FLOOD STUDY

No. 40 MAXWELL STREET, MONA VALE, NSW

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1. Introduction and background

The proposed development involves alterations & additions to an existing dwelling and construction of a secondary dwelling. Flood information letter dated 13/12/2018, issued by Northern Beaches Council indicates the site is affected flooding. Therefore a floodstudy is prepared to address flood impact assessment and flood risk management for the proposed development. The site locality is shown in Figure 1.

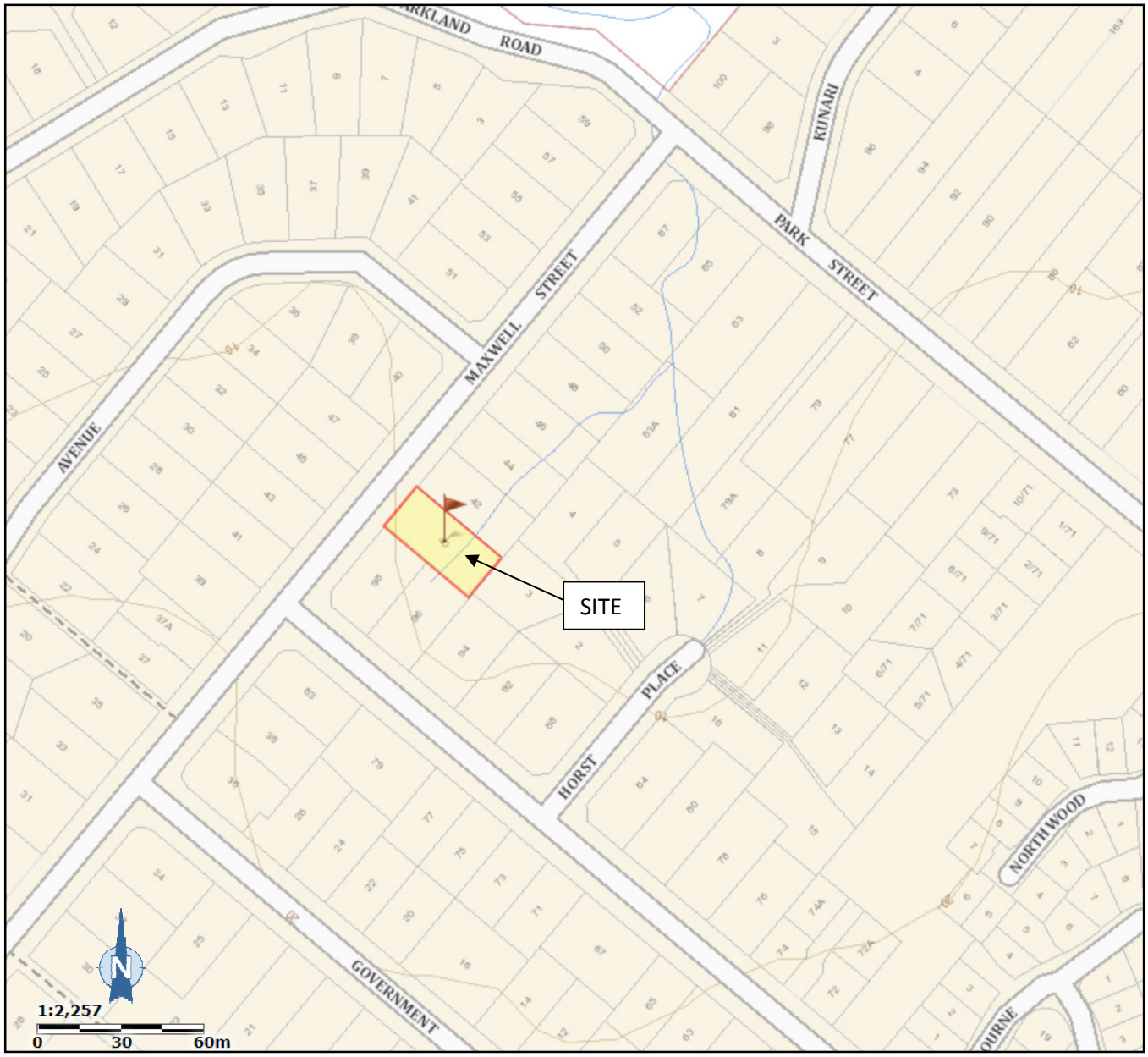

Figure 1 Site locality *(Source: Spatial Information Exchange)*

2. Data available

Data available for the flood study include:

- Flood maps and flood levels , dated 14 June 2016, supplied by Council.
- Proposed architectural drawings, project No 2018080, dated 11.03.2019, prepared by Blue Sky Building Designs.
- Site survey , dated 09/11/2018, prepared by Waterview Surveying services.
- Cadastre and topographical data from Land & Property Information (LPI) department in 2018.
- Aerial photos from Spatial Information Exchange (SIX) website in March 2019.

3. Existing flood conditions

The 1% Annual Exceedance Probability (AEP) flood extent map, flood hazard map, flood hydraulic category extent map and flood life hazard map are respectively presented from Figure 2 to Figure 5.

