

INCIDENT REPORT

Emergency Bypass Discharge at Clarks Beach WWTP

Heavy Rain Events - June and July 2025

EXECUTIVE SUMMARY

Clarks Beach Wastewater Treatment Plant (WWTP) experienced two emergency bypass discharges during winter 2025 when heavy rainfall caused pond levels to exceed safe operating thresholds.

- **Event 1 (12–13 June 2025):** ~1,500 m³ over 6 h 45 min
- **Event 2 (30–31 July 2025):** ~5,200 m³ over 10 h
- **Combined volume:** ~6,700 m³ of partially treated wastewater discharged to the Manukau Harbour (screened and aerated, without filtration or UV).

Both events exceeded several discharge quality parameters. Event 1 exceeded limits for TSS, TN, and faecal coliforms; Event 2 exceeded faecal coliform and BOD limits. Ammonia and pH remained compliant during both events.

Environmental monitoring at Clarks Beach and Waiau Beach showed that enterococci levels remained below the recreational guideline (<200 cfu/100 mL) throughout both events and returned to background within 1–3 days. Faecal coliforms were elevated on Day 1 but are not the primary indicator for recreational water safety. Physico-chemical parameters demonstrated strong resilience: nutrients (TN and TP) were diluted more than 100-fold relative to source concentrations, BOD was detectable only on Days 1–2 before dropping below detection, and dissolved oxygen and pH remained within normal marine ranges. Suspended solids were the only parameter to remain elevated for several days, representing the most persistent short-term effect. Overall, the results confirm rapid recovery and strong buffering capacity in the harbour, while highlighting suspended solids as the key short-lived impact of the bypasses.

The Manukau Harbour demonstrated resilience, with microbial and nutrient indicators recovering quickly and no evidence of oxygen stress. However, the short interval between bypasses indicates recurring capacity limitations at the plant, increasing the risk of cumulative impacts on ecological health and cultural values.

Emergency procedures, public health warnings, and monitoring were implemented effectively. The long-term resolution is the planned WWTP upgrade (expected July 2026), which will increase capacity from 1,600 m³/day to 5,200 m³/day and is expected to significantly reduce the likelihood of bypass events under storm conditions.

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1. BACKGROUND AND CONSENT CONTEXT

- **Consents:** R/REG/2015/4227 (coastal), R/REG/2015/4228 (land/water), R/REG/2017/844 (air)
- **Design capacity:** 1,600 m³/day
- **Average dry weather flow:** ~450 m³/day
- **Consent maximum:** 2,500 m³/day (plus incidental rainfall)

Recent storm events have regularly exceeded design and consented capacity, e.g. January 2023 (~2,000 m³/day), June 2025, and July 2025.

2. EVENT DESCRIPTIONS

2.1 Event 1 – 12–13 June 2025

- Duration: 18:30 (12 June) to 01:15 (13 June), 6 h 45 min
- Volume: ~1,500 m³
- Cause: 56.6 mm rainfall over 48 h raised pond to 60 mm below crest
- Treatment bypassed: Filtration and UV disinfection
- Consent compliance: TSS, TN, and faecal coliform limits exceeded (see Section 5 and Appendix A)

2.2 Event 2 – 30–31 July 2025

- **Duration:** 22:00 (30 July) to 08:00 (31 July), 10 h
- **Volume:** ~5,200 m³ (3.5 × larger than Event 1)
- **Cause:** Heavy rainfall; discharge coincided with high tide, aiding dilution
- **Treatment bypassed:** Filtration and UV disinfection
- **Consent compliance:** Source water data not available, but exceedances were probable given volume, duration, and bypass type

3. CONSENT COMPLIANCE ASSESSMENT

Table 3- 1. Summary of discharge quality against consent limits

Parameter	Consent Limit (Condition 18)	Event 1 (13 June 2025)	Event 2 (31 July 2025)	Compliance Note
TSS	30 mg/L	184 mg/L	n/a (not sampled)	Exceeded limit (Event 1); Event 2 unknown
Total Nitrogen (TN)	20 mg/L	21 mg/L	19 mg/L	Event 1 above limit; Event 2 within limit
Ammonia (NH ₄ -N)	10 mg/L	0.15 mg/L	0.27 mg/L	Both well within limit
cBOD ₅	20 mg/L (median)*	35 mg/L	40 mg/L	Both above median threshold*
Faecal coliforms	14 cfu/100 mL	140,000 cfu/100 mL	270,000 cfu/100 mL	Both far above limit
pH	6–9	7.8–8.1	6.7	Both within limit
Total Phosphorus	Not specified in consent	5.68 mg/L	5.54 mg/L	Not regulated

*BOD consent compliance is based on median and 92nd percentile across 12 monthly samples. Here values are reported as exceedances of the single-sample median threshold for incident context.

