SCHOOLS INFRASTRUCTURE NSW

ALEX AVENUE PUBLIC SCHOOL, SCHOFIELDS

FLOOD RISK ASSESSMENT

FEBRUARY 2019

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Alex Avenue Public School, Schofields
Flood Risk Assessment

Schools Infrastructure NSW

WSP
Level 27, 680 George Street
Sydney NSW 2000
GPO Box 5394
Sydney NSW 2001

Tel: +61 2 9272 5100
Fax: +61 2 9272 5101
wsp.com

REV	DATE	DETAILS
A	12/10/18	First draft
B	30/10/18	Second draft
C	14/12/2018	Final
D	11/01/2019	Re-issued for SSDA
E	25/01/2019	Updated architectural layout
F	05/02/2019	Updated figure 3.1

	NAME	DATE	SIGNATURE
Prepared by:	Isabella See	10/01/19	
Reviewed by:	Eric Lam	10/01/19	
Approved by:	Stefan Spirig	05/02/19	

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1 INTRODUCTION

1.1 OVERVIEW

This Flood Risk Assessment has been prepared by WSP on behalf of the Schools Infrastructure NSW (the Applicant). It accompanies an Environmental Impact Statement (EIS) in support of State Significant Development Application (SSD 18_9368) for the new Alex Avenue Public School at the corner of Farmland Drive and future realignment of Pelican Road in Schofields (the site). The site is legally described as proposed Lots 1 and 2, being part of existing Lot 4 in DP1208329 and Lot 121 in DP1203646.

The new school will cater for approximately 1,000 primary school students and 70 full-time staff upon completion. The proposal seeks consent for:

- Construction of a 2-storey library, administration and staff building (Block A) comprising:
  - School administrative spaces including reception;
  - Library with reading nooks, makers space and research pods;
  - Staff rooms and offices;
  - Special programs rooms;
  - Amenities;
  - Canteen;
  - Interview rooms; and
  - Presentation spaces.
- Construction of four 2-storey classroom buildings (Block B) containing 40 homebases comprising:
  - Collaborative learning spaces;
  - Learning studios;
  - Covered outdoor learning spaces;
  - Practical activity areas; and
  - Amenities.
- Construction of a single storey assembly hall (Block C) with a performance stage and integrated covered outdoor learning area (COLA). The assembly hall will have OOSH facilities, store room areas and amenities;
- Associated site landscaping and open space including associated fences throughout and games courts;
- Pedestrian access points along both Farmland Drive and the future Pelican Road;
- Substation on the north-east corner of the site; and
- School signage to the front entrance.

All proposed school buildings will be connected by a covered walkway providing integrated covered outdoor learning areas (COLAs). School staff will use the Council car park for the adjacent sports fields pursuant to a Joint Use agreement. The proposed School pick up and drop off zone will also be contained within the future shared car park and will be accessed via Farmland Drive.

The purpose of this Flood Risk Assessment is to review the flooding risk at the site and any changes to flooding risk as a result of the proposed Alex Avenue Public School. The following items were carried out as part of this assessment:

- Review of previous technical flooding and drainage studies and analyses undertaken on water management for the site and wider region
- Summary of regional flood risk to the site (including climate change risk) based on existing studies
- Review of the drainage concept design to assess post development impact and what likely mitigations are required
- Summary of the proposed concept drainage design on site to provide context with the regional flood risk and any external flows which may impact the site.

The assessment has been carried out based on existing available mapping and flooding studies. No flood modelling was undertaken for the site as part of this assessment.

1.2 RESPONSE TO SEARS

The Flood Risk Assessment is required by the Secretary's Environmental Assessment Requirements (SEARs) for SSD 18_9368. This table identifies the SEARs and relevant reference within this report.

Table 1-1 SEARS and Relevant Reference

SEARS ITEM	REPORT REFERENCE
16. Flooding Identify flood risk on-site (detailing the most recent flood studies for the project area) and consideration of any relevant provisions of the NSW Floodplain Development Manual (2005), including the potential effects of climate change, sea level rise and an increase in rainfall intensity. If there is a material flood risk, include design solutions for mitigation.	Section 3 and 4

2 SITE DESCRIPTION

The general site identification details are provided in Table 2-1. Figure 2-1 shows the site location.

Table 2-1 Summary of general site information

SITE ADDRESS	CORNER OF FARMLAND DRIVE AND FUTURE REALIGNMENT OF PELICAN ROAD, SCHOFIELDS, NSW
Site identification	The site is legally defined as Lots 1 and 2, being part of existing Lot 4 in DP1208329 and Lot 121 in DP1203646. The site is yet to be subdivided and registered. The site is situated at the corner of Farmland Drive and future realignment of Pelican Road in Schofields.
Local government area (LGA)	Blacktown City Council
Site area (approximately)	20,000 m^2
Current site use	The site is currently vacant.
Surrounding land uses	Greenfield lots are located to the east and west of the site. An unnamed creek is present to the south of the site. Residential lots are located to the north of the site, on the opposite side of Farmland Drive.
Proposed site use	The site is proposed to be developed into a primary school in the north-western portion with a playing field in the southern portion of the site.

