

3-20 Tempus Street, Rouse Hill – Flood RFI Response – October 2025

SSD-76190964

14 October 2025

Freecity Group
Level 1/ 8 Khartoum Road,
Macquarie Park NSW 2113

Dear Rob,

RE: 3-20 Tempus Street, Rouse Hill

This advice relates to the review of the Flood Impact and Risk Assessment (FIRA) for the proposed development within a flood-affected area of Rouse Hill. It addresses comments received from DCCEEW–CPHR, The Hills Shire Council (THSC), and the NSW SES regarding the adequacy of the flood modelling, emergency response measures, and proposed design levels. The following sections provide responses in blue to the comments received from the three authorities.

The NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) - Conservation Programs, Heritage and Regulation (CPHR)

The Flood Impact and Risk Assessment (FIRA) demonstrates a generally viable pedestrian evacuation route to higher ground along Tempus Street during the PMF flood event. CPHR supports the proposed pedestrian evacuation route to higher ground via Tempus Street, which remains flood-free during the PMF and provides a viable emergency pathway.

However, White Hart Drive is shown to function as a floodway in both the 1% Annual Exceedance Probability (AEP) (refer to Figure 1) and probable maximum flood (PMF) flood events, with flood hazard categories reaching H5 at critical access points. These conditions are unsafe for vehicle movement and inconsistent with the emergency access principles outlined in Flood Risk Management Guideline EM01 (DPE, 2023). The access ramp to the car park opens directly onto White Hart Drive within this floodway area.



Figure 1: Proposed Condition Flood Function for 1% AEP Event

The site is subject to flash flooding. The critical storm duration is approximately 20 minutes for all events up to and including the 1% AEP, and 15 minutes for the PMF. As the creek water level is relatively low (46.60 m AHD) and flooding is of short duration for both the 1% AEP and PMF events, the flood risk from mainstream flooding is considered unlikely. Accordingly, a shelter-in-place strategy managed by the building operator is recommended for vehicle users until floodwaters recede (approximately one hour) to below the top of the kerb, after which residents can safely evacuate by car. An evacuation route is always also available for pedestrians who wish to use the metro or walk.

The underlying hydraulic model used to support the FIRA has a 5 m grid resolution, which introduces uncertainty at the local scale particularly in relation to transitions between high and low hazard zones and detailed site features like basement ramps, doorways, and pits.

The model, with a 5 m grid, provides sufficient resolution for a State Significant Development Application (SSDA) at the property scale, as it reasonably represents flood behaviour and potential flood impacts associated with the proposed development. The model also incorporates a 1D channel. Further refinement of the cell size below 5 m was tested but not feasible, as it led to numerical instability within the model configuration. It is therefore recommended that the 5 m grid model be retained for this assessment, as it provides a stable and reliable representation of flood behaviour at the required level of detail.

All basement entries and vehicular access points should either be protected to the greater of the 1% AEP flood level plus freeboard or the PMF level or relocated to ensure flood-free access in all events up to the PMF

The proposed ramp crest level has been set at the 1% AEP plus 0.5 m freeboard, which is above the PMF level.

The Hills Shire Council Comments

The flood report indicates the hydrologic and flood models used in the flood study were supplied by Council. The models were sourced from Sydney Water.

Noted. The flood report was amended where required. In addition, the following paragraph has been added under Section 1.5:

“Freecity Group, on behalf of the client, approached The Hills Shire Council (hereafter referred to as “Council”) to obtain the latest flood model covering the site. However, Council directed Freecity Group to Sydney Water for access to the most recent flood model. The Vineyard and Rouse Hill Flood Study model and report were subsequently obtained from Sydney Water with Council’s consent.”

Flood modelling files are required to be provided and a detailed review of the flood modelling undertaken. The flood study is to be undertaken in accordance with Council’s flood modelling guidelines and requirements.

The flood model will be provided to Council for review in the SSDA stage. The assessment has been undertaken in accordance with Council’s DCP and national guidelines.

Compliance with flood planning level requirements is required to be undertaken once a review of the flood models is completed.

