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Woolworths
The fresh food people

FLOOD MANAGEMENT REPORT
PROPOSED WOOLWORTHS
11-13 PERCY STREET, AUBURN, NSW

State Significant Development Application

Revision 01
AUGUST 2020

Our Job No. 19513

henry&hymas

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1. GLOSSARY

ARI	Average Recurrence Interval
AEP	Annual Exceedance Probability
AHD	Australian Height Datum (National Survey datum)
DA	Development Application
DECC	Department of Environment and Climate Change
RAFTS	Computer software package for 1D hydrologic analysis
HEC-RAS	Computer software package for 1D hydraulic modelling
FFL	Finished Floor Level
Flow	Volume of water per time (also known as flow rate) (m3/s or L/s)
Freeboard	Height difference between flood water surface level and finished floor level
FWL	Flood Water (Surface) Level
Hydraulic	Science of a moving liquid in a confined space
Hydrograph	Graph showing the rate of flow versus time past a specific point in a river, channel, or conduit carrying flow.
Hydrologic	The study of the water on the earth and in its atmosphere
LPI	Department of Land and Property Information
RL	Reduced Level (surface elevation)
PMF	Probable Maximum Flood level
Sheet Flow	Overland flow with the form of a continuous but not concentrated flow on a surface
Topography	The arrangement of the natural and artificial physical features of an area
Velocity	Measure of the speed and direction of the water flow (m/s)

NSW Floodplain Development Manual
The Floodplain Development Manual is a document published in 2005 by the New South Wales State Government. The document details Flood Prone Land Policy which has the primary objective of reducing the impact of flooding and flood liability on individual owners and occupiers of flood prone property, and to reduce private and public losses resulting from floods. At the same time, the policy recognises the benefits from occupation and development of flood prone land.

2. INTRODUCTION

2.1. General

This report has been prepared in response to enquiries by the Secretary's Environmental Requirements (SEARs) in relation to flooding and drainage enquiries for the proposed development.

The report will address the issues raised in item number 14, relating to flooding and include; description of the flood assessment and modelling, flood behaviour for range of storm events, and the impacts of on the proposed development.

The subject site is located located at 11-13 Percy Street, Auburn within the Haslams Creek catchment which runs along the eastern boundary of the site. The locality sketch of the site is shown in Figure 3.1 below.

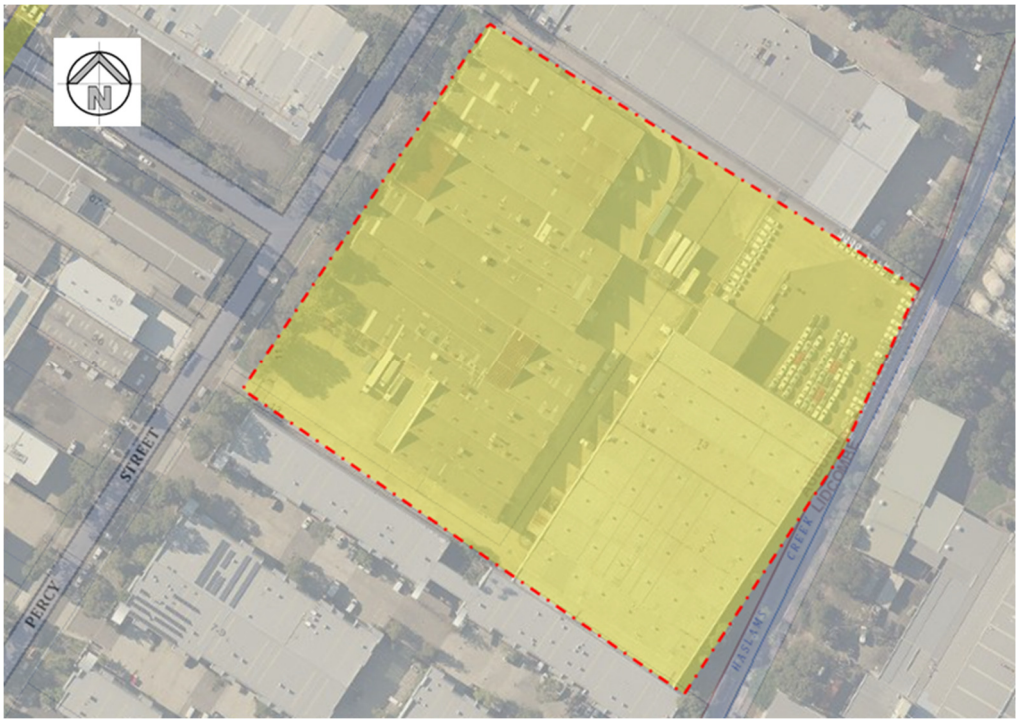


Figure 1 - Locality sketch

The aim of this Flood Assessment Report is to ensure that the development does not have any impact on the existing flood extent or neighbouring properties. The report will also address the following items:

- Nature of flooding in the locality - to ensure that the proposed development is compatible with the flow regime of the waterway and does not affect the existing flood extent up to and including 100 year ARI Storm events
- Ensure that the proposed development maintains the Flood Planning Levels provided in Haslams Creek Floodplain Risk Study and Plan, January 2003 by Bewsher Consulting Pty Ltd on behalf of Auburn City Council.

- Land forming operations, their impact on flooding and their suitability for development
- Compensatory earthworks and an assessment of the effect on floodplain storage
- Ensure that proposed development complies with the Proposed Planning Matrix for the Haslams Creek Catchment extracted from Haslams Creek Floodplain Risk Study and Plan, January 2003 by
- *Bewsher Consulting Pty Ltd*
- Flood risk assessment – to assess the risks associated with the proposed development
- Recommendations on all precautions to minimise risk to personal safety of occupants and the risk of property damage for the development to address the flood impacts on the site
- Provide a Flood evacuation plan

SITE DESCRIPTION

2.2. Local and Regional Context

The existing site is located in the Sydney metropolitan suburb of Auburn and is approximately 3.5ha in area. It is bounded by Percy Street along the north-western boundary, it is surrounded by commercial and industrial premises along the north-eastern and south-western sides, while the south-eastern side is bounded by the Haslams Creek.

The site is currently mostly impervious and occupied by an industrial development; it appears as though there are no water quality or quantity measures provided for the existing development. Most of the site is occupied by buildings and the surrounding concrete carpark and driveways, at exception of a small strip of landscape along the north-western boundary. The surface of the site generally falls from west to east, from RL 7.50 to RL 4.20 at approximately 1.2%. A valley runs through the middle section of the site, acting as a waterway conveying the overland flood water from upstream towards Haslams Creek.

The catchment plan showing Haslam Creek catchment and the envelope of the subject site is shown in the catchment plan provided in Appendix A.

No exact information is available in regards to the grading of Percy Street, although it is assumed for the road to also fall from south-west to north-east.

2.3. The Proposed Development

The proposed site will be used for commercial purposes.
The redevelopment includes the demolition of the current warehouse and the construction of a 2 storey building occupying the majority of the site. The building will include a ground floor and a mezzanine floor for a Woolworths distribution centre warehouse. A concrete carpark and loading docks will surround the building.

