

Flood Risk Assessment

New High School for Wilton

Prepared for SINSW on behalf of NSW Department of Education / 29 August 2025

251308

Contents

1.0	Introduction	4
1.1	Guidance Documents	4
1.2	Site Description	4
1.3	Proposed Activity Description.....	5
2.0	Site Characteristics.....	8
2.1	Future Development and Zoning.....	8
2.2	Catchment Information.....	9
2.3	Site Topography	10
3.0	Flood Planning Requirements.....	12
3.1	Wilton Growth Area DCP, 2021.....	12
3.2	Wollondilly DCP	13
4.0	Hydrological Analysis.....	14
4.1	External Catchment Analysis	14
4.2	DRAINS Hydrological Flow Calculation	14
5.0	Existing Flood Information	17
5.1	Draft Wollondilly Shire Flood Study (2023 / 2024)	17
5.2	Flood Planning Area	18
5.3	North Wilton Stage 2 & 3 Water Cycle Management Strategy Report, 2022.....	19
5.4	Climate Change.....	21
6.0	Flood Emergency Response Considerations.....	22
6.1	Site Access.....	22
6.2	Flood Emergency Management	24
7.0	Conclusions and Recommendations	26
	Mitigation Measures	26
	Evaluation of Environmental Impacts	27

Rev	Date	Prepared By	Approved By	Remarks
1	30/05/2025	RC	TM	Draft for review
2	12/06/2025	RC	TM	For approval
3	26/06/2025	RC	TM	For REF Submission
4	01/07/2025	RC	TM	For REF Submission
5	29/08/2025	RC	TM	Updates to address RtS comments

1.0 Introduction

This Flood Risk Assessment (FRA) has been prepared to support a Review of Environmental Factors (REF) for the NSW Department of Education (DoE) for the construction and operation of the new high school for Wilton (the activity).

The purpose of the REF is to assess the potential environmental impacts of the activity prescribed by *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP) as “development permitted without consent” on land carried out by or on behalf of a public authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The activity is to be undertaken pursuant to Chapter 3, Part 3.4, Section 3.37A of the T&I SEPP.

This document has been prepared in accordance with the *Guidelines for Division 5.1 assessments* (the Guidelines) by the Department of Planning, Housing and Infrastructure (DPHI) as well as the *Addendum Division 5.1 guidelines for schools*.

The Planning Circular PS 24-001 notes that the flood risk profile of each proposal should be considered, which assess the flood characteristics for the location, the nature and type of development and any impacts on the existing community and surrounding properties. The purpose of this report is to outline the existing constraints of flooding and overland flow paths at the school site and assess the risk and impact associated with the proposed activity. The details of this report are based on currently available information and correspondence undertaken at the time of writing.

1.1 Guidance Documents

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

- Department of Planning and Environment (2021) Considering Flooding in Land Use Planning Guideline;
- Department of Planning and Environment (2023) Flood Impact and Risk Assessment – Flood Risk Management Guide LU01;
- Department of Planning, Housing and Infrastructure – Planning Circular PS 24-001, Update on addressing flood risk in planning decisions, 1st March 2024;
- NSW Department of Planning, Industry and Environment (2021) North Wilton Precinct Schedule 2
- NSW Floodplain Development Manual, June 2023
- NSW Planning Portal Spatial Viewer (Spatial Collaboration Portal - Map Viewers (nsw.gov.au)); and
- School Infrastructure New South Wales (SINSW) Guidelines for School Site Selection and Master Planning, 2023.
- Stantec (2023) Wollondilly Shire Draft Flood Study Report, Final Draft, August 2023
- TKD Architects (2025) Wilton High School: Architectural Masterplan Design Report For Tender, Revision B, May 2025
- Wilton Growth Area Development Control Plan (DCP) 2021
- Wollondilly Interactive Mapping (uses Wollondilly Shire Draft Flood Study updated mapping 2024)
- Wollondilly Shire Council Development Control Plan 2016

1.2 Site Description

The current street address is 200 Fairway Drive, Wilton, NSW 2571. The site forms part of the southern portion of Lot 1063 in Deposited Plan 1289197 that was previously subdivided by Landcom. The site is approximately 3.79ha hectares in size and is located within the North Wilton Precinct.

As a result of precinct wide rezonings, the surrounding locality is transitioning from a semi-rural residential

area to a highly urbanised area with new low to medium density residential development with supporting services. North Wilton is approximately 85km south-west of the Sydney CBD, 30km north-west of Wollongong and 30km southwest of Campbelltown-Macarthur Strategic Centre. The precinct is located on an interchange with the Hume Highway, which connects the Southern Highlands with the Sydney metropolitan region to the northeast and Canberra to the south-west.

The proposed school site does not currently have road access, however Landcom is expected to deliver the road network and surrounding public domain network in accordance with DA/2022/1279/1. Proposed Road 14 located on the eastern boundary of the site will ultimately provide future access to the site. The site contains several patches of remnant native vegetation particularly within the south-western portion of the site. An aerial photograph of the site is provided in Figure 1.



Figure 1: Aerial photograph of the site. Source: Nearmap imagery collected March 2025.

1.3 Proposed Activity Description

The proposed activity is for the staged construction and operation of a new high school for Wilton which will accommodate up to 1,000 students and 78 staff.

The new high school includes general and support learning spaces, specialist learning hubs, a library, administrative areas and a staff hub. Core facilities include a canteen, carparks, and sports courts.

Specifically, this proposal includes the following:

- Stage 1 includes:

- Construction of a learning hub (Block A).
- Sport field and sports courts.
- Northern car park
- Stage 2 includes:
 - Construction of learning hubs (Blocks B and C) and a sports and performance hub (Block D)
 - Southern car park
- Associated site utilities and services including installation of new padmount substation and a new main switchboard.
- Main school pedestrian entrance proposed off Road 14.
- Kiss and drop zone proposed along Road 14.
- Earthworks and tree removal.

Figure 2 shows the proposed site plan. New sub-arterial roads will bound the west of the site, with Road 20 to the north of the primary school site and Road 14 to the east. The construction of all roads are to commence in November 2025, with completion by June 2026.



2.0 Site Characteristics

2.1 Future Development and Zoning

The site is located within the North Wilton Precinct, and forms part of the Wilton Growth Area. The Wilton Growth Area is in the Western City District, which includes the local government areas of Camden, Campbelltown, Fairfield, Liverpool and Wollondilly.

The site is within Landcom's 'Panorama' Precinct, with the project aiming to deliver up to 5,600 homes over the next 25 years. Figure 3 provides an overview of the future development within the precinct and the greater site context.

The precinct is well connected by the Hume Motorway, with additional major roads planned in the surrounding area – including a new bridge and on- and off-ramp onto Hume Motorway, as indicated in the North Wilton Precinct staging plan in Figure 4. These have a target completion of April 2027.

Though the site was not included in the Wollondilly Local Environmental Plan (LEP) 2011 land zoning, the site has been categorised as SP2 Regional Road and UD Urban Development in the 2021 State Environmental Planning Policy Precincts – Western Parkland City (SEPPWPC) land use zoning.

