# BONACCI

Western Sydney University
Bankstown City Campus
Development –
Flood Emergency
Response Plan

#### **Document Status Note:**

Revision	Date Issued	Prepared by	Amended by	Reviewed by	Comment
Α	21/06/2019	VC		JH	
В	15/07/2019	JH		VC	Amended Section 2
С	17/07/2020	VC	JB	SN	Amended Section 4
D	05/08/2020	VC	JB	SN	Amended Section 4
E	11/08/2020	VC	JB	SN	Amended PMF Level

Prepared by: Vincent Chu

Date: 15/07/19

Project Name: New Western Sydney University Bankstown City Campus Development

BG Project No: 10979

Discipline: Civil Engineering

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Report Amendment Register

Rev. No.	Section & Page No.	Issue/Amendment	Updated/Initials	Reviewer/Initials	Date
С	Section 4	Updated evacuation route and refuge point	JB	SN	17/07/2020
D	Section 4	Updated Section 4 PSMP Contractor requirements	JB	SN	05/08/2020
E		Updated PMF	JB	SN	11/08/2020

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#### 1. Introduction

This Flood Emergency Response Plan has been developed as the requirement from the Office of Environment and Heritage (OEH) to promote a satisfactory awareness of expected flood behaviour and risks, identify measures to become flood prepared and recommend a course of action during and after flood events. This report has been prepared to fulfil the flooding requirements from the Office of Environment and Heritage (OEH), specifically No. 18 h to j.

# 2. Flooding

The site is located at 74 Rickard Road Bankstown within the Salt Pan Creek Catchment which is a tributary of Georges River in Sydney's south. Updated deposited land survey plans, has the site of 74 Rickard Road (incorporated into Lot 15 – Plan of Subdivision DP1256167 dated June 10, 2020) and is approximately 3,678 m2. Previously the lots which now appear to have been incorporated into Lot 15 DP1256167 included 74 Rickard Road (being Lot 5 DP 777510) included a portion of 375 Chapel Street (being part Lot 6 DP 777510), in addition public domain works which are proposed to Rickard Road, 70 Rickard Road (being part Lot 7 DP777510) and access is proposed via 80 Rickard Road (being Lot 12 DP566924).

The catchment is approximately 26km2 and the site is subject to overland flooding in the 100 year ARI event. The hydraulic model using TUFLOW has been prepared with hydrographs provided by Canterbury Bankstown Council as an input parameter. The results indicate that the majority of the site is at risk of flooding in the critical duration of 100-year ARI design storm event and PMF. The estimated 100-year and PMF flood at the upstream of the proposed building are approximately 25.25m respectively. Refer to Civil Design Report for details.



Figure 1 - 1% AEP Existing Flood Depth and Level

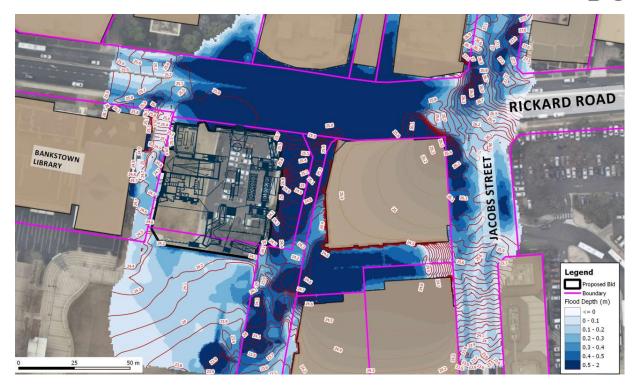


Figure 2 - PMF Event Flood Extract

# 3. Flood and Evacuation Warnings

A network of rainfall gauge stations is maintained by Bureau of Meteorology (BOM). These provide information to the BOM as one source of information informing their flood warning system. The BOM should issue one of five types of warnings through local radio, television and their website – http://www.bom.gov.au. In addition, the State Emergency Service (SES) may issue a flood bulletin, evacuation warning or evacuation order. The different warning types are as below.

#### 3.1 Severe Weather Warning

Severe weather warnings are issued by the BOM for potentially dangerous weather conditions. A description of the threat will be included in the warning along with the time for next issue. It is noted that a severe weather warning does not imply that flooding will eventuate. Warnings are generally updated every six hours or as the event dictates.

