

Our Ref: 19-000709

3 September 2019

Adams Consulting
3/28 Bougainville St
Manuka, ACT, 2603

Attention: Tony Adams

Dear Tony

Parkwood Planning Proposal - Flood Risk Assessment

BACKGROUND

Calibre has been engaged by Riverview Developments (ACT) Pty Ltd to carry out a flood risk assessment to address comments raised by NSW Office of Environment and Heritage (OEH) on the Parkwood Planning Proposal (PP.2014.01) submitted to Yass Valley Council.

PURPOSE OF REPORT

This report is written to provide additional flood risk management information to demonstrate compliance of the Parkwood Planning Proposal, currently with Yass Valley Council, with the provisions set out by the Ministerial Direction Section 9.1 Direction 4.3 and the NSW Floodplain Development Manual (2005).

Calibre has carried out an assessment of the following:

1. The impact of flooding on the proposed development.
2. The impact of the proposed development on flood behaviour (particularly downstream flood impacts as a result of potential encroachment, land use and land form changes).
3. Impact of flooding on the safety of people/users of the development for the full range of floods up to the PMF including issues linked with isolation and accessibility for emergency services.
4. The adequacy of design flood level estimates and analysis to support a suitable freeboard to manage uncertainty for the purpose of establishing a flood planning level and flood planning area.
5. The implications of climate change (particularly increased rainfall intensity) on flooding.

METHODOLOGY

Calibre collected existing data relevant to the area covered by the Parkwood Planning Proposal and Murrumbidgee River, which included: digital terrain data, proposed rezoning information, flood extents along Ginninderra Creek as reported by Jacobs (West Belconnen Hydraulic Modelling Updated report, dated 18 July 2016), and existing flood data along Murrumbidgee River. This data was then overlaid to produce a flood map which shows the susceptibility of the proposed development to flooding. See Figure 1 – Flood Risk Plan enclosed.

Calibre approached Yass Valley Council, NSW State Emergency Services, and the National Library of Australia to obtain existing flood data for the Murrumbidgee River. However, no flood information along the Murrumbidgee River specific to the area of Parkwood was available. Since the cross sectional area and longitudinal grade of the Murrumbidgee River do not change abruptly, it was assumed that the hydraulic energy losses along the downstream portion of the river (i.e. northwest of the NSW-ACT border) is consistent with what can be observed upstream (i.e. southeast of the NSW-ACT border). Therefore, Calibre used the Murrumbidgee River Hydrology prepared by the Department of Housing and Construction ACT Region, which shows the upstream flood levels down to the NSW-ACT Border, to extrapolate the 1% Annual Exceedance Probability (AEP) Level, Probable Maximum Flood (PMF) Level, and Flood Planning Level along the Murrumbidgee River north west of the NSW-ACT border.

The Murrumbidgee River's extrapolated flood extents and Ginninderra Creek flood extents are shown in Figure 1 – Flood Risk Plan.

FLOOD RISK ASSESSMENT

This section aims to address the comments raised by OEH on the Parkwood Planning Proposal:

1. The impact of flooding on the proposed development.

It can be observed from Figure 1 that the flooding along the Murrumbidgee River only encroaches into the Environmental Conservation Zone, and is well below the General Residential Zone (R1). There is at least 35 metres difference in elevation between the PMF level and the nearest General Residential Zone (R1). It is therefore considered that the impact of flooding on the proposed development from the Murrumbidgee River is irrelevant.

The 1% AEP Flood Level and Flood Planning Level along Ginninderra Creek are contained within the Environmental Management Zone (E3) and Environmental Conservation Zone (E2), while the PMF level encroaches into some of the areas identified as General Residential Zone (R1). Special consideration should be given to essential community facilities and critical infrastructure services within the General Residential Zone (R1), which is below the PMF level.

2. The impact of the proposed development on flood behaviour (particularly downstream flood impacts as a result of potential encroachment, land use and land form changes).

Flood mitigation measures such as stormwater detention basins will be implemented as part of the development to alleviate downstream flood impacts due to the development.

3. Impact of flooding on the safety of people/users of the development for the full range of floods up to the PMF including issues linked with isolation and accessibility for emergency services.

Where the General Residential Zone (R1) is below the PMF level, special consideration should be given to essential community facilities and critical infrastructure including key access routes.

4. The adequacy of design flood level estimates and analysis to support a suitable freeboard to manage uncertainty for the purpose of establishing a flood planning level and flood planning area.

The Floodplain Development Manual states that a 0.5m freeboard is normally added to the 1% AEP flood level to determine the Flood Planning Level (FPL) for residential zones. In the "West Belconnen Hydraulic Modelling Update" report, dated 18 July 2016, Jacobs adopted a 1m freeboard to account for uncertainties in inflow data that they have used in the flood modelling of the Ginninderra Creek. Calibre considers this to be acceptable.