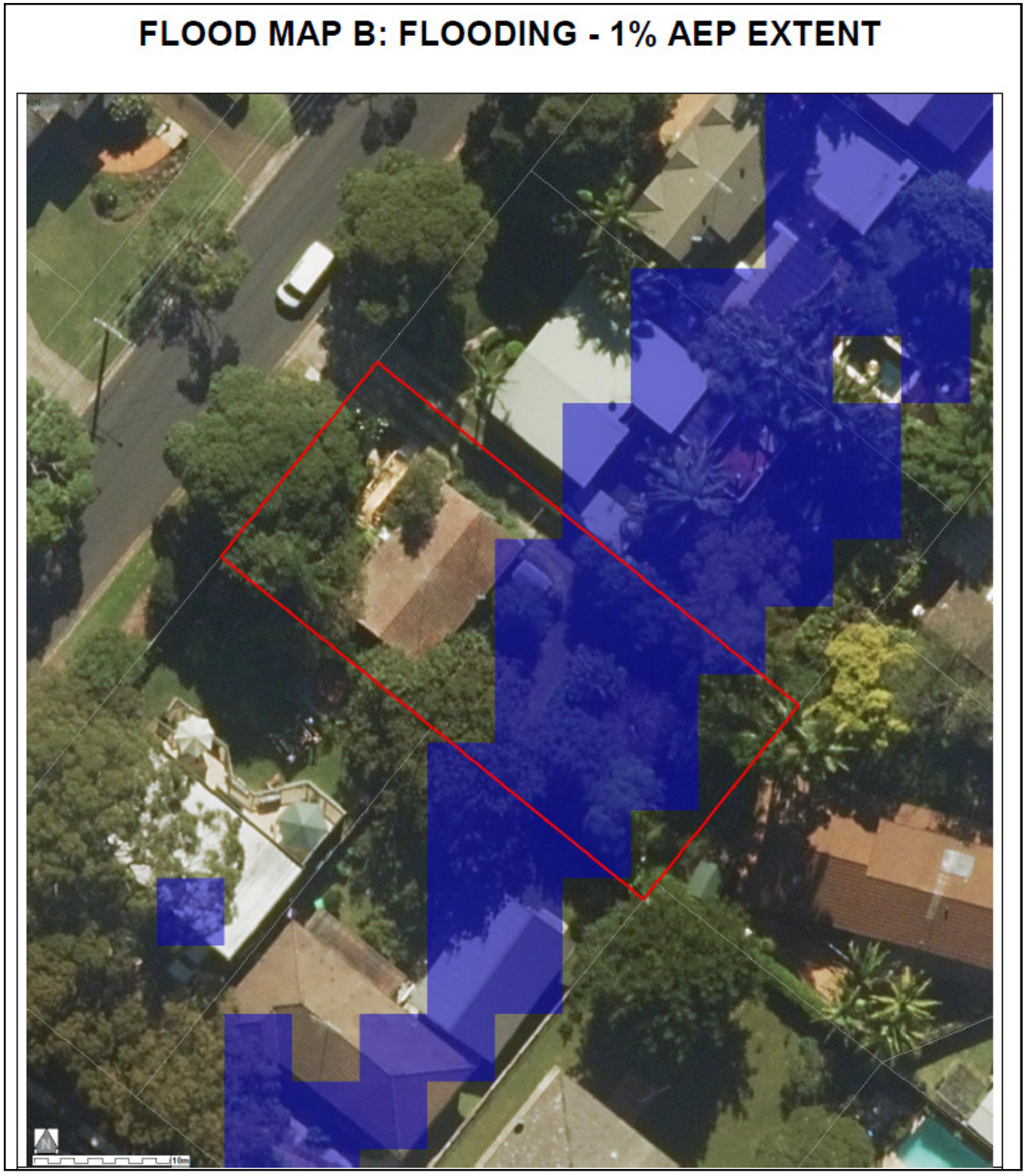

Figure 2 1% AEP Flood extent *(source: Northern Beaches Council)*

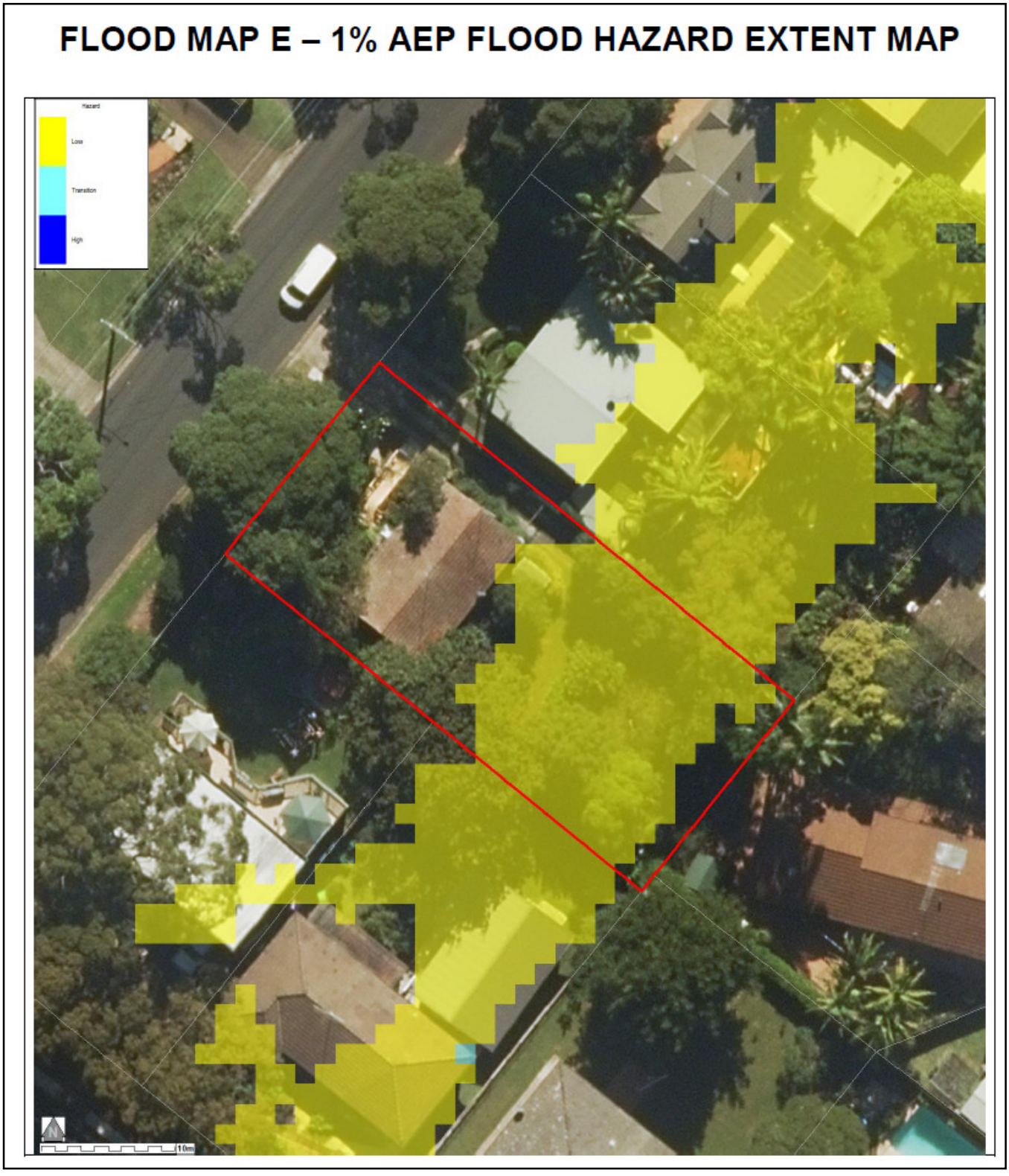

Figure 3 1% AEP Flood hazard map *(source: Northern Beaches Council)*

