Flood Assessment Report

Brookhollow Avenue Data Centre Expansion, Norwest

Prepared for Green Square DC c/o AREA Consulting / 12 Dec 2025

232040

TTW (NSW) Pty Ltd (ACN 649 974 112)
(ABN 74 649 974 112) I Consulting Engineers
Level 6, 73 Miller Street, North Sydney NSW 2060

Your Partner in Engineering

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Rev	Date	Prepared By	Approved By	Remarks
1	25/10/20	AV	MK	First Draft
2	25/12/12	AV	MK	Final

1.0 Introduction

This report has been prepared on behalf of Project Garden 1 Pty Ltd as trustee for the Norwest Property Trust (the applicant) in support of a State Significant Development Application (SSD-81928961) submitted to the Department of Planning, Housing and Infrastructure (DPHI) under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

This Flood Statement has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued for the State Significant Development Brookhollow Avenue Data Centre Expansion, Norwest (SSD-81928961) dated 8 April 2025. Specifically, this report has been prepared to respond to the SEARs requirement outlined in Table 1.

Table 1: Relevant SEARS Items

SEARS No.	Requirements	Report Section
21 – Flood Risk	Identify the flood planning area and level as set out in the relevant Council LEP or SEPP and identify any: • Flood risks on site having regard to adopted flood studies • The potential effects of climate change, and • Any relevant provisions of the NSW Flood Risk Management Manual.	The site is not located within a Flood Planning Area and is not subject to flood-related development controls, as confirmed by the Section 10.7 Planning Certificate (No. 81245, 1 Oct 2025). Flood modelling and review of existing studies (GHD 2000; S&G Consultants 2021) indicate only minor overland flow, fully contained within local drainage paths. Climate change has been assessed in accordance with ARR 2019 (Book 1 Ch. 6) using a 66% increase in rainfall intensities (SSP 3-7.5 scenario). The 1% AEP + CC flood is fully contained within the channel, with no overtopping expected. Refer to Sections 3.1-3.5 for further discussions.
	Where the development is occurring on flood prone land, a Flood Impact and Risk Assessment (FIRA) must be prepared having regard to the *Flood Impact and Risk Assessment – Flood Risk Management Guide LU01* (FIRA guide). When determining the scope and category of the FIRA, the requirements outlined in the FIRA guide must be considered.	The site is not located or mapped as flood prone land. Please refer to Section 3.1 and Section 3.5.
	Detail any flood risk management measures that are to be incorporated as part of the development having regard to relevant guidelines (including any design solutions, flood modification measures, property modification measures, operational procedures, or Flood Emergency Response Plan).	As the site is not flood-affected, no specific flood mitigation measures are required. Overland flow is fully contained within the road reserve and existing creek corridor up to the PMF even. Refer to Sections 3.1, 3.5 and 4.0 for further discussions.

1.1 Guidance Documents

The following documents have been reviewed and referenced in preparing this report:

- Australian Emergency Management Institute (2017) Australian Disaster Resilience Handbook Collection – 'Handbook 7 – Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia'
- Department of Planning and Environment (2022) NSW Government Cumulative Impact Assessment Guidelines for State Significant Projects (https://www.planning.nsw.gov.au/sites/default/files/2023-03/cumulative-impact-assessment-guidelines-for-ssp.pdf)
- NSW Department of Planning and Environment (2023) Flood Impact and Risk Assessment – Flood Risk Management Guide LU01
- NSW Department of Planning and Environment (2023) Flood Risk Management Manual https://www.environment.nsw.gov.au/topics/water/floodplains/floodplain-manual
- NSW Department of Planning, Housing and Infrastructure – Planning Circular PS 24-001, Update on addressing flood risk in planning decisions, 1st March 2024
- NSW Maps Viewer (Spatial Collaboration Portal - Map Viewers (nsw.gov.au))
- NSW Planning Portal Spatial Viewer (https://www.planningportal.nsw.gov.au/spatialviewer/)
- The Hills Shire Council (2021) The Hills Development Control Plan

1.2 Proposed Development

This SSDA seeks development consent for the construction and operation of a data centre, with a total power consumption of approximately 96MW (IT load). The proposal will form part of a broader state-of-the-art data centre campus, equipped to cater for growing data storage needs within Australia and the emergence of artificial intelligence (AI).

In summary, approval for the following is sought:

- Minor site preparation works including tree clearing and bulk earthworks;
- Civil earthworks and the installation of relevant servicing infrastructure and utilities;
- Construction of a four (4) storey data centre with roof top plant, equating to an RL 130 (39.39m) and Gross Floor Area (GFA) of 16,191m2;
- Installation of 77 x diesel fuel generators and associated storage
- Provision of on-site car parking for approximately 25 spaces; and
- Landscaping, tree removal and offset tree planting.

The proposed site layout is shown in Figure *1* below.