#### 3.2 Severe Thunderstorm Warning

A severe thunderstorm warning will be issued if there is strong evidence that a severe thunderstorm will develop or if a severe thunderstorm is reported. Flash flooding may occur during severe thunderstorms. Warnings are generally updated every three hours or shorter as required.

#### 3.3 Flood Alert

A flood alert will be issued if flood producing rain is expected. This provides an early warning that flooding may occur.

#### 3.4 Generalized Flood Warning

A generalised flood warning is to be issued when flooding is expected to occur in a given area. Three hours warning time is expected from issue of warning to peak flood level as per the "Service Level Specification for Flood Forecasting and Warning Services for New South Wales – Version 2.0" (BOM, 2013).

This is the most likely warning type for the subject site should evacuation need to occur. As per the section below, a safety representative will need to be assigned and responsible to receive the



warnings and enact the general site warning system to ensure that all personnel are evacuated from the site to fulfil proper safety procedures.

#### 3.5 Minor/Moderate/Severe Flood Warning

A more detailed flood warning may be issued based on any additional information available. Three hours warning time is expected from issue of warning to peak flood level. Real time river and harbour height data is available from the BOM website. (http://www.bom.gov.au/nsw/flood/)

#### 3.6 SES Flood Bulletins

The SES may issue a flood bulletin providing information of the likely flood consequences and recommended actions.

#### 3.7 Evacuation Warning

The SES may issue an evacuation warning allows time to prepare for evacuation.

#### 3.8 Evacuation Order

The SES will issue an Evacuation Order if evacuation is required. If this occurs, evacuation must be undertaken. Broadcast will be through radio/TV, automated telephone message or SMS.

If evacuation occurs the existing library forecourt area on the western side of the subject site could be nominated as the emergency assembly point and nominated refuge point. This location with a level of approximately 27.5m AHD is above the PMF levels of 25.25m at the site (74 Rickard Road). The existing library forecourt location could provide a safe refuge until the flood event has passed. The location of emergency assembly point and nominated refuge point and evacuation route are shown in below image, the Contractor shall identify the ultimate Project Safety Management Plan strategy as part of their requirements prior to starting construction and be sure to list all of the requirements as listed below. This Project Safety management Plan shall be created prior to construction starting and updated as site conditions progress through construction.

Evacuation drills are designed to increase flood awareness within the site population. These drills can be undertaken twice yearly to familiarise the employees and contractors of the procedures when responding to a flood event. It is an opportunity to outline flood levels and the dangers of entering flood water.

# 4. Assembly Point and Evacuation Routes

#### 4.1 During Construction

The contractor shall be made aware and reminded of the sites potential to flood in large rainfall events and the ability of the floodwaters to inundate the site. They shall ensure to post signs, create a warning system including audible signals such as alarms to advise the general work force of the imminent dangers. The Contractor shall also train their staff and site visitors on evacuation procedures from the site in case of such a scenario. It would be prudent that the Contractor account for the potential site flooding and the effects that could be sustained by equipment and tools and should come up with a contingency plan to move all plant hires including electricity, generators, and vehicles to higher ground within the site at the end of each day and before large rainfall events to minimise the potential for any damage to equipment.

During construction the Contractor is responsible to create, manage, implement and audit a Construction Management Plan which includes the requirement to develop a Project Safety Management Plan (PSMP) which will dictate how the Contractor will manage safety on-site, including but not limited to, during heavy rainfall events and flooding of the site and shall include the following requirements;

- Creation, management, implementation, and auditing of the flood emergency response plan as construction progresses on-site, as part of this response plan the contractor shall provide the following:
  - Identify Safety Personal responsible for creating, implementing, and auditing PSMP's (provide contact details, including names, phone numbers, emails etc)
  - Identify how flood emergency warnings will be received by above nominated safety individuals, including how that person will disseminate and share the information with the greater construction workforce
  - o Create an evacuation plan, including a muster point (assumed point included below)
  - Install warnings, alarms, signs, maps, flowcharts and update accordingly through construction
  - Training of construction workers and site guests shall be undertaken at the beginning of construction and updated weekly. This information shall be introduced at toolbox safety briefings to workers weekly and as information changes through construction

The existing library forecourt area on the western side of the subject site could nominated as the emergency assembly point and nominated refuge point. This location with a level of approximately 27.5m AHD is above the PMF levels of 25.25m at the upstream of proposed building (i.e. 74 Rickard Road) and the intersection of Rickard Road. The location can provide a safe refuge location until the flood event has passed. The location of emergency assembly point and nominated refuge point and evacuation route are shown in Figure 3 below.