FLOOD MAP F – 1% AEP FLOOD HYDRAULIC CATEGORY EXTENT MAP

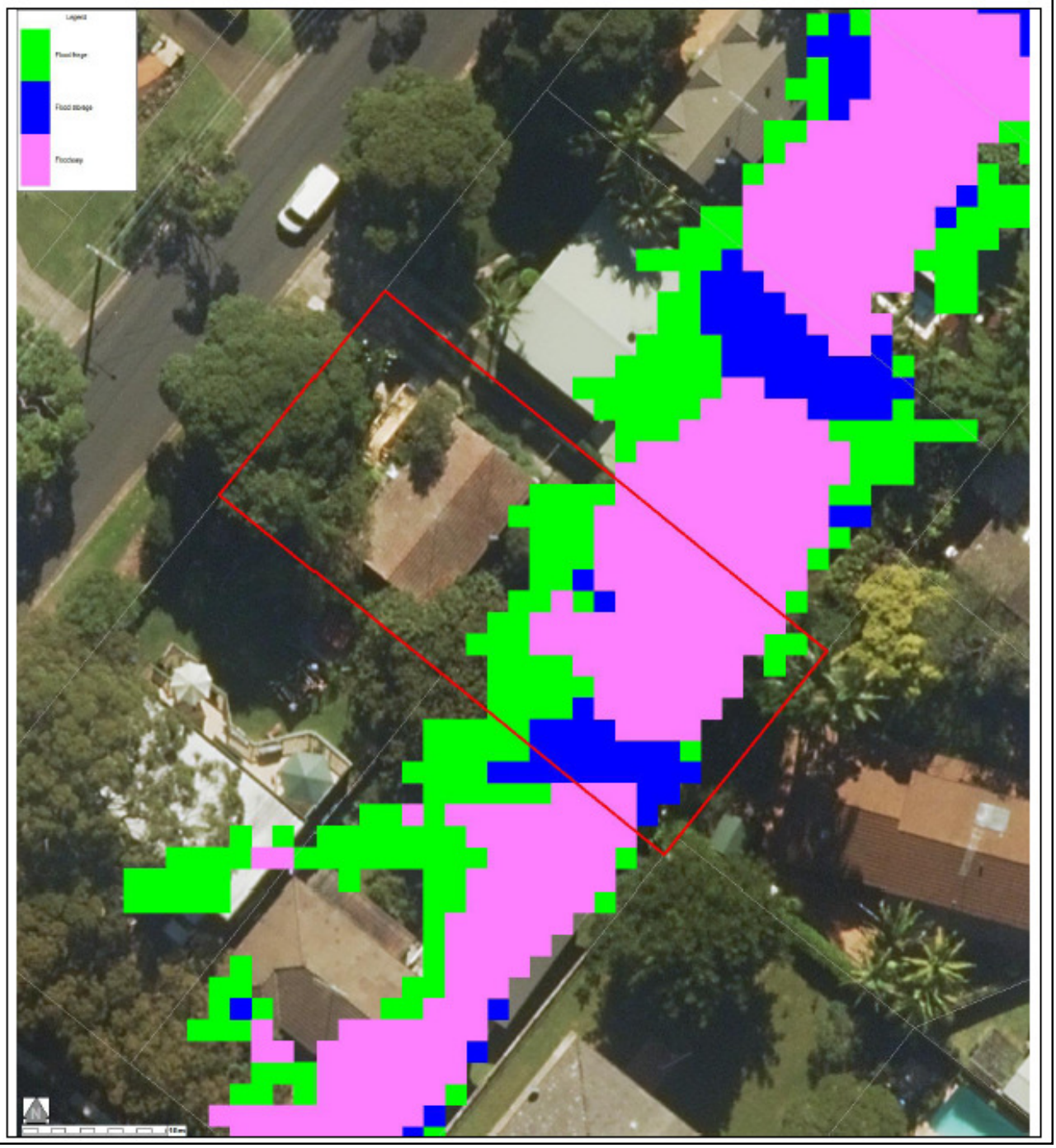

Figure 4 1% AEP Flood hydraulic category extent *(source: Northern Beaches Council)*

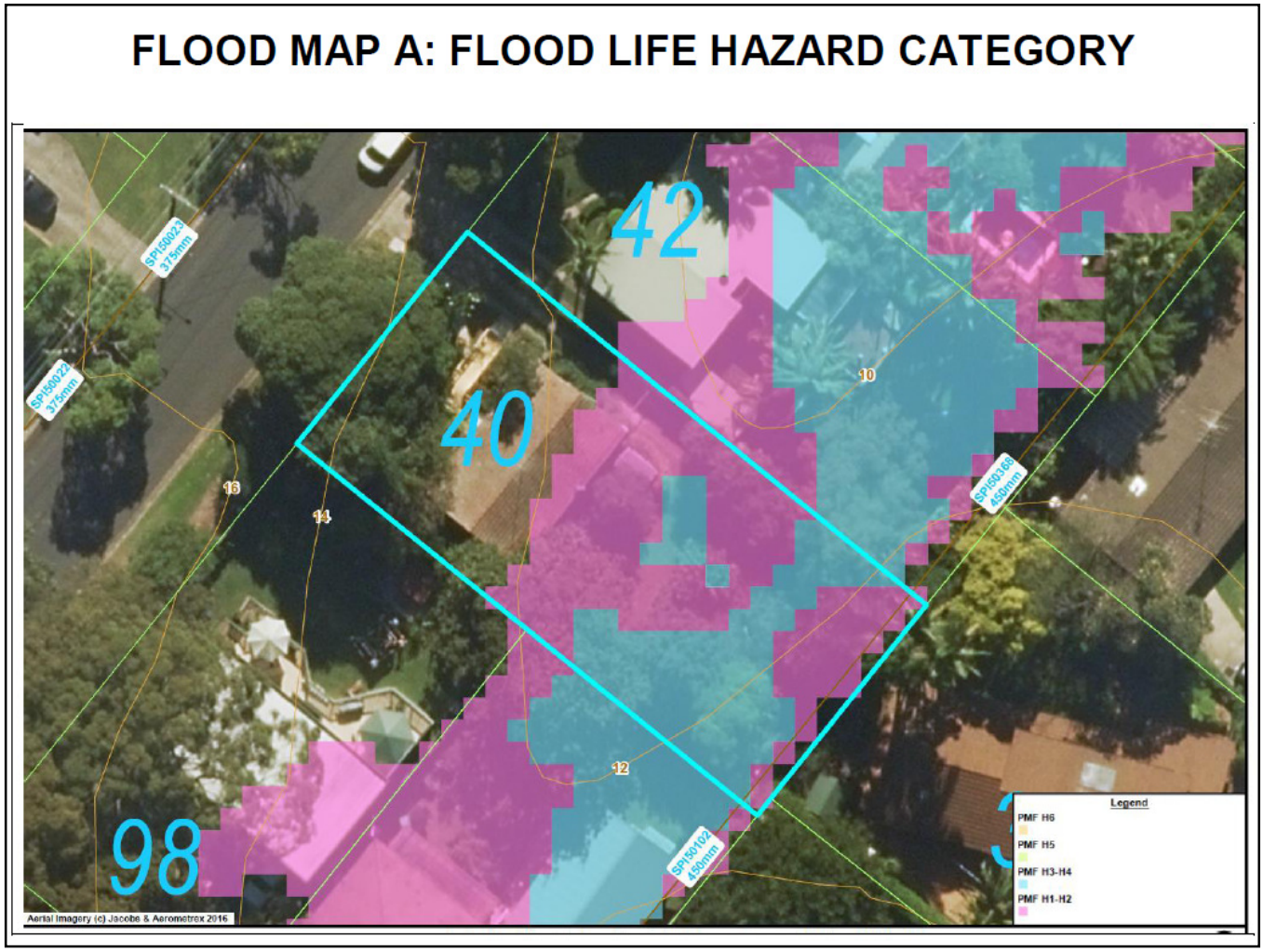

Figure 5 Flood life hazard *(source: Northern Beaches Council)*

Flood information from Figure 3 and Figure 5 indicates that within the site the flood hazard is low and the risk to life is tolerable (H3 to H5).