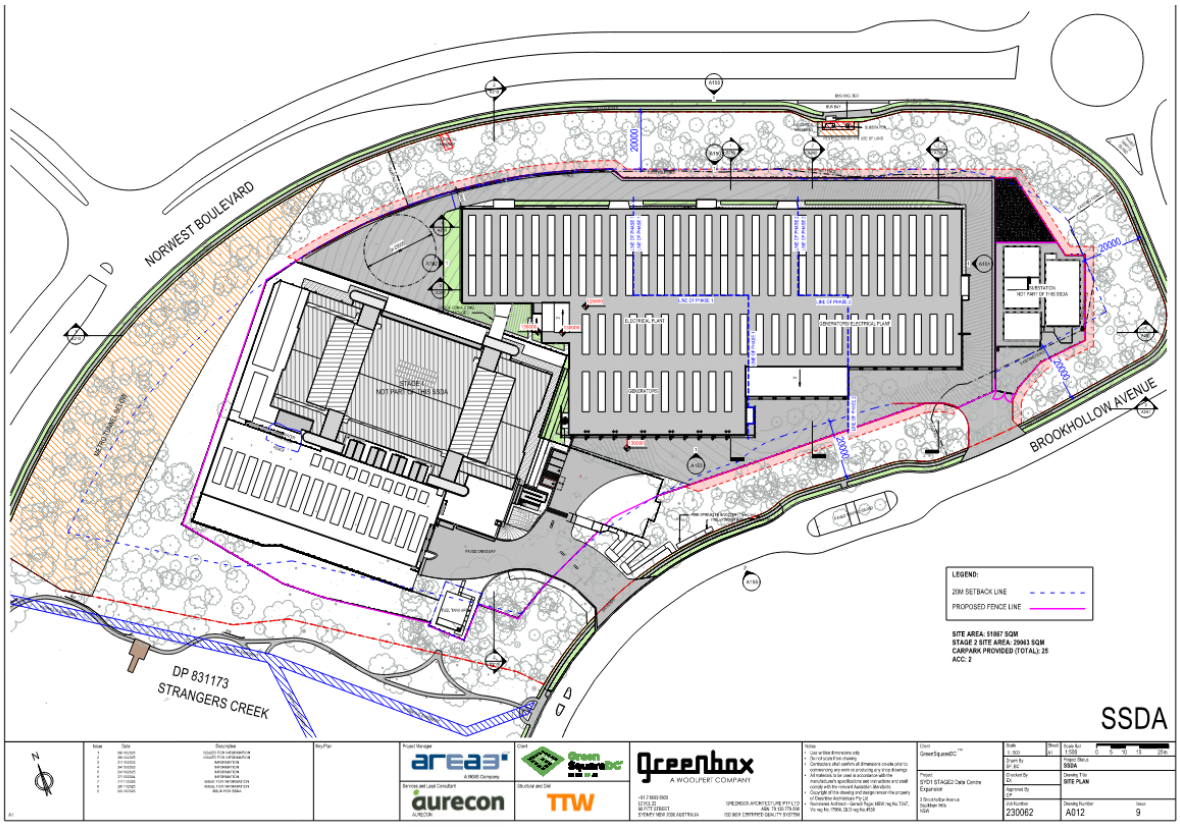

Figure 1- Site Plan (Source; Greenbox 05/12/2025)

2.0 Site Characteristics

2.1 Location

The site is located at 3 Brookhollow Avenue, Norwest NSW 2153 within The Hills Shire Local Government Area (LGA). The site is legally described as Lot 2021 in DP831173. The site has a total area of approximately 5.2ha, with frontages to Norwest Boulevard to the north, Brookhollow Avenue to the east and south. Strangers Creek marks the southwest border of the site, with the adjacent lot on the west occupied by commercial and office buildings.

The current site conditions and its surrounding area is presented in Figure 2. The site is currently zoned as SP4 ‘Enterprise’ under The Hills Local Environment Plan (LEP) 2019.

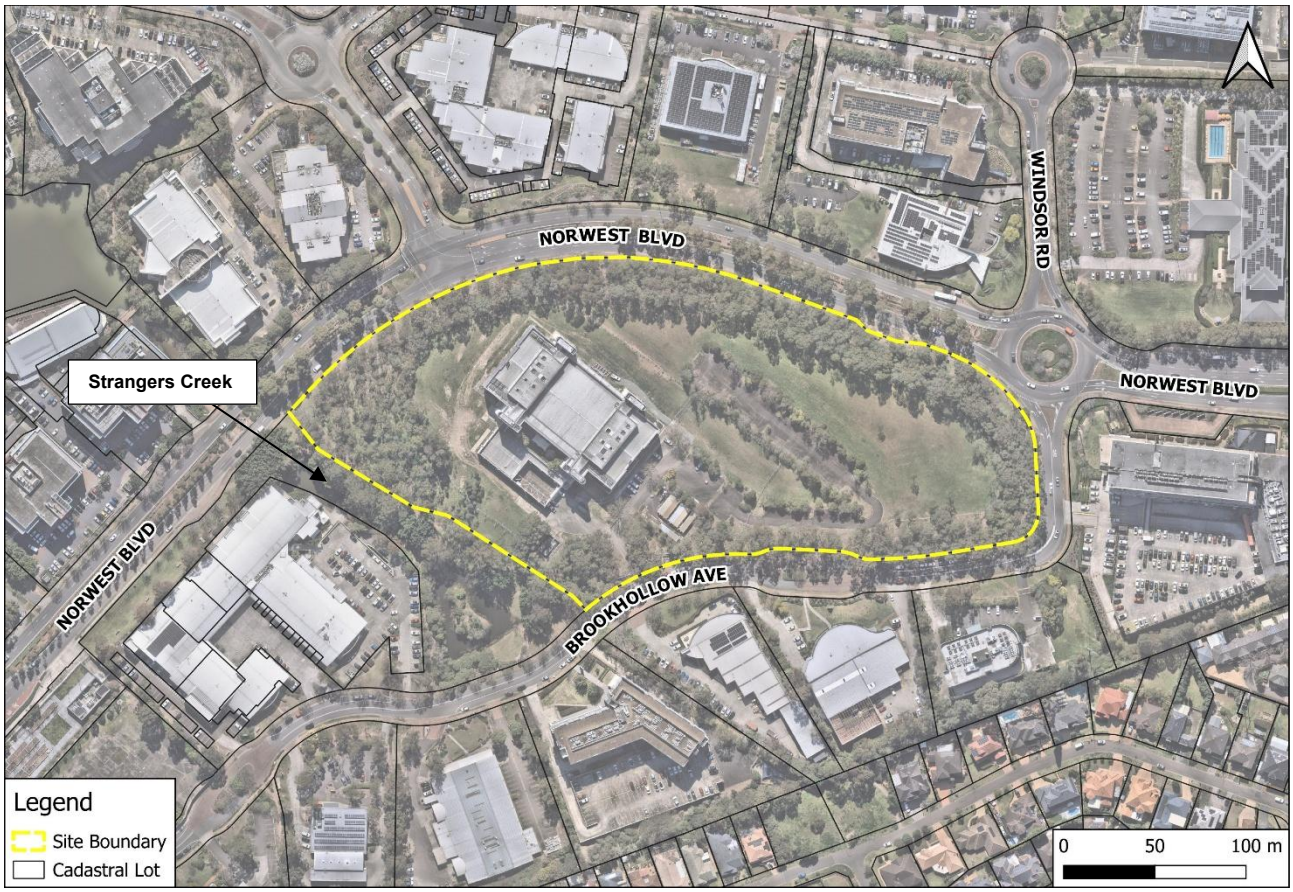

Figure 2: Site location and surrounding area. Source: Nearmap imagery dated July 2025.

