

# **Addendum-Wastewater Technical Review— PPC23**

## **Private Plan Change 23 (Whisper Creek)**

**John Messerly, May 2026**

### **1. Procedural Scope and Purpose**

This supplementary addendum is confined to technical implications arising from information that became available only after completion of the submitter evidence timetable through Local Government Official Information and Meetings Act (LGOIMA Ref. 161462) responses and associated newly disclosed technical documentation. It is intended to supplement matters already raised within the document titled *Wastewater Technical Review — PPC23 (Whisper Creek)*.

The addendum is narrowly confined to interpretation-relevant matters arising from:

- the Christchurch wastewater model calibration documentation; and
- the Christchurch wastewater design storm review documentation.

It is not intended to restate the broader wastewater submission, introduce unrelated new objections, or provide a general supplementary critique of the applicant evidence. Rather, the addendum is limited to identifying modelling limitations, calibration constraints, operational assumptions, validation status, wet-weather assessment uncertainties, and related evidential matters disclosed within the newly available documentation that may affect interpretation of wastewater-system modelling outputs within the specific coastal and groundwater-influenced environment relevant to PPC23.

The addendum is therefore confined to evidential sufficiency, modelling confidence, calibration scope, and interpretation limitations relevant to rezoning-stage wastewater-effect assessment, rather than the broader question of whether wastewater infrastructure could theoretically be engineered or upgraded in future.

### **2. Newly Available Wastewater Modelling Information**

Subsequent to the submitter evidence deadline, the following technical documents became available via LGOIMA Ref. 1614626 :

- *Christchurch City Wastewater Model – Draft Model Update and Calibration Report* (WSP, February 2020);
- *Christchurch City Council 2024 Design Storm Review Technical Memorandum* (WCS Engineering, August 2024).

The WSP report documents updating and recalibration of the Christchurch wastewater hydraulic model using revised network information and flow-monitoring data, including discussion of modelling assumptions, calibration methodology, simplifications, and validation constraints.

The Design Storm Review memorandum evaluates selected wastewater design storms using the updated model framework and long-term rainfall simulations.

These documents are directly relevant because the PPC23 wastewater assessment expressly relies upon the 2020 Christchurch wastewater model and the 2024 design-storm methodology described within those reports. The newly available documentation therefore materially informs interpretation

of the modelling outputs relied upon for assessment of surcharge behaviour, downstream conveyance performance, and wet-weather effects within the receiving Spencerville coastal wastewater system.

The newly available Christchurch City Council 2024 Design Storm Review Technical Memorandum materially increases the significance of storm-event selection within interpretation of wastewater-model outputs relied upon for PPC23. Because surcharge prediction, downstream conveyance assessment, and wet-weather performance interpretation within the operational wastewater model depend directly upon the rainfall forcing regime applied, uncertainty and calibration limitations within the operational model framework necessarily propagate into interpretation of predicted wastewater-system behaviour relied upon for PPC23. The memorandum further recognises that multiple storm-event scenarios may be necessary in order to fully understand wet-weather impacts within the wastewater network. However, Hall's Appendix B modelling memorandum does not clearly specify the recurrence interval, AEP basis, or broader scenario envelope associated with the wet-weather modelling relied upon for downstream surcharge interpretation. While a separate Christchurch City Council modelling request document references a '1 in 3 years rain' wet-weather simulation scenario in relation to PS78 assessment work, the presently disclosed material does not clearly establish the extent to which broader future-condition, compound-response, or sensitivity-testing scenarios were evaluated within the downstream wastewater assessment relied upon for PPC23. This distinction is important because operational serviceability under selected modelling assumptions is not necessarily equivalent to demonstrated confidence regarding long-term wastewater-system behaviour across the wider range of environmental conditions acknowledged elsewhere within the evidential record.

### **3. Acknowledged Model Constraints and Validation Limitations**

#### **3.1 Post-earthquake flow behaviour and calibration uncertainty**

The newly available reports confirm continuing uncertainty regarding post-earthquake wastewater-system behaviour within the wider Christchurch network. The report expressly records that "flows within the catchment post-earthquake repairs are not fully understood" and that recalibration work was required to better understand "current flows in the catchment." These statements are significant because they confirm that post-SCIRT wastewater behaviour remained an active empirical calibration issue within the operational wastewater model framework itself.

While the newly available calibration documentation confirms substantial citywide model recalibration activity, the report does not state uniformly high calibration confidence across all portions of the wastewater network, instead describing WWF calibration confidence as high in "most areas." In that context, and noting the absence within the disclosed material of PS78 catchment-specific infiltration/inflow investigations, localised coastal-groundwater sensitivity analysis, or empirical calibration information beyond assumed model parameters, the presently available documentation does not clearly demonstrate that equivalent calibration confidence was specifically established for the PS78 coastal receiving environment relevant to PPC23, notwithstanding the broader operational utility of the citywide wastewater model.