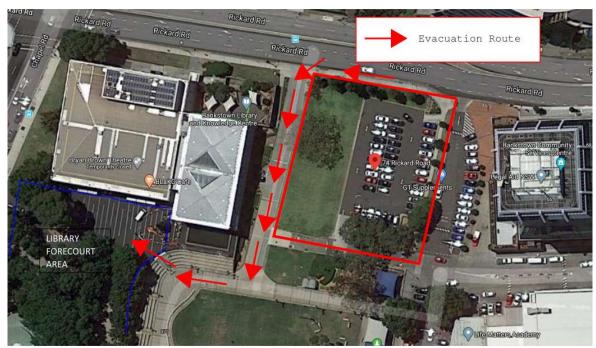


Figure 3 – Evacuation Route during Construction

### 4.2 During Operation of the University

The floor level at first level of the proposed University building is above the PMF level of 25.25m at the upstream of the proposed building. On-site refuge (i.e. first level or above) is recommended for this site during operation of the University.

# 5. Flood Response Preparation

#### 5.1 Evacuation Drills

Evacuation drills are designed to increase flood awareness within the site population. These official drills are to be undertaken twice yearly to familiarise the employees and contractors of the procedures when responding to a flood event. However, as noted above, it would be prudent that the flood evacuation procedure is inducted into the workforce at the start of construction, as well as reminded weekly at toolbox talks and or as information is updated or changed, so that every worker knows what is expected of them in case of an emergency. Evacuation drills are an opportunity to outline flood levels and the dangers of entering flood water.

### 6. Conclusion

As the majority of the site is at risk of flooding under the 100-year ARI design storm event and PMF, it is recommended to evacuate off-site to nominated refuge points during construction in the event of a major flood. The Contractor shall ensure to train staff as well as create a PSMP including evacuation plans for workers and equipment including contingency plans in the event of large rainfall events.

On-site refuge is not recommended during construction during large rainfall events and only considered feasible and recommended for this site once completion and commissioning including the full operation of the University. Once the site is finished construction on-site refuge would be acceptable, however, the University could still choose to utilize the muster point nominated above if they see benefit in using this location.

This report should be revised if the flood study for the subject site is revised to capture changes in the catchment since the last study.

\* Amondo 2019/2020 6.). BOTTARO-SULLAYER GUTLEY--

Instrument setting out terms of Easements or Profits à Prendre intended to be created or released and of Restrictions on the Use of Land or Positive Covenants intended to be created pursuant to section 88B of the Conveyancing Act 1919.

ePlan

(Sheet 1 of 3 sheets)

Plan: DP1256167

Plan of subdivision of Lot 5 and 6 in DP777510 and Right of Way over Lot 12 in DP 566924 covered by Subdivision Certificate No SUB 52/2070 .

24/3/2020

Full name and address of the owner of the land:

Canterbury Bankstown Council ABN 45 985 891 846 of Upper Ground Floor, Bankstown Civic Tower 66-72 Rickard Road, Bankstown NSW 2200

#### Part 1 (Creation)

Number of item shown in the intention panel on the plan	Identity of easement, profit à prendre, restriction on the use of land or positive covenant to be created and referred to in the plan	Burdened lot(s) or parcel(s)	Benefited lot(s), road(s), bodies or Prescribed Authorities
1	Right of way variable width (X)	Lot 15 <del>- DP1256167-</del> ⊁	Canterbury Bankstown Council
2	Right of way 6.6 wide (Y)	Lot 12 DP566924	Lot 15

#### PART 1A (Release)

Number of item shown in the intention panel on the plan	ldentity of easement or profit à prendre to be released and referred to in the plan	Burdened lot(s) or parcel(s)	Benefited lot(s), road(s), bodies or Prescribed Authorities
1	1 Right of carriageway created by DP777510		Lot 5 and Lot 12 in DP 566924