The overall Architectural site plan for the ground floor is provided in Appendix B

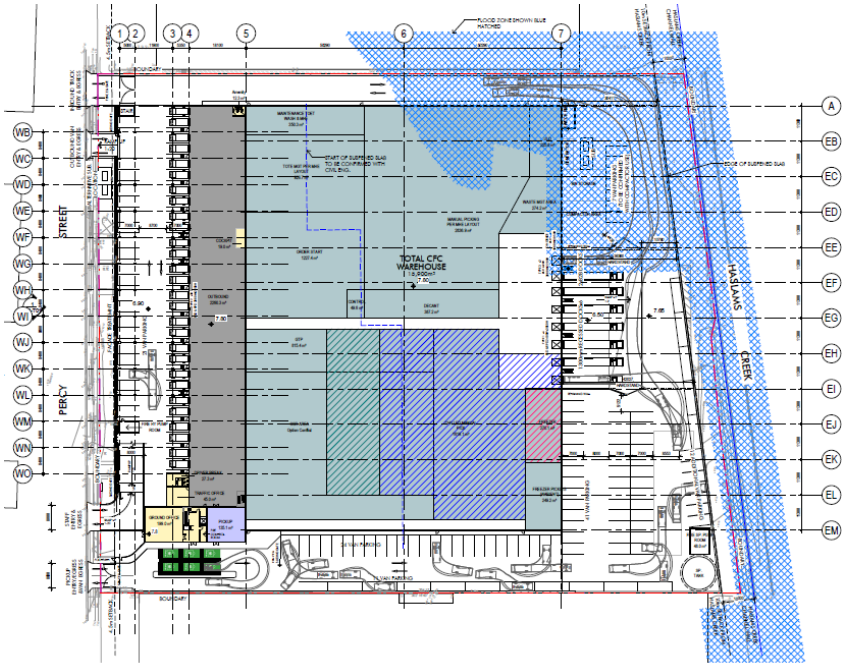


Figure 2 - Architectural Site Plan

3. FLOOD STUDY

3.1. Flood Study Source Information

The proposed site is located within Haslams Creek catchment which eventually drains to Haslams Creek downstream. The flood study information regarding flood levels, flood risk, flood maps and proposed planning matrix for the Haslams Creek catchment are extracted from Haslams Creek Floodplain Risk Study and Plan, January 2003 by Bewsher Consulting Pty Ltd prepared for Auburn City Council.

It should be noted that the original Flood Study from 2003 was undertaken prior to completion of the Haslams Creek Overland Flood Study (RHDHV 2016). A draft of the flood study report was issued to Council in 2016. The study is yet to be adopted by Council, however, provides the most accurate and up to date flood information for the subject site.

Proposed Flood planning levels are based on the received information received from Council and the Overland Flood Study.

Flood certificate received from Council and Flood levels are below:

Flood m AHD	
1 in 100 year ARI flood Percy street	west to east RL 7.40m to RL 7.20 AHD
1 in 100 year ARI flood Haslams Creek	west to east RL 5.60m to RL 5.20 AHD
PMF flood Percy street	west to east RL 8.60m to RL 8.00 AHD
PMF flood Haslams Creek	west to east RL 8.80m to RL 8.20 AHD

3.2. Catchment

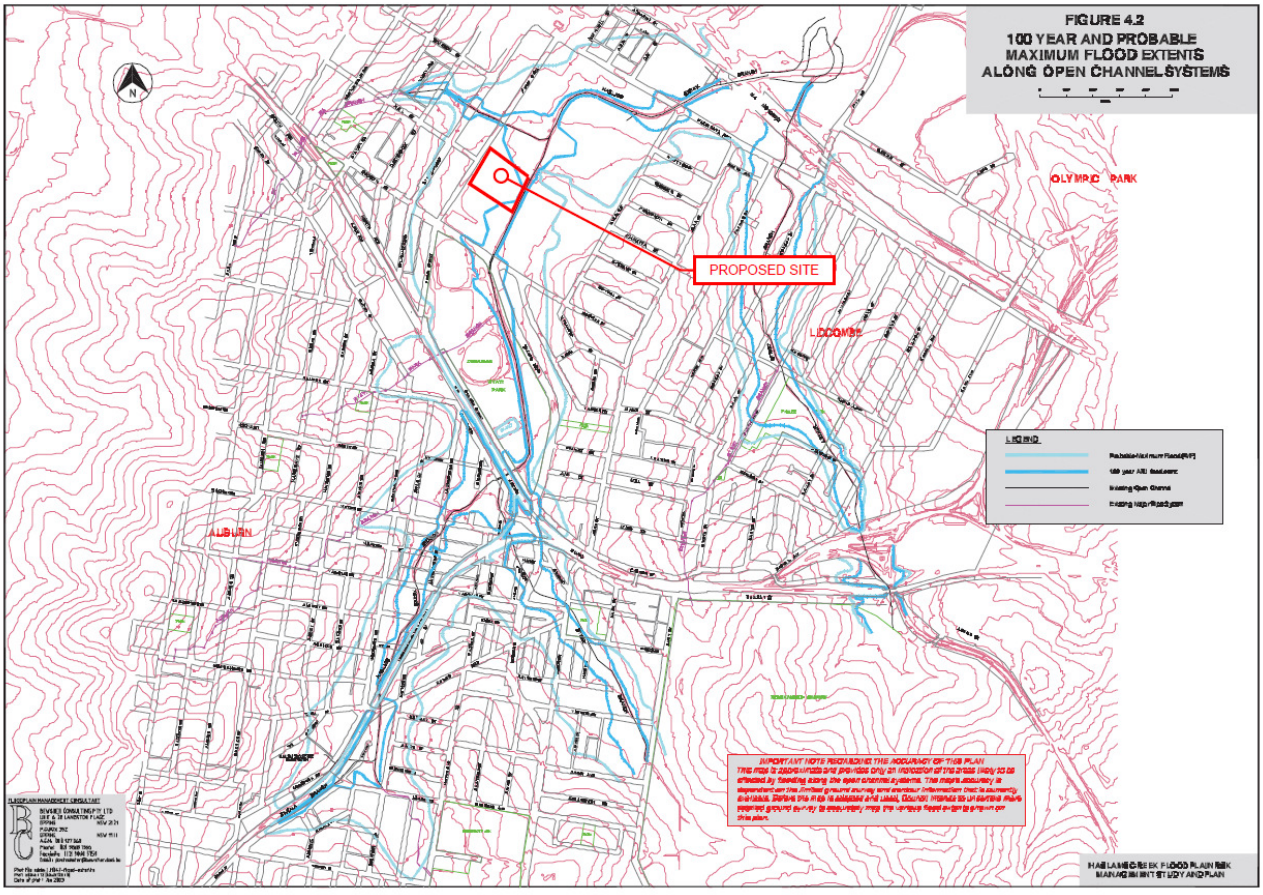
The subject site is located within the Haslams Creek catchment which is approximately seventeen square kilometres in area. The land use of the catchment is mainly residential with isolated industrial and commercial land use. Rookwood Cemetery (located on the south eastern side of the catchment) also forms part of Haslams Creek catchment, and divides the Cooks River and Haslams Creek catchments.

Upstream of Brixton Street to upstream of Parramatta Road, Haslams Creek is generally a concrete lined channel. From Parramatta Road to the M4 Motorway, the Creek has an unlined invert and concrete lined banks. The trunk drainage system for the catchment includes various stormwater channels and trunk drainage systems which discharge to Haslams Creek. The most of the trunk drainage system including Haslams Creek itself is under the control of Sydney Water Corporation (SWC).