4. ENVIRONMENTAL MONITORING

4.1 Monitoring Network Design

Monitoring was undertaken at two recreational sites (Figure 6-1):

1. **Clarks Beach boat ramp** (near-field)
2. **Waiau Beach boat ramp** (far-field)

Parameters monitored included pH, conductivity, dissolved oxygen (DO), cBOD₅, NH₄-N, Total Nitrogen (TN), Total Phosphorus (TP), Total Suspended Solids (TSS), faecal coliforms, and enterococci.



Figure 4-1. Environmental monitoring locations around Clarks Beach WWTP.

4.2 Microbiological Recovery

Enterococci levels were consistently below the recreational guideline of 200 cfu/100 mL and returned to background conditions within 1–3 days (Table 1). Event 2 showed faster recovery, with

Waiau Beach reaching <1.6 cfu/100 mL by Day 2. This difference is likely related to discharge timing at high tide, which enhanced dilution.

Faecal coliforms were analysed only on Day 1 at recreational sites (Table 6-1). Results were elevated (17 and 7 cfu/100 mL in Event 1; 46 and 46 cfu/100 mL in Event 2), exceeding the consent limit (14 cfu/100 mL). Monitoring was not continued beyond Day 1, as enterococci are the preferred microbiological indicator for recreational water safety.

Table 4-1 Microbiological results at monitoring sites

Event	Site	Day 1 Enterococci	Day 2 Enterococci	Day 3 Enterococci	Faecal Coliforms (Day 1)	Notes
1 (June 12–13)	Clarks Beach	40	26	3.3	17	All results below guideline
	Waiau Beach	39	28	6.5	7	All results below guideline
2 (July 30–31)	Clarks Beach	4.9	4.9	<1.6	46	Below guideline, background by Day 3
	Waiau Beach	13	<1.6	<1.6	46	Below guideline, background by Day 2

Note: Faecal coliforms were analysed only on Day 1 at recreational sites. Enterococci were monitored daily until levels confirmed safe, as they are the primary indicator for recreational water safety.

5.3 Physico-Chemical Parameters

Physico-chemical results are summarised in Table 6- 2.

- **TSS:** Elevated after both events (45–62 mg/L), gradually reducing but remaining above background for at least 3 days. This represents the most persistent environmental impact.
- **Nutrients:** TN and TP were strongly diluted compared to source levels. At recreational sites, TN ranged 0.049–0.45 mg/L and TP 0.021–0.044 mg/L, reflecting dilution factors >100× relative to pond outlet concentrations.
- **BOD:** Complete data show BOD was measurable only on Days 1–2, then dropped below detection (<0.5 mg/L). This demonstrates rapid breakdown of organic matter, confirming that the harbour ecosystem effectively processed the organic load within 2–3 days.
- **Ammonia:** Consistently low (<0.03 mg/L).
- **DO and pH:** Stable across both events (DO 8.1–9.7 mg/L, pH 7.6–8.1), indicating no oxygen depletion or acidification.

Table 4-2 Physico-chemical results at monitoring sites (Events 1 and 2, Days 1–3)

Event	Site	Day	TSS (mg/L)	BOD (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Ammonia (mg/L)	DO (mg/L)	pH
1 (June 12–13)	Clarks Beach	1	62.4	0.56	0.25	0.05	<0.005	8.3	8.0
		2	50.0	<0.5	0.40	0.035	0.022	8.8	7.8
		3	52.0	<0.5	0.45	0.037	0.022	8.2	8.1
	Waiau Beach	1	58.0	0.78	0.26	0.044	0.021	8.1	7.6
		2	45.2	<0.5	0.40	0.035	0.022	8.8	7.8
		3	47.0	<0.5	0.26	0.044	0.021	9.7	8.1
2 (July 30–31)	Clarks Beach	1	46.0	0.72	0.049	0.022	<0.005	8.4	8.0
		2	56.6	0.75	0.22	0.025	0.022	8.7	8.0
		3	48.0	<0.5	0.17	0.021	0.022	8.7	8.0
	Waiau Beach	1	52.2	<0.5	0.14	0.024	0.021	8.4	8.0
		2	60.2	0.57	0.17	0.024	0.023	8.3	8.0
		3	57.8	<0.5	0.17	0.024	0.023	8.6	8.0

4.4 Environmental Impact Interpretation

- **Rapid microbial recovery:** Enterococci remained within safe limits, confirming limited short-term public health risk.
- **Nutrient dilution:** Strong dilution factors (>100×) demonstrate the mixing capacity of the harbour.
- **Suspended solids persistence:** TSS was the only parameter showing multi-day elevation, highlighting it as the main short-lived residual effect.
- **Ecosystem resilience:** DO and pH stability, combined with rapid microbial and BOD recovery, indicate robust buffering capacity of the receiving environment.