#### PART 2 (Terms)

- 1. Terms of RIGHT OF WAY numbered 1 in the plan
- 1.1 Full and free right to Canterbury Bankstown Council (**Council**), and every person authorised by it (**Authorised Users**), to go, pass and repass at all times and for all purposes with or without animals or vehicles or both over that part of the burdened lot shown (X) (**Easement Site**).
- 1.2 The following actions are prohibited over the Easement Site without the prior written consent of the Council (which consent maybe withheld in the Council's absolute discretion):
  - (a) excavation, construction, or building works under or over the Easement Site;

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Instrument setting out terms of Easements or Profits à Prendre intended to be created or released and of Restrictions on the Use of Land or Positive Covenants intended to be created pursuant to section 88B of the Conveyancing Act 1919.

ePlan

(Sheet 2 of 3 sheets)

Plan: DP1256167

Plan of subdivision of Lot 5 and 6 in DP777510 and Right of Way over Lot 12 in DP 566924 covered by Subdivision Certificate No. 2/2020

- 24/3/2020
- (b) any encroachment on to the Easement Site; or
- (c) parking of vehicles on the Easement Site.
- 1.3 If the owner of the lot burdened wishes to carry out emergency repair works to buildings located on the lot burdened and these works affect the Easement Site (Emergency Repair Works), Council will act expeditiously in considering any request by the owner of the lot burdened for consent to the Emergency Repair Works.
- 1.4 Council must, at its cost, keep, repair and maintain the Easement Site in a clean, tidy, safe, unobstructed, level and trafficable condition.
- 2. Terms of RIGHT OF WAY numbered 2 in the plan
- 2.1 Full and free right for the owner of the lot benefitted and every person authorised by it (Authorised Users) to go, pass and repass at all times and for all purposes with or without animals or vehicles or both over that part of the burdened lot shown (Y) (Easement Site).
- 2.2 The following actions are prohibited over the Easement Site:
  - (a) excavation, construction, or building works under or over the Easement Site or access over the Easement Site in support of construction work on the benefited lot;
  - (b) any encroachment on to the Easement Site; or
  - (c) parking of vehicles on the Easement Site.
- 2.3 If the owner of the lot benefitted or its Authorised Users wish to carry out emergency repair works to buildings located on the lot benefitted and these works affect the Easement Site (Emergency Repair Works), the owner of the lot burdened will act expeditiously in considering and responding to any request by the owner of the lot benefitted or its Authorised Users for consent to the part of the Emergency Repair Works which affects the Easement Site. The owner of the lot burdened must not unreasonably withhold its consent.
- Council must, at its cost, keep, repair and maintain the Easement Site in a clean, tidy, safe, unobstructed, level and trafficable condition

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Instrument setting out terms of Easements or Profits à Prendre intended to be created or released and of Restrictions on the Use of Land or Positive Covenants intended to be created pursuant to section 88B of the Conveyancing Act 1919.

ePlan

(Sheet 3 of 3 sheets)

Plan: DP1256167

Plan of subdivision of Lot 5 and 6 in DP777510 and Right of Way over Lot 12 in DP 566924 covered by Subdivision Certificate No

Signed, sealed and delivered for and on behalf of Canterbury Bankstown Council by its Authorised Delegate pursuant to section 377 Local Government Act 1993:

re of eligible witness

Full name of witness (print)

66-72 heladed Faulteen NSW

Name of Authorised Delegate (print)

Signature of Authorised Delegate

Address of witness (print)

Position of Authorised Delegate (print)

REGISTERED



9.6.2020

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/Seq:1

14:00

SSM 86802 TO CORNER 287\*58'43" - I57.28I (DP II76985)

AVENUE

SSM 57343 - PM 59503

229° 47′ 57″ - 419.855 (MGA GND) 229° 47′ 57″ - 419.863 (BY ME)