Figure 2-1 Site location

Source: Six Maps, 2018

2.1 TOPOGRAPHY AND SURFACE WATER DRAINAGE

The site slopes downwards to the south and drains into the unnamed creek at the southern boundary of the site. This creek then drains to Eastern Creek and the into South Creek as part of the Hawkesbury-Nepean catchment.

The site is not identified as flood prone land based on Council flood planning mapping, however, it is located immediately north of an unnamed creek which is identified as flood prone land under the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006*.

2.2 PROPOSED ALEX AVENUE PUBLIC SCHOOL

The proposed Alex Avenue Public School would include new school buildings, a covered outdoor learning area, paved and non-paved outdoor activity areas and an at-grade staff car park as described in Section "1.1. Overview" shows the proposed school layout.

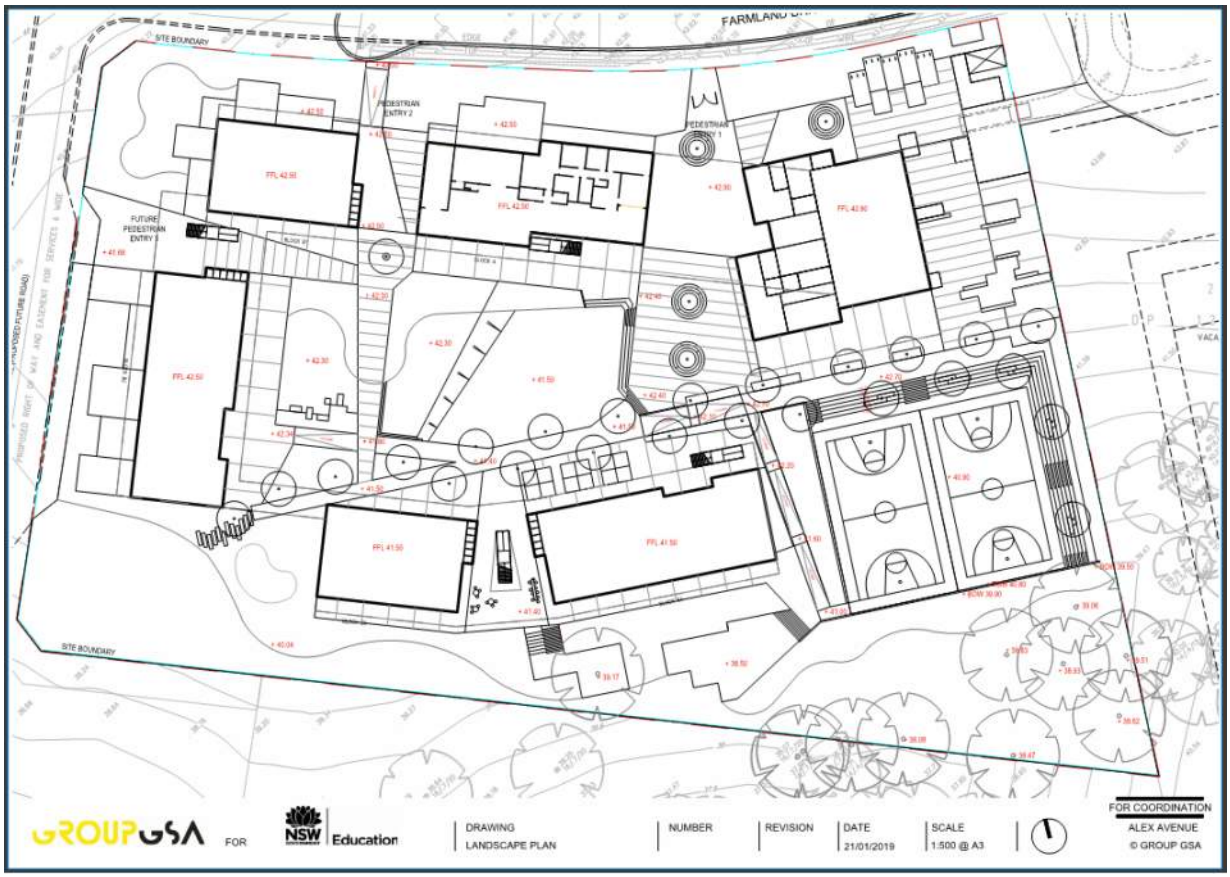


Figure 2-2 Proposed Alex Avenue Public School

Source: Group GSA, 2019

3 FLOOD RISK

A review of relevant local, state and regional planning instruments, and previous studies in the area was carried out to identify the likely flooding risk of the site. Legislation, mapping and previous studies reviewed include:

- *State Environmental Planning Policy (Sydney Region Growth Centre) 2006*
- Blacktown City Council Development Control Plan 2015 – Part J Water Sensitive Urban Design and Integrated Water Cycle Management
- Blacktown City Council Growth Centre Precincts Development Control Plan (DPE, 2016)
- Blacktown City Council Schedule 1 – Alex Avenue Precinct (DPE, 2016)
- Post Exhibition Flooding and Water Cycle Management (incl. Climate Change impact on Flooding) (GHD, 2010)
- NSW Floodplain Development Manual (Department of Infrastructure, Planning and Natural Resources, 2005)
- Water Management Plan, Flood Modelling and Riparian Corridor Study Report - North West Growth Centre (Cardno, 2015)
- Updated South Creek Flood Study (Worley Parsons, 2015)
- Blacktown City Local Flood Plan – sub plan of the Blacktown City Local Disaster Plan, 2010
- Blacktown City Council Maps online (http://maps.blacktown.nsw.gov.au/)

Figure 3-1 shows that the site is not located within flood prone land as identified by the *State Environmental Planning Policy (Sydney Region Growth Centre) 2006* and the Blacktown City Council mapping. In addition, the site is not identified as being flood prone by the above reviewed studies and legislation (refer to Appendix A for flood maps from the reviewed studies). As such no further flood modelling for the site was carried out as part of this assessment.

