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RE: REZONING PROPOSAL FOR MONARCH'S RISE, KINGS HILL NSW -– BCS COMMENTS

Background

Torrent Consulting was engaged to provide flood risk management advice to support a proposed Planning Proposal (Rezoning) for Monarch's Rise, Kings Hill (the Site). Specifically, the Planning Proposal will seek to achieve the following:

1. Align Zone MU1 - Mixed Use with the lot layout envisioned under the Concept Masterplan and DA Approval (DA16-2013-599-1),

2. Extend Zone MU1 - Mixed Use over land zoned C2 – Environmental Conservation (about 2,300sqm) adjoining Newline Road, which is not Flood Prone, and

3. Reduce the Minimum Lot Size of Zone MU1 Mixed Use from 400sqm to 300sqm to achieve housing diversity in and around the neighbourhood centre and park.

Correspondence from the Biodiversity, Conservation and Science (BCS) Group of the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) (5 December 2024 ref: DOC24/842297) has raised potential isolation risks associated with long duration of inundation of main flood access routes to the Site. Accordingly, BCS has requested the following flood related considerations to be addressed:

- Demonstrate that future residents can reliably and safely self-evacuate in a manner consistent with the NSW SES's principles for evacuation.

Site Flood Access

The principal flood access route from the Site is northwards along Newline Road to Six Mile Road and the Pacific Highway. As part of the consent conditions for the existing Stage 1 approval (DA16-2013-599-1), Condition 16 (c) requires:

- *Road upgrades (as required) on Newline Road and Six Mile Road to provide a flood free access route with 1% (current day) AEP flood immunity from the Site to the Pacific Highway at locations D, K, Q and V in the BMT (2017) Kings Hill Flood Free Access Study (reference R.N20894)*

Accordingly, the proposed flood access provides for a minimum 1% Annual Exceedance Probability (AEP) flood standard.

Inundation along the flood access route for events in excess of the 1% AEP design flood magnitude may restrict Site access and provide for a period of isolation.

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Table 1 provides a summary of design peak flood levels at the Site derived from the Williams River Flood Study (BMT WBM, 2009) considering coincident Williams River and Hunter River flooding.

Table 1 – Design Flood Levels

Design Flood Event	Design Flood Level (m AHD))
1% AEP Williams River Event, 5% AEP Hunter River Event	4.55
5% AEP Williams River Event, 1% AEP Hunter River Event	4.68
0.5% AEP Williams River Event, 5% AEP Hunter River Event	4.67
5% AEP Williams River Event, 0.5% AEP Hunter River Event	5.15
PMF Williams River Event, PMF Hunter River Event	9.59

The dominant Hunter River flooding mechanism provides for the highest peak flood levels at the Site corresponding to 4.68m AHD for the 1% AEP event and 5.15m AHD for the 0.5% AEP event.

The Williamtown - Salt Ash Floodplain Risk Management Study and Plan (BMT WBM, 2017) established design flood conditions for mainstream flooding of the lower Hunter Estuary. This included an updated Flood Frequency Analysis (FFA) of the historical flood record at Raymond Terrace. The updated FFA provided for slightly higher design peak flood levels at Raymond Terrace in comparison with the Wiliams River Flood Study.

The modelled reach of the Williams River in the Williamtown - Salt Ash FRMSP does not extend to the Site. However, the Kings Hill Flood Free Access Review Study (BMT WBM, 2017) extrapolated a 1% AEP design flood level of 5.2m AHD for Newline Road flood access requirements based on the existing mapping. This corresponds to design flood level requirement under Condition 16 (c) in the Stage 1 DA approval providing for 1% AEP flood immunity for the Site access.

Potential Flood Isolation

As noted above, peak flood levels at the Site are dominated by the Hunter River flooding condition providing a backwater influence into the lower floodplain of the Williams River. This influence extends to approximately Seaham upstream of the Site.

