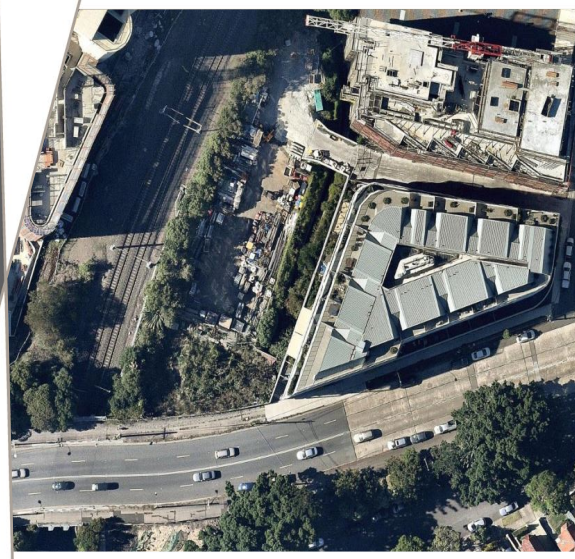
Flood Risk Assessment

120c Old Canterbury Road, Summer Hill

59918139



Prepared for
The Yard 120C Pty Ltd

3 July 2020

Cardno
Shaping the Future

Contact Information

Cardno (NSW/ACT) Pty Ltd
ABN 95 001 145 035

Level 9, The Forum
203 Pacific Highway St Leonards NSW 2065

Telephone: 61 2 9496 7700
Facsimile: 61 2 9439 5170
International: 61 2 9496 7700

sydney@cardno.com.au
www.cardno.com

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Executive Summary

It is proposed to develop the property known as No. 120C Old Canterbury Road, Summer Hill, legally described as Lot 1 in DP 817359 and Lot 100 in DP 875660 (hereafter referred to as the "subject site").

To inform the proposed development a flood risk assessment in response has been undertaken. This included:

- An assessment of the flooding impact of the planned development;
- Flood emergency response; and
- Compliance with requirements of the Comprehensive Inner West DCP 2016 and the Section 117 Direction 4.3 – Flood Prone Land.

The proposed development site at 120C Old Canterbury Road, Summer Hill is subject to flooding by floodwaters spilling from Hawthorne Canal and overland flows. Detailed flood modelling of existing conditions has been undertaken by WMAwater in 2015.

Features of the subject site and planned development include:

- The site ground levels generally vary west to east across the middle and northern section of the site from around 10 m AHD to 9.5 m AHD except in the southern section of the site where the ground grades up to Old Canterbury Road at levels which vary from 17.1 m AHD – 18.5 m AHD;
- The proposed floor level of apartments on Level 01 is 12.5 m AHD will provide more than 650 mm freeboard above the 100 year ARI flood level;
- The proposed floor levels of apartments on Levels 02 to 08 are all higher than the PMF level;
- replacing the current bridge. The bridge span across the canal is assumed to incorporate 0.5 m high open railings which will be 50% porous;
- A driveway crest level of 12.5 m AHD on the ramp down to the basement car parking which provides more than 650 mm freeboard above the 100 year ARI level;
- Level 01 is suspended in order to create a void beneath the building to maintain flood storage and the pattern of flood flow through the property in a 100 yr ARI flood (refer **Figure 13**);

The car park is accessed via an access road from McGill Street. It is estimated that it would become unsafe for small vehicles to drive across the bridge when the depth of floodwaters across the driveway exceed 0.3 m (which would occur before the peak of a 100 yr ARI flood). It is estimated that it would become unsafe for large vehicles to drive across the bridge when the depth of floodwaters across the driveway exceed 0.5 m at around the peak of a 100 yr ARI flood.

It should be noted that while both Figures 1 and 2 in the 2016 WMAwater letter report (refer **Appendix A**) and in **Figures 5 – 10** show flooding across Old Canterbury Road along Hawthorne Canal and along the light rail corridor this is misleading. The flood contours in this area are for flood flows conveyed through the Hawthorne Canal crossing and the rail crossing. Old Canterbury Road is considerably higher than the PMF levels at these crossings and is in fact not inundated at these locations at any time.

It is noted in **Figure 9** that shallow flooding is mapped in the vicinity of the Old Canterbury Road / Edward St / Weston St intersection located west of 120C Old Canterbury Road, Summer Hill. The mapped flood depth is in the range 0.15 m – 0.3 m. In the case of the 100 yr ARI flood the depth of floodwaters is less than 0.15 m.

It is concluded that if needed emergency services would be able to access 120C Old Canterbury Road from the west along Old Canterbury Road and/or residents could be evacuated if in need of medical attention via the ground floor connection to Old Canterbury Road.

Flood emergency planning in the South West Metropolitan District was reviewed to provide the context for flood emergency planning for the subject site. The 2017 South West Metropolitan Regional Emergency Management Plan details arrangements for, prevention of, preparation for, response to and recovery from emergencies within the South West Region. The Inner West Council website currently advises that the Inner Emergency Management Plan is to be published soon

During extreme floods rare than a 100 yr ARI flood any residents, retail staff and/or visitors on Level 01 would need to retreat to communal areas on Level 02 which is at a level higher than the PMF. Access to Level 02 would be via internal stairs.

The refuge area provided by the two communal rooms on Level 02 in total exceeds the estimated required area of refuge.

As indicated in Section 6.2, it is expected that Building Owners and Managers (in accordance with existing OH&S requirements, the Building Code of Australia) are to have a building Emergency Management Plan which complies with the provisions of AS 3745.

The building Emergency Management Plan will contain a Flood Emergency Response Plan. It is also expected that all wardens trained under the building emergency plan are to be aware of the actions to be implemented in an extreme flood, trafficable routes to the site during extreme floods and how to liaise with the any building occupants on the site.

A basic Flood Emergency Response Plan accompanies this report.

The objectives of Section 117(2) of the EP&A Act 1979, Section 4.3 Flood Prone Land are:

(a) to ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005, and
(b) to ensure that the provisions of an LEP on flood prone land is commensurate with flood hazard and includes consideration of the potential flood impacts both on and off the subject land.

A planning proposal may be inconsistent with the Section 117(2) Direction only if the relevant planning authority can satisfy the Director-General (or an officer of the Department nominated by the Director-General) that:

(a) the planning proposal is in accordance with a floodplain risk management plan prepared in accordance with the principles and guidelines of the Floodplain Development Manual 2005, or

(b) the provisions of the planning proposal that are inconsistent are of minor significance.

The future flood risk is addressed by the proposed form of development which achieves and/or exceeds the requirements of the Comprehensive Inner West DCP 2016. As discussed under Section 3.4, it is concluded that the configuration for the planned development on the site that:

- There is a local impact in the vicinity of the end of the western solid wall in the 100 yr ARI flood partially within and adjacent to the site;
- There are no adverse impacts on any adjoining development in the 100 yr ARI flood;

- There are no significant adverse impacts in the PMF.

Consequently, there will be no substantially increased requirement for government spending on flood mitigation measures or infrastructure arising from the proposed concept development.

The proposed development has been assessed against each of the considerations set out in Direction and concludes that the proposed form of development is informed by the principles and guidelines of the Floodplain Development Manual 2005 and the complies with intent of Section 117(2) of the EP&A Act 1979, Section 4.3 Flood Prone Land and any provisions of the planning proposal that are inconsistent are of minor significance.

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1 Introduction

1.1 Background

As described by GSA Planning in 2017, a Planning Proposal has been prepared on behalf of The Yard 120C Pty Ltd by for the property known as No. 120C Old Canterbury Road, Summer Hill, legally described as Lot 1 in DP 817359 and Lot 100 in DP 875660 (hereafter referred to as the "subject site").

It was requested that the Inner West Council amend the Ashfield LEP 2013 to rezone the western portion of the subject site (Lot 1 DP817359) from SP2 Infrastructure to B4 Mixed Use as well as alter the FSR and maximum building height across the entire site.

The Planning Proposal was lodged on 16 December 2016. The proposal initially sought a maximum height of RL46.50 and an FSR of 3:1 across the entire site.

In June 2017, in response to submissions and liaison with Council, the proposed building height was lowered by 2 floors to a maximum RL of 41.1 and the proposed FSR was reduced to 2.75:1

In July 2017, the Planning Proposal was considered by Council who resolved to proceed with the Planning Proposal subject to further amendments which have been incorporated into the Planning Proposal report amended by GSA Planning in August 2017.

This report was amended to reflect an eight (8) storey building height to Old Canterbury. Previously, changes have been made to address the LEP Making Guidelines outlined in Table 5 of the Council report.

The 2017 Planning Proposal also considered the Section 117 directions including Section 117 Direction 4.3 – Flood Prone Land as follows:

> *Direction 4.3 – Flood Prone Land*
>
> *The direction applies when a relevant planning authority prepares a planning proposal that creates, removes or alters a zone or a provision that affects flood prone land.*
>
> *The objectives of this direction are stated, inter alia:*
>
> *(a) to ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005, and*
>
> *(b) to ensure that the provisions of an LEP on flood prone land is commensurate with flood hazard and includes consideration of the potential flood impacts both on and off the subject land.*
>
> *The proposal is inconsistent with the Direction as it does seek to rezone special uses land which is flood prone to a mixed-use zone. However, this inconsistency is considered to be of a minor significance and readily overcome through the design and siting of development. The proposal is accompanied by a flood level certificate and these levels have been considered in the concept design which is separately submitted. As noted in Council's report, a detailed flood study will be prepared following Gateway determination.*

The Inner West Council provided the following notes in regard to closing out the inconsistency to the

Section 117 Direction 4.3 Flood Prone Land:

> *Condition 1(b) of the attached Gateway Determination issued by the Department of Planning and Environment (DPE) on 25 October 2017 a detailed flood study is required to be prepared which includes the following:*
>
> - *Demonstrated consistency with NSW Flood Prone Land Policy and principles of the Floodplain Development Manual 2005 as indicated in the attached Section 117 Direction 4.3 – Flood Prone Land. .*

The matters to be considered are outlined in the Council Report (Item No C0717 Item 7) considered at 25 July 2017 Council meeting, namely:

- *A review of the existing topography maps, flood inundation maps, flood hazard maps etc.*
- *The implementation of Council controls and State Government policies to ensure adequate and design of any potential development the proposed planning controls can accommodate on the site during a flood event.*
- *Engineering assessment and reporting of the potential development the proposed planning controls can accommodate on the site and its impact on the existing surrounding developments/sites.*
- *A review of the impact of flooding on the potential development the proposed planning controls can accommodate on the site and surrounding properties and mitigation solutions to any future development that might be required to minimise any adverse impact.*
- *Identify the Flood Study flood risk management procedures necessary for the potential development the proposed planning controls can accommodate on the site.*
- *Quantify any post development flood water levels.*

1.2 Objective

The objective of the study was to address the following considerations for planned development of the site:

- An assessment the impact of planned development on flooding;
- Flood emergency response; and
- Compliance with requirements of the Comprehensive Inner West DCP 2016 and the Section 117 Direction 4.3 – Flood Prone Land.

2 Previous Studies

The proposed development on 120c Old Canterbury Road, Summer Hill is subject to flooding by floodwaters spilling from Hawthorne Canal and overland flows. Consequently, previous studies of flooding in Hawthorne Canal are relevant to the subject site.

2.1 2015 Hawthorne Canal Flood Study

As described by WMAwater, 2015:

> *In order to implement the Policy within its local government area (LGA), Ashfield Council and Marrickville Council have embarked on a program of studies and actions as set out in the NSW Floodplain Development Manual with the assistance of Sydney Water Corporation and the Office of Environment and Heritage.*
>
> *The Hawthorne Canal Flood Study constitutes the first stage of the management process for the Hawthorne Canal catchment within the Ashfield and Marrickville LGAs.*
>
> *The primary objectives of the study are to:*
>
> - *prepare suitable models of the catchment and floodplain for use in a subsequent Floodplain Risk Management Study;*
> - *provide results for flood behaviour in terms of design flood levels, depths, velocities, flows and flood extents within the study area;*
> - *prepare maps of provisional hydraulic categories and provisional hazard categories;*
> - *determine provisional residential flood planning levels and flood planning area;*
> - *prepare preliminary emergency response classifications for communities; and*
> - *assess the sensitivity of flood behaviour to potential climate change effects such as increases in rainfall intensities and sea level rise.*

The 2015 report details the results and findings of the Study. The key elements included:

- a summary of available flood related data and a summary of previous events;
- details on the build and verification of the hydrologic and hydraulic models;
- sensitivity analysis of the model results to variation of input parameters;
- potential implications of climate change predictions; and
- the definition of design flood behaviour for existing catchment conditions.

The approach to hydrological and hydraulic modelling was summarised as follows:

> *The hydrologic modelling was undertaken using DRAINS and the hydraulic model was established using TUFLOW.*
>
> *Due to the limited available data for calibration and significant changes to the catchment in recent history, the calibration and verification of the models to historic data was tentative. Sensitivity analyses were undertaken to assess the influences of modelling assumptions on key outputs, and the potential impacts of future climate change. In the context of the Hawthorne Canal catchment, sea level rise is not likely to affect structures within the Marrickville LGA and impacts are restricted to the downstream areas of Ashfield Council.*

The design rainfall events that were modelled were the 2 year, 5 year, 10 year, 20 year, 50 year and 100 year ARI design events and the Probable Maximum Precipitation (PMP). The temporal patterns for the design events were sourced from Australian Rainfall and Runoff (AR&R) (Pilgrim, 1987) and the Intensity-Frequency-Duration (IFD) data was obtained from the Bureau of Meteorology's (BoM) internet-based tool. The PMP estimates were derived according to the BoM guidelines, the Generalised Short Duration Method (BoM, 2003).

The outcomes of the study were identified as follows:

The design flood modelling indicates that significant flood depths may occur in a number of locations included in the Haberfield, Petersham, Lewisham, Ashfield / Dulwich Hill and Summer Hill suburbs. A detailed examination of existing flood behaviour at these "hot spots" has been undertaken. The study shows that while the railway line exacerbates the flooding problem, rail transport itself is unlikely to be severely disrupted during flood events. Major routes such as Parramatta Road and Old Canterbury Road are both reported and shown to experience significant flooding during most ARI design events, likely leading to severe traffic disruption.

2.2 2016 Flood Certificate for 120c Old Canterbury Road, Lewisham

On 21 June 2016, WMAwater prepared a flood certificate report for 120C Old Canterbury Road, Lewisham.

This letter report is attached in **Appendix A.**

As described by WMAwater, 2016:

Figure 1 and Figure 2 (refer **Appendix A**) *attached shows the existing flood behaviour in the vicinity of the property for the 1% AEP event and the PMF event. Based on modelling results from the Flood Study, it is evident that 120C Old Canterbury Road is impacted by mainstream and overland flow.*

Mainstream flow in the vicinity of the site originates from the open channel of Hawthorne Canal, located to the south-east of the site, and which travels in a northerly direction along the eastern boundary of the site. Overland flow approaches the site from the west; with overland flow originating from streets and properties to the west as well as from the light-rail underpass to the south-west of the site. Flow through the light-rail underpass occurs when the mainstream flow to the south of the Old Canterbury Road embankment exceeds the capacity of the constricting culvert and backwaters; with the increasing flood level and extent allowing flow to diverge through the light-rail underpass.

The peak flood depth on the site was found to be 5.7 m in the 1% AEP event and 7.9 m in the PMF event. The peak flood level was found to be:

- *In the 1% AEP event: a minimum of 11.8 m AHD and a maximum of 12.3 m AHD; and*
- *In the PMF event: a minimum of 14.0 m AHD and a maximum of 14.4 m AHD.*

In relation to the flood planning level, WMAwater, 2016 advised:

> *Given the depth of flood affectation, the recommended freeboard is 0.5 m in addition to the 1% AEP peak flood level. Therefore, the minimum level of 12.8 m AHD is applicable for:*
>
> - *the entry levels to the underground car park facilities (this includes the driveway entry level, the ground floor entry level of stairs or lifts that will descend into the underground area and ventilation ducts);*
> - *the floor level for residential dwellings; and*
> - *the floor level or if not the floor level, the level below which the building should be flood-proofed with no sensitive equipment below this level for non-residential areas*

It should be noted that while both Figures 1 and 2 in the 2016 WMAwater letter report (refer **Appendix A**) show flooding across Old Canterbury Road along Hawthorne Canal and along the light rail corridor this is misleading. The flood contours in this area are for flood flows conveyed through the Hawthorne Canal crossing and the rail crossing. Old Canterbury Road is considerably higher than the PMF levels at these crossings and is in fact not inundated at these locations at any time.

The downstream headwall of the Hawthorne Canal crossing is located around 11m downstream of the southern boundary of the property. Consequently, the maximum 1% AEP flood level on the property identified by WMAwater of 12.3 m AHD is in fact the water level inside the Hawthorne Canal crossing and is not the maximum 1% AEP water level within the open sections of the property.

3 Flooding Assessments

As overviewed in Section 2.1 the 2015 Hawthorne Canal Flood Study is the most recent study which provides flood information under existing conditions.

At a meeting held with the Inner West Council on 27 June 2018 it was requested that the impacts on flooding of the planning proposal be assessed using Council's Hawthorne Canal floodplain model. This assessment was undertaken on 4 August 2018 and is described as follows.

3.1 2015 Assessment

As overviewed in Section 2.1, the 2015 Hawthorne Canal Flood Study is the most recent study which provides flood information for the 2 yr ARI, 5 yr ARI, 10 yr ARI, 20 yr ARI, 50 yr ARI, 100 yr ARI floods and the PMF under existing conditions.

3.1.1 Model Configuration

The floodplain model which was used for assessment purposes is described in WMAwater, 2015. The model schematisation is given in F**igure 2**.

3.1.2 Terrain

As described by WMAwater, 2015:

> *Airborne Light Detection and Ranging (LiDAR) survey of the catchment and its immediate surroundings was provided for the study by SWC. It was indicated that the data were collected in 2007 by AAMHatch. These data typically have accuracy in the order of:*
>
> - *+/- 0.15m (for 70% of points) in the vertical direction on clear, hard ground; and*
> - *+/- 0.75m in the horizontal direction.*
>
> *The accuracy of the ALS data can be influenced by the presence of open water or vegetation (tree or shrub canopy) at the time of the survey.*
>
> *From this data, a Triangular Irregular Network (TIN) was generated by WMAwater. This TIN was sampled at a regular spacing of 1 m by 1 m to create a Digital Elevation Model (DEM), which formed the basis of the two-dimensional hydraulic modelling for the study.*

3.1.3 Cross Section Data

As described by WMAwater, 2015:

> *Within the Hawthorne Canal catchment, the main drainage network includes regular open channel sections. For these areas, the definition to the top of the concrete-lined channel was based on cross-sections provide by the SWC capacity assessment document (SWC, 1998).*
>
> *Structures traversing the waterway such as bridges and culverts may have a significant influence on flood behaviour. Often such structures constrict and obstruct flow and their impact can vary with flood magnitude. Geometric details of these structures are required for the hydraulic model. These structures are typically not accurately captured by remote sensing technologies such as ALS and for this reason a traditional ground survey was commissioned and undertaken by Chase Burke & Harvey (CBH) Surveyors. From this, definition of the cross- sectional area was obtained, particularly where the underside of the bridge was not the same height as the top of the concrete-lined channel*

3.1.4 Roughness

The spatial variation in Manning's "n" values is shown on **Figure 3** The Manning's "n" values adopted for these areas, including flowpaths (overland, pipe and in-channel), are shown in **Table 1**.

Table 1 Roughness "n" Values adopted in TUFLOW (after Table 13, WMAwater, 2015)

Surface	Roughness "n" Value
Pipes	0.02
Roads and Footpaths	0.02
Light Vegetation (such as parks with predominantly grass surfaces)	0.04
General Overland Areas	0.04
Properties	0.05
Medium-Heavy Vegetation	0.08

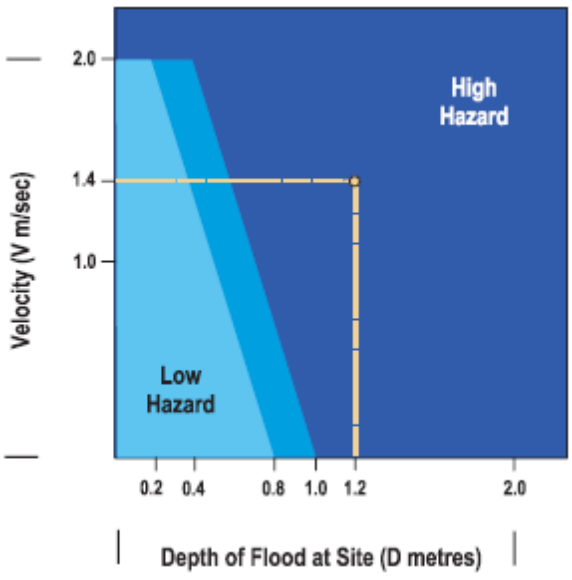
3.1.5 Results

The peak flood level profiles for the 2 yr ARI, 5 yr ARI, 10 yr ARI, 20 yr ARI, 50 yr ARI, 100 yr ARI floods and the PMF under Existing Conditions are plotted in **Figure 4**.

The estimated 100 yr ARI extent, flood levels and flood levels in the vicinity of the property under Existing Conditions are plotted in **Figure 5**.

The estimated 100 yr ARI flood velocities in the vicinity of the property under Existing Conditions are plotted in **Figure 6**.

Experience from studies of floods throughout NSW and elsewhere has allowed authorities to develop methods of assessing the hazard to life and property on floodplains. This experience has been used in developing the 2005 NSW Floodplain Development Manual to provide guidelines for managing this hazard. These guidelines are shown schematically blow.



Provisional Hazard Categories (after Figure L2, NSW Government, 2005)

To use the diagram, it is necessary to know the average depth and velocity of floodwaters at a given location. If the product of depth and velocity exceeds a critical value (as shown below), the flood flow will create a **high hazard** to life and property. There will probably be danger to persons caught in the floodwaters, and possible structural damage. Evacuation of persons would be difficult. By contrast, in **low hazard** areas people and their possessions can be evacuated safely by trucks. Between the two categories a transition zone is defined in which the degree of hazard is dependent on site conditions and the nature of the proposed development.