4. FLOOD ASSESSMENT

4.1. Flood Levels and Flood Planning Levels

The flood extent map for Haslams Creek's catchment is shown in the figure below and in Appendix C. The map shows the 100yr ARI and PMF flood extents, as well as the existing terrain and existing drainage system.



From figure 3, it is found that the back side of the subject site encroaches into the existing 100yr ARI flood extent.

Flood levels have been obtained from Cumberland Council through the letter "Flood levels at no 11 Percy Street, Auburn Being Lot 1 DP 1183821" dated 3 July 2019. The flood information about the property has been provided according to the information available to Council from the "Haslams Creek Overland Flood Study" prepared by Royal Haskoning DHV in March 2016. The received letter and map can be found in Appendix D.

No. 11 Percy Street is found to be surrounded by flooding along Percy Street, although the flooding does not seem to affect the side along this boundary. Overland flow is on the side of the neighbouring property no 9 Percy street. Although,

the eastern corner is affected by flooding, area in which is proposed to have no buildings but only carpark on suspended slab. In accordance with the flood certificate, this lot is classified as both “floodway area” and “flow path”.

No. 13 Percy Street is found to be affected by flooding in its northern section. Nearly a third of the site is affected by flooding; hence a CDC cannot be issued for the site, which is classified as all of the following:

- A flood storage area
- A floodway area
- A flow path
- A high hazard area
- A high risk area

For this reason, the proposal is to suspend whatever portion of the building that is found to encroach the flood zone in order to not reduce the flood storage volume and impede the movement of flood water in any way.

The requirement for the minimum habitable floor level is to be 0.5m above the flood level at the upstream side of the structure proposed in the development. The minimum floor level for non-habitable structures such as garages, laundry and sheds is 0.15m above the flood level at the upstream side of the structure (interpolation between flood levels is allowed).
The maximum flood levels upstream of the proposed development are marked at Location C as RL7.2m and RL7.4m at Location A. As stated on page 3 of the flood certificate, interpolation between flood levels is allowed. This indication has also been confirmed by Rolyn Sario from Cumberland Council, therefore the flood level for the site has been established to be RL7.3m, which is the result of interpolation between the flood levels indicated at the corners of the site. Therefore, the finished floor level for the site will be required to be RL7.80m (7.3m +0.50m freeboard).

Furthermore, in accordance with Table 5-Haslams Creek Floodplain in the Auburn Development Control Plan 2010 (refer to Appendix F), a High Flood Risk precinct is defined as an area within the envelope of land subject to a high hydraulic hazard (in accordance with the provisional criteria outlined in the Floodplain Management Manual) in a 100 year flood or potentially subject to evacuation difficulties.
Property no. 13 Percy Street is classified as a High Flood Risk zone, as such, the land is considered unsuitable for commercial and industrial development, as well as residential, subdivision, crucial utilities and essential community facilities (refer to Appendix J).
Although, considering the nature of the existing development and the proposal of a new development that stays clear of the flood extent, it is believed that the site will be suitable for development.

Moreover, the lots were found to be affected by Probable Maximum Flood (PMF), hence an evacuation plan may also be required (refer to appendix I).
Climate change has become a major environmental concern over the last 20 years. With the increasing amounts of greenhouse gases being released to the atmosphere due to human activity, the average earth surface temperature has been rising. As such, this may be affecting the climate and sea level.
Climate change has the potential to alter flood levels as a result of increased rainfall intensity and increase in receiving water levels (i.e. sea levels). Freeboard provides a factor of safety that includes the climate change.

4.2. Design Building Levels

The flood planning level for the subject site is taken as 0.5m freeboard to 100 year storm event flood level, which provides flood protection for the site up to and including 100 year ARI storm events (In accordance with Floodplain Development Manual, April 2005 by NSW Environment and Heritage).

4.3. Flood Impact

From Figure 4 below, it is observed that the subject site does into the existing 100 year ARI flood extent in the south eastern corner of the site. We are proposing suspended structure over the flood extent and the proposal will not have any adverse impact to the existing floodplain or neighbouring properties.
As part of the proposed development, there is also no filling within floodplain storage area, which ensures that there is no impact on flood regimes or floodplain storage.
The proposed development does not have any impact on the existing flood levels up to 1:100 year storm event.