2.2 Topography

To assess the topography of the wider area, the latest available elevation data (2019–2020) was obtained from the Elevation Information System (ELVIS) at a 1 m resolution. As shown in the Digital Elevation Model (DEM) in Figure 3, overland flow generally trends toward the west of the development area, while the development site itself is located on relatively higher ground. A representative cross-section illustrating the local topographic variation is provided in Figure 4**.**

To the north of the site, Norwest Boulevard functions as an overland flow path, conveying runoff toward the Norwest Station area.

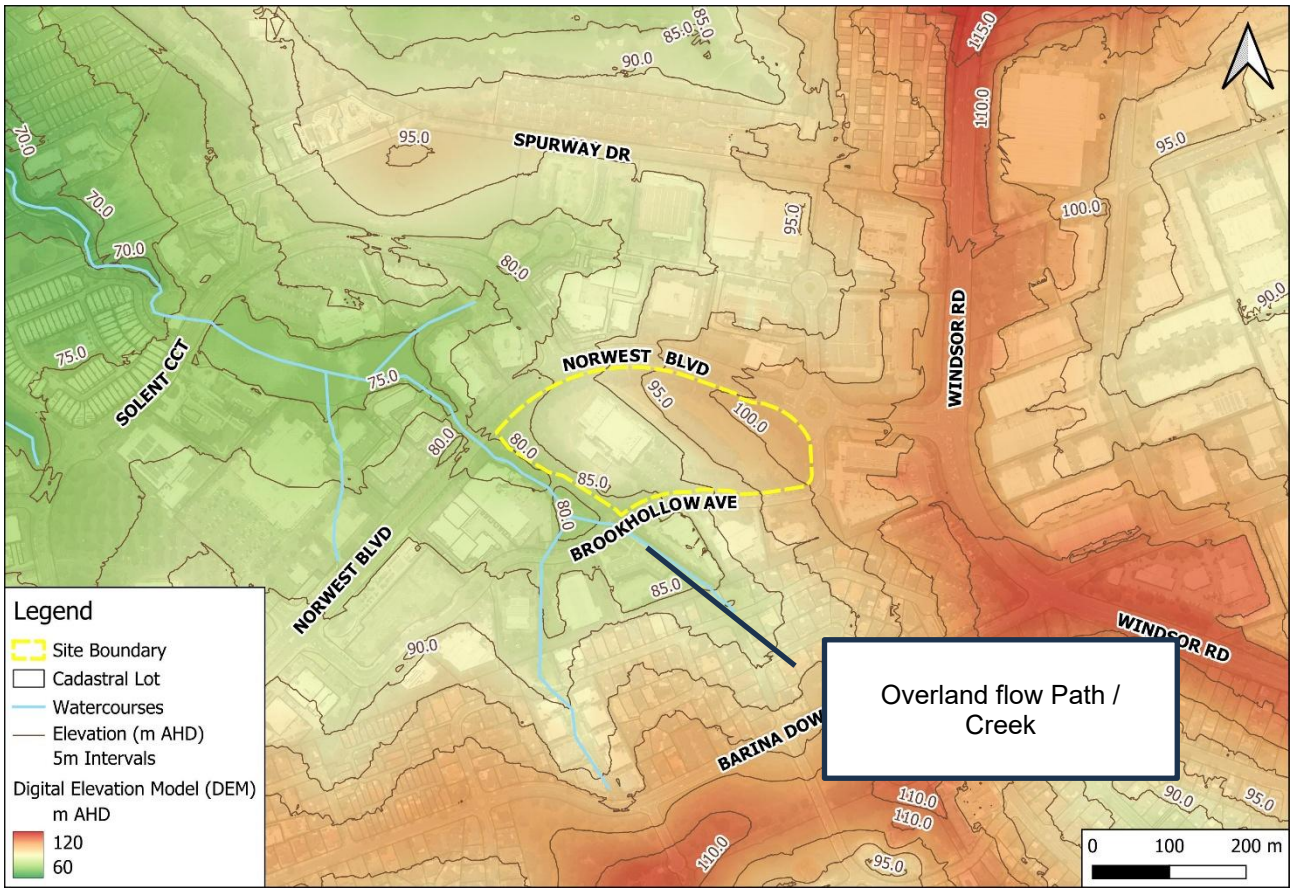

Figure 3: Topography of the site and its surrounding area based on 2019 and 2020 LiDAR data (Source: ELVIS).

