ENVELOPE

RESPONSE TO STATEMENT OF EVIDENCE

MT WELCOME, PUKERUA BAY

TO	Pukerua Property Group LP	**DATE**	2 September 2026
PROJECT NAME	Mt Welcome, Pukerua Bay	**ENVELOPE REF**	1753-02
ATTENTION	William Dorset	**FROM**	Kyle Dirse
EMAIL ADDRESS	william.dorset@classicdevelopments.co.nz		

INTRODUCTION

This memorandum provides Envelope Engineering's comments on the Statement of Evidence of Darcy Brittliff dated 25 August 2026 (stormwater, wastewater, earthworks management and water supply infrastructure).

This memorandum has been prepared by Mr Kyle Dirse. While this is not a matter before the Environment Court, Mr Dirse has read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023 ('Code'), and has complied with that Code in the preparation of this memorandum. The data, information, facts and assumptions Mr Dirse has considered as part of this memorandum are set out in this memorandum. The reasons for the conclusions of the memorandum are also set out in this memorandum. Unless stated otherwise, this memorandum is within the Mr Dirse's expertise and he has not omitted to consider material facts known to him that might alter or detract from the opinions expressed.

Item	Matter
Issue 1	Sediment source and yield
Issue 2	Sediment removal facilities and the mass-earthworks alternative
Issue 3	Retention wetland operation and maintenance access
Issue 4	Stormwater modelling and downstream flood ponding
Issue 5	Scale of additional detention
Issue 6	On-lot storage and re-use tanks
Issue 7	Rain garden design criteria
Issue 8	Wastewater modelling and downstream overflows
Issue 9	On-site wastewater detention and septicity

ISSUE 1 – SEDIMENT SOURCE AND YIELD

"Each of these sediment sources is present. However, the open watercourses between the piped outfalls and retention wetlands (source (ii)) are considered the highest-risk and most likely sediment source. This is because no hydrological control is proposed upstream of these outlets, meaning runoff from rainfall events is discharged directly to these flow paths at increased peak rates." (paragraph 11)

Darcey considers there is an opportunity to refine the outlet locations and sediment-management response to minimise erosion risk and future maintenance

Response:

The primary sediment source is expected to be the surrounding hillsides, rather than the developed-area discharges. Stormwater from the development will be treated through rain gardens, targeting approximately 75% TSS removal before discharge. Sediment from the hillsides should also reduce as stock is removed and revegetation becomes established.

The wetlands provide peak-flow attenuation downstream of the open gully reaches. On-lot tanks may reduce smaller events where storage is available but would provide limited control during larger events unless specifically designed for extended detention. The direct response is therefore appropriate outlet design, energy dissipation and scour protection.

The outlets are intentionally located partway up the gullies to maintain runoff to the existing wetlands while avoiding their footprints. Their detailed design can be refined to promote diffuse flow and minimise reconcentration, erosion and future maintenance.

A forebay at a piped inlet would not capture diffuse sediment entering from the surrounding hillsides. The wetlands have been designed to accommodate sediment accumulation without compromising their storage or stormwater functions.

ISSUE 2 – SEDIMENT REMOVAL FACILITIES AND THE MASS-EARTHWORKS ALTERNATIVE

"I have not completed any conceptual design detail on this point but present the opportunity to the Panel to consider a mass earthwork exercise to create a best practice stormwater system upon the land." (paragraph 19) "This approach would be a direct conflict to the current wetland design based on the ecological restrictions on the development. The current site's ecological impact of such an engineering focused design compared to the current restricted/balanced design promoted in the application is unknown. It has not been discussed in my presence by any Party" (paragraph 20)

Response:

The mass-earthworks alternative was not raised in conferencing, and the statement confirms that no concept design has been prepared and that its ecological effect is unknown. We do not recommend this approach. The current arrangement is a deliberate balance between stormwater function and the wetland remediation on which the ecological assessment and the application rely.

