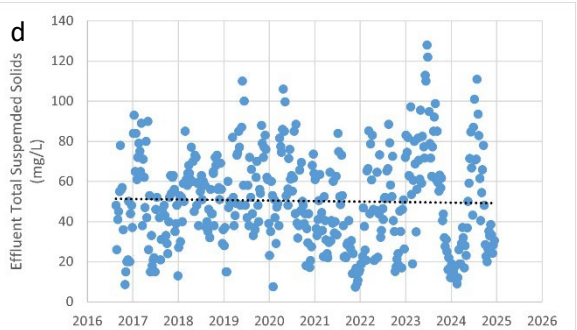


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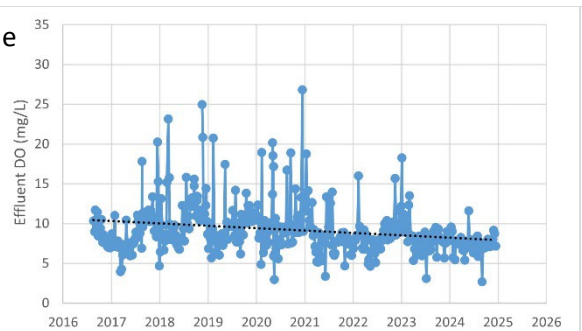


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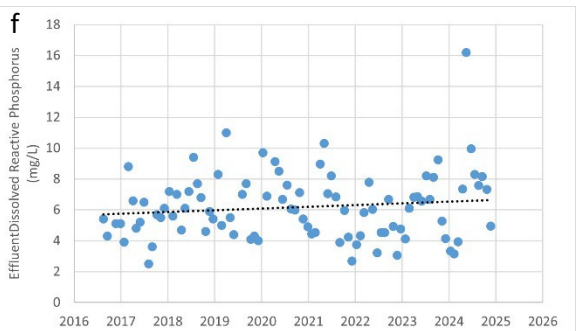


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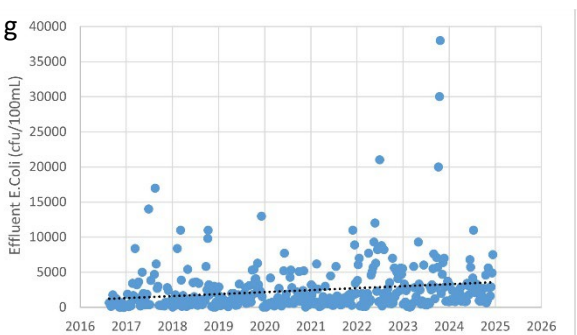


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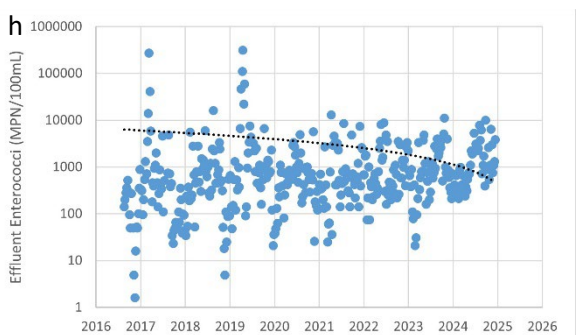


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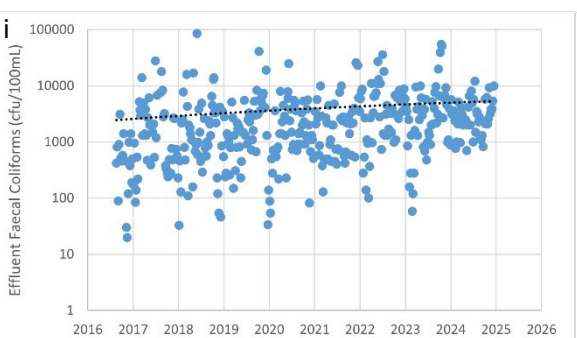


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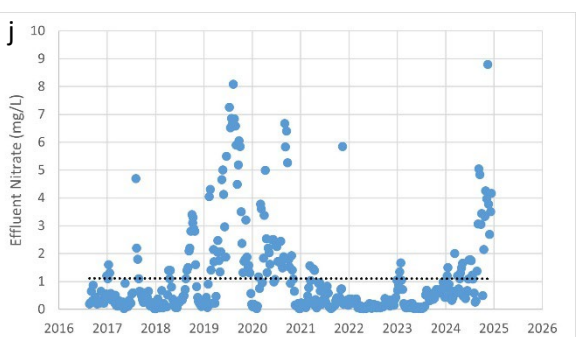


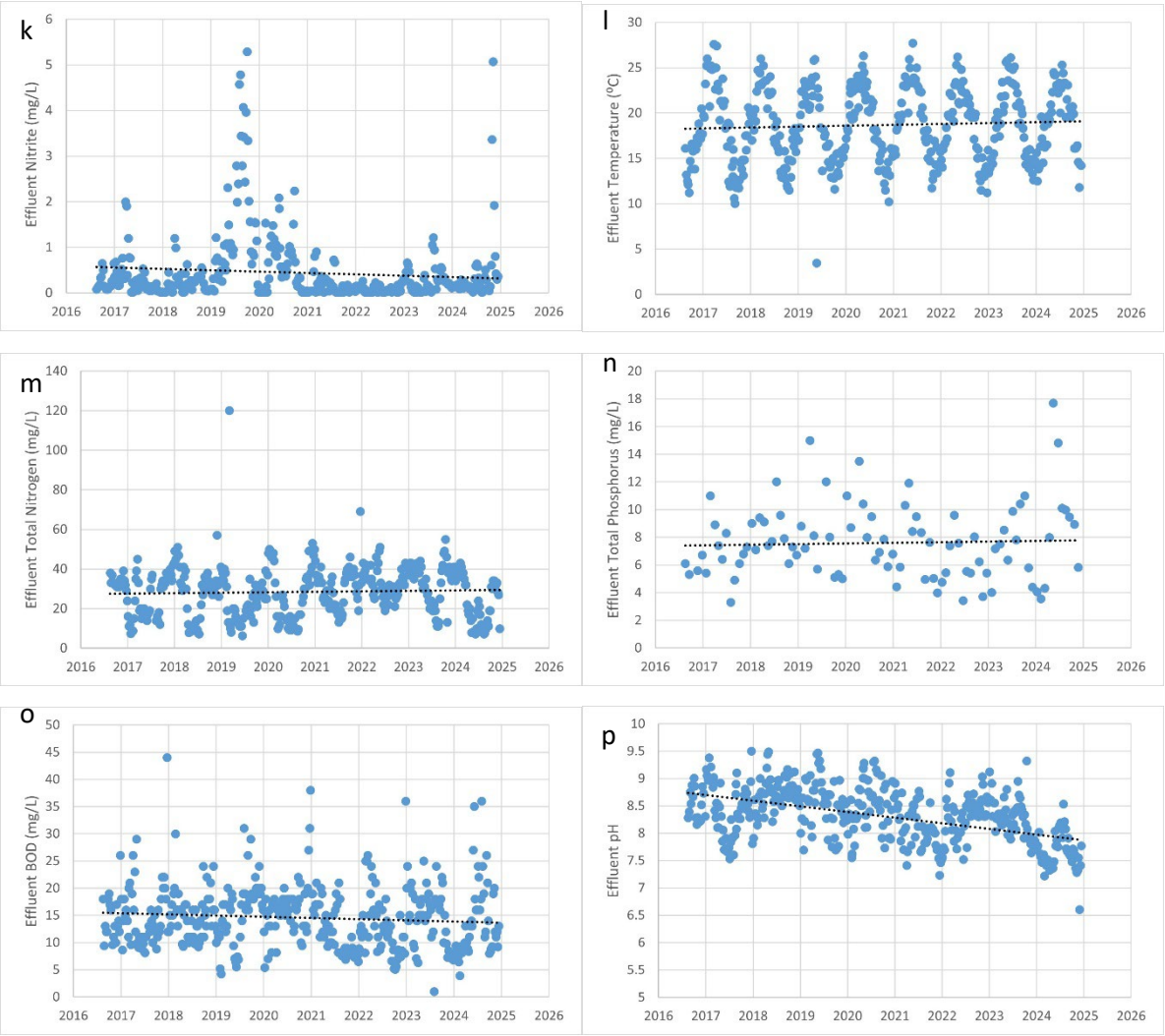



***Figure 2: Scatter plots of effluent parameters Jul 2017 – Jun 2025***

Figure 3 shows a correlation matrix between variables in the effluent at Snells-Algies WWTP for data over the period July 2017-June 2025. Appendix A shows the p-values (0.05) that represent statistically significant correlations between effluent parameters. Key correlations to note that complement the trends observed in the effluent scatter plots (Figure 2a-3p) are:

- There is a moderate positive correlation between salinity and total suspended solids, dissolved reactive phosphorus, and total phosphorus. The potential saline intrusion could explain the increase in total suspended solids and dissolved reactive phosphorus.
- As effluent flow has increased, there is a positive correlation between flow and levels of Escherichia coli, faecal coliforms, and total nitrogen. Suggesting that higher inflows (from growth or wet-weather events) reduce treatment retention time and are associated with elevated microbial and nutrient concentrations. Additionally, historical observations from the operations team have noted a strong link between peak saline intrusions during King tides and a decline in the overall microbial quality of the effluent
- The relationship between total nitrogen and oxidized nitrogen could indicates inefficient nitrification, which may be due to insufficient aeration or reduced retention time in the system. Current monitoring does not include measurements for total Kjeldahl nitrogen (TKN)

or ammonia, making it difficult to explain the discrepancy between high total nitrogen and low nitrate/nitrite levels. The un-accounted nitrogen may be either organic nitrogen or ammonia. The weak correlation between total nitrogen and dissolved oxygen (0.13) provides little evidence of process linkage, but without data for chlorophyll *a* or ammonia, a definitive conclusion cannot be drawn. As shown in the results below (section 3.2.2), the environmental monitoring indicates consistently high total nitrogen (TN) levels across all sites, suggesting that the elevated TN values at the treatment plant may be influenced by saline intrusion.

