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ATT: Emma Butcher

7/02/2020

**EXHIBITION OF MODIFICATION REQUEST – FRASER DRIVE
RESIDENTIAL SUBDIVISION (MP 06_0243 MOD 5) – OBJECTION TO
APPLICATION**

A0001-10397160-AAR-01

Dear Emma

We are writing on behalf of Mr. William H Sullivan and Mr. Robert T Sullivan (herein referred to as 'our client') in relation to the recently submitted request to modify the Fraser Drive residential subdivision project approval. The development site is located within the Tweed Shire Local Government Area (LGA) and is located to the west of our client's property, commercially known as Pioneer Country (98 Fraser Drive, Tweed Heads South NSW 2486).

After reviewing the provided information in the submission, it is our concern that the proposed works will adversely affect the behaviour of stormwater discharging into our client's property. This may result in a loss of enjoyment and productivity of their land and existing commercial and rural uses.

We therefore write to object to the submitted development proposal above. Further details are provided herein:

Existing Guidelines

Current design guidelines, applicable to the submission state the following in relation to Stormwater Management:

Tweed Shire Council – Development Design Specification D5 Stormwater Drainage Design

The requirements for stormwater detention design are outlined in the Upper Parramatta River Catchment Trust On-Site Detention Handbook and Section 5.00 of QUDM

The development shall limit the maximum discharge rate to 200L/s/ha for all storm events up to and including the 100 ARI Storm event unless the following is demonstrated:

- a) The downstream (“minor” or “major”) drainage systems have utilised or uncommitted capacity greater than increased peak stormwater discharge from the subject site; and
- b) The drainage capacity planned for, or committed to other sites will not be consumed; or
- c) Written satisfactory arrangements with Tweed Shire Council have been made to augment the downstream drainage systems.

Where the downstream drainage system capacity is unable to accept an increased stormwater discharge without resulting in the following:

- a) Flooding, or
- b) Increase risk of danger or nuisance to other persons or property,
- c) Exceeding roadway flow width and depth limits.

Then permissible site discharge lower than 200l/s will be required.

Queensland Urban Drainage Manual (QUDM)

Utilisation of the Rational Method for determination of ‘peak’ stormwater discharge should **not** be considered appropriate for the use in the following circumstances:

- Assessment of catchments with significant floodplain storage, detention basins, or catchments with side-spread usage of on-site detention systems.

Background Notes to QUDM

- A new design procedure was introduced in the 2016 edition of QUDM for the initial sizing of detention basins. There is the risk that this simplified, preliminary basin sizing procedure could be used by some designers for the final design of detention systems.
- To avoid such risks, local governments may choose to not endorse this initial sizing procedure, but instead require detention systems to be initially sized using the final basin sizing procedures outlined in Section 5.6.2, i.e. through the use of numerical modelling.

A hydrologic method that generates a hydrograph must be adopted for the design of those components of the drainage system which are volume dependent, such as detention basins.

Upper Parramatta River Catchment Trust

The catchment OSD policy aims to ensure that subsequent developments will not increase flooding or stormwater flows at any downstream locations, in all flood events up to and including 100 year ARI.

Whilst specific to the Upper Parramatta River catchment the guideline states the following:

- Permissible site discharge (PSD) - 80 L/s/ha
- Detention Volume - 470 cubic metres per hectare (m³/ha) of storage is required to control runoff in all storms up to and including 100 year ARI events.

It also states the following:

The use of these two simple parameters avoids the need for complex calculations by the designer.

Proposed Design

Outlet Locations

Information associated with the application shows that the proposed development will have five discharge locations described as northern, eastern, south-eastern, southern, south-western (Drawing No. 7214/29/01-DA19). Stormwater detention basins upstream of these outlets will provide a retarding volume with a desired effect to attenuate runoff leaving the development.

Two (east and south-east) of the five outlets will directly discharge stormwater to the east, across Fraser Drive into Pioneer Country and are further discussed in this letter.

Relevant Reports

The application is supported by a letter prepared by Meinhardt Urban PTY LTD titled 'The Stormwater Management Plan - Revision C: East at Banora Point (Reference 118414 GC:RB).

The letter has been prepared as an amendment to, and based on recommendations documented in Cardno's Stormwater Management Plan Report titled "Proposed Development Lot 9 on DP1039569 Fraser Drive – South Tweed–Stormwater Management Plan" dated 8 December 2006.