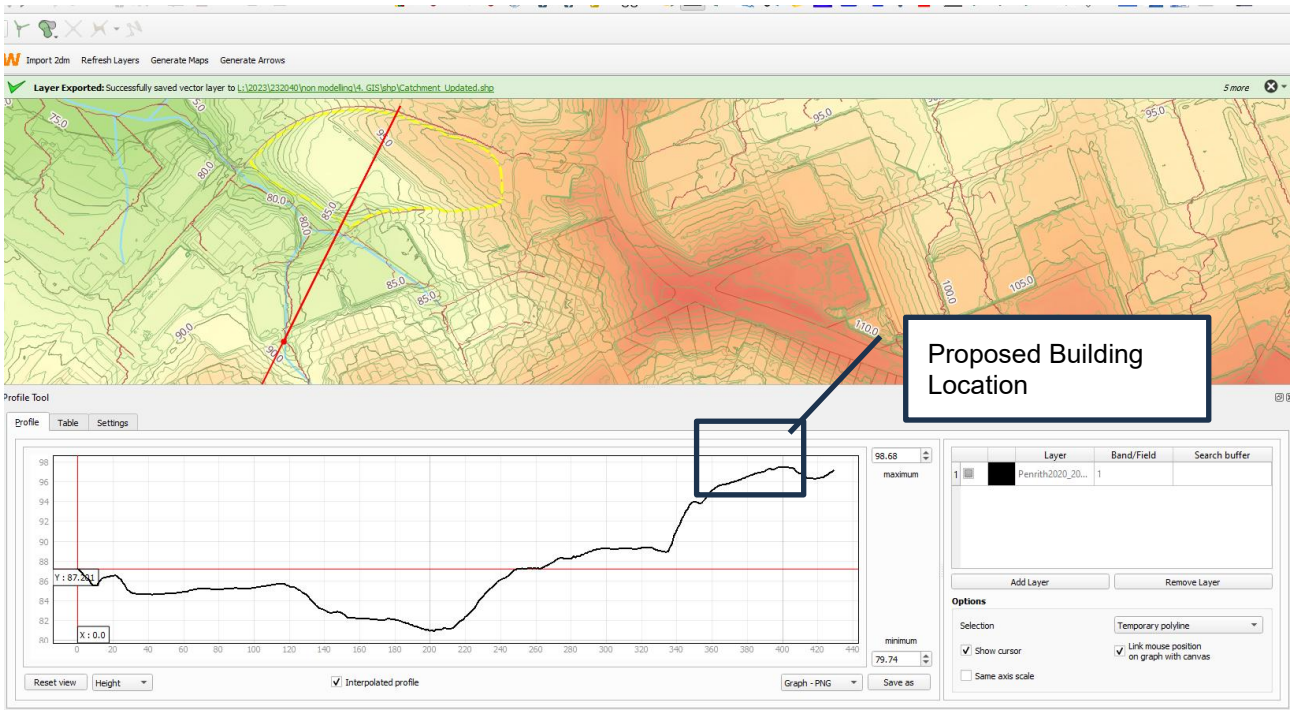

Figure 4- Typical Cross section

3.0 Existing Flood Information

3.1 Section 10.7 Planning Certificate

Based on the **Section 10.7 Planning Certificate (No. 81245, issued 1 October 2025)** for **1-9 Brookhollow Avenue, Norwest (NSW 2153)**, the property:

- Is **zoned SP4 Enterprise** under *The Hills Local Environmental Plan 2019*; and
- Is **not located within a Flood Planning Area and is not subject to flood-related development controls**, as confirmed under **Item 9 (Flood Related Development Controls)** of the certificate – *"NO"*

This is shown in Figure 5 :

9 Flood related development controls

(1) If the land or part of the land is within the flood planning area and subject to flood related development controls.

NO

(2) If the land or part of the land is between the flood planning area and the probable maximum flood and subject to flood related development controls.

NO

Figure 5- Flood related development control section from section 10.7 planning certificate

3.2 Available flood studies

3.2.1 GHD (2000) Strangers Creek Report on Flooding, Trunk Drainage and Water Quality

The Strangers Creek Report on Flooding, Trunk Drainage and Water Quality (GHD, 2000) forms part of The Hills Shire Council's Norwest Stormwater Drainage Master Plan. However, no detailed information or results from this study are publicly available. In addition, the report is over two decades old and may not reflect current catchment conditions or development within the Norwest area.

3.2.2 Flood Statement Report for 14-16 Brookhollow Avenue, Norwest

A flood statement prepared by S&G Consultants (2021) for 14–16 Brookhollow Avenue, located immediately south of the subject site, provides valuable context for understanding local catchment behaviour. The study found that this section of Brookhollow Avenue lies within the Strangers Creek catchment and is subject to minor overland flow conveyed through a shallow swale at the rear of the properties. The surrounding area, including 3 Brookhollow Avenue, is situated on relatively higher ground compared to the Strangers Creek gully located further west (between 18–20 and 22 Brookhollow Avenue), indicating that mainstream flooding from Strangers Creek is unlikely to affect the site. The contributing upstream catchment, estimated at approximately 1.45 ha, was assessed to generate a peak flow of about 0.9 m^3/s during the 1% AEP event, which can be contained within the existing rear setbacks. Based on these findings, similar localised overland flow conditions are expected to occur at 3 Brookhollow Avenue, with no significant risk of creek flooding. The previous study also confirmed that development along Brookhollow Avenue can comply with The Hills Shire Council DCP and Ministerial Direction 4.3 (Flood Prone Land) requirements without adverse impact on flood behaviour.

3.2.3 North West Rapid Transit project integrated Management System

According to the *NRT Stormwater and Flooding Management Plan (Sydney Metro, 2021)*, flooding across the Sydney Metro Northwest corridor was assessed using detailed 1D/2D TUFLOW hydraulic modelling to identify local overland flow paths and inundation risks. The modelling incorporated a full range of flood events, including the 1% AEP and Probable Maximum Flood (PMF), as well as climate change sensitivity scenarios (+10%, +20%, and +30% increases in rainfall intensity). The plan emphasises that new infrastructure must not exacerbate existing flood behaviour ("no net worsening") and that mitigation should focus on maintaining existing flow conveyance, providing adequate overland flow paths, and ensuring safe access and egress during flood events. Flood emergency management procedures, including monitoring, closure of flood-prone access points, and event-based response protocols, were also incorporated to minimise residual flood risks during both construction and operational phases.

The Metro area is located well to the southwest of the Green Square Data Centre site and lies outside the local catchment. Therefore, flooding associated with the Metro infrastructure is not expected to have any material impact on the site.

3.3 Catchment Delineation and Hydrological Modelling

Catchment delineation for the site was undertaken using HEC-HMS. The results, presented in Figure 6 indicate that the majority of the upstream catchment drains toward the Strangers creek located adjacent to the site. In contrast, the Norwest Boulevard area forms an independent catchment with its own local drainage system. As such this catchment is not included in this assessment.

It was found that Norwest Boulevard has a relatively steep grade, and any runoff generated along this roadway is directed downstream to the creek , away from the development site. As such, overland flow from Norwest Boulevard is not expected to impact the proposed development.