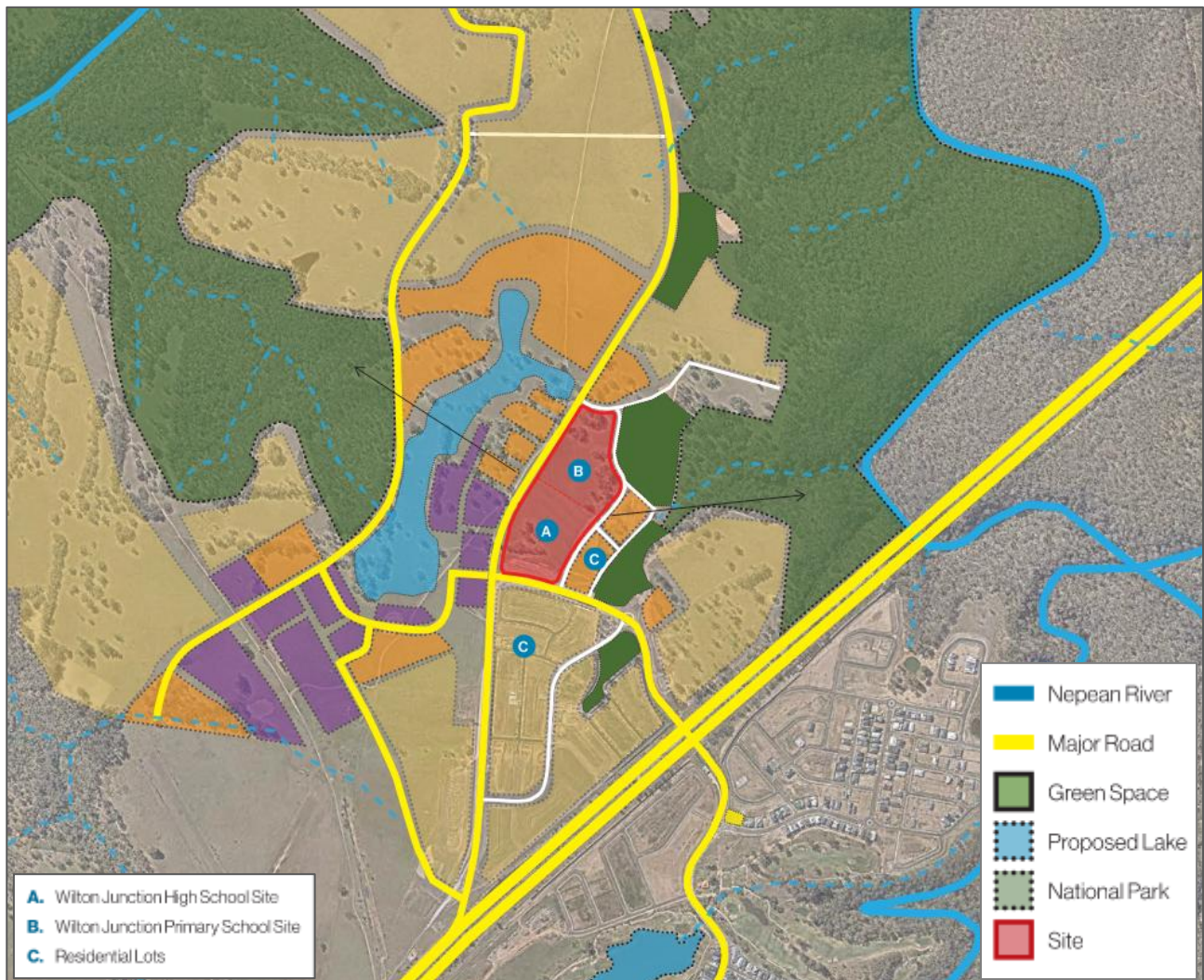


Figure 3: Greater site context, with proposed works in the North Wilton Precinct. Source: TKD Architects, March 2025

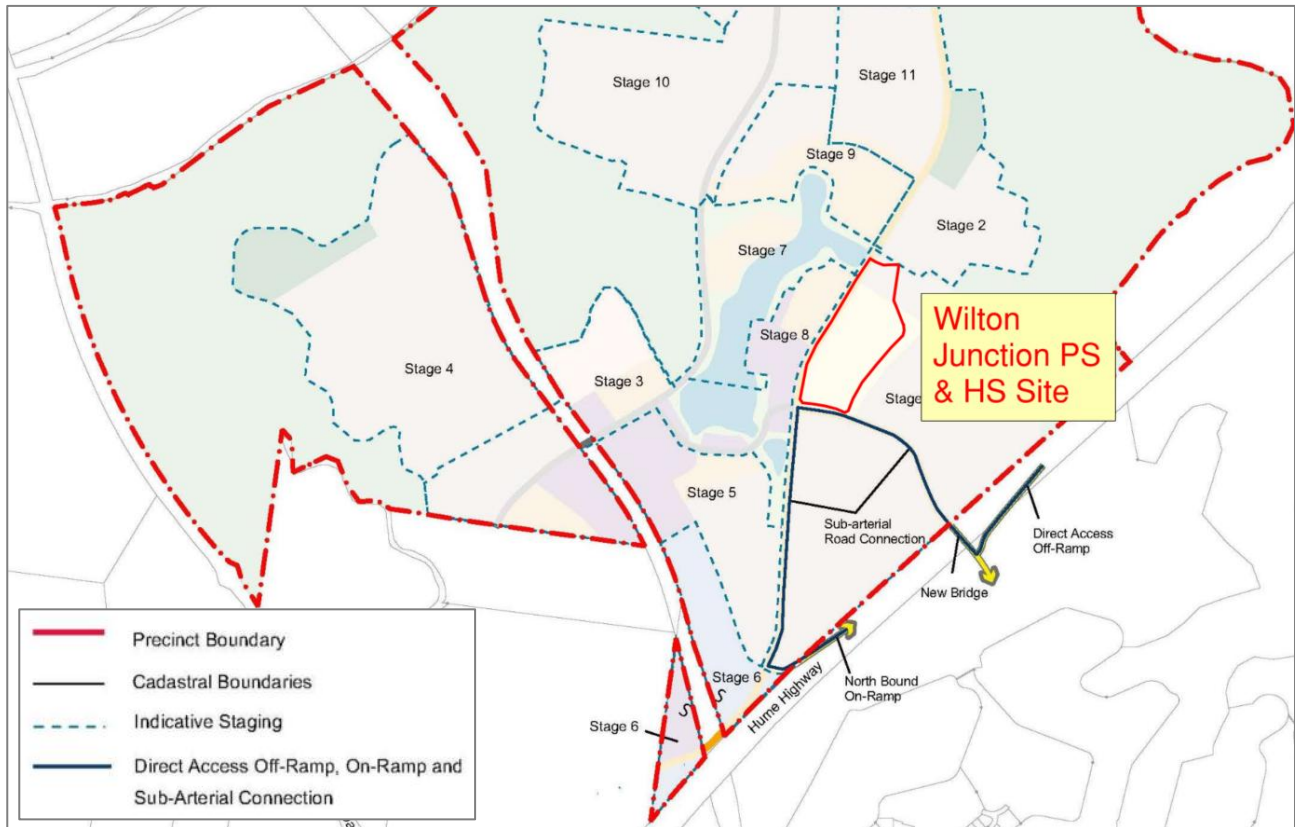


Figure 4: North Wilton Precinct Indicative Staging Plan. Source: NSW Department of Planning, Industry and Environment, North Wilton Precinct Schedule 2, 2021

2.2 Catchment Information

The site is situated within the Upper Nepean sub-catchment of the larger Hawkesbury-Nepean catchment. The Upper Nepean River Catchment area covers around 1,000 km², including the Nepean, Cataract, Cordeaux and Avon Rivers. The site is flanked by the Nepean River to the west (approximately 1.6km distance from the site) and Allens Creek to the east (approx. 700m distance).

This region is currently undergoing significant development, including new residential subdivisions and new/upgraded roadways to support the increasing population. These developments have the potential to alter catchment runoff characteristics and flood behaviour along the river.

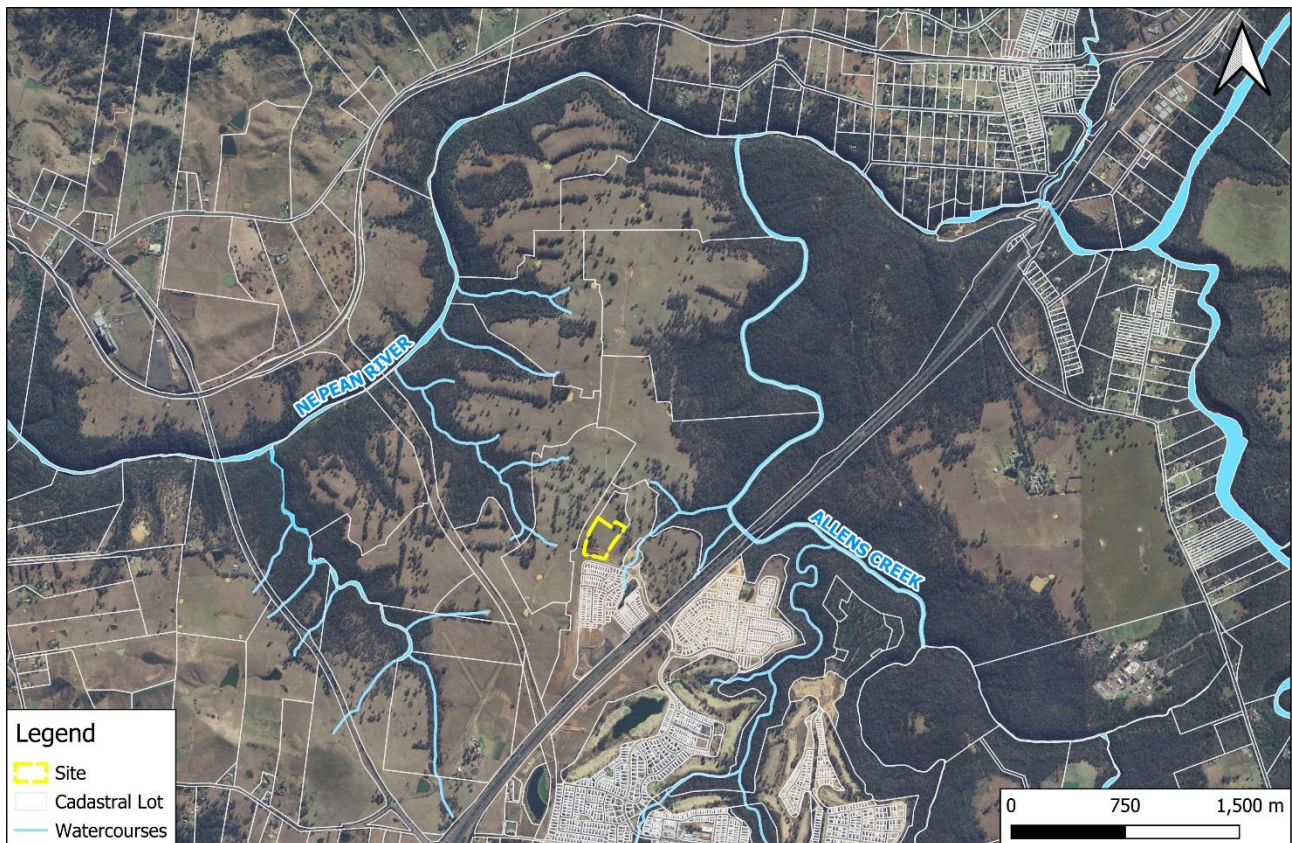


Figure 5: Location of site in relation to surrounding watercourses

2.3 Site Topography

To assess the topography of wider area, the latest available elevation data (2019) was obtained from the NSW Spatial Services, Elevation Information System (ELVIS).

