



Hahei WWTP

Annual Report – April 2023 to March 2024
Resource Consent 135636

**RE: HAHEI WASTEWATER TREATMENT PLANT
Annual Report – 2023-2024
Resource Consents: 135636**

This report covers the compliance of the Hahei WWTP discharge to the Wigmore Stream with the operational resource consent requirements. The time period for this report is the 1st of April 2023 until the 31st of March 2024.

Please find attached the supporting monitoring data for the daily effluent disposed and the analytical data compliance for the period above as Appendix A.

Condition 3: *The treatment plant and discharge to the Wigmore Stream shall be managed and operated by an appropriately trained operator.*

The site is overseen by a Supervisor who holds a Diploma in Wastewater Treatment and is run by operators who hold or are working towards level 4 qualification in wastewater treatment.

Condition 5: *The maximum volume of treated wastewater discharged to the Wigmore Stream shall not exceed 700 cubic metres in any 24-hour period.*

Figure 1 below shows the daily effluent discharge volume for the compliance period. The maximum discharge volume recorded was 455 m³ on 18th June 2023.

Hahei WWTP			
Total Influent Flow	35,280		m3
Maximum Effluent Flow	455		m3
Average Effluent Flow	117		m3
Total Effluent Flow	42,717		m3

Figure 1: Summary of Flows at Hahei WWTP for 2023/24

Condition 6: *The maximum discharge rate of treated wastewater to the Wigmore Stream shall not exceed 8.1 litres per second.*

There is a physical limit in place that controls the discharge rate of treated wastewater to the Wigmore Stream to approximately 6 litres per second. The mechanics is explained by Peter Leitch from Guaranteed Flow Systems (GFS) as follows:

“I’ve checked the records and report that there is a physical limit in place. There is an orifice plate installed at the Wigmore stream discharge point. The orifice diameter is 26mm. The orifice plate limits flow to approx. 6 l/s. [at 6 l/s the pump develops 15m of discharge head. For flows greater than 6 l/s the pump discharge pressure is decreases to a point that is insufficient to force a greater flow through the plate”

Condition 7: *The consent holder shall ensure that all waste entering, and treated in, the Hahei wastewater treatment plant, goes through all stages of treatment available at the plant prior to discharge. This includes the micro filtration unit.*

There were no periods within the compliance period where flows bypassed the MFU treatment or any of the ponds. There were no overflows in the plant and all waste that entered the plant through the pump station went through the aeration pond, retention pond and the MFU.

Condition 8: *The following limits shall apply to the discharge to the Wigmore Stream from the commencement of this resource consent:*

Parameter	90 percentile, not more than one sample in each preceding 10 samples shall exceed:	Running average, over any consecutive 10 samples shall not exceed:
a) Suspended solids (g/m ³)	20	10
b) Carbonaceous biochemical oxygen demand (cBOD ₅) (g/m ³)	20	10
c) <i>Escherichia coli</i> (cfu/100 mL)	20	10
d) Total ammoniacal nitrogen (g/m ³)	15	10
e) Total Kjeldahl Nitrogen (g/m ³)	20	15
f) Total Phosphorus (g/m ³)	20	14

Figure 2: Maximum values reached for each parameter and requirements for the reporting period.

The maximum Total Ammoniacal Nitrogen and Total Kjeldahl Nitrogen values occurred during the summer peak season – specifically over the two weeks either side of New Years Eve. This was due to the minor *Daphnia* bloom that occurred earlier in spring of 2023 which will have depleted the active sludge followed by a large increase in population of Hahei over the summer period where there was a delay in the active sludge building back up.

The 90th Percentile and Running Average *Escherichia coli* values were elevated from April to October 2023, peaking at 70 cfu/100mL recorded on 16th October 2023. These values have since declined to normal levels. The cause for this spike was caused by damaged membranes in the MFU which was repaired in December 2023.

	90th Percentile	Running Average
Suspended solids (g/m ³)	3.6	2.5
cBOD ₅ (g/m ³)	6.7	3.5
<i>Escherichia coli</i> (cfu/100 mL)	63.2	35.8
Total Ammoniacal nitrogen (g/m ³)	27.0	14.4
Total Kjeldahl Nitrogen (g/m ³)	26.6	14.8
Total Phosphorus (g/m ³)	10.8	9.4

Figure 3: 90th percentile and Running Average of sampled parameters for Hahei WWTP Effluent Discharge

Please see Appendix A for the compliance data.

