INCIDENT REPORT
Emergency Bypass Discharges at Waiuku WWTP
Heavy Rain Events - June and July 2025

EXECUTIVE SUMMARY

The Waiuku Wastewater Treatment Plant (WWTP) experienced four emergency bypass discharges during June–July 2025 when prolonged wet weather and high inflows caused ponds to reach or approach critical levels.

- **Event 1 (13–16 June 2025):** ~13,000 m³ over 59.5 h
- **Event 2 (21–22 June 2025):** ~5,000 m³ over 23.5 h
- **Event 3 (10–13 July 2025):** ~16,200 m³ over 75 h (proactive discharge ahead of forecast storm)
- **Event 4 (21–22 July 2025):** ~4,752 m³ over 22 h

Combined volume: ~39,000 m³ of partially treated wastewater discharged to the Manukau Harbour (screened and aerated only, with filtration and UV bypassed).

All events resulted in exceedances of bacterial parameters. Event 1 also exceeded limits for Total Inorganic Nitrogen (TIN), Total Suspended Solids (TSS), and $cBOD_5$. Events 2 and 3 had TSS exceedances, while Event 4 was limited to microbial exceedances.

Environmental monitoring at Sandspit Reserve (near-field) and Waitangi Falls (far-field) showed:

- Enterococci levels generally returned below recreational guideline values (<200 cfu/100 mL) within 1–3 days, although recovery patterns varied between events.
- Nutrients (TN, TP) were strongly diluted (>30–100× reduction relative to source concentrations).
- Biochemical Oxygen Demand (BOD) dropped below detection (<0.5 mg/L) within 1–2 days.
- Dissolved oxygen remained stable (8.0–8.6 mg/L; 88–98% saturation), indicating no oxygen depletion.

In some events (particularly Events 1 and 3), downstream sites recorded higher bacterial levels than the WWTP discharge, suggesting contributions from other sources such as stormwater or catchment runoff.

Public health protection measures (Safeswim alerts) were implemented immediately. Mana Whenua were notified after the sequence of events with a summary of the incidents, and information on shellfish safety was included in those communications.

The root cause was insufficient pond storage under sustained wet season conditions, with limited recovery time between rainfall events. This reflects ongoing system constraints that are expected to continue until the planned South-west Wastewater Upgrade Programme (2026) is commissioned.

Overall, the bypasses caused temporary exceedances of consent limits, particularly for microbial parameters. Monitoring confirmed that the receiving environment generally recovered within a few days, but the recurrence of four events within six weeks highlights system vulnerability during extended wet periods.

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1. BACKGROUND AND CONSENT CONTEXT

1.1 Resource Consent (DIS60334129)

- **Consent reference:** DIS60334129 (granted June 2019, expires June 2027).
- **Consent holder:** Watercare Services Limited.
- **Location:** Williams Road, Glenbrook (Waiuku WWTP).
- **Key discharge limits (Condition 14):**
  - **Volume:** 5,500 m^3/day, plus allowance for rainfall above 40 mm/week.
  - **Timing:** Up to 6 hours per day, commencing 1 hour after ebb tide, max 255 L/s.
  - **Quality:**
    - $cBOD_5$ <20 mg/L (92nd percentile <45 mg/L)
    - TSS median <30 mg/L (92nd percentile <45 mg/L)
    - Ammoniacal-N <20 mg/L (winter limit)
    - TIN <20 mg/L
    - TP <8 mg/L
    - Enterococci median <50 cfu/100 mL (92nd percentile <150 cfu/100 mL)
    - Faecal coliforms <430 cfu/100 mL (92nd percentile)
- **Notification (Condition 25):** Auckland Council and Auckland Regional Public Health Service must be notified "as soon as practicable" of any unauthorised discharge or bypass.

1.2 Plant design capacity and limitations

- **Design capacity:** Sufficient for typical dry-weather flows (~450–750 m^3/day).
- **Storm event capacity:** Limited pond storage, vulnerable to consecutive high inflows.
- **Operational constraints:** Manual pump activation required during emergencies; filtration and UV disinfection cannot be retained under bypass conditions.

1.3 Historical context of similar events (e.g. Jan 2023 flooding).

- Previous events (e.g. January 2023 Auckland Anniversary flooding) demonstrated similar pond capacity challenges.
- Climate-driven changes are increasing the frequency and intensity of rainfall events, reducing recovery time between storms and increasing the risk of repeated bypass discharges.
- Long-term resolution is the planned South-west Wastewater Upgrade Programme (2026), which involves upgrading Waiuku WWTP as part of a regional approach to increase capacity and improve storm resilience.