The site is located on a ridgeline which separates two catchments, as depicted in the Digital Elevation Model (DEM) of the site in Figure 6. Any rainfall generated onsite or external flows entering the site will therefore be split flow, with some directed west towards the Nepean River, and the remainder to the east in the direction of Allens Creek. This is evident in Figure 7, which shows a cross-sectional elevation profile through the site.

The ground surface within the subject site boundary varies between 165 – 173 m AHD, with highest elevations to the south at the Fairway Drive frontage. Elevations are lowest at the east, with proximity to Allens Creek. The creek system to the east sits well below the site, with the first-order tributary around 130m AHD.

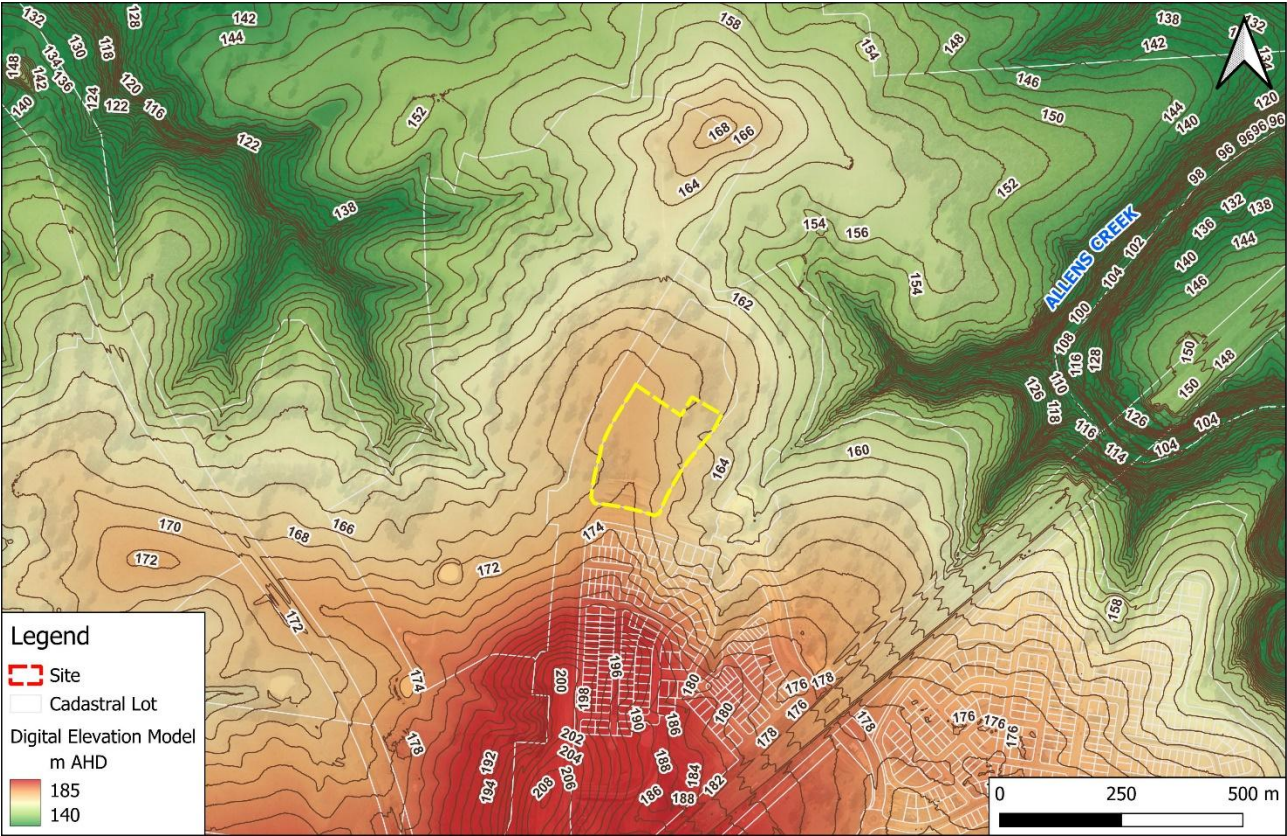


Figure 6: Topography of the site and surrounding area

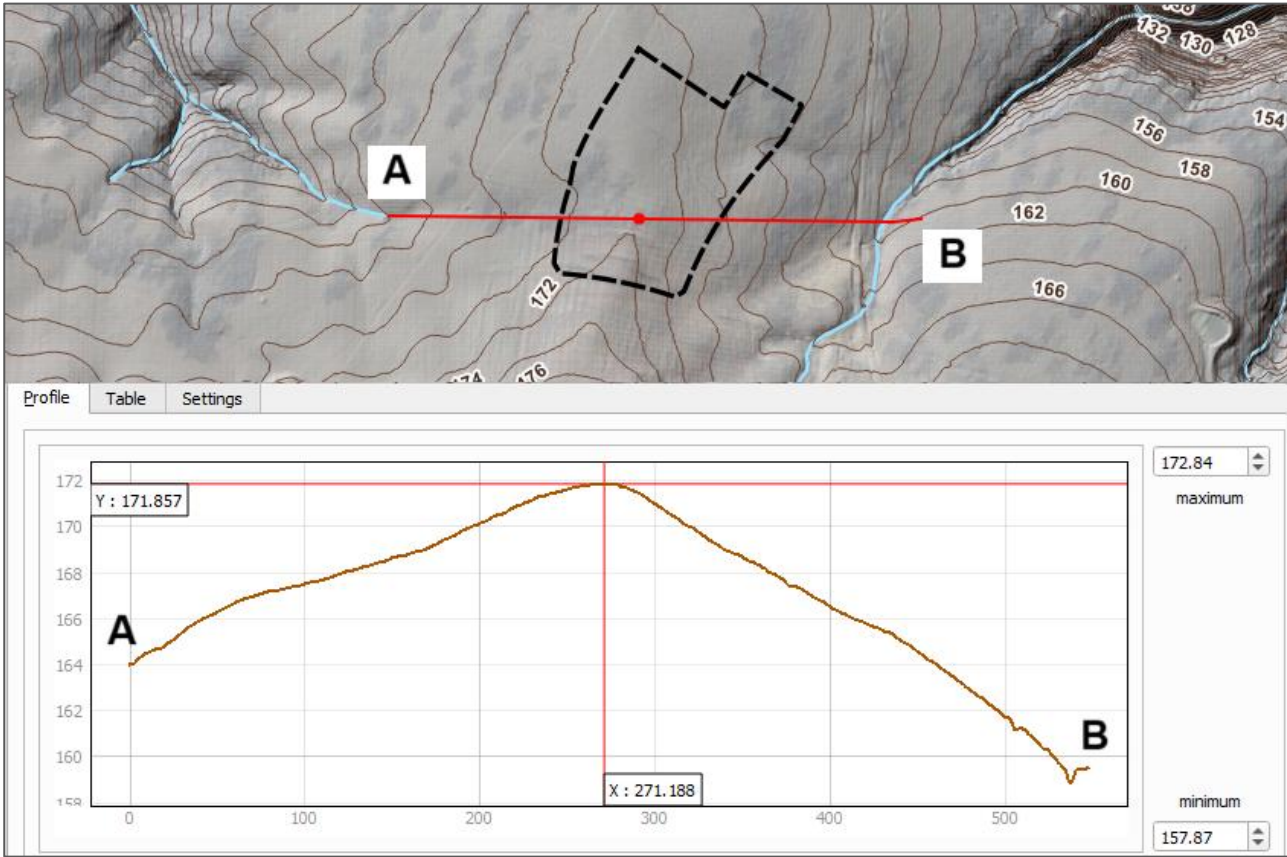


Figure 7: Cross-sectional elevation profile from west to east

3.0 Flood Planning Requirements

3.1 Wilton Growth Area DCP, 2021

The current Development Control Plan (DCP) in place for North Wilton is the Wilton Growth Area DCP. This was published in 2021 and supersedes all previous development controls laid out in the Wollondilly Local Environment Plan 2011 and the Wollondilly DCP 2016.

Part 3 'General Controls' Section 3.2 'Flooding' of the Wilton Growth Area DCP provides a risk-based approach to planning and development in the flood prone lands of the wider Wilton area. It should be noted that this project is utilising the Part 5 REF pathway, and is therefore not held to DCP or other local controls. While these can be used as the basis for design aspects, these are not requirements for the project.

The flood controls laid out in Section 3.2.2 of the DCP are shown below in Figure 8.