Flood planning level was advised based on Council’s DCP and stated in Section 4.4 of the flood report.

An assessment of whether the development will impact on flooding elsewhere is required once a review of the flood models is undertaken.

The flood impact assessment was undertaken as part of this study; for details refer to Section 4.3 of the flood report issued for SSDA.

The applicant is required to demonstrate the effect of wind-driven rain, via a sensitivity assessment, on the site’s hydrology as well as on overland flooding within and around the site. Compared to its current vegetated state, the addition of more impervious areas including three high-rise buildings will significantly add more rain captured within the site and this needs to be considered in the design of the site’s

stormwater management system and in the flood models. The wind-driven rain's angle of incidence can be taken as 45 degrees.

The influence of wind-driven rain will be addressed through the detailed Stormwater Management Plan to ensure appropriate on-site drainage and runoff management. While wind effects are recognised, they are not expected to materially alter overland flow behaviour given the site's topography and the predominance of shallow sheet flow. Accordingly, wind sensitivity will be considered qualitatively within the stormwater design rather than through additional hydraulic modelling.

The area along the site's eastern boundary between the new buildings and the existing wall of the Rouse Hill Town Centre (refer Figure 2) will be a 'trapped' area and can potentially flood when pits and pipes are blocked or fail during a major storm event. At this stage, it is not clear whether an escape route for the trapped floodwaters is available or can be provided. How flooding within this trapped area is addressed especially in consideration of wind-driven rain falling between the new buildings and the town centre is to be addressed.