Figure 6- Catchment Delineation for the Site

In regard to Strangers Creek, a DRAINS model was developed to estimate design flows for the 1% AEP and 1% AEP + Climate Change events within the creek adjacent to the site. The model setup and key assumptions are summarised below in Table 2.

Table 2- Drains model Setup

Catchment	Area (ha)	EIA (Effective Impervious Area)	RIA (remaining impervious are)	PA (Pervious) Area	Slope
A1	12	30%	40%	30%	5%
A2*	21.5	30%	40%	30%	5%

* Catchment A4 is added to A2

The rainfall losses were represented using the Initial Loss–Continuing Loss (IL/CL) model within the DRAINS software. The adopted parameters are as follows:

Table 3- Initial continuing loss parameters

Parameter	Impervious Area	Pervious Area
Initial Loss (mm)	1	10
Continuing Loss (mm/hr)	0	5

Model results indicate that Pattern 7 of the 10-minute storm is the critical duration for Sub-catchment A1, while Pattern 6 of the 10-minute storm is the most critical for Sub-catchment A2. The corresponding median peak flows are 10.5 m³/s for Catchment A2 and 5.8 m³/s for Catchment A1, resulting in a total combined peak flow of approximately 16.3 m³/s at the outlet of the study area.

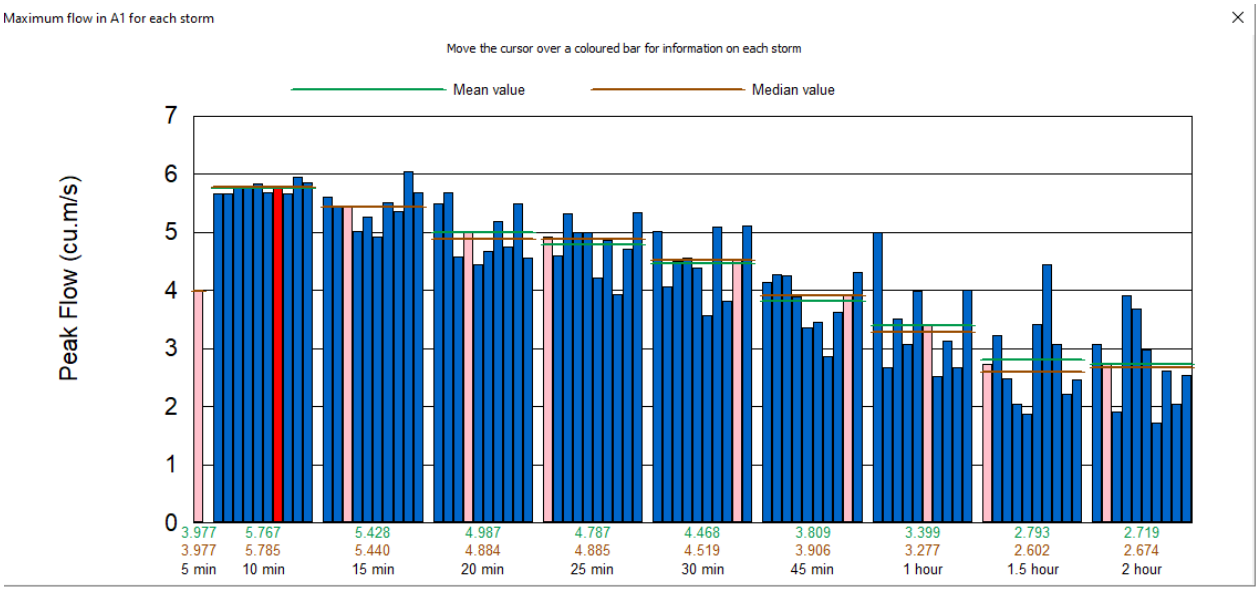

Figure 7 - Critical Duration analysis for Catchment A1

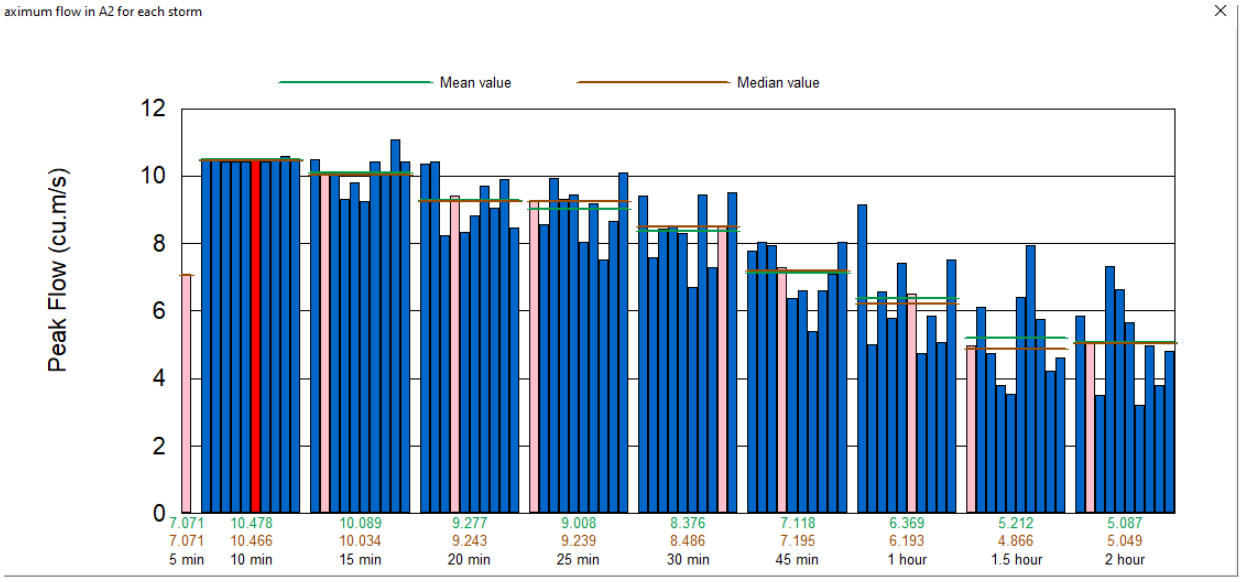

Figure 8- Critical Duration analysis for Catchment A2

3.4 Climate Change

As outlined in the new ARR2019 Climate Change Considerations chapter (i.e. Book 1 Chapter 6), the effects of climate change that has occurred since the development of the current set of rainfall IFDs (Intensity-Frequency-Duration data) should be considered and accounted for in the assessment of present time flooding conditions (i.e. the year of 2025 at the time of assessment). For this assessment, all rainfall intensities adopted have been upscaled to the year 2100 based on the Shared Socioeconomic Pathway (SSP) 3-7.5 Scenario, which represents the intermediate Greenhouse Gas Emissions Scenario. Specifically, this study adopted an 66% increase in rainfall intensities for all storms extracted directly from the ARR Data Hub, with duration 1hr or shorter. The increase in rainfall intensity factors (i.e. IFDs upscale factors) for various design storm durations, as extracted from the ARR Data Hub for the site area is shown in Figure 9.

SSP3-7.0

Year	<1 hour	1.5 Hours	2 Hours	3 Hours	4.5 Hours	6 Hours	9 Hours	12 Hours	18 Hours	>24 Hours
2030	**1.18**	**1.17**	**1.16**	**1.14**	**1.13**	**1.12**	**1.12**	**1.11**	**1.1**	**1.1**
2040	1.23	1.21	1.2	1.18	1.17	1.16	1.15	1.14	1.13	1.12
2050	**1.29**	**1.26**	**1.24**	**1.22**	**1.2**	**1.19**	**1.18**	**1.17**	**1.16**	**1.15**
2060	1.35	1.32	1.3	1.27	1.25	1.23	1.22	1.2	1.19	1.18
2070	1.42	1.38	1.35	1.32	1.29	1.28	1.26	1.24	1.22	1.21
2080	1.5	1.45	1.42	1.38	1.35	1.33	1.3	1.28	1.26	1.25
2090	**1.59**	**1.53**	**1.49**	**1.44**	**1.4**	**1.38**	**1.35**	**1.33**	**1.3**	**1.29**
2100	1.66	1.59	1.55	1.5	1.45	1.42	1.39	1.37	1.34	1.32

Figure 9- Climate change factors downloaded from data hub

The corresponding median peak flows are 9.64 m³/s for Catchment A1 and 17.9 m³/s for Catchment A2, resulting in a total combined peak flow of approximately 27.54 m³/s at the creek next to the site for climate change scenario of the study area.

3.5 Hydraulic modelling

Three cross-sections of the creek adjacent to the site were extracted from the available LiDAR dataset to accurately represent the existing ground surface and channel geometry along the flow path. The locations of these cross-sections are shown in Figure 10.

