Attachment 8

WEP Technical Note

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Date: 30 August 2024

Bengali Land Pty Ltd

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Attention: Pat Flanagan

Dear Pat,

Currunda Creek Trades and Services Precinct; DA 12781/2024 – Review of Public Submissions in relation to flooding and stormwater

We write to provide specialist advice in response to public submissions related to flooding received by Cairns Regional Council on your Development Application 12781/2024. The proposed development is located at 626R Redlynch Intake Road, Redlynch (the Site), upstream of the Redlynch Intake Road culvert crossing of Currunda Creek (the Culvert Crossing). The application is for Preliminary Approval for a variation request for MCU to facilitate the Currunda Creek Trades and Services Precinct and Development Permit for an ROL (1 lot into 2 and easements and a Preliminary Approval for an ROL (1 lot into 4 & road reserve/s and drainage reserve/s) and

This report has been prepared by Neil Collins, who has carried out flooding assessments in the Barron River Delta, Freshwater Creek and Currunda Creek over the last 35 years. Details are as follows.

1.0 Background

The Site is located in the lower catchment of Currunda Creek, with the Site located approximately 300 metres upstream of its discharge junction with Freshwater Creek. Currunda Creek has a catchment area of 749 hectares which is predominantly west of the Site. Freshwater Creek has a catchment area of 7,038 hectares to the Redlynch gauge at Mary Parker bridge. Currunda Creek experienced sever to extreme flooding and Freshwater Creek severe flooding on 26 March 2018, with a number of properties flooded and one reported case of overfloor flooding, and with severe damage to the Crystal Cascades Caravan Park and adjacent tennis courts. Severe bank collapse, erosion and deposition occurred in upper reaches of Currunda Creek, with a large flood debris load occurring, resulting in a "debris dam" building up on Redlynch Intake Road Culvert Crossing of the creek.

Neil Collins undertook an independent assessment of that event for Council and produced a detailed report by BMT in August 2018 outlining the investigation and the findings. The event was determined to be a 100 year ARI event in Freshwater Creek at the caravan park site, and more severe (slightly greater than a 100 year ARI event) in Currunda Creek. Major debris blockage on the Culvert Crossing exacerbated flooding locally in Currunda Creek and for approximately 300 m downstream of the Culvert Crossing.

BMT subsequently refined the flooding analysis and modelling for both Freshwater Creek and Currunda Creek for Council. BMT utilized that modelling to carry out a Flood Impact Assessment report dated 15 December 2022 as part of the development application for the Currunda Creek Trades and Services Precinct. That report includes the following:

The flood impact modelling results demonstrate that the filling of the site will result in less than 10mm impact on the peak flood levels external to the site… Small increases of up to 80mm do result on the Redlynch Intake Road for the 5%, 10% and 20% AEP events however in each event the depth of flooding over the road at the causeway crossing is already in excess of 700mm and is not trafficable. The serviceability of the road is therefore not impacted by this small increase in flood level. Notwithstanding this, it is anticipated that the impacts can be reduced during the detailed design phase of the assessment.

In addition, the report notes in terms of stormwater quality and management:

Management of stormwater flows has been considered and the following noted:

Mitigation of increased flows from the site is typically in the form of either on site detention basins or tanks, or on-line measures i.e. using any road crossings to attenuate flows.

The detailed design of the drainage reserve and local road drainage crossing will need to ensure suitable freeboard and immunity is maintained.

The design intent is clearly to ensure no significant adverse downstream or adjacent flooding impacts, with no increase in runoff flows, with filling and overbank works to ensure that all lots are above the 100 year ARI event. In addition, achieving flood storage balance is the preferred outcome.

2.0 Public Submissions in relation to Flooding and Stormwater

A number of submissions were received by Council, including the submission by Kelly Reaston Development Property Services on behalf of Kenneth and Karen Chapman. The Chapman property was adversely impacted by the March 2018 flood event, and is immediately downstream of the Culvert Crossing.

There were submissions received from residents of 9 properties which were likely affected by the March 2018 flood event downstream of or within 300m of the Culvert Crossing. There were also submissions from residents of 98 properties south of Currunda Creek which are not directly affected by Currunda Creek flooding; however their flooding concerns are likely to relate to the potential impacts of the development on the frequency and duration of closure of the Redlynch Intake Road Culvert Crossing of Currunda Creek. There are 1078 properties in total south of Currunda Creek which were affected by the closure of the Culver Crossing.

Given the damage and trauma caused by the March 2018 flood event, it is understandable that there is this degree of public interest, as any change of use or works in the catchment may be seen as having the potential to worsen flooding impacts from a similar event in the future.

Key concerns relating to flooding and water quality can be summarized as follows:

a. The application has not demonstrated adequate floodplain storage can be achieved;
b. It is poor planning practice to propose urban development / encroachment within the rural zone that relies on road infrastructure that is impassable in minor flood events;
c. The ability to rely on the flooding impacts of other industrial sites to establish appropriate site selection for the Site in a regional context is misstated;
d. The BMT flood impact assessment fails to adequately address downstream flooding impacts as it ignores the flood flow effects of debris blocking the Redlynch Intake Road Currunda Creek Culvert Crossing;

e. The proposed development could impact on the frequency and duration of closure of the Culvert Crossing; and
f. The proposed development will not adequately mitigate stormwater runoff water quality impacts due to the development.