This calculation leads to a provisional hazard rating. The provisional hazard rating may be modified by consideration of effective flood warning times, the rate of rise of floodwaters, duration of flooding and ease or otherwise of evacuation in times of flood. The estimated 100 yr ARI provisional flood hazard in the vicinity of the property under Existing Conditions are plotted in **Figure 7.**

As described by WMAwater, 2015:

> *The hydraulic categories, namely floodway, flood storage and flood fringe, are described in the Floodplain Development Manual (Reference 1). However, there is no technical definition of hydraulic categorisation that would be suitable for all catchments, and different approaches are used by different consultants and authorities, based on the specific features of the study catchment in question.*
>
> *For this study, hydraulic categories were defined by the following criteria, which has been adopted by consultants in a number of flood studies in NSW:*
>
> - *Floodway is defined as areas where:*
>
> - *the peak value of velocity multiplied by depth (V x D) > 0.25 m^2/s AND peak velocity > 0.25 m/s, OR*
> - *peak velocity > 1.0 m/s AND peak depth > 0.15 m.*
>
> *The remainder of the floodplain is either Flood Storage or Flood Fringe,*
>
> - *Flood Storage comprises areas outside the floodway where peak depth > 1 m; and*
> - *Flood Fringe comprises areas outside the Floodway where peak depth < 1 m.*

The provisional 100 yr ARI hydraulic categorisation in the vicinity of the property under Existing Conditions are plotted in **Figure 8**.

The estimated PMF extent, flood levels and flood levels in the vicinity of the property under Existing Conditions are plotted in **Figure 9**.

The estimated PMF provisional flood hazard in the vicinity of the property under Existing Conditions are plotted in **Figure 10.**

3.2 2019 Assessment

In August 2018 the Hawthorne Canal 1D/2D floodplain model supplied by Council was re-run and flood levels were extracted at four reference locations (refer **Figure 19**) as tabulated below.

In August 2019 a review of plans of the development on 14 McGill Street noted from the Basement Level 1 plan that the building outline differs from the model blockout in Council's model which may have been based on previous buildings on the site. Consequently, it was decided to amend the Existing Conditions model to reflect the current development on the site. The updated model was re-run and the calculated flood extents and levels under a 100 yr ARI flood and the PMF are plotted in **Figures 11** and **12** respectively.

The 2019 flood levels were extracted at four reference locations (refer **Figure 19**) and compared to the 2018 flood levels as follows.

	2018 Assessment		2019 Assessment			
Point	100yr ARI (m AHD)	PMF (m AHD)	100yr ARI (m AHD)	Difference (cm)	PMF (m AHD)	Difference (cm)
A	11.76	13.96	11.76	0	13.95	-1
B	11.78	13.95	11.78	0	13.95	0
C	11.78	13.95	11.79	1	13.96	1
D	11.87	13.95	11.88	1	13.95	0

These flood levels are in agreement with the results presented in Council's 2015 Hawthorne Canal Flood Study report.

The updated floodplain model was adopted as the benchmark against which impacts were assessed.

3.3 Future Conditions

The concept planning proposal layout of the car parking levels (Basement 1 and 2), ground floor layout, the typical layout of Levels 01-08 and typical sections are attached in the Architectural Drawings given in **Appendix B**.

The layout of the ground level and Level 01 is detailed in **Figure 13**. The proposed modifications to the access road and bridge crossing are detailed in **Figure 14**. The bridge span across the canal was assumed to incorporate 0.5 m high open railings which were assumed to be 50% porous.

Features of the latest adjusted layout include:

- an increased extent of void between the lowered ground level and split Level 01 (Loading bay FFL at RL 11.2 m, Retail FFL at RL 11.9 m, Residential FFL at RL 12.5 m);
- a raised lobby level in front of each of the Level 01 lifts (at RL 12.92 m);
- grills to facilitate flow through the loading bay and under residential and retails areas on Level 01 in a 100 yr ARI flood;
- a new bridge and pedestrian crossing; and
- lowered terraces.

The concept 0.6 m x 0.4 m columns that support the development represent less than 1% of the Level 01 footprint. The void between the current ground level and the underside of the split Level 01 slab was therefore assumed to be 99% porous. Stairwells and lift wells connecting Level 01 to the basement levels were also blocked out in the model.

Under Existing Conditions, the adopted roughness value for the site is 0.05. This roughness value was retained for future conditions on the basis that all current buildings and obstructions and vegetation will be removed within the building footprint and that the lowering of roughness due to these actions would provide be balanced by local hydraulic losses in the vicinity of the proposed rectangular columns. It is proposed to lower the ground level below the building to 9.5 m AHD (roof slab level for the basement car park) to preserve 100 yr ARI flood storage which would be otherwise reduced by the ramp down to the basement car parking levels, various stairwells and lift wells and the proposed grading on the park at the northern end of the site.

The assumptions regarding obstructions in the void beneath the Level 01 split level slab include the location of a perimeter grill between the ground and the Level 01 slab and between the Level 01 slab and Level 02 on the eastern side of the development. The proposed apartments and retail outlet on Level 01 were blocked out in the Future Conditions model.

The intent of the perimeter grill between the ground and the underside of the Level 01 slab is to limit access to the void beneath the building while maintaining the provision for flow through the site in a 100 yr ARI flood. The intent of the grill between the Level 01 slab and Level 02 on the eastern side of the development is to facilitate flow through the site in extreme floods greater than a 100 yr ARI flood.

The assumed porosity of this grill is 80% which offers the opportunity to install an aesthetic grill while maintaining the available flow area.

The calculated flood extents and levels in a 100 yr ARI flood and the PMF under Future Conditions are plotted in **Figures 15** and **17** respectively.

3.4 Flood Impact Assessment

The calculated flood level differences in a 100 yr ARI flood and the PMF are plotted in **Figures 16** and **18** respectively.

It is noted that:

- The assessed 100 yr ARI flood level impacts are negligible;
- The assessed PMF level impacts are minor or are in an area which does not adversely impact the existing habitable floor level. There are no significant adverse impacts in the PMF.

Figure 18 identifies local impacts on the PMF levels along the rear wall of 20 McGill St. The floor level on this boundary is at RL 15.78 which is higher than the PMF level. There is a vent in this wall near the access road. The indicative bottom level and top level of the vent are around 13.75 m AHD and 14.6 m AHD.

Under current conditions the PMF level is around 14.0 m AHD. Consequently, it is expected that floodwaters would spill through this vent at the peak of the PMF. Likewise, under future conditions floodwaters would also spill through this vent at the peak of the PMF. The impact of a locally raised PMF level on inflow through the vent is likely modest in comparison with the ingress of floodwaters into basement car parking via driveways.

4 Flood Risks

The flood risks at and in the vicinity of 120C Old Canterbury Road, Lewisham are discussed as follows.

4.1 Flood Levels, Velocities and Hazards

The estimated 100 yr ARI flood extent, levels and depths, velocities and provisional hazards under Existing Conditions are plotted in **Figures 5, 6** and **7** respectively.

The estimated PMF extent, levels and depths and provisional hazards under Existing Conditions are plotted in **Figures 9** and **10** respectively.

The calculated flood extents and levels in a 100 yr ARI flood and the PMF under Future Conditions are plotted in **Figures 15** and **17** respectively.

4.2 Flood Risk

The provisional 100 yr ARI hydraulic categorisation in the vicinity of the property under Existing Conditions are plotted in **Figure 8**. The inundated section of the property is mapped as floodway.

The basement car park is accessed via a driveway from McGill Street. **Figure 14** details the proposed bridge crossing. The bridge span across the canal was assumed to incorporate 0.5 m high open railings which were assumed to be 50% porous.

It is estimated that it would become unsafe for small vehicles to drive across the bridge when the depth of floodwaters across the driveway exceed 0.3 m (which would occur before the peak of a 100 yr ARI flood). It is estimated that it would become unsafe for large vehicles to drive across the bridge when the depth of floodwaters across the driveway exceed 0.5 m at around the peak of a 100 yr ARI flood.

A crest level of 12.5 m AHD on the driveway crest level to the two-storey basement car parking levels provides more than 650 mm freeboard above the 100 year ARI level. Overtopping of the car park crest level is estimated to commence in around a 2,000 yr ARI flood. This freeboard would be overwhelmed in a PMF. The PMF is estimated to reach a level of around 13.95 m AHD.

It should be noted that while both Figures 1 and 2 in the 2016 WMAwater letter report (refer **Appendix A**) and in **Figures 5 – 10** show flooding across Old Canterbury Road along Hawthorne Canal and along the light rail corridor this is misleading. The flood contours in this area are for flood flows conveyed through the Hawthorne Canal crossing and the rail crossing. Old Canterbury Road is considerably higher than the PMF levels at these crossings and is in fact not inundated at these locations at any time.

It is noted in **Figure 9** that shallow flooding is mapped in the vicinity of the Old Canterbury Road / Edward St / Weston St intersection located west of 120C Old Canterbury Road, Summer Hill. The mapped flood depth is in the range 0.15 m – 0.3 m. In the case of the 100 yr ARI flood the depth of floodwaters is less than 0.15 m. It is concluded that if needed emergency services would be able to access 120C Old Canterbury Road from the west along Old Canterbury Road.

4.3 Rate of Rise of Floodwaters

To understand the likely warning times and associated response times during extreme flood events it is necessary to estimate the expected rate of rise of floodwaters. At the car park entry, the estimated rate of rise of flooding in a 60 minute PMF event is around 5 m/hr (WMAwater, 2015).

The representative spill level to initiate flow down the driveway is 12.5 m AHD (assuming that the ingress of floodwaters via any vents or lift shafts is limited) and it is estimated that in a PMF event that the onset of flows down the car park ramps would occur around 55 minutes after start of the PMP storm.

Consequently, any residents and/or visitors on Level 01 would need to retreat to communal areas on Level 02.

It was assessed that the three basement car parking levels would be progressively filled by floodwaters in a similar timeframe due to the expected flooding of each car parking level (from Basement 01 to Basement 02 to Basement 03) in order to drive flows down the access ramp ie. the Basement 01 car park would act like a retarding basin with the second “basin” (Basement 02) filling over a slightly shorter time than Basement 01 and with the third “basin” (Basement 03) filling over a slightly shorter time than Basement 02.

The time it would take to fill each level of the car park to a depth of 0.9 m was also estimated using a simple hydraulic model of flows down the ramps. For the case of the PMF (which is the most rapidly rising flood that was assessed) the estimated times it would take to fill each level of the car park to a depth of 0.9 m and to completely full is around 12-15 minutes and around 17-22 minutes respectively**.**

In events less extreme than the PMF but of sufficient severity to overtop the driveway crest level and where the inflow volume is less than the storage volume in the car parking levels then the same flooding behaviour would be expected with flooding initially occurring on all levels but at the time inflows cease floodwaters would continue to flow down the access ramps until the flood level in the car park reaches its maximum level (ie. Basement 03 would fill like a bath tub).

4.4 Duration of Inundation

Depending on the duration of the PMP storm the indicative duration of PMF levels exceeding the basement car parking driveway crest level and the Level 01 habitable floor level is around 55 minutes.

4.5 Persons at Risk (PAR)

The direct Persons at Risk (PAR) during the PMF was estimated for Level 01 and the car parking levels and the indirect PAR was estimated for the levels higher than the PMF level (Levels 02-08).

Retail

In the case of the retail on the Level 01, the PAR was based on the approach adopted to estimate the PAR within Warringah Mall previously reported by Cardno, 2007. The PAR for Warringah Mall was based on:

- An estimated average 6,667 visitors to Warringah Mall each trading hour;
- 60% of all visitors are visiting ground floor retailers (estimate provided by Centre Management) giving 4,000 ground floor visitors per hour;
- The area of retail premises that experience overfloor flooding greater than 0.2 m in a 100 yr ARI flood as a proportion of the total ground floor retail area;
- On average 9.2 hours of trading each weekday; and
- On average 14 hours of trading each weekend.

In the case of 120C Old Canterbury Road the average number of visitors per hour to the retail outlet on Level 01 was scaled based on the ratio of the floor level of the retail outlets to the area of ground floor retailers at Warringah Mall. This gave an estimate of an average of around 6 workers and visitors per hour on Level 01 exposed to flood risk during the period of operation of the retail outlet which was assumed to be 14 hours per day. A maximum number of 9 workers and visitors was also estimated.

The estimated number of persons directly at risk on Level 01 under proposed conditions is 3.5 (because it accounts for periods when the retail outlets are not trading).

Residential

The number of residents and/or visitors that would be indirectly at risk during a PMF was estimated based on the following assumed occupancies of apartments.

- 1 Bedroom 1.5 persons
- 2 Bedroom 2.5 persons
- 3 Bedroom 3.5 persons
- 4 Bedroom 4.5 persons

The following assumptions were also made when estimating the Population at Risk (PAR):

- During day-time hours on weekdays:
  - the average occupancy per apartment over the whole building would be reduced by one person per apartment to account for one resident in each apartment working (this is viewed as a conservative assumption);
  - the average duration of occupancy would be 9 hours per day (out of 10 hours)
  - the average duration of occupancy of the neighbourhood store would be 10 hours per day (out of 10 hours)
- During night-time on weekdays:
  - All residents would reside on site each night ie. the average occupancy per apartment applies over the whole building;
  - the average duration of occupancy would be 14 hours per night (out of 14 hours);
  - the average duration of occupancy of each retail outlet would be 4 hours per night (out of 14 hours)
- During weekends:
  - the average duration of occupancy of all residents would be 18 hours per day (out of 24 hours)
  - the average duration of occupancy of each retail outlet would be 14 hours per day (out of 24 hours)

In relation to estimating the PAR in car parking levels during a flood the following assumptions were made

- During day-time hours on weekdays:
  - the average occupancy per apartment over the whole building applies;
  - the average duration of occupancy of the car park would be 0.25 hours per day;
- During night-time on weekdays:
  - the average occupancy per apartment over the whole building applies;
  - the average duration of occupancy of the car park would be 0.25 hours per day;
- During weekends:
  - the average occupancy per apartment over the whole building applies;
  - the average duration of occupancy of the car park would be 0.5 hours;

The estimated total number of visitors/retail staff **directly** at risk during a PMF is summarised in **Table 1** while the total number of workers and of workers/residents/visitors that would be indirectly at risk during a PMF (all other levels higher than the PMF) is summarised in **Table 2**.

Table 1 Estimated Population at Risk (PAR) Directly during a PMF

Retail staff/Residents/Visitors directly at Risk				
Level 01 Retail		Level 01 Residential		Car Parking Levels
Max	PAR	Max	PAR	PAR
9	3.5	7.5	5.9	2.6

Table 2 Estimated Population at Risk Indirectly during a PMF

Retail staff/Residents/Visitors indirectly at Risk			
Retail		Residential	
Max	PAR	Max	PAR
15	5.8	136	108.3

4.6 Pedestrian and Vehicular Stability in Floods

The latest edition of Australian Rainfall and Runoff released in 2019 provides guidance on both pedestrian and vehicle stability in floods.

4.6.1 Pedestrian Stability

As stated in ARR2019:

> *Cox et al., 2010 concluded that self-evacuation of the most vulnerable people in the community (typically small children, and the elderly) is limited to relatively placid flow conditions. Furthermore, a D.V as low as 0.4 m2s-1 would prove problematic for people in this category, i.e. the more vulnerable in the community.*
>
> *These hazard regimes for tolerable flow conditions (D.V) as related to the individual's physical characteristics (H.M) are presented in Figure 9.2.4 …...*

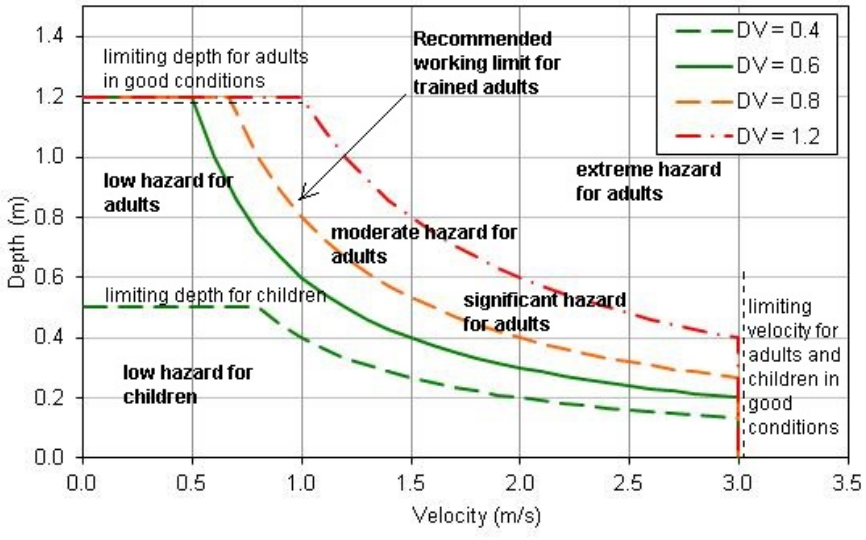


Figure 9.2.4. Safety Criteria for People in Variable Flow Conditions (After Cox et al, 2010)

4.6.2 Vehicle Stability

Determining safety criteria for vehicles requires an understanding of the physical characteristics of the vehicle along with the nature of the flow.

The measure of physical attributes for vehicle stability analysis is the vehicle classification as based on length (L, m), kerb weight (W, kg) and ground clearance (GC, m). Three vehicle classifications are suggested:

- *Small passenger: L < 4.3 m, W < 1250 kg, GC < 0.12 m*
- *Large passenger: L > 4.3 m, W > 1250 kg, GC > 0.12 m*
- *Large 4WD: L > 4.5 m, W > 2000 kg, GC > 0.22 m*

The measure of flow attributes for vehicle stability analysis is D.V m2s-1, determined as the product of flow depth (D, m) and flow velocity (V, ms-1).

Limiting conditions exist for each classification based on limited laboratory testing of characteristic vehicles. The upper tolerable velocity for moving water is defined based on the frictional limits, and is a constant 3.0 ms-1 for all vehicle classifications.

The upper tolerable depths within still water are defined by the floating limits:

- *Small passenger vehicles: 0.3 m*
- *Large passenger vehicles: 0.4 m*
- *Large 4WD vehicles: 0.5 m*

The upper tolerable depths within high velocity water (at 3.0 ms^{-1}) are defined by the frictional limits:

- *Small passenger vehicles: 0.1 m*
- *Large passenger vehicles: 0.15 m*
- *Large 4WD vehicles: 0.2 m*

… Stability criteria based on the best available information for stationary small passenger cars, large passenger cars and large 4WD vehicles in various flow situations are presented in Figure 9.2.6 …..

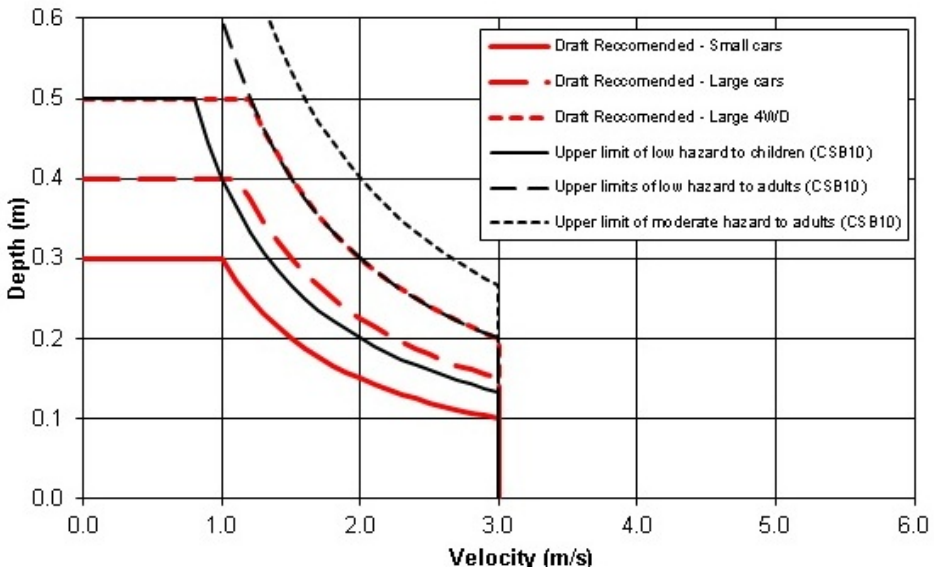


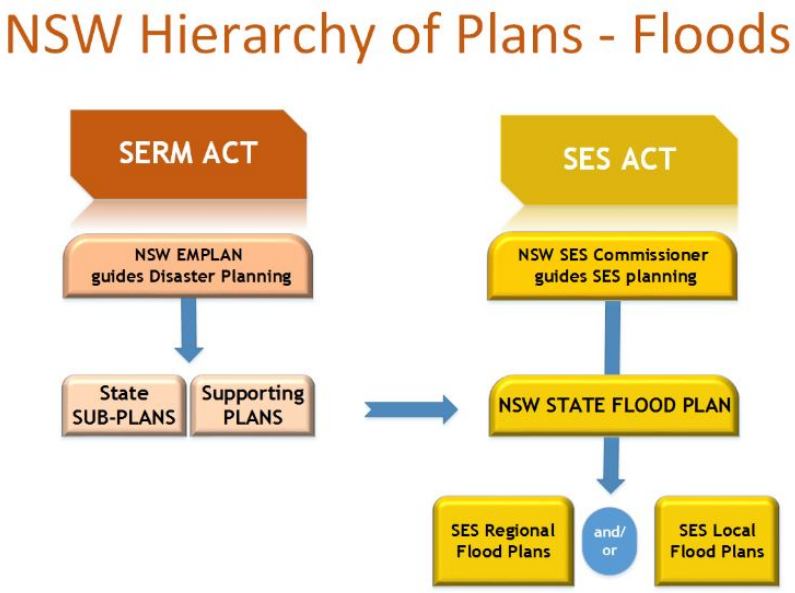
Figure 9.2.6. Interim Safety Criteria for Vehicles in Variable Flow Conditions (After Shand et al, 2011)

Shand et al (2011) concludes that the available datasets do not adequately account for the following factors and that more research is needed in these areas:

- *Friction coefficients for contemporary vehicle tyres in flood flows;*
- *Buoyancy changes in modern cars;*
- *The effect of vehicle orientation to flow direction (including vehicle movement);*
- *Information for additional categories including small and large commercial vehicles and emergency service vehicles*

5 Emergency Planning

The hierarchy of plans which guide the planning for floods in NSW is as follows:



5.1 2017 NSW State Flood Plan

The NSW State Flood Plan is a sub plan of the State Emergency Management Plan (EMPLAN) (NSW Government, 2017). It has been prepared in accordance with the provisions of the State Emergency Service Act 1989 (NSW) and is authorised by the State Emergency Management Committee in accordance with the provisions of the State Emergency and Rescue Management Act 1989 (NSW).

The latest plan was provisionally endorsed by the State Emergency Management Committee at Meeting 107 held on 5 December 2017.

The purpose of this plan is to set out the arrangements for the emergency management of flooding in New South Wales

As described by the Plan:

> *The Plan sets out the emergency management aspects of prevention; preparation; response and initial recovery arrangements for flooding and the responsibilities of individuals, agencies and organisations with regards to these functions.*
>
> *The Plan recognises the existence of the problem of coastal inundation and erosion caused by severe weather. The management system for dealing with episodes of coastal erosion is described in the New South Wales State Storm Plan.*
>
> *The Plan recognises the existence of the threat posed by tsunami to NSW coastal communities. The arrangements for the emergency management of tsunami are contained within the State Tsunami Emergency Sub Plan.*

This Plan is intended to be read in conjunction with:

(a) The New South Wales State Emergency Management Plan (EMPLAN), of which the State Flood Sub Plan is a sub-plan;
(b) The New South Wales State Storm Plan, which covers arrangements relating to severe storm events; and
(c) NSW Floodplain Development Manual.

