Our Ref: 8001702601-L01:BCP/bcp
Contact: Dr Brett C. Phillips

23rd April 2021

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The Manager
Scentre Group
GPO Box 4004
SYDNEY NSW 2001

Attention: Blake Kendall

Dear Blake,

STAGE 2B REDEVELOPMENT FLOOD IMPACT ASSESSMENT

Cardno was engaged by Scentre Group to assist in the preparation of a Development Application for Stage 2B of the Warringah Mall project to be submitted to the Northern Beaches Council. The proposed works comprise:

Stage 2B – Mini Major Loading Dock

- Partial demo of existing pedestrian paths and minor kerbing & pedestrian path changes.
- New post & fence screening and minor landscape works to partially screen loading dock from Condamine Street.
- Extend hardstand north to existing Target
- New cantilevered canopy approx. 5m. off existing façade.

The location of the proposed Stage 2B works and in relation to the 1% AEP flood extents is given in **Attachment A**.

The locations of the flood level reference points are given in **Attachment B**.

The chronology of flooding assessment that have been previously undertaken at Warringah Mall is overviewed in **Attachment C**.

The relevant 1% AEP flood levels at reference locations 189, 190 and 191 (refer **Attachment B**) after the completion of the overall augmentation scheme for Warringah Mall are as follows:

Location	1% AEP Flood Level
189	9.27 m AHD
190	9.24 m AHD
191	9.16 m AHD

As part of the proposed works there will be local regrading of the loading dock area which will tie into existing

pavement levels. These local regrading works will extend into the fringe of the 1% AEP flood.

The indicative impact of the local regrading was assessed based on a representative cross section through the loading dock entry and across the full width of the overland flowpath. A comparison of the conveyance under current conditions and with the local regrading works disclosed that the local impact on the 1% AEP flood level in the vicinity of the Stage 2B works would be a local increase of no more than 0.01 m.

It was also estimated that the proposed local regarding will locally reduce 1% AEP flood storage by around 2.8 m^3.

It is concluded that the proposed Stage 2B works will have a negligible impact on 1% AEP flooding in Warringah Mall and that any impact will be confined to the overland flowpath through Warringah Mall.

Yours faithfully

Brett C. Phillips

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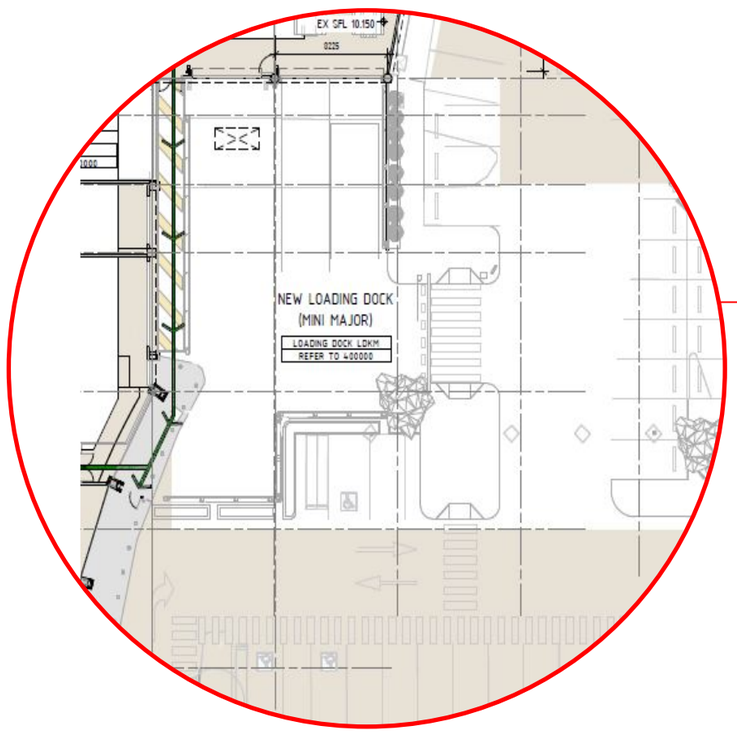
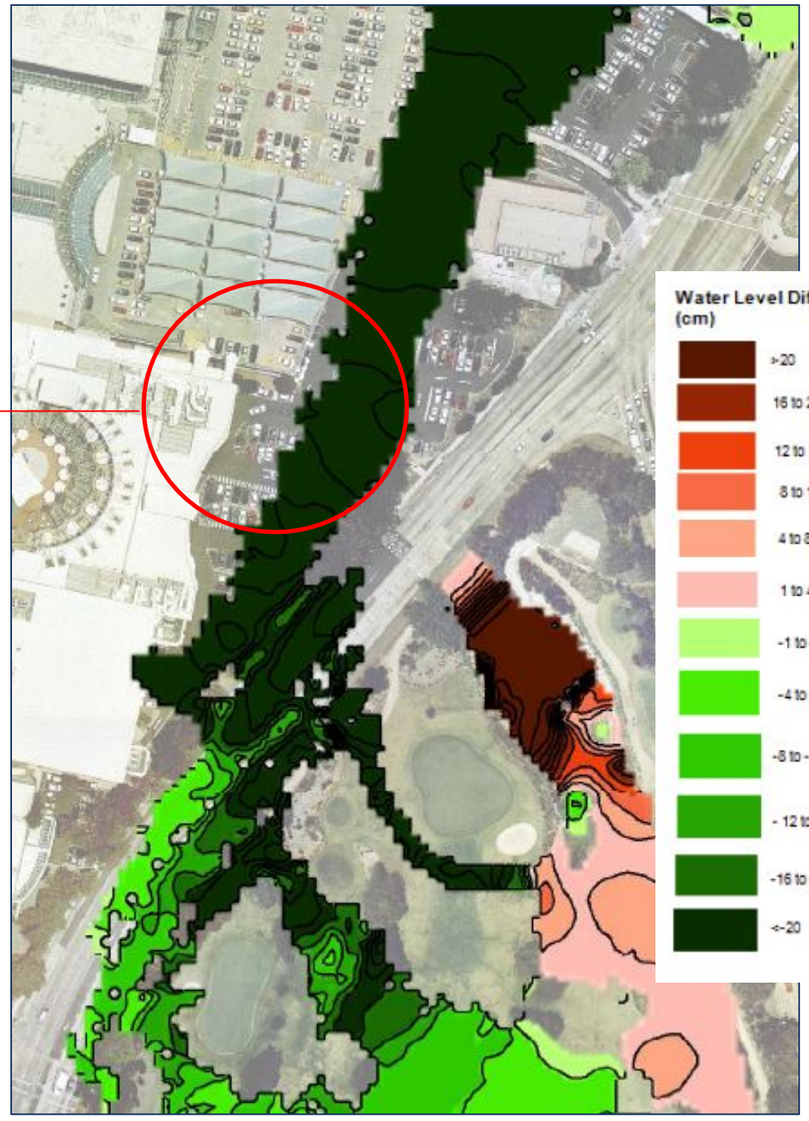
Dr Brett C. Phillips
Senior Principal,
for **Cardno**

2015 08 21 Updated S96 Results



0% Blockage Case



50% Blockage Case

Attachment B

ATTACHMENT C

PREVIOUS STUDIES

C.1 Introduction

Warringah Mall is a major regional shopping centre located within the Brookvale Creek catchment in the Sydney's northern suburbs. Prior to 2004 it was identified that under existing conditions Warringah Mall is flooded by overland flows and overflows from Brookvale Creek in major storms.

