



Reference: 20230256-L02_flood study [A]

Date: February 5, 2024

Creative Vision
Attn: Charbel Azzi
Level 2, 14 Railway Parade
Burwood NSW 2134

Dear Sir,

RE: 184-186 FIFTH AVENUE, AUSTRAL – FLOOD IMPACT ASSESSMENT

INTRODUCTION

A state significant development is proposed at the above site address in the form of a mixed use-development. Liverpool City Council requires a flood study to be undertaken to determine if the proposal has any adverse impacts on the flooding regime in the vicinity of the site. NSW Department of Planning & Infrastructure already commissioned previous a flood assessment which was carried out by Cardno for the Austral & Leppington North Precincts in 2011.

Furthermore, this flood study assumed the implementation of the report 'Austral & Leppington North Precincts Stormwater Management Strategy for the Austral Leppington Precinct Water Cycle Management - Responses to Exhibition Submissions', dated Development 2012; prepared by Cardno for NSW Department of Planning & Infrastructure in the base/concept pre- developed scenario.

The future building footprint has been incorporated in the concept post- development scenario to assess any flood impact resulting from the proposed development.

REFERENCE DOCUMENTS

The following documents have been referenced in this report:-

1. Austral & Leppington North Precincts – Riparian Corridor and Flooding Assessment; Main Report (Job Number 600288; Prepared for NSW Department of Planning & Infrastructure; July 2011)
2. Austral & Leppington North Precincts - Water Cycle Management; Responses to Exhibition Submissions (Job Number 600288; Prepared for NSW Department of Planning & Infrastructure; 6 December 2012)
3. Masterplan & Architectural drawings prepared by DKO Architecture;
4. NSW Government "The Floodplain Development Manual – The management of Flood Liable Land" (2005);
5. Engineers Australia, Australian Rainfall & Runoff; and
6. State Environmental Planning Policy (Exempt and Complying Development Codes) 2008; and
7. Liverpool City Council Development Control Plan 2021 – Item 9 'Flooding Risk'.



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NATURAL & BUILT ENVIRONMENT

The site is made of one existing residential lot and falls in the Local Government Area of the Liverpool City Council.

The site is bounded by Fifth Avenue to the North and adjoining properties in all other directions.

The site has a somewhat rectangular shape and is characterised by a sloping natural gradient from East to West.

Figure 1 shows the location of the site.



Figure 1 **Locality Plan**

The site is traversed by a creek along the western boundary. As a result, the site is affected by flooding caused from upstream catchment.

PROPOSED DEVELOPMENT

The proposed development involves the construction of four building structures as depicted on the concept architectural layout plans by DKO Architecture. Figure 2 below shows an extract of the site plan from the architectural drawings.

