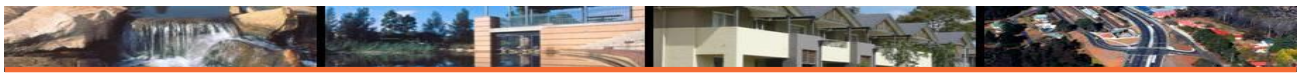

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Our Ref: 110512-04-ECQ Stage 3 Flood Assessment Letter.docx

21 December 2020

Frasers Property Group Australia
PO Box 3664
Rhodes NSW 2138

Attn: Raj Sharma

Subject: Eastern Creek Quarter;
Stage 3 Preliminary Concept Flood Assessment Letter

Dear Raj

This letter provides an overview of the flood constraints being considered in the preliminary concept design of the Eastern Creek Quarter (ECQ) Stage 3 development. Our assessment considers the findings of the rezoning reports prepared for the site in 2013 and 2014 by J. Wyndham Prince, together with the Eastern Creek Business Hub Stage 1 Construction Certificate Flood Letter also prepared by J. Wyndham Prince in December 2018 and provides advice on the current ECQ Stage 3 concept development layout.

The concept layout for ECQ Stage 3 is provided in Plate 1 below.

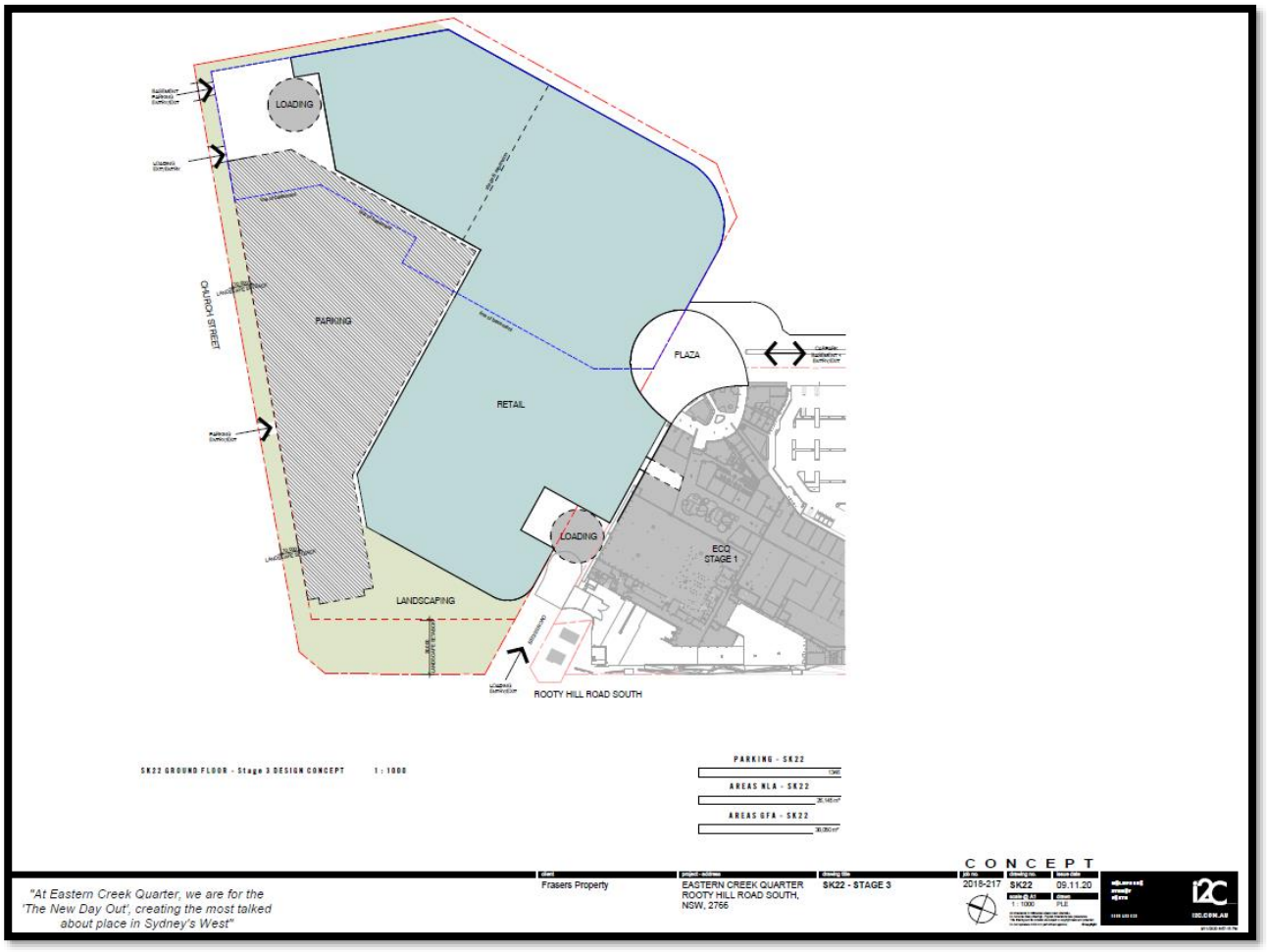

Plate 1 – ECQ Stage 3 Concept Plan

1. BACKGROUND

1.1. Eastern Creek Business Hub – Water Cycle Management Strategy Report Incorporating Water Sensitive Urban Design Techniques (JWP, March 2013)