3.2.2 Controls

1. Development must assess impacts of climate change and increased rainfall intensities.
2. Stormwater conveyance will have a Major/Minor System configuration. Minor flows will be conveyed and contained in a system of kerb and gutter, pits and pipes/culverts. Major flows (flow in excess of Minor System capacity) will be conveyed in overland flow paths designed to cater for such flows.
3. Management of 'minor' flows using piped systems for the 1 in 10 (10%) AEP (residential land use) and the 1 in 20 (5%) AEP (commercial land use) will be in accordance Council's Design and Construction Specifications.
4. Management of 'major' flows using dedicated overland flow paths such as open space areas, roads, waterways and riparian corridors for all flows in excess of the pipe drainage system capacity and above the 10% AEP will be in accordance Council's Design and Construction Specifications.
5. Pedestrian and cycle pathways and open space may extend within the 1% AEP flood level, provided the safe access criteria contained in the NSW Floodplain Manual are met and there is no impact on the flood behaviour.
6. Development is not to result in an increase in flood levels on adjoining or surrounding land.
7. Development on flood prone land will comply with Council's Design and Construction Specifications and Flood Risk Management Policy.
8. Flood Prone Land identified in the relevant Precinct's Schedule shows indicatively the extent of the 1% AEP flood level. Where development is proposed adjacent to land identified as Flood Prone Land, in the relevant Precinct Schedule, as being affected by the 1% AEP level, Council may require a more detailed flood study to be undertaken by the applicant to confirm the extent of the flood affectation on the subject land.
9. Cut and fill is not to occur in the 1% Annual Exceedance Probability (AEP) floodway or within critical flood storage areas.

Figure 8: Flood controls laid out in Section 3.2.2 of the Wilton Growth Area DCP

The DCP states that Council may require a more detailed flood study to be undertaken to confirm the flood affectation of the land if a development is shown to be affected by the 1% AEP event, or where it is adjacent to ‘flood prone land’ (i.e., the Probable Maximum Flood (PMF)). The flood affectation of the site in the 1% AEP and PMF events is assessed against this requirement in Section 5.0.

There are no flood-related controls explicitly laid out for educational establishments.

3.2 Wollondilly DCP

Though the Wilton Growth Area DCP supersedes the Wollondilly DCP, it is important to acknowledge the controls within the Council DCP, which is still adopted for other areas within the LGA.

In the 2016 Wollondilly DCP, schools are categorised as an ‘Essential Community Facility’ and are consequently subject to stringent development controls.

Essential Community Facilities must not be located within Medium or High Flood Risk Precincts, with the definition outlined in Table B of the DCP (refer Figure 9 below). If located within the Low Flood Risk Precinct, *“The floor of any development must be above the Probable Maximum Flood Level. The submission of a surveyor’s certificate must be required on forming up of the structure, certifying that floor is not less than the required level.”*

Table B – Flood Risk Precinct Definitions
High Flood Risk Precinct In the absence of a detailed assessment with a Floodplain Risk Management Plan (that takes precedence over this definition), the following definition applies. The High Hazard Flood Risk Precinct has been defined as the area within the envelope of land subject to a high hydraulic hazard (as defined with the provisional criteria outlined in the Floodplain Development Manual and must be deemed to include the transition zone without a comprehensive study) in a 1% AEP (1in 100 year ARI) flood event.
Medium Flood Risk Precinct In the absence of a detailed assessment with a Floodplain Risk Management Plan (that takes precedence over this definition), the following definition applies. The Medium Hazard Flood Risk Precinct has been defined as land below the 1:100 year ARI flood level plus 0.5m freeboard (Flood Planning Level) that is not within the High Flood Risk Precinct.
Low Flood Risk Precinct In the absence of a detailed assessment with a Floodplain Risk Management Plan (that takes precedence over this definition), the following definition applies. The Low Hazard Flood Risk Precinct has has been defined as all other land within the floodplain (ie; within the extent of the Probable Maximum Flood or PMF) but not identified within either the High Flood Risk or the Medium Flood Risk Precinct where risk of damages are low for most land uses.

Figure 9: Flood risk precinct definitions as laid out in the Wollondilly DCP (2016)

The available flood information for the site is reviewed alongside the compliance of the proposed development with the applicable flood planning controls in Section 4.0 and 5.0.

4.0 Hydrological Analysis

Given the sensitivity of the proposed land use alongside the expanding development around the Wilton area, it is necessary to review the risks associated with stormwater and overland flow within the site.

4.1 External Catchment Analysis

There are first-order streams lying to the east and west of the site. To the east, the first and second order streams drain into the fourth-order Allens Creek, situated approximately 670 m from the site. The streams to the west of the site run toward the northwest, discharging into the Nepean River approximately 1.5 km from the site.

As noted in Section 2.3, the subject site is located along a ridgeline and subsequently has two upstream catchments ('Western' catchment and an 'Eastern' catchment). The external catchments contributing to runoff flows within the site boundary has been estimated and is shown in Figure 10, with the total contributing area estimated as 0.286 hectares (0.139 ha Eastern catchment, and 0.147 ha Western catchment). As the site is located at the top of the catchment area, the external catchment area is small and will not produce significant overland flows across the site.

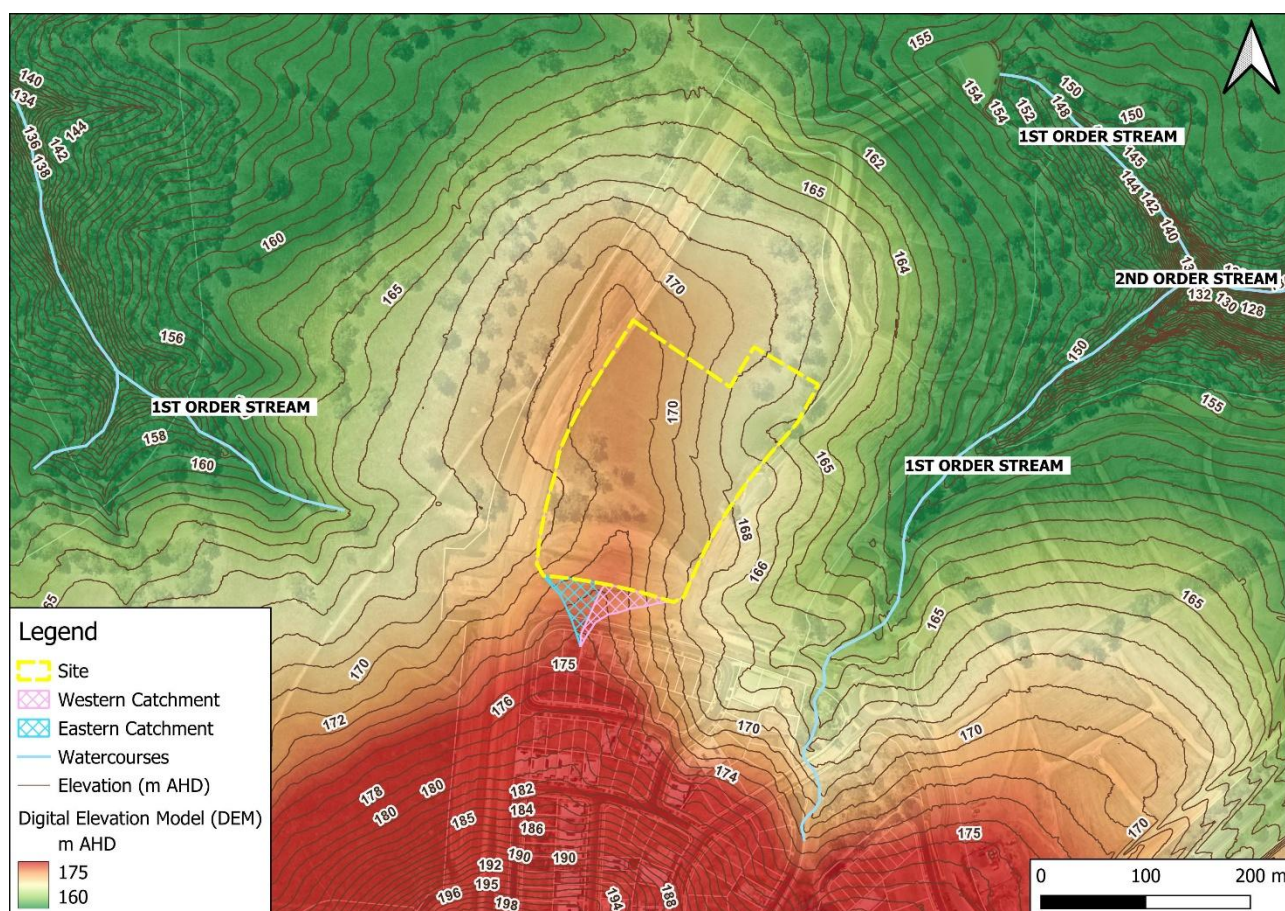


Figure 10: External catchments contributing to overland flow within the new Wilton high school

4.2 DRAINS Hydrological Flow Calculation

A DRAINS model was prepared to estimate overland flow derived from the upstream catchment outlined in Figure 10.

The model parameters and assumptions are laid out in Table 1. As the upstream catchment is largely derived from the future Fairway Drive and the residential development to the south, a 90% effective impervious area has been adopted.

Table 1: DRAINS Model Parameters

Parameter	Input
Model Type	IL/CL Model
Overland Flow Equation	Kinematic wave equation
Catchment Area	0.139 ha (Eastern), 0.147 ha (Western)
Impervious Area Initial Loss	0 mm
Impervious Area Continuing Loss	0 mm
Pervious Area Initial Loss	15 mm
Pervious Area Continuing Loss	2 mm
Time of Concentration	5 minutes
Effective Impervious Area	90%
Pervious Area	10%

1% AEP rainfall data, including temporal patterns and incremental rainfall data, was obtained from the Australian Rainfall and Runoff Data Hub and the Bureau of Meteorology (BOM) Rainfall Intensity-Frequency-Duration (IFD) Data System. The model was run for 10 temporal patterns, with storm durations ranging from five minutes to three hours.

