HUTT CITY PROPOSED DISTRICT PLAN HEARING STREAM 7 – SUBDIVISION

SUPPLEMENTARY NOTE OF DIETER ENGEL – PDP/475.4 - Hydraulic neutrality – Continued

Submitter: Dieter Engel – PDP/475 , 10A Bloomfield Terrace, Lower Hutt

Hydraulic neutrality requires an accurate existing-condition baseline

There is one further issue that I think follows directly from my submission about hydraulic neutrality.

We can write a very good hydraulic-neutrality rule into the District Plan, but the rule will only work if the **existing-condition baseline against which future development is compared is accurate**.

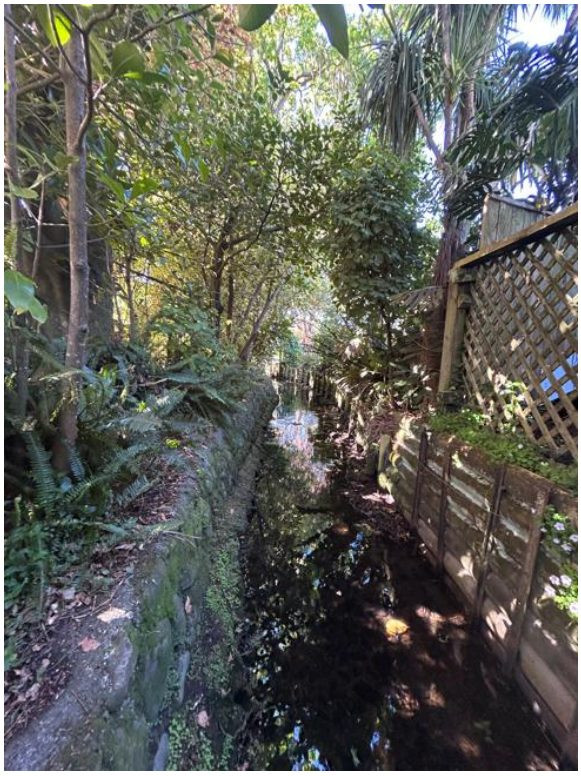
My own property at **10A Bloomfield Terrace** provides a useful example.



This is Hutt City's published flood mapping at my property. The map shows floodwater extending across my house and much of the site, including very substantial modelled depths.

The physical site does not appear flat. The Opahu Stream runs along the low eastern side of the property. My back lawn is above the stream and the land rises past the house toward the vehicle parking area on the western side. I estimate that the parking area is approximately 1.5m to 2m metres above the stream-bank level, although I do not have a topographical survey establishing the exact difference.

My wife and I bought this property in 1982 and have lived here for 44 years.



Stream at 10A Bloomfield Terrace



10A Bloomfield Terrace - Steps at back door



10A Bloomfield Terrace: Back lawn, stream on the left; steps at back door in foreground (right)



10A Bloomfield Terrace: the land rises about 1m up the side of the house from the back lawn on the east side of the house to the paved vehicle parking area on the west side of the house.

The previous owner told me when we purchased the house that the highest flood he had experienced during the 1970s came up to approximately the **top concrete step beside this eastern door**.

I cannot now establish that the event he was referring to was definitely the major storm of **20 December 1976**, although that is an obvious possibility.

That distinction is important. The 20 December 1976 storm was an exceptionally severe regional rainfall event. Hydrologist Graeme Horrell subsequently assessed the Pinehaven Stream flood from that storm as being of the order of at least a 1,000-year event in that catchment, and in excess of a 10,000 year event in Taita (181mm rainfall in 6 hours at DSIR rain gauge, Taita). That does not establish that it was a 1,000-year event here in the Opahu catchment, but it demonstrates how exceptional that regional storm was.

During the 44 years that I myself have lived here, the highest floodwater I have personally seen has reached only about the **second step**.

I therefore think there is a straightforward question that needs answering:

How does the modelled 1% AEP flood extent, which appears to inundate the whole house and extend substantially further upslope, reconcile with the actual flood history observed at this property over many decades?

I am not suggesting that personal observations alone replace hydraulic modelling. I am suggesting that a model intended to regulate individual properties should be checked against the best available real-world evidence.