Reasons of Concern

Eastern Outlet

This outlet is proposed to discharge stormwater across Fraser Drive to the east, into our client's property. Based on provided information the existing catchment area draining to this outlet has been increased from 8.8 ha in the existing case to 10.37 ha in the proposed (9.97 ha previously approved).

The letter states that, *'an increase in the size of the detention storage to the eastern discharge point is necessary to ensure no adverse impact due to the revised lot layout and for compliance with the original Site Based Stormwater Management Plan'*. The detention basin volume is initially sized using the Rational Method as outlined in the Cardno approved report. This calculation method is no longer supported by the latest revision of QUDM and therefore current best practice should be adopted for any resultant modifications.

The final adopted basin volume is calculated using the software XP-RAFTS in accordance with QUDM, however it is unclear how the existing and proposed imperviousness has been calculated. A table in the letter showing the catchment input parameters shows that the existing catchment (8.8 ha) has a pervious area of 5.28 ha and an impervious area of 3.52 ha which seems to correlate to the external area being 100% impervious and the site 100% pervious. Based on aerial photography, this relationship does not appear to be correct, which would lead to a higher prediction in existing flows being generated by the site.

In the developed case, for the same catchment, the relationship between pervious and impervious appears to be exactly the same as the existing case, 60% pervious to 40% impervious. It is unclear why this has not increased, to reflect current pasture site being developed with hardstand, roads and roofs. The current approach could be over estimating existing stormwater runoff rates and underestimating stormwater runoff rates

in the developed case, therefore reducing the amount of detention needed for the developed case to achieve objectives.

Notwithstanding the lack of changes in catchment imperviousness, it is unclear why 5mm has been adopted as the pervious area initial loss. QUDM Table 5.6.1 – Recommended initial loss values for use in sizing detention basins (*mm*) indicates that 5mm would only be applicable to Bare Soil (Soil Group D – Clay), which does not correlate to existing ground cover. A higher loss value would impact the calculation of existing flows leaving the site, likely to be less than currently predicted, therefore impacting on basin volume and outlet configuration.

The letter only provides 100 year ARI results and it is unclear if the basin has considered all recurrence intervals (2 year ARI to 100 year ARI) as recommended in QUDM and the UPRCT guides. From our experience, basin volume and outlet configuration arrangement can be significantly affected when all recurrence intervals are considered. It is concerning that smaller, yet more frequently occurring storm events have not been investigated and could be adversely affecting the downstream property.

Furthermore, the 100 year ARI results provided do not comply with Tweed Shire Council – Development Design Specification D5 Stormwater Drainage Design maximum discharge rate of 200L/s/ha. Results indicate a discharge rate of approximately 574L/s/ha.

Lastly the adopted basin volume provides a rate of approximately 135m³/ha which is low when compared to the UPRCT 470m³/ha. Whilst the UPRCT rate is adopted to the Upper Paramatta River Catchment and notwithstanding the fact that Tweed Shire Council – Development Design Specification D5 Stormwater Drainage Design refer to this guide, our experience indicated that a rate of approximately 350m³/ha would be expected for this area when all recurrence intervals are considered therefore reinforcing our concern that the proposed basin is undersized.

South-eastern Outlet

Whilst the letter states that proposed changes will not affect previously approved strategy it is unclear how pre-development flow rates will be maintained.

In addition to this uncertainty, there are unresolved issues associated with the existing cross drainage infrastructure capacity and downstream conditions at the eastern side of Fraser Drive. Any increase in flow would exacerbate the issue and we therefore seek for additional information to show this is not the case.

Conclusion

Based on the provided information and abovementioned discussion we are concerned that current assumptions and modelling approach could result in an overestimation of existing flows therefore a false objective for which to compare developed case flow rates to. This will inevitably cause the release of higher discharge rates than would current be experienced from the site's natural state. Thus, it is our concern that the proposed works will adversely affect the behaviour of stormwater discharging into our client's property resulting in a loss of enjoyment and productivity of their land and existing commercial and rural uses.

We recommend that modelling parameters are reviewed and a complete assessment of all recurrence intervals (2 to 100 Year ARI) undertaken to ensure current guides and planning policy are complied with.

Yours sincerely



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