Table 2 outlines the peak flow for each of the median 1% AEP storms. The 1% AEP 5-minute storm was found to be the critical duration, with a peak 1% AEP flow of 0.094 m³/s from the Western catchment and 0.089 m³/s from the Eastern catchment.

Table 2: Peak flow calculated for each of the median 1% AEP storms

1% AEP Storm	Median Storm	Peak Flow (m ³ /s)	
		Western Catchment	Eastern Catchment
1% AEP, 5-minute burst	Storm 1	0.094 (critical duration)	0.089 (critical duration)
1% AEP, 10-minute burst	Storm 1	0.091	0.086
1% AEP, 15-minute burst	Storm 2	0.090	0.076
1% AEP, 20-minute burst	Storm 7	0.078	0.074
1% AEP, 25-minute burst	Storm 1	0.079	0.075
1% AEP, 30-minute burst	Storm 3	0.066	0.063
1% AEP, 45-minute burst	Storm 3	0.059	0.056
1% AEP, 60-minute burst	Storm 3	0.050	0.047
1% AEP, 90-minute burst	Storm 2	0.046	0.044
1% AEP, 120-minute burst	Storm 6	0.046	0.044
1% AEP, 180-minute burst	Storm 6	0.028	0.026

Rainfall depths and intensity in the PMF event were calculated using the Generalised Short Duration Method (GSDM). The 15-, 30-, 45-, 60- and 90-minute storm durations were assessed, and the peak flows for each outlined in Table 3.

Table 3: Peak flow calculated for each of PMF storms

PMF Storms	Peak Flow (m ³ /s)	
	Western Catchment	Eastern Catchment
15-minute	0.406 (critical duration)	0.383 (critical duration)
30-minute	0.309	0.292
45-minute	0.269	0.254
60-minute	0.255	0.241
90-minute	0.198	0.187

Conservative estimates therefore indicate that the peak flow entering the site from the Western catchment in the PMF event is 0.406 m³/s, and 0.383 m³/s from the Eastern catchment. It should also be noted that the future Fairway Drive, which will bound the site to the south, should be designed to contain 1% AEP flows within the road reserve, thereby resulting in even less flow entering the site once this is constructed.

While there is a notably small external upstream catchment contributing to overland flow, it should be acknowledged that any runoff generated onsite is currently graded towards the proposed buildings, which are located to the east of the site (refer to proposed layout in Figure 2, and the existing ground surface contours in Figure 6). The site will therefore need to cater for runoff from the site itself and have adequately sized inground drainage and overland flow provisions. It is recommended that good practice levels design is adopted with falls away from building thresholds and Finished Floor Level (FFL) of the school and continuous overland flow paths provided around and downstream of the proposed buildings.

5.0 Existing Flood Information

5.1 Draft Wollondilly Shire Flood Study (2023 / 2024)

Wollondilly Shire Council engaged Advisian to conduct the Wollondilly Shire Flood Study with the aim of producing reliable flood information that ensures new development is appropriately designed, and flood risk is appropriately managed in villages and rural areas. Advisian completed WBNM hydrologic and TUFLOW hydraulic flood modelling using the latest topographic data and techniques outlined in Australian Rainfall & Runoff 2019 (ARR 2019) for areas that have not been the subject of previous detailed studies, including the Wilton area.

Though this Flood Study has not been formally adopted (final draft report dated August 2023), the flood mapping produced as part of the study is available on the Council website. Modelling and flood mapping was updated following public exhibition and flood consultation in 2024.

The flood extents in the 1% AEP and the PMF event are shown in Figure 11, with the study reporting that flood extents in the vicinity of Wilton are relatively similar between the 10%, 1% and 0.2% AEP events. Figure 12 shows the modelled flood depth during the PMF event, with depths between 0.5 – 1.0 m approximately 140 m northeast of the site, close to the first-order stream.

It should be noted that the flood extents and depths are based on a draft study and subject to change. It is important to note that the history of flooding in many parts of Wollondilly is not well documented, and isolated incidences (including evacuations and road closures) have not been recorded in detail. This is particularly relevant for the site, given the area is only newly developed and receptors were limited during past flood events. The study is also limited in that the model grid size is 6m, and this coarser resolution may mask areas of localised flooding. Despite this, the Draft Flood Study mapping has been used as the main reference point in this report given that it is based on the current industry standard methods and in accordance with the ARR 2019 Guidelines. The modelling was also updated following public consultation to ensure they align with locals' observations and lived experience.

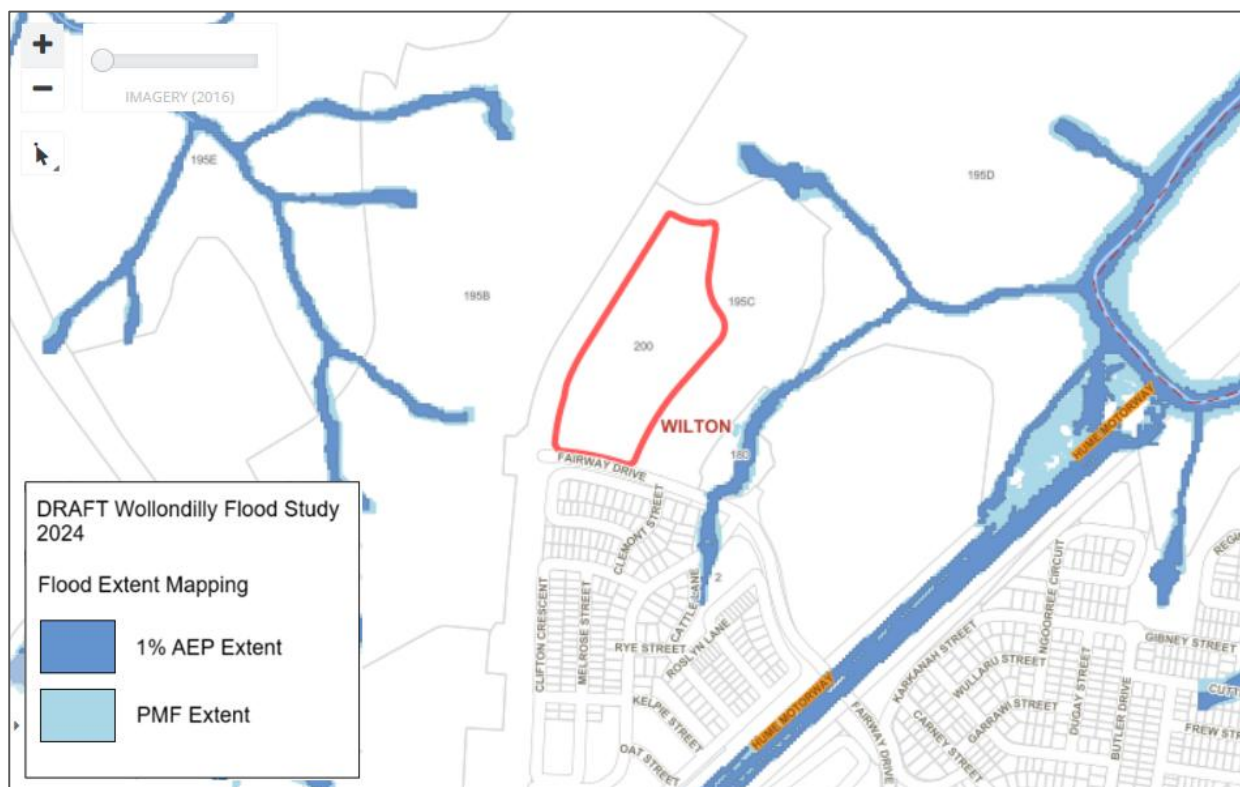


Figure 11: Peak flood extent in the Wilton area during both the 1% AEP event and the PMF event. Source: adapted from Wollondilly City Council, 2024.



Figure 12: Peak flood depth in the Wilton area during the PMF event. Source: adapted from Wollondilly City Council, 2024.

5.2 Flood Planning Area

The DCP states that where development is shown to be affected by the 1% AEP event, or if it is adjacent to Flood Prone Land (i.e. PMF), Council may require a more detailed flood study to be undertaken to confirm the flood affectation of the land (refer Figure 8 for the controls).

While the DCP notes that Flood Prone Land (and an indicative 1% AEP flood extent) is identified in the relevant Precinct Schedule, this is not contained within the North Wilton Precinct Schedule 2 attached with the DCP. However, a draft Flood Planning Area (FPA) is available on the Wollondilly Interactive Map, based on the findings of the draft Wollondilly Flood Study. This is depicted in Figure 13.

The Flood Planning Area (FPA) is defined as the area below the Flood Planning Level, which is commonly taken as the 1% AEP flood level plus 500 mm freeboard for residential development. Council proposes to adopt this approach in defining the FPA for mainstream flooding across the LGA. In accordance with the approach adopted in the Stonequarry Creek (Picton) Floodplain Risk Management Study and Plan (2020), the Wollondilly Flood Study proposes a lesser freeboard of 300 mm be applied to 1% AEP flood levels to set the Flood Planning Level in areas of overland flooding. This approach required separation of the 1% AEP flood mapping into areas of mainstream flooding and overland flooding, based on the application of a velocity-depth product ($V \times D$) threshold of 0.8 m²/s. Areas where the velocity-depth product is greater than 0.8 m²/s were identified as the highest flow conveyance areas and considered to be overland flow areas. A freeboard of 500 mm was added to 1% AEP flood levels in areas identified as mainstream flooding.