The land uses within the Brookvale Creek catchment include residential and industrial/commercial developments as well as a significant area of bushland known as Allenby Reserve (see **Figure C1**).

The 2006 Peninsula Industrial Estate Floodplain Management Study assessed flooding under existing conditions and the merits of a number of structural management options that could achieve a balance between reducing flood hazard and flood damages and protecting the environment of the Brookvale Creek floodplain.

In December 2006 Warringah Council requested an assessment of options for the Warringah Mall site that did not have any liability costs for Council. A 2007 report titled Managing Flooding of Warringah Mall assessed four schemes (Cardno Willing, 2007). . Schemes 1 and 2 were based on constructing a basin in Allenby Reserve on alternative sites plus limited drainage augmentation works in the Peninsula Industrial Estate. Schemes 3 and 4 were Schemes 1 and 2 plus additional drainage augmentation works in Warringah Mall respectively. A multi-criteria assessment of the four schemes concluded that Scheme 3 achieved the greatest reductions in the estimated population at risk and flood damages in the Peninsula Industrial Estate, Warringah Mall and it's at-grade car parks. A key component of Scheme 3 was the proposed Allenby Reserve Basin (Option A2).

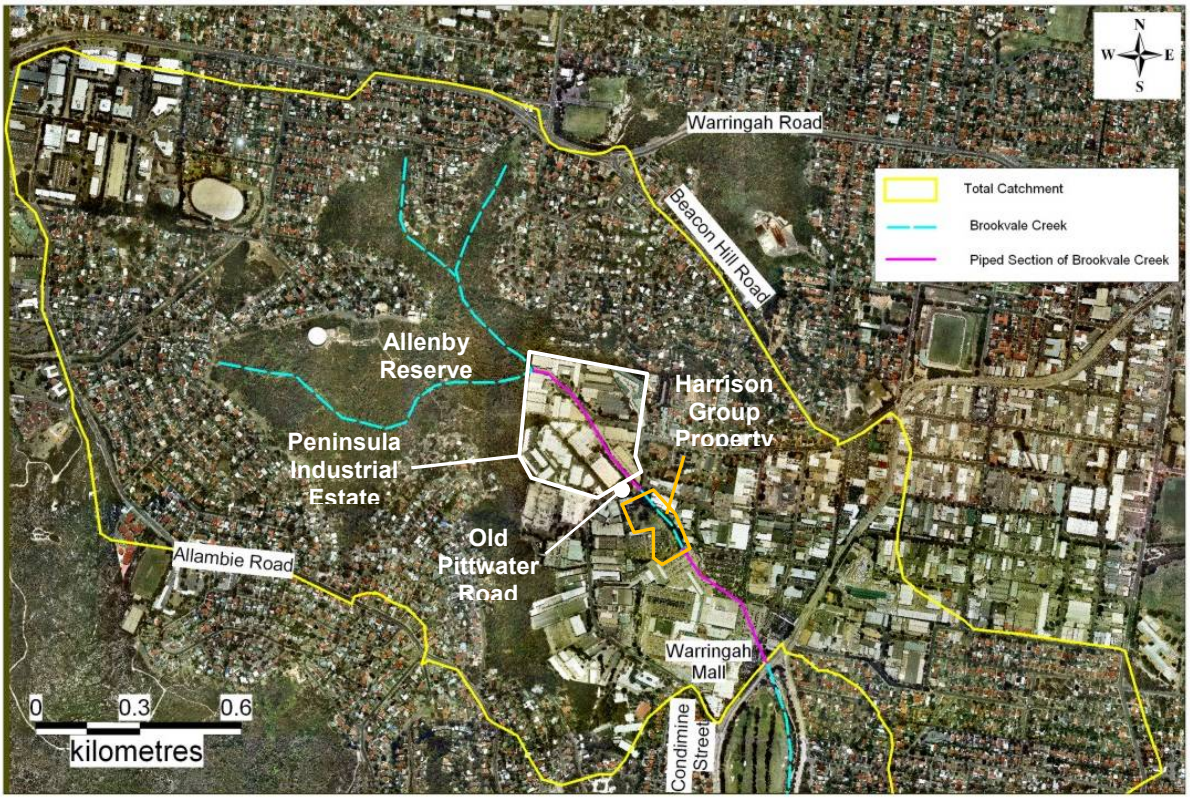


Figure C1 Open and Piped Reaches of Brookvale Creek and its Catchment

However, Warringah Council advised that it would not support Scheme 3 because in its view the public benefits did not outweigh its concerns regarding the location of the basin within the reserve and its potential adverse environmental impacts. Consequently, the co-owners of Warringah Mall need to implement a scheme of works within Warringah Mall that reduces overland flooding along the primary overland flowpath during a 100 yr ARI event to a Low Hazard rating without any upstream works.

Subsequently, in December 2008 a report titled Warringah Mall Flood Impact Assessment was submitted to Council as part of a series of documents supporting two Development Applications that were submitted to Council (Cardno Willing, 2008). These Development Applications covered proposed stormwater augmentation works within the Warringah Mall site and as part of a First Stage Retail development.

In April 2009 Council engaged an external Peer Reviewer to review the hydrological and hydraulic assessments and the proposed stormwater augmentation stormwater works. The floodplain model was updated in accordance with discussions with Council and its Peer Reviewer and the sensitivity of 100 yr ARI flooding at Warringah Mall to inlet blockage, pit losses and works proposed for the Palm Tree Car Park was tested. The final values of floodplain model parameters were agreed as part of the peer review process. The final model was then run to identify final amendments to the augmentation works to meet Council's requirements.

C.1 Existing Flood Behaviour

As discussed by MHL, 1992 and Webb McKeown, 2001 there are no recorded streamflow data for Brookvale Creek. Likewise there are no water level recorders within the study area. A very limited number of observed flood levels were available for historical major rainfall events in March 1975, March 1977, February 1986, January 1989 and April 1992.

Almost all of the historical flood levels were observed at a single location within the Harrison Group property located at 71-79 Old Pittwater Road located immediately upstream of Warringah Mall (see **Figure 2**).

C.1.1 Hydrology

The hydrological analyses undertaken included the:

- Collation and review of historical storms and flood events in the Brookvale Creek catchment;
- Calibration of a previously assembled hydrological model (**xprafts**) of the catchment against historical data when available and against estimates of historical peak flows reported by Webb McKeown & Associates, 2001;
- Estimation of historical peak flows at key locations in the Brookvale Creek catchment in order to assess the severity of historical storms in comparison with design storms. The inferred severity of a number of historical storms was as follows: March 1975 (20 yr ARI), March 1977 (2 yr ARI), February 1986 (5 yr ARI), January 1989 (20 yr ARI) and April 1992 (10 yr ARI);
- Estimation of design flood hydrographs at key locations in the Brookvale Creek catchment for the 20yr ARI, 50yr ARI, 100yr ARI, 10,000yr ARI, 100,000 yr ARI and Probable Maximum Flood (PMF) events for input into the floodplain model, and the
- Assessment of a number of basin options.