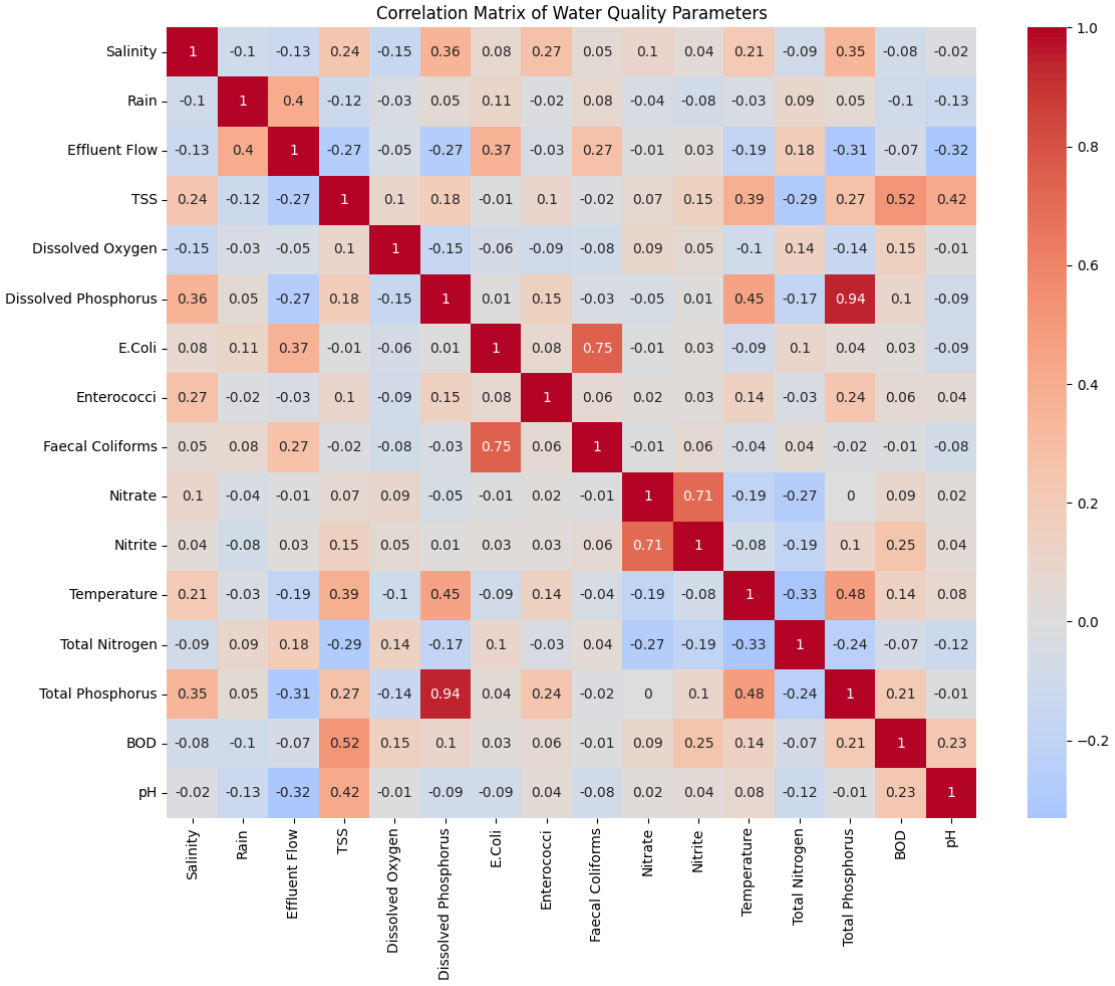



***Figure 3:Snells Effluent Correlation Matrix Jul 2017-Jun 2025. On the scale 1 indicates perfect positive linear correlation and a -1 indicate a perfect negative correlation.***

## 3.2 Receiving water quality

### 3.2.1 Samples

Water quality and shellfish monitoring was undertaken throughout the 2024–2025 reporting year in accordance with the consented programme.Table 5 presents the sampling schedule for the WQMP and the ESMP in 2024-2025, including daily discharge volumes, rainfall on the day and in the preceding three days, and the sites visited.

Sampling rounds alternated between all water quality sites (WQ), outfall-only checks, and shellfish (SF) collections, depending on the monitoring requirement for that month and prevailing tidal access. The schedule also captures wet-weather events (e.g., 2 October, 29 April, 12 June) where relevant.

***Table 5: WQMP schedule for July 2024 to June 2025***

| Date | Discharge ($m^3$/day) | Rainfall (day) | Rainfall (prev. 3 days) | Notes |
|---|---|---|---|---|
| 22 July | 2,208 | 6.0 | 40.0 | All WQ sites |
| 20 August | 1,375 | 0.0 | 47.5 | Outfall |
| 04 September | 1,043 | 1.5 | 19.0 | All WQ sites |
| 18 September | 1,102 | 0.0 | 21.5 | SF |
| 02 October | 1,536 | 28.5 | 0.0 | All WQ sites |
| 01 November | 713 | 0.0 | 10.5 | All WQ sites |
| 12 November | 447 | 0.0 | 5.5 | Outfall |
| 16 December | 1,161 | 18 | 1.5 | Outfall |
| 14 January | 781 | 0.0 | 0.0 | All WQ sites |
| 12 February | 724 | 0.0 | 3.5 | All WQ sites |
| 13 March | 716 | 0.0 | 0.0 | Outfall |
| 25 March | 717 | 0.0 | 0.0 | SF |
| 29 April | 1,623 | 2.0 | 35.0 | Outfall |
| 15 May | 713 | 0.0 | 0.5 | All WQ sites |
| 12 June | 2,095 | 3.5 | 45.0 | Outfall |

***Notes:*** *WQ = Water quality sites; SF= Shellfish sites.*

### 3.2.2 Results for 2024-2025

Water quality monitoring was carried out at six sites spanning the outfall mixing zone and the sentinel site at Martin's Bay. Mean values (± standard error) for July 2024–June 2025 are summarised in Table 6.

Overall, results were broadly consistent across sites, with no evidence of spatial patterns directly attributable to the WWTP discharge:

- Nutrients: Ammonia, nitrate, and nitrite concentrations were low and comparable among sites, with slightly higher values at the 1,500 m south and Martin's Bay control site. Total nitrogen and phosphorus levels showed natural variability but no clear outfall gradient.
- Microbiological indicators: E. coli, Enterococci, and faecal coliforms were generally below detection or very low across all outfall sites. Elevated values at Martin's Bay are consistent with wider catchment inputs rather than WWTP effects.
- Physicochemical parameters: Dissolved oxygen was near full saturation, pH remained stable (≈8.1–8.2), and salinity and conductivity reflected normal coastal conditions.
- Suspended solids and turbidity: TSS was higher at Martin's Bay (54 ± 5.9 mg/L) compared with outfall sites (38–45 mg/L), suggesting local catchment or analytical influences rather than discharge impacts.
- Chlorophyll a: Low and variable between sites, consistent with natural seasonal fluctuations.

Overall, water quality at the outfall monitoring locations was similar to, or in some cases more stable than, the sentinel site at Martin's Bay. The results provide no evidence of measurable adverse effects from the WWTP discharge on the receiving environment during 2024–2025.

***Table 6: Environmental monitoring results 2024 - 2025***

| | Units | Martin's Bay | 1500m South of outfall | 500m South of outfall | 150m West of outfall | 500m North of outfall | 500m East of outfall |
|---|---|---|---|---|---|---|---|
| **July 2024 - June 2025** | | | | | | | |
| Ammonia | µg/L | 9-2.1 | 13-4.4 | 7.5-2.5 | 10-2.7 | 7.7-2.3 | 6.6-1.1 |
| BOD | mg/L | 0.63-0.071 | 0.5-0 | 0.5-0 | 0.5-0 | 0.5-0 | 0.5-0 |
| Chlorophyll | µg/L | 1.6-0.84 | 0.83-0.1 | 2.4-1.5 | 0.71-0.068 | 0.77-0.065 | 0.88-0.15 |
| Conductivity | µS /m | 5100-95 | 5200-49 | 5200-41 | 5200-42 | 5200-43 | 5200-44 |
| Dissolved Reactive Phosphorus | µg/L | 8.3-0.29 | 8.4-0.62 | 8.4-0.57 | 9.2-0.71 | 8.4-0.61 | 8.2-0.6 |
| E.coli | cfu/100 mL | 26-22 | 1.8-0.14 | 1.6-0.013 | 1.6-0.013 | 1.6-0.013 | 1.6-0.013 |
| Enterococci | MPN/100mL | 27-13 | 10-0 | 10-0 | 10-0 | 10-0 | 10-0 |
| Faecal coliforms | cfu/100 mL | 29-24 | 1.8-0.14 | 1.6-0.011 | 1.9-0.27 | 1.6-0.013 | 1.6-0.013 |
| Nitrate | µg/L | 2.6-0.24 | 3.5-0.57 | 2.5-0.31 | 3-0.45 | 3.5-0.69 | 3.2-0.77 |
| Nitrite | µg/L | 2-0 | 2-0 | 2-0 | 2-0 | 2-0.0083 | 2-0 |
| NO3NO2 | µg/L | 2.6-0.24 | 3.5-0.57 | 2.5-0.31 | 3-0.45 | 3.5-0.68 | 3.2-0.77 |
| Percentage Saturation | % | 100-0.33 | 100-0 | 100-0 | 99-0.83 | 100-0 | 92-7.5 |
| pH | pH unit | 8.1-0.031 | 8.1-0.033 | 8.1-0.034 | 8.1-0.029 | 8.1-0.029 | 8.2-0.026 |
| Salinity | ppt | 35-0.11 | 35-0.2 | 34-1.6 | 35-0.2 | 35-0.19 | 34-1.1 |
| Sample DO | mg/L | 7.4-0.08 | 7.7-0.13 | 7.8-0.2 | 7.7-0.12 | 7.7-0.13 | 7.8-0.17 |
| Suspended Solids | mg/L | 54-5.9 | 38-3.9 | 45-3.3 | 42-2.8 | 41-4.2 | 41-4.5 |

| | Units | Martin's Bay | 1500m South of outfall | 500m South of outfall | 150m West of outfall | 500m North of outfall | 500m East of outfall |
|---|---|---|---|---|---|---|---|
| Temperature | °C | 20-0.55 | 18-0.93 | 18-0.93 | 18-0.92 | 18-0.92 | 18-0.92 |
| Total Nitrogen | µg/L | 95-8.3 | 83-9.6 | 74-4.3 | 110-20 | 72-5.8 | 80-6.5 |
| Total Phosphorus | µg/L | 15-2.8 | 11-1.1 | 9.5-0.69 | 10-0.78 | 11-1.2 | 9.6-0.8 |
| Turbidity | NTU | 1.5-0.28 | 0.55-0.055 | 0.6-0.064 | 0.6-0.073 | 0.58-0.067 | 0.52-0.061 |

*Results are mean values ± standard error (rounded up to 2 significant figures)*

### 3.2.3 Trends 2018-2025

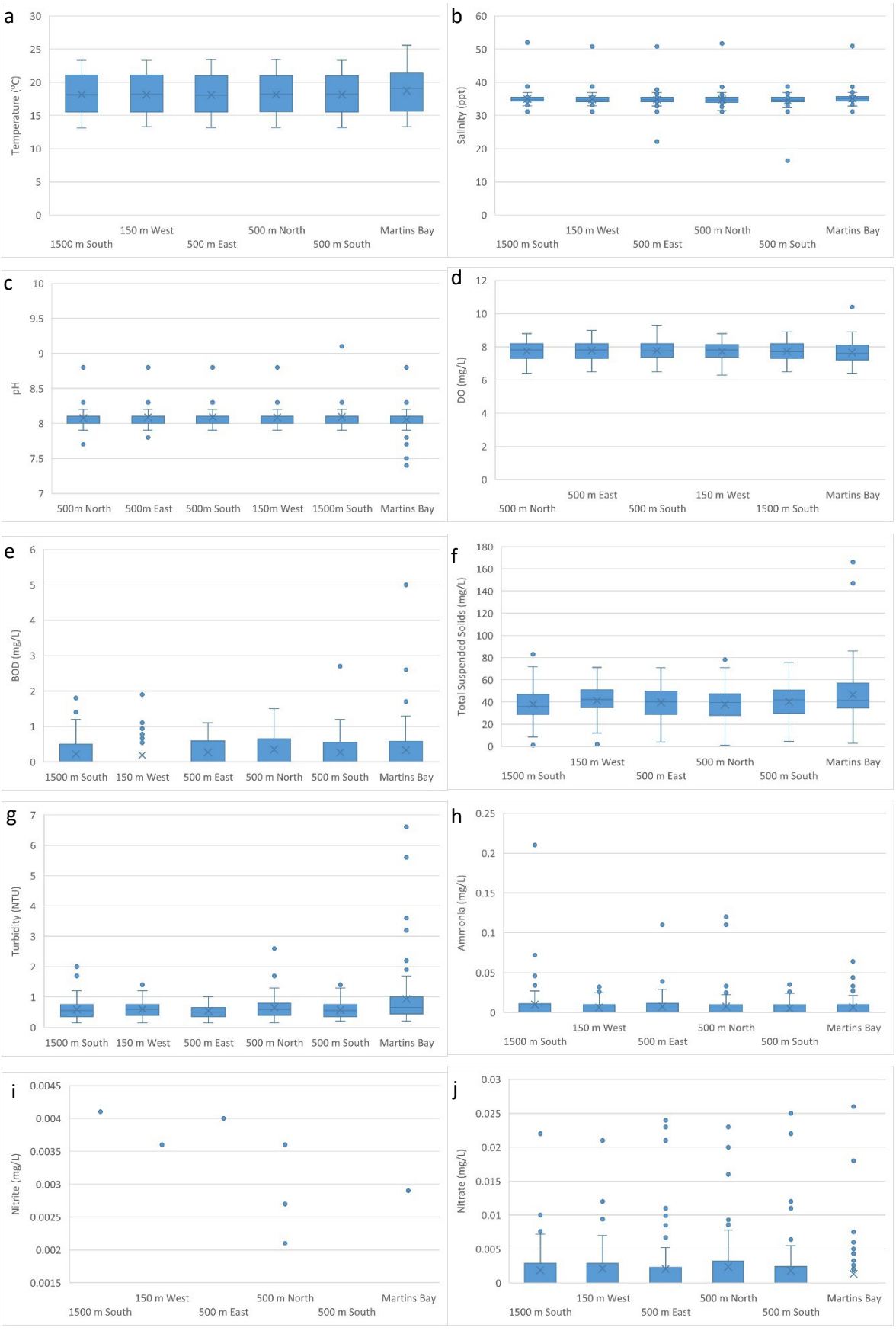
Historical comparisons are represented in Figure 4a – 4p using data from July 2018 (when sampling at the five current sites commenced). These are shown in the boxplots below along with the outfall data for the same period where data is available. To address the large differences in values associated with the outfall data, additional boxplots excluding this data are included in Appendix B.