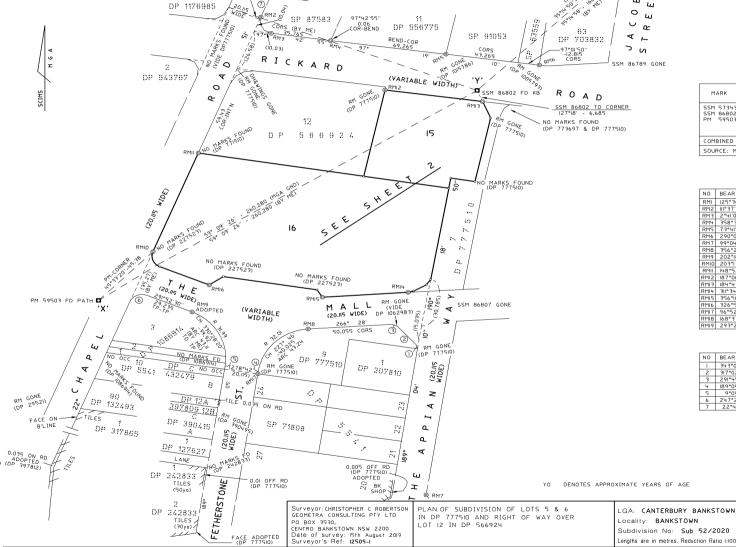
MGA COORDINATES STATE EASTING NORTHING 318522.894 6245690 945 FOUND SSM 86802 PM 59503 318425.685 318202.214 6245553.383 6245419.942 FOUND COMBINED SCALE FACTOR (CSF) = 0.999999 SOURCE: MGA COORDINATES ADOPTED FROM SCIMS AS AT 30/07/2019

#### TABLE OF REFERENCE MARKS

BEARING	DISTANCE	DESCRIPTION
125°36'00"	3.605	DH&W FOUND KERB (VIDE DP 1212420)
III°37'00"	3.445	DH&W FOUND KERB (DP II79458)
2°41'00"	3.37	DH&W FOUND KERB (DP II79458)
358°34'00"	3.25	DH&W FOUND KERB (DP II79458)
73°41'00"	7.805	DH&W FOUND PATH (DP II56098)
290°00'00"	10.56	DH&W FOUND KERB (DP 1005793)
99°04'00"	3.63	DH&W FOUND KERB (DP 739993)
356°28'00"	3,4	DH&W FOUND KERB (DP 777510) (BY ME)
202°18'40"	3,49	DH&W FOUND KERB ADOPTED (DP 777510)
203°13'00"	6.075	DH&W SET KERB
148°52'00"	4.35	DH&W SET KERB
187°06'25"	24.345	DH&W SET KERB
184*47'10"	24.24	DH&W SET KERB
311°34'30"	16.145	DH&W SET KERB (TRAFFIC ISLAND)
356°18'00"	3.665	DH&W SET KERB
326*57'40"	4.06	NAIL&W FOUND KERB (ORIGIN UNKNOWN)
96°52'00"	3.61	DH&W FOUND KERB (ORIGIN UNKNOWN)
168°33'00"	4.61	DH&W SET KERB
293°22'00"	6.355	DH&W SET KERB
	125*36'00" III*37'00" 2*4I'00" 358*34'00" 73*4I'00" 290*00'00" 99*04'00" 920*18'40" 203*18'00" 148*52'00" 187*06'25" 184*47'10" 311*34'30" 326*18'00" 326*57'40" 96*52'00"	125°96'00" 3.605 111"37'00" 3.445 24'100" 3.37 358'34'00" 3.25 73'41'00" 7.805 290'00' 10.56 99'00'00" 10.56 99'00'00" 3.63 356'28'00" 3.4 2021'8'40" 3.49 203'13'00" 6.075 188'52'00" 4.35 187'06'25" 24,345 187'47'10" 24,24 31"34'30" 16,145 356'18'00" 3.665 356'25" 4.36

#### TABLE OF BOUNDARIES

NO	BEARING	DISTANCE	DESCRIPTION
- 1	343°03'00"	2.735	CORNERS
2	317°02'30"	16.57	CORNERS
3	291°45'00"	3.305	CORNERS
4	189°04'00"	2.285	CORNERS
5	9°04'00"	2.49	CORNERS
6	247°21'30"	CH 10.705	ARC: II.865 RAD: 7.635 CORNERS (BY ME)
7	22°49'30"	56.65	CORNERS



FACE ADOPTED - (DP 777510)