As shown in Figure 13, the site shown to be located outside of the FPA for both mainstream and overland flooding. The site is also outside of the PMF extent, as indicated in Figure 12 above, and therefore a more detailed flood study is not required (as per DCP).

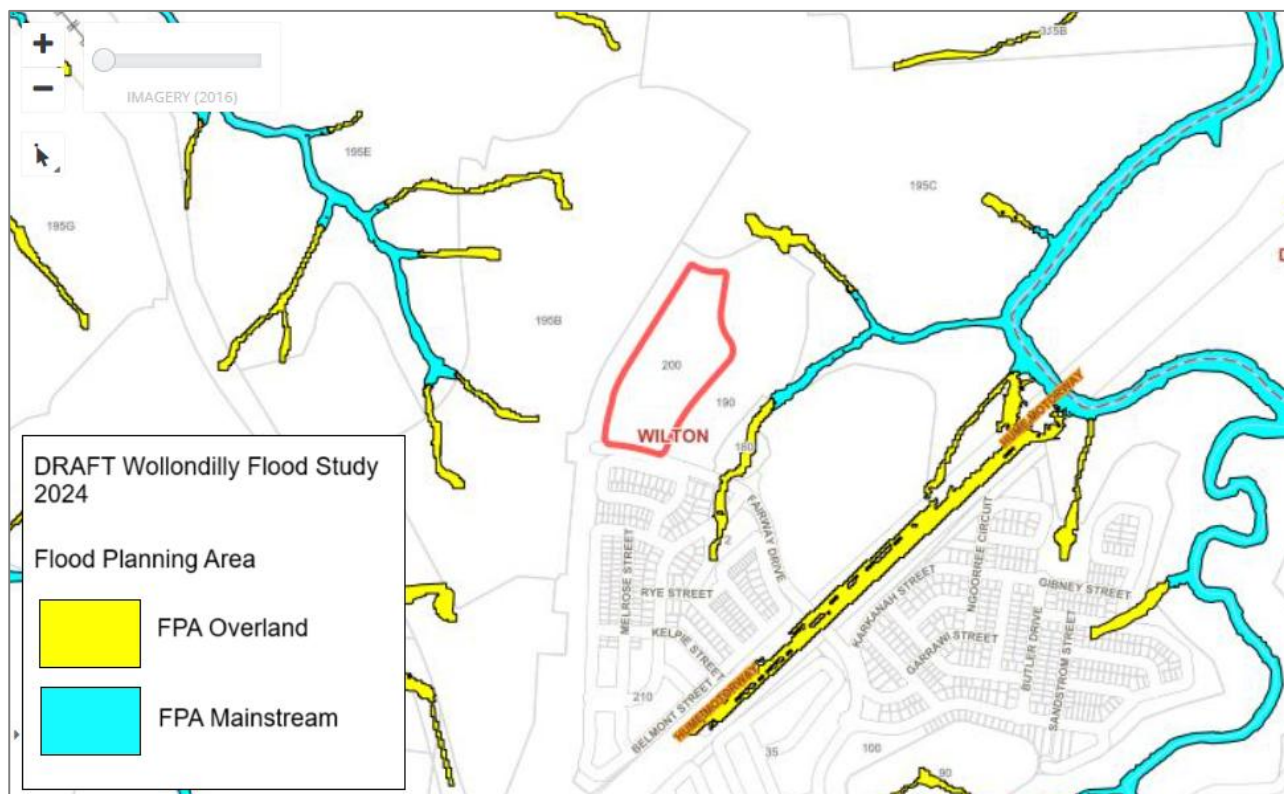


Figure 13: Wollondilly Flood Planning Area close to the site. Source: Source: adapted from Wollondilly City Council, 2024.

5.3 North Wilton Stage 2 & 3 Water Cycle Management Strategy Report, 2022

Landcom engaged Stantec (formerly 'Cardno') to produce a Water Cycle Management Study. This aimed to demonstrate that the North Wilton Stage 2 & 3 subdivision and its proposed land uses (including the Wilton HS) comply with all relevant flooding and stormwater management controls and objectives as described in the Wilton Growth Area (WGA) Development Control Plan (DCP) 2021 and the Design Specification.

The study incorporated proposed development and assumed land uses in their model, as shown in Figure 14. None of the Gross Pollutant Traps (GPTs), bioretention treatments or stormwater treatment measures outlined in the report are expected to have an impact on flood risk.

The report states that hydrologic and hydraulic calculations conducted as part of the study demonstrate that the 1% AEP event flood level does not interact with the proposed North Wilton Precinct. Any remaining flood risk is to be managed through the design of a trunk and street stormwater system. The report concludes that flood modelling for subsequent stages of the precinct is not required, and the requirements of WGA DCP and Wollondilly LEP (WLEP) 2011 have been met.

The cumulative impact of both the new Wilton primary school alongside the new HS is deemed negligible, as neither are located within a flowpath or storage area and therefore neither development is expected to have adverse offsite impacts. The site, alongside the primary school, is part of a new subdivision which would have been approved based on sound land use planning with respect to flood risk. This does not change the flood assessment outcomes within this report.



Figure 14: Land use assumptions incorporated into the Water Cycle Management Strategy MUSIC model. Source: Stantec, 2022.

5.4 Climate Change

Both the Wilton Growth Area DCP (see Control 1 in Figure 8) and the Planning Circular PS 24-001 note that the impacts of climate change on future flood frequency and levels should also be considered when assessing a proposal.

Climate change is expected to have an adverse impact on the frequency and severity of flood-producing rainfall events, which has the potential to have a significant impact on flood behaviour. As per FB01 (Understanding and Managing Flood Risk) of the Flood Risk Management Guidelines (NSW Department of Planning and Environment, 2023), flood studies under the Floodplain Management Program must consider how changes in flood-producing rainfall events impact on flood behaviour.

The FB01 Guideline summarises the percentage change to the intensity and volume of flood-producing rainfall events based on a 7% uplift for every 1°C increase in mean temperature. This is outlined in Table 4, demonstrating an increase between 10.6–14.4% for representative concentration pathway (RCP) 4.5, and 22.5–30.0% for RCP8.5.

Table 4: Typical increases in rainfall for different RCPs in different locations (Source: NSW Department of Planning and Environment FB01 Guide, 2023)

Year	% change in rainfall (based on 7% change in intensity and volume for every 1°C change in mean temperature)							
	East Coast South		Murray Basin		Rangelands		Southern Slopes	
	RCP4.5	RCP8.5	RCP4.5	RCP8.5	RCP4.5	RCP8.5	RCP4.5	RCP8.5
2060	10.6	15.7	10.4	15.5	12.0	17.8	9.0	13.0
2070	11.6	19.2	11.3	19.3	13.3	22.0	9.8	16.4
2080	12.5	22.7	12.2	22.8	14.1	26.0	10.4	19.5
2090	12.7	26.0	12.6	26.2	14.4	30.0	10.6	22.5

The 0.5% and 0.2% AEP events are in the order of 15% and 30% more rainfall than the present-day 1% AEP flood event, respectively. The 0.5% AEP event can therefore provide a proxy for the scale of change to the 1% AEP event under RCP4.5 in 2090, while the 0.2% AEP event provides an indication of flood behaviour under RCP8.5 in 2090.

As presented in Figure 11, the site is not impacted by flooding in the PMF event and is therefore unaffected by flooding in both the 0.5% and 0.2% AEP events. As such, climate change is not expected to have any adverse effects on flood behaviour at the site.

6.0 Flood Emergency Response Considerations

6.1 Site Access

Though the site is not directly affected by flooding, it is important to assess the vulnerability of the wider area in the PMF event for the purpose of flood emergency response planning.

As outlined in Section 1.3 and 2.1, a new sub-arterial road is to be constructed to the west of the site, with completion by June 2026. A new bridge over Hume Motorway (linking Fairway Drive north and south of the Motorway) and on/off ramps onto Hume Motorway are also to be completed by April 2027 (refer to Figure 3 and Figure 4). New connections onto Picton Road are also planned. These will significantly improve the site's accessibility.

Figure 15 indicates the initial Stage 1 catchment area for the school within 'Neighbourhood 1' of the North Wilton Precinct, which is expected to be mostly developed at Day of Opening (2027). Figure 16 shows the wider site area during the existing PMF event.

The Wilton HS Rapid Transport Assessment (Stantec, 2024) states that Neighbourhood 1 will comprise a total of 699 dwellings, and it is expected that there will be approximately 60 high school students from these dwellings (of an estimated 90 students for Day 1 Term 1). All these students fall within a notional distance of 800 metres.