The existing flood levels at the site supplied by Council are shown in Figure 6 and Table 1.

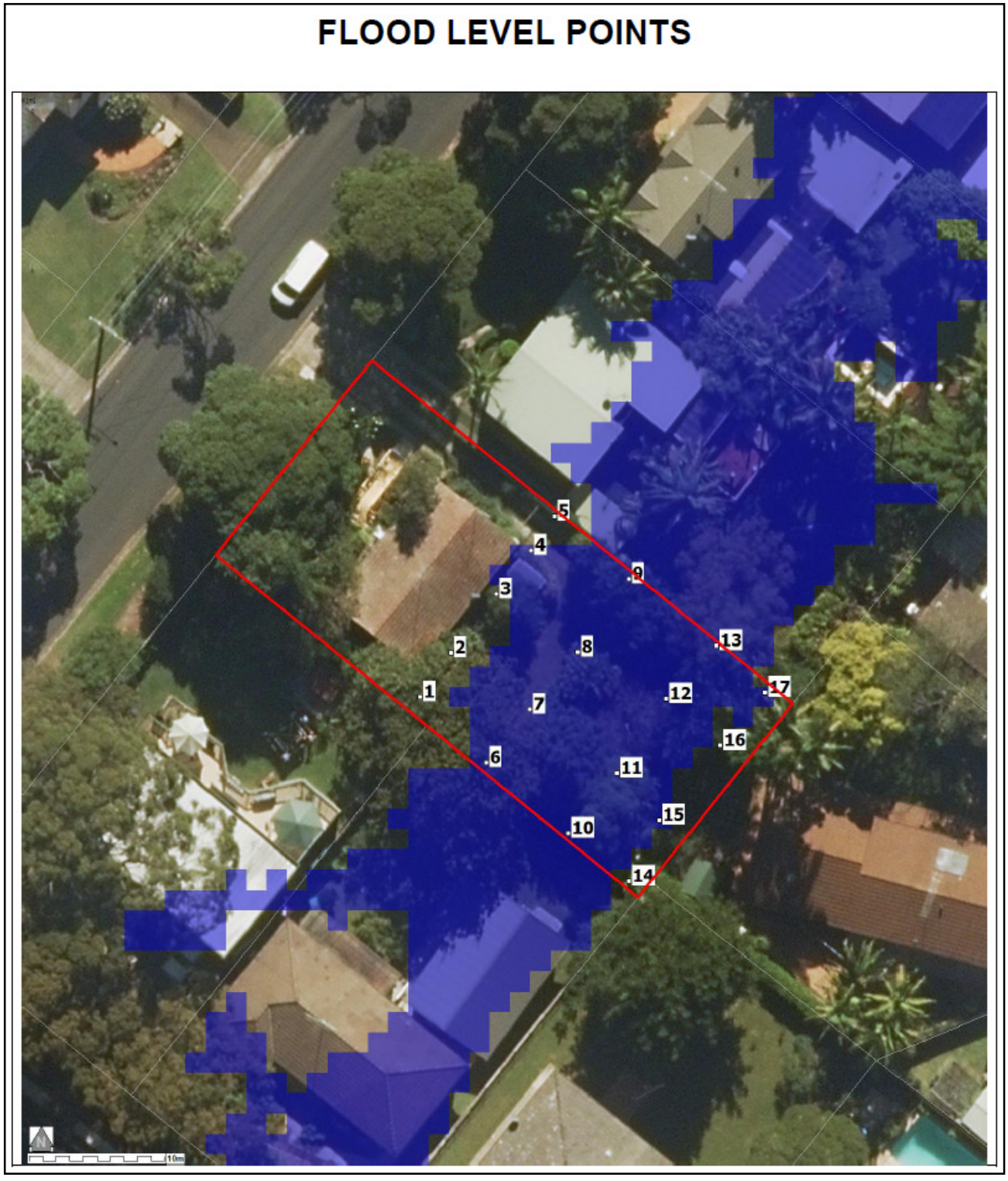

Figure 6 Location of flood levels

Table 1 Flood levels at locations shown in Figure 6

ID	5% AEP Max WL (m AHD)	5% AEP Max Depth (m)	1% AEP Max WL (m AHD)	1% AEP Max Depth (m)	1% AEP Max Velocity (m/s)	Flood Planning Level (m)	PMF Max WL (m AHD)	PMF Max Depth (m)	PMF Max Velocity (m/s)
1	N/A	N/A	N/A	N/A	N/A	11.83	11.67	0.21	0.53
2	N/A	N/A	N/A	N/A	N/A	11.55	11.35	0.24	0.60
3	N/A	N/A	N/A	N/A	N/A	11.16	10.92	0.41	0.62
4	N/A	N/A	10.46	0.16	0.32	10.94	10.71	0.41	0.68
5	N/A	N/A	N/A	N/A	N/A	10.65	10.44	0.28	0.78
6	N/A	N/A	11.46	0.24	0.43	11.96	11.76	0.54	0.81
7	N/A	N/A	11.24	0.19	0.46	11.72	11.49	0.44	0.83
8	N/A	N/A	10.75	0.33	0.48	11.26	11.01	0.59	0.83
9	N/A	N/A	10.21	0.23	0.60	10.69	10.43	0.45	0.96
10	N/A	N/A	11.52	0.32	0.52	12.05	11.84	0.64	0.81
11	N/A	N/A	11.35	0.58	0.55	11.81	11.61	0.84	0.88
12	N/A	N/A	10.71	0.30	0.87	11.20	10.92	0.52	1.10
13	N/A	N/A	10.05	0.30	0.63	10.57	10.31	0.56	0.94