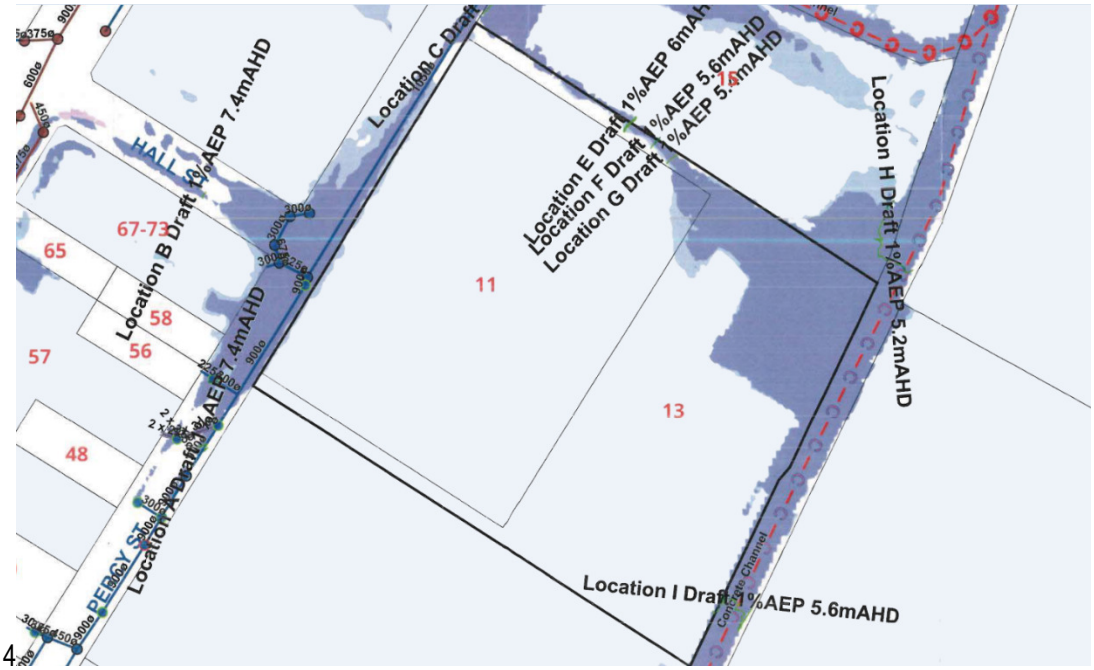


Figure 4

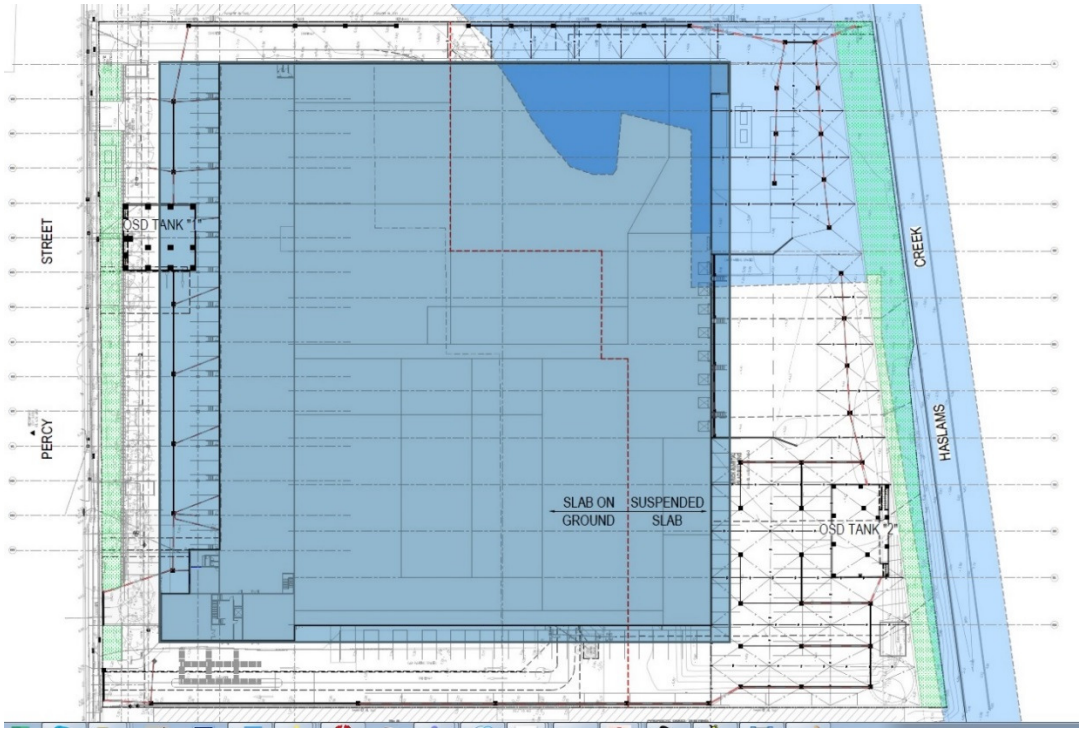


Figure 5

4.4. Flood Evacuation

Given the nature of the proposed development it is important to consider safe flood evacuation from the site under extreme flood conditions such as the 100 year flood and PMF.

The Bureau of Meteorology (Met. Bureau) is normally the government agency responsible for issuing flood warnings throughout Australia. However, the Met. Bureau has limited resources and cannot provide a flood warning service for all areas.
Flood warning systems generally monitor rainfall and river gauges in the upper parts of catchments in real time and, through hydrologic/hydraulic models, predict the resulting flow and flood levels at some time in the future in the lower catchment.

Forecasts of continuing rain or anticipated changes in rainfall intensity can also be included in the models to provide additional forecasting ability.
The minimum 'turn-around time' between when the rainfall actually occurs and the predicted flood levels occur is about 6 hours. When there is less than 6 hours between the rainfall and the associated flood, the Met. Bureau classifies this as 'flash flooding'. In these catchments, by the time the Met. Bureau is aware of the excessively high rainfalls, the flooding has already occurred. For the Haslams Creek catchment, the time between heavy rainfall and the occurrence of flooding can be less than one hour. Therefore, the Met. Bureau is unable to provide a specific flood warning service for the catchment.

The only warning available in catchments that experience flash flooding is a 'thunderstorm warning'. Thunderstorm warnings are made by the Met. Bureau within the Newcastle–Sydney–Wollongong area and are based on information available from synoptic charts and Sydney Radar. The warnings are made before the rainfall actually occurs. It is usually provided for general areas (e.g. the Sydney area) and is not specifically targeted at individual, small catchments, such as the Haslams Creek catchment.

The finished floor levels are above the 1% AEP flood levels, which would allow a building lockdown procedure to be initiated. Evacuation of the building could be commenced once the channel flood waters have subsided.
If deemed safe by the building's chief emergency warden and rescue personal, the building occupancy could be evacuated either by:

Unfortunately, there is limited scope to improve the flood warning in the Haslams Creek catchment as this relatively small urbanised catchment experiences 'flash flooding'. As such, the Met. Bureau would be unable to provide a specific flood warning service to this catchment. In that case

Based on the size of the Haslams Creek catchment and the random nature of rainfall patterns, it is understood that the Channel will take a few hours to reach its maximum flood level. Which means that at very worst there will be a few hours warning for a major flood. This is sufficient time to enable evacuation of the staff. The effective warning time is typically used to move equipment, move stock, evacuate people and move cars from the parking area.
Once the property has received the flood warning it is the responsibility of the warehouse management to start implementing the evacuation plan. This will be ensuring that the Staff leave the site in an orderly manner or prepare for the building lockdown.
In case of flash flooding the staff need to remain in the building until the water inundation has subsided.

5. CONCLUSIONS

This flood assessment has been carried out in accordance with Haslams Creek Floodplain Risk Management Study and plan by Bewsher Consulting Pty Ltd which has been prepared for Auburn Council. It maintains all the requirements in accordance with Council's flood study and plan for the catchment within which the site sits.

The proposed building levels have a minimum 0.5m freeboard to 100 year ARI storm events which makes the proposed site envelope flood protected up to and including 100 year ARI events. This flood assessment also concludes that there is no social or financial impact to the community. Since there is no filling activities or encroachment within the 100 year flood extents, there is no flood affectation to the existing flood regimes, floodplain storage or adjacent properties.
The proposed development complies with all criteria which need to be fulfilled in accordance with the proposed planning matrix for the Haslams Creek floodplain catchment within which the site sits.

Whilst it is inevitable that the development will be impacted by major floods such as the PMF, with adequate warning measures and evacuation procedures in place, the safety of the occupants of the Warehouse can be assured.

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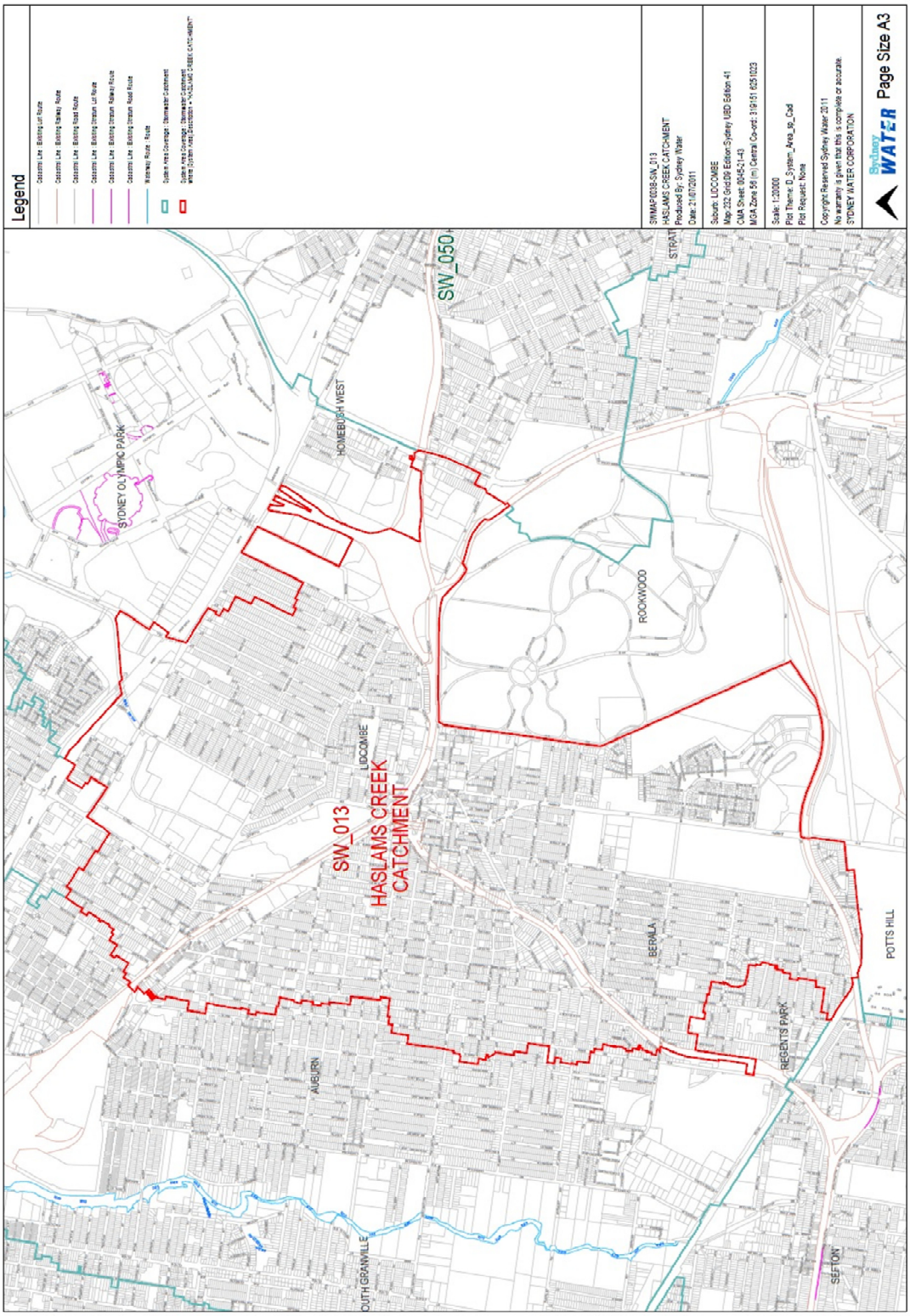
APPENDIX A – HASLAMS CREEK CATCHMENT PLAN