Key points to note:

- The temperature at the outfall has the greatest spread and highest median but have little influence on the receiving environment
- Aside from a few outliers, dissolved oxygen levels have similar data distribution across all monitoring sites
- pH has a greater spread at the Martin's Bay location, but have a similar data distribution across all other monitoring site, suggesting no direct link with the discharge.
- While there is no turbidity data for the outfall, the box plot reveals no material variation in turbidity across the sites. The control site at Martin's Bay has higher turbidity
- Ammonia data is not available for the outfall, but a comparison of trends between the outfall sites and the Martin's Bay control site shows similar data distribution. Occasionally, the receiving environment may be influenced, as higher outliers are observed at the 500 m North, 500 m East, and 1,500 m South sites compared to Martin's Bay
- Chlorophyll a data is also not available for the outfall, though all monitoring sites show a similar spread and skew to that of Martin's Bay
- For bacteria (Escherichia coli and Enterococci), there is unlikely any influence on the harbour with similar data spread across monitoring sites and Martins Bay having high outliers, likely due to occasional external sources of bacterial introduction into the harbour
- At Martins Bay, faecal coliforms have higher outliers than at the outfall monitoring sites.

Overall, water quality at the Martins Bay site shows more variation across several parameters than at the outfall locations, suggesting that the WWTP discharge does not adversely affect the water quality of the Hauraki Gulf. Similarly, other parameters' do not show any notable spatial patterns on the boxplots.

Appendix C has scatter plots for each site and parameter for the period July 2018 - June 2025.


a
Temperature (°C)
1500 m South
150 m West
500 m East
500 m North
500 m South
Martins Bay
b
Salinity (ppt)
c
pH
500m North
500m East
500m South
150m West
1500m South
d
DO (mg/L)
e
BOD (mg/L)
f
Total Suspended Solids (mg/L)
g
Turbidity (NTU)
h
Ammonia (mg/L)
i
Nitrite (mg/L)
j
Nitrate (mg/L)

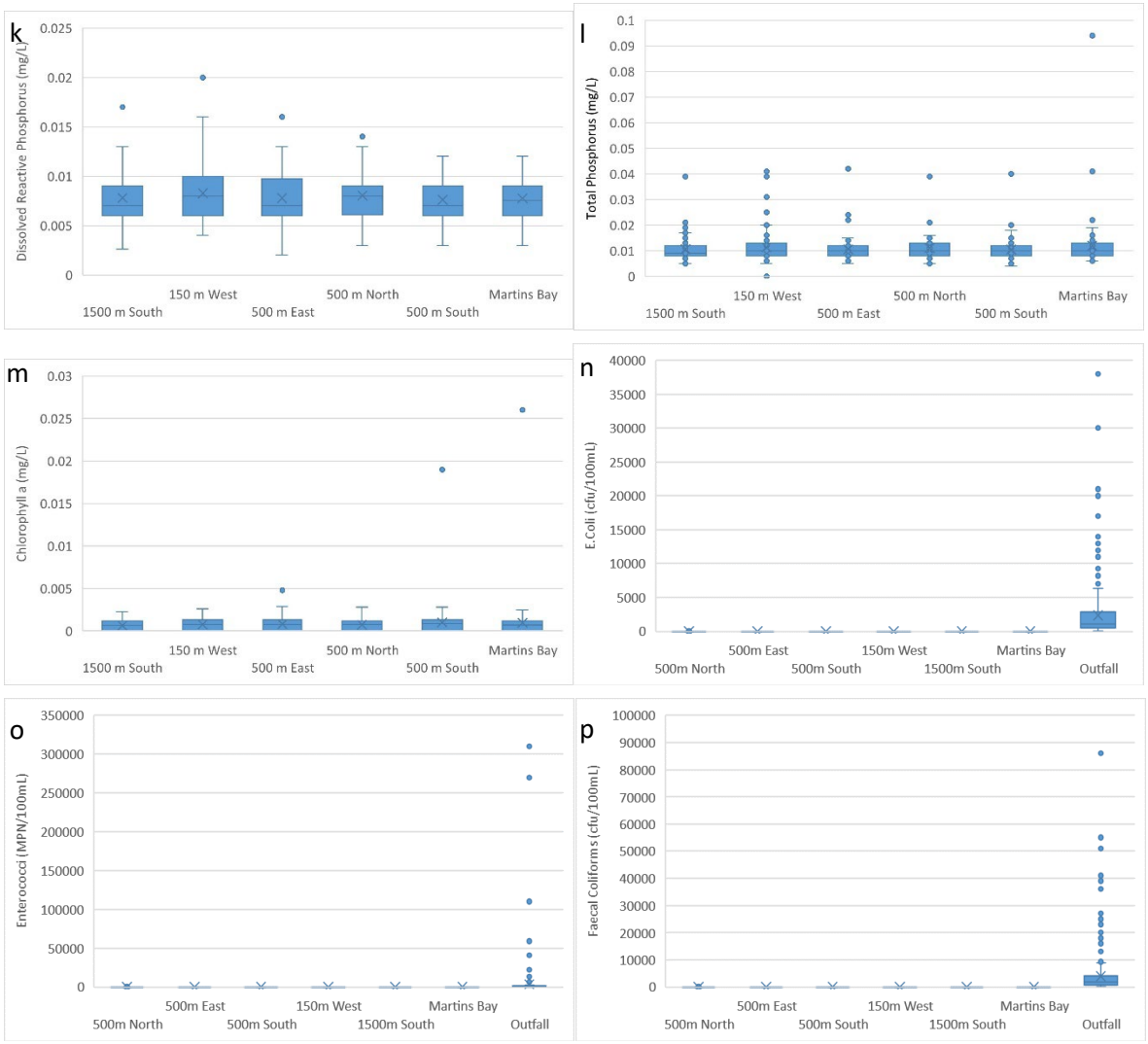



***Figure 4: Box blots for Snells WWTP water quality parameters at outfall for monitoring sites during Jul 2018 – Jun 2025***

### 3.2.4 Comparison to other sites

Table 7 provides a comparative analysis of water quality between the test sites, Martin's Bay, and the three nearest Auckland Council marine monitoring locations. Figure 5 illustrates the geographical distribution of these sites. It should be noted that Auckland Council does not publish bacterial data as part of its marine monitoring programme.

Consistent with previous years, the comparison reveals minimal variation in water quality between the effluent discharge and those situated farther away (Martin's Bay and Auckland's Councils marine monitoring sites). Salinity levels remain markedly higher at the Auckland Council sites, primarily due to the effluent consisting largely of freshwater. Aside from differences in total suspended solids and total phosphorus, results for Martins Bay and the Auckland Council sites indicate no significant discrepancies.

The latest reporting period (2023-2024) shows a notable rise in total phosphorus concentrations at Martins Bay, increasing from 7.2 mg/L to 15 mg/L. This elevation was not observed at the outfall sampling locations, suggesting it is unlikely to be associated with discharge activities.

Levels of total suspended solids at both Martins Bay and near the outfall are consistent with historical data but remain substantially higher than those measured at other Auckland Council sites.

The moderate correlation found among salinity, total suspended solids, dissolved reactive phosphorus, and total phosphorus within effluent data indicates possible saline intrusion within the wastewater network. Recent, as-yet-unpublished drone surveys, along with stakeholder communications, have identified unusually high sediment accumulation along the shoreline, resulting in increased oyster bed mortality rates (Mussel Reef Restoration Trust).

As part of the commissioning requirements for the new outfall and routine maintenance of the existing one, Watercare has conducted inspection dives of its infrastructure. These assessments did not reveal any evidence of erosion adjacent to the outfall.

Overall, these findings suggest potential catchment-wide variations affecting the area, with no link to discharge activities.

***Table 7: 2024-2025 data for the Snells-Algies monitoring sites and nearby Auckland Council sites***

| Parameter | Unit | Effluent discharge | Martin's Bay | Ti Point (Omaha) | Mahurangi Heads | Orewa |
|---|---|---|---|---|---|---|
| Temperature | ˚C | 18.6-0.62 | 20-0.55 | 17.6 ± 2.6 | 17.6 ± 3.1 | 17.7±3.2 |
| Salinity | ‰ | 1.63-0.06 | 35-0.11 | 34.17 ± 0.81 | 33.65 ± 1.0 | 33.89 ± 0.9 |
| DO | mg O2/L | 13.5-0.43 | 7.4-0.08 | 7.76 ± 0.4 | 7.74 ± 0.5 | 7.84 ± 0.5 |
| TSS | mg/L | 40.5-3.8 | 54-5.9 | 3.2 ± 0.6 | 7.1 ±10.3 | 3.1 ± 0.3 |
| Turbidity | NTU | 0.51 ± 0.22* | 1.5-0.28 | 0.46 ± 0.4 | 1.03 ± 0.5 | 0.57 ± .5 |
| Ammoniacal nitrogen | µg N/L | 46.3 ± 61.1* | 9-2.1 | 12 ± 4 | 12 ± 3 | 11 ± 3 |
| Dissolved reactive phosphorus | mg P/L | 7.0-0.32 | 8.3-0.29 | N/A | N/A | N/A |
| Total phosphorus | µg/L | 8.4-0.8 | 15-2.8 | 9 ± 6 | 8 ± 1 | 8 ± 1 |
| Chlorophyll *a* | µg/L | 1.0 ± 0.30* | 1.6-0.84 | 0. 5 ± 0. 3 | 0. 5 ± 0. 2 | 0. 3 ± 0. 1 |

*Notes: Results are mean values ± standard error.*


***Figure 5: Auckland Council monitoring sites.***

## 3.3 Shellfish quality

Table 8 shows results for shellfish testing, with both sampling rounds completed this period. One round was missed in early 2021 due to COVID restrictions and another in early 2023 because of flooding. This year's samples showed viruses below detection limits. Unusually high Enterococci results were found at both sites in March (25/03), though monthly water quality checks for February, March, and April detected no Enterococci above limits at any location, making a link to discharge unlikely.

The public health risk assessments developed as part of the assessment of ecological effects for the outfall concluded that shellfish from this area might not be safe for human consumption. The reports made that conclusion using modelling under various tidal conditions.