Re-forming the gullies as engineered stormwater management areas would require the earthworks, ecological, landscape and freshwater effects of the development to be reassessed.

ISSUE 3 – RETENTION WETLAND OPERATION AND MAINTENANCE ACCESS

"I would direct consideration of these areas to stormwater management first as stated in Issue 2 above. Then clearly set boundary of land title around what is stormwater management, and what is ecology therefore providing clear delineation to support access and maintenance activities required by these stormwater systems." (paragraph 22)

Response:

The maintenance access corridors have been widened to 4.0 m in the current design, and the delineation of the maintenance zone will be shown on the subdivision plans at detailed design. The JWS also records that access to every outlet could not be agreed, as it was not considered feasible.

ISSUE 4 – STORMWATER MODELLING AND DOWNSTREAM FLOOD PONDING

"In Caucus the agreement was that the current Awa model was the best tool to respond to this question however it too has limitations on its suitability due to how it considers the lag and behaviour of Taupo Swamp. Lidar in that model is out of date to current information and all Parties agreed that any model run requires both these items to be updated. The Applicant post caucus has completed an initial run of this for future discussion with Tiaki Wai/GWRC" (paragraph 23)

Response:

The JWS does not record agreement that the Awa model is the correct tool. Rather, it records that the existing models are fit for their stated purposes, but neither could confidently answer the Panel's question without further modelling.

Our assessment is that:

- The development's Taupō catchment discharges enter the stream approximately 500m upstream of the Airlie Road culvert and must pass through that control and the full length of Taupō Swamp before reaching the downstream flood-affected areas.
- The James Street Farm catchment is physically separate catchment that contributes to the flooding noted in the Awa report. This is primarily caused by highway culvert and bridge blockages
- The proposed stormwater system attenuates peak flows within the sites stormwater management devices.

Accordingly, we do not expect the development to materially worsen flooding at James Street Farm. However, we acknowledge that the total runoff volume will increase and that, at the time of conferencing, neither model had demonstrated the downstream effect.

Following conferencing, Envelope extended the Awa model to include Taupō Swamp and offered to present the results in the JWS. This was not agreed by the other parties. The extended modelling has since been completed and shows no increase in downstream flood levels.

The assessment remains preliminary, as the Awa model was not developed specifically to assess changes in runoff volume through Taupō Swamp. Its build report notes that the swamp terrain was lowered and smoothed for calibration rather than based on surveyed levels, and that the model's reproduction of flood timing at the gauge was qualified. These limitations are relevant because swamp storage and timing govern whether additional upstream runoff affects downstream levels.

Despite these limitations, the Awa model is the only current tool available for this assessment, and the extended modelling indicates that the development will not worsen downstream flooding.

ISSUE 5 – SCALE OF ADDITIONAL DETENTION

"I have simply considered the Application and where it is sensible to lift the spillway height and therefore ultimate outlet height to contemplate additional storage opportunity." ... "This information has not been discussed in Caucus, however it is provided by me as independent with respect to Issue 5." (paragraph 25)

Response:

Raising the spillway and bund crests would provide additional detention above the current spillway level but would not reduce the total runoff volume. The same volume would reach the downstream catchment later. Whether that change in timing reduces, has no effect on, or potentially increases downstream flood levels is the question addressed under Issue 4.

The proposed ponds are not significantly space-constrained and retain flexibility at detailed design. Additional storage could be created by refining the pond geometry and shaping the pond floors, which are currently based on LiDAR ground information. This would generally be preferable to significantly increasing the bund heights.

Increasing the bund heights could introduce further engineering and environmental constraints, including:

- Dam safety and freeboard: The proposed basins already have embankment heights of approximately 5–6 m and storage volumes of approximately 5,600–11,500 m^3. Increasing their height and volume could require the dam classification, spillway capacity and freeboard requirements to be reassessed
- Higher bunds would require further assessment of embankment stability, foundation conditions and settlement against the ENGEO investigations, together with increased earthworks.
- A larger bund footprint would extend into proposed wetland planting and remediation areas.