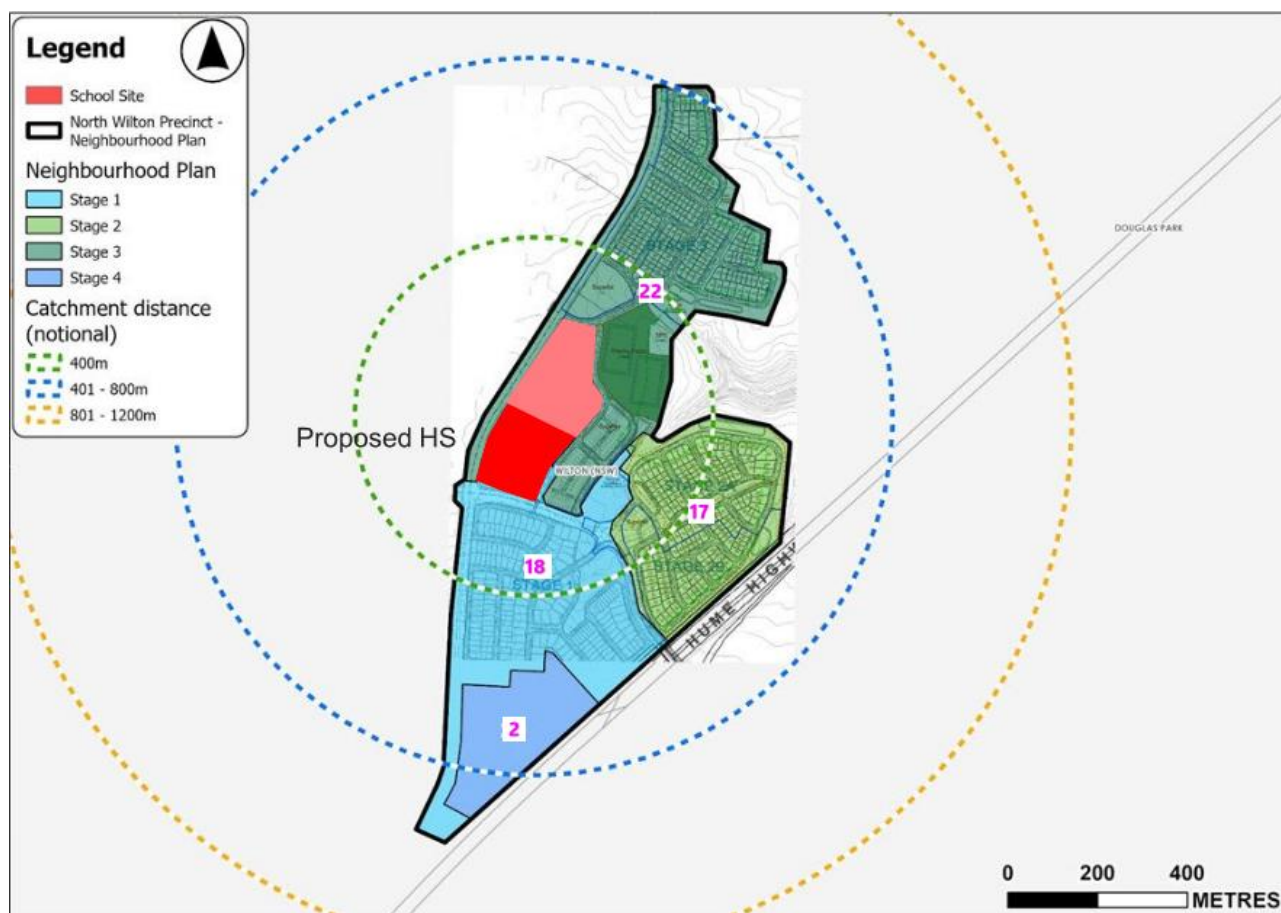


Figure 15: Wilton HS - Intake Assessment Stage 1 (Neighbourhood 1). (Source: Stantec, 2024).

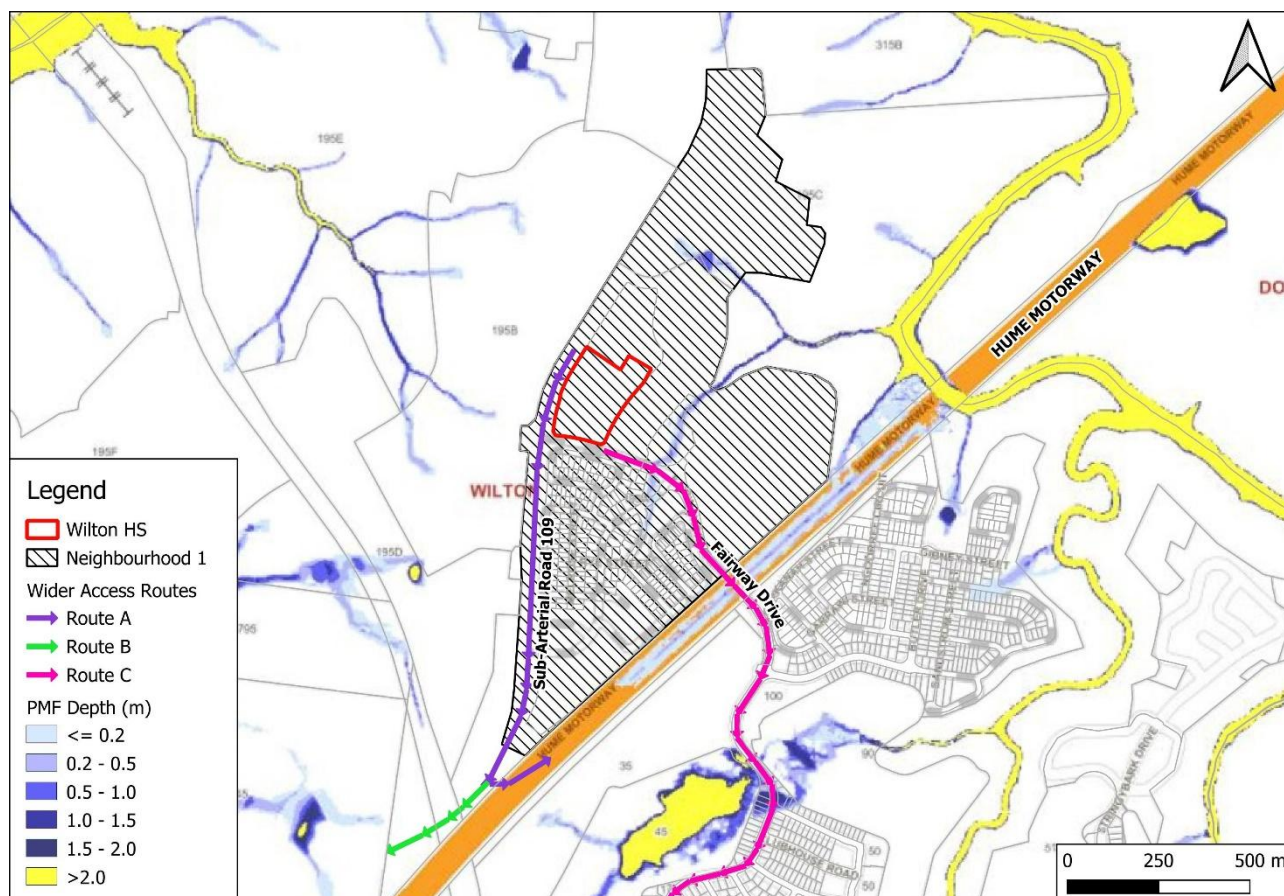


Figure 16: Wider access and egress routes from the new Wilton high school shown against the PMF flood depths. Source: adapted from Wollondilly City Council, 2025.

While the Draft Flood Study model does incorporate design plans for subdivisions and developments, this did not include the proposed North Wilton Precinct development. Modelling indicates some flooding derived from the first order streams which drain into Allens Creek. However, given that these watercourses will be culverted and managed as part of the ongoing subdivision works, there is unlikely to be any access constraints during the PMF event for students within the Neighbourhood 1 catchment.

Stantec note that some students from further afield will attend Wilton HS until additional schools become operational. By 2041, it is expected that the high school will have a capacity of 1,000 students, with approximately 300 students outside a 3,600m distance from the site. These students (and staff/site visitors) will access the school via sub-arterial roads (Fairway Drive and sub-arterial roads 108 and 109). These main wider access routes from the Wilton HS site are shown against the PMF event in Figure 16, and can be summarised as follows:

- Route A provides egress from the site via the sub-arterial roads 108 and 109 to the west of the site, before joining Hume Motorway via the northbound on-ramp (completion by April 2027).
- Route B provides egress from the site via the sub-arterial roads 109 and 108, before continuing southeast towards the new connections onto Picton Road. It is then possible to join Hume Motorway southbound.
- Route C provides egress from the site via Fairway Drive and the new bridge to be constructed over Hume Motorway.

Section 10 of the Draft Flood Study assesses flood emergency response considerations for the wider area, as shown in Figure 17. The study notes that the Hume Motorway crossing of Allens Creek remains 'flood-free up to the PMF' (Point 15), despite the mapping showing otherwise (even in events as frequent as the 10% AEP). The assessment also indicates that Hume Motorway is flood-free in the PMF at several other river crossings

(Point 14 and 16), and therefore remains a key access road in the event of a major flood. A Google Earth desk study of the area indicates that Hume Motorway is elevated above the PMF level, and the flood mapping discrepancy (particularly towards Allens Creek) is likely a result of the road not being built into the DEM, allowing flows from the creek to encroach onto the motorway.