5.2 2017 South West Metropolitan Regional Emergency Management Plan

The 2017 South West Metropolitan Regional Emergency Management Plan details arrangements for, prevention of, preparation for, response to and recovery from emergencies within the South West Region (NSW Government, 2017). It encompasses arrangements for:

- emergencies controlled by combat agencies;
- emergencies controlled by combat agencies and supported by the Regional Emergency Operations Controller (REOCON);
- emergency operations for which there is no combat agency;
- circumstances where a combat agency has passed control to the REOCON; and,
- demobilisation and transition of control from response to recovery.

As described by the Plan:

The objectives of this plan are to:

- *support Local Emergency Management Plans (EMPLANs) and augment them when required;*
- *identify trigger points for regional level activation, escalation and demobilisation;*
- *define participating organisation and Functional Area roles and responsibilities in preparation for response to and recovery from emergencies;*
- *set out the control, co-ordination, support and liaison arrangements at the Regional level;*
- *detail activation and alerting arrangements for involved agencies at the Regional level;*
- *detail arrangements for the acquisition and co-ordination of resources at the Regional level;*
- *maintain a governance over the Local Emergency Management Committees within its area of responsibility; and*
- *provide/facilitate emergency management training at a local and regional level*

The plan describes the arrangements at Regional level to prevent, prepare for, respond to and recover from emergencies and also provides policy direction for the preparation of Sub Plans and Supporting Plans. Further:

- *This plan relies on effective implementation of the Governance framework for Emergency Management;*
- *Arrangements detailed in this plan are based on the assumption that the resources upon which the plan relies are available when required; and*

- *The effectiveness of arrangements detailed in this plan are dependent upon all involved agencies preparing, testing and maintaining appropriate internal instructions, and/or standing operating procedures.*

This plan is to be read in conjunction with the arrangements stipulated in the NSW State-EMPLAN

5.3 Inner West Emergency Management Plan

The Inner West Council website currently advises that the Inner Emergency Management Plan is to be published soon (Visit: https://www.innerwest.nsw.gov.au/council/meetings/committees/local-emergency-management-committee)

As described on Council's website:

> *To minimise the consequences of emergencies, it is necessary for a responsible authority to have in place an emergency management structure and set of arrangements designed to assist the community to prevent, respond to and recover from emergencies.*
>
> *Inner West Council has established a Local Emergency Management Committee to carry out emergency management as the responsible authority for the Inner West local government area.*
>
> *This committee is responsible for an all-agencies comprehensive approach to emergency planning to prepare the community for disasters. Committee members include Emergency Services and agencies with functional responsibilities.*

5.4 Temporary Flood Refuge

Two primary sources of information were located when considering the size of a temporary flood refuge:

- Building Code of Australia (BCA, 2008)[1]
- US Flood Emergency Management Authority (FEMA, 2000)[2].

As outlined above, the Building Code of Australia (2008) stipulates that an area of public assembly such as halls or theatres should have a maximum density of 1 m^2 per person (BCA, 2008). FEMA, 2000 recommends a minimum of 0.45 m^2 per person for tornado shelters.

In the case of the proposed development a conservative maximum density of 2 m^2 per person has been adopted.

Based on the estimated peak number of persons that could be at risk in the car park and on Level 01 the estimated maximum area of refuge required is 33 m^2. Access to Level 02 would be via internal stairs and will also provide access to Old Canterbury Road.

This refuge would be provided by the two communal rooms on Level 02 which in total exceed the required area of refuge.

[1] Building Codes of Australia (2008 Edition). *Part D Access and Egress. D1.13 Number of Persons Accommodated*

[2] FEMA (2000) *Design and Construction Guidance for Community Shelters*, Federal Emergency Management Agency, Mitigation Directorate, FEMA361, 1st Ed., July 2000

6 Flood Emergency Response

It is expected that Building Owners and Managers (in accordance with existing OH&S requirements, the Building Code of Australia and relevant City of Parramatta regulations) are to have a building Emergency Management Plan which complies with the provisions of AS 3745.

6.1 Flood Warning

The Bureau of Meteorology does not prepare flood predictions for Hawthorne Canal.

Other sources of information regarding approaching severe weather conditions which could cause potential flooding at the site including:

- The Bureau of Meteorology through their website (www.bom.gov.au);
- Observation of local rainfall;
- The local SES (http://parramatta-ses.com);
- Inner West Council Emergency Management Officer;
- Local television stations; and/or
- Local radio stations.

An important indication of likely imminent flood activity would be intense local rainfall and residents, retail workers and visitors should take notice of extreme rainfall warnings issued by the Bureau of Meteorology and disseminated by local media.

6.2 Draft Flood Emergency Detailed Response Plan

The building Emergency Management Plan will contain a Flood Emergency Response Plan. It is also expected that all wardens trained under the building emergency plan are to be aware of the actions to be implemented in an extreme flood, trafficable routes to the site during extreme floods and how to liaise with the any building occupants on the site.

A basic Flood Emergency Response Plan accompanies this report.

7 Planning Considerations

7.1 Comprehensive Inner West DCP 2016

The compliance of the proposed development with the planning requirements identified by WMAwater, 2016 which are now included in Section A3 Flood Hazard of the Comprehensive Inner West DCP 2016 is assessed as follows.

DS2.1 Floor levels of habitable rooms must be a minimum of 0.5m above the standard flood level at that location. For areas of minor overland flow (a flood depth of 300mm or less or overland flow of 2cum/sec or less) a lower freeboard of 300mm may be considered on its merits.

The proposed ground floor level of apartments is 12.5 m AHD which provides more than 650 mm freeboard above the 100 year ARI flood level. The proposed floor levels of apartments on Levels 02 to 08 are all higher than the PMF level.

The proposed development complies with this requirement.

DS2.2 Any portion of buildings classified as being flood prone must be constructed from flood compatible materials.

This requirement is noted and will be implemented during the detailed design and construction.

DS2.3 Flood free access must be provided where practicable.

The basement car park is accessed via a driveway from McGill Street. **Figure 14** details the bridge crossing. The bridge span across the canal was assumed to incorporate 0.5 m high open railings which were assumed to be 50% porous.

It is estimated that it would become unsafe for small vehicles to drive across the bridge when the depth of floodwaters across the driveway exceed 0.3 m (which would occur before the peak of a 100 yr ARI flood). It is estimated that it would become unsafe for large vehicles to drive across the bridge when the depth of floodwaters across the driveway exceed 0.5 m at around the peak of a 100 yr ARI flood.

In the PMF shallow flooding is mapped in the vicinity of the Old Canterbury Road / Edward St / Weston St intersection located west of 120C Old Canterbury Road, Summer Hill. The mapped flood depth is in the range 0.15 m – 0.3 m. In the case of the 100 yr ARI flood the depth of floodwaters is less than 0.15 m. It is concluded that access to 120C Old Canterbury Road is available from the west along Old Canterbury Road directly to Levels 02 and 03 of the proposed development.

Controls for underground garages

The car park driveway crest level is 12.5 m AHD. Car parking is assessed against the following requirements.

DS11.1 Freeboard protection of 500mm must be provided within the internal driveway prior to descending into the underground garage.

The car park driveway crest level is 12.5 m AHD which provides more than 650 mm freeboard above the 100 year ARI level to the basement car parking levels.

The proposed development complies with this requirement.

DS11.2 Suitable pumps must be provided within the garage to allow for drainage of stormwater should the underground garage become inundated during flooding.

This requirement is noted and will be implemented during the detailed design and construction.

DS11.3 Adequate flood warning systems, signage and exits must be available to allow safe and orderly evacuation without increased reliance upon the SES or other authorised emergency services personnel.

A basic Flood Emergency Response Plan accompanies this report. Signage will be installed to warn residents/visitor driving along the access road from McGill Street and parking in the basement car parking levels of the potential for flooding in extreme floods.

The proposed development will comply with this requirement.

DS11.4 Reliable access for pedestrians or vehicles must be provided from the building, commencing at a minimum level equal to the lowest habitable floor level to an area of refuge above the PMF

This requirement is noted and will be implemented during the detailed design and construction.

During extreme floods rare than a 100 yr ARI flood any residents, retail staff and/or visitors on Level 01 would need to retreat to communal areas on Level 02 which is at a level higher than the PMF. Access to Level 02 would be via internal stairs.

The refuge area provided by the two communal rooms on Level 02 in total exceeds the estimated required area of refuge.

The proposed development complies with this requirement.

7.2 Section 117(2) of the EP&A Act 1979, Section 4.3 Flood Prone Land

Drawing on the preceding assessments and considerations the following responses to considerations under Section 117(2) of the EP&A Act 1979, Section 4.3 Flood Prone Land are provided:

Objectives

(1) The objectives of this direction are:

(a) to ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005, and

(b) to ensure that the provisions of an LEP on flood prone land is commensurate with flood hazard and includes consideration of the potential flood impacts both on and off the subject land.

What a relevant planning authority must do if this direction applies

(4) A planning proposal must include provisions that give effect to and are consistent with the NSW Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005 (including the Guideline on Development Controls on Low Flood Risk Areas).

Flood risk can be defined as being existing, future or residual risk:

- **Existing flood risk** - the existing problem refers to existing buildings and developments on flood prone land. Such buildings and development by virtue of their presence and location are exposed to an 'existing' risk of flooding.
- **Future flood risk** - the future problem refers to buildings and developments that may be built on flood prone land in the future. Such buildings and developments may be exposed to a 'future' flood risk, i.e. a risk would not materialise until the developments occur.
- **Continuing risk of flooding** - the continuing problem refers to the 'residual' risk associated with floods that exceed management measures already in place, i.e. unless a floodplain management measure is designed to withstand the Probable Maximum Flood, it will be exceeded by a sufficiently large flood at some time in the future.

Measures available for the management of flood risk can be categorised according to the way in which the risk is managed. As a result, there are three types of measures for the management of flooding:

- Flood Modification Measures (for the existing risk)
- Property Modification Measures (for the future risk)
- Emergency Response Modification Measures (for the residual risk).

The flood risks on 120C Old Canterbury Road, Summer Hill are described in **Section 4** above.

Existing Flood Risk

The existing flood risks on 120C Old Canterbury Road has been assessed using a 1D/2D floodplain model and are described in Section 3.1 above.

The estimated 100 yr ARI flood extent, levels and depths, velocities and provisional hazards under Existing Conditions are plotted in **Figures 5, 6** and **7** respectively.

The provisional 100 yr ARI hydraulic categorisation in the vicinity of the property under Existing Conditions are plotted in **Figure 8**. The inundated section of the property is mapped as floodway.

The estimated PMF extent, levels and depths and provisional hazards under Existing Conditions are plotted in **Figures 9** and **10** respectively.

Future Flood Risk

The future flood risk is addressed by the proposed form of development which achieves and/or exceeds the requirements of the Comprehensive Inner West DCP 2016 as discussed in Section 7.1 and by providing measures for the passage of floodwaters through the site.

As discussed under Section 3.4, it is concluded that the configuration for the planned development on the site detailed in **Figures 13** and **14** that:

- The assessed 100 yr ARI flood level impacts are negligible;
- The assessed PMF level impacts are minor or are in an area which does not adversely impact the existing habitable floor level. There are no significant adverse impacts in the PMF.

Figure 18 identifies local impacts on the PMF levels along the rear wall of 20 McGill St. The floor level on this boundary is at RL 15.78 which is higher than the PMF level. There is a vent in this wall near the access road. The indicative bottom level and top level of the vent are around 13.75 m AHD and 14.6 m AHD.

Under current conditions the PMF level is around 14.0 m AHD. Consequently, it is expected that floodwaters would spill through this vent at the peak of the PMF. Likewise, under future conditions floodwaters would also spill through this vent at the peak of the PMF. The impact of a locally raised PMF level on inflow through the vent is likely modest in comparison with the ingress of floodwaters into basement car parking via driveways.

Continuing Flood Risk

The estimated total number of visitors and retail staff **directly** at risk during a PMF is summarised in **Table 1** while the total number of workers and of workers/residents/visitors that would be indirectly at risk during a PMF (all other levels higher than the PMF) is summarised in **Table 2**.

During extreme floods rare than a 100 yr ARI flood any residents, retail staff and/or visitors on Level 01 would need to retreat to communal areas on Level 02 which is at a level higher than the PMF. Access to Level 02 would be via internal stairs.

The refuge area provided by the two communal rooms on Level 02 in total exceeds the estimated required area of refuge.

As indicated in Section 6.2, it is expected that Building Owners and Managers (in accordance with existing OH&S requirements, the Building Code of Australia) are to have a building Emergency Management Plan which complies with the provisions of AS 3745.

The building Emergency Management Plan will contain a Flood Emergency Response Plan. It is also expected that all wardens trained under the building emergency plan are to be aware of the actions to be implemented in an extreme flood, trafficable routes to the site during extreme floods and how to liaise with the any building occupants on the site.

A basic Flood Emergency Response Plan accompanies this report.

(6) A planning proposal must not contain provisions that apply to the flood planning areas which:

(a) permit development in floodway areas,

The 2005 NSW Floodplain Development Manual defines "floodway areas" as follows:

> *"those areas of the floodplain where a significant discharge of water occurs during floods. They are often aligned with naturally defined channels. Floodways are areas that, even if only partially blocked, would cause a significant redistribution of flood flow, or a significant increase in flood levels."*

Level L01 is suspended in order to create a void beneath the building to maintain flood storage and the pattern of flood flow through the property in a 100 yr ARI flood (refer **Figure 13**).

As discussed under Section 3.4, it is concluded that the configuration for the planned development on the site detailed in **Figure 13** that:

- The assessed 100 yr ARI flood level impacts are negligible;
- The assessed PMF level impacts are minor or are in an area which does not adversely impact the existing habitable floor level. There are no significant adverse impacts in the PMF.

It is therefore concluded that the proposed concept development complies with the intent of this requirement, namely to not significantly redistribute flood flow or to significantly increase flood levels.

(b) permit development that will result in significant flood impacts to other properties,

As concluded under Section 3.4 the concept planned development has no adverse impact on 100 yr ARI flood levels and no significant adverse impact on PMF levels due to the proposed form of development and the presence of local hydraulic controls downstream of the property which are controlling 100 yr ARI and PMF levels on the property.

(c) permit a significant increase in the development of that land

The Persons at Risk (PAR) directly during the PMF is any resident, retail staff or visitor who resides or works or is visiting Level 01 or anyone who happens to be in car parking levels during extreme floods which overtop the Level 01 floor level and the driveway crest level to the car parking levels ie. events greater than a 2,000 yr ARI flood. The estimated PAR directly at risk in extreme floods on Level 01 is 9.4 persons.

As indicated in Section 6.2, it is expected that Building Owners and Managers (in accordance with existing OH&S requirements, the Building Code of Australia) are to have a building Emergency Management Plan which complies with the provisions of AS 3745.

As indicated in Section 6.2, it is expected that Building Owners and Managers (in accordance with existing OH&S requirements, the Building Code of Australia) are to have a building Emergency Management Plan which complies with the provisions of AS 3745.

The building Emergency Management Plan will contain a Flood Emergency Response Plan. It is also expected that all wardens trained under the building emergency plan are to be aware of the actions to be implemented in an extreme flood, trafficable routes to the site during extreme floods and how to liaise with the any building occupants on the site.

A basic Flood Emergency Response Plan accompanies this report.

(d) are likely to result in a substantially increased requirement for government spending on flood mitigation measures, infrastructure or services

As discussed under Section 3.4, it is concluded that the configuration for the planned development on the site detailed in **Figure 13** that:

- The assessed 100 yr ARI flood level impacts are negligible;
- The assessed PMF level impacts are minor or are in an area which does not adversely impact the existing habitable floor level. There are no significant adverse impacts in the PMF.

Consequently, there will be no substantially increased requirement for government spending on flood mitigation measures or infrastructure arising from the proposed concept development.

The building Emergency Management Plan will contain a Flood Emergency Response Plan. It is also expected that all wardens trained under the building emergency plan are to be aware of the actions to be implemented in an extreme flood, trafficable routes to the site during extreme floods and how to liaise with the any building occupants on the site.

A basic Flood Emergency Response Plan accompanies this report.

The implementation of a FERP for the development is not reliant on any requirement for government spending on services.

Consistency

(9) A planning proposal may be inconsistent with this direction only if the relevant planning authority can satisfy the Director-General (or an officer of the Department nominated by the Director-General) that:

(a) the planning proposal is in accordance with a floodplain risk management plan prepared in accordance with the principles and guidelines of the Floodplain Development Manual 2005, or

(b) the provisions of the planning proposal that are inconsistent are of minor significance.

The future flood risk is addressed by the proposed form of development which achieves and/or exceeds the requirements of the Comprehensive Inner West DCP 2016. As concluded under Section 3.4 the concept planned development is expected to have a no adverse impact on 100 yr ARI flood levels and no significant adverse impact on PMF levels due to the proposed form of development and the presence of local hydraulic controls downstream of the property which are controlling 100 yr ARI and PMF levels on the property. Consequently, there will be no substantially increased requirement for government spending on flood mitigation measures or infrastructure arising from the proposed concept development.

The building Emergency Management Plan will contain a Flood Emergency Response Plan. It is also expected that all wardens trained under the building emergency plan are to be aware of the actions to be implemented in an extreme flood, trafficable routes to the site during extreme floods and how to liaise with the any building occupants on the site.

A basic Flood Emergency Response Plan accompanies this report.

The implementation of a FERP for the development is not reliant on any requirement for government spending on services.

The proposed development has been assessed against each of the considerations set out in Direction and it is concluded that the proposed form of development is informed by the principles and guidelines of the Floodplain Development Manual 2005 and the complies with intent of Section 117(2) of the EP&A Act 1979, Section 4.3 Flood Prone Land and any provisions of the planning proposal that are inconsistent are of minor significance.

8 Conclusions

It is proposed to develop the property known as No. 120C Old Canterbury Road, Summer Hill, legally described as Lot 1 in DP 817359 and Lot 100 in DP 875660 (hereafter referred to as the "subject site").

To inform the proposed development a flood risk assessment in response has been undertaken. This included:

- An assessment of the flooding impact of the planned development;
- Flood emergency response; and
- Compliance with requirements of the Comprehensive Inner West DCP 2016 and the Section 117 Direction 4.3 – Flood Prone Land.

The proposed development site at 120C Old Canterbury Road, Summer Hill is subject to flooding by floodwaters spilling from Hawthorne Canal and overland flows. Detailed flood modelling of existing conditions has been undertaken by WMAwater in 2015.

Features of the subject site and planned development include:

- The site ground levels generally vary west to east across the middle and northern section of the site from around 10 m AHD to 9.5 m AHD except in the southern section of the site where the ground grades up to Old Canterbury Road at levels which vary from 17.1 m AHD – 18.5 m AHD;
- The proposed floor level of apartments on Level 01 is 12.5 m AHD will provide more than 650 mm freeboard above the 100 year ARI flood level;
- The proposed floor levels of apartments on Levels 02 to 08 are all higher than the PMF level;
- replacing the current bridge. The bridge span across the canal is assumed to incorporate 0.5 m high open railings which will be 50% porous;
- A driveway crest level of 12.5 m AHD on the ramp down to the basement car parking which provides more than 650 mm freeboard above the 100 year ARI level;
- Level 01 is suspended in order to create a void beneath the building to maintain flood storage and the pattern of flood flow through the property in a 100 yr ARI flood (refer **Figure 13**);

The car park is accessed via an access road from McGill Street. It is estimated that it would become unsafe for small vehicles to drive across the bridge when the depth of floodwaters across the driveway exceed 0.3 m (which would occur before the peak of a 100 yr ARI flood). It is estimated that it would become unsafe for large vehicles to drive across the bridge when the depth of floodwaters across the driveway exceed 0.5 m at around the peak of a 100 yr ARI flood.

It should be noted that while both Figures 1 and 2 in the 2016 WMAwater letter report (refer **Appendix A**) and in **Figures 5 – 10** show flooding across Old Canterbury Road along Hawthorne Canal and along the light rail corridor this is misleading. The flood contours in this area are for flood flows conveyed through the Hawthorne Canal crossing and the rail crossing. Old Canterbury Road is considerably higher than the PMF levels at these crossings and is in fact not inundated at these locations at any time.

It is noted in **Figure 9** that shallow flooding is mapped in the vicinity of the Old Canterbury Road / Edward St / Weston St intersection located west of 120C Old Canterbury Road, Summer Hill. The mapped flood depth is in the range 0.15 m – 0.3 m. In the case of the 100 yr ARI flood the depth of floodwaters is less than 0.15 m.

It is concluded that if needed emergency services would be able to access 120C Old Canterbury Road from the west along Old Canterbury Road and/or residents could be evacuated if in need of medical attention via the ground floor connection to Old Canterbury Road.

Flood emergency planning in the South West Metropolitan District was reviewed to provide the context for flood emergency planning for the subject site. The 2017 South West Metropolitan Regional Emergency Management Plan details arrangements for, prevention of, preparation for, response to and recovery from emergencies within the South West Region. The Inner West Council website currently advises that the Inner Emergency Management Plan is to be published soon

During extreme floods rare than a 100 yr ARI flood any residents, retail staff and/or visitors on Level 01 would need to retreat to communal areas on Level 02 which is at a level higher than the PMF. Access to Level 02 would be via internal stairs.

The refuge area provided by the two communal rooms on Level 02 in total exceeds the estimated required area of refuge.

As indicated in Section 6.2, it is expected that Building Owners and Managers (in accordance with existing OH&S requirements, the Building Code of Australia) are to have a building Emergency Management Plan which complies with the provisions of AS 3745.

The building Emergency Management Plan will contain a Flood Emergency Response Plan. It is also expected that all wardens trained under the building emergency plan are to be aware of the actions to be implemented in an extreme flood, trafficable routes to the site during extreme floods and how to liaise with the any building occupants on the site.

A basic Flood Emergency Response Plan accompanies this report.

The objectives of Section 117(2) of the EP&A Act 1979, Section 4.3 Flood Prone Land are:

(a) to ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005, and
(b) to ensure that the provisions of an LEP on flood prone land is commensurate with flood hazard and includes consideration of the potential flood impacts both on and off the subject land.

A planning proposal may be inconsistent with the Section 117(2) Direction only if the relevant planning authority can satisfy the Director-General (or an officer of the Department nominated by the Director-General) that:

(c) the planning proposal is in accordance with a floodplain risk management plan prepared in accordance with the principles and guidelines of the Floodplain Development Manual 2005, or

(d) the provisions of the planning proposal that are inconsistent are of minor significance.