Overall, the monitoring results demonstrate that while the bypasses introduced elevated microbial and physical contaminants immediately after discharge, the receiving environment recovered rapidly within days, without evidence of long-term ecological stress.

5. CUMULATIVE ENVIRONMENTAL IMPACT

5.1 Combined Discharge Metrics

- **Total discharge volume:** ~6,700 m³ of partially treated wastewater across two events.
- **Duration:** 16 h 45 min combined bypass operation.
- **Frequency:** Two bypasses within 49 days, highlighting a recurring pattern under storm conditions.

5.2 Ecosystem Stress Assessment

- **Microbiological recovery:** Enterococci levels at both sites (Table 1) remained below the recreational guideline (200 cfu/100 mL) throughout monitoring and returned to background levels within 1–3 days.
- **Physico-chemical stability:** DO and pH (Table 2) remained within normal marine ranges, confirming that the harbour ecosystem maintained oxygenation and buffering capacity during both events.
- **Persistent effects:** TSS remained elevated for several days (Table 2), representing the most consistent short-lived impact.
- **Nutrient dilution:** TN and TP at recreational sites (Table 2) were strongly diluted (>100×) relative to source concentrations, limiting cumulative nutrient stress.

5.3 Cultural and Community Considerations

- **Cultural values:** Repeated discharges into Manukau Harbour have implications for areas of customary importance.
- **Public health:** Safeswim alerts and shellfish gathering advisories were issued for both events, and no recreational exposure incidents were reported.

5.4 Overall Assessment

Environmental monitoring indicates that the receiving environment recovered quickly after each event, with microbial indicators returning to safe levels within 72 hours and stable DO and pH throughout. However, the recurrence of bypasses within a short interval increases the risk of cumulative effects, particularly from repeated inputs of suspended solids and the cultural significance of discharges to Manukau Harbour. The pattern reinforces the need to address WWTP capacity constraints to prevent repeated incidents.

6. ROOT CAUSE ANALYSIS

- **Primary cause:** Treatment plant capacity (1,600 m³/day) inadequate during storm inflows exceeding 2,000 m³/day.

- **Contributing factors:**
 - Increased frequency of intense rainfall events (climate change influence)
 - Limited operational options once ponds reach critical levels
 - Ageing infrastructure not designed for current conditions

The recurrence of bypasses within a short period indicates that capacity limitations will continue until the planned upgrade is completed.

7. CORRECTIVE AND PREVENTIVE ACTIONS

7.1 Immediate Actions (Completed)

- Controlled discharges undertaken to prevent overtopping
- Environmental monitoring completed
- Public health warnings and Safeswim alerts issued
- Notifications to Council and iwi (Event 1 only) completed

7.2 Short-term Measures (Next 12 months)

- Enhanced weather and pond level monitoring with automated alerts
- Revised emergency response protocols
- Staff training for extreme weather scenarios
- Monthly dam safety inspections during storm season

7.3 Long-term Solution

- **New treatment plant upgrade (expected July 2026):**
 - Capacity increased to 5,200 m³/day
 - Design incorporates storm resilience and climate change projections
 - Aims to eliminate routine bypass events

8. CONCLUSION

- Two emergency bypass discharges occurred in June and July 2025, releasing a combined volume of ~6,700 m³ of partially treated wastewater to the Manukau Harbour.
- Both incidents exceeded several consent parameters, particularly faecal coliforms (Table 1), and highlighted the treatment plant’s limited capacity during storm events.
- Environmental monitoring (Tables 6-1 and 6- 2) provides key insight into the effects and recovery of the harbour following these discharges:
 - Enterococci levels remained below the recreational guideline (200 cfu/100 mL) and returned to background within 1–3 days.
 - BOD was measurable only on Day 1–2 and then dropped below detection, showing rapid breakdown of organic material.
 - Nutrients (TN, TP) were strongly diluted (>100×) at recreational sites compared with the source, limiting cumulative nutrient stress.
 - TSS was the most persistent parameter, remaining elevated for several days at both sites.
 - DO and pH remained stable throughout both events, indicating no acute ecological stress.
- The monitoring therefore shows that while the bypasses caused short-term localised increases in microbial and physical contaminants, the receiving environment demonstrated strong resilience and rapid recovery.
- However, the occurrence of two events within 49 days indicates a recurring capacity limitation that increases the risk of cumulative environmental and cultural impacts.

In summary, monitoring confirms that the harbour has a strong capacity to recover from individual bypasses, but repeated events present ongoing risks. The effectiveness of short-term emergency management protected public health, yet the underlying capacity constraint will only be addressed through the planned 2026 treatment plant upgrade.