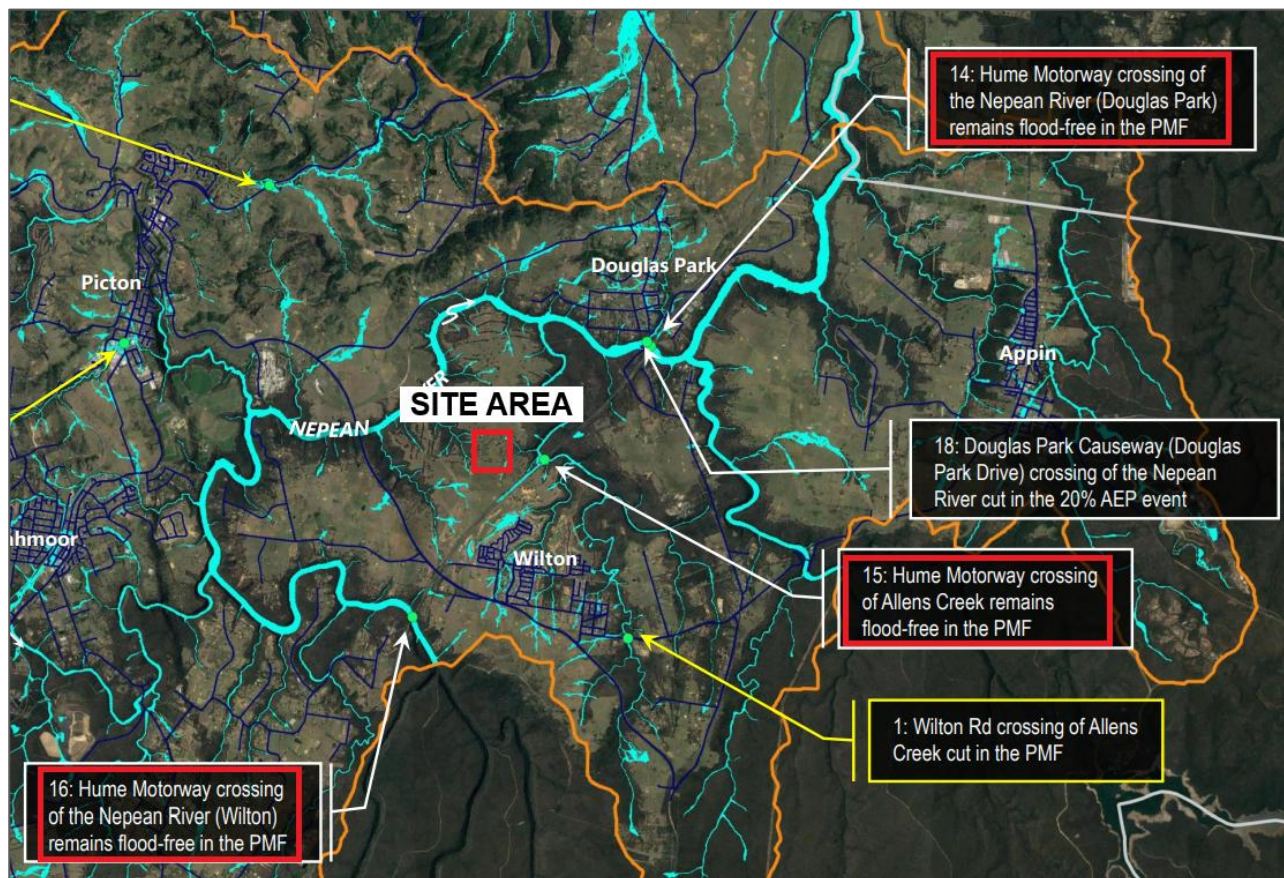


Figure 17: Draft Flood Study - Flood Emergency Response Considerations in the South Wollondilly area, shown against the 1% AEP Flood Event. Source: Wollondilly Shire Draft Flood Study, August 2023.

This is also likely the case along Fairway Drive to the south (Route C), with mapping indicating flood depths up to 2 m on the road from the watercourse to the east (see Figure 16). Elevation data obtained from ELVIS (2019) show that the road is approximately 178m AHD, while the landscaped area to the east is approximately 173m AHD. It is therefore likely that the road is elevated above the PMF level at this location.

Site access and egress is a residual risk for the site and should be reviewed again once the flood study is finalised to confirm there is no change to flood affectation in the surrounding area, though this is unlikely.

6.2 Flood Emergency Management

Flood emergency management measures are implemented by schools to reduce risk to people and property in extreme flood events. The school itself is not flood affected and, subject to further verification, site access and egress should be maintained during extreme events. As a result, a standalone Flood Emergency Response Plan (FERP) is not considered necessary for the school. Further verification of the flood risk to the surrounding road network is recommended through a review of the final Wollondilly Shire Flood Study Report, once available, to ensure any residual risks are accounted for. This may include inputs to the school's Emergency Management Plan as opposed to a standalone FERP.

Where roads are flood impacted in the wider Wollondilly area, the period of isolation is reasonably short. The Draft Flood Study assessed time of flood duration at several locations where key access roads are potentially

cut by floodwaters. Though this assessment did not include the Wilton area, it provides an indicator of isolation times within the catchment. The assessment showed that roads are typically cut within 2 to 4 hours of the start of the storm for the events tested that are smaller than the PMF. During the PMF, the identified roads are cut by local watercourse flooding within 1 to 2 hours and the duration of inundation is typically less than 2 hours.

While there is often advanced warning time of extreme rainfall events such as those endured in a 1% AEP-PMF event, this cannot be relied upon. Severe weather events may lead to flash flooding with little to no warning time, and pre-emptive closure of the school may not be achievable.

Shelter-in-place (SIP) guidance published by the NSW Department of Planning and Environment (DPE) in January 2025 states that SIP is an appropriate emergency management response when the flooding occurs within less than 6 hours from the commencement of causative rain, and if the duration of isolation by floodwaters is less than 12 hours from the commencement of rainfall. In the event of a major flood event, the school is therefore safe for a shelter-in-place flood emergency management approach, provided good practice levels design is adopted (with falls away from building thresholds and a FFL at least 300mm above surrounding ground levels).

7.0 Conclusions and Recommendations

TTW have completed a flood assessment to support a REF for the NSW DoE for the construction and operation of the new high school for Wilton.

In summary:

- The project is utilising the Part 5 REF pathway, and is therefore not held to DCP or other local controls. While these can be used as the basis for design aspects, these are not requirements for the project.
- Updated flood maps based on the Draft Wollondilly Shire Flood Study (Final draft report published August 2023, mapping updated in 2024) indicate that the site is not subject to flooding up to the PMF event.
- The site does not fall within the draft Flood Planning Area for either mainstream sources or overland flooding, and is not located within any flood risk precinct.
- A DRAINS model was prepared to calculate hydrological flows entering the site from the local upstream catchment. Based on this the proposed buildings are not impacted by overland flow from the external catchment.
- As the site is shown to be unimpacted by both mainstream and overland flooding, no flood planning controls apply to the site.

The site will need to cater for runoff from the site itself and have adequately sized inground drainage and overland flow provisions. It is recommended that good practice levels design is adopted with falls away from building thresholds and Finished Floor Level (FFL) of the school and continuous overland flow paths provided around and downstream of the proposed buildings.

Mitigation Measures

Mitigation measures identified as necessary are outlined in Table 5.

Table 5: Mitigation Measures

Aspect	MM ID	MM Name	Mitigation Measure	Timing
Soil & Water	SWMM5	Stormwater Management System	The operational stormwater management system must be designed by a suitably qualified civil engineer. The system must: a. Ensure that the system capacity has been designed in accordance with the relevant Australian Standards; and b. Ensure that the system has been designed in accordance with the <i>Australian Rainfall and Runoff (Engineers Australia, 20016) and Managing Urban Stormwater: Council Handbook (EPA, 1997) Guidelines</i>.	Design

Operational Flooding	OPFMM2	Emergency Management Plan	Prior to the commencement of operations of Stage 1, a School Emergency Management Plan must be prepared to address flood considerations. The School Emergency Management Plan is required to be updated prior to the commencement of Stage 2 operations. Within 12 months of the completion of the final Wollondilly Shire Flood Study, the School Emergency Management Plan must be reviewed and updated if necessary to reflect the impacts of the final Flood Study including preparation of a Flood Emergency Management Plan (FEMP) if required, to the satisfaction of the DoE. A copy of the School Emergency Management Plan is to be provided to the relevant DoE Project Lead for implementation during operations.	Prior to commencement of each stage of operations. Within 12 months of the completion of the final Wollondilly Shire Flood Study.
-----------------------------	--------	---------------------------	--	---

Evaluation of Environmental Impacts

Based on the identification of potential issues, and an assessment of the nature and extent of the impacts of the proposed activity, it is determined that:

- As the site is located outside the PMF extent, the proposed development will not redistribute flows or reduce flood storage. As such, the development will have no impact on flood behaviour, flood risk to the existing community, nor will it expose its users to onsite flood risks that require management or mitigation. In addition, it will not have any adverse offsite impacts, nor will it impact hydrology, drainage lines, downstream assets or watercourses.
- The cumulative impact of both the new primary school at Wilton alongside the high school is deemed negligible, as neither are located within a flowpath or storage area and therefore neither development is expected to have adverse offsite impacts.
- The extent and nature of potential impacts are low and will not have significant impact on the locality, community and/or the environment.
- Potential impacts can be appropriately mitigated or managed to ensure that there is minimal impact on the locality, community and/or the environment.

Prepared by
TTW (NSW) PTY LTD



RACHEL CALDWELL
Civil Flood Modeller

Authorised By
TTW (NSW) PTY LTD



TIM MOORE
NSW Civil Manager