Assessment of Ecological Effects on the receiving environments from a discharge of treated wastewater from the combined Snells Beach and Warkworth WWTPs- M.james, M.Stewart, 2016, Watercare Services limited

***Table 8: Shellfish quality results for the reporting period 2024-2025, compared to the historical range between 2019 and 2025***

| Details | North of outfall | | | South of outfall | | |
|---|---|---|---|---|---|---|
| | 18-Sep-24 | 23-Mar-25 | *Range 2019-2025 | 18-Sep-24 | 23-Mar-25 | *Range 2019-2025 |
| Rainfall on day (mm) | 0 | 0 | N/A | 5 | 0 | N/A |
| Rainfall on previous three days (mm) | 21.5 | 0 | N/A | 1 | 0 | N/A |
| Enterococci spp. (MPN/100 g) | 45 | 1100 | <18 - 130 | 20 | 7900 | <1.8 - 230 |
| Faecal coliforms (MPN/100 g) | <18 | <18 | <18 - 45 | <18 | <18 | <18 - 490 |
| Adenoviruses (MPN/100 g) | <4 | <4 | <4 | <4 | <4 | <4 - <8 |
| Enteroviruses (pfu/100 g) | <4 | <4 | <4 | <4 | <4 | <4 - <8 |

*Notes: *Sampling began in April 2019; n=8*

### 3.3.1 Shellfish quality trends

Sampling at the current shellfish locations (North and South) commenced in April 2019.

For viruses (both adenoviruses and enteroviruses) the results have always been below the detection limit at both the North and South sampling sites, indicating the WWTP are not introducing viruses into the receiving environment at detectible levels.

Figure 6 and Figure 7 show the distribution and trend of bacteria in shellfish over the past six years, the southern site has a larger spread and mean for both bacteria. Results have been below or very close to the detection limits (<18 MPN/100g – Enterococci and faecal coliforms) for the past five years. Showing as of recent minimal impact on the receiving environment.

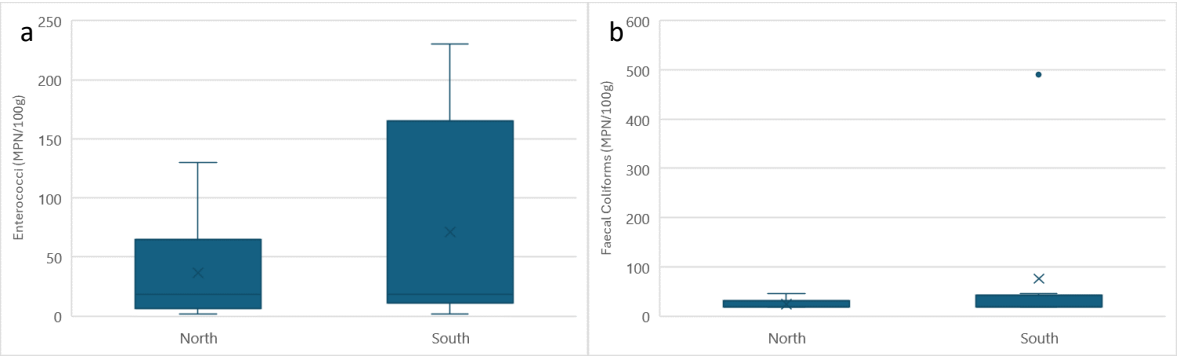



***Figure 6: Boxplots of shellfish bacteria sampling Apr 2019 – Mar 2025.***

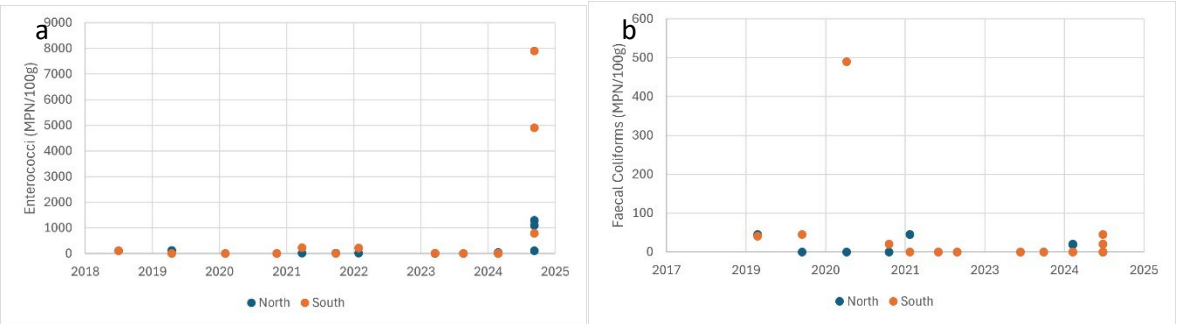



***Figure 7: Scatter plots of shellfish bacteria sampling Apr 2019 – Mar 2025.***

# 4 Conclusions

Overall, the WWTP was compliant with consent limits for the period from July 2024 to June 2025, with no evidence indicating that its discharge has adverse effects on the receiving marine environment.

- **Receiving environment:**

  Water quality results were consistent between the monitoring sites.
  Except for high suspended solids at Martins Bay and the Outfall, water quality near the outfall was comparable to other coastal sites. No link was found between suspended solids and discharge impact. Wider catchment data suggested a larger-scale cause.

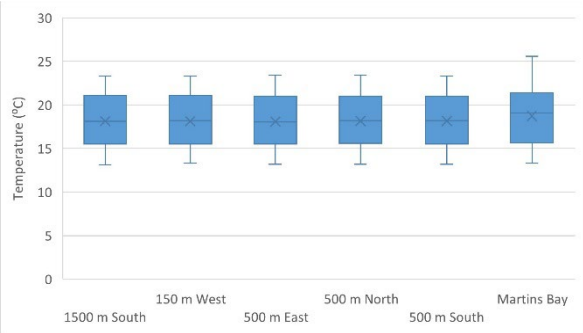
- **Contact recreation and shellfish gathering:** Bacterial indicators near the outfall were higher than before, but no enteroviruses or adenoviruses were found in shellfish samples.

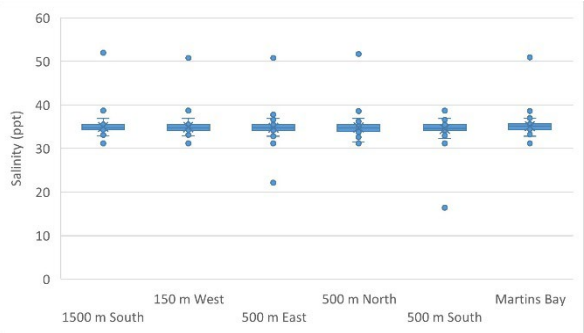
# 5 Appendix

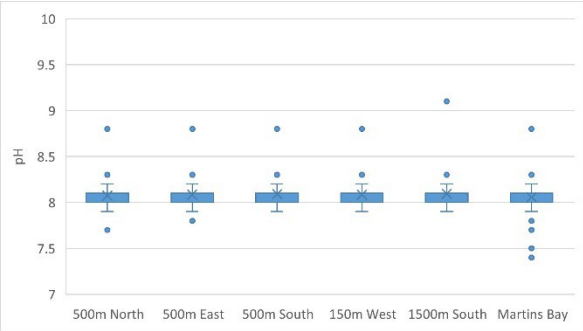
## 5.1 Appendix A - Effluent p-values correlations

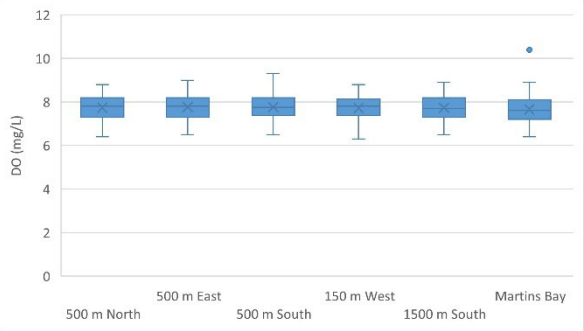
| Correlation | Salinity | Rain | Effluent Flow | TSS | Dissolved Oxygen | Dissolved Phosphorus | E.Coli | Enterococci | Faecal Coliforms | Nitrate | Nitrite | Temperature | Total Nitrogen | Total Phosphorus | BOD | pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Salinity | 1.00 | -0.11 | -0.16 | 0.24 | -0.15 | 0.36 | 0.08 | 0.27 | 0.05 | 0.10 | 0.04 | 0.21 | -0.09 | 0.35 | -0.08 | -0.02 |
| Rain | | 1.00 | 0.40 | -0.09 | -0.02 | 0.01 | 0.11 | -0.02 | 0.08 | -0.03 | -0.07 | -0.04 | 0.09 | 0.01 | -0.09 | -0.11 |
| Effluent Flow | | | 1.00 | -0.24 | -0.04 | -0.28 | 0.36 | -0.03 | 0.26 | 0.01 | 0.05 | -0.19 | 0.20 | -0.29 | -0.08 | -0.27 |
| TSS | | | | 1.00 | 0.10 | 0.18 | -0.01 | 0.10 | -0.02 | 0.07 | 0.15 | 0.39 | -0.29 | 0.27 | 0.52 | 0.42 |
| Dissolved Oxygen | | | | | 1.00 | -0.15 | -0.06 | -0.09 | -0.08 | 0.09 | 0.05 | -0.10 | 0.14 | -0.14 | 0.15 | -0.01 |
| Dissolved Phosphorus | | | | | | 1.00 | 0.01 | 0.15 | -0.03 | -0.05 | 0.01 | 0.45 | -0.17 | 0.94 | 0.10 | -0.09 |
| E.Coli | | | | | | | 1.00 | 0.08 | 0.75 | -0.01 | 0.03 | -0.09 | 0.10 | 0.04 | 0.03 | -0.09 |
| Enterococci | | | | | | | | 1.00 | 0.06 | 0.02 | 0.03 | 0.14 | -0.03 | 0.24 | 0.06 | 0.04 |
| Faecal Coliforms | | | | | | | | | 1.00 | -0.01 | 0.06 | -0.04 | 0.04 | -0.02 | -0.01 | -0.08 |
| Nitrate | | | | | | | | | | 1.00 | 0.71 | -0.19 | -0.27 | 0.00 | 0.09 | 0.02 |
| Nitrite | | | | | | | | | | | 1.00 | -0.08 | -0.19 | 0.10 | 0.25 | 0.04 |
| Temperature | | | | | | | | | | | | 1 | -0.331 14767 2 | 0.476931 | 0.1 4335 7 | 0.0 7946 3 |
| Total Nitrogen | | | | | | | | | | | | | 1 | -0.23945 | -0.0 7142 | -0.1 2058 |
| Total Phosphorus | | | | | | | | | | | | | | 1 | 0.2 0504 1 | -0.0 1112 |
| BOD | | | | | | | | | | | | | | | 1 | 0.2 3484 8 |
| pH | | | | | | | | | | | | | | | | 1 |

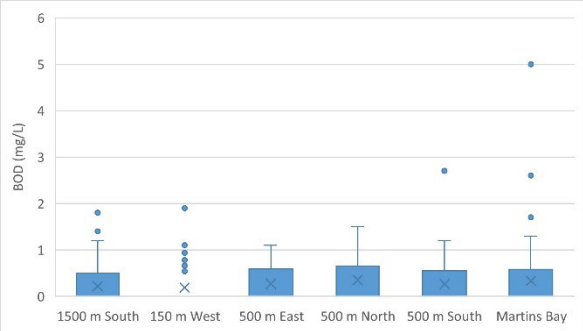
## 5.2 Appendix B - Water quality parameters at monitoring sites