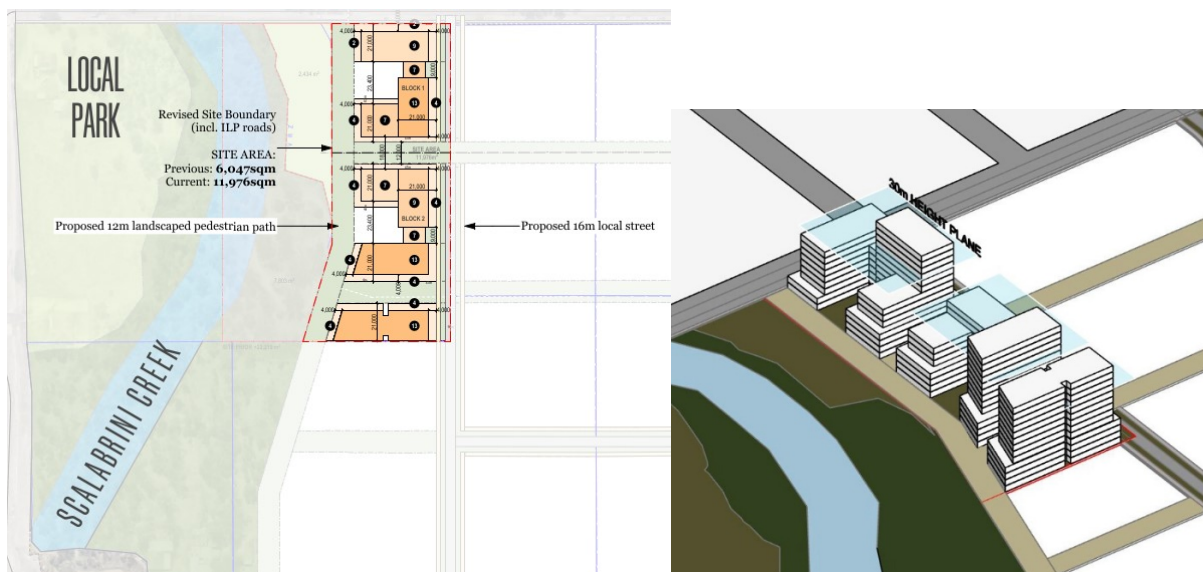


Figure 2 Proposed Site Layout

FLOOD STUDY

Liverpool City Council

We have been advised that a flood study is required to determine how the proposed development can be built without causing any adverse impact on the flood behaviour in the floodplain and specifically in the vicinity of the site.

Liverpool City Council's requirements for flooding are detailed in the Development Control Plan Item 9 - 'Flooding Risk'.

Objectives

The purpose of this flood study is to establish the Flood Planning Levels for the proposed development. It also provides a comparison of pre vs post flood results and determines measures that need to be implemented for the development not to have any adverse impacts on the flooding characteristics.

In summary, the objectives are as follows:-

- Prepare a dynamic 1D/2D computer model based on existing site conditions for 1% AEP;
- Define design flood levels, depths and hazards for the catchment for the existing site conditions;
- Modify the site conditions to post-development to predict the new flood levels for 1% AEP;
- Determine the Flood Planning level (FPL)
- Determine if the proposed development has any adverse impact on flooding;
- Propose mitigation measures; and
- Adopt these measures in the architectural plans and during construction.

Hydrology

The hydrological modelling was adopted from council provided flood model. The critical duration for the subject site in the 1% AEP storm event has been determined to be 9 hours as per the flood report of the council provided TUFLOW flood model (Location ID: BC5 – Bonds creek -d/s Tributary 1 Junction).

Hydraulic Modelling

Definition

The model is a dynamically lined 1D/2D TUFLOW model.

Proposed Buildings

The proposed building outlines on proposed site were modelled as blocked obstructions.

The buildings finish floor level to be the adopted Flood Planning Level (FPL) which equals the 1% AEP flood level plus 500mm freeboard as required by Council.

2D Model Setup

Two-dimensional (2D) hydraulic modelling was carried out to determine the flood behaviour in the study area. A fine grid size (3m x 3m) was deemed necessary to define the extent of the flooding through the developed areas.

Design Flood Modelling Results

Design flood modelling was undertaken for the 1% AEP design flood event. The results are presented in Appendix 1 of this report.

Flood depth & Water surface elevation maps for the PMF storm event has also been prepared and are presented in Appendix 1.

FLOOD PLANNING LEVEL

Table 1 Flood Level & Flood Planning Level

Location & Description	1% AEP Flood Level (m) AHD	PMF Flood Level	FPL
Building Block 1	71.6	72.25	72.1
Building Block 2	72.1	72.75	72.6
Building Block 3	72.2	72.95	72.7

EVACUATION

All four building blocks are not located within the 1% AEP flood extent. However, the flood maps suggest that in the PMF event the building blocks will be affected by flooding.

As The PMF flood will be a flash flood in nature and Fifth Avenue and Fourth Avenue will also be subject to flooding; it will not be safe to evacuate the site in such extreme flood event.

It is recommended that the residents/ operations of the building blocks go up to level 1 from the Ground floor and take shelter in case of very severe flood event forecast and do not attempt to drive into the flood water.

DISCUSSION & RECOMMENDATION

This section of the report provides a review of the results and discusses Council's requirements as stated in the DCP.

1. The proposed development does not have any adverse impacts on the flooding elsewhere in the floodplain. This can be seen in the flood maps (as the proposed structures do not encroach onto 1% AEP flood extent). As a result, the proposed development does not increase the flood levels and hazards elsewhere in the floodplain. This indicates that there is no change in the flood conveyance and no loss in flood storage;
2. The Proposed habitable FFLs of the buildings are to be at or higher than the FPL (1%AEP flood RL + 500mm freeboard)
3. Any fencing located within the flood extent of the site is to be open style so that floodwater can traverse downstream without any obstruction.
4. The requirements of the DCP are to be implemented.