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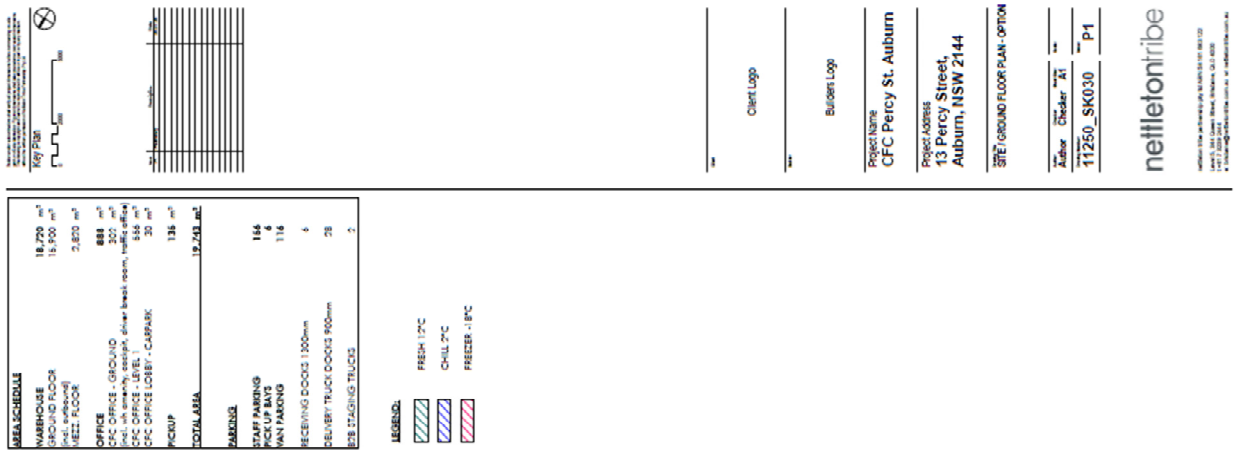
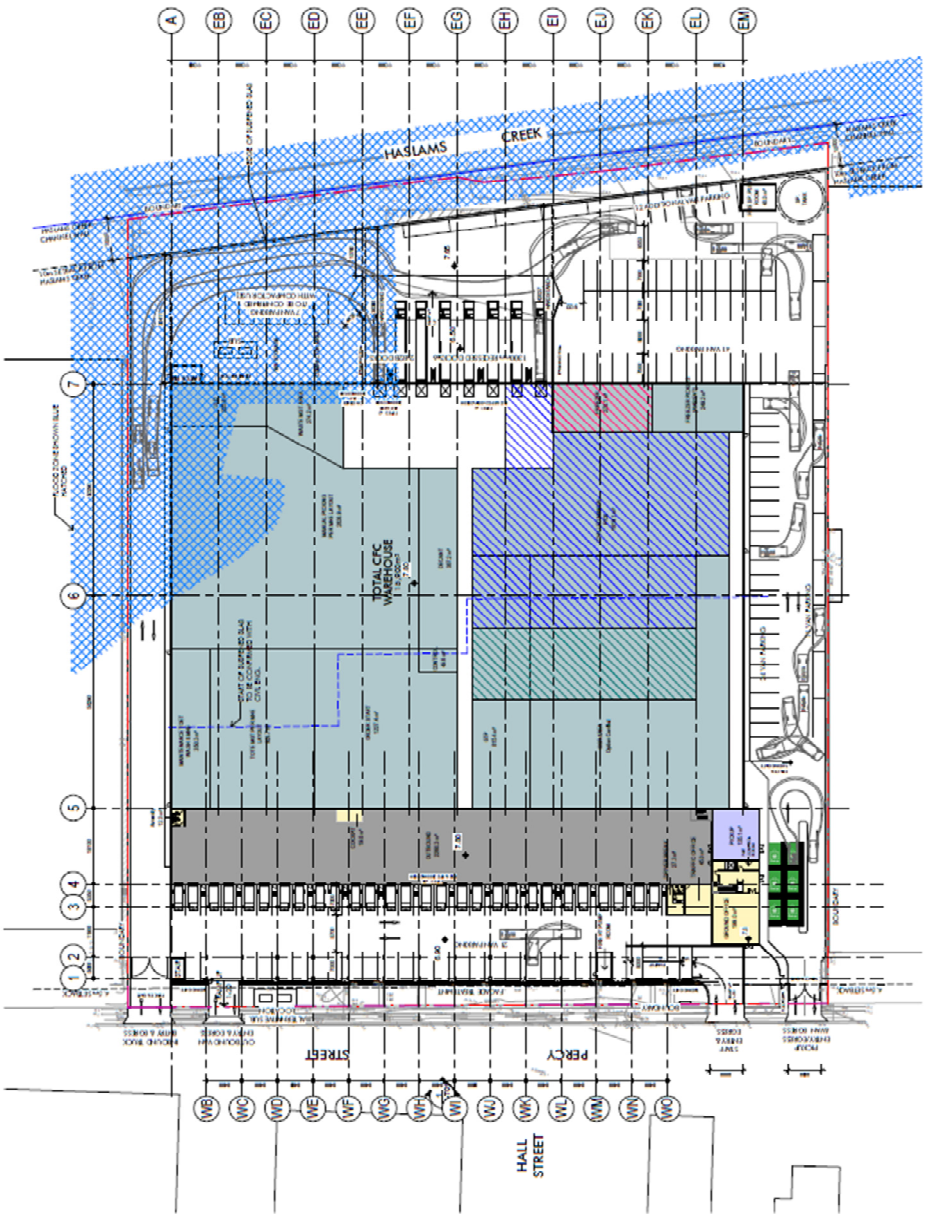
APPENDIX B – ARCHITECTURAL PLAN





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APPENDIX C – 100YR ARI AND PMF FLOOD MAP

APPENDIX D – 1%AEP FLOOD LEVELS

CUMBERLAND COUNCIL

3 July 2019

Our Reference D-08-01/03
Contact Rolyn Sario
Telephone 8757 9536

Boro Seizov
Level 5, 79 Victoria Avenue
CHATSWOOD NSW 2067

Dear Sir/Madam

FLOOD LEVELS AT NO 11 PERCY STREET, AUBURN
BEING LOT 1 DP 1183821

Council refers to your request dated 27 June 2019 requesting flood information at the above property.