2. EVENT SUMMARY

Table 2-1. Summary of emergency bypass events (June–July 2025)

Event	Dates	Duration	Volume (m^3)	Cause	Recovery (Enterococci <200 cfu/100 mL)	Consent Compliance
1	13–16 June	59.5 h	~13,000	Heavy rainfall, pond at critical level	2–3 days	Exceeded for $cBOD_5$, TSS, TIN, faecal coliforms, enterococci
2	21–22 June	23.5 h	~5,000	Further rainfall, insufficient recovery from Event 1	3–4 days (variable far-field)	Exceeded for TSS, faecal coliforms, enterococci
3	10–13 July	75 h	~16,200	Proactive discharge ahead of forecast rainfall	4 days	Exceeded for TSS, faecal coliforms, enterococci
4	21–22 July	22 h	~4,752	Elevated inflows during prolonged wet season	<24 h	Exceeded for faecal coliforms, enterococci

The four emergency bypass discharges had a combined volume of ~39,000 m^3 of partially treated wastewater. All bypasses omitted filtration and UV disinfection, resulting in microbial exceedances in every case. Event 1 also exceeded consent limits for TIN, TSS, and $cBOD_5$, while Events 2 and 3 exceeded for TSS in addition to microbial indicators. Event 4 was limited to microbial exceedances only.

Recovery of recreational water quality was generally within 1–4 days, though patterns varied. Events 1 and 4 showed rapid improvement, while Events 2 and 3 were more variable, with occasional far-field results higher than source concentrations. This suggests that catchment runoff or other external inputs may have contributed during wetter periods.

3. COMPARATIVE EVENT ANALYSIS

The four bypass events together discharged ~39,000 m^3 of partially treated wastewater over June–July 2025. Event volumes ranged from ~4,700 m^3 (Event 4) to ~16,200 m^3 (Event 3), with durations between 22 and 75 hours.

Responses varied: Events 1, 2, and 4 were reactive to rising pond levels, while Event 3 was initiated proactively ahead of forecast rainfall to avoid uncontrolled overflow.

Environmental recovery was generally within 1–4 days but differed between events. Events 1 and 4 showed rapid return to safe recreational water quality, while Events 2 and 3 demonstrated slower or more variable recovery, with occasional far-field results exceeding discharge concentrations. This indicates that rainfall-driven catchment inputs may have influenced harbour water quality during wetter periods.

Overall, the sequence of four bypasses within six weeks highlights the vulnerability of the current system during extended wet seasons, with limited recovery time between rainfall events.

4. CONSENT COMPLIANCE ASSESSMENT

4.1 Overview

All four bypass discharges bypassed filtration and UV disinfection, leading to exceedances of microbial parameters. Event 1 also exceeded limits for $cBOD_5$, TSS, and TIN. Events 2 and 3 had TSS exceedances in addition to microbial parameters, while Event 4 was limited to microbial exceedances only.

4.2 Summary of Compliance Outcomes

Event	Duration	Volume (m^3)	$cBOD_5$	TSS	NH_4-N	TIN	F. Coliforms	Enterococci	TP	Overall Status
1 (13–16 Jun)	59.5 h	~13,000	Exceeded (5% over 92%ile)	Exceeded median (20% over)	✓	Exceeded (6.5% over)	Exceeded (4,319% over)	Exceeded (1,967% over)	✓	Non-compliant
2 (21–22 Jun)	23.5 h	~5,000	✓	Exceeded median (1% over)	✓	✓	Exceeded (5,714% over)	Exceeded (2,100% over)	✓	Non-compliant
3 (10–13 Jul)	75 h	~16,200	✓	Exceeded median (1% over)	✓	✓	Exceeded (1,109% over)	Exceeded (1,100% over)	✓	Non-compliant
4 (21–22 Jul)	22 h	~4,752	✓	✓	✓	✓	Exceeded (714% over)	Exceeded (307% over)	✓	Non-compliant

✓ = compliant with consent limit. Percentages show extent of exceedance relative to consent thresholds. Median and 92nd percentile limits are rolling annual measures; results here are incident values provided for context.

4.3 Notification Requirements

All four events were notified to Auckland Council in line with Condition 25 (“as soon as practicable”). Event 3 was notified proactively ahead of discharge, given forecast rainfall and anticipated pond capacity issues. Notifications were also logged internally in accordance with consent conditions.

5. ENVIRONMENTAL MONITORING

Figure 5-1. Environmental monitoring locations around Waiuku WWTP.