The future flood risk is addressed by the proposed form of development which achieves and/or exceeds the requirements of the Comprehensive Inner West DCP 2016. As discussed under Section 3.4, it is concluded that the configuration for the planned development on the site that:

- There is a local impact in the vicinity of the end of the western solid wall in the 100 yr ARI flood partially within and adjacent to the site;
- There are no adverse impacts on any adjoining development in the 100 yr ARI flood;

- There are no significant adverse impacts in the PMF.

Consequently, there will be no substantially increased requirement for government spending on flood mitigation measures or infrastructure arising from the proposed concept development.

The proposed development has been assessed against each of the considerations set out in Direction and concludes that the proposed form of development is informed by the principles and guidelines of the Floodplain Development Manual 2005 and the complies with intent of Section 117(2) of the EP&A Act 1979, Section 4.3 Flood Prone Land and any provisions of the planning proposal that are inconsistent are of minor significance.

9 References

Department of Planning ( ) *Section 117(2) of the EP&A Act 1979, Section 4.3 Flood Prone Land*

FEMA (2000) *Design and Construction Guidance for Community Shelters*, Federal Emergency Management Agency, Mitigation Directorate, FEMA361, 1st Ed., July 2000.

Inner West Council (2016). *Comprehensive Inner West DCP 2016*, Section A3 Flood Hazard.

NSW Government (2005). *Floodplain Development Manual, The management of flood liable land*, April, 29 pp + Apps

NSW Government (2017) *New South Wales State Flood Plan*, December, 105 pp.

NSW Government (2017) *South West Metropolitan Regional Emergency Management Plan*, July, 27 pp.

WMAwater (2015) *Hawthorne Canal Flood Study,* prepared for Marrickville Council, Version 6, February, 80 pp + Apps.

WMAwater (2016) *Flood Certificate for 120C Old Canterbury Road, Lewisham*, prepared for Mr Timperi, 21 June 2016.

(Source: Nearmap accessed 3 March 2018)

Figure 1 Location of 120C Old Canterbury Road

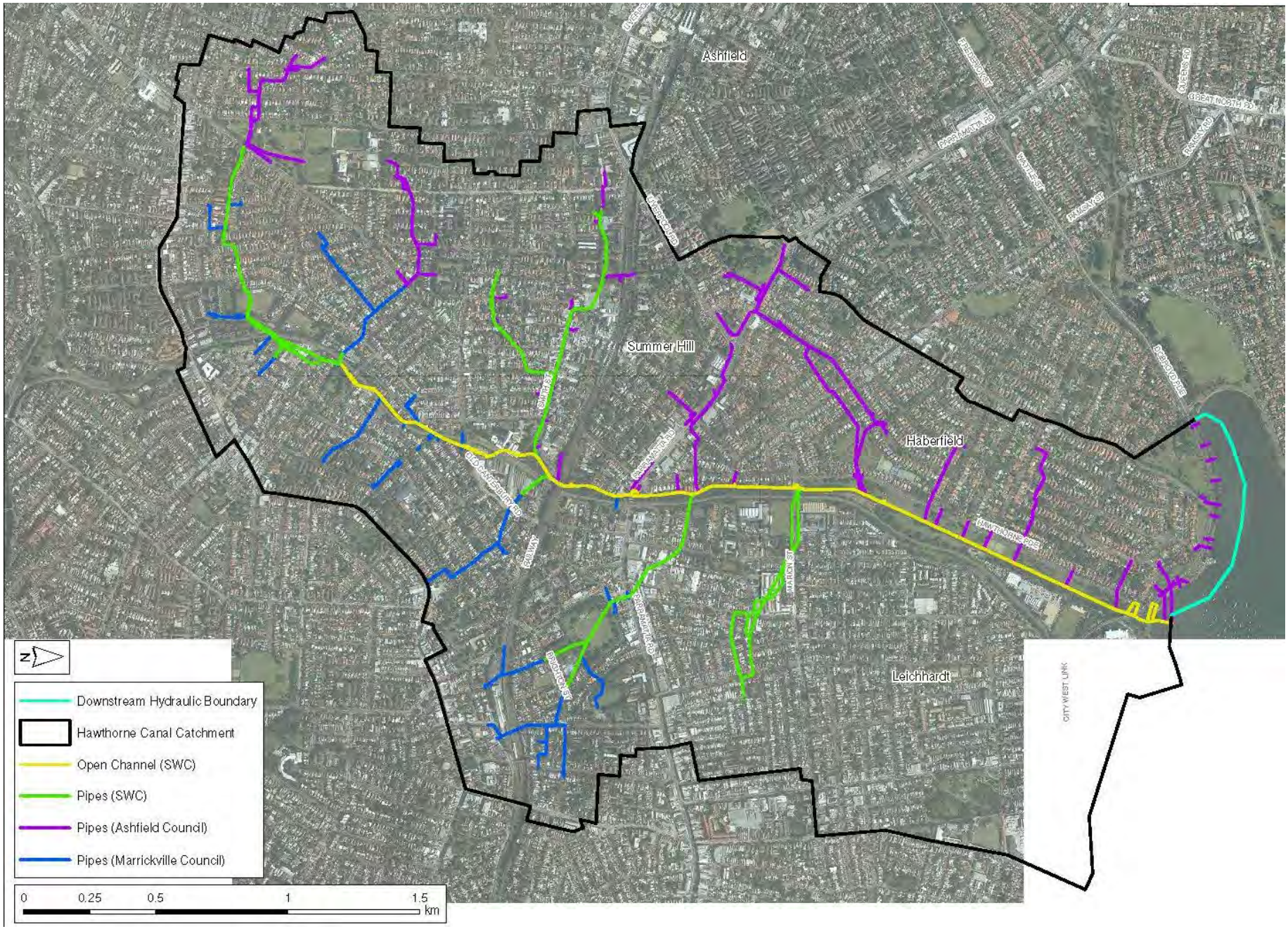


Figure 2 Hydraulic Model Schemitisation (after Figure 13, WMAwater, 2015)

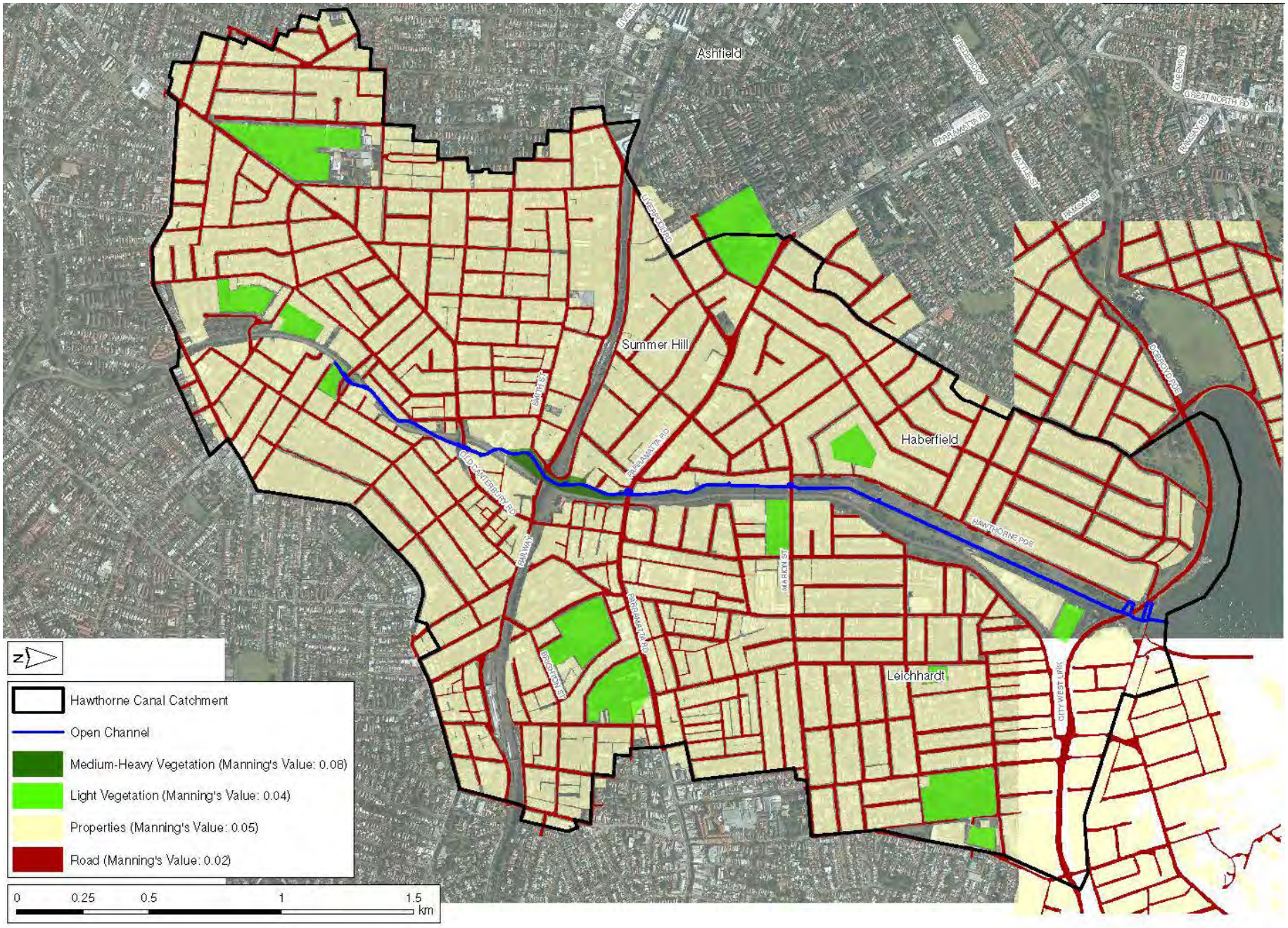


Figure 3 Floodplain Roughness (after Figure 14, WMAwater, 2015)

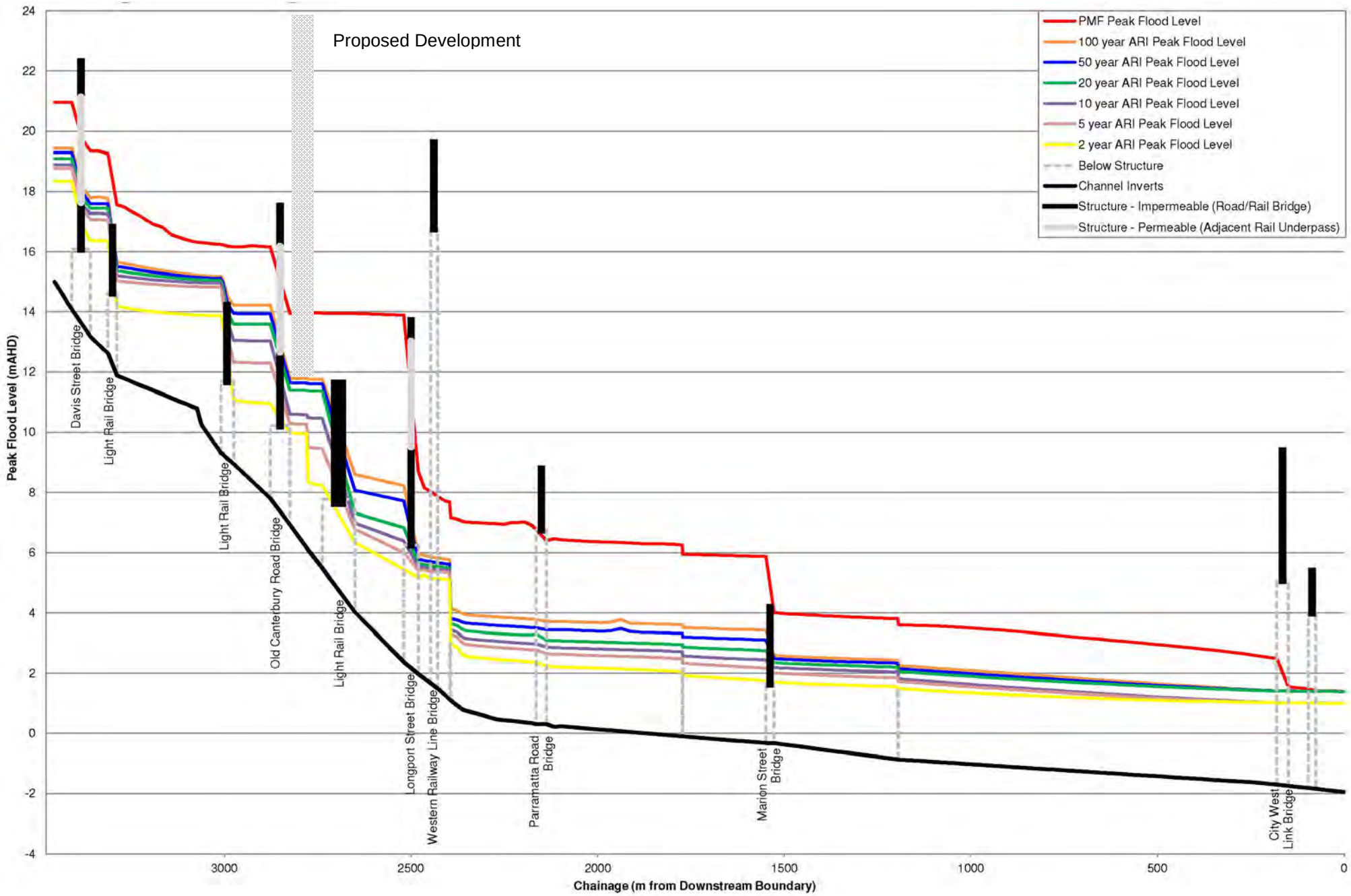


Figure 4 Peak Flood Level Profiles (after Figure 26A, WMAwater, 2015)

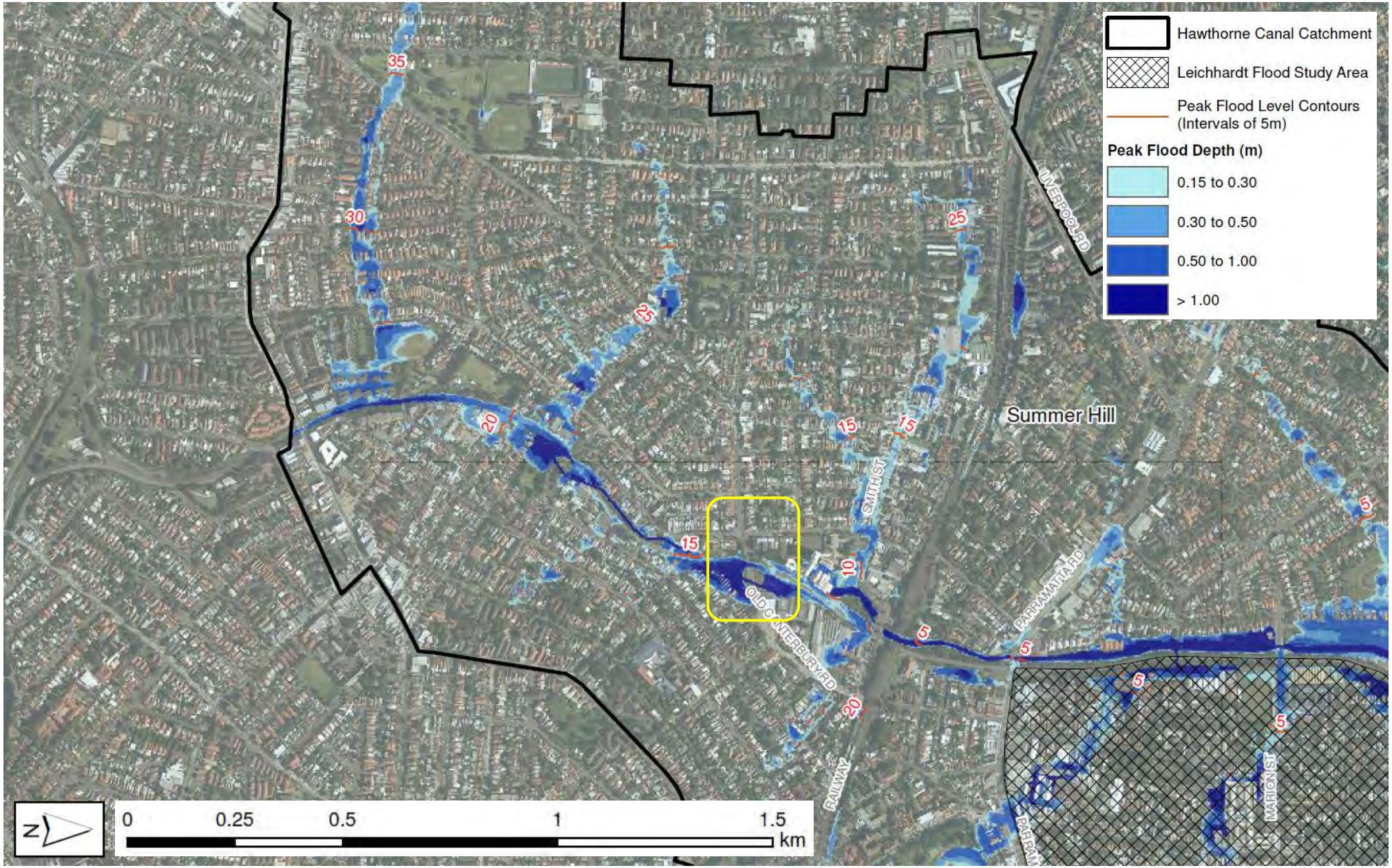


Figure 5 100 yr ARI Flood Extents and Flood Levels (after Figure 24, WMAwater, 2015)

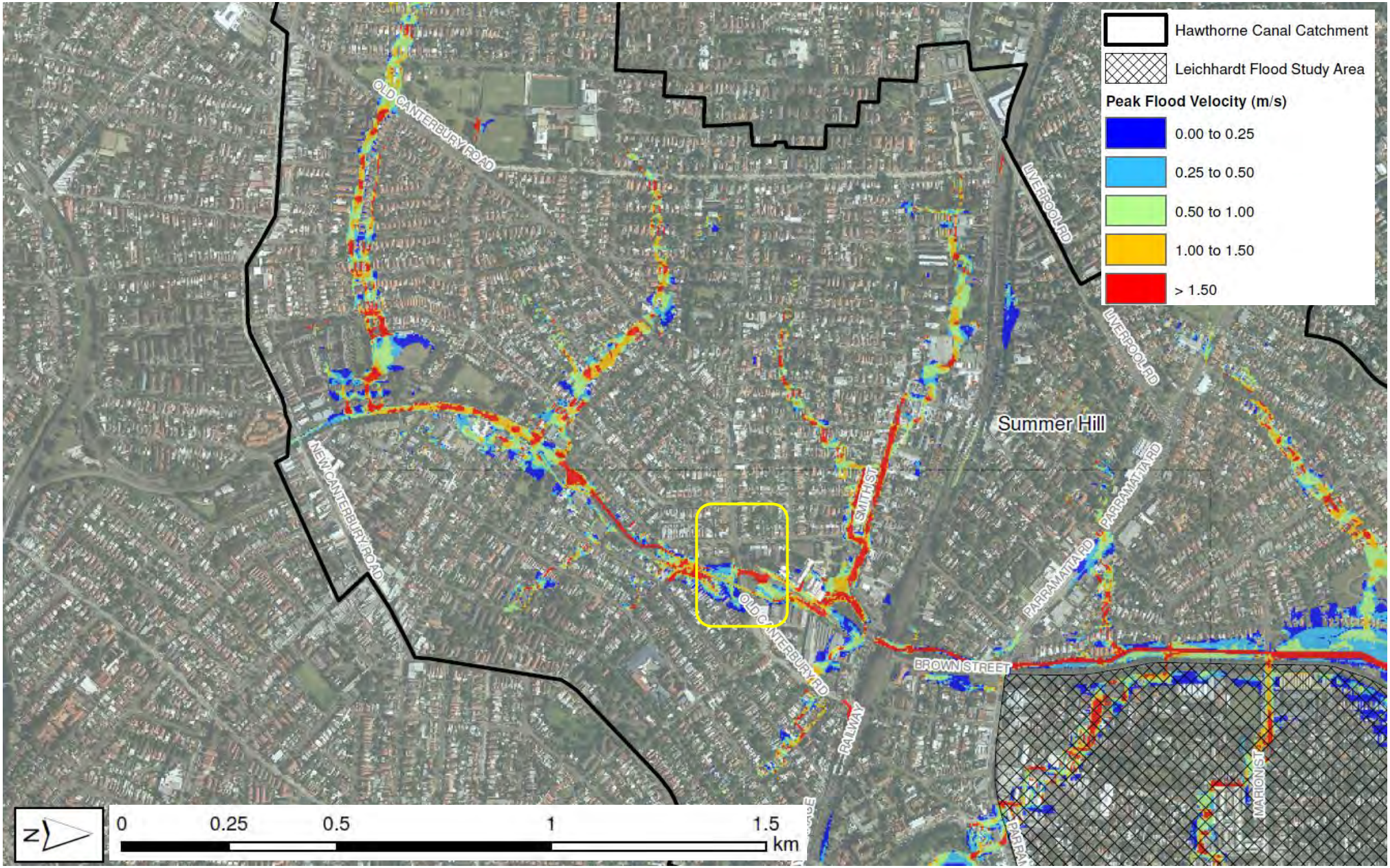


Figure 6 100 yr ARI Flood Velocities (after Figure 27, WMAwater, 2015)