The above property is shown to be affected by the 1% Annual Exceedance Probability (AEP) flood, according to the information available to Council from the "Haslams Creek Overland Flood Study" prepared by Royal Haskoning DHV in March 2016.

The 1% AEP flood level refers to a flood which has a 1% chance of being equalled or exceeded in any one year and this site has been assessed as a medium flood risk. It should be noted that a flood could occur that is more severe than the 1% AEP flood at any time.

The maximum 1% AEP flood level relevant to the subject property has been determined (see the attached plan) to Australian Height Datum (AHD) as follows:

1.	At location A	-	7.4 mAHD
2.	At location B	-	7.4 mAHD
3.	At location C	-	7.2 mAHD
4.	At location E	-	6.0 mAHD
5.	At location F	-	5.6 mAHD
6.	At location G	-	5.4 mAHD
7.	At location H	-	5.2 mAHD

The subject property has been identified as Flood Control lot. Under the SEPP (Exempt & Complying Development) 2008 Regulation 3.36C, a Complying Development Certificate must not be issued for, "*any part of a flood control lot unless that part of the lot has been certified, for the purposes of the issue of the relevant complying development certificate, by the council or a professional engineer who specialises in hydraulic engineering as not being any of the following:*

16 Memorial Avenue, PO Box 42, Merrylands NSW 2160
T 02 8757 9000 F 02 9840 9734 E council@cumberland.nsw.gov.au W cumberland.nsw.gov.au
ABN 22 798 563 329

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a) *a flood storage area,*
b) *a floodway area,*
c) *a flow path,*
d) *a high hazard area,*
e) *a high risk area.**

Council has determined that part of the flood control lies in two of the five items above – items *b* and *c* therefore; a CDC cannot be issued on this site. The identified flood items are represented by the darker area within the 1% AEP flood extent on the attached map. If the development is proposed within any part of this zone (dark blue area), a pre and post flood study must accompany the Development Application. Alternatively, if the development is proposed within the uncoloured and/or light blue areas (flood fringe zone), a CDC may be considered for this site. However, the surface flows must not be impeded (blocked) and the redevelopment shall allow the free movement of the flood around any proposed structure(s).

FLOOD LEVELS AT NO 13 PERCY STREET, AUBURN
BEING LOT 2 DP 1183821

Council refers to your request dated 27 June 2019 requesting flood information at the above property.

The above property is shown to be affected by the 1% Annual Exceedance Probability (AEP) flood, according to the information available to Council from the "Haslams Creek Overland Flood Study" prepared by Royal Haskoning DHV in March 2016.

The 1% AEP flood level refers to a flood which has a 1% chance of being equalled or exceeded in any one year and this site has been assessed as a high flood risk. It should be noted that a flood could occur that is more severe than the 1% AEP flood at any time.

The maximum 1% AEP flood level relevant to the subject property has been determined (see the attached plan) to Australian Height Datum (AHD) as follows:

8.	At location A	-	7.4 mAHD
9.	At location C	-	7.2 mAHD
10.	At location E	-	6.0 mAHD
11.	At location F	-	5.6 mAHD
12.	At location G	-	5.4 mAHD
13.	At location H	-	5.2 mAHD
14.	At location I	-	5.6 mAHD
15.	At location J	-	5.8 mAHD

The subject property has been identified as Flood Control lot. Under the SEPP (Exempt & Complying Development) 2008 Regulation 3.36C, a Complying Development Certificate must not be issued for, "*any part of a flood control lot unless that part of the lot has been certified, for the purposes of the issue of the relevant complying development certificate, by the council or a professional engineer who specialises in hydraulic engineering as not being any of the following:*

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a) *a flood storage area,*
b) *a floodway area,*
c) *a flow path,*
d) *a high hazard area,*
e) *a high risk area."*

Council has determined that part of the flood control lies in five of the five items above – items *a, b, c, d* and *e* therefore; a CDC cannot be issued on this site. The identified flood items are represented by the darker area within the 1% AEP flood extent on the attached map. If the development is proposed within any part of this zone (dark blue area), a pre and post flood study must accompany the Development Application. Alternatively, if the development is proposed within the uncoloured and/or light blue areas (flood fringe zone), a CDC may be considered for this site. However, the surface flows must not be impeded (blocked) and the redevelopment shall allow the free movement of the flood around any proposed structure(s).

Minimum habitable floor levels shall be 0.5m above the flood level at the upstream side of the structure. Minimum non-habitable floor levels (garages, laundry, sheds, etc.) shall be 0.15m above the flood level at the upstream side of the structure. Interpolation between flood levels is allowed.

The relationship between these levels and the ground surface may be determined by a survey of the property undertaken by a Registered Surveyor.

It should be noted that where the development or redevelopment of the property is proposed, reference should be made to the relevant Development Control Plan with regard to flooding and drainage issues. Please include a copy of this letter and map with any Development Application that you may lodge with Council for the subject site.

For flood modelling purposes, the models (pre and post development flood study) shall be calibrated to Council's 1%AEP Flood levels (or interpolated levels) at least 10 metres upstream and downstream from the property boundaries. Surface flows through the property shall not be obstructed nor diverted on to another property.

Council's drainage line is included in the Map attached for Hydraulic Grade Line (HGL) analysis.

Flood levels are not static due to changing circumstances (e.g. revision of the flood model) and accordingly the above flood level is only valid for six months from the above date.

If you have any further enquiries regarding this matter please contact Council's Senior Stormwater Engineer, Mr Mark Evens on 8757 9538 or Council's Drainage Engineer Mr Rolyn Sario on 02 8757 9536.