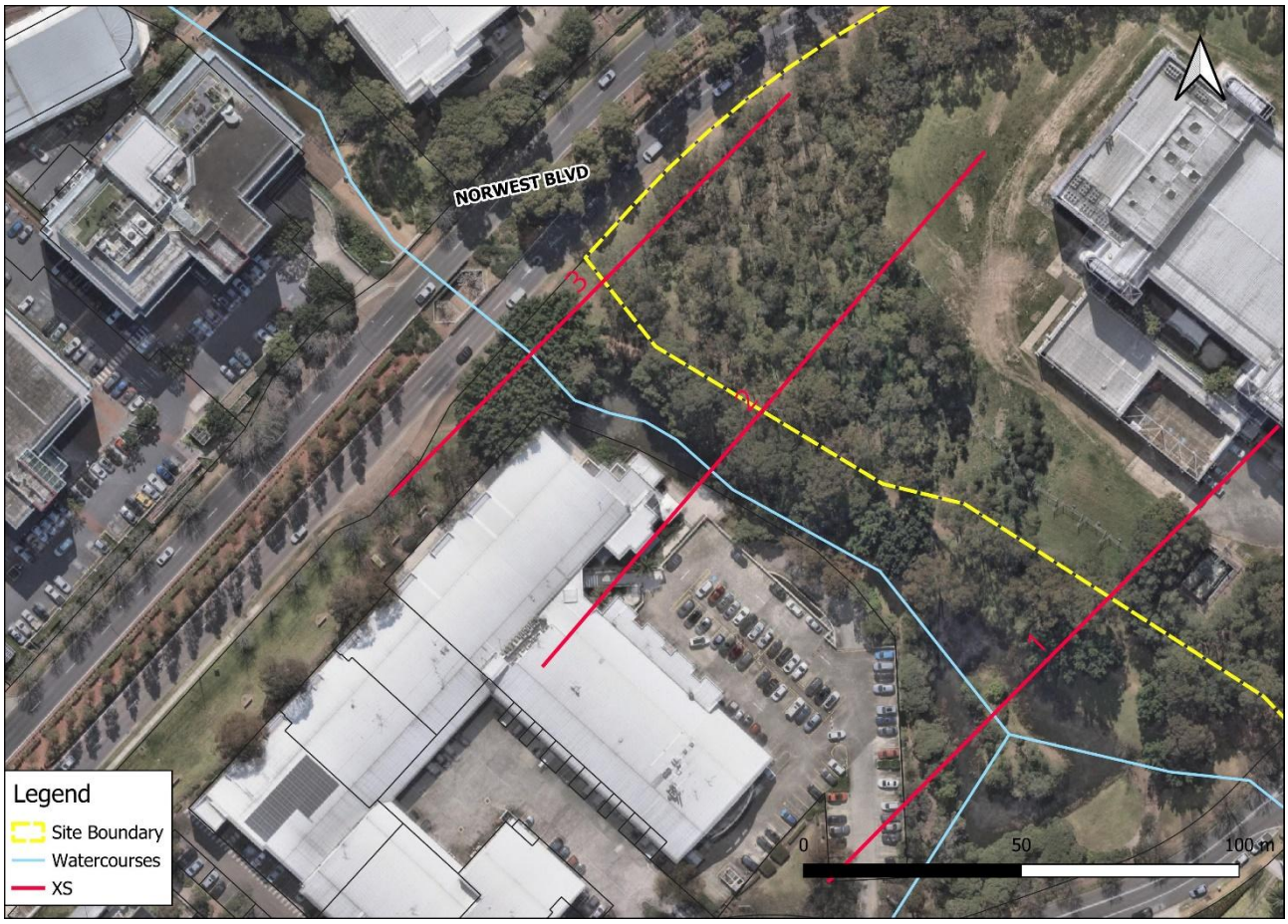

Figure 10- The location of Cross section s

A preliminary 1D HEC-RAS model was prepared using the selected cross-section to estimate creek flood extents for the 1% AEP, 1% AEP + climate change (CC), and PMF events. The model applies Manning's roughness of $n = 0.035$, appropriate for a natural channel with moderate vegetation and irregular banks. For the PMF, a peak flow equal to 3.5 times the 1% AEP flow is assumed, giving a PMF discharge of approximately 54 m³/s.

The downstream culvert/bridge Northwest Boulevard was not included due to insufficient structural data; results therefore represent a simplified open-channel condition intended for indicative assessment adjacent to the site.

Water surface profiles for the 1% AEP, 1% AEP + Climate Change (CC), and PMF (the most conservative) scenarios for Cross-Section #2 are presented in Figure 11, Figure 12 and Figure 13. Under the adopted assumptions, the PMF, representing the most extreme flood event, remains contained within the channel, and larger floods are not expected to overtop the channel banks at this location.