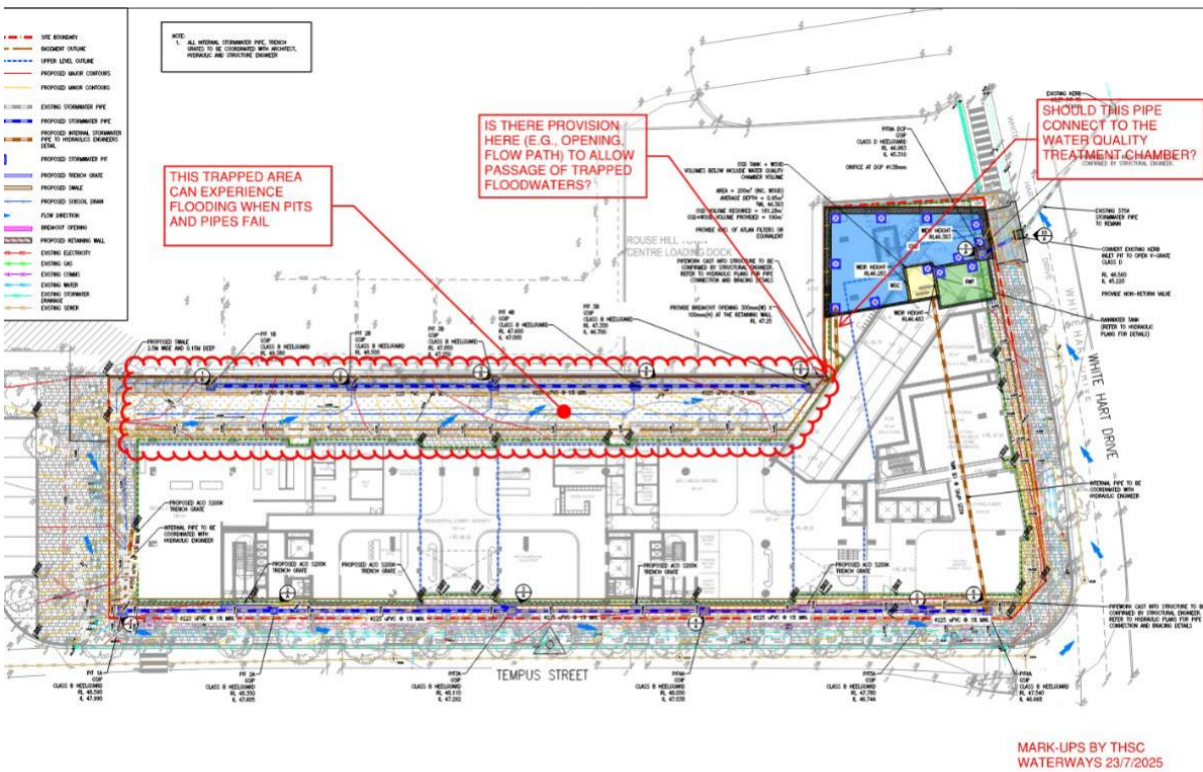


Figure 2: Markup by THSC Regarding the Trapped Area

The potential for localised ponding in the narrow area between the proposed buildings and the Rouse Hill Town Centre wall has been noted. The flood model assumes a fully blocked pit and pipe network, representing a conservative scenario. The detailed Stormwater Management Plan will confirm how this area drains under both normal and failure conditions, including allowance for overflow or relief paths to prevent water entrapment. Wind-driven rain will be qualitatively considered within this assessment, noting that surface flows are expected to remain shallow and directed as sheet flow toward existing drainage infrastructure.

SES Comments

Recommendations

Recommend reconsidering the proposed basement entry location to allow for flood free access/egress. The proposed basement access ramp exits onto White Hart Drive which reaches Hazard Level 5 (H5) during the 10% Annual Exceedance Probability (AEP) flood, which is unsafe for all people and vehicles. Other surrounding streets appear to be flood free in all flood extents and may provide a safer alternative.

The design team acknowledges the SES and Council preference for flood-free vehicle access and agrees that relocating the basement ramp to Tempus Street could enhance evacuation outcomes. This option was investigated; however, architectural, structural, and site layout constraints make relocation infeasible without significant impacts on building function and the broader site interface.

The site is subject to short-duration flash flooding, with a critical storm duration of approximately 15–30 minutes and flood depths typically receding within about an hour. The proposed flood emergency strategy is therefore designed to ensure safety during these brief periods of inundation:

- **access:** Visitors arriving on foot or by public transport can evacuate to the designated assembly point at any time. The pedestrian evacuation route along Tempus Street remains flood-free during all events up to and including the PMF, allowing access to the metro and surrounding areas.
- **access:** Visitors arriving by car will shelter within the lobby area until floodwaters recede below the kerb level on White Hart Drive, after which safe vehicle egress can occur. This temporary approach avoids unnecessary traffic movements during peak flood conditions and aligns with the short duration of flood isolation at the site.

The car park entry ramp has been designed with a crest level set at the 1 % AEP level plus 0.5 m freeboard, which is above the PMF level, ensuring that floodwaters do not enter the basement. Based on model review, flood hazard conditions along White Hart Drive during the 10 % AEP event are expected to be low (H1–H2, restricted to the gutter). The flood model will be further validated during detailed design to confirm these outcomes.

Recommend ensuring that all openings to the basement (ramp, vents, etc) are situated above the Probable Maximum Flood (PMF), or reconsidering basement carparking if this is not feasible to reduce risk to life and property.

All basement openings, including the ramp and vents, are set above the Probable Maximum Flood level. The ramp crest is designed at the 1 % AEP level plus 0.5 m freeboard, ensuring the basement remains flood-free in all events.

Recommend pursuing site design and stormwater management that reduces the impact of flooding and minimises any risk to the community. Any improvements that can be made to reduce flood risk will benefit the community.

Opportunities to further reduce flood risk will be explored through the detailed Stormwater Management Plan. This will include consideration of on-site detention and other design measures to manage runoff and minimise any potential impacts.

Comments

Principle 1 Any proposed Emergency Management strategy should be compatible with any existing community Emergency Management strategy.

Any proposed Emergency Management strategy for an area should be compatible with the evacuation strategies identified in the NSW State Flood Plan and the Hills Shire Flood Emergency Sub Plan, where evacuation is the preferred emergency management strategy for people impacted by flooding.

SES has recommended relocating the underground car park entrance, as their preferred emergency management strategy is evacuation. While we support evacuation for pedestrians and metro users, our recommendation for vehicle users is to shelter in place for approximately one hour before evacuating. This approach minimises additional traffic loading on surrounding roads.