It is noted that the site is located adjacent to land identified as Flood Prone under the *State Environmental Planning Policy (Sydney Region Growth Centre) 2006* (refer to Figure 3-1). Figure 3-2 shows mapping from the *Post Exhibition Flooding and Water Cycle Management* report (GHD, 2010) prepared as part of the North West Growth Centre Precinct planning. The report identified this land below the site as the 100-year ARI flood extent. The proposed Alex Avenue public school is not located in this zone however it is recommended that ongoing design avoids this area.

3.1 CLIMATE CHANGE

The NSW Floodplain Development Manual (2005) requires flood studies and floodplain risk management studies to consider changes to rainfall intensities, extreme rainfall events and sea level rise as a result climate change. The *Post Exhibition Flooding and Water Cycle Management* (incl. Climate Change impact on Flooding) (GHD, 2010) prepared as part of the North West Growth Centre Precinct planning assessed the impact of climate change in the Eastern Creek catchment through simulation of 20% increased rainfall intensities in the 100-year ARI storm event. This resulted in an increase of the modelled 100-year ARI flood levels of between 50 to 88mm and increased flood extents of 0.5 to 10 metres depending on location. No mapping for the climate change scenario was provided as part of this report. While the site would be impacted by increases to rainfall intensity, the edge of the development for the proposed Alex Avenue Public School is over 100 metres and 3 metre increase in elevation from the receiving waterway at the south of the site and as such would be likely to remain outside the flood prone area.

The site is not located in a coastal region and as such would be unlikely to be impacted by increases to sea level due to climate change.

3.2 CONSULTATION

Blacktown City Council were contacted via phone to confirm flood risk and request any further known drainage or flooding issues. Verbal confirmation was given that the site is outside the Council flooding extents and written flooding advice was sought (refer to Appendix B). The flood letter from Blacktown Council stated that the site is not affected by any Flood Risk Precinct or Local Overland Flooding categories. Figure 3-1 shows mapping from both the Department of Planning and Environment *State Environmental Planning Policy (Sydney Region Growth Centres) 2006* and Blacktown City Council. This mapping does not identify flood prone land on the site, however it is noted that flood prone land is located below the site.

Figure 3-1 Flooding Risk – SEPP (Sydney Region Growth Centres) 2006 and Blacktown Development Control Plan 2015