Four reasons why I think that question needs investigation

First, the Eastern Lower Hutt modelling used what is described as **dynamic freeboard**. The Stantec report says the freeboard values were added to the maximum 1% AEP flood depths. Those depths were then imported back into a second 2D simulation after all subcatchments, 1D pipes and 1D river reaches had been deleted, and the water was allowed to redistribute over the terrain for five minutes.

That is very different from simply calculating the 1% AEP flood level and then adding a separate planning allowance above that level for a minimum floor level.

Greater Wellington's May 2025 Flood Hazard Modelling Standard now makes that separation explicit. It says that freeboard is applied when advising minimum building floor levels and that:

"Freeboard will not be included in mapped flood extents or depths."

Second, the Eastern Lower Hutt report identifies continuous flow and stage data for the **Waiwhetū Stream** at the Whites Line East gauge, but identifies no equivalent Opahu Stream flow gauge. Eastern Lower Hutt model build … The model was specifically calibrated against the Waiwhetū gauge using five significant historical flood events. Eastern Lower Hutt model build …

Third, although the wider Eastern Lower Hutt model was compared with observed flooding from the 2004 and 2016 events, I have seen no property-specific validation at 10A Bloomfield Terrace which demonstrates that the extraordinary mapped depth and extent here correspond with observed flood behaviour.

The model report itself warns against relying on it too closely at individual-property scale. It records that approximately 80% of asset inverts were unknown and required interpolation, and recommends reviewing asset information before undertaking detailed property-level assessments.

Fourth, the Waiwhetū Stream has had the benefit of a much stronger empirical record. The Eastern Lower Hutt model was calibrated specifically at the Waiwhetū gauge against five historical events. Greater Wellington has subsequently produced Waiwhetū flood-depth maps for events ranging from the mean annual flood through 5-, 10-, 20-, 50- and 100-year events, with explicit uncertainty runs for the larger events, including such matters as channel roughness and bridge blockage.

I think residents elsewhere in Lower Hutt should be entitled to the same basic standard: a model that is calibrated where possible, ground-truthed against actual floods, and transparent about the difference between modelled floodwater and planning allowances for uncertainty.

Why this matters to the Stream 7 hearing

This is not simply a disagreement about the flood map on my own property.

It goes directly to the hydraulic-neutrality provisions we are discussing in Stream 7.

Hydraulic neutrality is a **before-and-after comparison**. Council must establish what runoff, flows, volumes and flood behaviour exist before development and then determine whether the proposed development makes them worse.

If the existing-condition model is materially inaccurate, then that comparison is unreliable. An overstated baseline can mask or distort the additional effect of development; an understated

baseline can expose downstream properties to additional risk. Either way, the hydraulic-neutrality calculation is only as reliable as the baseline against which it is measured.

That is why I have proposed that the approved existing-condition or pre-development baseline be specifically identified and retained with the property record.

I would add that, where hydraulic modelling is relied upon to establish that baseline, it should be **validated against observed flood behaviour and gauged data where available**, and planning freeboard should remain separately identifiable rather than being treated as additional floodwater in the existing-condition baseline.

Otherwise we could have a District Plan which says very clearly that hydraulic neutrality is mandatory, but still fails to achieve hydraulic neutrality in practice because the starting point is wrong.

A wider example — Stokes Valley

The principle also matters beyond my own property. Development in an upper catchment may affect people and infrastructure a considerable distance downstream. Stokes Valley is an obvious example, where communities in Glen Road, Tawhai Street, Horoeka Street and Lowry Crescent, together with Hutt City infrastructure such as the Silverstream Landfill, can potentially be affected by changes in runoff from changes of land use further upstream. I am not asking this Panel to determine any particular development proposal. My point is simply that **hydraulic neutrality can protect downstream communities only if the pre-development baseline is independently reliable and the increase in both peak flow and runoff volume is genuinely prevented.**

Conclusion

I ask the Panel to ensure that SUB-S6 requires not only hydraulic neutrality, but a reliable and demonstrable existing-condition baseline against which hydraulic neutrality is assessed.