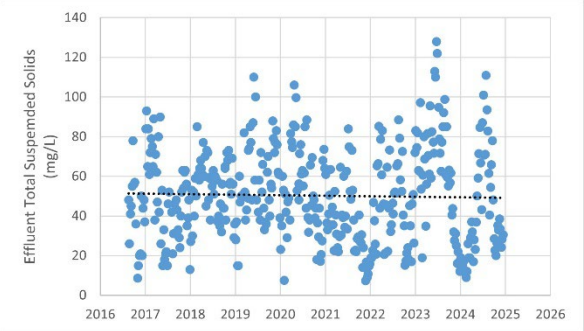


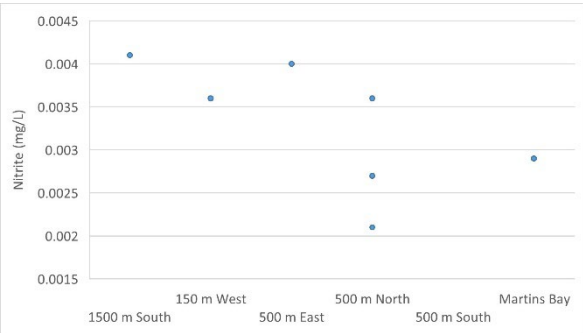



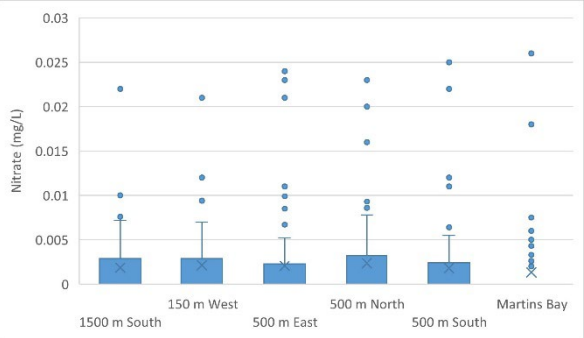



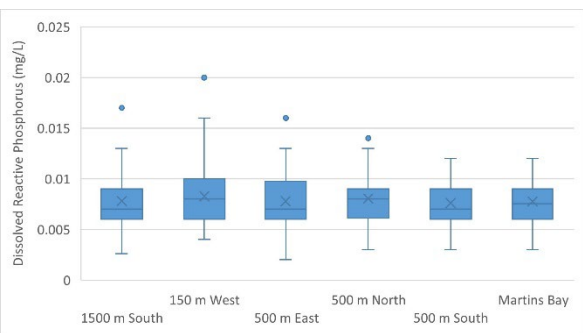



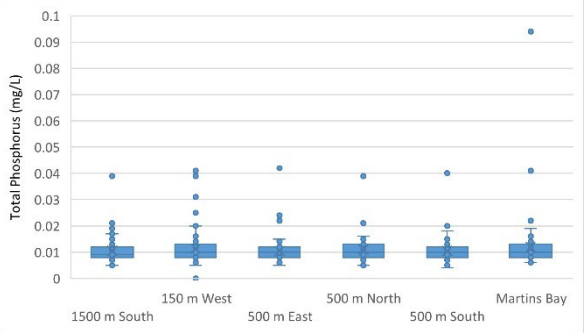



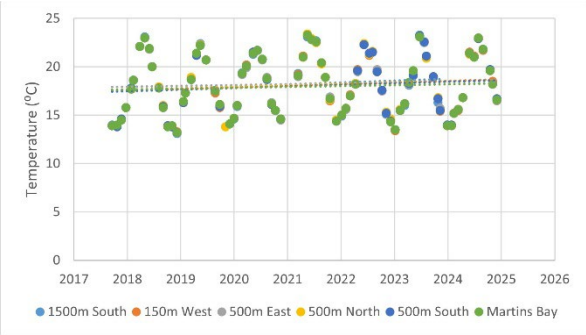



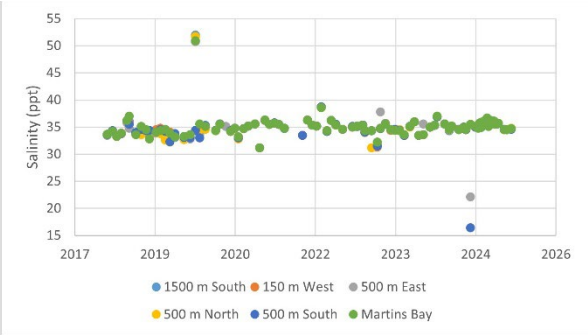



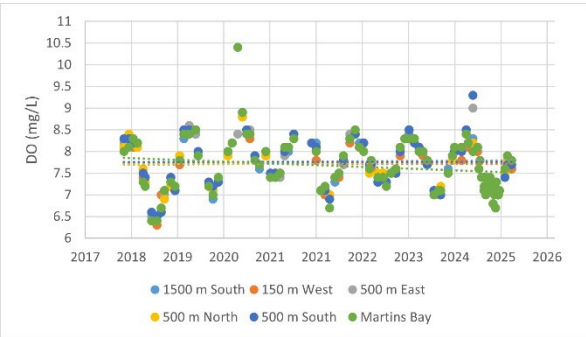



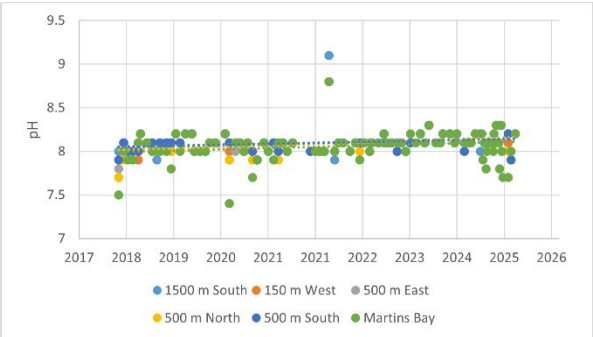



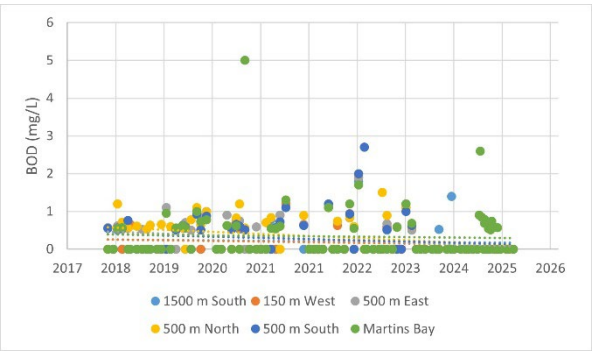
## 5.3 Appendix C - Water quality trends at monitoring sites

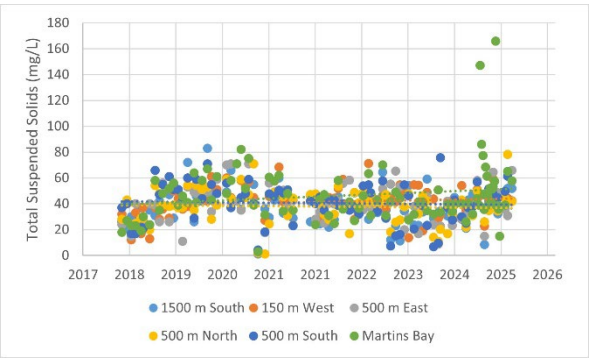


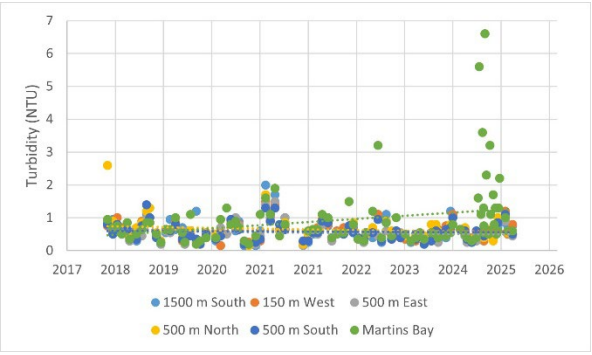



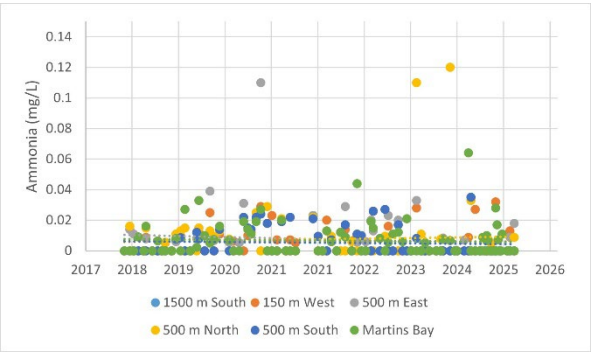



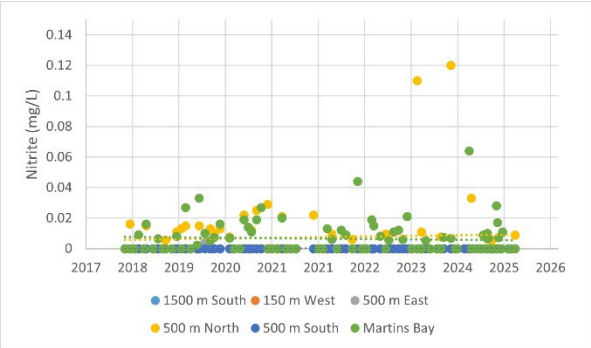



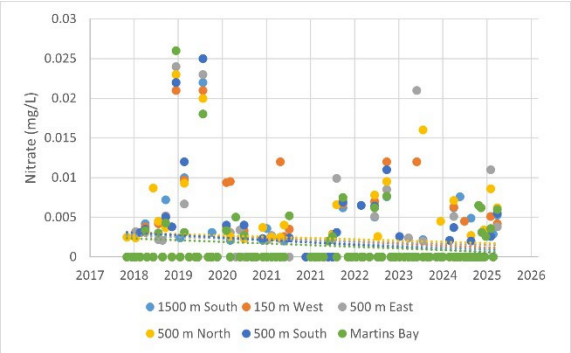



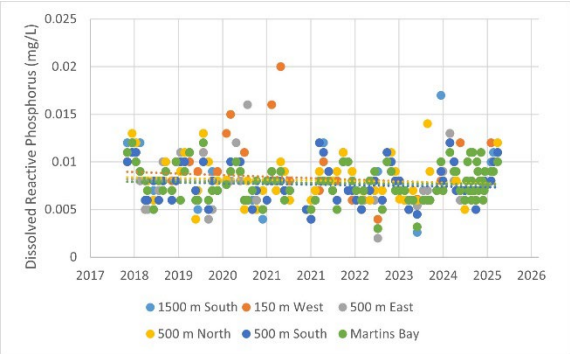



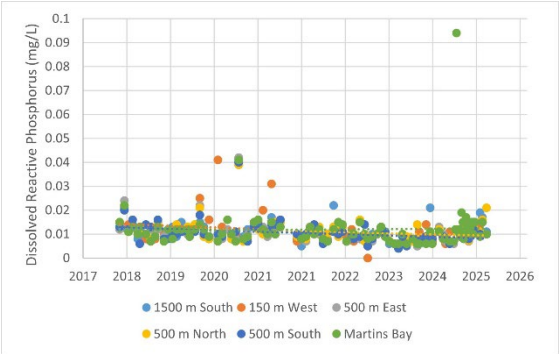



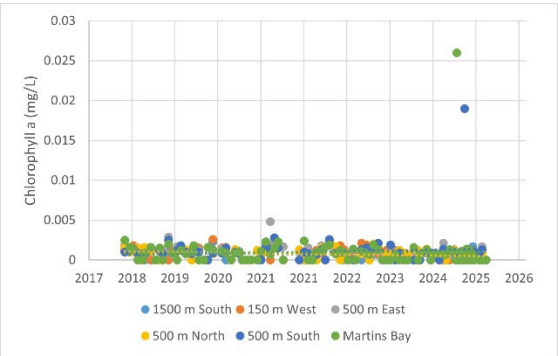



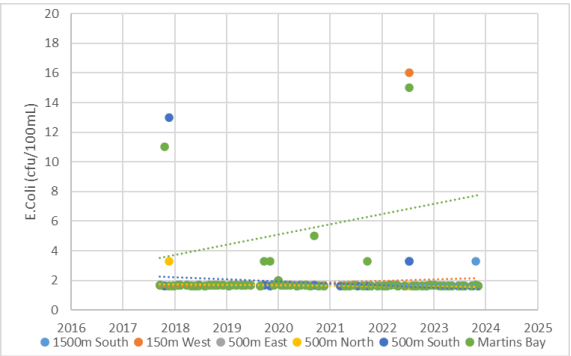

Nitrite (mg/L)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
2017 2018 2019 2020 2021 2021 2022 2023 2024 2025 2026
1500 m South 150 m West 500 m East
500 m North 500 m South Martins Bay


