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Salvestro Planning
PO Box 783
Wagga Wagga, NSW
2650

10 September 2020

Attention: Mr K Hyde

Dear Kyan,

Re: Preliminary Flood Constraints Information for 58 Plumpton Road, Springvale

Thank you for contacting WMAwater in regard to flooding constraint information for the property located at the above referenced address. The site is zoned as Large Lot Residential (R5) as per the Wagga Wagga Local Environmental Plan (LEP) 2010. Due to the size of lots in this area, subdivision into large rural lots is common. A similar subdivision is proposed for the site. A number of surrounding lots have already been subdivided or have approval to do so. It is important to consider the flooding constraints for the site in the context of the broader cumulative development that is occurring.

The site is subject to inundation from overland flow, which is typically shallower than mainstream flooding, the site sits within the broader Stringybark Creek system moving in a northerly direction. The Wagga Wagga Major Overland Flow Floodplain Risk Management Study (MOFFRMS; WMAwater, ongoing) (Reference 1), defines existing design overland flood behaviour at the site. The information derived from that study is the most up to date representation of flood behaviour available. While not yet adopted, Council approval to utilise the results of this study was granted on the 13th August 2020 (phone, C. Atkinson).

1. SITE LOCATION AND TOPOGRAPHY

The primary site is located at 58 Plumpton Road in the western portion of the Stringybark Creek – Lake Albert catchment. The surrounding sites (including those to the south and those fronting Brindabella Drive) to be considered as part of the constraints analysis include:

- Lot 6 DP 243027, 60 Plumpton Road
- Lot 51 DP 1220118, 58 Plumpton Road
- Lot 52 DP 1220118, 58A Plumpton Road
- Lot 328 DP 1222593, 117 Brindabella Drive
- Lot 331 DP 1222593, 103 Brindabella Drive
- Lot 333 DP 1222593, 101 Brindabella Drive
- Lot 330 DP 1222593, 1 Belmore Place

- Lot 329 DP 1222593, 3 Belmore Place
- Part Lot 334 DP 1222593, 6 Belmore Place
- Lot 332 DP 1222593, 4 Belmore Place

There are currently nine existing dwellings across the sites.

Ground levels within the sites are, for the most part, above 200 mAHD, and rise gently away from Plumpton Road and Brindabella Drive, the low point of the sites being at the intersection of these streets, sitting at 199.3 mAHD. The highest point is approximately 203.5 mAHD on the north western corner of 58 Plumpton Road.

2. DESIGN FLOOD BEHAVIOUR

2.1. Design Flood Depth

The site is subject to shallow overland flow as defined by the Wagga Wagga Major Overland Flow Floodplain Risk Management Study. Peak design flood depths and levels are provided on Figure 1to Figure 6 for the 5% AEP, 1% AEP and 0.2% AEP events respectively, using results from Reference 1. The extent of the PMF event is also shown on Figure 3. The primary and surrounding sites are partially inundated by shallow overland flow moving in a northerly direction to join Stringybark Creek approximately 300m north of Brindabella Drive. The western portions of the sites remain flood free up to and including the PMF event.

A maximum flood depth of 0.37m occurs in the 1% AEP event immediately adjacent to the existing dwelling on the 58 Plumpton Road site, with depths across other areas typically around 0.2m. Across the adjacent sites a maximum flood depth of 0.4m occurs adjacent to the dwelling at 1 Belmore Place. Similarly, depths are typically around 0.2m across the remaining areas and increasing to 0.3m across the sites fronting Brindabella Drive. The deepest section of the flow path moves in a northerly direction, set back approximately 100m from Plumpton Road. Adjacent to 58 Plumpton Road, depths on Plumpton Road are less than 0.1m, with small deeper sections of up to 0.46m and 0.57m to the north and south, respectively.

Similar flow behaviour is observed in the 5% and 0.2% AEP events, with depths typically less than 0.15m in the 5% AEP event and less than 0.3m in the 0.2% AEP event. There is not a significant change in the overall flood extent with an increase of approximately 20m between the 5% AEP and PMF events.