FRENCH

SP 42942

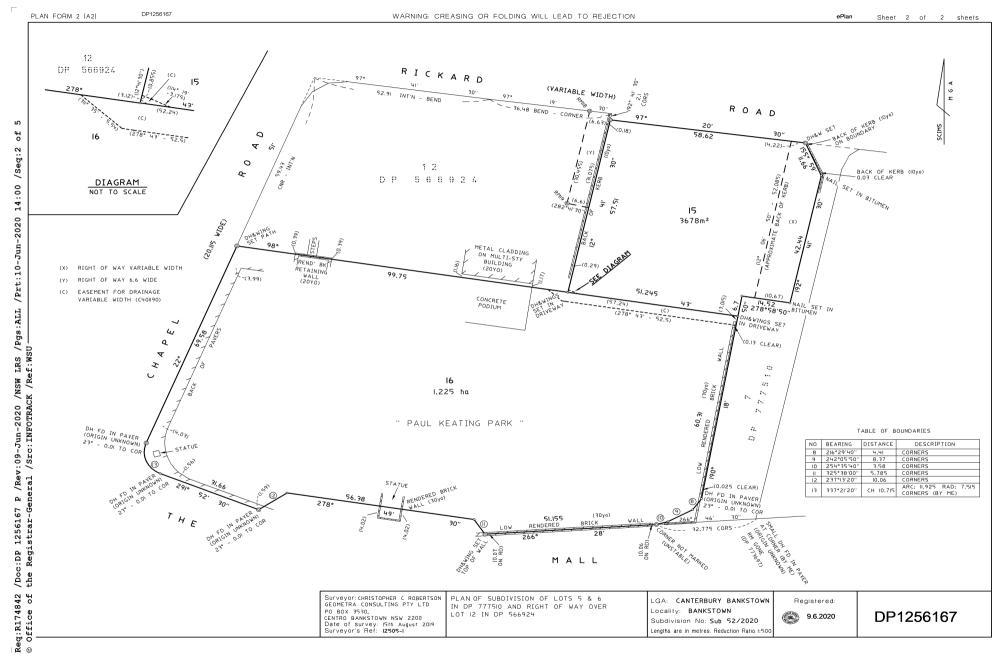
Locality: BANKSTOWN Subdivision No: Sub 52/2020 Lengths are in metres. Reduction Ratio I:100

SSM 57343 FD KB

Registered: 9.6.2020

DP1256167

/Prt:10-Jun-2020 P 1256167 P /Rev:09-Jun-2020 /NSW LRS /Pgs:ALL gistrar-General /Src:INFOTRACK /Ref:WSU /Doc:DP 1256167 the Registrar-Ge Req:R174842 © Office of



- 1

PLAN FORM 6 (2018) DEPOSITED PLAN AI	OMINISTRATION SHEET Sheet 1 c	of 3 sheet(s)
9.6.2020 Office Use Only Registered:		Office Use Only
	DP1256167	
Title System: TORRENS		
PLAN OF SUBDIVISION OF LOTS 5 & 6 IN DP 777510 AND RIGHT OF WAY OVER	LGA: CANTERBURY BANKSTON	٧N
LOT 12 IN DP 566924	Locality: BANKSTOWN	
	Parish: BANKSTOWN	
	County: CUMBERLAND	
Survey Certificate	Crown Lands NSW/Western Lands Of	fice Approval
I, CHRISTOPHER C ROBERTSON	I,(Au	
Of GEOMETRA CONSULTING PTY LTD	approving this plan certify that all necessary approvallocation of the land shown herein have been given	
PO BOX 3530 CENTRO BANKSTOWN NSW 2200		
a surveyor registered under the Surveying and Spatial Information Act 2002, certify that:	Signature:	
*(a) The land shown in the plan was surveyed in accordance with the Surveying and Spatial Information Regulation 2017, is accurate and the survey was completed on 15th AUGUST 2019	File Number:	
*(b) The part of the land shown in the plan (*being/*excluding **	Office:	
was surveyed in accordance with the Surveying and Spatial Information Regulation 2017, the part surveyed is accurate and the survey was completed on	*Authorised Person/*General Manager/*Accredited the provisions of section 6.15 Environmental Plann. Act 1979 have been satisfied in relation to the prop	ing and Assessment
Datum Line: 'X' – 'Y'	new road or reserve set out herein.// Signature:	
Type: *Urban/* <del>Rura</del> l		
The terrain is *Level-Undulating / * <del>Steep-Mountainous.</del> Signature:	Accreditation number Consent Authority: Cautabeay Saust Date of endorsement: 24/342020	been Coencel
Surveyor Identification No: 1908	Subdivision Certificate number: Sub 52/2	2020 ·
Surveyor registered under the Surveying and Spatial Information Act 2002	File number: SW 52/7070	
*Strike out inappropriate words.	,	
**Specify the land actually surveyed or specify any land shown in the plan that is not the subject of the survey.	*Strike through if inapplicable.	
Plans used in the preparation of survey/eempilation.	Statements of intention to dedicate public roads, create public reserv	
DP 227523 DP 237384 DP 739993 DP 773697	and drainage reserves, acquire/resume land.	
DP 777510 DP 1005793 DP 1062983 DP 1086914		
DP 1176985 DP 1212420 DP 1231000		
PPN DP 1256167		
Surveyor's Reference: 12505-1	Signatures, Seals and Section 88B Statements PLAN FORM 6A	should appear on