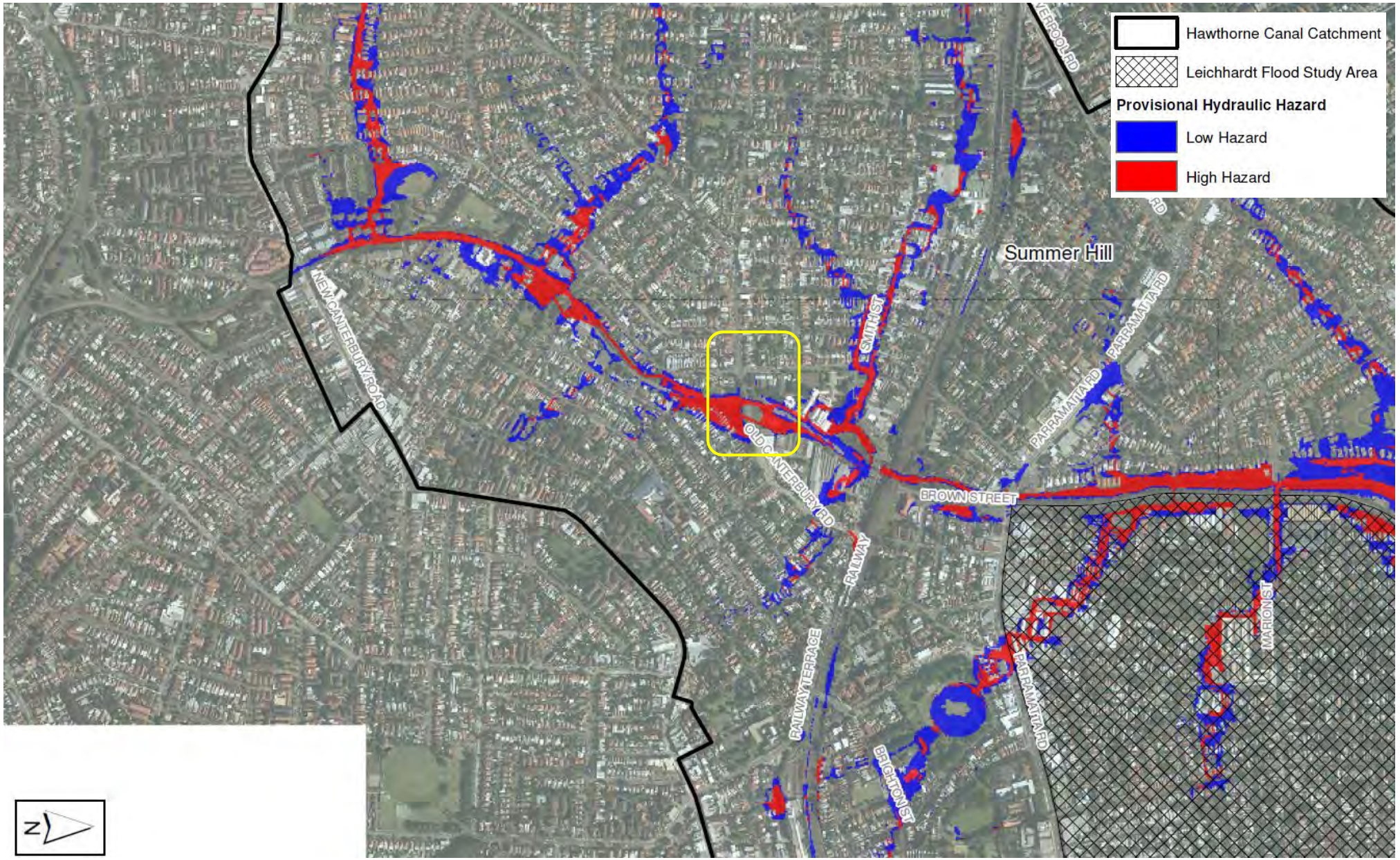


Figure 7 100 yr ARI Provisional Flood Hazards (after Figure 30, WMAwater, 2015)

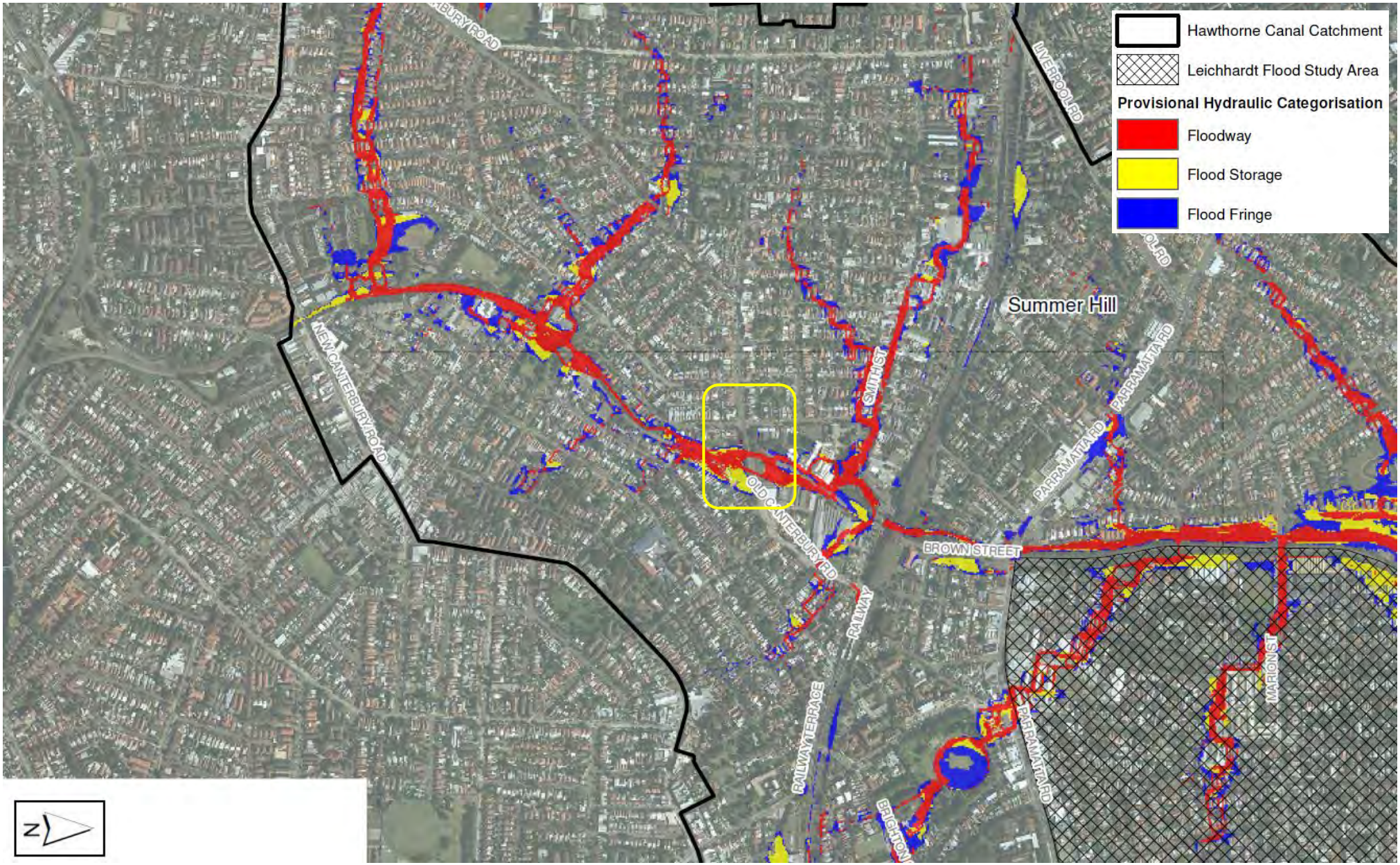


Figure 8 100 yr ARI Hydraulic Classification (after Figure 34, WMAwater, 2015)

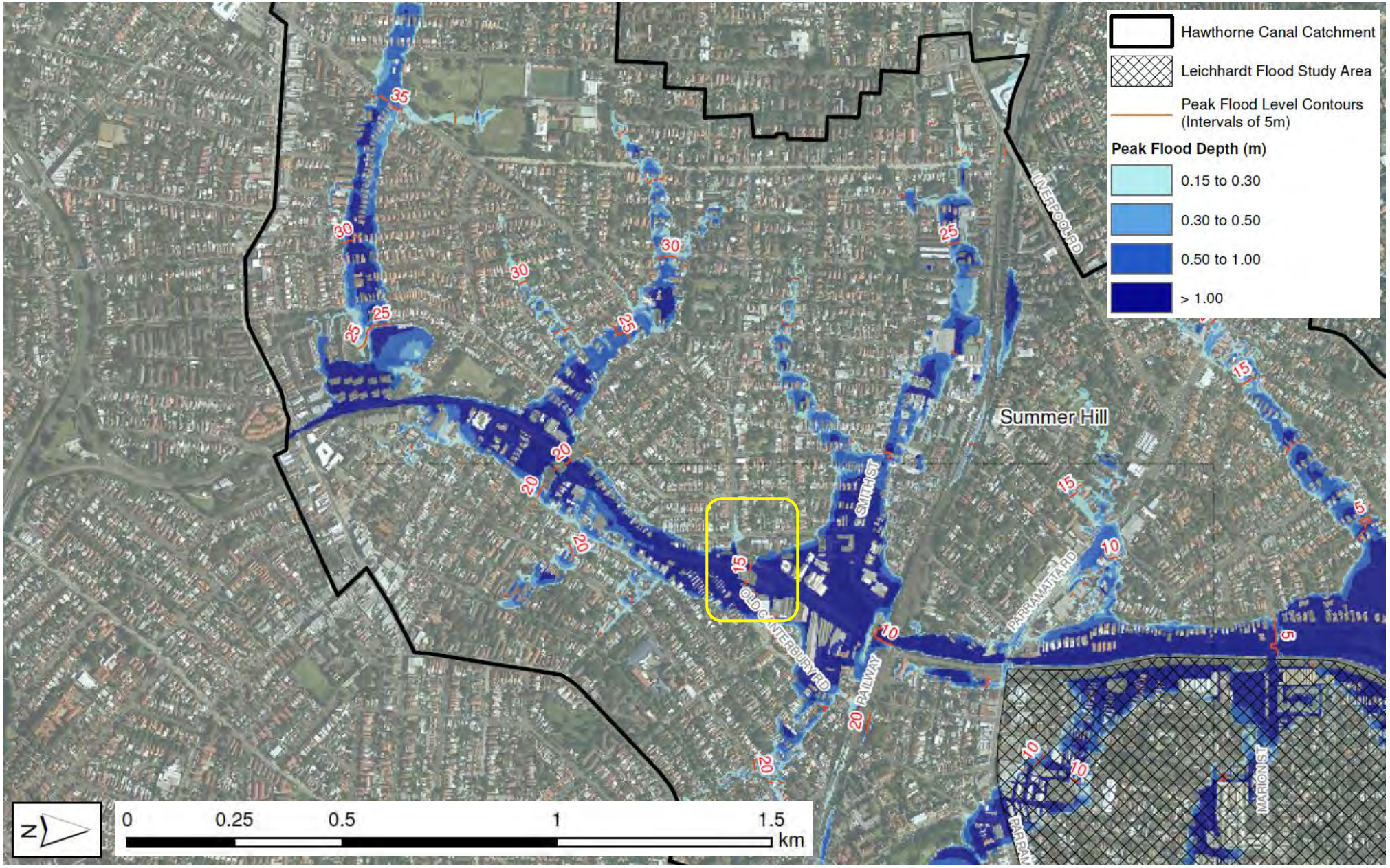


Figure 9 PMF Extents and Flood Levels (after Figure 25, WMAwater, 2015)

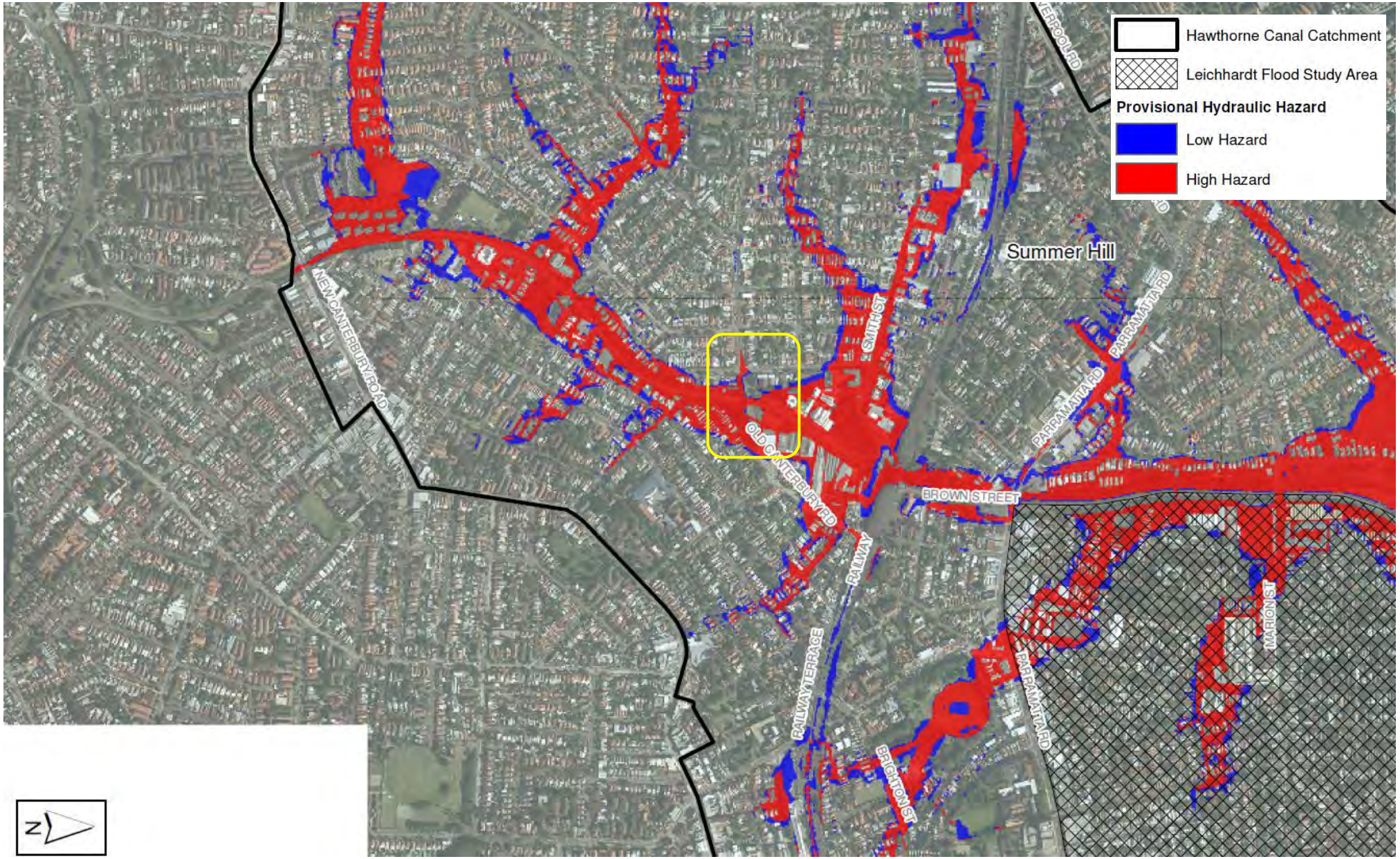


Figure 10 PMF Provisional Flood Hazards (after Figure 31, WMAwater, 2015)

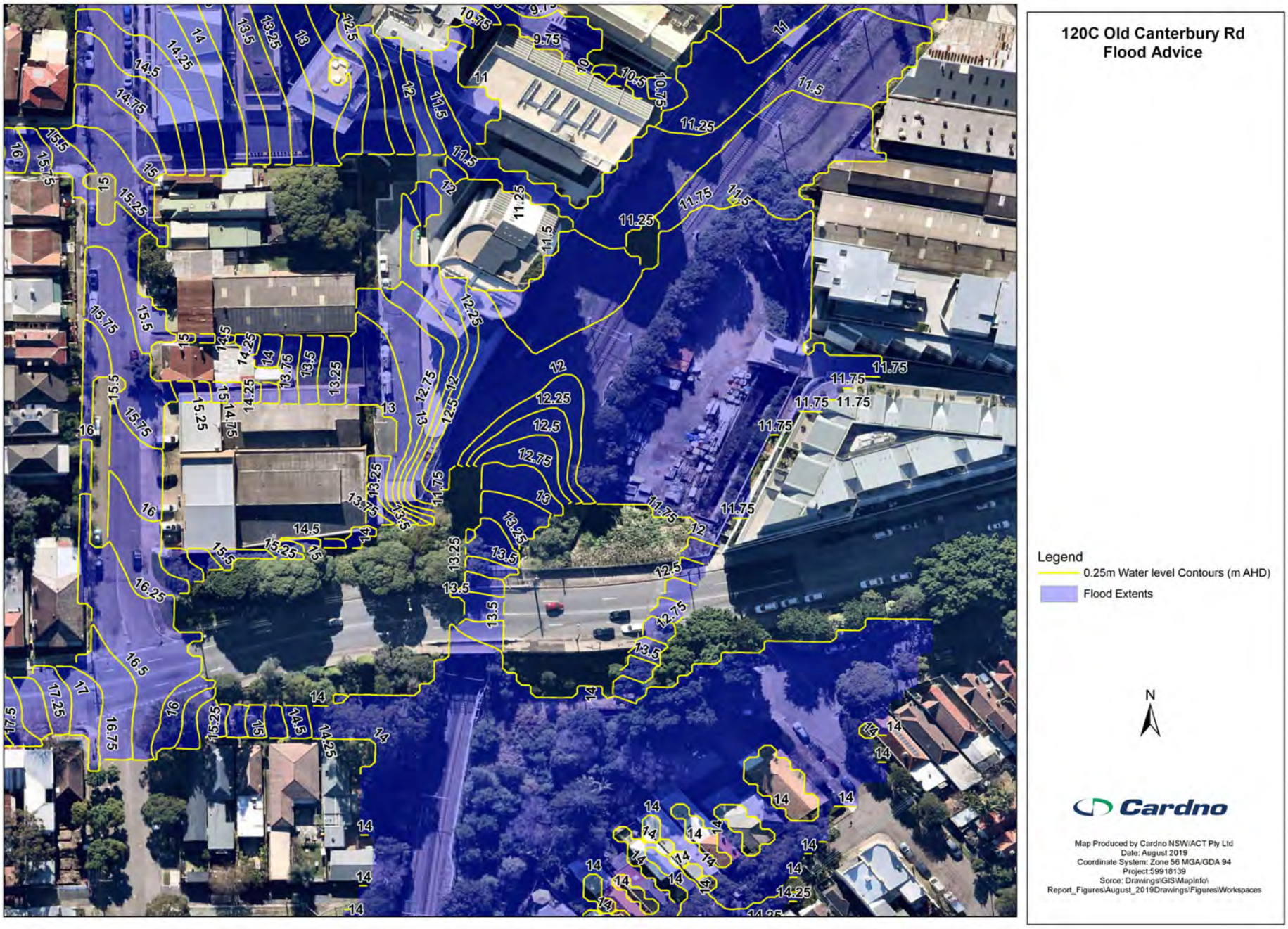


Figure 11 100 yr ARI Flood Extents and Flood Levels (m AHD) – Benchmark Conditions

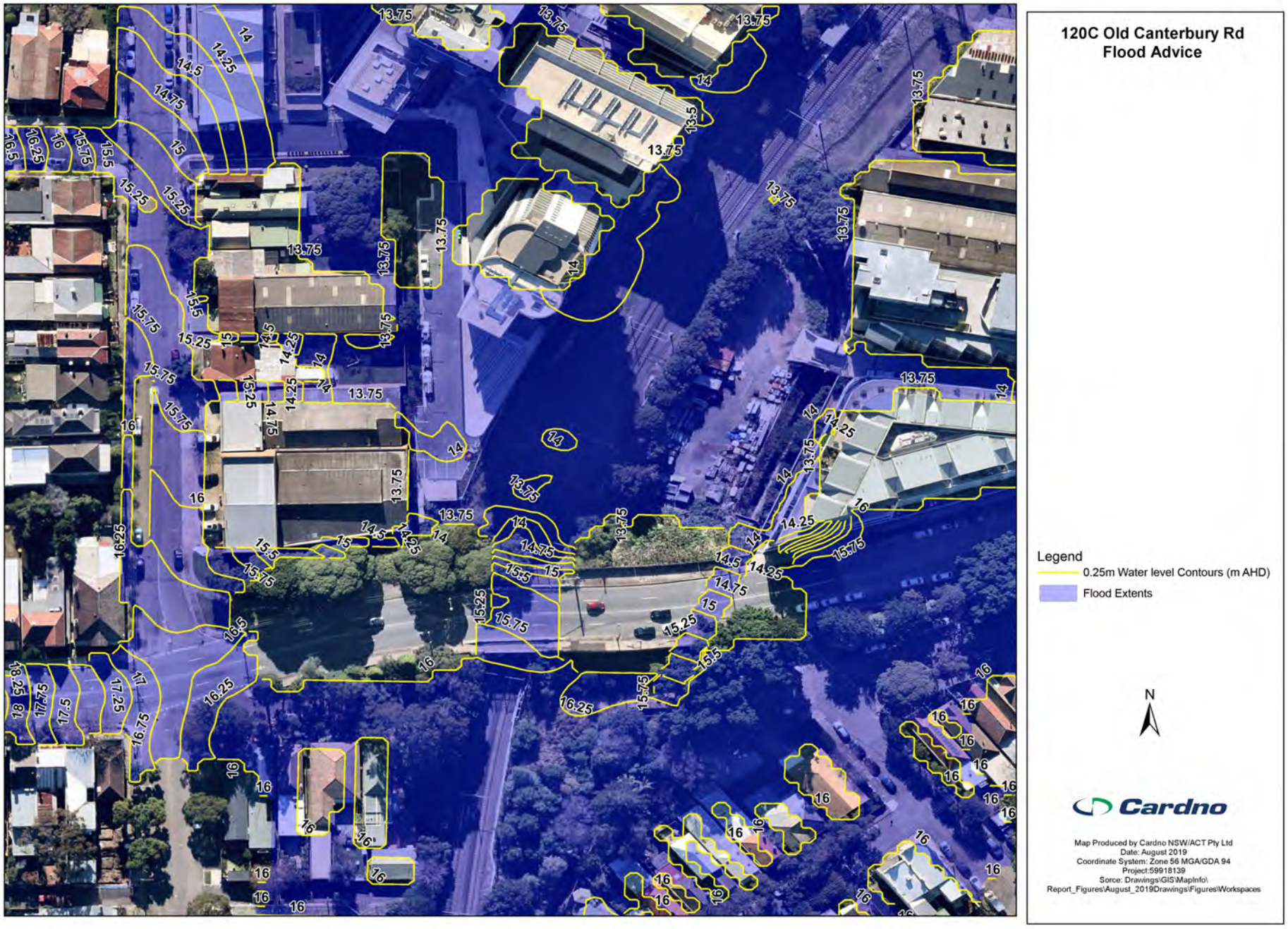


Figure 12 PMF Extents and Flood Levels (m AHD) – Benchmark Conditions

Figure 13 Proposed Layout of Ground Level and Level 01 (after Fox Johnston, May 2020)