The newly available calibration material further demonstrates that model confidence depended materially upon empirical monitoring and calibration assumptions subject to instrumentation limitations. The report records multiple instances where flow-monitoring datasets required caution

because of instrumentation limitations. These disclosures confirm continuing dependence upon evolving empirical calibration assumptions in order to interpret post-earthquake wet-weather-flow behaviour and overflow response within the Christchurch wastewater network. This is materially relevant because the newly available documentation also contains no clear indication of detailed PS78 catchment-specific infiltration/inflow calibration associated with the degraded coastal gravity system receiving PPC23 wastewater flows.

### **3.2 Simplifications and assumptions within the modelling framework**

The calibration report also highlights the extent to which modelling confidence depends upon calibration assumptions and operational simplifications.

These disclosures increase the significance of modelling simplifications already identified within WSP's modelling memorandum in Hall's Appendix B, which confirms that the operational model relied upon for PPC23 is principally a trunk-main model in which pipes smaller than DN225 are generally excluded and some subcatchments remain aggregated rather than subdivided by individual manholes. The newly available calibration report is relevant to these simplifications because it confirms continuing dependence upon empirical recalibration and refinement in order to interpret post-earthquake wet-weather behaviour within the operational model framework.

The newly available calibration report also materially increases the significance of simplified pump representation already identified within Hall's Appendix B. The calibration material repeatedly confirms that interpretation of post-earthquake wet-weather behaviour within the Christchurch wastewater network remained dependent upon continuing empirical recalibration and refinement processes. In that context, WSP's acknowledgement that continuous pump representation "may lead to under predictions of peak flows downstream" becomes more materially relevant within the shallow-groundwater coastal receiving environment associated with PPC23. The disclosed material does not clearly demonstrate that transient coincident peak-flow conditions associated with upstream LPS pump cycling, local wet-weather infiltration/inflow response, and additional PPC23 loading were specifically assessed within the receiving Spencerville wastewater network.

### **3.3 Stress-event representation and design-event selection**

The newly available reports materially strengthen the concern already identified in the Wastewater Technical Review regarding the limited scope of the PPC23 wastewater assessment in relation to coastal-system behaviour. The WSP report found in Appendix B of Hall's report already acknowledged that a variety of storm-event conditions would be necessary to fully understand WWF impacts on the network, including variation in AEP, rainfall intensity, event duration, and timing relative to network flow patterns. The newly available reports now provide additional technical context clarifying the significance of that limitation.

In particular, the 2020 model-calibration report confirms that the Christchurch wastewater model is a calibrated operational model dependent upon empirical monitoring, calibration assumptions, and continuing refinement processes associated with wet-weather-flow behaviour and overflow prediction. The newly available "2024 Design Storm Review" likewise clarifies that the "2024 design storm" used in the PPC23 assessment was a selected design-event construct derived from long-term rainfall analysis rather than a comprehensive assessment of interacting coastal-system conditions. However, neither newly available report

contains any clear indication that the PPC23 assessment explicitly incorporated PS78 catchment-specific infiltration/inflow behaviour, groundwater-rise effects, rainfall–groundwater interaction, sea-level-rise-induced infiltration change, antecedent groundwater conditions, tidal or coastal boundary interaction, compound coastal forcing, or evolving wet-weather infiltration response associated with shallow-groundwater coastal systems, notwithstanding that these interacting factors are identified within the literature already cited in the Wastewater Technical Review as materially relevant to wastewater-system behaviour in coastal environments.

The significance of the newly available reports is therefore not merely that the PPC23 assessment relied upon a selected wet-weather design event, but that the additional technical context now available further reinforces that the assessment remained confined to a relatively narrow operational WWF scenario within an evolving calibrated trunk-focused model framework, while the disclosed modelling documentation still does not clearly demonstrate incorporation of the interacting coastal-system drivers identified in the cited literature as materially relevant to wastewater-network response under wet-weather conditions.

### 3.4 Validation completeness and operational confidence

The newly available model report also materially strengthen concerns regarding the present level of operational confidence that can be placed in model predictions relevant to PPC23. The report expressly states that:

“Model validation is yet to be completed.”

Accordingly, the operational wastewater model relied upon for PPC23 had not yet been validated against observed operational behaviour at the time of reporting. This is materially relevant because the model is being relied upon not merely for operational planning purposes, but as evidential support for rezoning-stage wastewater-effect assessment within a shallow-groundwater coastal receiving environment involving earthquake-affected infrastructure, wet-weather sensitivity, and infiltration/inflow concerns already identified within the Wastewater Technical Review.