C.1.2 Hydraulics

A unified 1D and 2D **xpswmm2D** model of the Brookvale Creek floodplain including the drainage systems and overland flowpaths between Kentwell Road (located around 800 m downstream of Candamine Street) and Allenby Reserve (upstream) was assembled. The Brookvale Creek channel between Old Pittwater Road and Warringah Mall through the Harrison Group property (refer Figure 1) was also modelled as a 1D section linked to the 2D floodplain to provide better definition of the channel geometry.

Within the limits of the available information the model was calibrated using available historical flood levels. This model was then run to estimate the flood levels and flow velocities at key locations on the Brookvale Creek floodplain for the 20 yr ARI, 50 yr ARI, 100 yr ARI, 10,000 yr ARI, 100,000 yr ARI and PMF design storms design storms under existing conditions and 20 yr ARI, 50 yr ARI, 100 yr ARI design storms with various flood mitigation measures in place.

C.1.3 Calibration

The hydrological model was not calibrated directly against historical flow data but was instead compared with historical flood estimates. Similarly the hydraulic model was only calibrated against flood levels observed at a single location as summarised in **Table C1**. Where appropriate the models were configured so as to be consistent with previous models. Similar model parameters and values were adopted where appropriate.

The estimated 100 yr ARI design flood depths under existing conditions are presented in **Figure C2**.

Table C1
Comparison of Observed and Predicted Historical Flood Levels at 71-79 Old Pittwater Rd

		Estimated Peak Flood Level (m AHD)			
Storm	**Recorded Peak Flood Levels (m HAD)**	2001 Study	Difference (cm)	2007 Study	Difference (cm)
Apr-92	12.78 m AHD	12.6 - 12.7	- 17 to -7	12.80	+ 2
Jan-89	12.82 m AHD (after Powter, 1989	12.7 - 12.9	-12 to +8	12.75	-7
Feb-86	12.37 m AHD (after Powter, 1989) 12.44 m AHD (after W L Blackhouse, 2000)	12.2 - 12.4	-24 to +3	12.50	-13 to - 6
Mar-77	12.80 m AHD (after Powter, 1989)	12.2 - 12.3	-67 to -50	12.40	-47 to -40
	12.87 m AHD (after W L Blackhouse, 2000)				
Mar-75	13.03 m AHD (after Powter, 1989)	12.8 - 12.9	-23 to -13	12.85	- 18

C.2 Stormwater Augmentation

A proposed augmentation scheme is described in Cardno Willing, 2008. The 2008 scheme evolved based on consideration of the need to minimise flood impacts on the land adjoining the upstream boundary of Warringah Mall (the Harrison Group property) and the need to minimise or if possible eliminate the need for any augmentation works on the adjoining upstream property to direct overflows from Brookvale Creek into the augmentation scheme. Other considerations included (refer Figure C2):

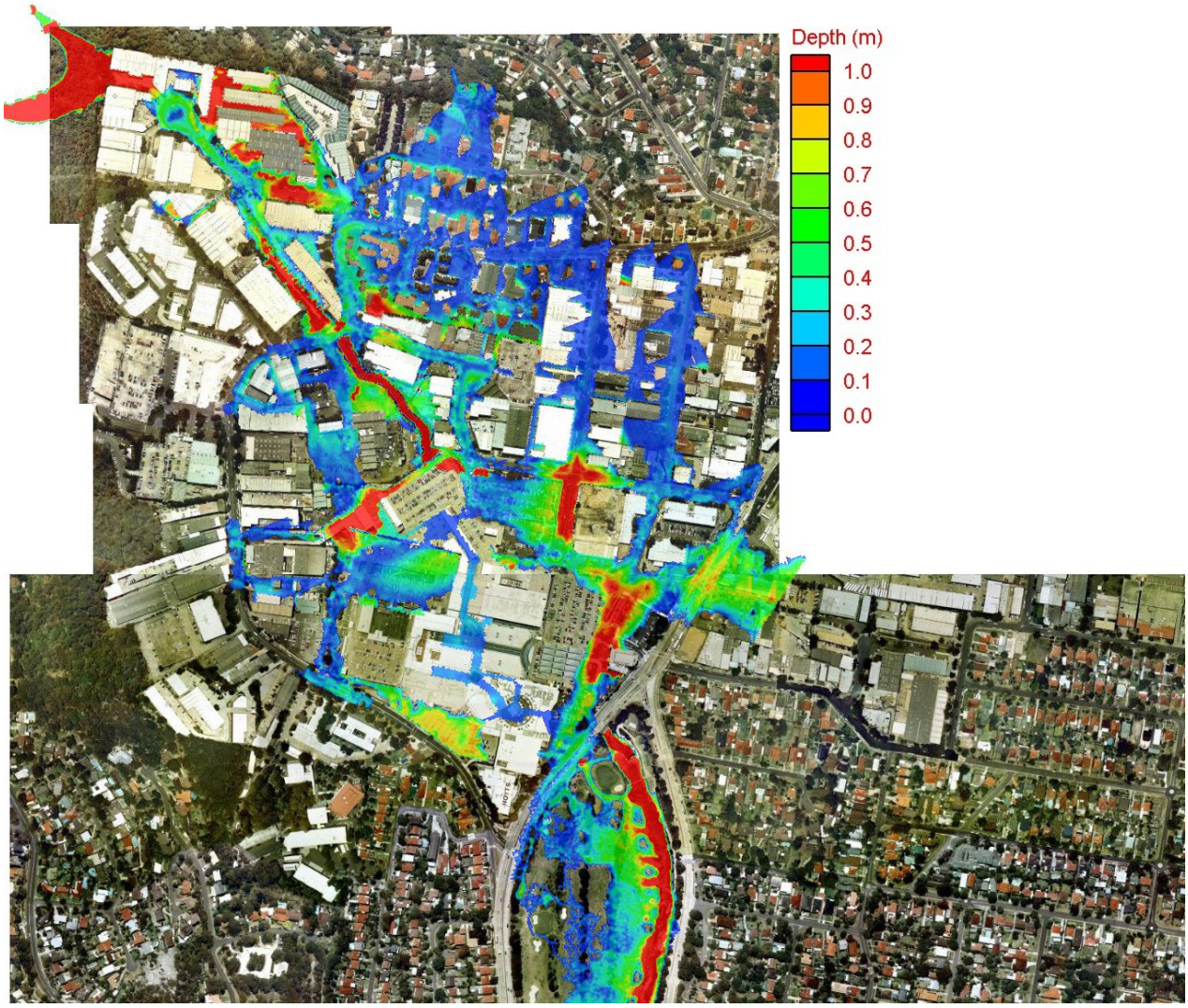


Figure C2 100 yr ARI Flood Depths under Existing Conditions

- The need to reduce the frequency of overland flows spilling from Cross Street and then down the access road to the Woolworths loading dock;
- The need to eliminate the overland flows that enter the Starfish Car Park under Existing Conditions in events up to the 100 yr ARI event and if possible under climate change;
- Identification of a preferred alignment within the constraints of existing and/or planned development on the Warringah Mall site;
- Avoidance as far as possible of the relocation of any existing services;
- Likely constraints on the construction of a crossing under Condamine Street;
- Potential flooding impacts downstream of Condamine Street; and
- The footprints of future development identified in the Masterplan for Warringah Mall.