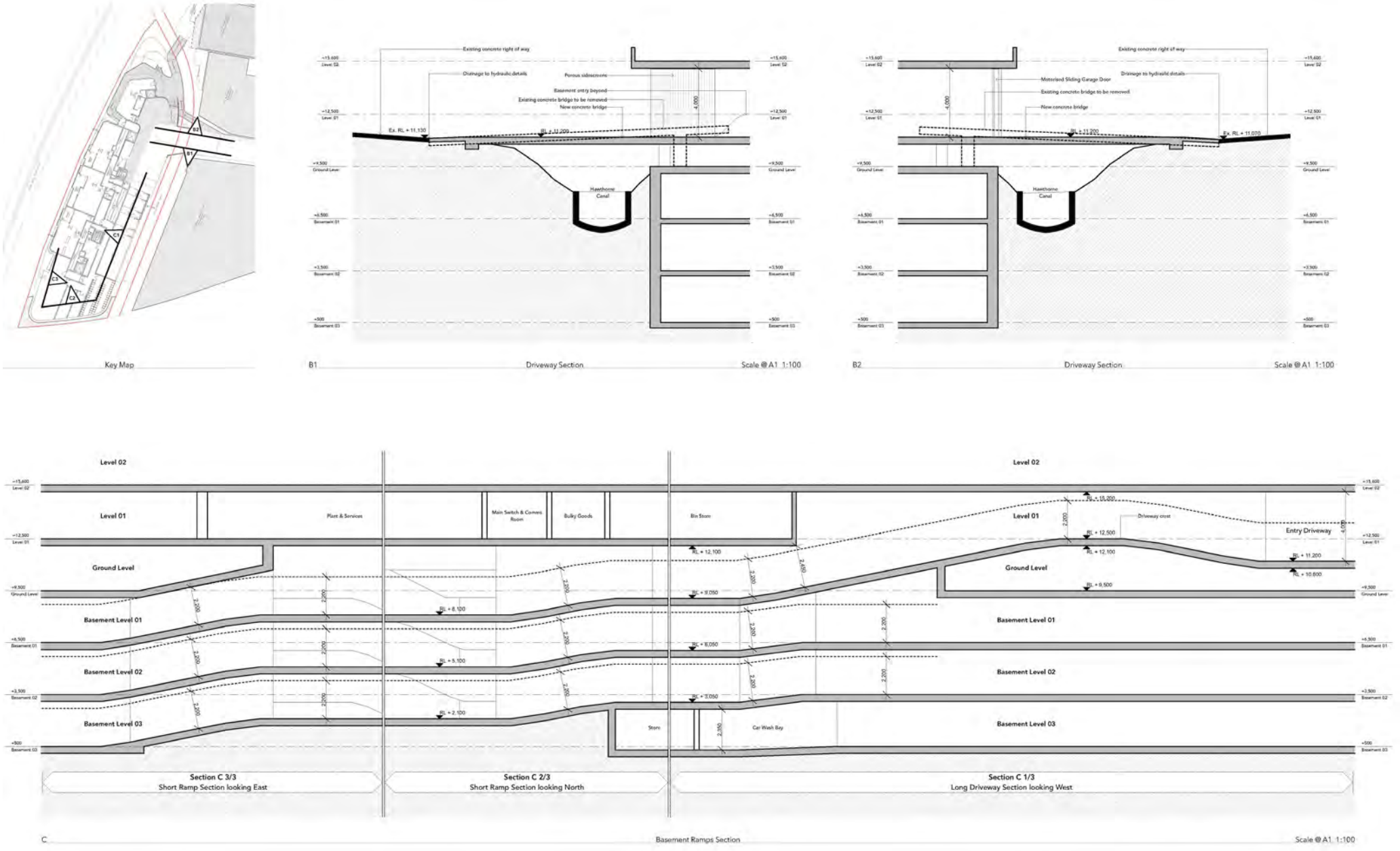


Figure 14 Updated Bridge Crossing and Driveway Ramps

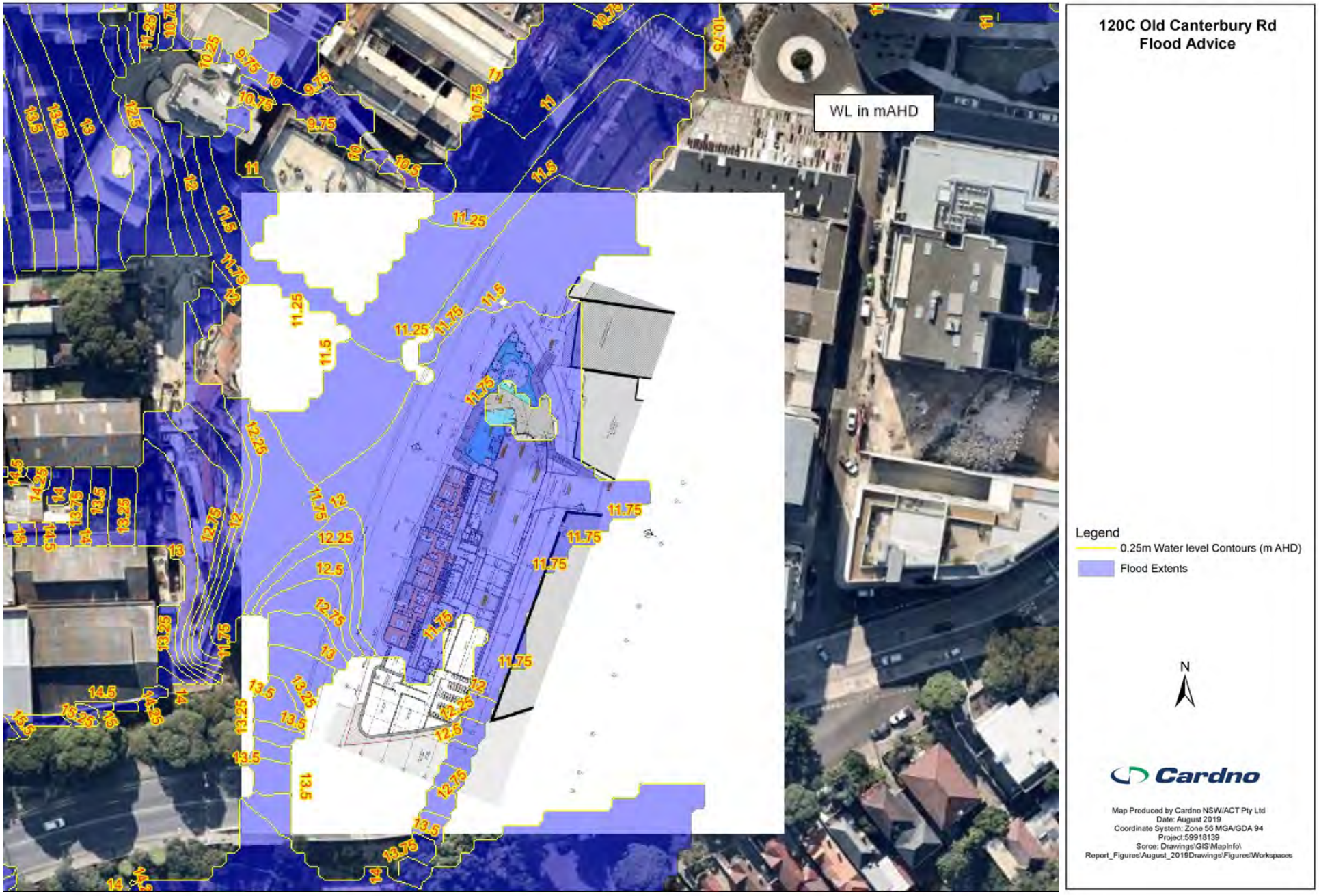


Figure 15 100 yr ARI Flood Extents and Flood Levels (m AHD) – Future Conditions

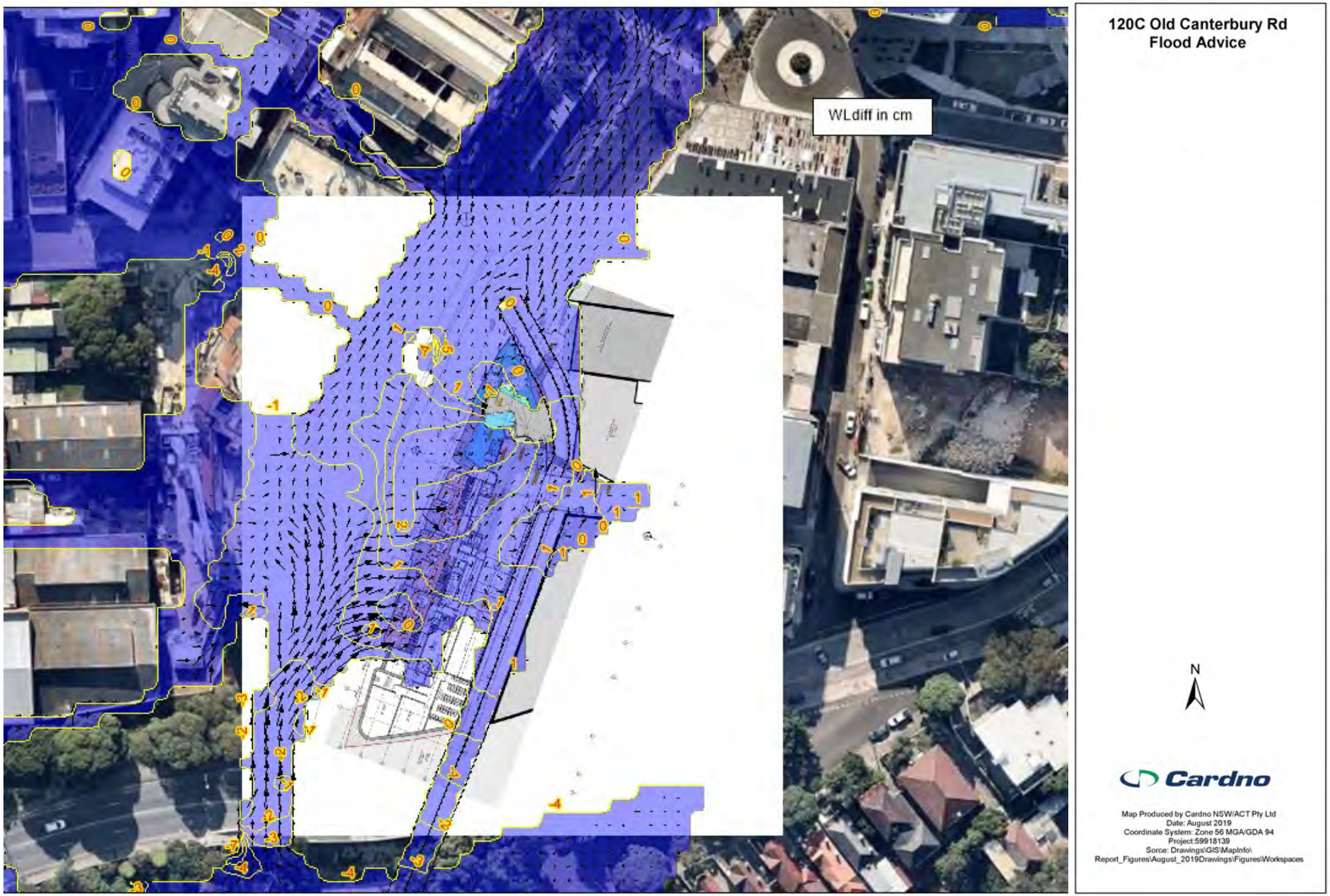


Figure 16 100 yr ARI Flood Level Differences (cm) – Future minus Benchmark Conditions

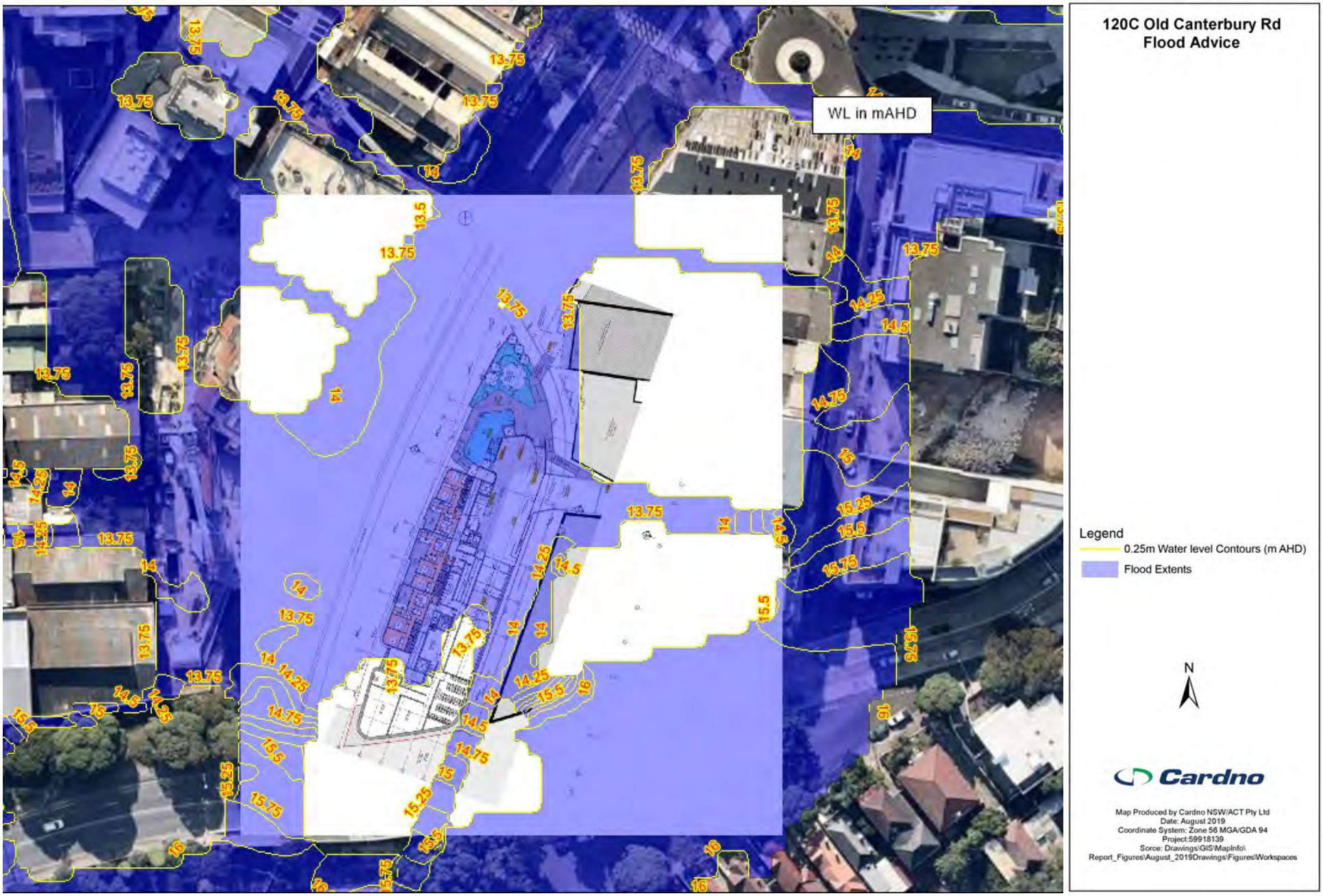


Figure 17 PMF Extents and Flood Levels (m AHD) – Future Conditions

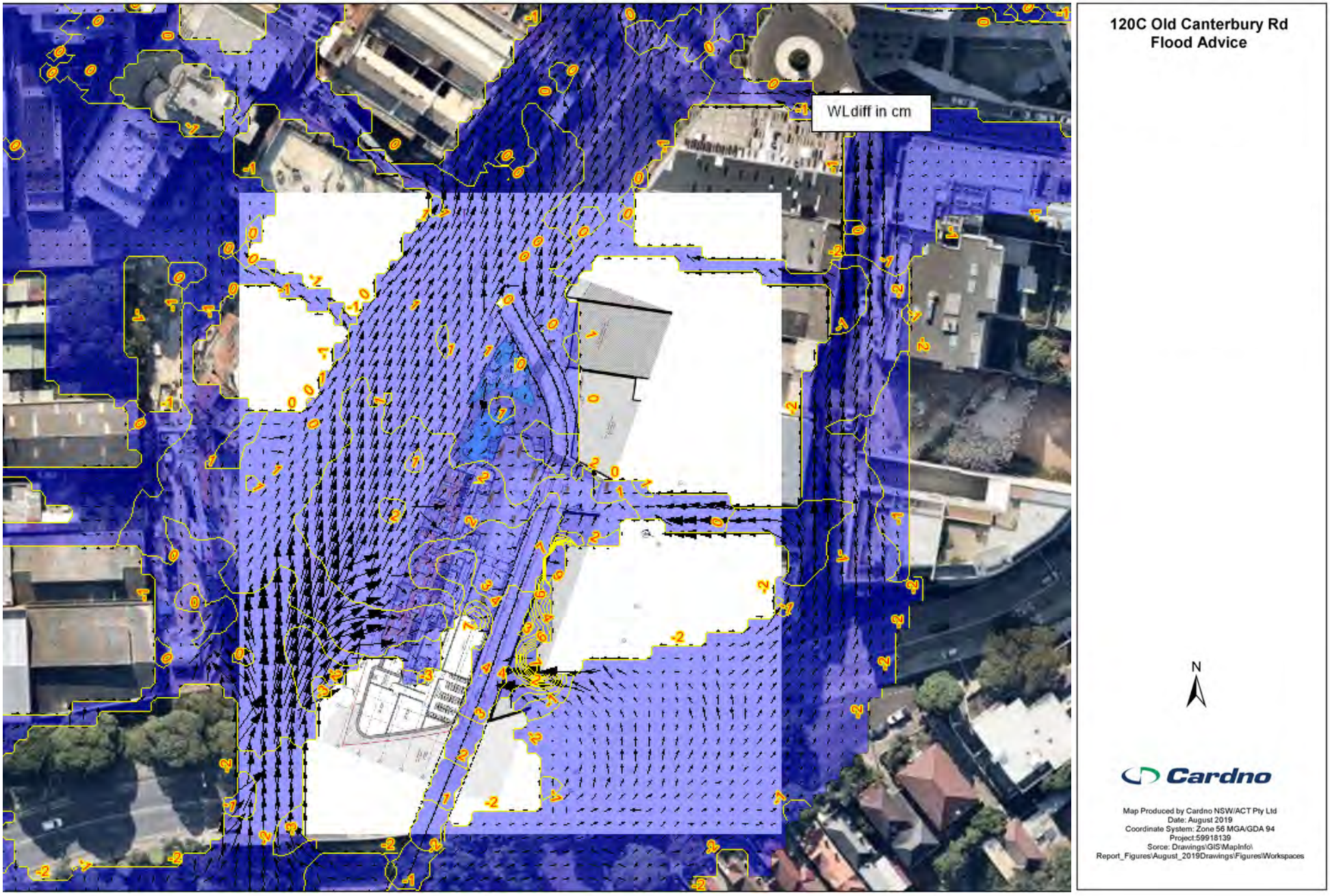


Figure 18 PMF Level Differences (cm) – Future minus Benchmark Conditions

Figure 19 Reference Locations

Figure XX Provisional Hydraulic Classification (after Figure 36, WMAwater, 2015)

120c Old Canterbury Road, Summer Hill

APPENDIX A
FLOOD CERTIFICATE JUNE 2016

Cardno
Shaping the Future

Mr Timperi
2 Tebbutt Street
Leichhardt, NSW 2040

L11105499_120C_OldCanterburyRd.docx

21 June 2016

Attention: Mr Timperi

Dear Rick,

Re: Flood Certificate for 120C Old Canterbury Road, Lewisham

Thank you for contacting WMAwater in regard to a flood certificate for the property located at the above referenced address. WMAwater completed the Hawthorne Canal Flood Study on behalf of Ashfield Council and Marrickville Council, within which area the property is located.

The site consists of Lot 1 in DP 817359 and Lot 100 in DP 875660; with the joint address of 120C Old Canterbury Road, Lewisham. It is bounded by Old Canterbury Road to the south, the light-rail line to the west, the open channel of Hawthorne Canal to the east, and the intersection of the light-rail line and the open channel at the north boundary of the site. Access to the site is via a privately owned and operated bridge across Hawthorne Canal with a right of carriageway through the adjacent property.

The current land use of the site is industrial and no impermeable buildings are currently located on the site. The Planning Proposal is for an increase in Floor Space Ratio (FSR), an increase in allowable building height and a rezoning of the site.

Figure 1 and Figure 2 attached shows the existing flood behaviour in the vicinity of the property for the 1% AEP event and the PMF event. Based on modelling results from the Flood Study, it is evident that 120C Old Canterbury Road is impacted by mainstream and overland flow.

Mainstream flow in the vicinity of the site originates from the open channel of Hawthorne Canal, located to the south-east of the site, and which travels in a northerly direction along the eastern boundary of the site. Overland flow approaches the site from the west; with overland flow originating from streets and properties to the west as well as from the light-rail underpass to the south-west of the site. Flow through the light-rail underpass occurs when the mainstream flow to the south of the Old Canterbury Road embankment exceeds the capacity of the constricting culvert and backwaters; with the increasing flood level and extent allowing flow to diverge through the light-rail underpass.

WMAwater Pty Ltd (Formerly Webb McKeown and Associates)

ABN 14 600 315 053

DIRECTORS
M K Babister BE(Hons), MEngSc GradDipMgt, FIEAust
R W Dewar BSc(Hons), MEngSc, MAIG, MIEAust
E J Askew BE(Hons), MIEAust
S D Gray BE, MEng

ASSOCIATES
R Hardwick Jones BE(Hons), MEngSc, MIEAust
M E Retallick BE(Hons), BSc, MIEAust

Level 2, 160 Clarence St, SYDNEY NSW 2000
Phone: 02 9299 2855 Fax: 02 9262 6208
Email: enquiry@wmawater.com.au
Website: wmawater.com.au

The peak flood depth on the site was found to be 5.7 m in the 1% AEP event and 7.9 m in the PMF event. The peak flood level was found to be:

- In the 1% AEP event: a minimum of 11.8 m AHD and a maximum of 12.3 m AHD; and
- In the PMF event: a minimum of 14.0 m AHD and a maximum of 14.4 m AHD.

COUNCIL POLICY

The Ashfield Council *Interim Flood Development Control Policy* (DCP) was adopted by Council on the 25th March 2014 and is applicable to this development proposal. From this:

Controls for new residential developments

- *(2.1) Floor levels of habitable rooms must be a minimum of 0.5m above the standard flood level at that location. For areas of minor overland flow (a flood depth of 300mm or less or overland flow of 2cum/sec or less) a lower freeboard of 300mm may be considered on its merits.*
- *(2.2) Any portion of buildings classified as being flood prone must be constructed from flood compatible materials.*
- *(2.3) Flood free access must be provided where practicable.*

Controls for new non-residential development

- *(5.1) Floor levels (except for access-ways) must be at least 0.5m above the standard flood level or the buildings must be flood-proofed to at least 0.5m above the standard flood level. For areas of minor overland flow (a flood depth of 300mm or less or overland flow of 2cum/sec or less) a lower freeboard of 300mm may be considered on its merits.*
- *(5.2) Flood free access must be provided where practicable.*

Controls for underground garages

- *(11.1) Freeboard protection of 500mm must be provided within the internal driveway prior to descending into the underground garage.*
- *(11.2) Suitable pumps must be provided within the garage to allow for drainage of stormwater should the underground garage become inundated during flooding.*
- *(11.3) Adequate flood warning systems, signage and exits must be available to allow safe and orderly evacuation without increased reliance upon the SES or other authorised emergency services personnel.*
- *(11.4) Reliable access for pedestrians or vehicles must be provided from the building, commencing at a minimum level equal to the lowest habitable floor level to an area of refuge above the PMF.*

FLOOD PLANNING LEVEL

Given the depth of flood affectation, the recommended freeboard is 0.5 m in addition to the 1% AEP peak flood level. Therefore the minimum level of 12.8 m AHD is applicable for:

- the entry levels to the underground car park facilities (this includes the driveway entry level, the ground floor entry level of stairs or lifts that will descend into the underground area and ventilation ducts);
- the floor level for residential dwellings; and
- the floor level or if not the floor level, the level below which the building should be flood-proofed with no sensitive equipment below this level for non-residential areas

Should you require any further clarification, please do not hesitate to contact the undersigned.