Source: Blacktown City Council and NSW Department of Planning & Environment

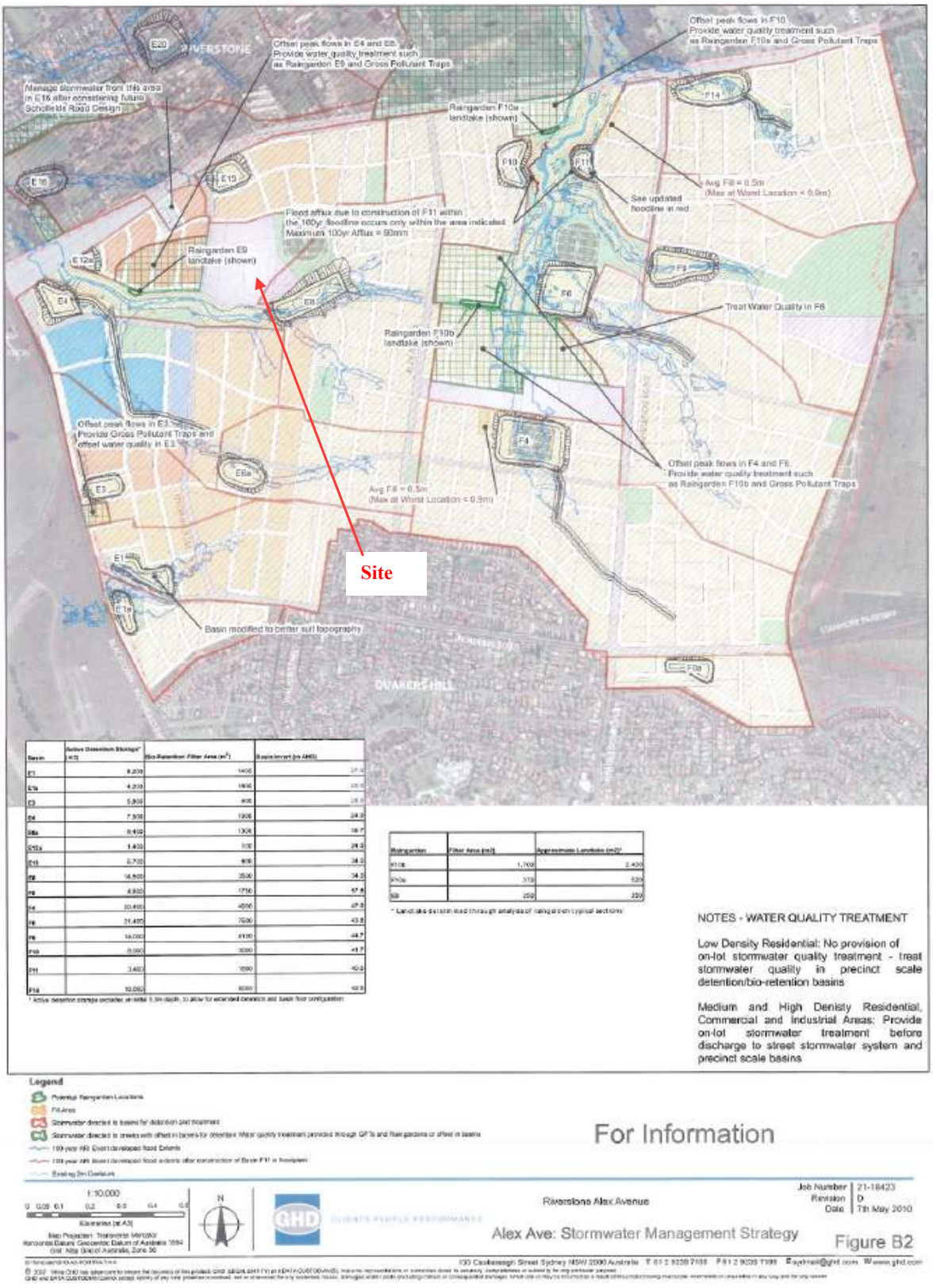


Figure 3-2 WSUD Strategy for the North West Growth Centre including 100-year flood extents

Source: Post Exhibition Flooding and Water Cycle Management (incl. Climate Change impact on Flooding) (GHD, 2010)

4 STORMWATER MANAGEMENT

4.1 PROPOSED STORMWATER DRAINAGE SYSTEM

Stormwater controls are included in the concept design to ensure that the proposed Alex Avenue Public School does not adversely impact on stormwater flows downstream of the site. The proposed stormwater drainage treatment system has been designed in accordance with the following guidance documents:

- AS3500 – 'National Plumbing and Drainage Code' – Part 3: Stormwater Drainage
- Australian Rainfall and Runoff, 2016 – Parts 1 & 2
- Blacktown City Council's Engineering Guide for Development
- Blacktown Development Control Plan, Part J, 2015
- Blacktown City Council, Developer Handbook for Water Sensitive Urban Design, Version 1.1, November 2013
- Guidelines for development adjoining land and water managed by DECCW (OEH, 2013).

A piped stormwater drainage system will be provided to collect all concentrated flows from the proposed buildings and hardstand surfaces. The site will drain to a water quality basin on the south eastern boundary. The basin will be sized for the 1 in 20 ARI event as per the requirements of the Blacktown Development Control Plan 2015, with provision for overflow in the event of a 100 year ARI event. The water quality basin will then discharge to the creek at the southern boundary of the site.

Blacktown City Council confirmed that on-site detention is not required for the proposed Alex Avenue Public School as the site is catered for in a regional basin downstream as part of development of the North West Growth Centre (refer to Figure 3-2). A 65m^3 rainwater tank is also included to collect water from the roof for re-use on site and to reduce run-off from site.

Further details of the proposed stormwater treatment system are provided in the *Stormwater Management, Hydrology and Water Quality Report* (WSP, 2019*)* prepared for the proposed Alex Avenue Public School.

4.1.1 OVERLAND FLOW PATHS

The Blacktown City Council Engineering Guide for Development requires overland flow paths to be maintained through the site to cater for the 100 year ARI event. The proposed stormwater drainage system includes for overflow in the event of the 100 year ARI event.

5 CONCLUSION

The site is not identified as flood prone by Department of Planning and Environment or Blacktown City Council mapping and legislation. However, it is noted that the site is located adjacent to the 100-year ARI flood extent as mapped by the Department of Planning and Environment for the North West Growth Centre precinct. As such it is recommended the ongoing design avoids this area.

Modelling prepared to assess the impact of climate change in the Eastern Creek catchment showed an increase of the 100-year ARI flood levels of between 50 to 88 mm and increased flood extents of 0.5 to 10 metres depending on location. The proposed Alex Avenue Public School is over 100 metres and 3 metre increase in elevation from the receiving waterway at the south of the site and as such would be likely to remain outside the flood prone area. The site is not located in a coastal region and as such would not be impacted by increases to sea level from climate change.

Stormwater from the site will be collected and treated before discharging to the nearby creek. The proposed stormwater drainage system has been designed to cater for the 1 in 20 ARI storm event as per the requirements of the Blacktown Development Control Plan 2015 with provision for overflow up to the 1 in 100 year ARI.

Overland flow strategy for the site will be confirmed during the detailed design phase and will be designed to maintain flow direction and cater for the 100 year ARI storm event.