Of the existing nine dwellings, four are within the flood extent and included within the existing flood model developed as part of Reference 1. Impacts associated with these four dwellings are included in the existing design flood behaviour defined by Reference 1. The relatively shallow depths across the sites mean that significant fill will not be required in order to achieve required flood planning levels, likely minimising broader flood impacts.

2.2. Hydraulic Hazard

Hazard classification plays an important role in informing floodplain risk management in an area as it reflects the likely impact of flooding on development and people providing a measure of potential risk to life and property damage from flooding. Hydraulic hazard is typically determined by considering the depth and velocity of floodwaters. In recent years, there have been a number of developments in the classification of hazards. Research has been undertaken to assess the hazard to people, vehicles and buildings based on flood depth, velocity and velocity depth product.

This classification provides a more detailed distinction and practical application of hazard categories, identifying the following 6 classes of hazard:

- H1 – No constraints, generally safe for vehicles, people and buildings;
- H2 – Unsafe for small vehicles;
- H3 – Unsafe for all vehicles, children and the elderly;
- H4 – Unsafe for all people and all vehicles;
- H5 – Unsafe for all people and all vehicles. All building types vulnerable to structural damage. Some less robust building types vulnerable to failure. Buildings require special engineering design and construction; and
- H6 – Unsafe for all people and all vehicles. All building types considered vulnerable to failure.

The relatively shallow depths across the sites mean that the hydraulic hazard for the 5% AEP, 1% AEP and 0.2% AEP events is consistently H1 – generally safe for people, vehicles and buildings, with maximum small pockets of H2 – unsafe for small vehicles, along the central slightly deeper portion of the flow path. These categorisations indicate that the flood behaviour is generally safe for vehicles, people and buildings and is not likely to impose risk to life or property damage in the 1% AEP event.

2.3. Hydraulic Categories

Hydraulic categorisation of the floodplain is used in floodplain risk management to assist in the assessment of the suitability of future types of land use and development. Hydraulic categorisation involves mapping the floodplain to indicate which areas are most important for the conveyance of floodwaters, and the temporary storage of floodwaters. The Floodplain Development Manual (Reference 2) defines land inundated in a particular event as falling into one of the three hydraulic categories listed in Table 1. Typically, development within floodway or flood storage areas would be likely to push water into other areas and redistributing the flood risk, unless the development is carefully designed to avoid these impacts. Development therefore sited within Flood Fringe areas is unlikely to broadly impact on flood behaviour.

Table 1: Hydraulic Categorisation Definitions (*Floodplain Development Manual* (Reference 2))

Category	Definition
Floodway	• Those areas where a significant volume of water flows during floods; • Often aligned with obvious natural channels; • Areas that, even if only partially blocked, would cause a significant increase in flood levels and/or a significant redistribution of flood flow, which my adversely affect other areas; and • Often, but not necessarily, areas with deeper flow or areas where higher velocities occur.
Flood Storage	• Parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood; • If the capacity of a flood storage area is substantially reduced, for example by the construction of levees or by landfill, flood levels in nearby areas may rise and the peak discharge downstream may be increased; and • Substantial reduction of the capacity of a flood storage area can also cause a significant redistribution of flood flows.
Flood Fringe	• Remaining area of land affected by flooding after floodway and flood storage areas have been defined; • Development in flood fringe areas would not have any significant effect on the pattern of flood flows and/or flood levels.

Large areas of the sites are classified as Flood Fringe (or flood free) and development within these areas is unlikely to result in broader flood impacts on other areas. A portion of the site is classified as Flood Storage, however it is noted that two dwellings already exist through this area, limiting the remaining areas, classified as Flood Storage, available for development. The large areas of Flood Fringe and flood free land provide a number of opportunities for development that is unlikely to impact on the broader flood behaviour.

3. FLOOD PLANNING AREA

The flood planning area (FPA) is defined in Reference 1 and refers to the area to which flood related planning and development controls are applied. The Draft Flood Planning Area shown in Reference 1 is provided in Diagram 1 below. The 1% AEP flood levels are shown on Figure 5.