Principle 2 Decisions should be informed by understanding the full range of risks to the community.

Further, risk assessment should consider the full range of flooding, including events up to the Probable Maximum Flood (PMF) and not focus only on the 1% AEP flood. Climate change considerations should also be included. It is noted that the site itself is affected by flash flooding on the southwestern boundary as frequently as the 10% Annual Exceedance Probability (event). During the PMF event the site itself reaches depths of up to 0.5 metres.

The assessment considered the full range of flood events, including the 10 %, 5 %, 2 %, and 1 % AEP events, the 1 % AEP with climate change, and the PMF. This ensures that both existing and future flood risks, including those influenced by climate change, have been appropriately evaluated across all relevant scenarios.

White Hart Drive is also inundated by flooding with “Flood hazard on White Hart Drive reaches hazard category H5, which is unsafe for people and vehicles, during the 1% AEP design event.” Flood mapping provided in the Flood Impact and Risk Assessment (FIRA) further shows areas of White Hart Drive to the East of the site reaching H5 as frequently as the 10% AEP event. The site appears to have Rising Road Access with Tempus Street to the north mapped as flood free, with only the intersection of Tempus Street and White Hart Drive inundated in the PMF event.

The only issue is that the flood hazard for the 10% AEP (refer to Figure 3) is classified as H1 and H2 (restricted to the gutter). There appears to be a problem with the TUFLOW output of hazard ratings for the 10% AEP, as the model cell size (shown with back squares in the snippet below) is 5 m and those high hazard values generally occur in sub-cells.

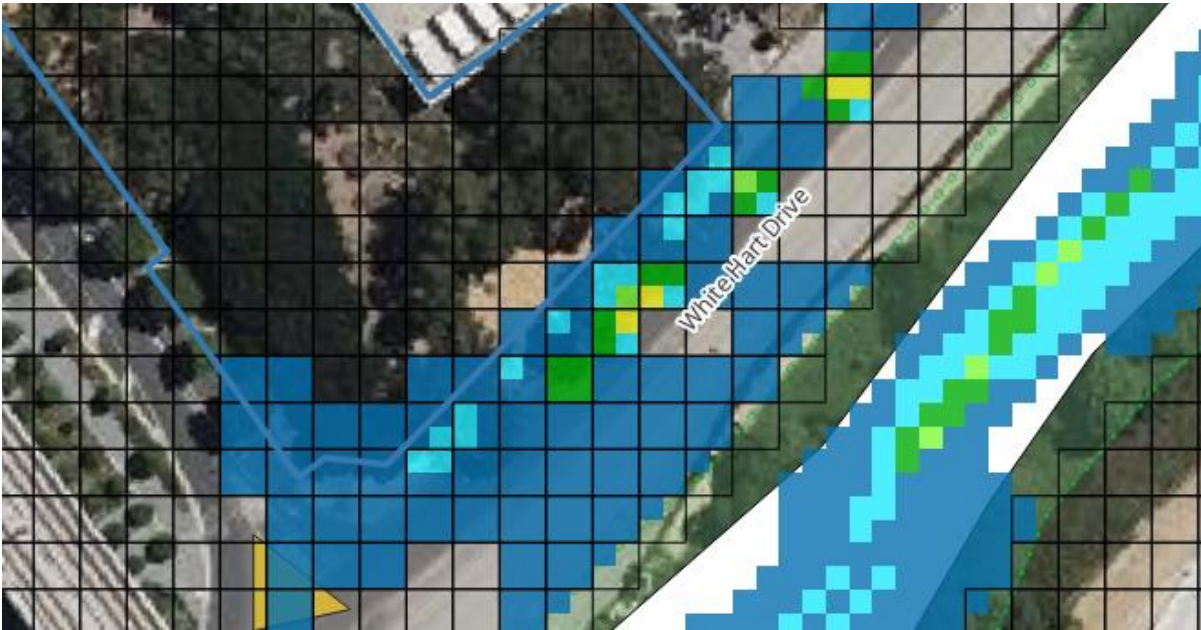


Figure 3: 10% AEP Event Hazard Output

The velocity is less than 2 m/s, with peak depths of up to 0.24 m. The velocity–depth product ($V \times D$) is up to 0.36 m^2/s in the gutter, as shown in Figure 4 below.