5.1 Monitoring overview

- **Sites:** Sandspit Reserve (near-field) and Waitangi Falls (far-field) (see Figure 5-1).
- **Timing:** Daily sampling for 1–4 days after each bypass (extended where results warranted).
- **Parameters:** Microbiological (enterococci; faecal coliforms for consent context) and physico-chemical (DO, pH, BOD, nutrients, TSS).
- **Purpose:** Track short-term effects and time to return to typical recreational water quality.

5.2 Microbiological recovery

- **Enterococci (primary recreational indicator):** As summarised in Table 5-1, enterococci typically returned to <200 cfu/100 mL within 1–2 days of each bypass (a conservative window of 1–4 days is retained for generality).
- **Spatial pattern:** On several wet-period dates, far-field values exceeded near-field, a pattern consistent with additional catchment/stormwater inputs operating alongside the bypasses.
- **Faecal coliforms:** Exceeded consent limits in discharge samples during all bypasses (expected when UV is bypassed); recreational-site results followed the enterococci recovery pattern.

5.3 Physico-chemical parameters

- **BOD:** Detectable on Day 1 (sometimes through Day 2–3), then often <DL by Day 2–3; when detectable, values remained low.
- **Dissolved oxygen and pH:** Stable within marine-typical ranges; no evidence of oxygen depletion.
- **Nutrients (TN/TP):** Receiving-water concentrations were substantially lower than source (pond) concentrations; no signs of acute nutrient stress within the monitored windows.
- **Suspended solids (TSS):** Most persistent short-term effect—elevated for ~2–5 days (often 2–3 days) after some events before trending toward background (see Table 5-1).

5.4 Interpretation

Overall, the receiving environment generally recovered within days after each bypass, with TSS the main short-lived residual. Potential ecological implications of these results are discussed in Section 6.

Table 5-1. Receiving environment summary statistics (June–July 2025). *Ranges (min–max) and medians for key parameters at Sandspit Reserve (near-field) and Waitangi Falls (far-field). ND values are handled as 0.5×DL for statistics; %ND reports the proportion of non-detects.*

Parameter	Units	Sandspit n	Sandspit Range	Sandspit Median	Sandspit %ND	Waitangi n	Waitangi Range	Waitangi Median	Waitangi %ND
Enterococci	cfu/100 mL	18	1 – 1200	28	5.6	18	10 – 7700	125	0.0
Faecal coliforms	cfu/100 mL	18	8 – 2400	83	0.0	18	72 – 46000	640	0.0
Suspended Solids	mg/L	18	9.80 – 159.00	53.60	0.0	18	5.00 – 102.00	37.90	0.0
BOD	mg/L	18	0.25 – 2.50	0.65	5.6	18	0.25 – 6.80	0.84	22.2
Total Nitrogen	mg/L	18	0.46 – 1.80	0.87	0.0	18	0.68 – 5.80	3.15	0.0
Ammonia	mg/L	18	0.01 – 0.13	0.09	0.0	18	0.02 – 0.12	0.06	0.0
Total Phosphorus	mg/L	18	0.02 – 0.09	0.05	0.0	18	0.01 – 0.25	0.04	0.0
Sample DO	mg/L	16	8.20 – 9.20	8.75	0.0	16	7.90 – 10.70	8.75	0.0
pH	pH unit	17	7.6 – 8.1	7.8	0.0	17	7.1 – 8.0	7.6	0.0
Conductivity	µS/cm	7	3900.00 – 40000.00	31000.00	0.0	7	740.00 – 37000.00	11000.00	0.0

6. CUMULATIVE ENVIRONMENTAL IMPACT

6.1 Combined discharge context

- Frequency & scale: Four bypasses across ~6 weeks (13 June–22 July 2025), totalling ~39,000 m^3 of partially treated wastewater.
- Temporal spacing: Limited recovery time between events, particularly between Events 1–2 and 3–4.

6.2 Short-term cumulative effect

- **Microbial indicators:** Across monitoring windows, no progressive accumulation from one event to the next; see Section 5.2 for recovery times.
- **Suspended solids (TSS):** Most persistent short-term effect; elevated for ~2–5 days post-bypass in several events before trending toward background.
- **BOD & DO:** BOD typically <DL by Day 2–3; DO and pH remained stable with no oxygen stress observed.
- **Nutrients:** Receiving-water TN/TP remained substantially lower than source during each event; no short-term accumulation signal within the monitored periods.
- **Catchment inputs:** On several wet-period dates, far-field peaks exceeded near-field, indicating concurrent stormwater/catchment inputs during the monitoring periods.