Nitrate (mg/L)
0.03
0.025
0.02
0.015
0.01
0.005
0
2017 2018 2019 2020 2021 2021 2022 2023 2024 2025 2026
1500 m South 150 m West 500 m East
500 m North 500 m South Martins Bay


Dissolved Reactive Phosphorus (mg/L)
0.025
0.02
0.015
0.01
0.005
0
2017 2018 2019 2020 2021 2021 2022 2023 2024 2025 2026
1500 m South 150 m West 500 m East
500 m North 500 m South Martins Bay


Dissolved Reactive Phosphorus (mg/L)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
2017 2018 2019 2020 2021 2021 2022 2023 2024 2025 2026
1500 m South 150 m West 500 m East
500 m North 500 m South Martins Bay


Chlorophyll a (mg/L)
0.03
0.025
0.02
0.015
0.01
0.005
0
2017 2018 2019 2020 2021 2021 2022 2023 2024 2025 2026
1500 m South 150 m West 500 m East
500 m North 500 m South Martins Bay


E.Coli (cfu/100mL)
20
18
16
14
12
10
8
6
4
2
0
2016 2017 2018 2019 2020 2021 2022 2023 2024 2025
1500m South 150m West 500m East 500m North 500m South Martins Bay

# Appendix D. Compliance assessment for the Snells WWTP

***Table 5: Assessment of Compliance with Consent Conditions Snells-Algies WWTP Discharge to Air (#REG-67908)***

| Condition Number | Consent Conditions Snells-Algies WWTP Discharge to Air (#REG-67908) | Compliance Rating | Comment |
|---|---|---|---|
| 01 | Discharge permits REG-67908 and REG-67909 shall expire 35 years from the date of commencement, unless it has lapsed, surrendered or been cancelled at an earlier date pursuant to the Resource Management Act 1991. | 1 | |
| 02 | The discharge activities shall be carried out in general accordance with the plans and information submitted with the application, detailed below, and all material referenced by the Council as consent number Land use consents LAN-67900 and LAN-67917; Discharge permits REG-67903 and REG-67908, REG-67905 and REG-67909, and REG-67901; Coastal Permits REG-67912, REG-67915 and REG- 67918, REG-67916 and REG-67911:<br>• Application Form, and Assessment of Environmental Effects prepared by Mitchell Partnerships Limited, dated 27 June 2016; and<br>• Further information submitted with the application and listed in Appendix 1; or<br>• Any subsequent plans or information that has received written approval from the Team Leader Northern Monitoring, Auckland Council. | 1 | |
| 03 | In the event of any conflict between the document listed above and the conditions of this consent, the conditions shall prevail. | 1 | |
| 04 | The Consent Holder shall ensure that all staff and contractors undertaking works on site are aware of, and adhere to, all conditions of this consent. | 1 | |
| 27 | Within six months of the date of commencement of this consent, the Consent Holder shall install and operate a meteorological monitoring station to measure wind speed, wind direction, temperature and rainfall at the site. The monitor shall continuously log these meteorological conditions in real-time so that the readings are available to site staff and be of a type and in a location agreed to by Team Leader Northern Monitoring, Auckland Council. The location of the monitor shall minimise the potential for obstacles to affect the accuracy of the readings. | 1 | The weather station at Snells WWTP was installed in March 2018 |
| 28 | The Consent Holder shall ensure that all processes on site are operated, maintained, supervised, monitored and controlled to ensure that emissions to air authorised by this consent are maintained at the minimum practicable level. | 1 | Ongoing |
| 29 | Beyond the boundary of the site, there shall be no odour or dust caused by discharges from the site which, in the opinion of an enforcement officer, is noxious, offensive or objectionable. | 1 | No noxious, offensive or objectionable odour or dust this reporting year |
| 30 | No discharges from any activity on site shall give rise to visible emissions, other than clean water vapour, to an extent which, in the opinion of an enforcement officer, is noxious, dangerous, offensive or objectionable. | 1 | No incidents or events for this reporting year |
| 31 | Beyond the boundary of the site, there shall be no hazardous air pollutant, caused by discharges from the site, which is present at a concentration that causes, or is likely to cause adverse effects to human health, the environment or property. | 1 | No incidents or events for this reporting year |

| Condition Number | Consent Conditions Snells-Algies WWTP Discharge to Air (#REG-67908) | Compliance Rating | Comment |
|---|---|---|---|
| 32 | All processes on site shall be operated in accordance with the Odour Management Plan submitted and accepted in accordance with Condition 39 of this consent. | 1 | Ongoing |
| 33 | No part of the process shall be operated without the associated emissions control equipment being fully operational and functioning correctly. | 1 | Ongoing |
| 34 | All processing equipment, buildings, ducting and emissions control equipment shall be maintained in good condition and as far as practicable be free from leaks in order to prevent the escape of fugitive emissions | 1 | Ongoing |
| 35 | The meteorological conditions and proximity of sensitive receptors shall be considered prior to undertaking any potentially-odorous activities at the site. | 1 | Ongoing |
| 36 | A walkover inspection of the WWTP site shall be undertaken at least once per week to identify any odours that may be originating from the site. The results shall be recorded and any odour potentially detectable off-site investigated immediately. Where necessary, remedial action shall be undertaken as soon as practicable. | 1 | |
| 37 | All sludge removal from the storage ponds and subsequent de-watering and disposal shall be carried out in a manner that minimises odour to the extent practicable. | N/A | |
| 38 | The Consent Holder shall prepare and maintain an Odour Management Plan, as part of the Management Plan, to describe measures to control and reduce the potential for odour generation to occur, which could give rise to off-site effects. The Odour Management Plan shall as minimum include the following:<br>a. Identification of all fugitive and point sources for discharges of contaminants into air, including a site plan showing the locations of each point source and the specifications of all odour control devices;<br>b. Details of procedures to minimise discharges of contaminants into air, including details of the inspection, maintenance, monitoring and contingency procedures in place;<br>c. Monitoring and maintenance requirements for odour treatment equipment, e.g. moisture content and pH for biofilter media and pressure drop across biofilter media;<br>d. The procedures for the walkover, recording of the results and any remedial actions taken in accordance with Condition 37<br>e. Complaints investigation, monitoring and reporting in accordance with Condition 59; and<br>f. The identification of key staff and contractors responsibilities and contact details.<br>g. A requirement that an Auckland Council enforcement officer to be notified as soon as practicable in the event of any significant discharge to air, which results or has the potential to result in a breach of these conditions or adverse effects on the environment. The following information shall be included:<br>i. Details of the nature of the discharge;<br>ii. An explanation of the cause of the incident; and<br>iii. Details of remedial action taken. | 1 | Auckland Council approved the plan in July 2017 |

| Condition Number | Consent Conditions Snells-Algies WWTP Discharge to Air (#REG-67908) | Compliance Rating | Comment |
|---|---|---|---|
| 39 | The Odour Management Plan shall be submitted to the Team Leader Northern Monitoring, Auckland Council for approval in a certification capacity within three months from the date of commencement of this consent and shall be reviewed at least once every year. | 1 | Auckland Council approved the plan in July 2017 |
| 40 | Within one month of commissioning the new WWTP, the Consent Holder shall provide an updated Odour Management Plan for the new WWTP to the Team Leader Northern Monitoring, Auckland Council for approval in a technical certification capacity. The Consent Holder shall implement the approved Odour Management Plan. | 1 | Auckland Council approved the plan in July 2017 |
| 41 | The Consent Holder shall prepare a Management Plan, the purpose of which is to integrate operational practices, environmental monitoring programmes and reporting of results required by the conditions of these consents. The Management Plan shall as a minimum include the following matters:<br>PLEASE SEE PAGE 44/95 OF THE CONSENT DOCUMENT FOR THE MATTERS. | 1 | Operation Management Plan in February 2018 |
| 42 | The Management Plan shall be to a standard acceptable to the Team Leader Northern Monitoring, Auckland Council. | 1 | |
| 43 | The Management Plan required under Condition 42 shall be submitted to the Team Leader Northern Monitoring, Auckland Council for approval in a certifying capacity within six months of the consents commencing except for those parts approved under other conditions which shall be submitted in accordance with the timeframes required by those conditions. | 1 | |
| 44 | The Consent Holder shall undertake the requirements of the Management Plan once it has been finalised. All subsequent significant updates to the Management Plan throughout the term of this consent shall be submitted to the Team Leader Northern Monitoring, Auckland Council for approval prior to implementation. | 1 | |
| 45 | Within three months of consent commencing, the consent holder shall submit an Ecological Monitoring Plan for approval to the Team Leader-Northern Monitoring. The Plan shall include detailed monitoring and reporting programme to measure the potential ecological effects from the wastewater discharge on the receiving environment. | 1 | Auckland Council approved the plan in December 2017 |
| 46 | The consent holder shall ensure that the results of the monitoring undertaken in accordance with Conditions 7 to 9 (short-term standards), Conditions 11 to 12 (long-term standards), Condition 17 and the Viral Monitoring Condition 42 (c) to (e) are reported to the Team Leader Northern Monitoring, Auckland Council quarterly, within 20 working days of the period ending 31 December, 31 March, 30 June and 30 September each year. | 1 | Ongoing |
| 47 | An Annual Performance Report shall be submitted to the Team Leader Northern Monitoring, Auckland Council by September 30 of each year. The report shall:<br>a. Collate, analyse and interpret all relevant data and information pertaining to this consent for the previous year from 1 July to 30 June;<br>b. Include comment on general plant performance and any trends in changes in the discharge volume and/or the discharge quality standards over time;<br>c. Include a consideration of compliance with each consent condition; and<br>d. Identify any actions required and submit a timetable to rectify any non-compliance. | 1 | Ongoing |