14	N/A	N/A	N/A	N/A	N/A	12.08	11.87	0.52	0.61
15	N/A	N/A	11.44	0.31	0.25	11.86	11.69	0.56	0.48
16	N/A	N/A	N/A	N/A	N/A	11.11	10.84	0.31	0.78
17	N/A	N/A	10.33	0.24	0.38	10.80	10.55	0.46	0.48

WL – Water Level
PMF – Probable Maximum Flood
N/A = no peak water level/depth/velocity available in flood event

4. Proposed development

The proposal involves extension to ground floor, additional first floor to the existing dwelling and a detached secondary dwelling. The proposed development layout is presented in Figure7.

Figure 7 Proposed development layout.

The proposed layout is overlaid on the Council's flood map to identify 1% AEP flood levels. The overlay is shown in Figure 8.

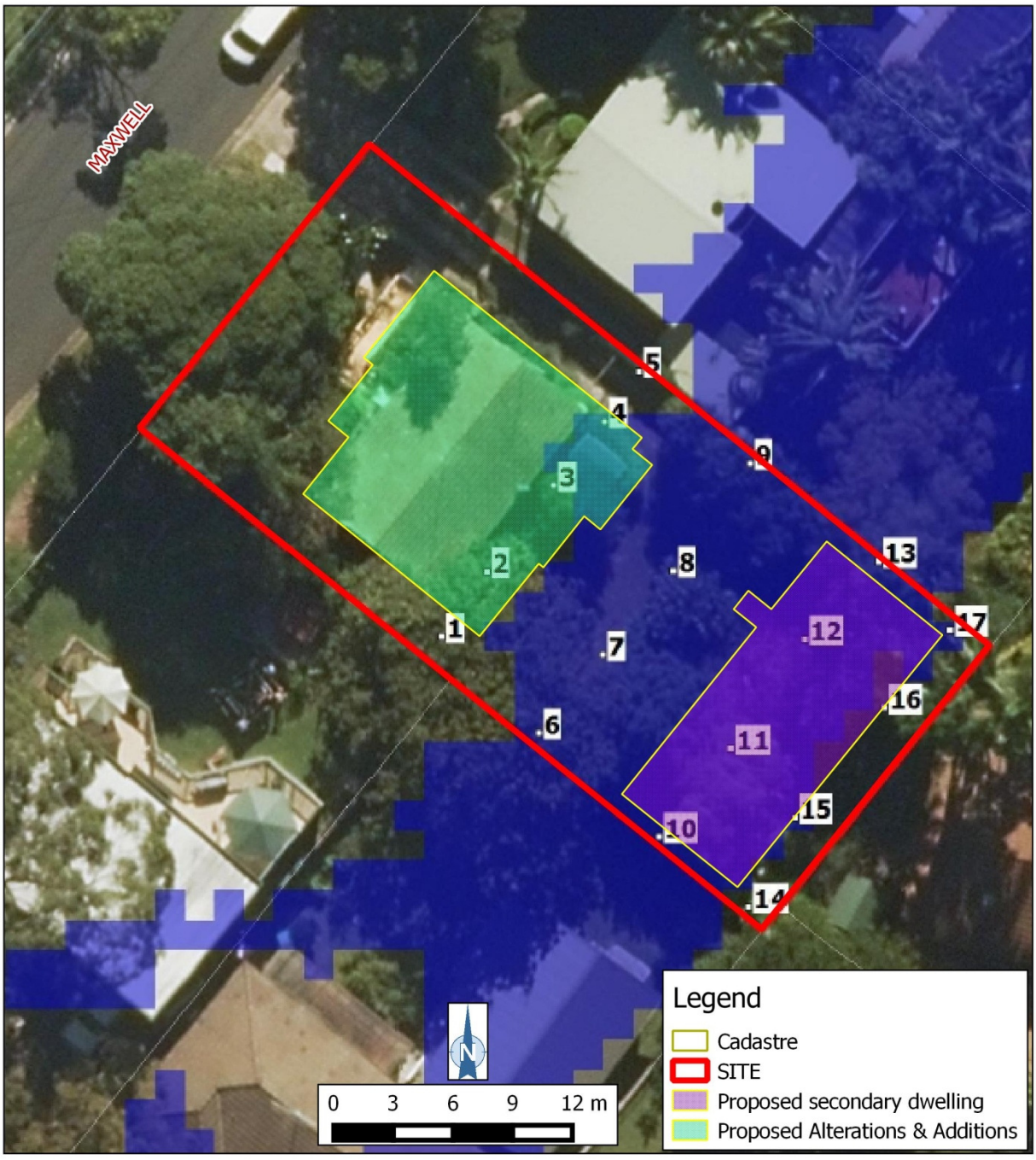

Figure 8 Flood map overlay

Figure 8 and Table1 indicate upstream 1% AEP flood levels are 11.46 mAHD (point 6) and 11.52 mAHD (point 10) for the proposed additions and secondary dwelling respectively. The flood map overlay also shows the development encroaches the 1% AEP flood extent.