6 LIMITATIONS

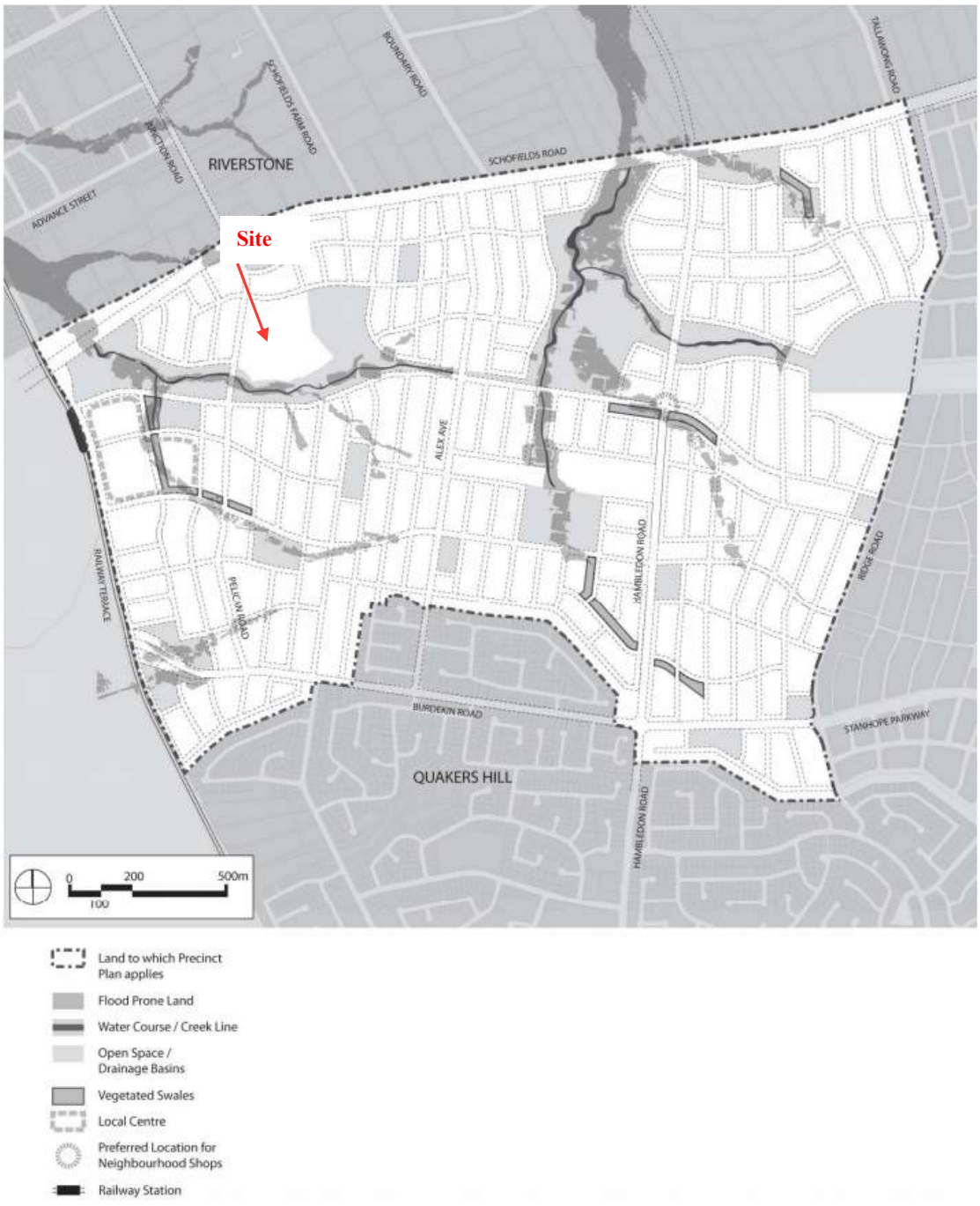
This report was prepared based on publicly available information. WSP takes no responsibility for accuracy or completeness of this information.