In our opinion, the proposed building footprint due to the proposed addition does not displace the floodwaters in such a manner to impact on the flooding behaviour in terms of loss of flood storage, increase in velocity and risk.

CONCLUSIONS

A detailed investigation on the flooding behaviour has been undertaken to determine the feasibility of the proposed development at 184-186 Fifth Avenue, Austral.

Using the flood provided TUFLOW model and accounting for council's proposed works in the vicinity; the study determined the flood extent and water surface elevation for the 1% AEP & PMF design flood.

The flood maps show that 1% AEP flood does not encroach onto the proposed development's building footprint. Therefore, there is no flood impact caused due to the proposed development. The proposed development does not increase the flood levels elsewhere in the floodplain or cause any loss of the flood storage.

The flood maps are included under Appendix 1. Should you have any further queries or questions, please do not hesitate to contact the undersigned.

Yours faithfully

S&G Consultants Pty Limited

A handwritten signature in blue ink, appearing to read 'S. Haddad', enclosed within a faint rectangular box.

Sam Haddad

Director (Civil)

MIEAust CPEng NER



A1 Appendix 1

Flood Mapping

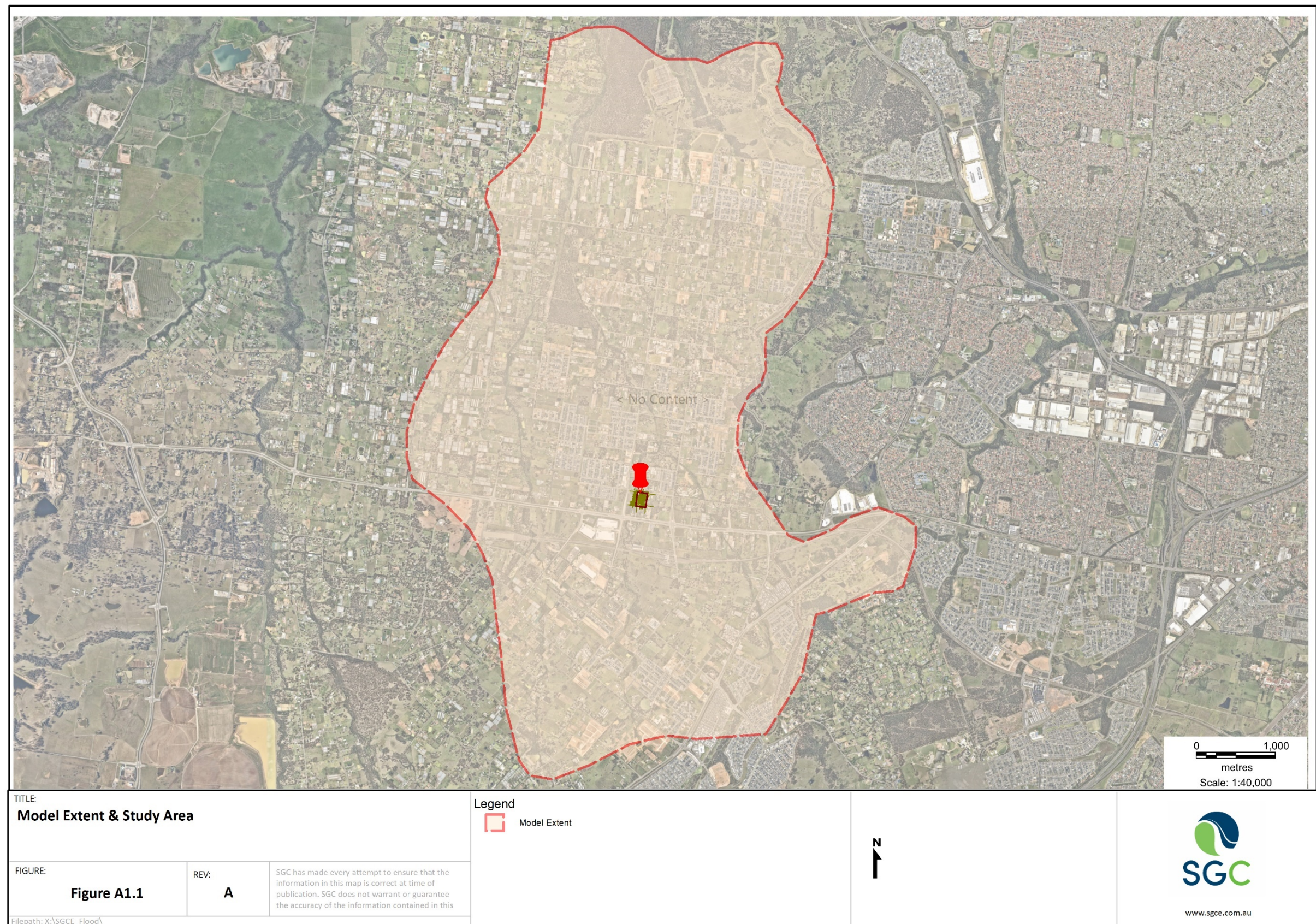


Figure A 1.1 Model Extents & Study Area

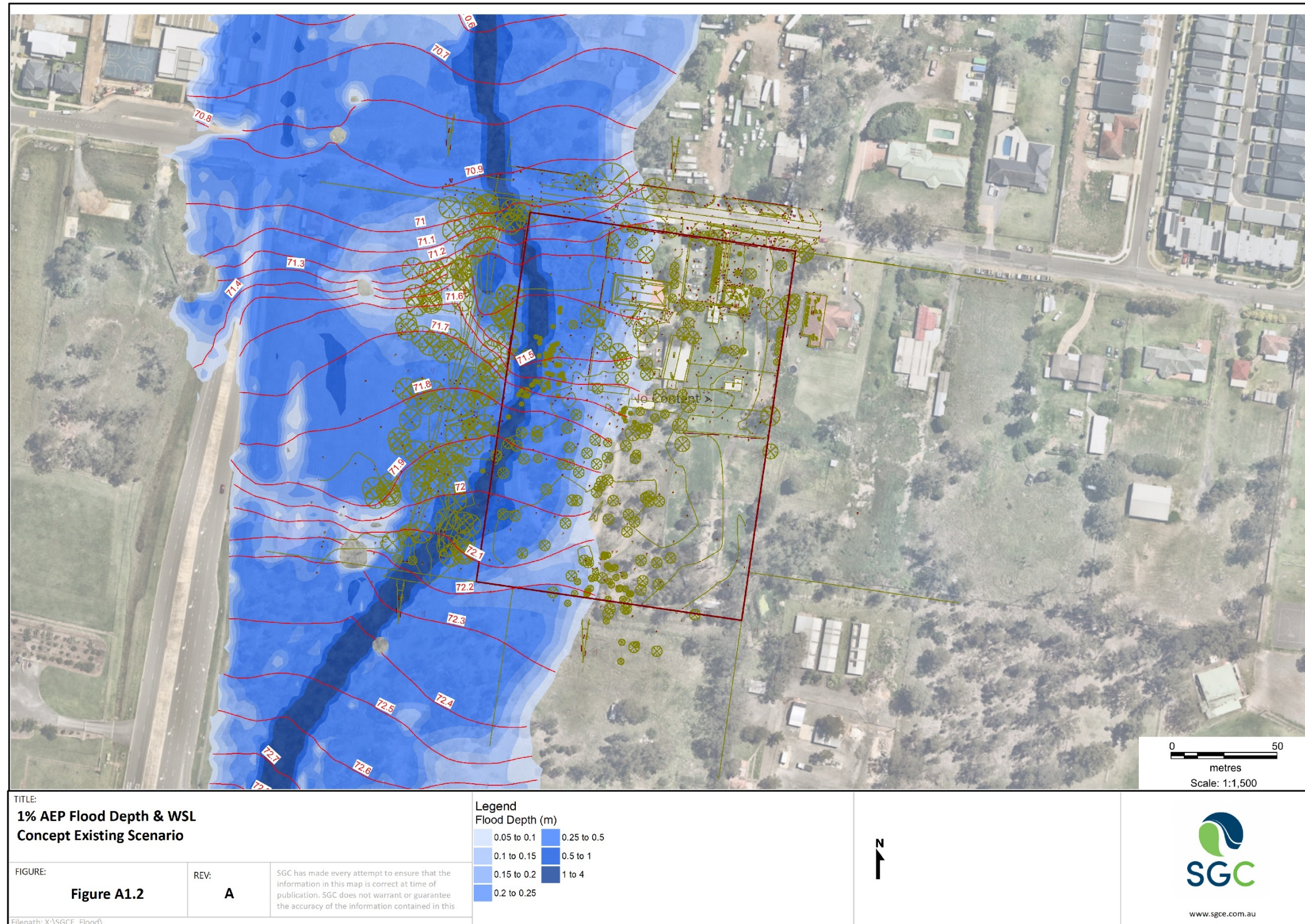