The stormwater augmentation scheme proposed in 2008 is presented in **Figure C3**.

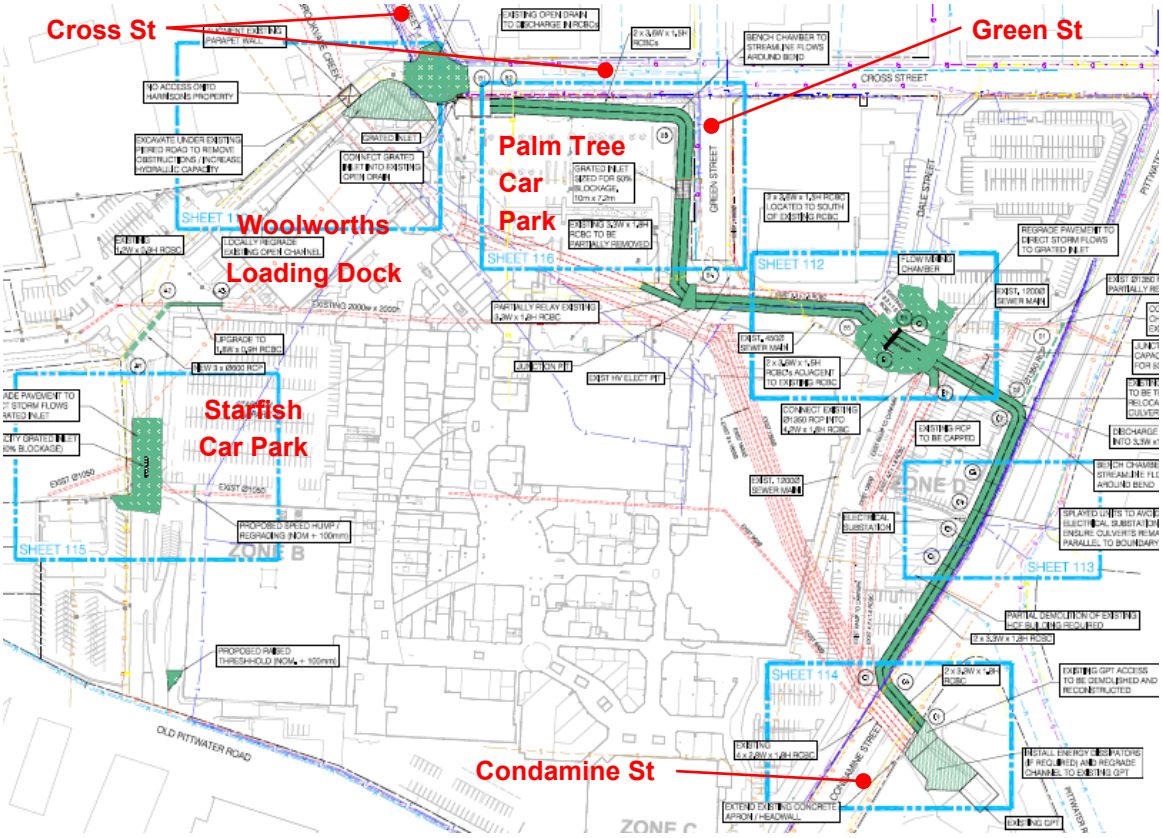


Figure C3 2008 Proposed Stormwater Augmentation Works (shown in green)

2.2.1 Sensitivity Testing

In response to requests from Warringah Council and Council's Peer reviewer the testing of the sensitivity of 100 yr ARI flood behaviour was undertaken in respect of the following matters:

- Different design storm burst durations (1.5 hour, 2 hour and 3 hour bursts) as well as a 9 hour storm burst to assess the effect on known flood ponding areas within the floodplain eg. upstream of Old Pittwater Road crossing (refer Figure 1), Green Street (refer **Figure C3**), etc;
- Penetrations of the existing culvert upstream of Old Pittwater Road;
- Partial blockage of the inlets and proposed overflow structures on Brookvale Creek located on the upstream boundary of Warringah Mall;
- Partial blockage of the culvert inlet located on the eastern boundary of Allenby Reserve (see **Figure C1**);
- Partial blockage of the inlet to the proposed additional culverts to be constructed around the northern and eastern sides of the Palm Tree Car Park (refer **Figure C3**);
- Adjustment of the roughness values for residential areas;
- Adjustment of losses at major drainage structures within Warringah Mall;
- Proposed details of the new entries to a planned multi-storey Palm Tree Car Park ; and
- Proposed details for landscaping over the additional culverts to be constructed around the northern and eastern sides of the Palm Tree Car Park (refer **Figure C3**)

Other sensitivity testing that was requested by AMP Capital Investors was to test the impact of removal of a further section of the parapet wall at the upstream end of Warringah Mall with 50% and 0% blockage.

A total of 18 sensitivity runs were undertaken using the hydraulic model of the proposed Stormwater Development Application (DA) measures.

It was concluded that the 1.5 hour storm burst gave slightly higher peak 100 yr ARI flood levels at most locations in comparison with the 2 hour, 3 hour and 9 hour storm bursts. The 1.5 hour storm burst was adopted as the benchmark for all subsequent assessments.

The penetrations of the existing culvert upstream of Old Pittwater Road were found to have minimal impact on the estimated 100 yr ARI flood levels downstream of Old Pittwater Road.

It was concluded that nil blockage conditions give the greatest lowering of 100 yr ARI flood levels in Brookvale Creek while partially increasing flood levels in Green Street. Conversely, partial blockage of the culvert inlet on Brookvale Creek and of the overflow outlet and the slot in the parapet wall only partially lowers 100 yr ARI flood levels in Brookvale Creek while partially lowering the flood levels in Green Street.

It was concluded from these runs that increasing the losses in major chambers would generally increase 100 yr ARI flood levels in Warringah Mall by up to 4 cm and in Green Street by up to 24 cm.

It was concluded that increasing the total length of the parapet wall that is lowered to 10 m (from 5 m) has a small effect on 100 yr ARI flood levels within Warringah Mall while in Green Street the local increase could be up to 4 cm.

Based on the outcomes of the sensitivity tests the hydraulic model of the Stormwater DA conditions was adjusted as follows:

- the inlet and outlet loss coefficients on several conduits in several key structures were adjusted;
- the total length of the parapet wall that is to be lowered was increased to 10 m (from 5 m).