BIBLIOGRAPHY

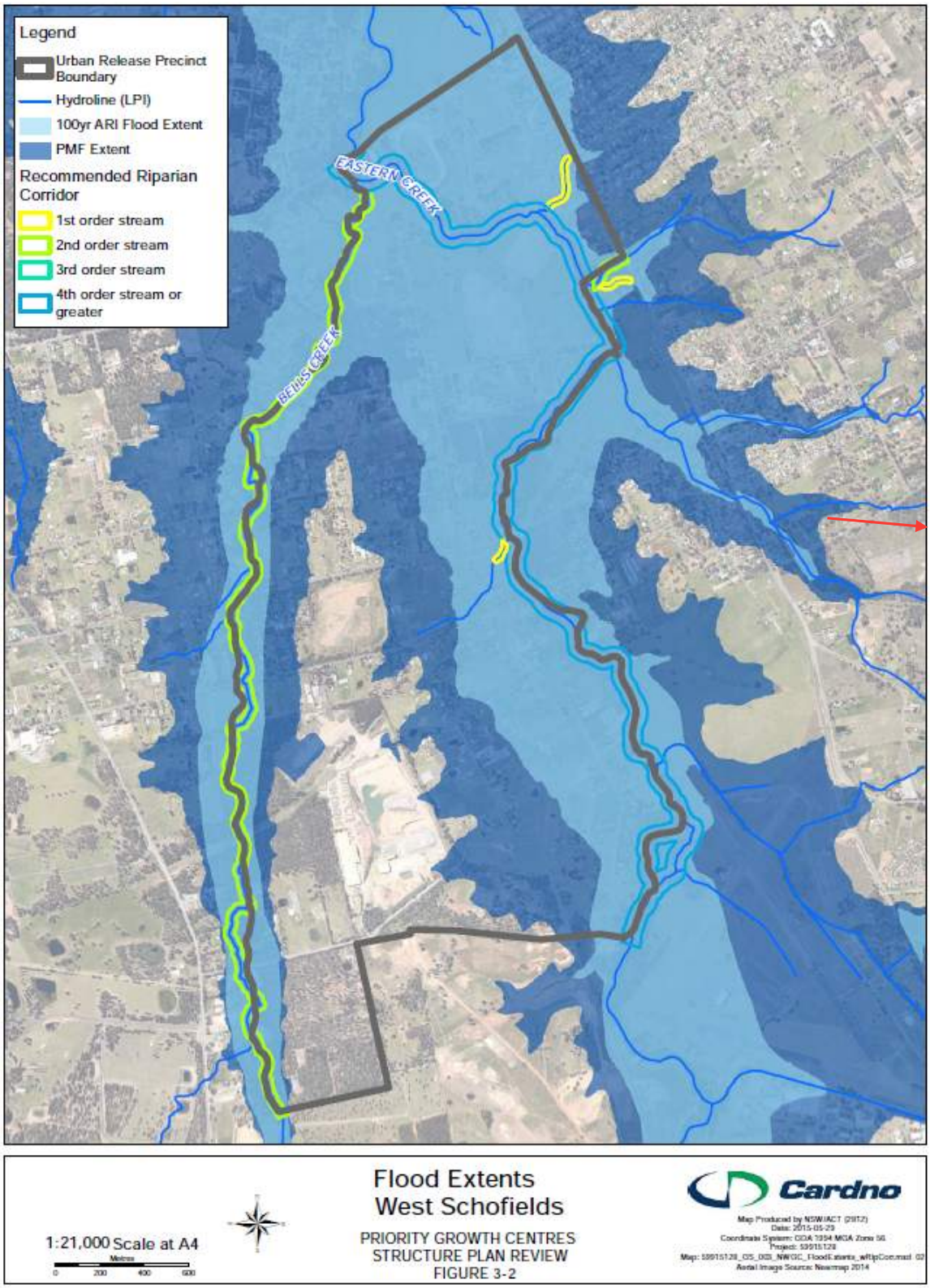
- Blacktown City Council Development Control Plan 2015
- Blacktown City Council (2013), Developer Handbook for Water Sensitive Urban Design, Version 1.1
- Blacktown City Local Flood Plan – sub plan of the Blacktown City Local Disaster Plan (2010)
- Blacktown City Council (2005), Engineering Guide for Development
- Blacktown City Council Maps, available online: http://maps.blacktown.nsw.gov.au/, accessed 9/10/18
- Cardno (2015), Water Management Plan, Flood Modelling and Riparian Corridor Study Report - North West Growth Centre
- Department of Planning and Environment (2016), Blacktown City Council Growth Centre Precincts Development Control Plan
- Department of Environment and Climate Change (2013), Guidelines for development adjoining land and water managed by Department of Environment and Climate Change
- Department of Environment and Climate Change (2007), Floodplain Risk Management Guideline - Practical Consideration of Climate Change
- Department of Infrastructure, Planning and Natural Resources (2005), NSW Floodplain Development Manual,
- GHD (2010) Post Exhibition Flooding and Water Cycle Management (incl. Climate Change impact on Flooding)
- Worley Parsons (2015), Updated South Creek Flood Study

APPENDIX A

REGIONAL FLOODING MAPS



Source: Blacktown City Council Schedule 1 - North West Growth Centre – Alex Avenue Precinct (Department of Planning and Environment, (2016)



Source: Water Management Plan, Flood Modelling and Riparian Corridor Study Report – North West Growth Centre Cardno, 2015