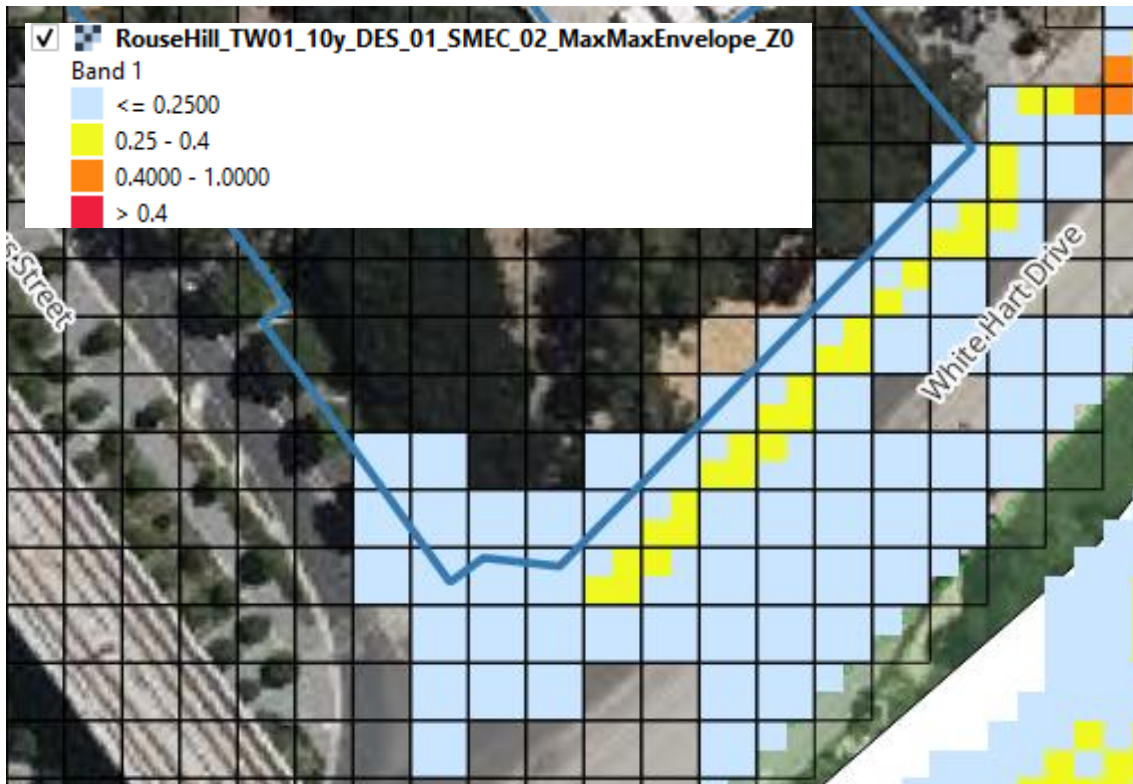


Figure 4: 10% AEP Event Velocity Depth Product

We recommend site design allows for flood free access/egress to the site. Currently, “Vehicle access to the basement car park is proposed via a single driveway on White Hart Drive with all vehicles to turn left on entry and exit.” This means vehicles will exit into, and travel through the highest area of flood hazard during flood events. We recommend investigating alternative vehicle access points, such as onto Tempus Street, which appears to remain flood free.

Although SMEC agrees that relocating the basement car park ramp from White Hart Drive to Tempus Street could potentially enable evacuation during all storm events for both pedestrians and vehicle users, this option was not feasible due to architectural and civil design constraints. In addition, evacuation for vehicle users is not considered realistic due to flash flooding behaviour associated with overland flows. Given that the flood hazard for the 10% AEP event is classified as H1 and H2 (restricted to the gutter), sheltering in place for approximately one hour and then evacuating once floodwaters recede is considered a reasonable strategy for vehicle users. This approach avoids unnecessary traffic on adjacent roads.