Two runs were then undertaken for the 0% blockage scenario (Run 19) and the 50% blockage scenario (Run 20). It was concluded from these runs that in comparison with 100 yr ARI flood levels under Existing Conditions (with the same degrees of blockage) that the Stormwater DA works:

- Lower the 100 yr ARI flood levels downstream of Old Pittwater Road on average by up to 8 cm;
- Decrease the 100 yr ARI flood levels in Green Street by around 45 cm; and
- Lower the 100 yr ARI flood level in Brookvale Creek immediately upstream of Warringah Mall by up to 67 cm (depending on the degree of blockage of the culvert entry);
- Has a minimal impact on 100 yr ARI flood levels downstream of Condamine Street.

Based on discussions at a meeting with Council and Council's Peer Reviewer held in November 2009, it was agreed that Runs 19 and 20 were to be adopted as the basis for any final assessments of the Stormwater DA and/or First Stage Retail schemes which would include any additional measures to meet Council's required freeboard at entries to Warringah Mall.

C.2.2 Flood Impact Assessment

The flood depths, velocities and flood hazards for the 100 yr ARI design storm under the amended Stormwater DA conditions were assessed and the 100 yr ARI flood depths and flood hazards are given in **Figures C4** and **C5** respectively.

The intent of the works in the vicinity of the Cross Street car park is to provide locally at least 300 mm freeboard above the local 100 yr ARI flood level to protect the entry to Woolworths from the Palm Tree Car Park. It is proposed to construct a low wall around the edge of the existing open section of an engineered waterway to 11.15 m AHD and to tie this low wall into the raised entry hump and proposed landscape mound(s) to prevent floodwaters in Cross Street from outflanking these works (refer **Figure C3**).

The flood impact assessment confirmed that the 300 mm freeboard would be achieved opposite the Cross Street roundabout in accordance with Council's requirement.

The intent of the works proposed on the boundary of the Star Fish car park (refer Figure C2) is to exclude overland flows from the car park and instead to confine overland flows to the existing roads. It was concluded from the flood impact assessment that the 500 mm freeboard would be achieved opposite the Star Fish car park in accordance with Council's requirement for any new development.

Figure C4 100 yr ARI Flood Depths under Amended Stormwater DA Conditions

It was also concluded from the results of the assessment of the proposed amended Stormwater DA that the augmentation works provide a significant beneficial reduction in flood levels and overland flows within Warringah Mall and a beneficial reduction in flood hazard and risk posed to persons visiting or working within Warringah Mall. In a 100 yr ARI event the augmentation works:

- Succeed in excluding overland flows from the retail areas within Warringah Mall;
- Reduce flood levels in Brookvale Creek from Warringah Mall upstream to Old Pittwater Road;
- Lower the 100 yr ARI flood level in Green Street by up to 57 cm;
- Reduce overland flooding along the primary overland flowpath through the external car parks of Warringah Mall and its associated internal roads and reduce the overland flows to Low Hazard throughout Warringah Mall except for a small section of the access road connected to Pittwater Road (north of the Castle Car Park) in accordance with Council requirements;
- Provide at least 300 mm freeboard to the entries to Warringah Mall from the Palm Tree Car Park and at least 500 mm freeboard to entries to Warringah Mall from the Star Fish Car Park in accordance with Council requirements; and
- Increase flood levels by up to 3 cm only in the Warringah Golf Course immediately downstream of Condamine Street.

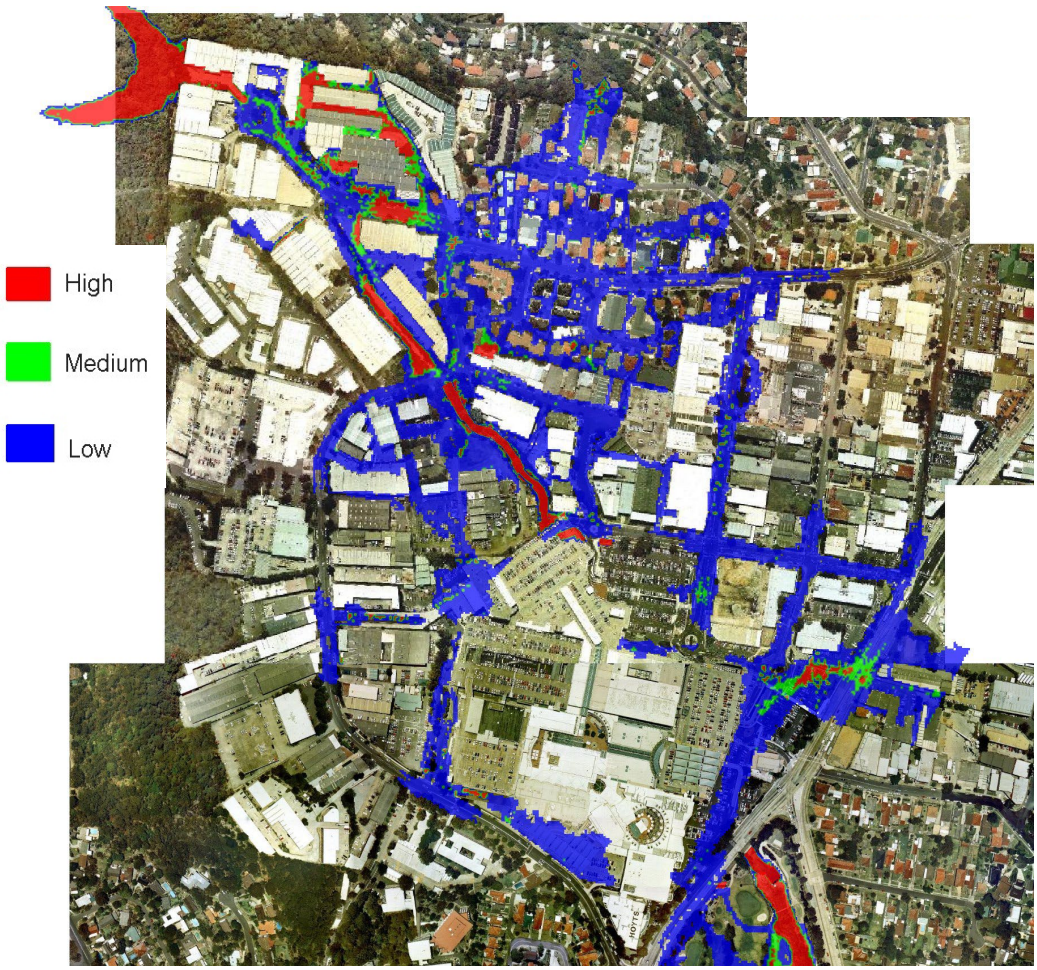


Figure C5 100 yr ARI Flood Hazards under Amended Stormwater DA Conditions

C.3 Physical Model Studies

This scheme further evolved to respond to opportunities presented by subsequent planned development for Warringah Mall and to services constraints identified on the site. The stormwater augmentation scheme proposed in 2013 (shown in green) is presented in Figure 4 while the locations of Chambers B4 and B6 are presented in **Figure C6**.

In 2014 detailed consideration of the outcomes of physical modelling of Chambers B4 and B6 (refer Figure 7) and the interaction of the proposed works with other services, the feasibility of relocating services at the southern end of Green Street, traffic management during construction, construction sequencing and potential hydraulic impacts during construction led changes to the 2013 scheme including changes to the Condamine Street crossing and re-alignment of the new stormwater culverts through the Bing Lee site. The 2014 stormwater augmentation scheme is presented in **Figure C7**.