The Water Cycle Management Strategy report was prepared to inform and integrate with the State Significant Development Application process for the Eastern Creek Business Hub site. The strategy consists of a treatment train consisting of on lot treatment, street level treatment and subdivision / development treatment measures.

The ECQ Stage 3 portion of the site was then identified as the Northern Catchment Stage 2 development in the Indicative Layout Plan (ILP) for the site.

The hydrology modelling confirmed that post development case peak discharges up to the 1% AEP (100 year ARI) storm event from the site can be managed to existing levels via on-lot detention management in the order of 430 m³/ha of developed area. As we understand it, two (2) detention basins (designed by others) have already been constructed in the eastern portion of the site and will provide the required detention management for the broader site.

An upstream catchment of approximately 35 ha was identified as draining to the site. The majority of this catchment (30.6 ha) was identified as discharging toward the southern portion of the site. A grass lined channel was sized to convey post-climate change flows from the upstream catchment through the site. The remaining upstream catchment (approximately 4.4 ha) would need to be considered in the northern portion of the site.

The report noted that the development would be above the regional Probable Maximum Flood (PMF) level of 38 m AHD at the northern culvert Crossing of the M7 Motorway and that a local PMF assessment had not been undertaken. Given the likely flash flood nature of a local PMF event in an urban catchment, little warning time would be available. The need for continuous rising grade evacuation was noted, and a number of potential evacuation routes were identified.

The report concluded that the Water Cycle Management Strategy for the developed site provides a basis for the detailed design and development of the site to ensure that the environmental, urban amenity, engineering and economic objectives for stormwater management and site discharge are achieved.

1.2. Eastern Creek Business Hub – Local Probable Maximum Flood Assessment (JWP, June 2014)

The PMF flood assessment was prepared to address comments received from the Office of Environment and Heritage during the Public Exhibition phase of this development.

An investigation of the existing drainage arrangement noted that most of the upstream catchment would discharge to the site via an existing 2 x 750 mm diameter culvert crossing of Rooty Hill Road South (RHRS) near Cable Place, with flows in larger storm events overtopping RHRS at a localised low point and entering the site. An existing channel within the site conveys these flows through the site to a relatively large culvert under the M7 Motorway in the East. The investigation noted that a smaller upstream catchment would discharge through the northern portion of the site near the alignment of Beggs Road, and ultimately discharge under the M7 Motorway via a second relatively large culvert in the east.

The development of the northern portion of the site was anticipated to be approximately 7.9 hectares in size and consist of bulky goods/commercial sites. A TUFLOW model was prepared for the site and the local PMF extents, depths, levels and hazards were mapped for the site. The underlying terrain information utilised photogrammetry and detail survey data, together with a series of terrain modification reflecting the anticipated development within the TUFLOW model.

The results indicated that the majority of the site was located within a low flood hazard zone. There were some high hazard areas within car parking areas, channels and the far eastern extents of the site. High flood hazard in portions of Beggs Road were noted. It was anticipated that the built form of the northern portion of the site might change, however it was assumed that the Beggs Road alignment would convey the bulk of the flows and therefore the final built form of the northern portion of the site was not anticipated to have any material effect on PMF extent and hazard categorisation.

The report concluded that the risk to life throughout the development is low, and that the flood evacuation strategy outlined in the Water Cycle Management Strategy (JWP, 2013) remains valid.

1.3. Eastern Creek Business Hub – Local Probable Maximum Flood Assessment Update (JWP, August 2018)

To support the bulk earthworks stage of the site, Frasers Property Australia engaged J. Wyndham Prince to update the Local Probable Maximum Flood Assessment (JWP, 2014) to address the condition B3 of the development consent (SSD-5175) for the bulk earthworks on the site. Condition B3 required the following to be addressed in accordance with the NSW Floodplain Manual (2005):

- Rare floods between 1 in 100-year event to the probable maximum flood event;
- Impact of development on flood behaviour, levels, velocities, duration on adjacent and upstream areas;
- Impact of flooding up to the probable maximum flood event on the proposed development; and
- A sensitivity analysis to determine the impact from climate change.