5. The implications of climate change (particularly increased rainfall intensity) on flooding.

Australian Rainfall and Runoff 2016 states that affects to rainfall intensities within Australia vary spatially, and that by 2070 there may be a 40% increase in intensity for the 24 and 72 hour events within the Queensland-New South Wales border. Adopting this information, Calibre estimated the increase in the 1% AEP flood levels along the Murrumbidgee River and the Ginninderra Creek, at the locations shown in Figures 2 and 3, to be approximately 1.5m and 0.5m respectively, by year 2070.

Figure 2 shows that the 1% AEP flood level along the Murrumbidgee River, at the location of the cross section, could increase from 435.731m AHD to 437.161m AHD due to climate change. This increase of ~1.5m in the 1% AEP flood level is still well below the proposed development.

Figure 3 shows that the 1% AEP flood level along the Ginninderra Creek, at the location of the cross section, could increase from 537.982m AHD to 538.445m AHD due to climate change. This increase of ~0.5m in the 1% AEP flood level is still below the adopted Flood Planning Level for the proposed development.

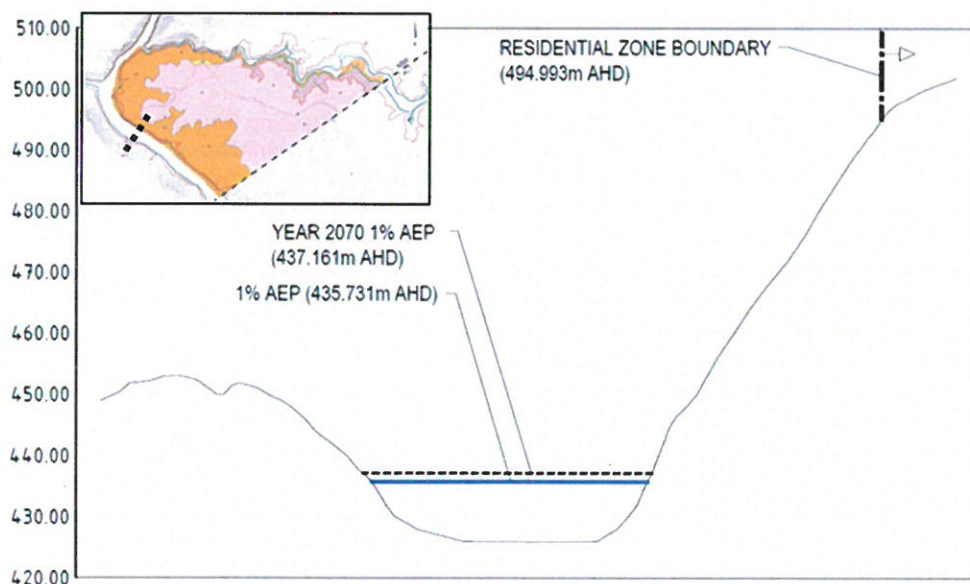


Figure 2. Section along Murrumbidgee River

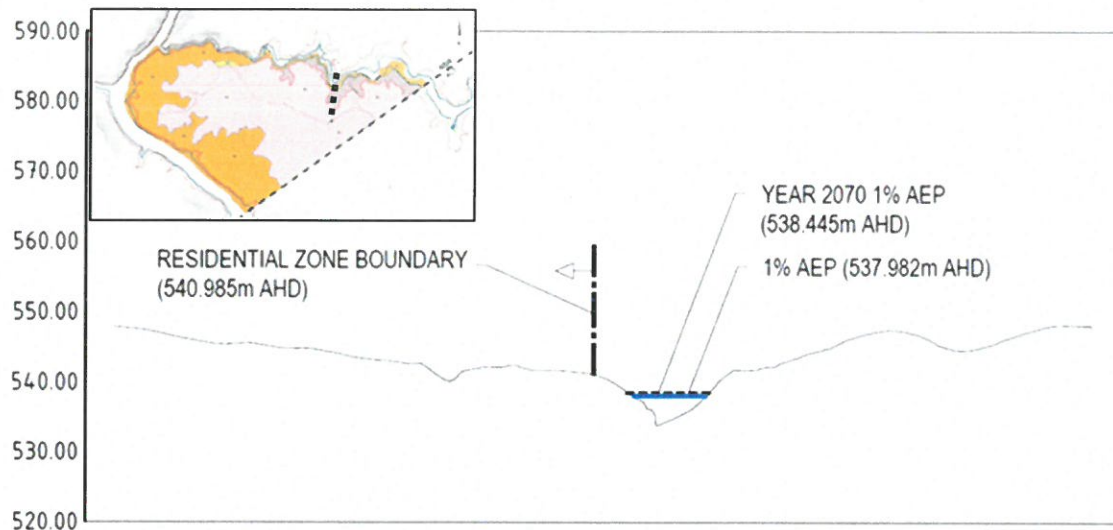


Figure 3. Section along Ginninderra Creek

CONCLUSION

Calibre has carried out a flood risk assessment on the proposed planning proposal to demonstrate its compliance with the provisions set out by the Ministerial Direction Section 9.1 Direction 4.3 and the NSW Floodplain Development Manual (2005). Calibre collected and used current existing data on Murrumbidgee River and referenced the Jacobs 18 July 2016 Report on Ginninderra Creek (West Belconnen Hydraulic Modelling Update) to conclude that the future development is above the 1% AEP Flood Level and the Flood Planning Level. However, some of the land zoned as General Residential Zone (R1) is below the PMF level. Development within these areas should not include essential community facilities and critical infrastructure.