2.3.1 Chamber C6 Physical Model Study

Currently stormwater is conveyed by 1 x 4.2 m (W) x 1.8 m (H) + 2 x 1350 mm diameter conduits + 1 x 1500 mm diameter conduit + 3 x 1.8 m diameter conduits + 1 x 900 mm diameter conduit discharges into a large chamber (Chamber C6) which in turn discharges into 4 x 2.8 m (W) x 1.8 m (H) culverts which convey stormwater under Condamine Street and into the Brookvale Creek GPT. As part of planned augmentation works it is proposed to connect two new 3.3 m (W) x 1.8 m (H) culverts into a re-constructed Chamber C6 (refer **Figure C7**) and lowering the two central culvert under Condamine Street by up to 1.0 m.

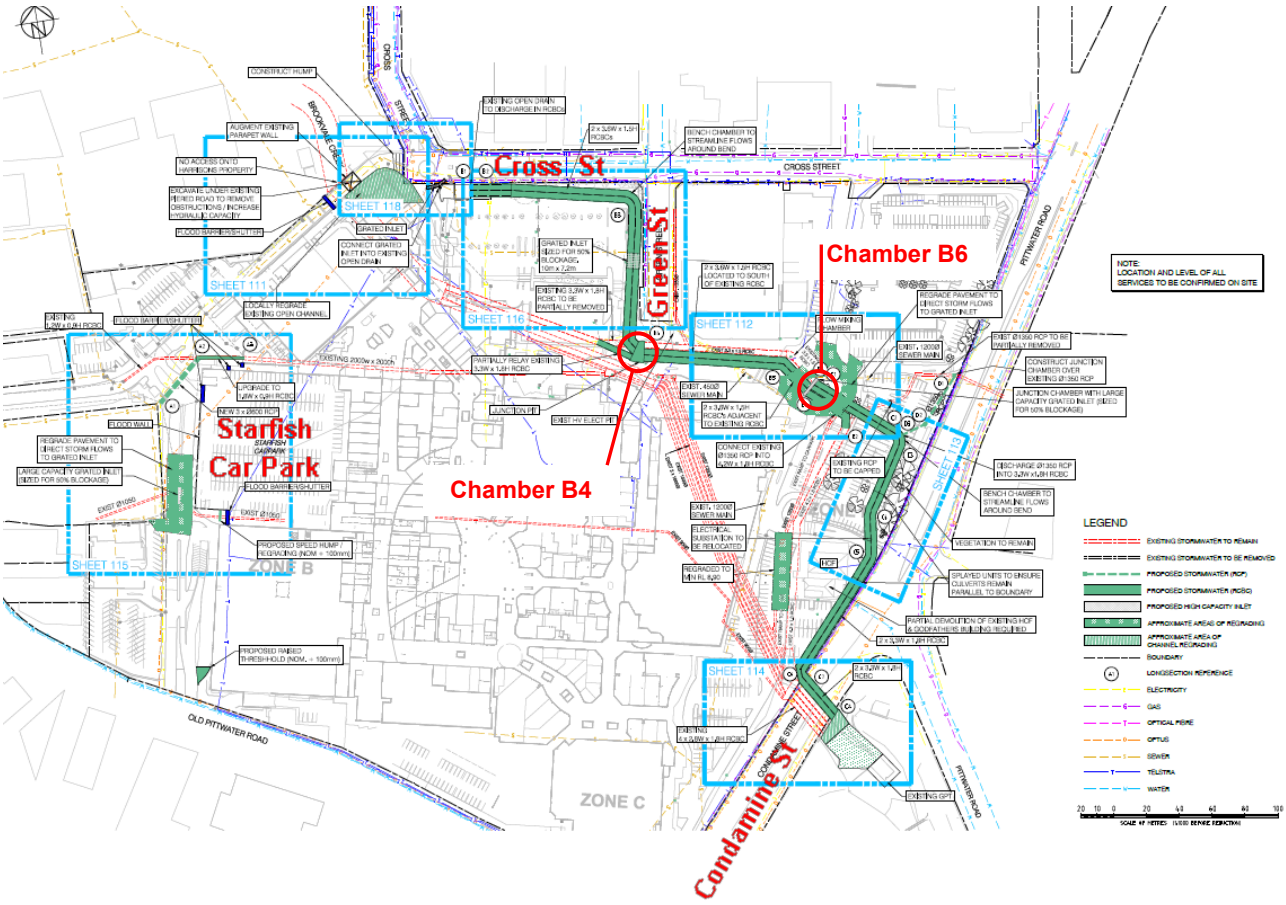


Figure C6 Location of Chambers B4 and B6

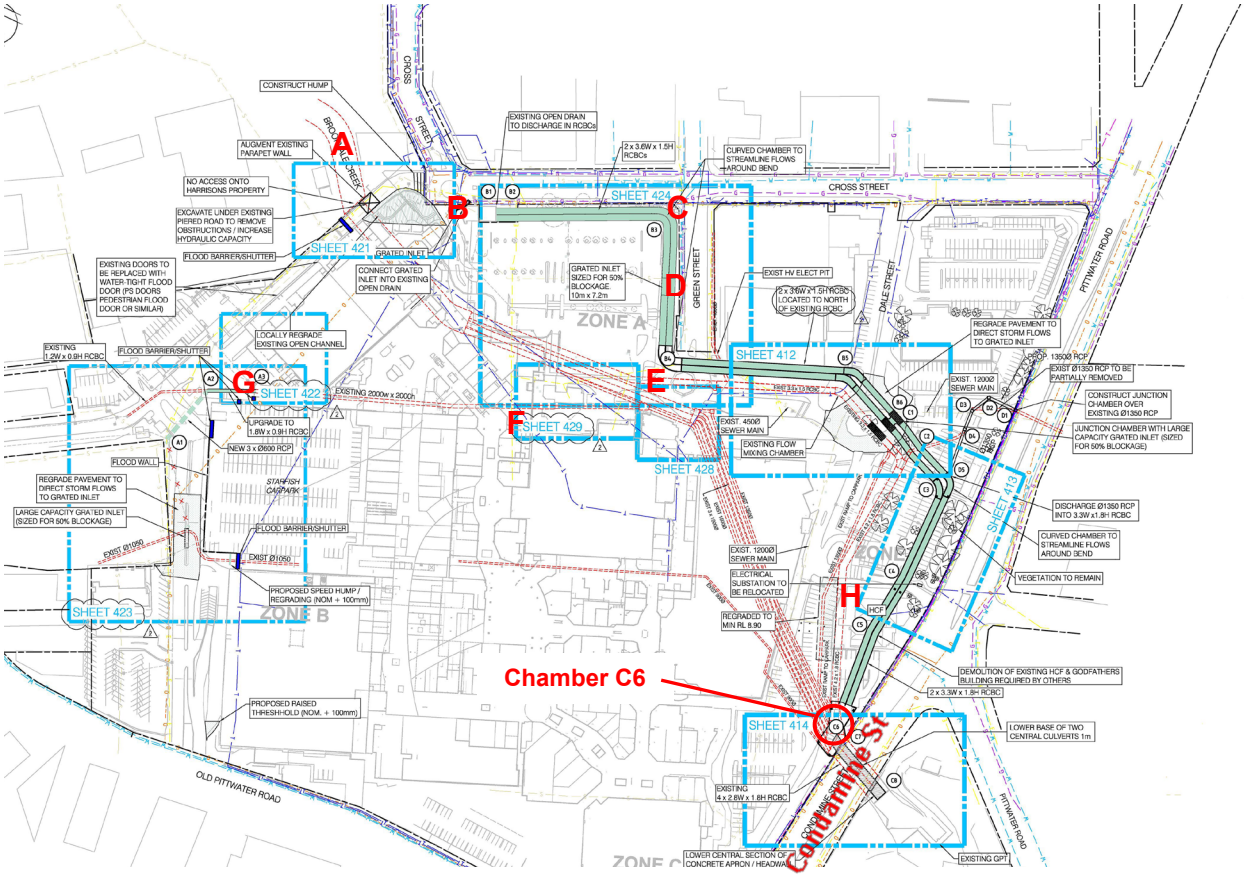


Figure C7 Location of Chamber C6

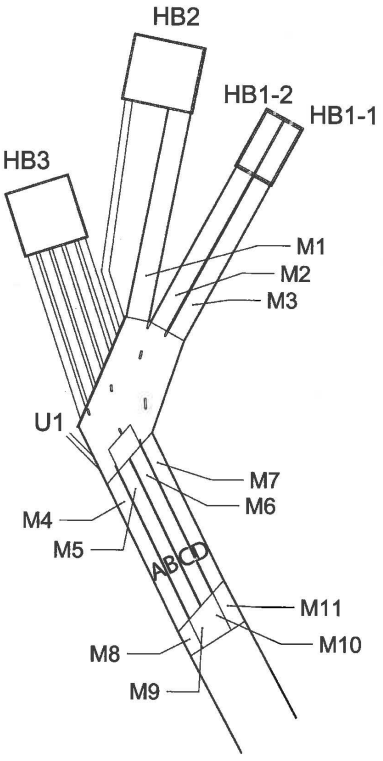


Figure C8 Chamber C6 Physical Model Layout and Location of Manometer Tapping Points (after WRL, 2015)

One of the conditions of consent required a physical model study of Chamber C6 and the Condamine Street crossing to confirm the hydraulic losses which were assumed in the computer model studies and to provide advice on how the hydraulic losses in Chamber C6 can be minimized.

The Physical Model

Prior to constructing the physical model, the layout of Chamber C6 was reviewed and adjusted to further streamline flows through the chamber and to reduce hydraulic losses. The model layout is given in **Figure C8.**

A Froude scale of 16.3: 1 was used for this model and Table C2 summarises the various scaling ratios. This precise scale was adopted to best match the prototype pipes to available acrylic pipe diameters. The scale provided flow depths that could be accurately measured and ensured that head losses had suitable resolution. The culverts have a relatively flat grade in some parts and the scale ensured that frictional and surface tension effects did not become dominant. At this scale, the form losses and turbulence were accurately represented. This scale ensured that maximum prototype flow rates were achievable, with total prototype flow of 70.3 m3/s being represented by 65.5 L/s in the model.

Table C2 Model Scaling Ratios

Ratio	Symbol	Formula	Value
Length ratio	L_R	16.3	16.3
Time ratio	T_R	$L_R^{0.5}$	*4.04*
Velocity ratio	V_R	$L_R^{0.5}$	*4.04*
Flow ratio	Q_R	$L_R^{2.5}$	*1073*

The model was constructed with a marine plywood base and acrylic walls and roofs for culverts and the chamber. Acrylic pipes were used for all pipe inlets. In parts of the model an expanded PVC base was used in order to allow for raising and lowering of the invert level for design modifications.