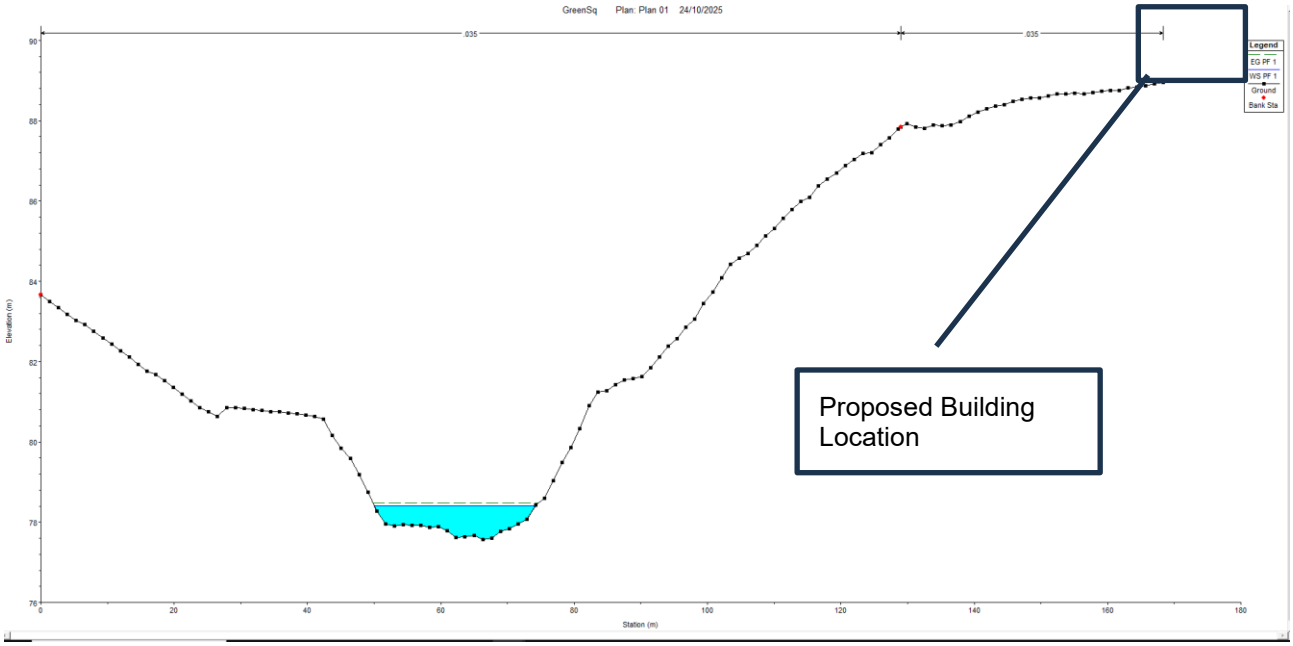

Figure 11- Cross section for 1% AEP Flood level

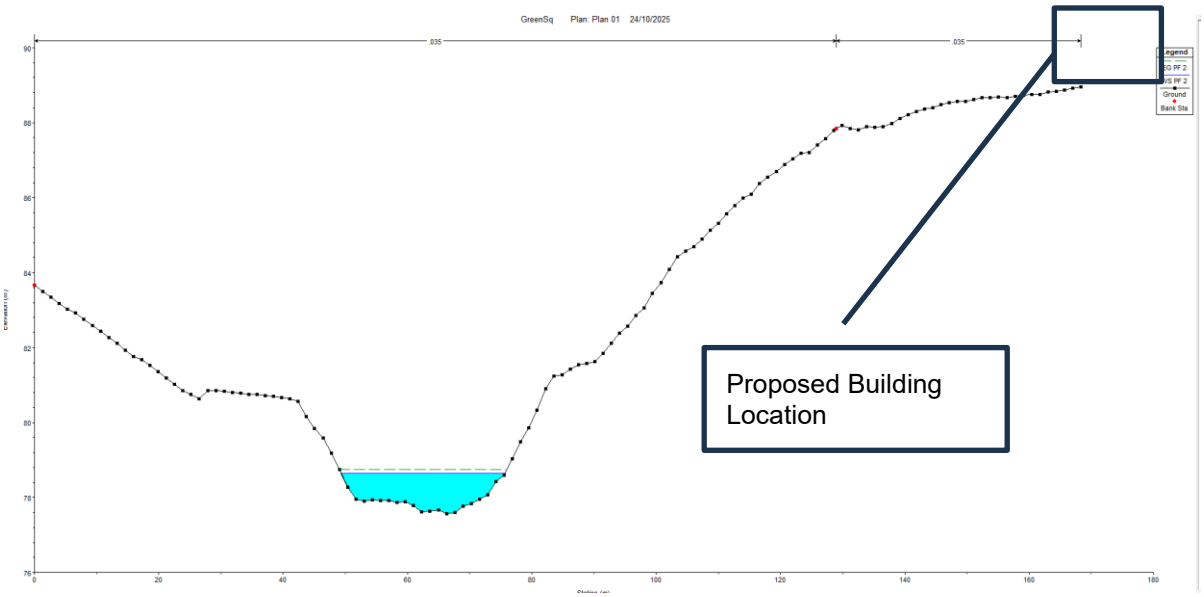

Figure 12- Cross section for 1% AEP CC Flood level

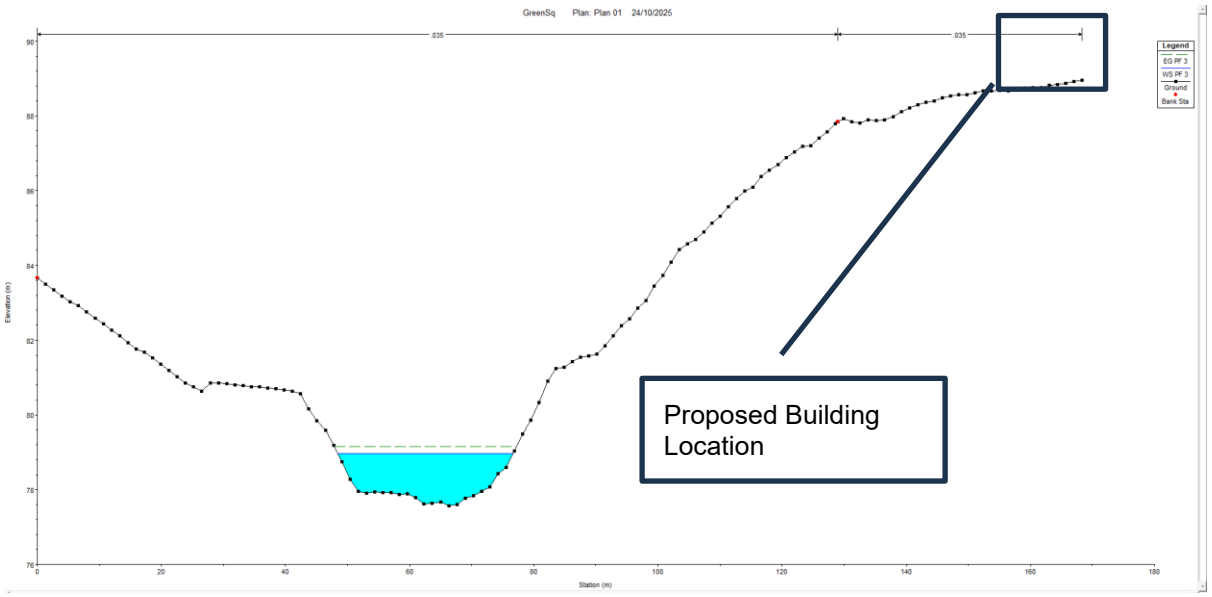

Figure 13- Cross section for PMF Flood level

4.0 Flood Planning Controls

Flood Control Land and Applicable Development Controls

In accordance with Part C, Section 6 – Flood Control Land (2012) of the Hills Shire Council Development Control Plan, the following procedure must be followed to determine which flood-related development controls apply to a site:

Step 1: Determine whether the property is identified as a Flood Control Lot or Flood Controlled Land. (This can be confirmed through the purchase of a Section 149 [now Section 10.7] Planning Certificate from Council or by reviewing Council's online mapping.)

Step 2: Identify which of the six land use categories the proposal falls under (refer to Schedule A).

Step 3: Assess and document how the proposal will satisfy the applicable flood-related development controls and their objectives (refer to Sections 2 to 10).

Step4: Discuss the final application with Council staff prior to lodgement. Advice from a suitably qualified civil engineer may be required.

Based on the findings presented in Section 3.1 and 3.5, of this report, the subject site is not affected by flooding and does not fall within a Flood Control Lot or Flood Controlled Land. Consequently, Steps 2 to 4 above are not applicable, hence flood-related development controls do not apply for the subject site.

5.0 Conclusion

A flood assessment has been undertaken for the proposed Green Square Data Centre Expansion at 3 Brookhollow Avenue, Norwest, to identify potential flood risks and confirm compliance with relevant Council and State planning requirements. The assessment incorporated a review of available flood information, existing topography, and detailed site specific hydrologic and hydraulic analyses.