The report explains that calibration of the model relied upon selected empirical datasets including short-term flow monitors, pump-station loggers, and long-term monitoring sites. **However, calibration and validation are not the same process.** Calibration concerns adjustment of model parameters to fit selected observed datasets, whereas validation concerns whether the model has been demonstrated to reliably reproduce observed operational system behaviour under broader real-world conditions.

Importantly, the newly available documentation does not clearly demonstrate validation of the operational wastewater model against the range of interacting wet-weather and coastal-system conditions relevant to the Kainga–Brooklands–Spencerville receiving environment. Nor does the newly available material clearly demonstrate validation against PS78 catchment-specific infiltration/inflow behaviour associated with the degraded coastal gravity system receiving PPC23 wastewater flows.

The significance of this point is not that the Christchurch wastewater model is unusable for operational purposes. Rather, it is that the newly available report itself confirms that validation against observed operational behaviour had not yet been completed at the time the model framework was being relied upon for wastewater-effect assessment relevant to PPC23. Where

validation against observed operational behaviour has not yet been completed, the degree of confidence appropriately capable of being placed in predictive rezoning-stage wastewater-effect outputs is necessarily more limited.

#### **4. Relationship to Existing Wastewater Technical Review**

The matters identified above do not introduce new substantive themes beyond those already raised within the existing Wastewater Technical Review.

Rather, the newly available material appears relevant because it materially informs previously identified concerns regarding:

- uncertainty associated with post-earthquake wastewater-system behaviour;
- the scope and completeness of calibration and validation;
- groundwater-sensitive coastal wastewater-system dynamics;
- limitations associated with stress-event representation;
- and the distinction between local servicing assessment and broader receiving-network behaviour.

In particular, the newly available documentation appears directly relevant to Sections 3–8 of the existing Wastewater Technical Review concerning:

- system-level assessment scope;
- physical groundwater and coastal drivers;
- empirical baseline uncertainty;
- and cumulative wastewater-system effects within a coastal environment.

This addendum therefore does not seek to replace or materially expand the original technical review, but instead to identify newly available technical information relevant to interpretation of the wastewater modelling framework relied upon within the PPC23 assessment.

#### **5. Concluding Observation**

The newly available wastewater modelling documentation does not demonstrate that wastewater modelling is inappropriate or incapable of informing infrastructure assessment.

However, the documentation does identify acknowledged limitations, assumptions, calibration constraints, and unresolved validation matters relevant to interpretation of wastewater-system modelling outputs in coastal networks.

Within the particular context of PPC23 — involving a low-gradient coastal environment influenced by groundwater, sea-level rise, vertical land movement, and earthquake-affected infrastructure — those acknowledged limitations may be relevant to the level of confidence presently available for rezoning-stage assessment of wastewater-system behaviour and long-term resilience.

Accordingly, the newly available material appears relevant to the broader question already raised within the existing Wastewater Technical Review regarding evidential sufficiency and the degree to which wastewater-system effects have presently been assessed at an integrated system level appropriate to the environmental conditions governing the receiving network.

These newly available disclosures do not necessarily establish that unacceptable wastewater effects will occur. However, they materially qualify the degree of predictive confidence reasonably capable

of being attributed to the wastewater modelling framework relied upon for PPC23. This is particularly relevant within a broader evidential context in which other infrastructure and hazard assessments associated with PPC23 have involved explicit consideration of future-condition uncertainty, adaptive management responses, and continuing reassessment mechanisms associated with coastal-system behaviour. In the context of rezoning-stage decision-making involving long-term urban intensification within a shallow-groundwater coastal environment influenced by post-earthquake uncertainty and wet-weather sensitivity, the disclosed calibration limitations, operational simplifications, and unresolved modelling assumptions are directly relevant to the degree of evidential confidence presently available to support system-level wastewater-effect assessment under section 32.

## References

Christchurch City Council. 2026. Responses to John Messerly regarding “Wastewater infrastructure capacity and resilience” (LGOIMA Ref. 1614626). Response under the Local Government Official Information and Meetings Act 1987, 15 April 2026.

WCS Engineering Pty Ltd. 2024. *Christchurch City Council 2024 Design Storm Review: Technical Memorandum*. Prepared for Christchurch City Council, August 2024.

WSP New Zealand Limited. 2020. *Christchurch City Wastewater Model: Draft Model Update and Calibration Report*. Report No. 3-CHCH2.28. Prepared for Christchurch City Council, 3 February 2020.