Condition 11: *A flow meter shall be installed to record, on a continuous basis, the quantity of effluent discharged on a daily basis. The device shall have a reliable calibration to water flow and shall be maintained to an accuracy of +/- 5%. Access to the meter shall be made available to the staff and agents of the Waikato Regional Council at all reasonable times.*

A flow meter quantifying the effluent discharge is installed on the discharge to the Wigmore Stream. A calibration of the flowmeter was previously performed in September 2022 and most recently on the 30th May 2024. The calibration verification certificate was submitted to WRC by TCDC on 30th May 2024, see appendix B for calibration certificate.

Condition 14: *Within 3 months of the commencement of this consent the consent holder shall install and monitor a flow recorder which shall, as a minimum, record flow in the Wigmore Stream in litres per second every 15 minutes at a suitable location upstream of the discharge authorised by this consent. The purpose of the flow monitoring is to establish a reliable correlation to flows in the Opitonui River. The datalogger shall be linked by telemetry to the Waikato Regional Council. It shall be cross referenced to the Waikato Regional Council flow recorder on the Opitonui River downstream of Awaroa Stream confluence (Waikato Regional Council site number 660.1, map reference nztn 1832431e 5926826n). The necessity for flow recording may be modified at any time following approval in writing from the Waikato Regional Council following a request in writing from the consent holder to do so. The approval process will consider a written report by the consent holder with data and explanation to show that sufficient flow monitoring of the Wigmore Stream has been obtained to have a scientifically reliable correlation to flows in the Opitonui River, or which demonstrates the inability to obtain a scientifically reliable correlation following the collection of sufficient flow data. The minimum period of flow monitoring shall include a summer/autumn period with a prolonged low flow recession.*

No further monitoring is required under Condition 14 as advised by WRC in the 2019-2020 Site Compliance Report.

Condition 15: *In addition to the flow monitoring required by condition 14 of this consent, the consent holder shall undertake manual low-flow gauging in the Wigmore Stream at least once during each calendar year when flows are at a seasonal summer low and the flow recorder site is operational. Where there is a prolonged period of summer low flows, the consent holder will repeat the low-flow gauging to ensure data at lower stream flows are measured. The low-flow gauging shall be undertaken at a suitable location upstream of the discharge authorised by this consent at or near the flow recorder site. The purpose of the low-flow gauging is to verify the flow records measured by the flow recorder. The low-flow gauging shall be undertaken by an appropriately qualified and experienced person. A copy of the results of the gauging(s) shall be forwarded to Waikato Regional Council with the written report required in condition 14 and 21 of this consent. The requirement for manual stream flow monitoring under this condition can cease when approval in writing from the Waikato Regional Council under condition 14 has been provided.*

Low flow gauging within the Wigmore Stream was not conducted during the compliance year as the flow gauging station is not operational (see condition 14).

Condition 16: Discharge and surface water monitoring:

The consent holder shall measure and characterise the quality, quantity and variability of treated effluent being discharged to the Wigmore Stream and the effects of the discharge on the quality and variability of surface water. To this end, the consent holder shall undertake sampling and analysis of the discharge and surface water as follows:

Frequency	Sample type and/or location	Parameter
a) Every 15 minutes	Wigmore Stream Refer to condition 14.	<ul style="list-style-type: none"> Water level Instantaneous flow
b) Daily	Treatment Plant	<ul style="list-style-type: none"> Rainfall
c) Daily	Discharge	<ul style="list-style-type: none"> Volume Instantaneous peak flow Average flow
d) Weekly - during the period from the start of the third week of December to the start of the third week of February - monthly otherwise.	<ul style="list-style-type: none"> Inlet of MFU Discharge, following all treatment stages and prior to entering the Wigmore Stream Wigmore Stream 50 metres upstream of discharge Wigmore Stream downstream at Pa Road bridge <p>Downstream samples to be collected within the period 1 hour either side of local low tide during daylight hours and while discharge is operating.</p>	<ul style="list-style-type: none"> Total Ammoniacal Nitrogen <i>Escherichia coli</i> Enterococci Conductivity pH Sample date and time Time of low tide occurrence closest to sample time
e) Monthly – to coincide with d)	<ul style="list-style-type: none"> Inlet of MFU Discharge, following all treatment stages and prior to entering the Wigmore Stream Wigmore Stream 50 metres upstream of the discharge Wigmore Stream downstream at Pa Road bridge <p>Downstream samples to be collected within the period 1 hour either side of local low tide during daylight hours and while discharge is operating.</p>	<ul style="list-style-type: none"> cBOD₅ Nitrate Nitrogen Suspended solids Total Kjeldahl Nitrogen Soluble Reactive Phosphorus Total Phosphorus by Persulphate Digestion Turbidity Sample date and time Time of low tide occurrence closest to sample time
f) Once per year in January or February	<ul style="list-style-type: none"> Wigmore Stream 50 metres upstream of the discharge Wigmore Stream downstream at Pa Road bridge <p>Refer to condition 19 for sampling and assessment methodology.</p>	<ul style="list-style-type: none"> Aquatic Macroinvertebrate assessment Habitat and aquatic plant assessment Sample date and time Time of low tide occurrence closest to assessment time
g) At least once per year – to coincide with summer low flows	Wigmore Stream Additional gauging each summer may be required if low flow conditions are prolonged, to capture a series of low flow records. Refer to condition 15.	<ul style="list-style-type: none"> Flow (via flow gauging) Sample date and time
h) Once every five years in January or February, commencing 2019	<ul style="list-style-type: none"> Wigmore Stream 50 metres upstream of the discharge Wigmore Stream downstream at Pa Road bridge 	<ul style="list-style-type: none"> Fish populations

At present, there is no flow gauging exists on the Wigmore Stream. This means the low flow gauging was also not conducted.

Monthly and peak period sampling from 11 December 2023 to 19 February 2024 occurred as can be seen on Appendix A.

The annual ecological monitoring as required by Condition 16 f) and fish population survey as required by Condition 16 h) was conducted in January 2024, see Appendix C.

Condition 17: *All samples taken in relation to monitoring under this consent shall be collected by a suitably qualified and experienced person(s) with relevant training in the sampling and transporting of water quality samples and in accordance with the monitoring implementation plan titled "Wastewater Sampling at Hahei WWTP and Wigmore Stream" by united water, dated 1-04-2009 (Waikato Regional Council document number 1472702), or any subsequent update. This plan shall detail methods and map locations for how, when and where sampling will take place. An updated monitoring implementation plan shall be provided to the Waikato Regional Council within three months of commencement of this consent, and at two yearly intervals thereafter, or more often if any method or location changes. The Waikato Regional Council shall be provided with an updated copy of the monitoring implementation plan within one month of any update to the plan.*

An updated Monitoring Plan for Hahei WWTP was produced in December 2022 and submitted to WRC by TCDC on 7 December 2022. The next review is due in December 2024.

Condition 20: *Periodic reporting*

The consent holder shall provide to the Waikato Regional Council a data report by 1 December each year that this consent is current. This report shall include all data collected under condition 16 of this consent for the period 1 April to 30 September of the current year and shall identify any non-compliance within that period.

Monthly reports are sent to WRC.

Condition 21: *The consent holder shall provide to the Waikato Regional Council a written monitoring report by 1 June each year that this consent is current for the 12 month period from 1 April of the preceding year to 31 March of the current year. As a minimum this report shall include the following:*

A. A summary of the monitoring results required by condition 16 of this consent for the 12 month period from 1 April of the preceding year to 31 March of the current year and a critical analysis of the information in terms of compliance and environmental effects;

B. A comparison of data with previously collected data identifying any emerging trends;

C. Comment on compliance, and any reasons for non-compliance or difficulties in achieving compliance, with condition 8 of this consent;

D. Comment on any works that have been undertaken, or that are proposed to be undertaken in the upcoming year, to improve the environmental performance of the treatment and/or disposal system;

E. Report on and discuss any complaints received regarding the treatment and/or discharge of treated effluent; and

F. Any other issues considered important by the consent holder.

Appendix A contains the compliance data for the compliance period. This includes historic trends.

Spikes in the effluent nutrient concentrations are seen over the peak period, this includes ammonia, TKN, phosphorus, and cBOD. Over the Christmas and New Year period the pond loading increases due to the population increase in the town. This has likely been exacerbated by Daphnia blooms that occur during late winter which feed on and therefore deplete the Nitrobacter and sludge that is used in the nitrogen cycling process.