The results confirm that the site is not flood-affected and is not located within a Flood Planning Area, as verified by the Section 10.7 Planning Certificate (No. 81245, 1 October 2025). Hence, no flood-related development controls apply to the subject site, under Part C, Section 6 – Flood Control Land (The Hills DCP 2012).

Minor overland flow paths were identified along local drainage lines connected to Strangers Creek; however, modelling indicates that these flows are fully contained within the existing channel for all assessed events, including the 1% AEP + Climate Change scenario. The HEC-RAS analysis demonstrates that the 1% AEP + CC flood level remains well below the channel banks, confirming that overtopping is not expected under any design condition. While the site is located outside any flood sources extent, it is prudent that adequate and appropriate local drainage system is provided for the development to ensure that the site is not impacted by flooding due to internal local drainage issues.

Given these findings, the proposed development will not cause adverse impacts on existing flood behaviour or surrounding properties and can be supported. Based on the above, a Flood Impact and Risk Assessment (FIRA) is not required for this development, and that the proposed GreenSquare Data Centre Expansion is compatible with the local land use, satisfies all relevant planning and flood management requirements, and presents no material flood risk to people, property, or adjoining developments.

Prepared by
TTW (NSW) PTY LTD

ALI VAHIDI
Senior Civil Flood Modeller

Authorised By
TTW (NSW) PTY LTD

Michael Koi
Associate - Flood