ePlan

**DEPOSITED PLAN ADMINISTRATION SHEET** PLAN FORM 6A (2017) Sheet 2 of 3 sheet(s) Office Use Only Office Use Only 9.6.2020 Registered: DP1256167

### PLAN OF SUBDIVISION OF LOTS 5 & 6 IN DP 777510 AND RIGHT OF WAY OVER **LOT 12 IN DP 566924**

NB 52/2020 Subdivision Certificate numbers Date of Endorsement:

This sheet is for the provision of the following information as required:

- A schedule of lots and addresses See 60(c) SSI Regulation 2017
- Statements of intention to create and release affecting interests in accordance with section 88B Conveyancing Act 1919
- Signatures and seals- see 195D Conveyancing Act 1919
- Any information which cannot fit in the appropriate panel of sheet 1 of the administration sheets.

#### SURVEYING & SPATIAL INFORMATION REGULATION 2017 CLAUSE 60 (C)

LOT	STREET No.	STREET NAME	STREET TYPE	LOCALITY
15	74	RICKARD	ROAD	BANKSTOWN
16	375	CHAPEL	ROAD	BANKSTOWN

PURSUANT TO SECTION 88B OF THE CONVEYANCING ACT, 1919, IT IS INTENDED TO CREATE:

- 1. RIGHT OF WAY VARIABLE WIDTH SHOWN AS (X)
- 2. RIGHT OF WAY 6.6 WIDE SHOWN AS (Y)

IT IS INTENDED TO RELEASE:

1. RIGHT OF CARRIAGEWAY VARIABLE WIDTH (VIDE DP 777510)

If space is insufficient use additional annexure sheet

Surveyor's Reference: 12505-1

ePlan

PLAN FORM 6A (2017) DEPOSITED PLAN AI	OMINISTRATION SHEET Sheet 3 of 3 sheet(s)					
Registered: 9.6.2020 Office Use Only	Office Use Only					
PLAN OF SUBDIVISION OF LOTS 5 & 6 IN DP 777510 AND RIGHT OF WAY OVER LOT 12 IN DP 566924	DP1256167					
Subdivision Certificate number: Sub \$7/7070  Date of Endorsement: 24/3/2070	<ul> <li>This sheet is for the provision of the following information as required:</li> <li>A schedule of lots and addresses - See 60(c) SSI Regulation 2017</li> <li>Statements of intention to create and release affecting interests in accordance with section 88B Conveyancing Act 1919</li> <li>Signatures and seals- see 195D Conveyancing Act 1919</li> <li>Any information which cannot fit in the appropriate panel of sheet 1 of the administration sheets.</li> </ul>					
SIGNATURES AND SEALS						
CANTERBURY BANKSTOWN COUNCIL by its authorized delegate pursuant to Section 377  Local Government Act 1998  Delegate (Signature)  Delegate (Print Full Name)						
I certify that am an eligible witness and that the delegate signed in my presence  Witness (Signature)  Heidi Menhum  Witness (Print Full Name)						
66-72 RICKORD RO BONISTOWN NSW 2200 Address of Witness						
	e additional annexure sheet					
Surveyor's Reference: 12505-1						