Yours sincerely,

SIVA SIVAKUMAR
MANAGER – ENGINEERING & TRAFFIC

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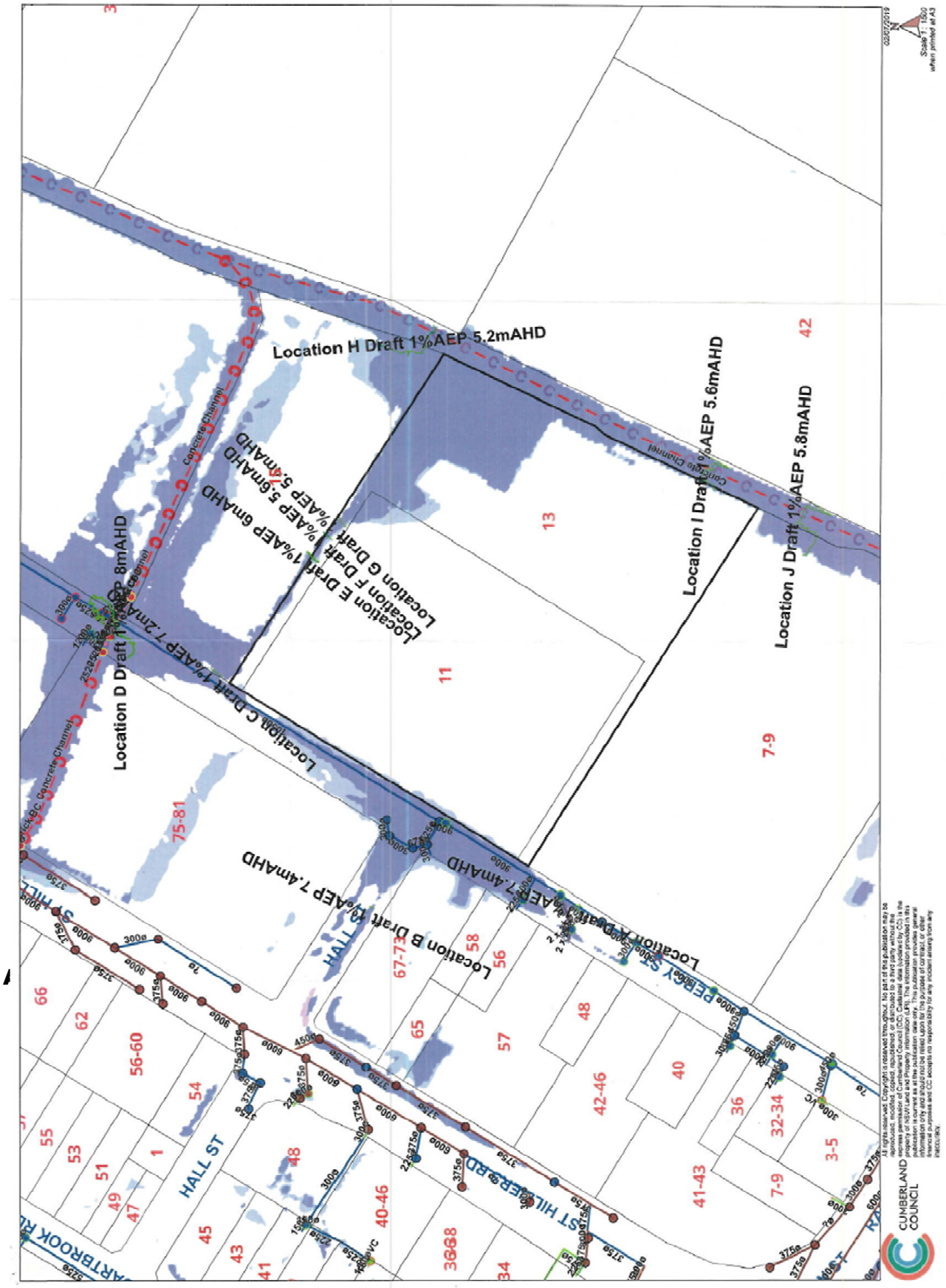
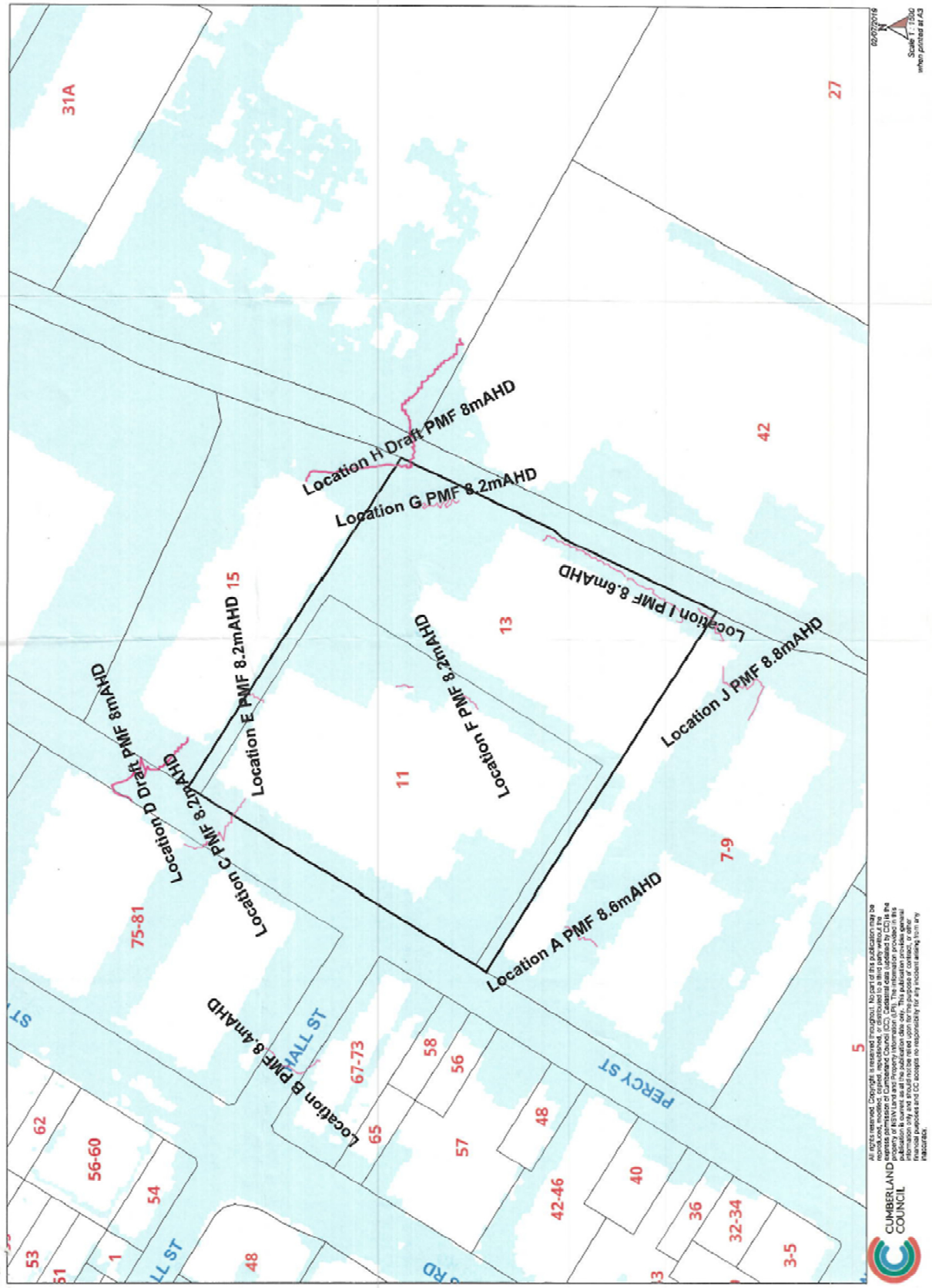

Location H Draft 1%AEP 5.2mAHD
Location I Draft 1%AEP 5.6mAHD
Location J Draft 1%AEP 5.8mAHD
Location E Draft 1%AEP 6mAHD
Location F Draft 1%AEP 5.6mAHD
Location G Draft 1%AEP 5.4mAHD
Location D Draft 1%AEP 7.2mAHD
Location C Draft 1%AEP 7.4mAHD
Location B Draft 1%AEP 7.4mAHD
Location A Draft 1%AEP 7.4mAHD
Concrete Channel
Brick/Rc Concrete Channel
HALL ST
ST HILLIERS RD
PERRY ST
CUMBERLAND COUNCIL

CUMBERLAND COUNCIL

y&hymas

3 July 2019

Our Reference D-08-01/03



APPENDIX F – HASLAMS CREEK FLOODPLAIN

Table 5 – Development controls.