Overlay of the proposed layout and flood hydraulic category map is presented in Figure 9.

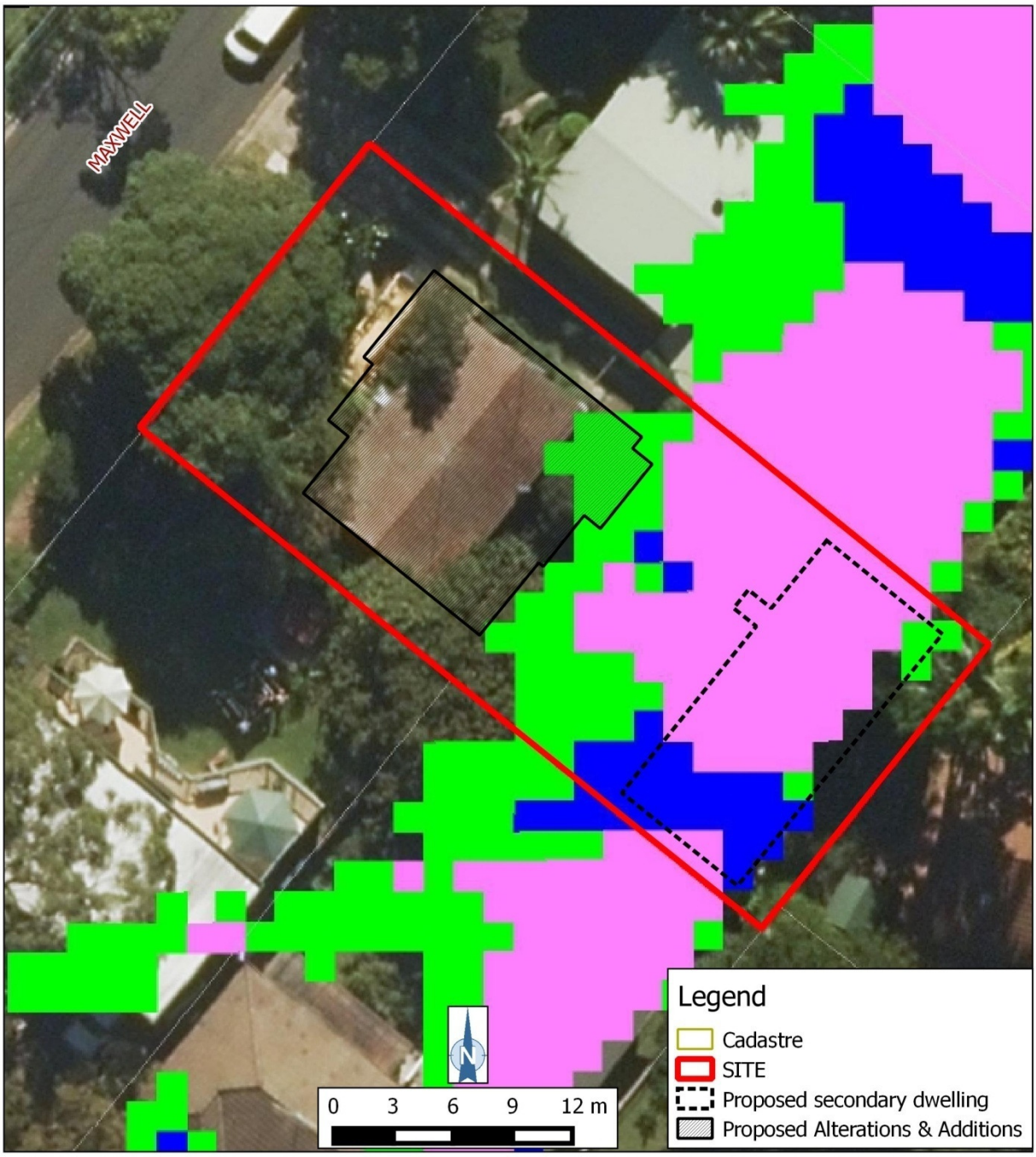

Figure 9 Overlay of proposed layout and flood category map

As seen from Figure 9 whilst the proposed extension is slightly encroach the flood fringe the proposed secondary dwelling is located in both flood way and flood storage area.

5. Flood mitigation and flood impact assessment

Suspended floor structure is proposed for the development as a flood mitigation measure. The opening in the subfloor will span between underpinning columns and be minimum 100mm above the 100-year flood level , enabling overland flow passage without obstruction. The proposed suspended floor for the addition area and secondary dwelling are displayed in Figure 10 and Figure 11.