The Hunter River catchment is some 21,500 km^2 compared to 1,100 km^2 for the Williams River. Accordingly, the potential extended isolation of the Site is predominantly driven by Hunter River flooding, with significantly shorter flood durations for events emanating from the Williams River.

The lower Hunter River floodplain is afforded a long flood warning time given the size of the basin with numerous flood level gauges incorporated into the formal flood warning system including Raymond Terrace and Maitland (Belmore Bridge).

Flood classifications in the form of locally defined flood levels are used in flood warnings to give an indication of the severity of flooding (minor, moderate or major) expected. These levels are used by the SES and BoM in flood bulletins and flood warnings. The flood classification levels are described by:

- Minor flooding: flooding which causes inconvenience such as closing of minor roads and the submergence of low-level bridges. The lower limit of this class of flooding, on the reference gauge, is the initial flood level at which landholders and/or townspeople begin to be affected in a significant manner that necessitates the issuing of a public flood warning by the BoM.

- Moderate flooding: flooding which inundates low-lying areas, requiring removal of stock and/or evacuation of some houses. Main traffic routes may be flooded.
- Major flooding: flooding which causes inundation of extensive rural areas, with properties, villages and towns isolated and/or appreciable urban areas flooded.

The Minor, Moderate and Major flood warning threshold levels at Raymond Terrace and Maitland are summarised in Table 3. The gauge height in metres corresponds to the elevation in metres above Australian Height Datum (AHD).

Table 3 – Flood Warning Levels (m AHD)

Warning Level	Maitland	Raymond Terrace
Minor	5.9	2.5
Moderate	8.9	3.1
Major	10.5	3.5

The Site flood access is noted as having 1% AEP design flood immunity for Hunter River flooding. The 1% AEP design event exceeds the Major Flood level at the respective gauges. The major flood level threshold at Raymond Terrace is above the design 5% AEP level of 3.2m AHD (BMT WBM, 2017) whilst the major flood level threshold at Maitland is above 10% AEP flood level of 10.4m AHD (WMAWater, 2010).

The BoM *Service Level Specification for Flood Forecasting and Warning Services for New South Wales and the Australian Capital Territory* (2015) provides a target flood warning time for quantitative flood level predictions of:

- Raymond Terrace - 18 hours prior to reaching 3.5m AHD trigger level (Major flood event classification)
- Maitland - 24 hours prior to reaching 7.1m AHD trigger level (between Minor and Moderate flood level classification).

The corresponding 1% AEP flood level at Raymond Terrace of 4.8m AHD and corresponding 1% AEP flood level at Maitland (Belmore Bridge) of 11.7m AHD are significantly higher and accordingly would be expected to have significantly greater flood warning time beyond a major flood level warning. It would be reasonable to expect that the Site will be afforded at least 24-hours of advance flood warning prior to the Newline Road access being subject to inundation for major Hunter River flooding.

The available warning time provides the opportunity for future residents of the Site to either:

- Have adequate provisions (e.g. food, water, medications etc) to safely remain in their homes for a potential extended isolation period (say up to 7 days)
- Relocate to alternative accommodation if the option to remain on Site is not appropriate for individual circumstances.

Given the available warning time and opportunity for appropriate response prior to flood affectation of Newline Road, it is considered the proposed development adequately manages the risks associated with potential extended isolation.

We trust that this letter report meets your requirements. For further information or clarification please contact the undersigned.

Yours faithfully

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References

BMT WBM (2009). Williams River Flood Study. Prepared for Dungog Shire Council and Port Stephens Council.

BMT WBM (2017). Kings Hill Flood Free Access Review Study. Prepared for Port Stephens Council.

BMT WBM (2017). Williamtown Salt Ash Floodplain Risk Management Study and Plan. Prepared for Port Stephens Council.

Bureau of Meteorology (2024) Service Level Specification for Flood Forecasting and Warning Services for New South Wales and the Australian Capital Territory – Version 3.15.

WMAWater (2010) Hunter River: Branxton to Green Rocks Flood Study. Prepared for Maitland City Council.