Five separate water supplies were applied to the model to supply the ten separate inflows to chamber C6. Two head boxes (HB1-1 and HBl-2) were constructed to control the flow into the proposed twin culverts (U9 and Ul0) upstream of chamber C6 with one head box for each culvert. One head box (HB2) was constructed to control the flow into the existing culvert (US) and the easternmost pipe (U7). One head box was constructed to control the flow into the five central pipes (U2-U6). Inflow into the westernmost pipe (Ul) was not controlled with a head box and was piped directly into the model.

Testing was carried out under five different steady state inlet boundary conditions and two different tailwater boundary conditions, based on hydrograph data provided by Cardno.

Physical Model Cases

Four design configurations were tested, starting with Cardno's proposed alternative to the DA approved scheme and proceeding with three successive modifications to this design. The designs are outlined as follows.

The Case 1 model was constructed as per the initial designs provided by Cardno, being the initial proposed alternative to the DA approved design. It involved a reconstructed C6 chamber and the lowering by 1.0 m of: the invert level of the two central culverts under Condamine Street; a small section upstream of these culverts inside C6; and downstream of these culverts on the apron.

Case 2 tested lowering the same area as in Case 1 by 740 mm (as opposed to 1.0 m in Case 1) to allow for a blinding slab to cover construction joints in the lowered culverts.

Case 3 considered increasing the size of the lowered section inside chamber C6, including the area upstream of the two outer culverts (the culverts themselves were not lowered). The extent of lowering remained 1.0 m, as in Case 1. **Figure C9a** presents the Case 3 flow conditions observed under peak flow conditions at the tailwater level WL1.

Case 4 was a final option where the size of the lowered section inside chamber C6 was between that of Case 1 and Case 3. The depth of lowering was 740 mm. **Figure C9b** presents the Case 4 flow conditions observed under peak flow conditions at the tailwater level WL1

The physical model and the modifications to the initial model which were undertaken and tested are described in the 2015 UNSW WRL Report titled “Warringah Mall Chamber C6 Physical Model Study”.

Results

The model study concluded (WRL, 2015):

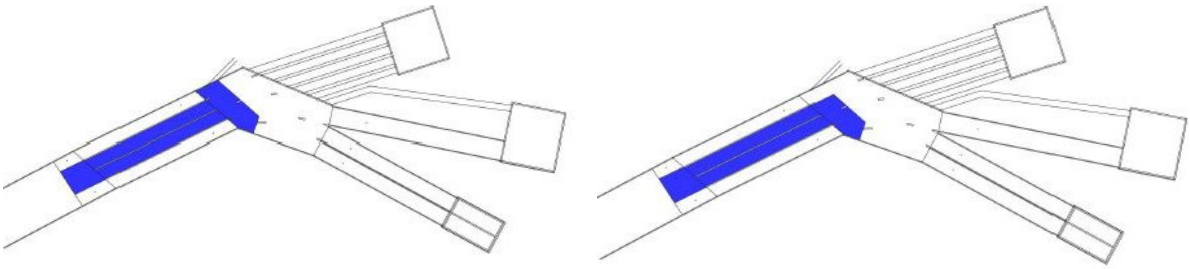
The best performing options were Case 3 and Case 4. Hydraulic losses in chamber C6 were minimised in Case 3 and flow in the Condamine Street culverts was most evenly distributed in Case 4.