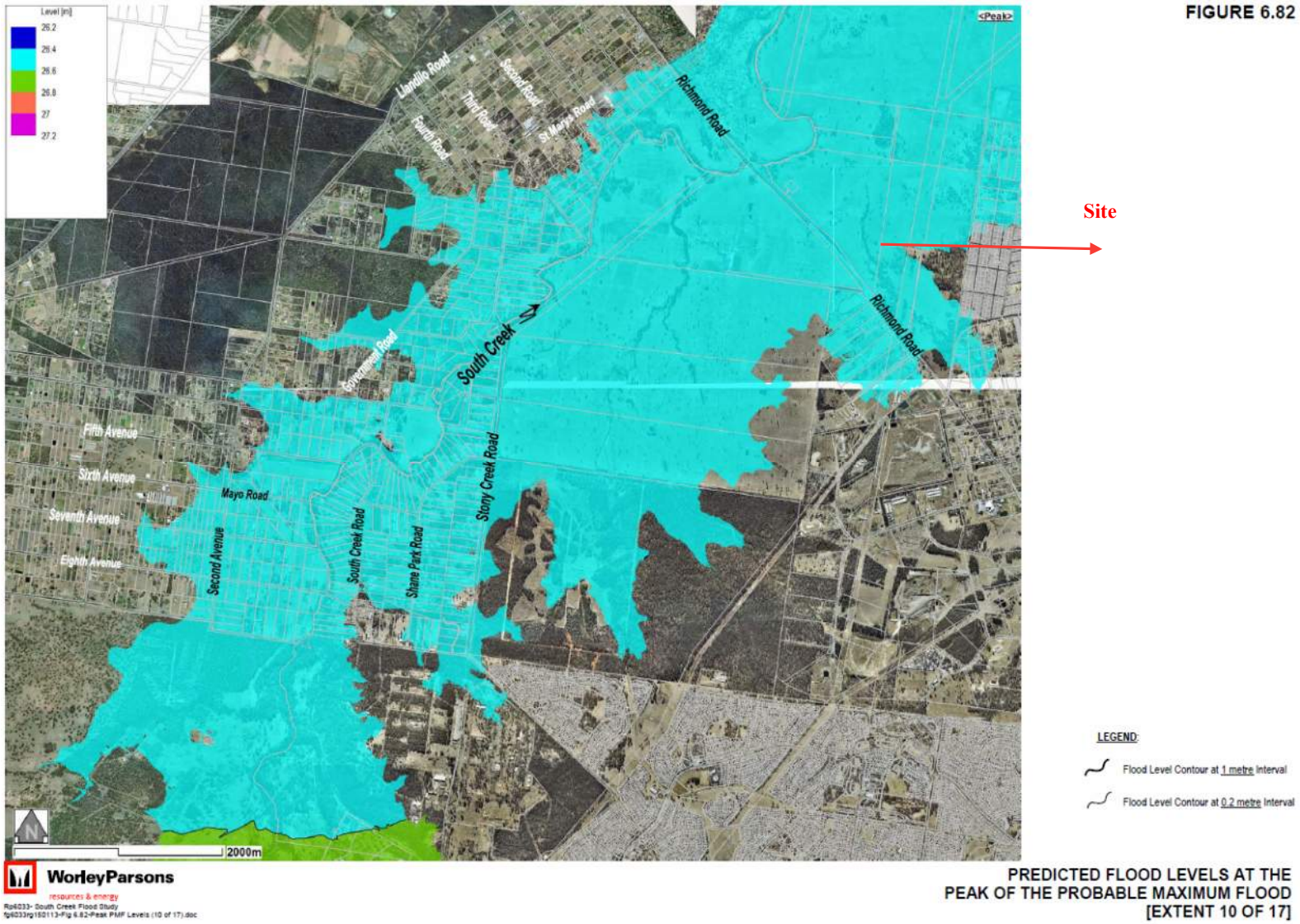


FIGURE 6.82

PREDICTED FLOOD LEVELS AT THE PEAK OF THE PROBABLE MAXIMUM FLOOD [EXTENT 10 OF 17]

Source: Updated South Creek Flood Study, Worley Parsons, 2015

APPENDIX B

BLACKTOWN COUNCIL FLOOD INFORMATION

Blacktown City Council
Growing with Pride

File no: 370027
C18/53187

17 October 2018

WSP Australia Pty Limited
Level 27
680 George Street
Sydney NSW 2000

Attention: Isabella See

Dear Isabella,

Schofields Road Schofields being Lot 4 in DP 1208329

I refer to your email of 11 October 2018 regarding flood information for the above property.

The above property is not shown affected by any of the Flood Risk Precincts or Local Overland Flooding categories based on the latest information available to Council from consultants or statutory authorities.

Council has carried out conceptual flood modelling to investigate the impact of proposed development in the catchment and the flood detention works currently under construction adjacent to the site. This conceptual modelling shows that the site should remain flood free in the 100 year ARI once the development is complete.

Council provides this information completely without any prejudice, warranty or indemnity whatsoever.

Council's flood mapping is available on Council's web site. To start click Discover Blacktown tab on the home page and then select Maps Online and follow the instructions. Council's flood mapping only covers the areas where it has information. A property that is not identified does not mean that there are no flood issues. It is the responsibility of the enquirer to check the natural fall of the land and to ensure that the subject property is not affected by local stormwater overland flows that might affect existing or future development on this land.

Council Chambers • 62 Flushcombe Road • Blacktown NSW 2148
Telephone: (02) 9839 6000 • **Facsimile:** (02) 9831-1961 • DX 8117 Blacktown
Email: council@blacktown.nsw.gov.au • **Website:** www.blacktown.nsw.gov.au
All correspondence to: The General Manager • PO Box 63 • Blacktown NSW 2148

Please find attached a copy of an extract from Council's Geographical Information System (GIS) showing where the nearest Council identified flood areas are. Please note the disclaimer and the contour interval of 0.5 metres.