6.3 Ecological health implications

- **Low short-term hypoxia risk:** Given stable DO and rapid BOD decline (Section 5), short-term oxygen stress for fish and invertebrates appears unlikely within the monitored periods.
- **pH and ammonia:** Values were within low-risk ranges for acute toxicity.
- **Turbidity/light:** Elevated TSS for ~2–5 days may temporarily reduce water clarity and light penetration, with short-lived implications for visual feeders, filter feeders, and shallow benthic/periphytic photosynthesis.
- **Nutrient pulses:** Strongly diluted and short-lived at monitored sites; acute eutrophication effects appear unlikely over days, though episodic phytoplankton responses could occur if pulses coincide with favourable conditions.
- **Public-health lens:** Enterococci recovery indicates short-lived risk at the monitored sites; near-field areas closest to the discharge pathway may experience higher risk within the first 24–48 h.
- **Attribution:** Given concurrent catchment inputs (Section 6.2), attribution of observed effects solely to the bypasses is uncertain.

6.4 Cultural and community considerations

Repeated discharges into Manukau Harbour are inconsistent with cultural expectations for water health and customary use. Public health messaging (Safeswim) was used during events;

Mana Whenua were notified after the sequence with a summary including shellfish safety information.

6.5 Overall assessment

- Monitoring indicates short-lived, localised effects after individual bypasses, with rapid microbial and BOD recovery and TSS as the main transient residual.
- The recurrence of four events within six weeks increases the risk of short-term cumulative effects, particularly for suspended solids and perceived impacts on cultural values, until increased capacity and storm resilience are delivered by the planned upgrade.

7. ROOT CAUSE ANALYSIS

7.1 Primary cause

Insufficient wet-weather capacity and storage. Prolonged winter rainfall raised pond levels to (or near) critical thresholds on multiple occasions. With limited inter-event recovery, emergency bypasses were initiated to manage risk to pond integrity and prevent uncontrolled overtopping.

7.2 Contributing factors

- **Sustained wet conditions and short inter-event gaps.** Four bypasses occurred within ~6 weeks (13 June–22 July), reducing the time available for ponds to draw down between storms.
- **Elevated wet-weather inflows (I&I).** Observed event volumes and rapid re-accumulation of pond levels are consistent with inflow and infiltration effects during heavy rain (network attribution not quantified here).
- **Process/asset constraints under emergency operation.** The emergency discharge pathway cannot retain filtration and UV disinfection, resulting in higher suspended solids and microbial loads than during routine operation.
- **Limited operational flexibility at high pond levels.** When ponds approach critical thresholds, options to delay or stage discharge (e.g., to align with favourable conditions) become constrained by dam safety and storage limits.
- **Concurrent catchment inputs.** During wet periods, stormwater and other catchment sources also influence harbour water quality (Section 6), complicating real-time impact management and interpretation.

7.3 Evidence base (from monitoring and operations)

- **Frequency and scale:** Four events totalling ~39,000 m³ indicate a systemic wet-weather capacity shortfall during the monitoring period.
- **Quality signatures:** Bypass events were accompanied by microbial exceedances and elevated TSS, consistent with filtration/UV being bypassed. BOD declined to low levels within 2–3 days and DO remained stable, indicating limited short-term oxygen demand in the receiving waters.
- **Recovery:** Enterococci typically returned <200 cfu/100 mL within 1–2 days (conservative window 1–4 days), but TSS remained elevated longer (often 2–3 days, up to ~5 days in some sequences), aligning with transient turbidity effects noted in Section 6.

7.4 Uncertainties and data gaps

- **Network attribution:** The relative contribution of specific network sub-catchments (I&I) to peak wet-weather inflows was not quantified in this incident review.
- **Event staging and tidal alignment:** The extent to which emergency discharges could be consistently aligned with optimal conditions is constrained at high pond levels; detailed optimisation analysis was outside scope.

- **Ecological endpoints:** Biological community responses (e.g., benthic macrofauna, shellfish condition) were **not assessed** for these events; Section 6 notes short-term water-quality implications only.

7.5 Implications

- **Near-term:** Without additional storage or inflow reduction, similar wet-season conditions may produce repeated bypass risk.
- **Longer-term mitigation:** The planned South-west Wastewater Upgrade Programme (2026) is expected to materially reduce wet-weather vulnerability by increasing treatment/storage capacity and overall system resilience (see Section 8).