It is also noted that the proposed ramp crest level has been set at the 1% AEP level plus 0.5 m freeboard, which is above the PMF level.

Principle 3 Development of the floodplain does not impact on the ability of the existing

Risk assessment should have regard to flood warning and evacuation demand on existing and future access/egress routes. Consideration should also be given to the impacts of localised flooding on evacuation routes. Evacuation must not require people to drive or walk through flood water.

As discussed above, people can walk along Tempus Street without encountering floodwater, and they can also potentially use the metro to travel to other destinations. Furthermore, given that the flood hazard for the 10% AEP is classified as H1 and H2 (gutter only) (refer to Figure 5), sheltering in place and then evacuating after about an hour (due to flash flooding) for people with vehicles is considered a reasonable approach.

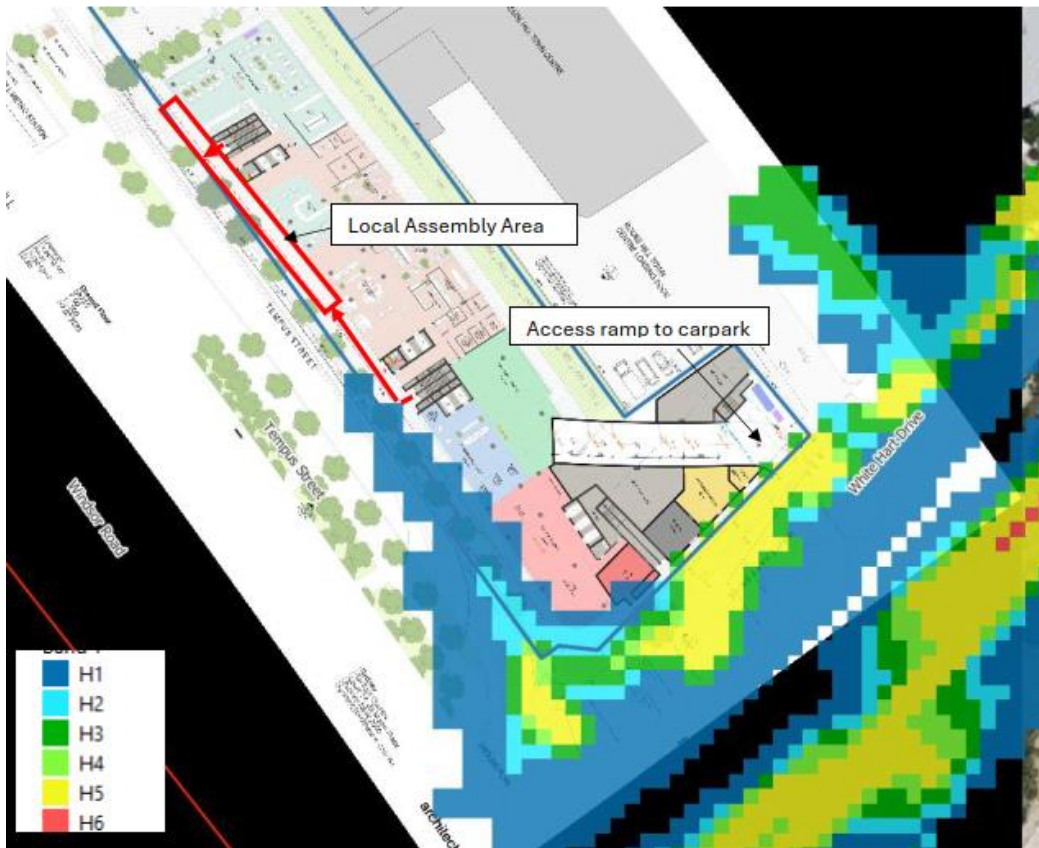


Figure 5: Flood Hazard Classification for the 10% AEP Event

Development strategies relying on an assumption that mass rescue may be possible where evacuation either fails or is not implemented are not acceptable to the NSW SES.