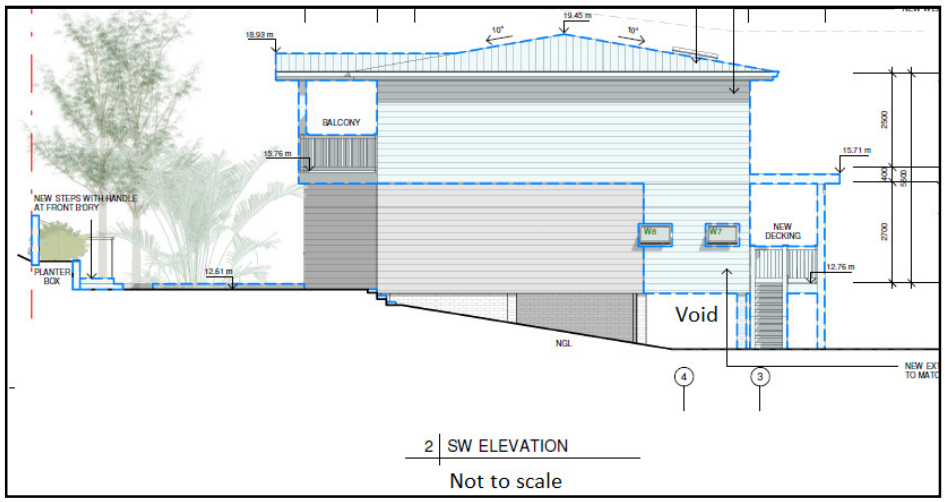

Figure 10 Proposed extension - Southwest Elevation

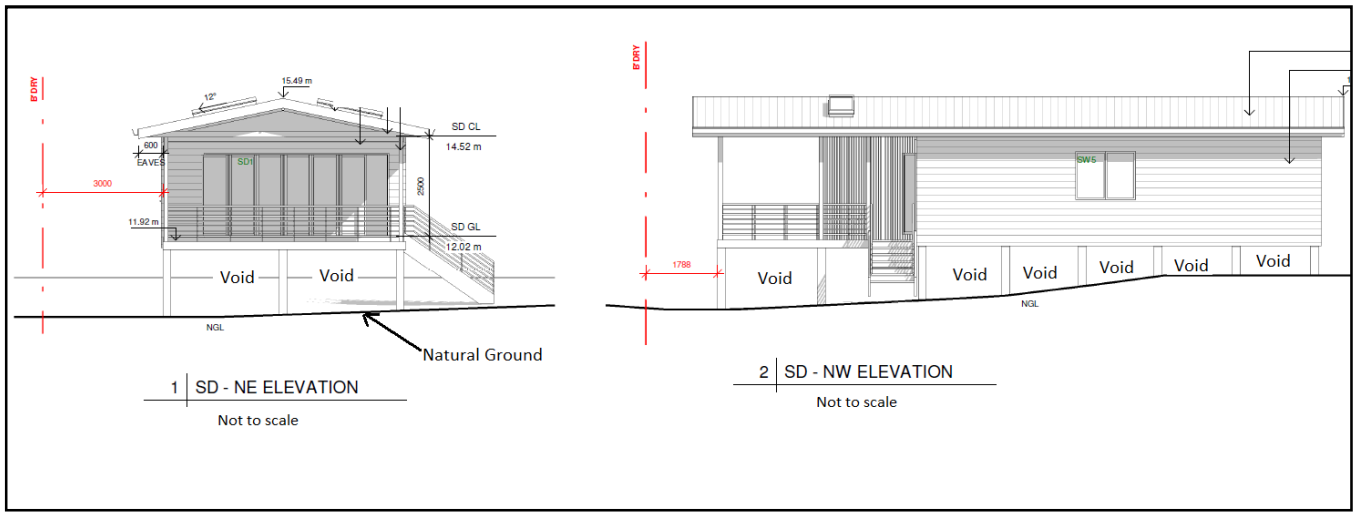

Figure 11 Proposed secondary dwelling- Northeast and Northwest Elevations

As shown in Figure 10 and Figure 11 the proposed suspended floor ensures the development does not cause detrimental impacts to the existing flood conditions.

6. Flood Risk mangement

The flood risk management is adopted from *clause 3.5 of the State Environmental Planning Policy (Exempt and Complying Codes) 2008.*

The above analysis and implementation of suspended floor ensure the proposed development is not any of the following

- *a flood storage,*
- *a floodway area,*
- *a flow path,*
- *a high hazard area,*
- *a high risk area.*

Based on Figure 8 and Table 1, the minimum Finished Floor Level (FFL) shall be set at 11.96 mAHD for the extension area and 12.02 mAHD for the secondary dwelling.

Unless supporting structures of the proposed development are of reinforced concrete or solid brick, a qualified structure engineer is to certify that the proposed development will

- *be able to withstand the forces of floodwater, debris and buoyancy up to 1% AEP level plus 0.5m, and*
- *have the part of the development at or below the 1% AEP level plus 0.5m constructed of flood compatible material.*

7. Flood evacuation

The top PMF level at the site is 11.87 mAHD which is below the FFL of both main dwelling 12.76 mAHD and the secondary dwelling 12.02 mAHD. Therefore development has complied with the in-place-shelter flood requirements.

8. Conclusions

The available flood information indicates the development is not subject to high flood hazard. Site analysis shows that suspended floor used as the flood mitigation measure will eliminate adverse impacts to the existing flood conditions. The flood risk management including FFLs and flood evacuation has been adequately addressed.