| Condition Number | Consent Conditions Snells-Algies WWTP Discharge to Air (#REG-67908) | Compliance Rating | Comment |
|---|---|---|---|
| 48 | The Consent Holder shall engage a suitably qualified person to review the collated water and sediment quality data at least monthly and assess the surface water quality monitoring undertaken as part of these consent conditions by 30 September of the fifth anniversary of the commencement of this consent and subsequently at five yearly intervals thereafter. This assessment shall as a minimum:<br>a. Report on any trends in the concentration of parameters measured;<br>b. In combination with the results of coastal water quality monitoring undertaken by Auckland Council, assess whether there is any evidence for nutrients sourced from new WWTP could breakthrough to coastal marine area surrounding the outfall approximately 2 km south of Martins Bay, in sufficient quantities to cause deterioration of coastal water quality; and<br>c. Review recorded concentrations in treated wastewater and from the monitoring undertaken in accordance with these conditions and assess whether the WWTP is operating efficiently and effectively.<br>This assessment shall be to a standard acceptable to the Team Leader Northern Monitoring, Auckland Council and shall be forwarded to the Team Leader by 30 September of each year that it is required. | N/A | Consent envisaged new treatment operative within the first five years. This has changed with consent variation, and it is assumed should only apply once the new treatment plant is operative and the associated environmental monitoring plan has taken effect. |
| 49 | All complaints received by the Consent Holder about the discharges shall be logged immediately. The information shall include:<br>a. The date, time, location and nature of the complaint;<br>b. Name, phone number and address of the complainant unless the complainant wishes to remain anonymous;<br>c. Action taken to remedy the problem;<br>d. Any equipment failure and remedial action taken;<br>e. The weather conditions at the time of the complaint including estimates of wind direction, wind speed, temperature and cloud cover; and<br>f. The date and name of the person making the entry.<br>Details of any complaints received shall be provided to the Auckland Council within 24 hours of receipt of the complaint(s) or on the next working day, if the complaint is associated with breaches to the performance standards set out in the above conditions. All other complaints shall be provided in the Annual Report required by Condition 48. | 1 | |
| 50 | All records, monitoring and test results that are required by the conditions of this consent shall be made available upon request by an enforcement officer and shall be kept for a minimum of two years from the date of each entry. | 1 | |
| 51 | The Consent Holder shall engage a suitably qualified person to undertake a Technology and Growth Review of the new WWTP and catchment at five yearly intervals after becoming operational. | N/A | |
| 52 | The Consent Holder shall engage a suitably qualified person to undertake a review of available wastewater treatment technologies prior to undertaking detailed design for the new MBR WWTP at Snells Beach. | N/A | |

| Condition Number | Consent Conditions Snells-Algies WWTP Discharge to Air (#REG-67908) | Compliance Rating | Comment |
|---|---|---|---|
| 53 | The conditions of this consent may be reviewed by Team Leader Northern Monitoring, Auckland Council pursuant to section 128 of the Resource Management Act 1991 (RMA), by giving notice pursuant to section 129, on the fifth anniversary of the commencement of these consents and subsequently at intervals of not less than five years thereafter in order to:<br>a. To deal with any significant adverse effects on the environment arising from the exercise of the consent, which was not foreseen at the time the application was considered and which is appropriate to deal with at the time of review; and / or,<br>b. To consider the adequacy of conditions that prevent nuisance and adverse effects beyond the boundary of the site particularly if regular or frequent complaints have been received and validates by a Council enforcement officer; and / or<br>c. To consider developments in technology and management practices that would enable practical reductions in the discharge of contaminants<br>d. To alter the monitoring requirements, including requiring further monitoring, or increasing or reducing the frequency of monitoring. | 1 | |
| 54 | This consent (or any part thereof) shall not commence until such time as the following charges, which are owing at the time the Council's decision is notified have been paid in full:<br>a. All fixed charges relating to the receiving, processing and granting of this resource consent under section 36(1) of the RMA; and<br>b. All additional charges imposed under section 36 of the RMA to enable the Council to recover its actual and reasonable costs in respect of this application.<br><br>c. All initial consent compliance monitoring charges, plus any further monitoring charges to recover the actual and reasonable costs incurred to ensure compliance with the conditions attached to this consent. | 1 | |
| 55 | The servants or agents of the Council shall be permitted to have access to the relevant parts of the property at all reasonable times for the purpose of carrying out monitoring procedures, inspections, surveys, investigations, tests, measurements or take samples while adhering to the Consent Holder's health and safety policies. | 1 | |

***Table 6:Assessment of Compliance with Consent Conditions Snells-Algies WWTP Discharge to Water (#REG-67909)***

| Condition Number | Consent Conditions Snells-Algies WWTP Discharge to Water (#REG-67909) | Condition Rating | Comment |
|---|---|---|---|
| 01 | Discharge permits REG-67908 and REG-67909 shall expire 35 years from the date of commencement, unless it has lapsed, surrendered or been cancelled at an earlier date pursuant to the Resource Management Act 1991. | 1 | |
| 02 | The discharge activities shall be carried out in general accordance with the plans and information submitted with the application, detailed below, and all material referenced by the Council as consent number Land use consents LAN-67900 and LAN-67917; Discharge permits REG-67903 and REG-67908, REG-67905 and REG-67909, and REG-67901; Coastal Permits REG-67912, REG-67915 and REG- 67918, REG-67916 and REG-67911:<br>• Application Form, and Assessment of Environmental Effects prepared by Mitchell Partnerships Limited, dated 27 June 2016; and<br>• Further information submitted with the application and listed in Appendix 1; or<br>• Any subsequent plans or information that has received written approval from the Team Leader Northern Monitoring, Auckland Council. | 1 | |
| 03 | In the event of any conflict between the document listed above and the conditions of this consent, the conditions shall prevail. | 1 | |
| 04 | The Consent Holder shall ensure that all staff and contractors undertaking works on site are aware of, and adhere to, all conditions of this consent. | 1 | Ongoing |
| 05 | Within one month of the completion of the new WWTP proposed, or of any interim works required to meet effluent quality requirements in this consent, the Consent Holder shall notify Team Leader Northern Monitoring, Auckland Council in writing that the works are completed and shall provide 'as-built certification' from a suitably qualified engineer that the new WWTP has been installed and is operating in accordance with industry standard. | 1 | |
| 06 | Terms (a) to (d) in this condition and Conditions 8 to 9 below apply to the continued operation of the existing Snells Beach / Algies Bay WWTP and shall apply until the new WWTP has been commissioned, but in any event for no longer than 5 years from commencement of this consent:<br>(a) The maximum daily treated wastewater discharge volume from the WWTP to the coastal marine area shall not exceed a maximum daily flow of 4,000 m3 per day (at peak wet-weather flow).<br>(b) Average daily dry weather flow shall not exceed 995 m3 per day. Average dry-weather flow shall mean the flow in the wastewater network that would occur during a normal day in a dry weather period (i.e. three consecutive days of less than 5mm rainfall per day), including wastewater, trade waste and groundwater infiltration; and<br>(c) The discharge of treated wastewater shall be tidally staged such that discharges shall not occur between 2.5 and 0.5 hours before high and low water, except, infrequently, when pond levels necessitate longer periods of discharge; and<br>(d) The population serviced shall not exceed 4,400 PE. | 1 | |

| Condition Number | Consent Conditions Snells-Algies WWTP Discharge to Water (#REG-67909) | Condition Rating | Comment |
|---|---|---|---|
| 07 | Treated wastewater discharges from the existing Snells Beach / Algies Bay WWTP shall be equal to or better than the limit specified for that parameter as set out in Table 1. Collection of treated wastewater samples shall occur weekly and take place following treatment and prior to discharging to the rising main outfall pipeline.<br>PLEASE SEE TABLE 2 ON PAGE 36/95 OF CONSENT DOCUMENT. | 1 | |
| 08 | Further to those parameters identified in Table 1, the Consent Holder shall also undertake discharge quality monitoring prior to discharging to the rising main outfall pipeline for the parameters identified in Table 2 below<br>PLEASE SEE TABLE 2 ON PAGE 36/95 OF CONSENT DOCUMENT | 1 | |
| 09 | Terms (a) to (d) in this condition and Conditions 11 to 13 below apply to the operation of the new Snells Beach / Algies Bay WWTP once deployed:<br>(a) Any discharges of treated wastewater from the new WWTP shall be via a 10 port diffuser outfall pipeline, or an alternative outfall structure providing, as a minimum, an equivalent 250-fold dilution factor at a distance of no more than 10 m from the discharge point;<br>(b) Discharge volume from the wastewater treatment system to the coastal marine area shall not exceed a maximum daily flow of 29,000 m3 per day (at peak wet-weather flow);<br>(c) The average daily dry-weather flow shall not exceed 6,400m3 per day. Average dry-weather flow shall mean the flow in the wastewater network that would occur during a normal day in a dry weather period (i.e. three consecutive days of less than 5mm rainfall per day), including wastewater, trade waste and groundwater infiltration.; and<br>(d) The population serviced shall not exceed 30,000 PE. | N/A | |
| 10 | Treated wastewater discharges from the new WWTP shall be equal to or better than the limit specified for that parameter as set out in Table 3. Collection of treated wastewater samples shall occur weekly and take place following UV treatment and prior to discharge to the rising main outfall pipeline<br>PLEASE SEE TABLE 3 ON PAGE 37/95 OF CONSENT DOCUMENT. | N/A | |
| 11 | Further to those parameters identified in Table 3, the Consent Holder shall also undertake discharge quality monitoring prior to discharging to the rising main outfall pipeline for the parameters identified in Table 4 below.<br>PLEASE SEE TABLE 4 ON PAGE 38/95 OF CONSENT DOCUMENT. | N/A | |
| 12 | In accordance with the monitoring requirements outlined in Condition 42(c), the consent holder shall ensure that the WWTP achieves a 4-log reduction (influent to effluent) of viruses based on FRNA-Bacteriophage indicator virus for dry and wet weather flows. | N/A | |
| 13 | The Consent Holder shall ensure that all chemical analyses and sampling techniques are carried out in accordance with the latest edition of “Standard Methods for the Examination of Water and Wastewater”, APHA AWWA WEF, or other standards approved in writing by Team Leader Northern Monitoring, Auckland Council. | 1 | |
| 14 | If no discharge is occurring on a scheduled sampling day, a sample shall be collected as soon as reasonably practicable following resumption of normal operation. | 1 | |

| Condition Number | Consent Conditions Snells-Algies WWTP Discharge to Water (#REG-67909) | Condition Rating | Comment |
|---|---|---|---|
| 15 | The Consent Holder shall advise Team Leader Northern Monitoring, Auckland Council in writing immediately in the event that problems are detected in association with the exercise of this consent that could pose an environmental risk by affecting discharge quality and shall outline a schedule of action to remedy issues. In the event that the 92nd percentile limit is exceeded for any analyte shown in Table 1 and 3 above, an additional grab sample shall be collected and tested for the analyte within 5 working days of receipt of the laboratory result. If the second grab sample returns an exceedance, an investigation shall also be undertaken into the cause of the exceedance, the significance of the effect of the exceedance on the receiving environment, and the remedial action undertaken (if required) in response to the exceedance and the findings of this investigation report to the Team Leader Northern Monitoring, Auckland Council within one month of the exceedance occurring. | 1 | |
| 16 | At all times during the term of this consent, the Consent Holder shall maintain flow meters to continuously measure the total daily inflow to the wastewater treatment plant and the total daily volume discharged to rising main outfall pipeline prior to entering the coastal marine area. The discharge volume meters must be maintained to ensure an accuracy of plus or minus 5 percent. Records shall be kept of the daily inflow and volumes discharged to the rising main outfall pipeline prior to entering the coastal marine area. Recorded data shall be reported in accordance with Condition 47. | 1 | Ongoing |
| 17 | The Consent Holder shall ensure that no new trade, industrial, non-domestic or other strong wastes shall be permitted to be discharged into the existing or new WWTP except in accordance with the Trade Waste Bylaw / Te Ture a RoheWaiparui a Mahi 2013 or any Operative Trade Waste By-law that may supersede this. | 1 | Ongoing. |
| 18 | The Consent Holder shall ensure that for the duration of this consent, the wastewater treatment system is maintained and operated by a suitably qualified and experienced wastewater plant operator. This operator shall oversee the operation and management of the wastewater treatment system and perform the operational and maintenance responsibilities specified in the Management Plan (Condition 42). | 1 | Ongoing |