The conclusions of the 2018 investigations were:

- In a PMF storm event, the depth of flooding within the proposed development is generally less than 0.5 metres. The depth in the far eastern extents of the development is up to approximately 2.4 metres as a result of the downstream culvert capacity being exceeded.
- Flood difference mapping indicated that there would be no flood impacts external to the site due to the proposed bulk earthworks development in a PMF event, and therefore it was also concluded that impacts would not occur in a more frequent (but still rare), smaller magnitude flood event such as a 1% AEP.
- The flood hazard mapping undertaken in accordance with Australian Rainfall and Runoff 2016 demonstrated that the majority of the proposed development is located within a low flood hazard H1 zone which is generally safe for people, vehicles and buildings.
- High flood hazard in the Beggs Road alignment and the channel in the southern portion of the site were identified, and it was recommended that occupants of the northern portion of the site evacuate to the north on foot or by vehicle to Rooty Hill Road South.
- The flood evacuation strategy previously outlined in the Water Cycle Management Strategy (JWP, 2013) to evacuate the site remains valid, and recommendations on pedestrian evacuation routes were provided.
- Given that an appropriate flood evacuation strategy is feasible in an extreme local PMF flood event, climate change sensitivity and testing of other rare events between the 1% AEP and PMF event were not considered necessary.

1.4. Eastern Creek Business Hub – Stage 1 Construction Certificate Flood Letter (JWP, December 2018)

J. Wyndham Prince were engaged by Frasers Property Group Australia to update the TUFLOW flood model for the site to specifically address Condition B26 of Development Consent SSD 8588 (20 July 2018) for the Stage 1 development of the site.

The report concluded that:

- the finished floor levels adjacent to the drainage network and ponded areas would need to be 44.3 m AHD to provide the required freeboard to the internal drainage infrastructure.
- overland flood protection in both Rooty Hill Road South and Beggs Road with a minimum freeboard of 0.3 m to the adjacent 1% AEP overland flood level would need to be provided to support the internal civil works assumption that overland flows external to the site would not enter the site.
- if alternate evacuation routes were provided to the south of the Stage 1 site, safe evacuation in an extreme PMF flood event could be managed via a route 1000 mm above the adjacent PMF flood levels.

While not the focus of the Stage 1 assessment, this is the most recent approved flood mapping for the ECQ site and confirms that the Beggs Road alignment would convey external catchment flows through the site to the east. The Beggs Road overland flow will need to be considered in the ECQ Stage 3 drainage design.

2. ECQ STAGE 3 DEVELOPMENT AND FLOOD CONSTRAINTS

The proposed ECQ Stage 3 development includes retail development and parking and will form an extension of the existing Stage 1 development located just south of Beggs Road. The extent of development is generally consistent with the Indicative Layout Plan (ILP) considered in the Rezoning Assessment (JWP, 2013) and subsequent PMF Flood Assessment (JWP, 2014), however the nature of the built form is somewhat different.

Given that the Beggs Road alignment has been identified in previous studies as being an important major overland flow path through the site, the design will need to give careful consideration to how these flows are managed through the site.

The Stage 3 concept design proposes a loading dock on Beggs Road and a retail building adjacent to the existing Stage 1 development. Overland flow could be conveyed via an open channel or trunk drainage culverts under or beside the buildings. The drainage design will need to consider the potential for blockage and ensure that the anticipated flows up to the PMF event are safely managed to ensure safe pedestrian and vehicular evacuation from the loading dock off Beggs Road can be achieved.

The conveyance of Beggs Road overland flow under the proposed Plaza and via the future basement carpark entry will also need careful consideration. As we understand it, the basement carparking will be at grade and open on the eastern side, so floodwater entering the basement can likely be managed safely via the drainage design, with appropriate consideration given to vehicular and pedestrian evacuation needs.

A refined catchment assessment of flows entering Church Street will form part of the future flood assessment. These flows will need to be considered in the Church Street drainage design to ensure that flows are managed appropriately and allow for the safe evacuation of the ECQ Stage 3 site to Rooty Hill Road South.

The above-mentioned flood constraints can be appropriately managed as part of the detailed drainage design.

3. FLOOD ASSESSMENT

Previous studies indicate that Beggs Road is a major overland flowpath. While the ECQ Stage 3 development extent is generally consistent with the ILP considered at rezoning stage, the major overland flowpath along Beggs Road is now restricted due to the ECQ Stage 3 development.

A comprehensive flood assessment reflecting the existing development and the proposed ECQ Stage 3 development is being prepared and will assess the flood impacts and flood hazard associated with the development and address Condition 15 of the SEARS.

Results of the flood assessment will be utilised to inform the detailed design process and ensure all identified flood constraints are addressed.

The drainage design of Beggs Road, the loading dock off Beggs Road, the Plaza and basement carpark entry will need to consider how flows up to the PMF event are managed through the site to the east to ensure that pedestrians and vehicles can safely evacuate this portion of the site in an extreme flood event.

Based on our understanding of the ECQ Stage 3 concept design and the previous stormwater management and flood studies prepared for the site, we are of the opinion that an appropriate flood management solution for the ECQ Stage 3 site can be achieved.

Yours faithfully,

Francis Lane
Senior Water Resources Engineer