Yours Sincerely,
WMAwater

Erika Taylor
Project Engineer

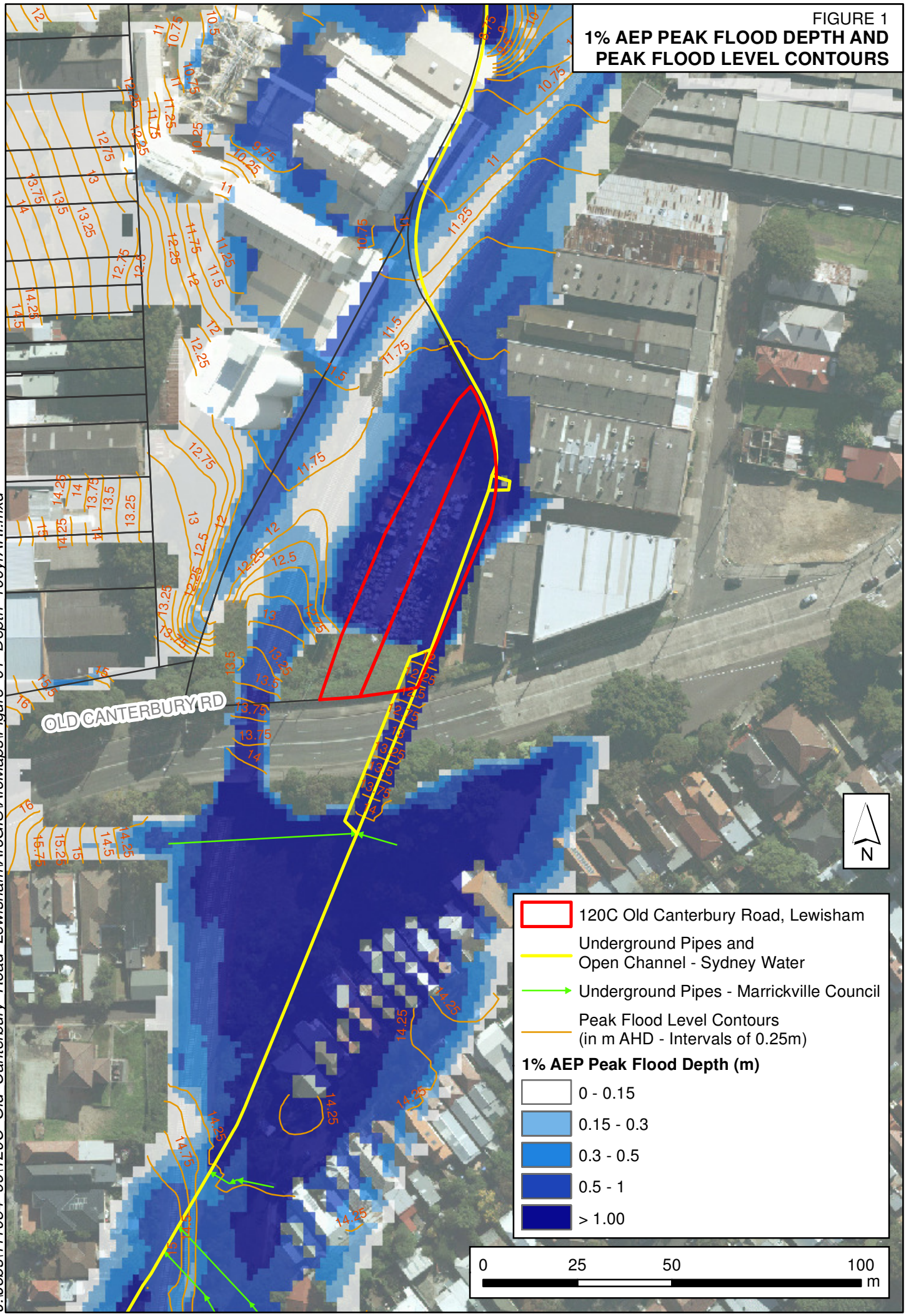
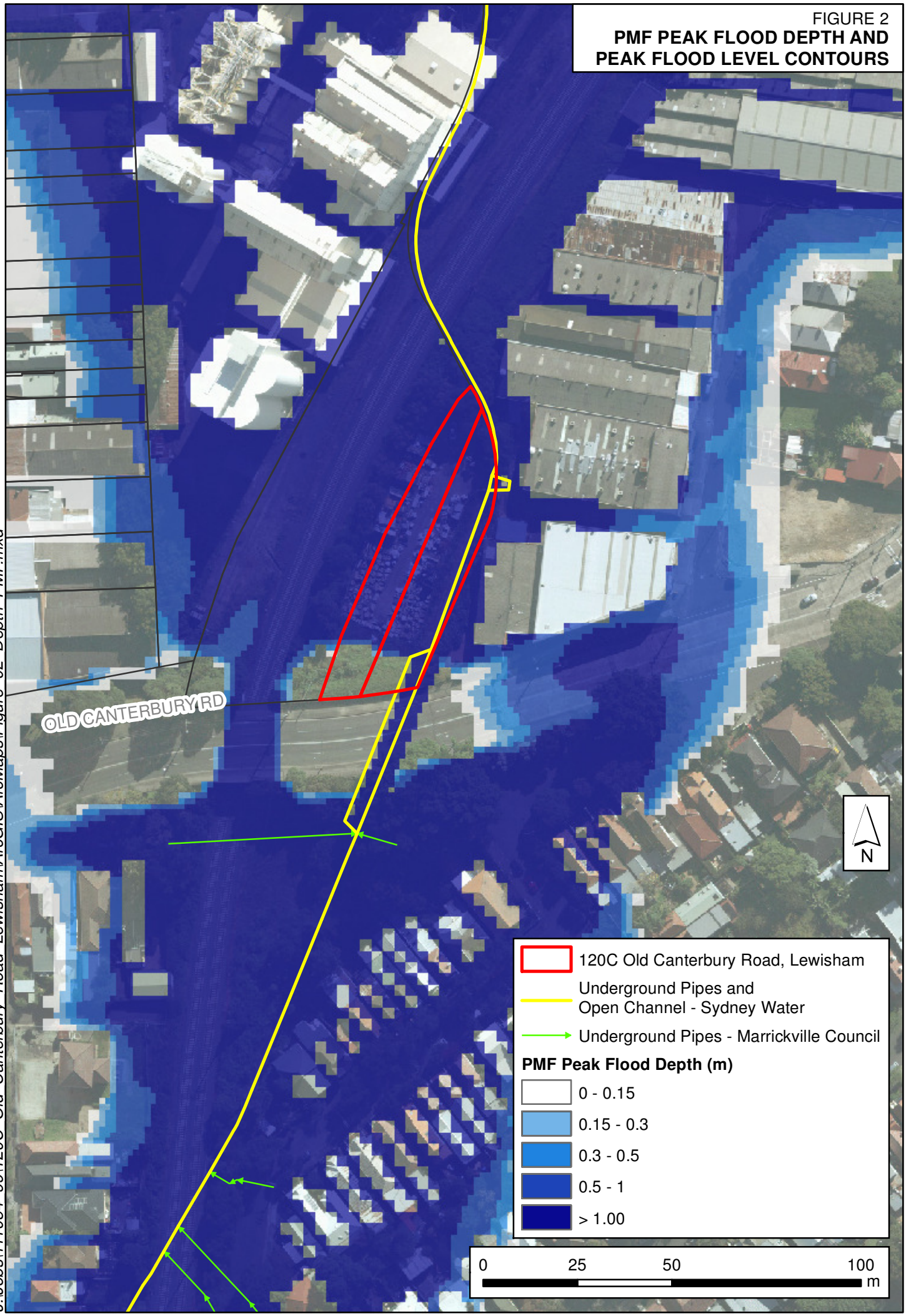


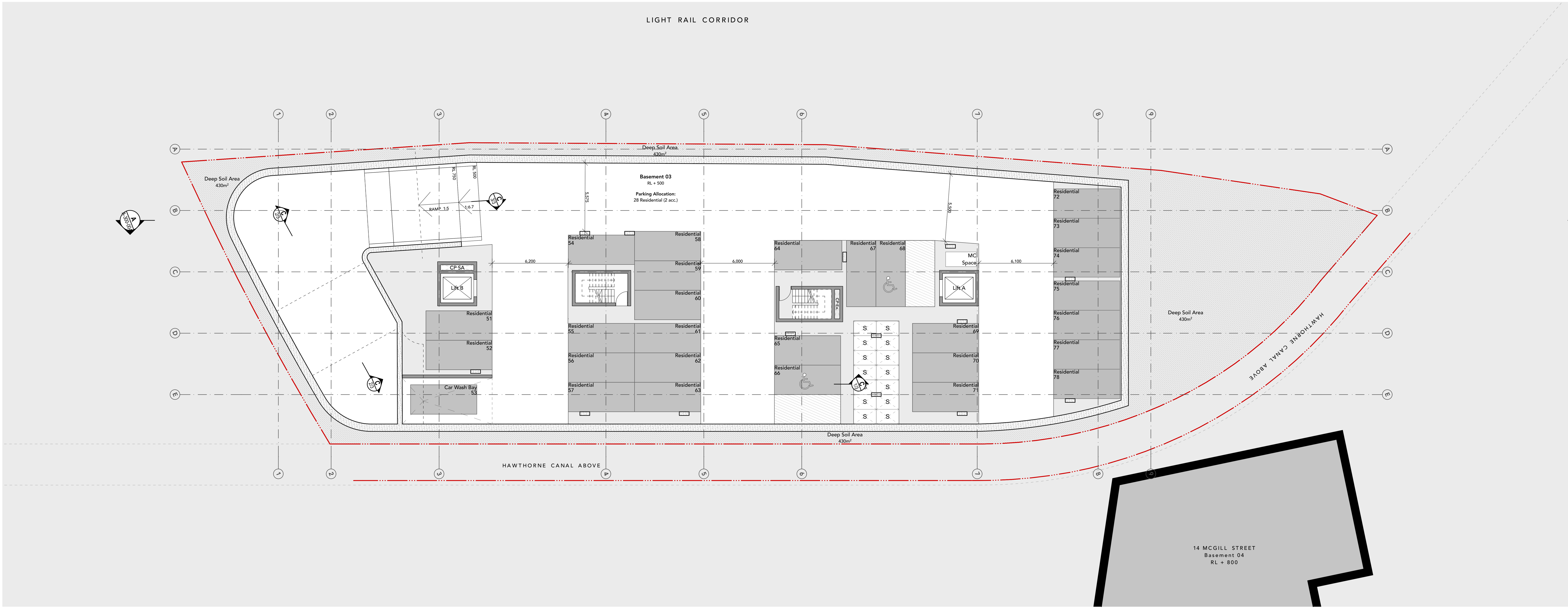
FIGURE 2
PMF PEAK FLOOD DEPTH AND PEAK FLOOD LEVEL CONTOURS

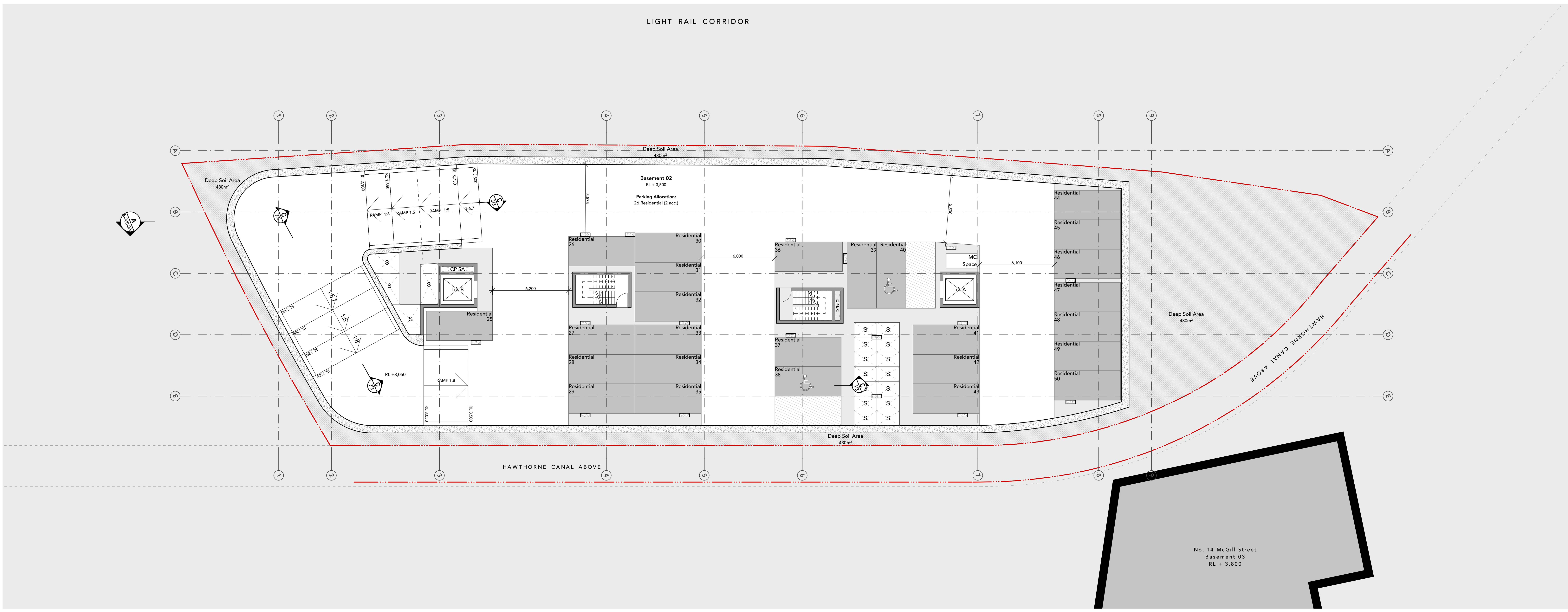


J:\Jobs\111054 99\120C Old Canterbury Road Lewisham\ArcGIS\ArcMaps\Figure 02 Depth PMF.mxd

120c Old Canterbury Road, Summer Hill

APPENDIX B
SELECTED ARCHITECTURAL DRAWINGS





Fox Johnston

Level 1, 268A Devonshire Street
Surry Hills
NSW 2010 AUSTRALIA
foxjohnston.com.au

T + 61 2 9211 2700
F + 61 2 9211 2785
ABN - 63111324353
contact@foxjohnston.com.au

Client
The Yard 120c

REV	DESCRIPTION	DRAWN	Issue Date
DA11	DA for Final Coordination	BW	24/5/20

REV	DESCRIPTION	DRAWN	Issue Date

ALL LEVELS TO AUSTRALIAN HEIGHT DATUM.

IT IS THE CONTRACTORS RESPONSIBILITY TO CONFIRM ALL MEASUREMENTS ON SITE PRIOR TO COMMENCEMENT OF WORK. DRAWINGS SHOULD NOT BE SCALED. WRITTEN DIMENSIONS ONLY SHOULD BE TAKEN FROM DRAWINGS. ALL DIMENSIONING IS TO SUBSTRATE BRICKWORK / BLOCKWORK UNLESS OTHERWISE NOTED.

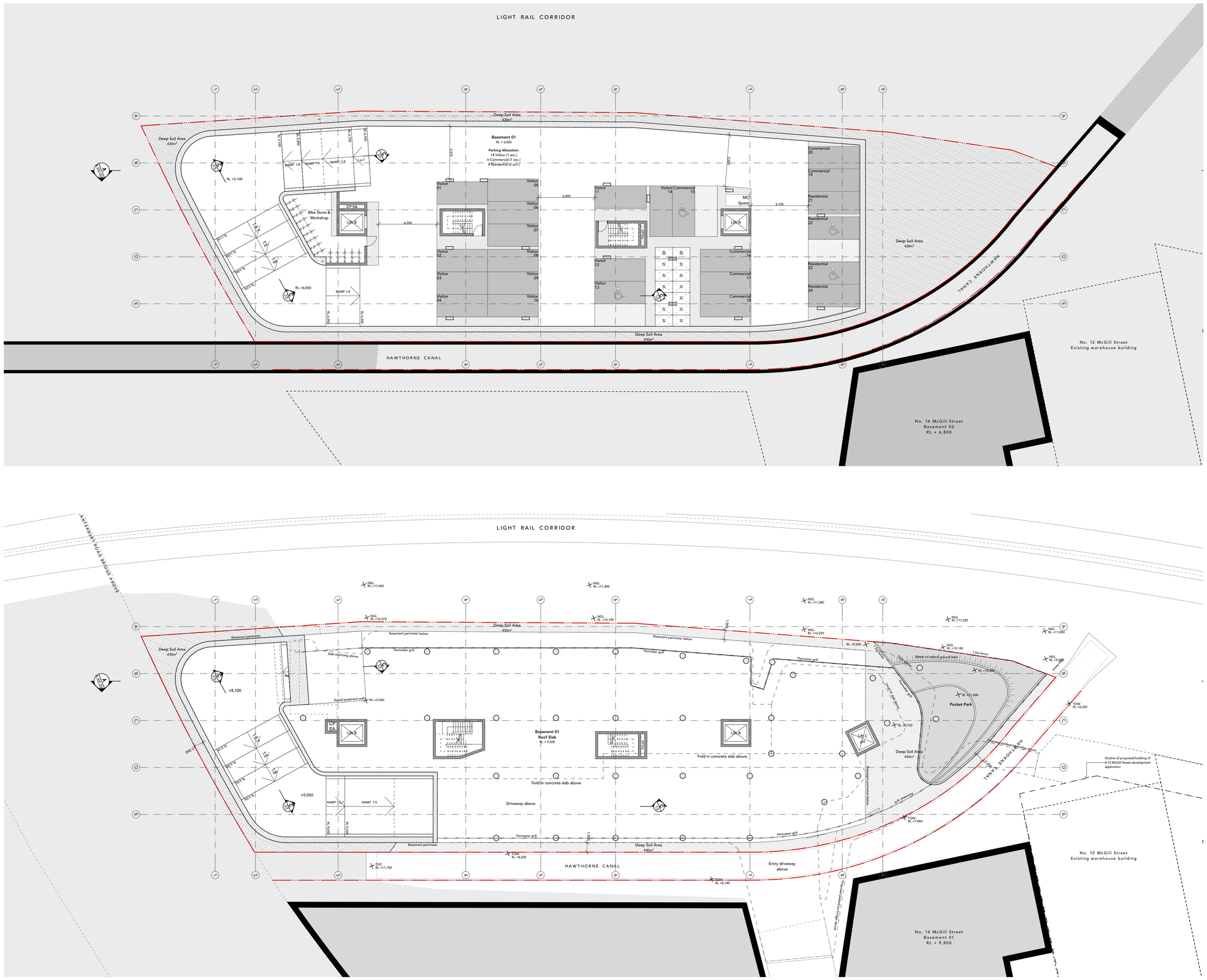
Project
120C Old Canterbury Road_Summer Hill

Title
Basement 2 & 3

Job No.	#Pln
Scale	1:200 @ A1
Date	22.05.20
Drawn/Checked	BW/ CJ

Dwg No. **A-200-001**
Rev. **DA11**

Document Set ID: 33989840
Version: 1, Version Date: 25/09/2020



Fox Johnston

Level 1, 268A Devonshire Street
Surry Hills
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foxjohnston.com.au

T + 61 2 9211 2700
F + 61 2 9211 2785
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contact@foxjohnston.com.au

Client
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REV	DESCRIPTION	DRAWN	Issue Date
DA11	DA for Final Coordination	BW	24/5/20

REV	DESCRIPTION	DRAWN	Issue Date

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Project
120C Old Canterbury Road_Summer Hill

Title
Basement 1 & Ground Level

Job No.	#Ph
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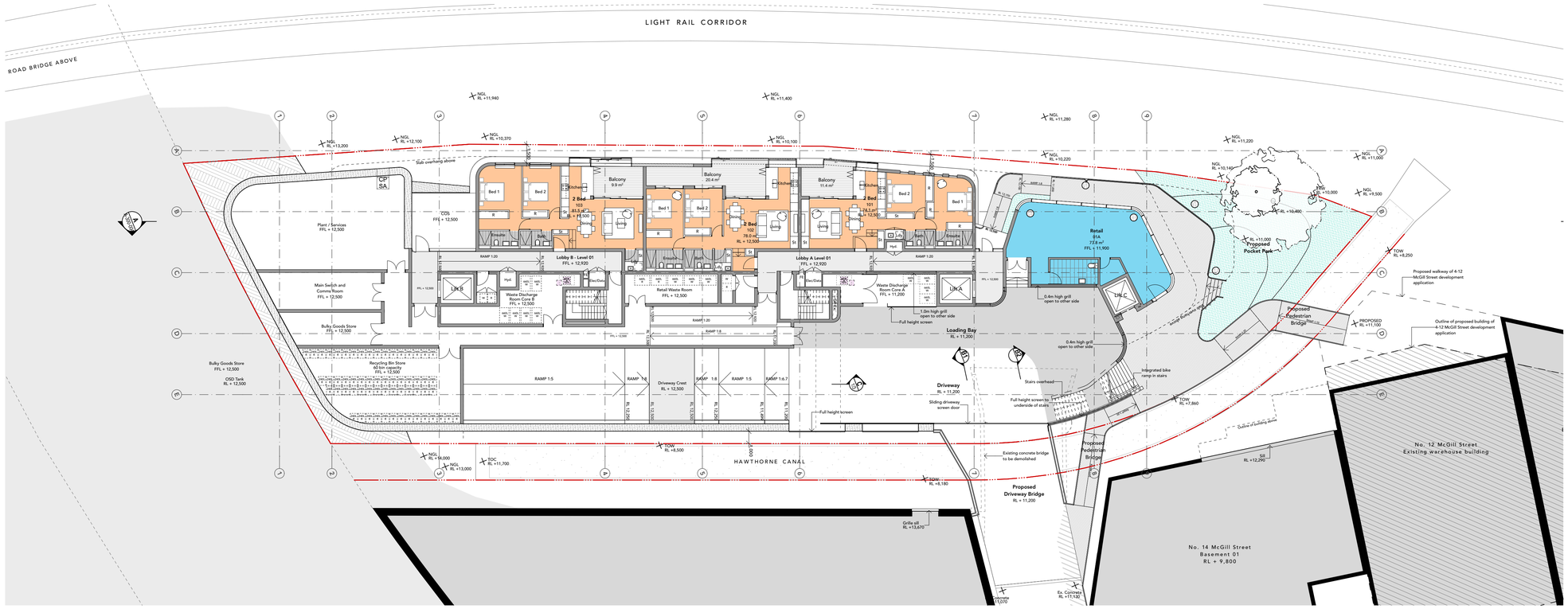
Date	22.05.20
Drawn/Checked	BW/ CJ

Dwg No. **A-200-002** Rev. **DA11**



Fox Johnston

Level 1, 268A Devonshire Street
Surry Hills
NSW 2010 AUSTRALIA
foxjohnston.com.au

T + 61 2 9211 2700
F + 61 2 9211 2785
ABN + 63111324353
contact@foxjohnston.com.au

Client
The Yard 120c

REV	DESCRIPTION	DRAWN	Issue Date
DA11	DA for Final Coordination	BW	24/5/20

ALL LEVELS TO AUSTRALIAN HEIGHT DATUM.