The total inflow cross sectional area was larger than the total outflow cross sectional area for chamber C6 in all cases. However, the physical model has demonstrated that the conveyance under Condamine Street is adequate due to the supercritical flow observed in these culverts. Further, it was found that any blockages downstream of the Condamine Street culverts {which are known to increase downstream levels by up to 0.5m) are unlikely to disrupt the supercritical flow in the culverts.

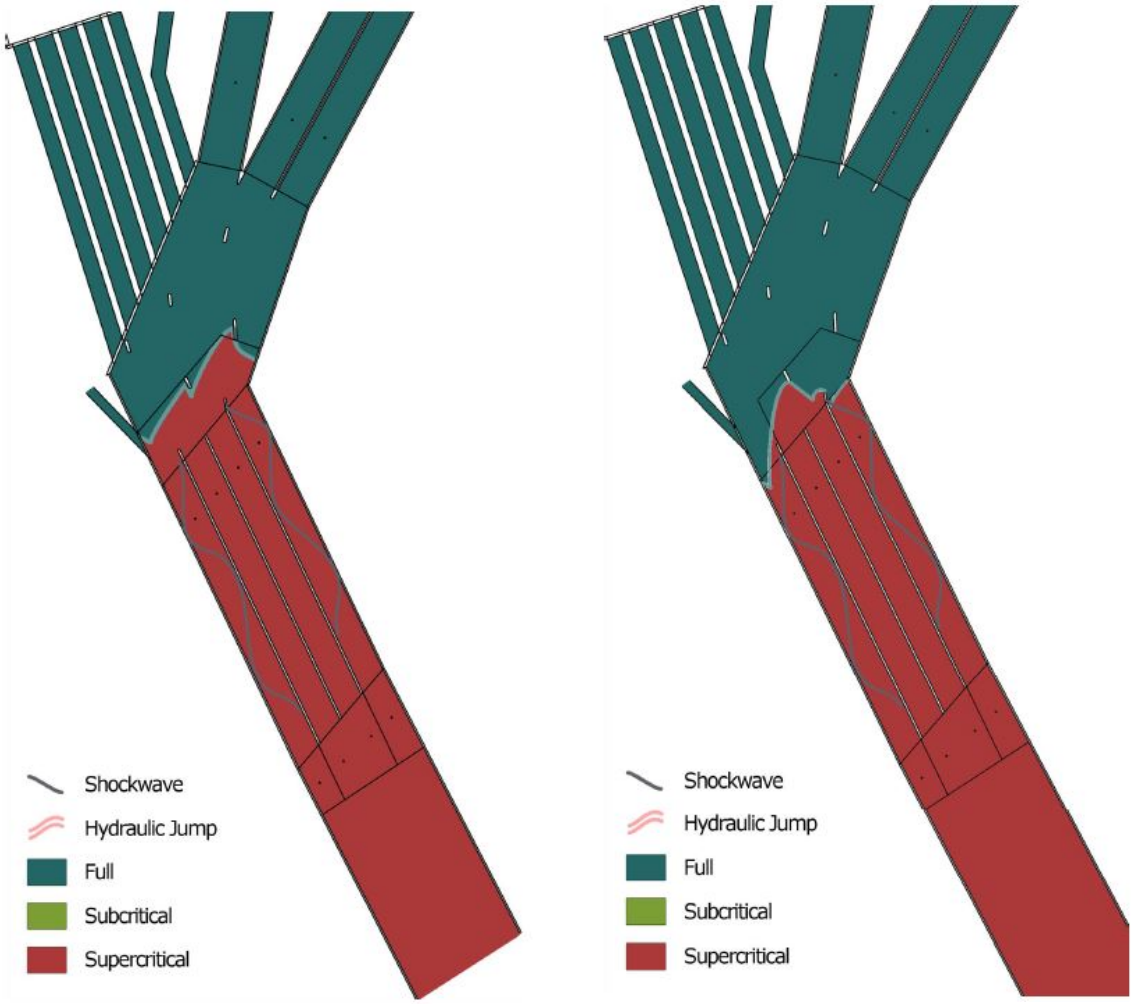
Warringah Mall Numerical Model

The Warringah Mall numerical model was modified to include nodes at Locations M1, M2 and M3 in order to compare the recorded and predicted heads (water levels) at these locations. It was found that the predicted heads at M1, M2 and M3 were all lower than observed. The numerical model at Chamber C6 was modified to match the observed flood levels at M1, M2 and M3 for Case 4 with 0% blockage flows which were adopted for the physical model tests. The comparison of the recorded and predicted heads (water levels) at M1, M2 and M3 are given in **Table C3**.

It was concluded that the modified model gave excellent agreement with the observed peak water levels and was suitable for estimating 100 yr ARI flood levels upstream and downstream of Chamber C6.



Case 3 Lowered Section in Blue **Case 4 Lowered Section in Blue**



(a) Case 3 Peak Flow Conditions **(b) Case 4 Peak Flow Conditions**

Figure C9 Observed Peak Flow Conditions in Chamber C6 and in Condamine Street Culverts (after WRL, 2015)

Table C3 Comparison of Peak Water Levels (m AHD) at Locations M1, M2 and M3 under Case 4 Conditions with 0% Blockage

Location	Observed WL (m AHD)	Predicted WL (m AHD)	Difference (cm)
M1	8.13	8.10	-3
M2	8.06	8.04	-2
M3	8.00	8.04	4

Table C4 Summary of Impacts of Model Reconfiguration at Chamber C6

Reference Point	In comparison to Previous DA1742 S96 Results	In comparison to Existing Conditions
Upstream of Warringah Mall (A)	Local increases of up to 7 cm	Still achieves a reduction in flood levels of up to 27 cm.
Cross St Roundabout (B)	No change	Local flood level is 10 cm lower
Intersection of Cross St and Green St (C)	Local increase of 3 cm.	Still achieves a local 73 cm reduction
Green St Low Point (D)	Local increase of 18 cm	Still achieves a local 72 cm reduction
Green St Roundabout (E)	Remains dry if two pit lids outside the Post Office are sealed or are raised to prevent surcharge	Substantial improvement as achieved by the previous DA1742 S96 scheme
DJ Loading Dock (F)	Local increase of 3 cm.	Up to a 58 cm reduction
Woolworths Loading Dock (G)	Local increase of 4 cm.	Substantial improvement as achieved by the previous DA1742 S96 scheme
Near Condamine St (H)	No more than 1 cm difference	

Results

The modified model was then re-run to estimate the 100 yr ARI flood levels under 0% and 50% inlet blockage scenarios. **Table C4** summarises the impacts of the model adjustments in the vicinity of Chamber C6 at locations of primary interest (refer **Figure C8**). While there were some local increases eg. Green St low point it was concluded that the local changes do not adversely impact any adjoining properties and the Stormwater DA would deliver significant reductions in 100 yr ARI flood levels in areas of concern eg. Green Street low point.