Flood Response Planning: Identified Risks and Mitigation

310 Terrigal Drive, Terrigal

Presentation to BCS

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CIVIL STORMWATER ENGINEERING GROUP

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Residual Risks and Mitigation

Identified Risk 1: Risk to Residents leaving or returning home during major flood events

The DPHI has supported Shelter In Place for this site, in accordance with the newly adopted guidelines. Shelter In Place is permitted for up to 6 hours under the guidelines.

Shelter in Place would only be **required for a 44 minutes**, which is well below that which the DPHI has deemed acceptable.

CSEG proposes following mitigation measures to address this risk noting that in light of the new SIP guidelines, peak flood duration up to and including PMF is significantly less than what is considered in the SIP guidelines. However we acknowledge residual risk remain and propose following measures to address those:

1. As demonstrated in the flood impact & risk report, warning signs and equipment would be installed to warn residents of any flooding. The development will be equipped with water gauges and alarm systems. When tenants move into the property, they will be given information about the dangers of driving through flood waters and detailed information of the catchment. Educational seminars to be conducted every 6 months educating residents about the risks associated with returning home and advising residents that they should not enter water inundated roads if they are unsure of the associated risks. When heavy rains are occurring, the internal message board within the building will displays signs reminding residents to Shelter in Place during heavy rainfall.
2. Installation of clearly visible water markers including warning signs and flood depth gauges to be installed at critical points around the site to ensure people are aware of the water depth and risks.
3. All residents would be requested to install weather warning apps on their phone such as BOM. The BOM app sends warning messages and notifications to mobile devices warning locals of any major weather events that might take place.
4. Referring to the flood hazard maps presented in the FIRA report, it demonstrates the extent of the flood water for each event and the associated risk. Risks are described in the legends presented on each flood map demonstrating the risks
5. associated with people, vehicles and buildings. During the 1% AEP event, residents returning home via Charles Kay Drive and the west of Terrigal Drive can do so safely as the flood levels are classified as low risk – generally safe for people, vehicles and buildings. This is only applicable to all flood events upto the 1%AEP. Higher flood events demonstrate higher risks for all surrounding roads which are unsafe for people and vehicles. This information is to be presented to all residents during the allocated meetings and seminars. This will assist residents to have a better understanding of flooding and make better decisions when approaching floor waters.

Residual Risks and Mitigation

Identified Risk 2: Risk to Residents due to a fire event

CSEG proposes following mitigation measures to address this risk noting that in light of the new SIP guidelines, peak flood duration up to and including PMF is 44 minutes, which is significantly than what is considered in the SIP guidelines. However, we acknowledge residual risk remain and propose following measures to address those:

1. **Internal Fire** - Residential flat buildings in flood zones face unique fire risks due to the combination of water-related hazards and potential fire hazards. Below are the key fire risks associated with such buildings:
    - Electrical system failures
    - Gas leaks
    - Combustible materials
    - Heating equipment malfunctioning
    - Human factors – candles and open flames

To reduce fire risk in residential flat buildings located in flood zones the following measures need to be considered:

- Install electrical systems above expected flood levels to prevent water damage. In this case, some electrical systems are proposed within the basement which is proposed with a ramp designed with a crest above PMF flood levels. This will prevent water from entering the basement and resulting of a fire and damage to electrical equipment such as lifts.
- To comply with the Building Code and the National Construction code, it is a must to install sprinkler systems within residential flat buildings including fire extinguishers, smoke alarms, fire tanks and hydrants. Further regulatory requirements are applicable to fire resistant inter tenancy walls to prevent the spread of fire from one room to another. Inter-tenancy walls generally require an FRL of 60/60/60 or higher. A fire resistance level of 120/120/120 can be proposed. **Refer to BCA Report submitted with the DA**
- Propose smoke sealing walls and doors that prevent the passage of smoke between tenancies such as fire rated plasterboard systems.
- Fire stoppers to be proposed for all penetrations and services including electrical, plumbing and HVAC systems.
- Design of fire escape and stairwells in compliance with high BAL rating so as to enable people to escape and shelter inside the fire escape stairwells which would be designed to withstand longer fire vents enabling emergency support services to assist post receding of peak flood events.
- Provide fire extinguishers in the common area of every level of the building.

Residual Risks and Mitigation

Identified Risk 2: Risk to Residents due to a fire event

CSEG proposes following mitigation measures to address this risk noting that However, the new SIP guidelines, peak flood duration up to and including PMF is **44 minutes**, which significantly less than what is considered in the SIP guidelines. However we acknowledge residual risk remain and propose following measures to address those:

2. **External Fire**- The development is proposed to be constructed in a manner that is designed with flood compatible material. Flood compatible materials also meet fire compatibility requirements e.g: masonry, concrete, aluminium, fire rated plasterboard, etc. Structural engineering studies were taken by JSBC consultants which supports that the proposed structure can withstand flood forces. **The structural report was supported by BCD as part of their assessment**. Further details can be resolved in the detailed development application phase.
3. Most importantly, the chances of a bushfire occurring during a flood event are extremely low, as the conditions that lead to bushfires and floods are typically opposite. During peak events all the foliage would be under water and surrounding trees will be wet. **A concurrent DA was lodged with the Planning Proposal and RFS has granted their General Terms of Approval for the design.**

Identified Risk 3: Medical Emergencies Mitigation

1. The building will be equipped with approach first aid kit and other lifesaving equipment such as defibrillators, emergency medical kits etc and residents. An internal medical emergency response plan to be provided to all residents. The plan to include a map outlining the location of all medical equipment including, medical kits, defibrillators, etc.
2. The probability of a medical emergency happening during a flood event is very low given that peak flood duration does not exceed an hour at most. But despite this, the duration of the local roads being closed is very short during a flood event. For the 1% AEP the flood model demonstrated a road closer for a maximum of 44 minutes. Most of these low probability event will be managed onsite using first aid kits, emergency support kits, defibrillators etc.
3. Another important thing to note is that during this period, the local medical emergency response team located on the corner of Terrigal Drive and Charles Kay Drive, across from the proposed development, will be inundated in flood waters and unable to attend to emergencies for flood events greater than the 1%AEP. For events equal to or less than the 1%AEP, it would be safe for ambulance services to attend site via the entry of the development on the Charles Kay Drive.