Key consideration should be given to access routes to ensure that residential areas below the PMF level can safely be evacuated during an extreme storm.

Yours sincerely

Calibre Professional Services Pty Ltd


Neil Luzano
 Engineer - Water & Environment


Ralf Sieberer
 Regional Leader – ACT and Victoria

ATTACHMENTS

1. Figure 1: Flood Risk Plan

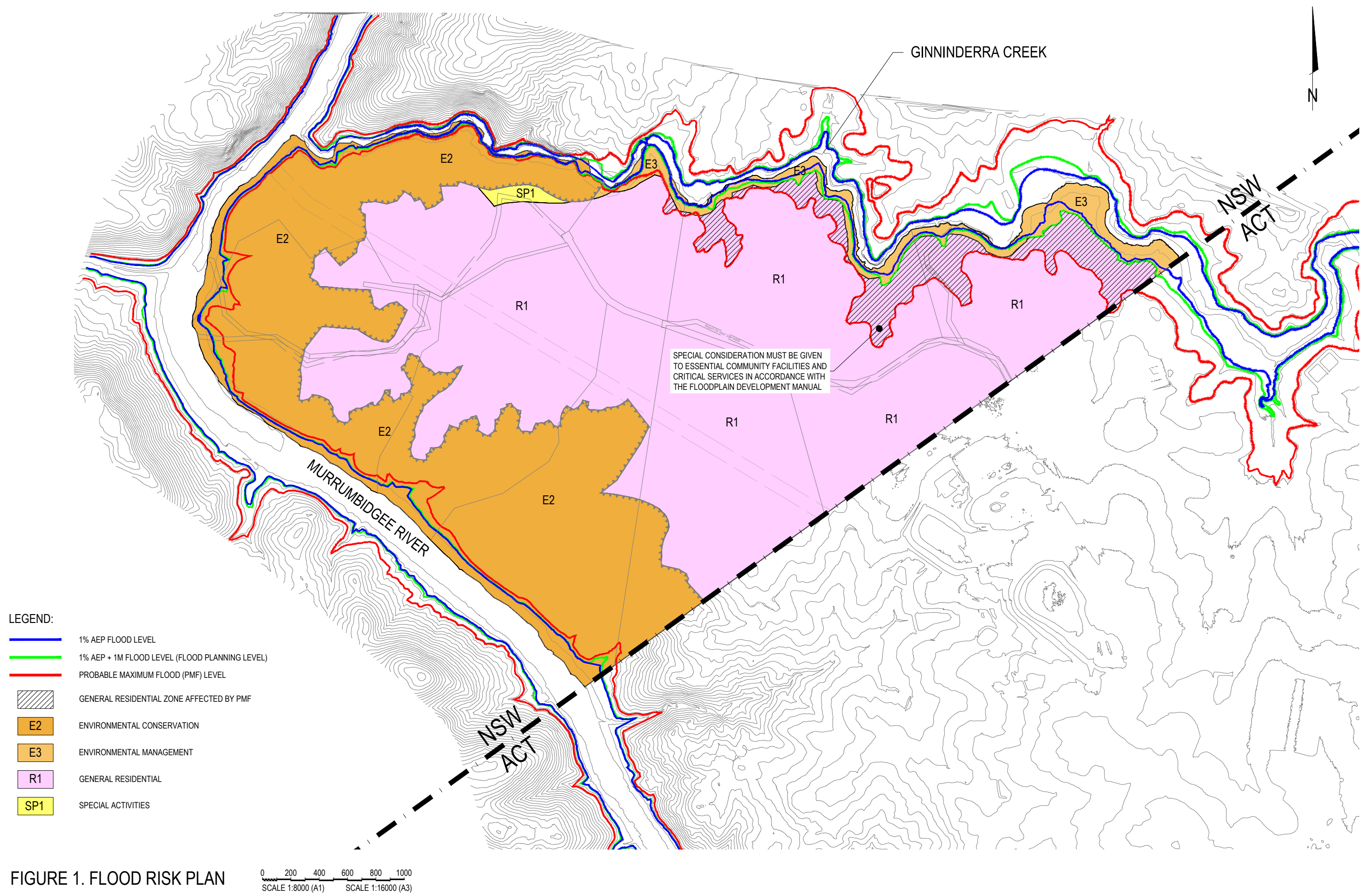


FIGURE 1. FLOOD RISK PLAN