Haslams Creek Floodplain

(Also applies to Duck River and Cooks River Floodplain in interim - subject to review)

	Flood Risk Precincts (FRP's)																		
	Low Flood Risk							Medium Flood Risk							High Flood Risk						
Planning Consideration	Essential Community Facilities	Critical Utilities	Subdivision	Residential	Commercial & Industrial	Recreation & Non-Urban	Concessional Development	Essential Community Facilities	Critical Utilities	Subdivision	Residential	Commercial & Industrial	Recreation & Non-Urban	Concessional Development	Essential Community Facilities	Critical Utilities	Subdivision	Residential	Commercial & Industrial	Recreation & Non-Urban	Concessional Development
Floor Level		5									2,3,4	2,3	1	6						1	2,6
Building Components		2									1	1	1	1						1	1
Structural Soundness		3									2	2	2	2						1	1
Flood Affectation		2								1	2	2	2	2						1	1
Evacuation		2,4	*	3,4	4					*	3,4	3,4	1	3						1	3
Management & Design		1,2,3	1							1	2,3,5	2,3,5	2,3,5	2,3,5						2,3,5	2,3,5

Not Relevant

Unsuitable Land Use

* Refer to '*Management & Design*' planning consideration for subdivision

Note: *Filling of the site, where acceptable to Council, may change the FRP considered to determine the controls applied in the circumstances of individual applications.*

Floor level

1	All floor levels to be equal to or greater than the 5 year ARI flood level plus freeboard unless justified by site specific assessment.
2	Floor levels of open car parking areas to be equal to or greater than the 20 year ARI flood plus freeboard. This may be achieved with a suspended floor which allows the continued passage of flood waters or filling if justified by a site specific assessment, as required with reference to flood affectation and other controls below. Enclosed car parking (e.g. garages or basement car parking) must be protected from the 100 year ARI flood.
3	Habitable floor levels to be equal to or greater than the 100 year ARI flood plus freeboard.
4	Below ground swimming pools should be free from inundation from storms up to the 5 year ARI. Where required, the private open space of a dwelling should be a usable outdoor recreation area which, during storm events equal to less than the 5 year ARI, is free from inundation by overland flows exceeding 50mm.
5	All floor levels to be equal to or greater than the probable maximum flood plus freeboard.
6	Floor levels to be as close to the design floor level (the level nominated above that would apply if not concessional development) as practical and no lower than the existing floor level when undertaking alterations or additions.

Note: The freeboard height in the Haslams Creek floodplain is variable primarily, due to the implications of sub-critical and super-critical flows caused by obstructions to the flowpath of flood waters, and can be determined by reference to a map and tables produced as part of the Haslams Creek FRMP and held in the offices of Council. The freeboard height for the Duck River and Cooks River floodplains is 0.5m.

Building components and method (Also see Table 7)

1	All structures to have flood compatible building components below or at the 100 year ARI flood level.
2	All structures to have flood compatible building components below or at the PMF level.

Structural soundness

1	Engineers report to certify that any structure can withstand the forces of floodwater, debris and buoyancy up to and including a 100 year flood.
2	Applicant to demonstrate that any structure can withstand the forces of floodwater, debris and buoyancy up to and including a 100 year flood.

3	Applicant to demonstrate that any structure can withstand the forces of floodwater, debris and buoyancy up to and including a PMF flood.

Flood affectation

1	Engineers report required to certify that the development will not increase flood affectation elsewhere.
2	The impact of the development on flooding elsewhere to be considered.

Note: When assessing flood affectation the following must be considered:
1. Loss of storage area in the floodplain (except for filling occurring up to the 20 year ARI.
2. Changes in flood levels caused by alteration of conveyance of flood waters.
3. Filling between the 20 year and 100 year ARI flood levels will not be permitted.

Evacuation

1	Reliable access for pedestrians required during a 5 year ARI flood.
2	Reliable access for pedestrians and vehicles required during a PMF flood.
3	Reliable access for pedestrians or vehicles is required from the dwelling, commencing at a minimum flood level equal to the lowest habitable floor level to an area of refuge above the PMF level, either on-site of off-site.
4	Applicant to demonstrate that the development is to be consistent with any relevant DISPLAN or flood evacuation strategy.

Management and design

1	Applicant to demonstrate that potential development as a consequence of a subdivision proposal can be undertaken in accordance with this Part.
2	Site Emergency Response Flood plan required (except for single-dwelling houses) where floor levels are below the design floor level.
3	Applicant to demonstrate that area is available to store goods above the 100 year flood plus 0/5m (freeboard).
4	Applicant to demonstrate that area is available to store goods above the PMF flood plus 0.5m (freeboard).
5	No external storage of materials below design floor level which may cause pollution or be potentially hazardous during any flood.

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G Flood Emergency Response Plan

	FLOOD WARDENS	STAFF	RESIDENTS AND VISITORS
PREPARE	-Check Bureau of Meteorology periodically for Severe Weather Warnings and broadcast to staff.	-Notify the Flood Warden if Weather Warning is current but has not been broadcast. -Be aware of who the flood wardens are on duty.	- Be aware of location of muster Point. Recommended only as a emergency solution.
HEAVY RAINFALL BEGINS			
MANAGE	- Monitor the level in the Creek	− Encourage less mobile persons to evacuate the shop and the site.	- Exercise caution if leaving. Less mobile persons to seek assistance. - Obey speed limits in car park and public roads.
WARNING ALARM TO SOUND WHEN WATER LEVEL IN HASLAMS CREEK IS RISING			
MONITOR	- Verify alarm. - Advise staff and visitors of situation. - Monitor water level at regular intervals.	- Wait for guidance from wardens as to actions. - Reassure customers. - Monitor water levels if appropriate.	- Look to staff and wardens for guidance. - While not recommended, this is the last chance to leave site for higher ground.
IDENTIFY MAJOR FLOOD	- Sound alarm, if a dangerous water level is identified and alarm has not sounded. - Warden to contact Local Emergency Management Officer or Duty Officer at SES Local Headquaters on **132 500**. Advise them of the situation.	− Sound alarm, if a dangerous water level is identified and alarm has not sounded.	- Notify staff if water is at the beginning of the driveway.
FLOOD ALARM TO SOUND WHEN WATER LEVEL REACHES 1m BELOW THE NORTHBRIDGE ROAD			
ACTION	− Remain calm. − Warden to Verify alarm, unless manually activated Encourage orderly vacate the store and the site. -Check if there is flooding on Percy street. − Check all staff have left the carpark. Close the access of the site if there is flooding on Percy street.	− Remain calm. − Assist with movement of less mobile persons.	− Remain calm. − Calmly move to higher ground.
ASSESS	− Warden to stay in touch with SES and Local Emergency Management Officer to determine when flood waters are receding. − Warden to assess if ok to return if inundation has subsided.	− Remain calm. − Reassure customers. − Wait for guidance from Wardens.	− Remain calm. − Wait for guidance from Staff.
RECOVERY	− Coordinate clean up of debris.	− Assist with clean up of debris on site.	− Once notification has been received exit site, taking care to avoid debris left from the flood.