Diagram 1 – Draft Flood Planning Area

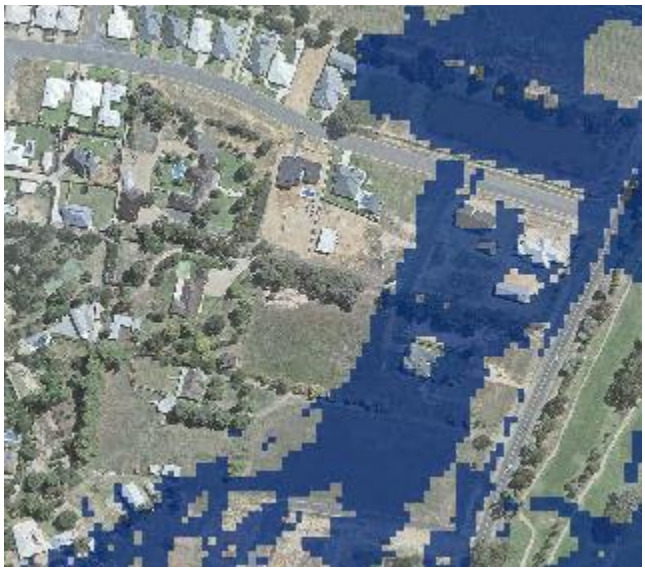

Diagram 1 indicates that only a portion of the sites is included in the FPA. Considering the relatively shallow flood depths across the sites and careful consideration of the location of proposed dwellings, the likely fill requirements to meet the flood planning level can be minimised. It is noted however that depending on the type of development, other controls may be applied between the FPA extent and the PMF extent, though this area is limited due to the small scale between flood events at the site.

Flood levels during the 1% AEP event vary across the site from 203.3 mAHD in the south western corner to 199.6 mAHD at the northern eastern corner fronting Brindabella Drive and Plumpton Road.

4. EVACUATION CONSTRAINTS

Overland flooding is typically of short duration however if evacuation from the sites is required egress from the site to the north via Plumpton Road is restricted due to road inundation in events as frequent as the 5% AEP, with flooding over the road to depths of up to 0.4 m just north of the sites. This depth increases to 0.5m and 0.7m in the 1% AEP and 0.2% AEP respectively. Access to the south is also restricted by greater flood depths. This indicates that evacuation to the north and south is unlikely to be safe even in moderate flood events, and that evacuation to the west is likely to be the safest option, if required from the proposed development.

5. SUMMARY

A review of the existing flooding constraints has been undertaken for 58 Plumpton Road and surrounding sites. There are currently nine dwellings across the sites. The area is subject to shallow overland flow with maximum depths of inundation up to 0.4m in the 1% AEP event. The relatively shallow depths across the sites mean that significant fill will not be required in order to achieve required flood planning levels, likely minimising broader flood impacts.

The relatively shallow depths across the sites mean that the hydraulic hazard for the 5% AEP, 1% AEP and 0.2% AEP events is consistently H1 – generally safe for people, vehicles and buildings, with maximum small pockets of H2 – unsafe for small vehicles, along the central slightly deeper portion of the flow path. These categorisations indicate that the flood behaviour is generally safe for vehicles, people and buildings and is not likely to impose risk to life or property damage in the 1% AEP event.

Large areas of the sites are classified as Flood Fringe (or flood free) and development within these areas is unlikely to result in broader flood impacts on other areas. A portion of the site is classified as Flood Storage, however it is noted that two dwellings already exist through this area, limiting the remaining areas, classified as Flood Storage, available for development. The large areas of Flood Fringe and flood free land provide a number of opportunities for development that is unlikely to impact on the broader flood behaviour. Development entirely within the limited Flood Storage areas should give consideration to possible impacts on flood behaviour.

Should you require any further clarification, please do not hesitate to contact the undersigned.

Yours Sincerely,
WMAwater

Erin Askew
Director

Figures:

References

1 WMAwater
Draft Wagga Wagga Major Overland Flow Floodplain Risk Management Study and Plan
Wagga Wagga City Council, Ongoing

2 Floodplain Development Manual
NSW Government, 2005