3.0 Consideration of Public Submissions

In relation to the above key concerns, our considered responses are as follows:

a. The requirement for a floodplain storage balance can be and is usually a standard approval condition applied by Council. Floodplain storage and flow conveyance balance can be achieved by maintaining or enhancing conveyance capacity of the waterway and that the compensating earthworks (cut in the overbank areas) can also maintain flood storage capacity. Based on the preliminary development details, it is our view that these requirements can be readily achieved through the detailed design process prior to the issue of a Development Permit for future ROL or MCU.
b. The proposed access to the Site is north of the Culvert Crossing and a high immunity access is provided via the Redlynch Intake Road for all traffic heading to the Site from the north. Access from the south is affected by the immunity of the Culvert Crossing, which is significantly less than 5 year ARI currently. The Site access and internal roads propose a minimum 10 year ARI immunity. The design intent for the development is to have no significant adverse flooding impacts beyond the Site boundaries, including on the Culvert Crossing. This includes not affecting the Culvert Crossing flood immunity or the frequency and duration of road closures due to flooding.
c. This is a planning issue which will be addressed by others.
d. The proposed development will not add to flood debris loads and blockages on the Culvert Crossing. Provided the development ensures no significant adverse flooding impacts beyond the Site, including no increases in peak flood flow, there will be no adverse downstream flooding impacts. The August 2018 Independent Assessment Report noted that:

   'There was severe erosion and stream bank collapse in Currunda Creek, and there may have been land slips in the upper catchments of Currunda Creek and Freshwater Creek, downstream of the dam, which caused the very high debris and sediment load. It is important to appreciate that large debris loads in largely undeveloped forested catchments in the Wet Tropics is a natural phenomenon.'

   With proposed stream stabilisation works, including the revegetation of all drainage reserves through the Site which will impede floating debris movement, the development should not add to and may reduce the existing flood debris load. The developed area of the Site is only 8 hectares out of a 13 hectare site, which represents only 1% of the Currunda Creek catchment. As the development is at the bottom of the catchment, urbanised runoff from the overbank sections of the Site will result in a reduced response time over that for the existing grassed site, resulting in the developed site runoff getting away before the main creek flood peak arrives. In any case, on-site detention basins or tanks can be installed if required given the size of the lots to ensure no increase in existing creek flows.

e. This issue arises from existing upstream residents being isolated due to flooding of the Culvert Crossing. In some wet seasons there are several closures within a short period of time. During the March 2018 event, the Culvert Crossing was overtopped for several hours; however the flood damage and debris blockage repairs and clean-up took much longer to rectify. Modelling carried out for the August 2018 independent Assessment report that, '*dependent on the degree of debris blockage at the culverts and along the guard rails, peak flood levels over the road to the north of the crossing could increase by between 140mm and 900mm and to the south by between 100mm and 700mm*.' Modelling for the proposed development to date indicates that peak flood level increases due to the development on a similar size flood event would be no more than 10mm downstream of the Culvert Crossing, and that flooding on downstream properties is much

more sensitive to flood debris blockage on the Culvert Crossing than it is from impacts due to the development.

f. The proposed development contemplates large lots for trades and services. It is common industry practice for Council's to require in-lot water quality / stormwater management treatment that is particularly designed for the use. This could include oil separators, gross pollutant traps, bio-basins or proprietary filter cartridge systems for nutrient and sediment control. Council approval conditions could require load reduction targets to be met by each lot owner; but in any case, industry standard load reduction targets will need to be met for the overall development. An over-arching site based stormwater management plan will need to be prepared, with subsequent detailed plans prepared for each individual development. Such an approach will ensure that an acceptable water quality outcome will be achieved.

4.0 Suitable and Appropriate approval conditions

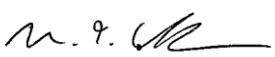
Given the early stage of the development process, subsequent refinement of the civil design, layout and flood and stormwater management will be required as the detailed design progresses, through subsequent Development Permit and Operational Works applications. No Site works can be carried out should the current application be approved.

To ensure that no worsening of flooding will occur beyond the Site, floodplain storage is maintained and to ensure suitable stormwater water quality standards for Site runoff is achieved, some suggested approval conditions outlined for Council's consideration are as follows:

a. A revised flood study by a suitably qualified RPEQ to update the BMT 12 December 2022 preliminary reporting is required to demonstrate no significant adverse off-site flooding impacts as well as no adverse impacts on Redlynch Intake Road Culvert Crossing time of closure and flood immunity will occur due to the proposed development. This includes flood level, flow and velocity considerations.
b. Detailed civil engineering calculations by a suitably qualified RPEQ demonstrating no loss of floodplain storage will result due to the development on all events up to the 100 year ARI (1% AEP) flood event in Currunda Creek.
c. An over-arching site based management plan for the entire development is required to demonstrate that a suitable stormwater management treatment train is proposed to demonstrate compliance with load reduction targets in accordance with the Cairns Plan Codes and State Government guidelines. Individual in-lot stormwater management plans are required to be prepared for each lot to specifically cater for the proposed use and development, and these lot based plans shall also demonstrate compliance with the required load reduction targets.

Please let me know if you require any further detail.

Yours faithfully



Water Engineering Partners Pty Ltd
Neil Collins BE (Civil), MEngSc - Expert advisor