Our position remains that the ponds are conservatively designed and there is limited benefit in increasing the bund heights without first demonstrating that additional detention is required. If further storage is necessary, the preferred approach would be to optimise the pond geometry and lower the pond floors through detailed design.

ISSUE 6 – ON-LOT STORAGE AND RE-USE TANKS

"Issue 1 identified that the most likely sediment source was the piped outlets from the development into the flow paths on the site. Caucus agreed that onlot tanks provide hydrological control." (paragraph 26)

Response:

The JWS records that appropriately designed on-lot tanks can, in principle, provide retention through re-use and extended detention. However, it does not demonstrate or quantify the extent of those benefits for this development.

The existing hillsides are expected to remain the primary source of sediment. Stormwater from the developed areas will be treated through rain gardens to remove TSS before entering the wetlands. Flow through the wetlands is also expected to occur primarily as shallow sheet flow rather than a channel flow. Accordingly, the piped outlets are not expected to be the most significant sediment source.

Extended detention within on-lot tanks is not preferred, as its benefit has not been quantified and any additional detention would be more effectively incorporated into the centralised ponds. Our position remains that on-lot tanks offer limited benefit across the development but could be used selectively in catchments where a specific retention benefit is demonstrated.

ISSUE 7 – RAIN GARDEN DESIGN CRITERIA

"The JWS is clear on the rain garden design criteria understood across New Zealand and I have no further comment to make upon that." (paragraph 30)

Response:

The JWS records disagreement on the design infiltration rate. GWRC and Tiaki Wai propose 30mm/hr, while we are prepared to adopt 87.5mm/hr if a Darcy's Law sizing criteria is adopted.

Our proposed rate is based on the midpoint of the Tiaki Wai WSUD Guideline's specified bioretention-media range of 100–250 mm/hr. Applying a 0.5 safety factor from Auckland Council GD01 to the midpoint of 175 mm/hr gives a design rate of 87.5 mm/hr.

GWRC and Tiaki Wai's proposed 30 mm/hr rate draws on Christchurch, Bay of Plenty and Waka Kotahi guidance and provides for long-term deterioration, clogging and maintenance. This rate reflects different regional conditions, including soil types and media specifications, and should not be treated as establishing a universal design rate for Wellington.

The JWS therefore records two different technical positions.

ISSUE 8 – WASTEWATER MODELLING AND DOWNSTREAM OVERFLOWS

"This approach is a reasonable approach to this question as initial development may simply require short main upgrades immediately below the site (as presented in the application) and only in time once the development grows to later stages more significant mitigation may be necessary once its discharge rates become more significant." (paragraph 32)

Response:

Since conferencing, we have completed the initial modelling using the updated model received from Tiaki Wai on 19 August 2026. The results support gravity servicing of the first 200 lots without bulk network upgrades or PS1 detention. No spill occurs during the six-month containment-standard event. At the one-year event, 100 lots produce no spill, while 200 lots produce a minor overflow of approximately 23.8m³ at PS13. This is recorded in the response and support memo to Minute 11.

Before development proceeds beyond 200 lots, the completed NGA wastewater model will be rerun. If it identifies a material worsening of network performance, the necessary bulk upgrades and/or PS1 detention will be implemented before further stages proceed.

The reserve lot for the wastewater detention device has been upsized to allow more future flexibility.

ISSUE 9 – ON-SITE WASTEWATER DETENTION AND SEPTICITY

"I would suggest this area is slightly larger than shown in this concept sketch to provide space for access, potential mitigation items like aerators, power and control systems, maintenance route etc. Albeit the idea of, and location of such an area presented in Caucus is reasonable." (paragraph 34)

Response:

Since conferencing, the lot for the wastewater detention device has been enlarged to provide space for access, aerators if required, power and control systems and a maintenance route. The location and area are considered appropriate.