Figure A 1.2 1% AEP Flood Depth & WSL – Existing Scenario

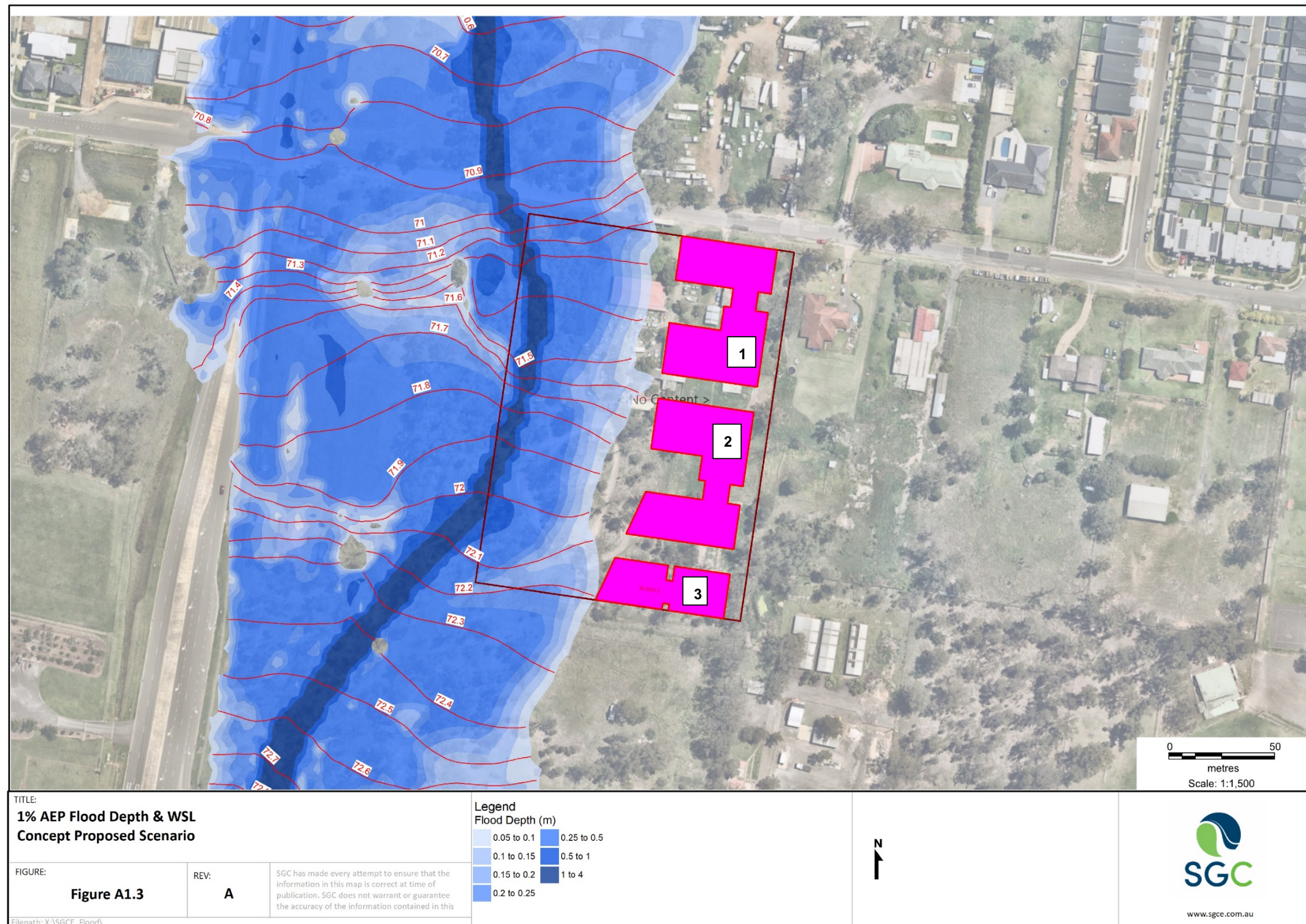


Figure A 1.3 1% AEP Flood Depth & WSL – Proposed Scenario

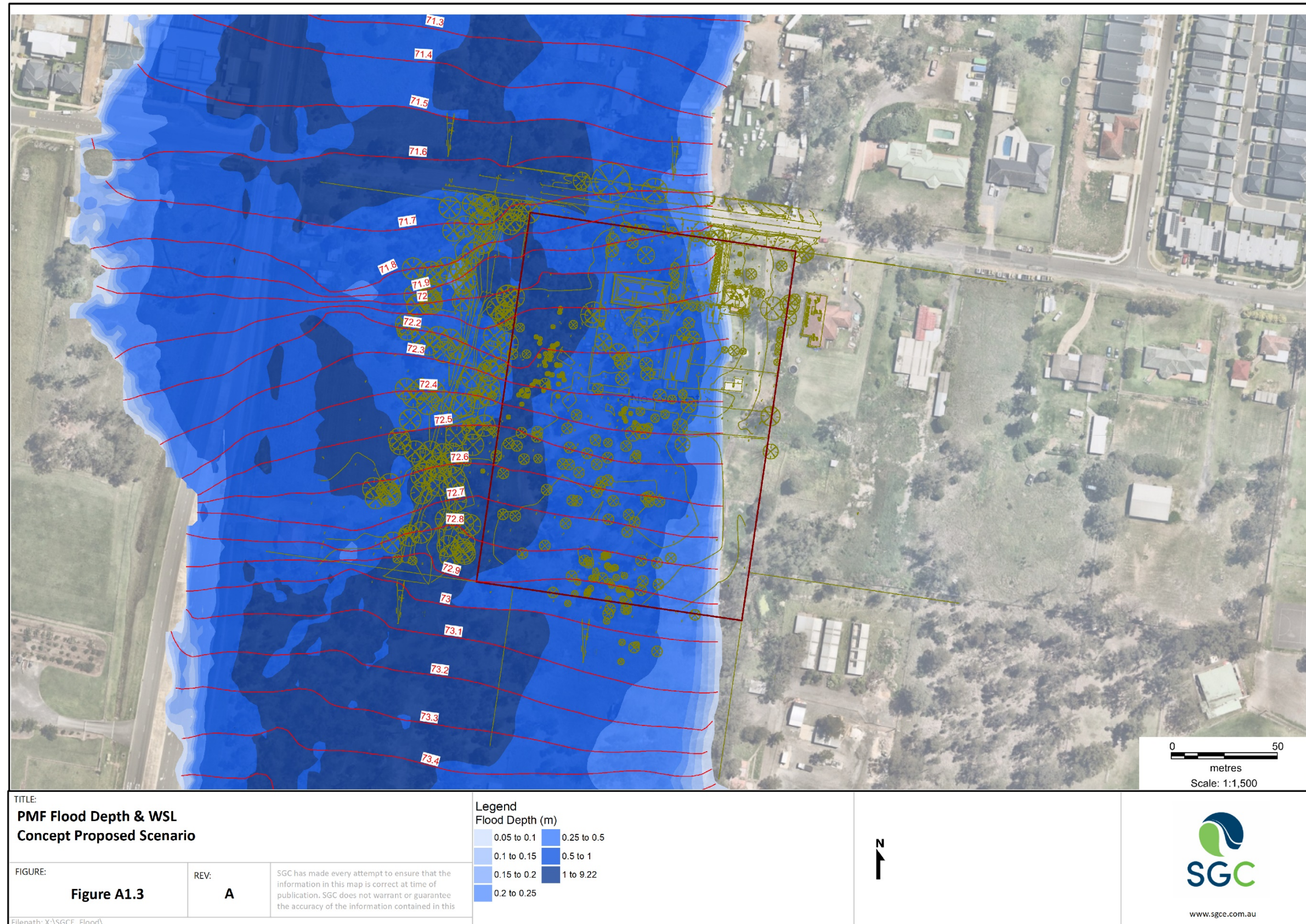


Figure A 1.4 1% AEP Flood Depth & WSL – Proposed Scenario

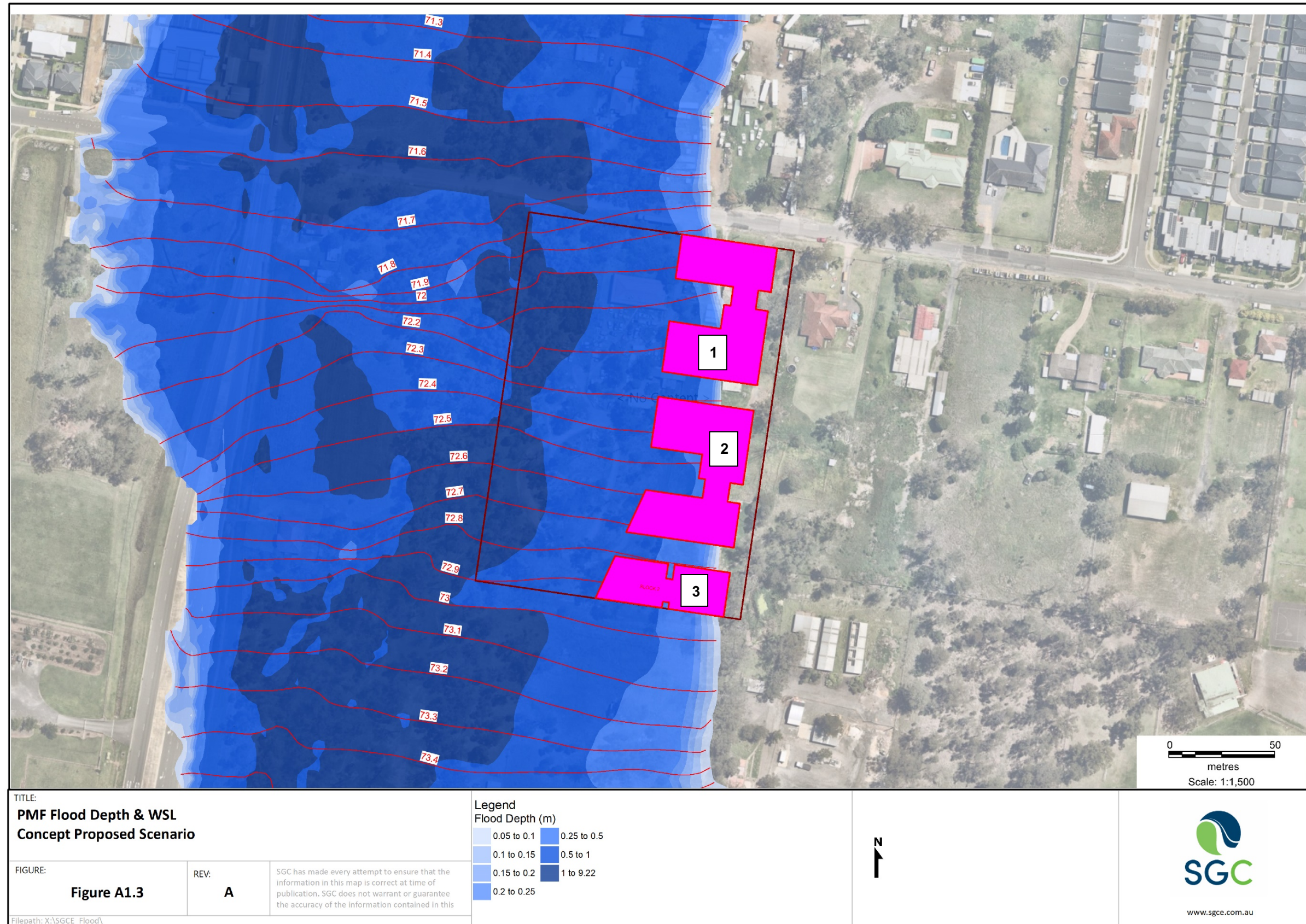


Figure A 1.5 1% AEP Flood Hazard – Proposed Scenario