The Daphnia blooms likely occur due to imbalance in the ecosystem where the food source for the Nitrobacter/sludge being too low which allows the Daphnia to outcompete the other organisms in the system. It has been suggested that supplemental feeding of the Nitrobacter/sludge could be done over the winter period to try maintain the ecosystem balance and provide a more stable environment for the treatment plant ponds.

The nitrate concentrations of the effluent have decreased on average compared to the previous compliance period. The ammonical nitrogen and TKN are noticeably higher during the peak summer period compared to the previous compliance period. The cBOD concentrations of the effluent has remained consistently higher than the stream sample results. The SS concentrations of the effluent have remained significantly lower than the stream sample results. The bacteria results at the upstream sample location have been on average significantly higher than the treated effluent results.

The results from the Wigmore Stream show that the effluent discharge is mostly not having a negative effect on the environmental nutrient and bacteriological concentrations.

The sample taken on the 16th of October 2023 showed a large increase in E. coli and Total coliforms in the Effluent. This was likely caused by the damaged membranes allowing the passing of E. coli through to the filtrate side of the membranes where the samples are taken. This was likely exacerbated by only briefly running the MFU for satisfying the sampling requirement on the day. The sample taken was not representative of normal discharge parameters. It is noted that the stream samples at both up and down stream of the discharge showed no significant changes in levels of E. coli. Operators were subsequently advised to allow the MFU to run a full filtration cycle before taking samples.

Due to increased Effluent E. coli and Total coliforms results, the membranes were inspected, and repaired in December 2023 by Guaranteed Flow Systems (GFS). These repairs included pinning and replacement of submerged membrane modules and repairs of associated equipment. The CIP process for cleaning the membranes was tested and changes made to the system to improve its effectiveness.

Condition 22: *The consent holder shall provide to the Waikato Regional Council an ecological assessment report by 1 June every two years for the duration of this consent. This report shall be prepared by a suitably qualified person or persons with relevant training in ecological monitoring and assessment. As a minimum this report shall include the following:*

A. A summary of the ecological monitoring and water quality results required by condition 16 for the preceding two years;

B. A comparison of data with previously collected data identifying any emerging trends;

C. A critical analysis of the current ecological health of the Wigmore Stream, the potential causes of any degradation of the stream, the effects of the discharge authorised by this consent on the Wigmore Stream and downstream coastal waters;

D. Any other issues considered important by the ecologist.

The last ecological survey was conducted by ecologist from Tonkin and Taylor in February 2023. The next survey shall be conducted in 2025.

Condition 23: *Contingency plan*

In the event of any bypasses, other extraordinary events or failure of any critical part of the treatment plant, the consent holder shall manage the treatment plant and discharge to the Wigmore Stream in accordance with the contingency plan titled "Hahei wastewater treatment plant contingency plan 2015" by Veolia (Waikato regional council document number 3584298 and 3584310), or any

subsequent update. An updated plan shall be provided to the Waikato regional council by 1 June 2018, and at three yearly intervals thereafter. The consent holder shall engage appropriately experienced persons to compile any update to the contingency plan, and it shall identify measures and notification protocols to be undertaken by the consent holder that will take into account any potential adverse effects on the Wigmore Stream and users, including but not limited to ecological effects, downstream recreational use, and the medical officer of health.

An updated Hahei WWTP contingency plan was produced in May 2023. This is included as Appendix D. The next review is due in 2026.

Condition 24: Management plan

The consent holder shall provide the Waikato Regional Council with a management plan which details the procedures that will be implemented to operate in accordance with the conditions of this resource consent and the procedures that will be put into place to maximise wastewater treatment and minimise odour production. This plan shall be lodged with the Waikato Regional Council within 3 months of the commencement of this consent, and shall be reviewed and updated as a minimum annually. The plan shall address, but may not be limited to, the following:

- A. A description of the entire treatment and disposal system facility and how it is operated;*
- B. A description of routine maintenance procedures to be undertaken;*
- C. An outline of the methods to be utilised to monitor the treatment plant in an operational sense including: monitoring of influent waste water and monitoring of treatment performance;*
- D. A description of the methods to be used to ensure that sampling of the discharge as required by condition 16 of this consent is representative of overall discharge quality;*
- E. Specific management procedures for the efficient functioning of the treatment system including micro filtration unit, including measures to ensure compliance with condition 8 of this consent relating to discharge quality parameters;*
- F. Procedures for recording routine maintenance and all repairs that are undertaken;*
- G. Contingency measures in place to deal with unusual events;*
- H. Chain of command and responsibility, including contact details;*
- I. Other actions necessary to comply with the requirements of this resource consent;*
- J. Procedures for improving and/or reviewing the management plan.*

The Hahei WWTP Management Plan has been updated in May 2024. A copy is attached as Appendix E.