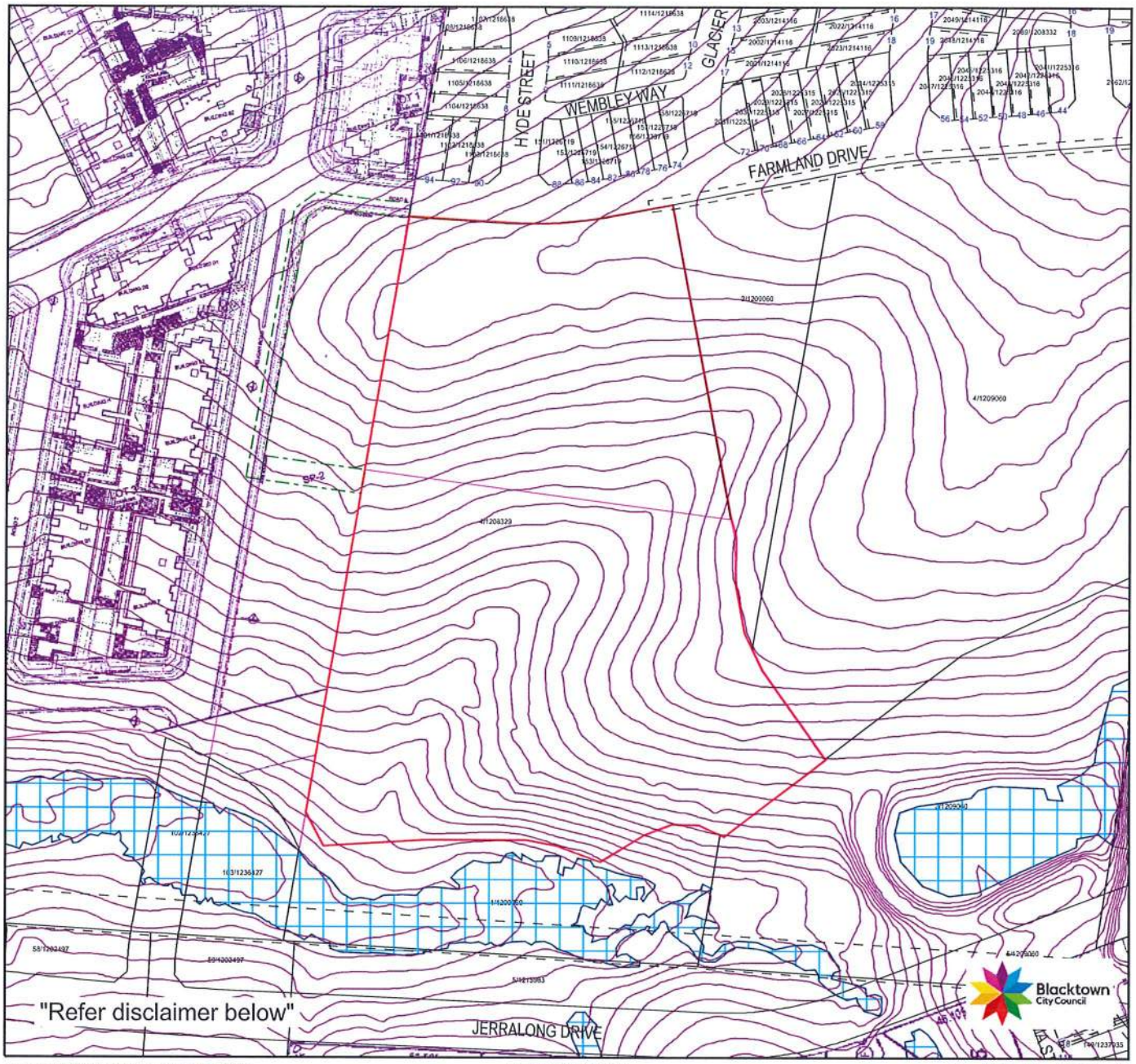
However, please also be advised that there may be affectations other than flooding which may impact on the use of the land.

If you would like to discuss this matter further, please contact me on 9839 6348.

Yours faithfully,

Tony Merrilees
Senior Engineer (Drainage) Development

Encl. Flood map.



Plot Date: 12/10/2018

BLACKTOWN CITY COUNCIL

Flood Risk Map

DISCLAIMER: The flood risk precincts shown are based on information available to Council and should be regarded as an indicative guide only. A more accurate indication of the extent of the respective flood risk precincts can be determined by relating surveyed ground levels at Australian Height Datum (AHD) to the hydraulic and/or flood level criteria determining flood risk precinct boundaries. This information may be obtained by a written request to Council accompanied by a ground level survey to AHD prepared by a Registered Surveyor. Should flood risk precinct extents be required for the purpose of a financial transaction of any nature, then the parties to that transaction should apply to Council for formal certification and/or seek independent legal or professional advice.

Scale 1:3000

- Parcel Extent.Torrens Title Extent
- Parcel Extent.Acquisition Torrens Title Extent
- Parcel LPI Extent.Torrens Title Extent
- Easement Segment.Extent
- Easement Segment.Proposed Extent
- Local Government Area.Gazetted Boundary
- Railway.CentreLine
- Developer Plan.Scanned Image
- EP-FLD Flooding Planning.Flood Prone SEPP Extent
- Flood Extents.Low Flood Risk Precinct
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- DTM Contour.28.5m Contour
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Plotted by: swadmin

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