8. CORRECTIVE AND PREVENTIVE ACTIONS

8.1 Immediate actions (completed)

- **Controlled emergency discharges** undertaken to manage pond safety when levels approached critical thresholds.
- **Public health messaging:** Safeswim status updates implemented during events in coordination with Council/ARPHS.
- **Regulatory notifications:** Auckland Council notified as soon as practicable for each event; incident details recorded in internal systems.
- **Environmental monitoring:** Post-event sampling completed at Sandspit Reserve and Waitangi Falls (Sections 5–6); results used to confirm recovery.
- **Internal debriefs:** Post-event reviews held between Operations and Environmental Care to capture lessons learned (e.g., sampling timing, pump readiness).

8.2 Short-term measures (next 12 months)

- **Wet-weather readiness**
    - Maintain pre-positioned emergency pump and ancillaries on site through the winter period where risk is elevated.
    - **Rainfall/pond-level triggers:** Refine trigger thresholds that prompt escalation, operational standby, and (where necessary) controlled discharge.
    - **Tidal alignment (where practicable):** Seek favourable windows to enhance dilution while remaining within dam-safety constraints.
- **Early warning and monitoring**
    - Automated alerts for forecast rainfall and rising pond levels to duty staff (Ops/EnvCare).
    - Field logistics playbook for rapid sampling (day 0/1) and consistent chain-of-custody.
    - Maintain short-term TSS focus in receiving-water checks given observed persistence (Sections 5–6).
- **Procedures and training**
    - Update emergency discharge SOP to reflect winter 2025 lessons (trigger logic, communications steps, sampling map).
    - Refresher training for operators on emergency setup/teardown and incident logging.
- **Engagement and communications**
    - **Regulatory:** Continue Council notifications per consent (Condition 25).
    - **Mana Whenua:** Provide consolidated post-sequence summaries (as done for winter 2025), including shellfish safety information; explore options for earlier heads-up notifications where practicable and desired.
    - **Community:** Keep Safeswim and website updates aligned with monitoring results and recovery.

- **Dam safety**
    - Maintain heightened inspection frequency during prolonged wet periods; document crest freeboard checks and board adjustments between ponds.

8.3 Longer-term solution

- **South-west Wastewater Upgrade Programme (2026):**
  The programme includes upgrading Waiuku WWTP as part of a regional approach to increase capacity and improve storm resilience. This is expected to materially reduce bypass risk under sustained wet-weather conditions by providing greater treatment and storage headroom. Commissioning and performance validation will confirm outcomes.

8.4 Follow-up and review

- **Post-winter review:** At the end of the wet season, review incident logs, triggers, tidal alignment opportunities, and monitoring outcomes; update SOPs and training accordingly.
- **Data gaps:** If bypass frequency remains elevated, consider targeted additions (e.g., short turbidity/light profiles during events) to strengthen ecological effect assessment (noting current monitoring focuses on short-term water quality).

CONCLUSION

Across June–July 2025, Waiuku WWTP undertook four emergency bypass discharges (combined ~39,000 m³). All bypasses omitted filtration and UV, resulting in microbial non-compliance in every event; Event 1 also exceeded TIN, TSS, and $cBOD_5$, Events 2–3 exceeded TSS, and Event 4 was limited to microbial parameters (see Section 4, Table 4-1).

Receiving-environment results indicate short-lived, localised effects within the monitored periods (Sections 5–6):

- Enterococci generally returned to <200 cfu/100 mL within 1–2 days (conservative window 1–4 days).
- TSS was the most persistent short-term effect, remaining elevated for ~2–5 days (often 2–3).
- BOD was low and often <DL by Day 2–3; DO/pH remained within marine-typical ranges, indicating low short-term hypoxia risk.
- On several wet-period dates, far-field peaks exceeded near-field, consistent with concurrent catchment/stormwater inputs, so attribution of all observed effects solely to the bypasses is uncertain.

The primary driver was insufficient wet-weather capacity and storage under sustained rainfall, compounded by short recovery windows between storms (Section 7). Emergency actions, public-health messaging (Safeswim), regulatory notifications, and post-event monitoring were implemented as outlined (Sections 5 and 8).

Looking ahead, short-term measures (triggers, readiness, monitoring and SOP updates) are in place (Section 8.2). The planned South-west Wastewater Upgrade Programme (2026)—which includes upgrading Waiuku WWTP—aims to increase capacity and storm resilience and is expected to materially reduce bypass risk under similar conditions (Section 8.3).

Overall, based on the monitoring completed, the harbour generally recovered within days after each bypass during winter 2025; however, the sequence of four events in six weeks underscores ongoing wet-weather vulnerability until additional capacity is delivered.