Condition 26: Unauthorised discharge

The consent holder shall notify the Waikato Regional Council as soon as practicable, and as a minimum requirement within 24 hours, of any discharge to Wigmore Stream from a source that has bypassed any part of the treatment system, or any discharge to the redundant disposal beds and/or redundant storage pond. The consent holder shall, within 7 days of the discharge occurring, provide a written report to the Waikato Regional Council, identifying the extent of the discharge, possible causes, steps undertaken to remedy the effects of the discharge and measures that will be undertaken to ensure future compliance with this consent.

No discharge to the grass plots has been conducted in the 2023/2024 compliance period.

Condition 27: Complaints

The consent holder shall maintain and keep a complaints register for all complaints, including discharge, water quality and odour complaints regarding operations at the site received by the consent holder. The register shall record:

- A. The date, time and duration of the event that has resulted in a complaint,*
- B. Any corrective action undertaken by the consent holder in response to the complaint, including actions taken to prevent similar events in the future.*
- C. The location of the complainant when the event was detected,*
- D. The possible cause of the event, and*
- E. The weather conditions and wind direction at the site when the event allegedly occurred.*

TCDC hold the complaints register for the site. Veolia are responsible for receiving and attending to complaints and providing the information back to TCDC.

Condition 28: *The register outlined in condition 27 shall be available to the Waikato Regional Council at all reasonable times. Waikato regional council shall be informed of complaints received by the consent holder which may infer non-compliance with the conditions of this resource consent to the Waikato Regional Council within 24 hours of the complaint being received. In addition, the consent holder shall provide written information on the incident including all of the details required by (a) to (e) of condition 27 of this consent, which shall be forwarded to the Waikato Regional Council within 5 days of the complaint being received.*

TCDC hold the complaints register for Hahei WWTP. They have confirmed that there were no complaints for the reporting period.

Condition 29: Wigmore Stream mouth

The consent holder shall be responsible for ensuring that the Wigmore Stream, from the treated wastewater discharge point to its mouth, is kept clear of debris and that the stream mouth is not blocked by sand, to the extent that the flow of the Wigmore Stream is unimpeded into the coastal marine area. The consent holder's obligations in respect of this condition are limited to the works that can be undertaken without the need for resource consent under the relevant rule(s) of the Waikato regional coastal plan.

Wigmore Stream is cleared whenever there is an RFS (Request for Service) or whenever an operator notices a blockage. The Wigmore Stream mouth has been cleared multiple times during the consent period.

Condition 30: *The consent holder shall implement the treatment plant upgrade works detailed in the Technical Memo titled "Hahei WWTP Consent Ammoniacal Nitrogen Reduction" by Harrison Grierson, dated 14 June 2017 (Waikato Regional Council document number 10628287), or equivalent upgrades, to ensure the wastewater discharge limits in condition 8 are met. The works shall include, as a minimum, installation of additional aeration in the Aeration Pond. These works shall be fully implemented within one year of the commencement of this consent.*

Additional aeration was installed at the Hahei WWTP in both ponds in 2017

Condition 31: *The consent holder shall provide a written report on or before the fifth and tenth anniversaries of the commencement of this consent that shall outline:*

A. What investigations have been undertaken to date to identify the long-term strategy for wastewater treatment and disposal options at Hahei upon the expiry of this consent,

B. What investigations have been undertaken or identified in relation to potential effects of disposal options being considered for wastewater at Hahei upon the expiry of this consent,

C. What consultation has been undertaken in relation to potential treatment and disposal options for wastewater at Hahei upon the expiry of this consent.

The 10-year anniversary report is due in 2027.

- Appendix A.** Hahei WWTP Annual Report Compliance Data
- Appendix B.** Hahei WWTP Effluent flowmeter calibration certificate
- Appendix C.** Hahei WWTP Ecological Monitoring report
- Appendix D.** Hahei WWTP Contingency Plan 2023
- Appendix E.** Hahei WWTP Management Plan 2024