IT IS THE CONTRACTORS RESPONSIBILITY TO CONFIRM ALL MEASUREMENTS ON SITE PRIOR TO COMMENCEMENT OF WORK. DRAWINGS SHOULD NOT BE SCALED. WRITTEN DIMENSIONS ONLY SHOULD BE TAKEN FROM DRAWINGS. ALL DIMENSIONING IS TO SUBSTRATE BRICKWORK / BLOCKWORK UNLESS OTHERWISE NOTED.

Project
120C Old Canterbury Road_Summer Hill

Title
Level 01 & Level 02

Job No.	#Ph
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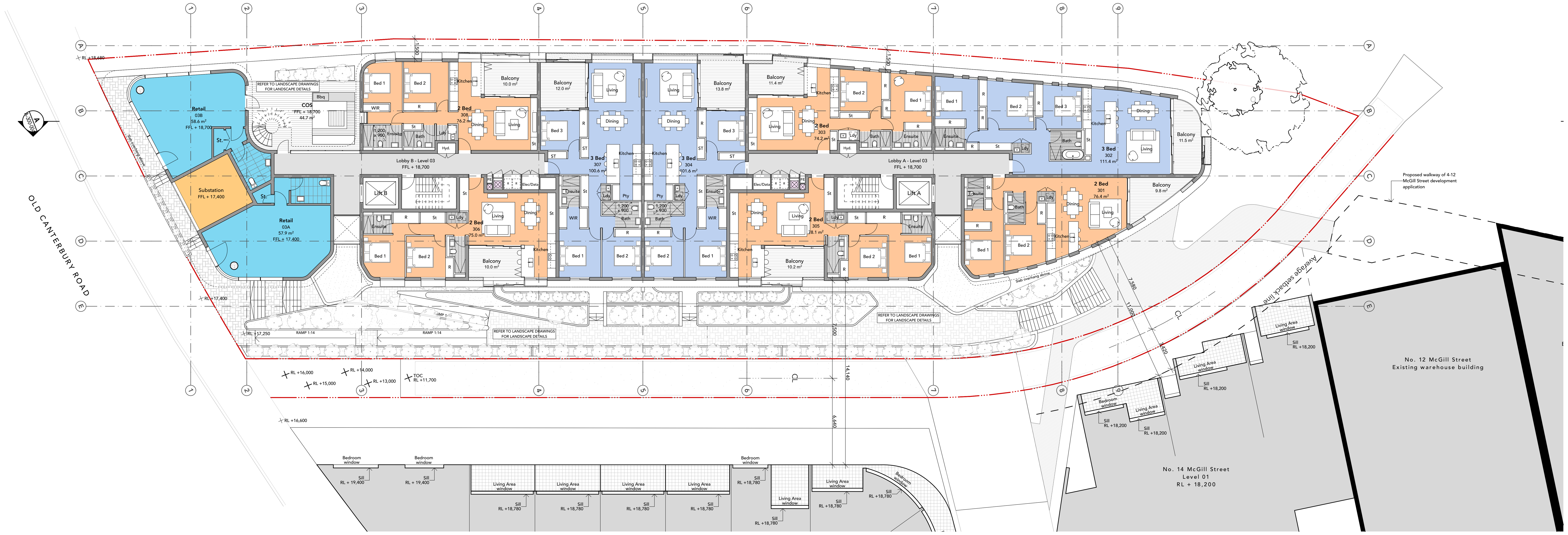
Date	22.05.20
Drawn/Checked	BW/ CJ

Dwg No. **A-200-003** Rev. **DA11**



Fox Johnston

Level 1, 268A Devonshire Street
Surry Hills
NSW 2010 AUSTRALIA
foxjohnston.com.au

T + 61 2 9211 2700
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Client
The Yard 120c

REV	DESCRIPTION	DRAWN	Issue Date
DA11	DA for Final Coordination	BW	24/5/20

REV	DESCRIPTION	DRAWN	Issue Date

ALL LEVELS TO AUSTRALIAN HEIGHT DATUM.

IT IS THE CONTRACTORS RESPONSIBILITY TO CONFIRM ALL MEASUREMENTS ON SITE PRIOR TO COMMENCEMENT OF WORK. DRAWINGS SHOULD NOT BE SCALED. WRITTEN DIMENSIONS ONLY SHOULD BE TAKEN FROM DRAWINGS. ALL DIMENSIONING IS TO SUBSTRATE BRICKWORK / BLOCKWORK UNLESS OTHERWISE NOTED.

Project
120C Old Canterbury Road_Summer Hill

Title
Level 03& Level 04

Job No.	#Pln
Scale	1:200 @ A1
Date	22.05.20
Drawn/Checked	BW/ CJ

Dwg No. **A-200-004**
Rev. **DA11**

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Fox Johnston

Level 1, 268A Devonshire Street
Surry Hills
NSW 2010 AUSTRALIA
foxjohnston.com.au

T + 61 2 9211 2700
F + 61 2 9211 2785
ABN - 63111324353
contact@foxjohnston.com.au

Client
The Yard 120c

REV	DESCRIPTION	DRAWN	Issue Date
DA11	DA for Final Coordination	BW	24/5/20

REV	DESCRIPTION	DRAWN	Issue Date

ALL LEVELS TO AUSTRALIAN HEIGHT DATUM.

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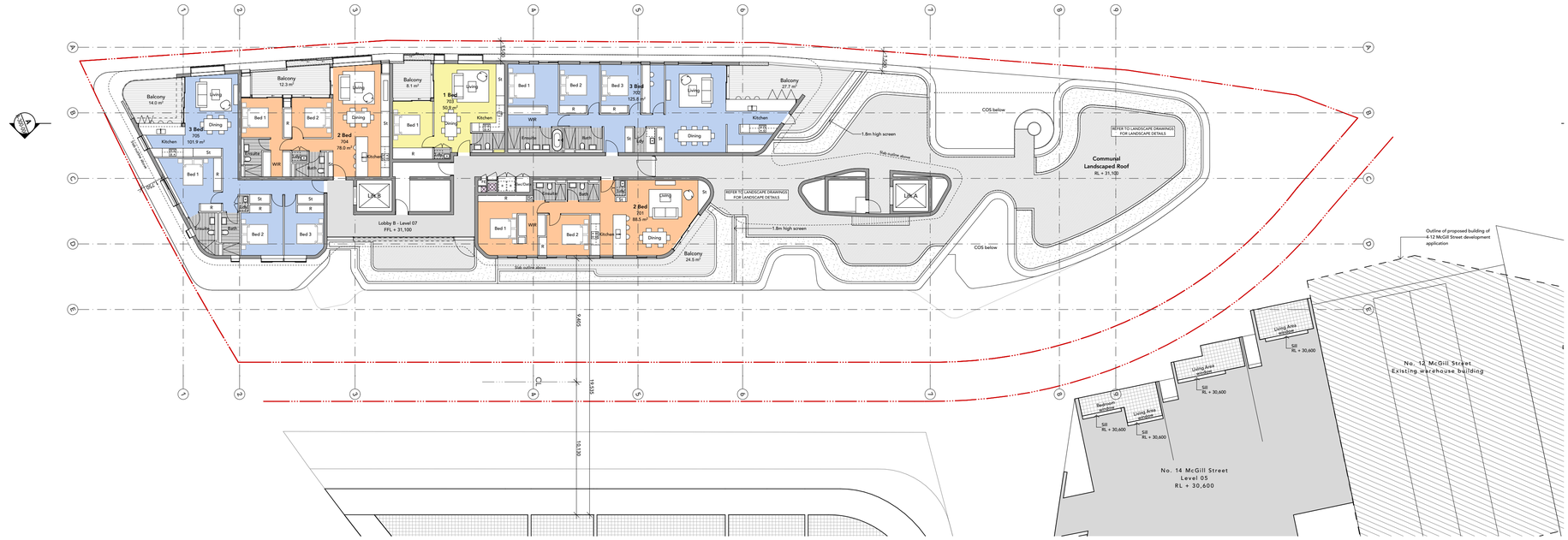
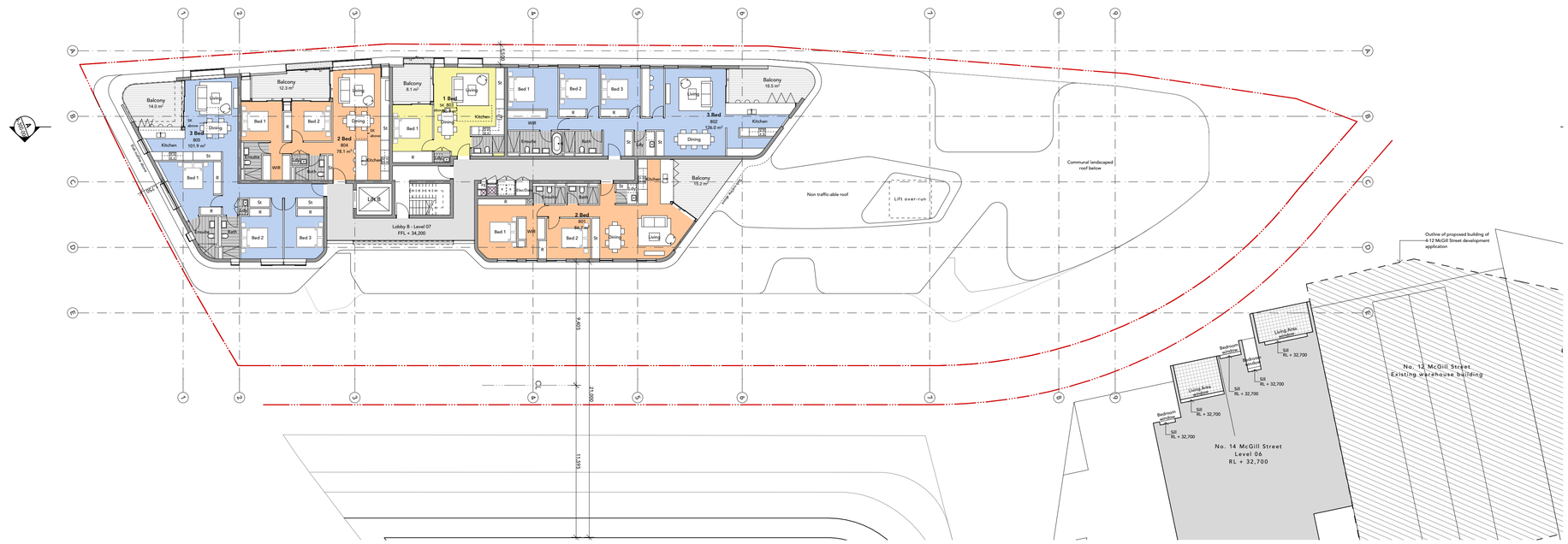
Project
120C Old Canterbury Road_Summer Hill

Title
Level 05 & Level 06

Job No.	#Ph
Scale	1:200 @ A1
Date	22.05.20
Drawn/Checked	BW CJ

Dwg No. **A-200-005** Rev. **DA11**





Fox Johnston

Level 1, 268A Devonshire Street
Surry Hills
NSW 2010 AUSTRALIA
foxjohnston.com.au

T + 61 2 9211 2700
F + 61 2 9211 2785
ABN - 63111324353
contact@foxjohnston.com.au

Client
The Yard 120c

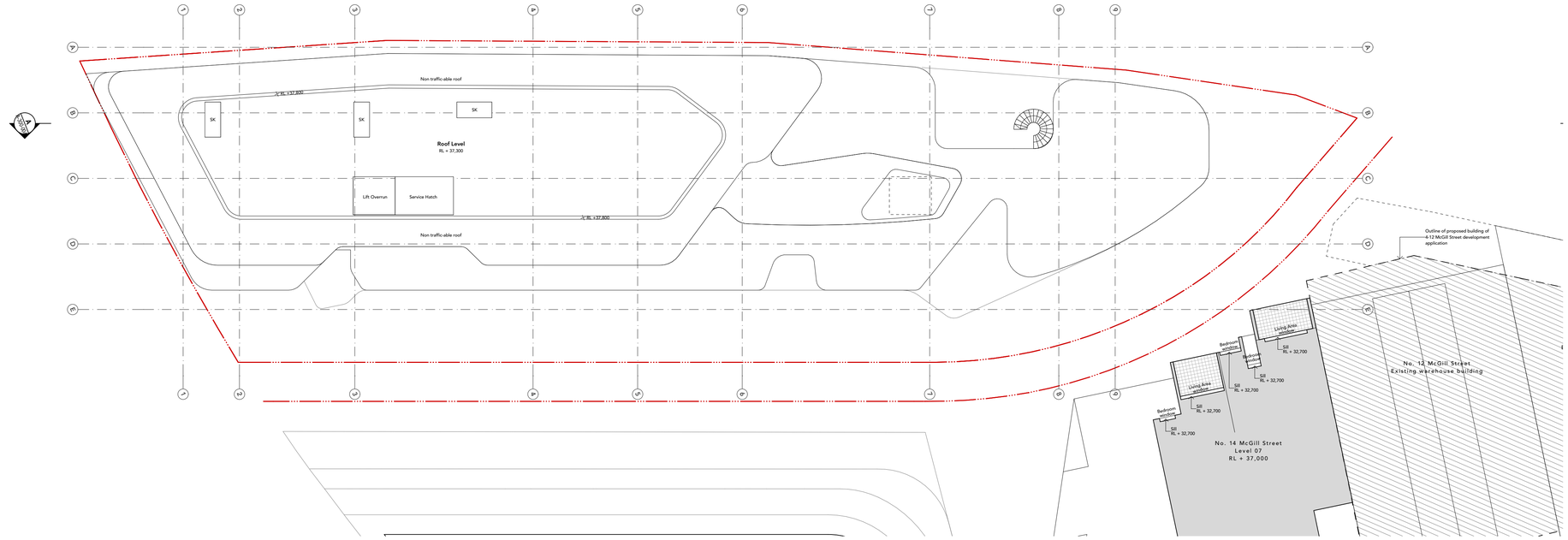
REV	DESCRIPTION	DRAWN	Issue Date	REV	DESCRIPTION	DRAWN	Issue Date
DA11	DA for Final Coordination	BW	24/5/20				

Project
120C Old Canterbury Road_Summer Hill

Title
Level 07 & Level 08

Job No.	#Ph
Scale	1:200 @ A1
Date	22.05.20
Drawn/Checked	BW CJ

Dwg No. **A-200-006** Rev. **DA11**



Fox Johnston

Level 1, 268A Devonshire Street
Surry Hills
NSW 2010 AUSTRALIA
foxjohnston.com.au

T + 61 2 9211 2700
F + 61 2 9211 2785
ABN - 63111324353
contact@foxjohnston.com.au

Client
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REV	DESCRIPTION	DRAWN	Issue Date
DA11	DA for Final Coordination	BW	24/5/20

REV	DESCRIPTION	DRAWN	Issue Date

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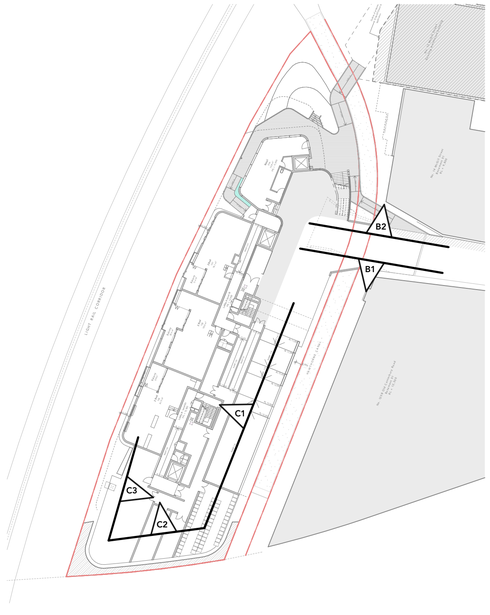
Project
120C Old Canterbury Road_Summer Hill

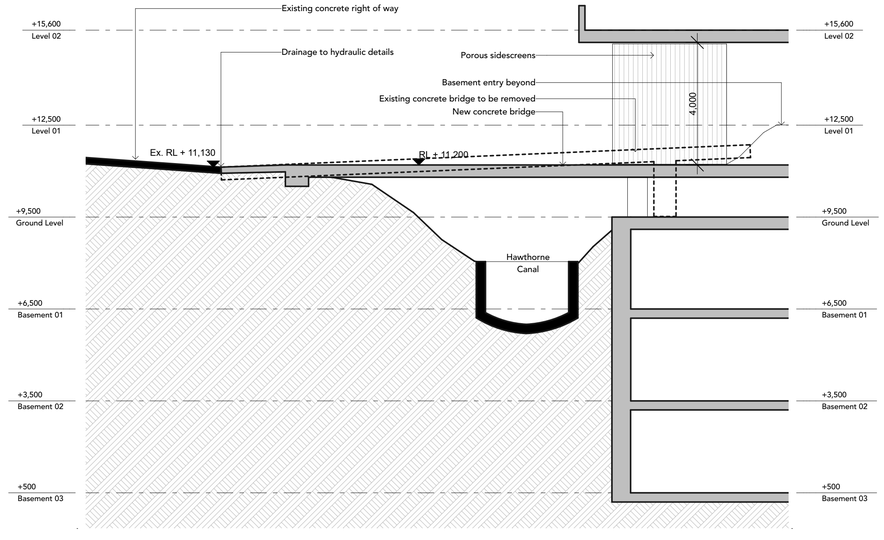
Title
Roof Level

Job No.	#Pn
Scale	1:200 @ A1
Date	22.05.20
Drawn/Checked	BW/ CJ

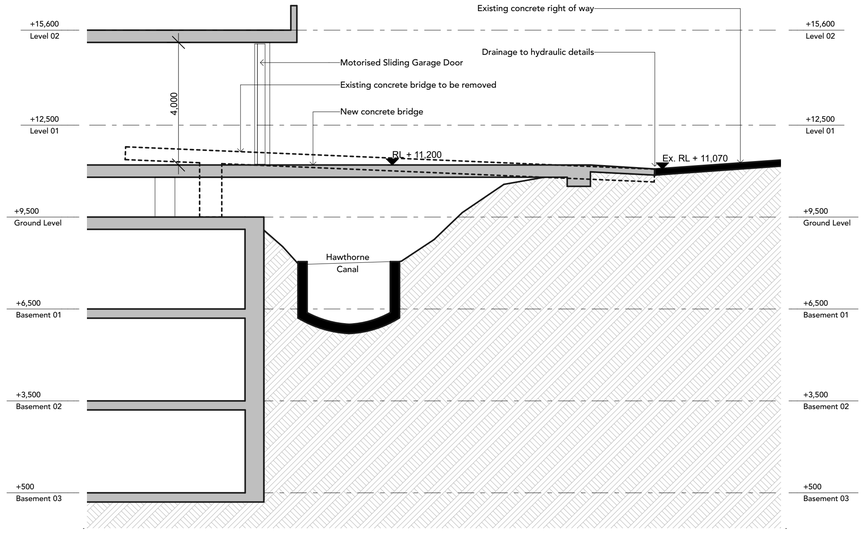
Dwg No. **A-200-007** Rev. **DA11**



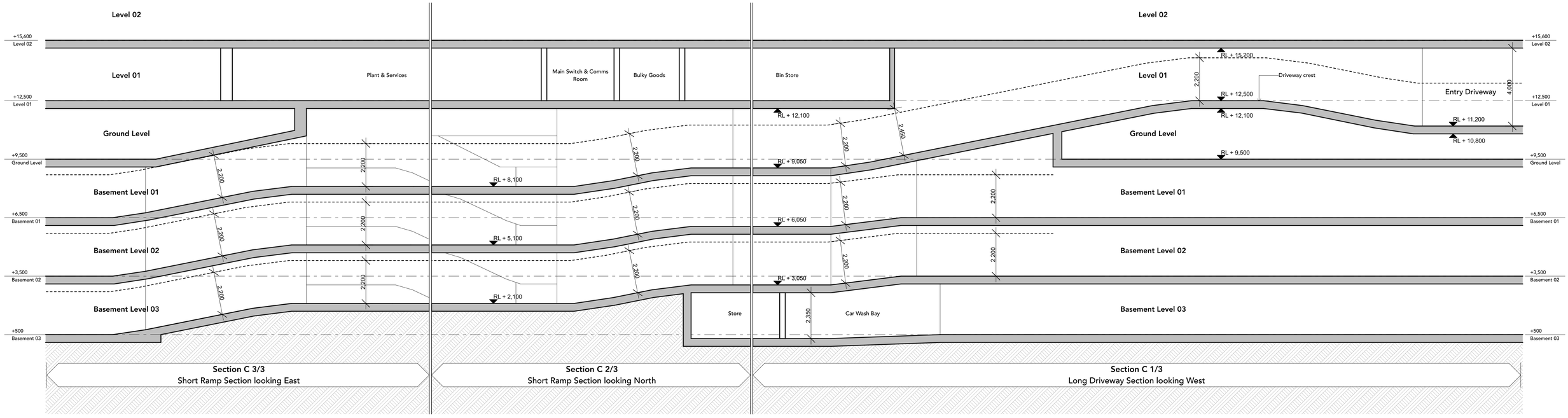
Key Map



B1 Driveway Section Scale @ A1 1:100



B2 Driveway Section Scale @ A1 1:100



C Basement Ramps Section Scale @ A1 1:100

Fox Johnston
Level 1, 268A Devonshire Street
Surry Hills
NSW 2010 AUSTRALIA
foxjohnston.com.au
T + 61 2 9211 2700
F + 61 2 9211 2785
ABN - 63111324353
contact@foxjohnston.com.au

Client
The Yard 120c

REV	DESCRIPTION	DRAWN	DATE
DA11	DA for Final Coordination	BW	22.05.20

REV	DESCRIPTION	DRAWN	DATE

Project
120C Old Canterbury Road_Summer Hill
Title
Sections B & C - Ramp & Driveway Levels

Job No.	#Pn
Scale	1:100, 1:500 @ A1
Date	22.05.20
Drawn/Checked	BW/ CJ

Dwg No. A-300-005 Rev. DA11