A mass rescue response is not anticipated for this site. The proposed flood emergency strategy ensures that safe pedestrian evacuation is always available and that vehicle users can shelter temporarily until conditions allow safe egress, removing the need for any SES-led rescue operations.

Basement car parks have inherent risks to life and property¹² and can often restrict safe evacuation of the occupants. This can be managed through building design, such as crest levels above a certain level (e.g. the PMF) to prevent water ingress and flooding.

The proposed ramp crest level for the basement car park (refer to Figure 6) has been set at the 1% AEP plus 0.5 m freeboard, which is above the PMF level.

Principle 5 Risks faced by the itinerant population need to be managed.

Any Emergency Management strategy needs to consider people visiting the area or using a development.

If visitors commute to the site on foot or by public transport, they can evacuate to the assembly point at any time without issue, as the evacuation route is not affected during any storm event up to and including the PMF. For anyone commuting to the site, the strategy is to shelter in the lobby for approximately an hour and then evacuate, as the water depth does not overtop the kerb on White Hart Drive. PMF flows will not enter the carpark, as the ramp crest level has been set above the PMF level. It is noted that this property does not have any visitor parking.

Principle 6 Recognise the need for effective flood warning and associated limitations.

An effective flood warning strategy with clear and concise messaging understood by the community is key to providing the community an opportunity to respond to a flood threat in an appropriate and timely manner. As the site is affected by flash flooding little to no warning time is likely to be available, with Severe Weather Warnings and Severe Thunderstorm Warnings from the Bureau of Meteorology the only warnings currently available.

Noted. We understand that, as the site is affected by flash flooding, little or no warning is available other than BoM severe weather warnings or severe thunderstorm warnings. We also note in the report that once flood depths begin overtopping the top of the kerb, the flood emergency plan should be initiated.

As the development operates under a Build-to-Rent and Co-Living model, the Flood Emergency Plan will be managed by the on-site building operator using established tenancy digital communication channels to quickly distribute weather alerts and safety instructions. While the site is subject to flash flooding and limited warning time, the Bureau of Meteorology's Severe Weather and Severe Thunderstorm Warnings will be used to trigger notifications and activate the flood response plan. Although the development contains approximately 322 BTR apartments, there are only 129 basement car spaces, which limits the number of vehicles requiring management during a flood event.

Principle 7 Ongoing community awareness of flooding is critical to assist effective emergency response.

The flood risk at the site and actions taken to reduce risk to life should be communicated to all site users (includes increasing risk awareness, community connections, preparedness actions, appropriate signage and emergency drills) during and after the construction phase. However, it is important to note that the NSW SES is opposed to the imposition of development consent conditions equiring private flood evacuation plans rather than the application of sound land use planning and flood risk management.

This development will not seek a private evacuation plan. SMEC understand that The Hill Shire Council flood emergency sub-plan, evacuation is the primary response strategy for people impacted by flooding. The plan discussed in details in response to Principle 5.

As a Build-to-Rent and Co-Living development, flood risk awareness and response actions will be managed through the on-site building operator and tenancy communication systems. Information on flood safety, weather alerts, and emergency procedures will be incorporated into resident onboarding, digital notifications, and on-site signage. A separate private evacuation plan is not proposed, as the site will operate in accordance with The Hills Shire Council Flood Emergency Sub-Plan, where evacuation is the primary response strategy for people impacted by flooding.

Development in a floodplain will increase the need for NSW SES to undertake continuous community awareness, preparedness, and response requirements. Residents and users of the proposed development should be made aware of their flood risk, the Hazards Near Me app (a tool to receive flood warnings as part of the Australian Warning System) and the NSW SES website which contains comprehensive information

for the general community about what to do before, during and after floods as well as in-language resources and HazardWatch (NSW SES interactive information and warnings site).

Flood risk information and links to NSW SES resources, including the Hazards Near Me app and HazardWatch, will be shared with residents through building operator communication channels.

If you have any queries or wish to discuss our submission further, please do not hesitate to contact me on 0299255587.

Yours sincerely,

Gus Naghib

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