| Condition Number | Consent Conditions Snells-Algies WWTP Discharge to Water (#REG-67909) | Condition Rating | Comment |
|---|---|---|---|
| 19 | The Consent Holder shall design and implement a Receiving Environment Water Quality Monitoring Programme for the coastal marine area surrounding the outfall discharge point of the existing Snells Beach WWTP and the new WWTP. The purpose of the Programme is to measure water quality in the receiving and surrounding coastal environments to ascertain any changes in water quality attributable to the discharges from the WWTPs and to confirm predictions on effects. The Programme shall be implemented within one month of the commencement of this consent as follows:<br>a. The Programme shall, as a minimum, monitor on a monthly basis the following parameter<br>PLEASE SEE TABLE 5 ON PAGE 39/95 OF CONSENT DOCUMENT<br>b. The Programme shall include as a minimum:<br>i. The parameters which are being monitored (as identified in (a) above);<br>ii. The location, methodology and frequency of all receiving environment water quality monitoring;<br>iii. The review and reporting methods; and<br>iv. A procedure for reviewing the Programme, including details as to when removal of monitoring parameters, changes to sampling locations or the sampling frequency may occur, and the monitoring results that will substantiate these. | 1 | Approved in September 2017 |
| 20 | Revisions to the Receiving Environment Water Quality Monitoring Programme shall be to a standard acceptable to the Team Leader Northern Monitoring, Auckland Council and shall be submitted to the Team Leader for approval in a certifying capacity prior to the proposed date of commencement. | 1 | Approved in September 2017 |
| 21 | The Consent Holder shall design a Shellfish Monitoring Programme for the coastal marine area surrounding the outfall discharge point of the existing Snells Beach / Algies Bay WWTP and the new WWTP. The programme shall be implemented within three month of the commencement of this consent and, as a minimum, monitor shellfish at least annually at an inshore site adjacent to the outfall for E.coli and viruses, at a site at Martins Bay as well as one near Mahurangi Heads. The shellfish monitoring programme shall include as a minimum:<br>i. The parameters which are being monitored;<br>ii. The location, methodology and frequency of all monitoring;<br>iii. The review and reporting methods; and<br>iv. A procedure for reviewing the shellfish monitoring programme including details as to when removal of monitoring parameters, changes to sampling locations or the sampling frequency may occur, and the monitoring results that will substantiate these. | 1 | Approved in December 2017 |
| 22 | Revisions to the Shellfish Monitoring Programme shall be to a standard acceptable to the Team Leader Northern Monitoring, Auckland Council and shall be submitted to the Team Leader for approval in a certifying capacity prior to the proposed date of commencement. | 1 | Approved in December 2017 |

| Condition Number | Consent Conditions Snells-Algies WWTP Discharge to Water (#REG-67909) | Condition Rating | Comment |
|---|---|---|---|
| 23 | Within one month of the new WWTP becoming operational, the Consent Holder shall engage a suitably qualified person to design and implement a Benthic Habitat Assessment Programme to identify any changes in spatial habitats in order to provide a basis to assess any changes in benthic communities in Martins Bay and surrounding the outfall which may be attributable to the discharges from the new WWTP and to confirm predictions on effects. The Benthic Habitat Assessment Programme shall, as a minimum, include:<br>a. Monitoring of:<br>i. Benthic ecology;<br>ii. Sediment texture;<br>iii. Sediment organic carbon content, including total nitrogen and total phosphorous concentrations;<br>iv. Heavy metals; and<br>v. Macroalgal cover and extent.<br>b. Mapping of spatial habitat changes within the coastal marine area at the outfall discharge location and the surrounding area from available aerial/satellite photos;<br>c. Review of any relevant benthic monitoring data from Auckland Council monitoring programmes;<br>d. Consider reasons for any changes in spatial habitat and benthic communities and the role of discharges from the new WWTP;<br>e. Any other issue considered important by the Consent Holder; and<br>f. A procedure for modifying the Benthic Habitats Assessment Programme including details as to when removal of monitoring parameters, changes to sampling locations or the sampling frequency may occur, and the monitoring results that will substantiate these. | N/A | Long term discharge |
| 24 | The Benthic Habitat Assessment Programme shall be to a standard acceptable to the Team Leader Northern Monitoring, Auckland Council and shall be forwarded to the Team Leader Northern Monitoring, Auckland Council by 30 September of each year that it is required. | N/A | Long term discharge |
| 25 | The Consent Holder shall engage a suitably qualified person to undertake an Emerging Contaminants Risk Assessment of the treated wastewater from the new WWTP within one month becoming operational and subsequently at five yearly intervals thereafter. The Emerging Contaminants Risk Assessment shall as a minimum include:<br>a. A review of changes in the state of knowledge of emerging contaminants relevant to the new WWTP either since the commencement of these consents or the previous Emerging Contaminants Risk Assessment, whichever is more recent.<br>b. Consideration of whether additional samples are required for the purposes of the Emerging Contaminants Risk Assessment.<br>c. Measurement of emerging contaminants if determined necessary and the results of any samples collected.<br>d. An assessment of the risks to the environment from emerging contaminants in the treated wastewater discharged from the new WWTP. | N/A | Long term discharge |
| 26 | The Emerging Contaminants Risk Assessment shall be to a standard acceptable to the Team Leader Northern Monitoring, Auckland Council and shall be forwarded to the Team Leader by 30 September of each year that it is required. | N/A | Long term discharge |

| Condition Number | Consent Conditions Snells-Algies WWTP Discharge to Water (#REG-67909) | Condition Rating | Comment |
|---|---|---|---|
| 41 | The Consent Holder shall prepare a Management Plan, the purpose of which is to integrate operational practices, environmental monitoring programmes and reporting of results required by the conditions of these consents. The Management Plan shall as a minimum include the following matters:<br>PLEASE SEE PAGE 44/95 OF THE CONSENT DOCUMENT FOR THE MATTERS. | 1 | Operational Management Plan in February 2018 |
| 42 | The Management Plan shall be to a standard acceptable to the Team Leader Northern Monitoring, Auckland Council. | 1 | Plan approved February 2018 |
| 43 | The Management Plan required under Condition 42 shall be submitted to the Team Leader Northern Monitoring, Auckland Council for approval in a certifying capacity within six months of the consents commencing except for those parts approved under other conditions which shall be submitted in accordance with the timeframes required by those conditions. | 1 | Plan approved February 2018 |
| 44 | The Consent Holder shall undertake the requirements of the Management Plan once it has been finalised. All subsequent significant updates to the Management Plan throughout the term of this consent shall be submitted to the Team Leader Northern Monitoring, Auckland Council for approval prior to implementation. | 1 | Ongoing |
| 45 | Within three months of consent commencing, the consent holder shall submit an Ecological Monitoring Plan for approval to the Team Leader-Northern Monitoring. The Plan shall include detailed monitoring and reporting programme to measure the potential ecological effects from the wastewater discharge on the receiving environment. | 1 | In December 2017 |
| 46 | The consent holder shall ensure that the results of the monitoring undertaken in accordance with Conditions 7 to 9 (short-term standards), Conditions 11 to 12 (long-term standards), Condition 17 and the Viral Monitoring Condition 42 (c) to (e) are reported to the Team Leader Northern Monitoring, Auckland Council quarterly, within 20 working days of the period ending 31 December, 31 March, 30 June and 30 September each year. | 1 | Ongoing |
| 47 | An Annual Performance Report shall be submitted to the Team Leader Northern Monitoring, Auckland Council by September 30 of each year. The report shall:<br>a. Collate, analyse and interpret all relevant data and information pertaining to this consent for the previous year from 1 July to 30 June;<br>b. Include comment on general plant performance and any trends in changes in the discharge volume and/or the discharge quality standards over time;<br>c. Include a consideration of compliance with each consent condition; and<br>d. Identify any actions required and submit a timetable to rectify any non-compliance. | 1 | Ongoing |

| Condition Number | Consent Conditions Snells-Algies WWTP Discharge to Water (#REG-67909) | Condition Rating | Comment |
|---|---|---|---|
| 48 | The Consent Holder shall engage a suitably qualified person to review the collated water and sediment quality data at least monthly and assess the surface water quality monitoring undertaken as part of these consent conditions by 30 September of the fifth anniversary of the commencement of this consent and subsequently at five yearly intervals thereafter. This assessment shall as a minimum:<br>a. Report on any trends in the concentration of parameters measured;<br>b. In combination with the results of coastal water quality monitoring undertaken by Auckland Council, assess whether there is any evidence for nutrients sourced from new WWTP could breakthrough to coastal marine area surrounding the outfall approximately 2 km south of Martins Bay, in sufficient quantities to cause deterioration of coastal water quality; and<br>c. Review recorded concentrations in treated wastewater and from the monitoring undertaken in accordance with these conditions and assess whether the WWTP is operating efficiently and effectively.<br>This assessment shall be to a standard acceptable to the Team Leader Northern Monitoring, Auckland Council and shall be forwarded to the Team Leader by 30 September of each year that it is required. | N/A | |
| 49 | All complaints received by the Consent Holder about the discharges shall be logged immediately. The information shall include:<br>a. The date, time, location and nature of the complaint;<br>b. Name, phone number and address of the complainant unless the complainant wishes to remain anonymous;<br>c. Action taken to remedy the problem;<br>d. Any equipment failure and remedial action taken;<br>e. The weather conditions at the time of the complaint including estimates of wind direction, wind speed, temperature and cloud cover; and<br>f. The date and name of the person making the entry.<br>Details of any complaints received shall be provided to the Auckland Council within 24 hours of receipt of the complaint(s) or on the next working day, if the complaint is associated with breaches to the performance standards set out in the above conditions. All other complaints shall be provided in the Annual Report required by Condition 48. | 1 | Ongoing |
| 50 | All records, monitoring and test results that are required by the conditions of this consent shall be made available upon request by an enforcement officer and shall be kept for a minimum of two years from the date of each entry. | 1 | Ongoing |
| 51 | The Consent Holder shall engage a suitably qualified person to undertake a Technology and Growth Review of the new WWTP and catchment at five yearly intervals after becoming operational.<br>The Technology and Growth Review shall be to a standard acceptable to the Team Leader Northern Monitoring, Auckland Council and shall be forwarded to the Team Leader by 30 September of each year that it is required. | N/A | |
| 52 | The Consent Holder shall engage a suitably qualified person to undertake a review of available wastewater treatment technologies prior to undertaking detailed design for the new MBR WWTP at Snells Beach. | N/A | |

| Condition Number | Consent Conditions Snells-Algies WWTP Discharge to Water (#REG-67909) | Condition Rating | Comment |
|---|---|---|---|
| 53 | The conditions of this consent may be reviewed by Team Leader Northern Monitoring, Auckland Council pursuant to section 128 of the Resource Management Act 1991 (RMA), by giving notice pursuant to section 129, on the fifth anniversary of the commencement of these consents and subsequently at intervals of not less than five years thereafter in order to:<br>a. To deal with any significant adverse effects on the environment arising from the exercise of the consent, which was not foreseen at the time the application was considered and which is appropriate to deal with at the time of review; and / or,<br>b. To consider the adequacy of conditions that prevent nuisance and adverse effects beyond the boundary of the site particularly if regular or frequent complaints have been received and validates by a Council enforcement officer; and / or<br>c. To consider developments in technology and management practices that would enable practical reductions in the discharge of contaminants<br>d. To alter the monitoring requirements, including requiring further monitoring, or increasing or reducing the frequency of monitoring. | 1 | |
| 54 | This consent (or any part thereof) shall not commence until such time as the following charges, which are owing at the time the Council's decision is notified have been paid in full:<br>a. All fixed charges relating to the receiving, processing and granting of this resource consent under section 36(1) of the RMA; and<br>b. All additional charges imposed under section 36 of the RMA to enable the Council to recover its actual and reasonable costs in respect of this application.<br>c. All initial consent compliance monitoring charges, plus any further monitoring charges to recover the actual and reasonable costs incurred to ensure compliance with the conditions attached to this consent. | 1 | |
| 55 | The servants or agents of the Council shall be permitted to have access to the relevant parts of the property at all reasonable times for the purpose of carrying out monitoring procedures, inspections, surveys, investigations, tests, measurements or take samples while adhering to the Consent Holder's health and safety policies. | 1 | |