

APPENDIX C

TUFLOW MODEL INPUTS & OUTPUTS

Survey and DEM Notes

The topographical survey triangulation provided by Rygate and Company Pty Ltd excluded a number of spot levels (necessary to define change in grade surface levels), the full definition of the kerbs and road pavement levels. The resulting existing surface triangulation (in the DEM provided by Rygate and Company Pty Ltd) was not representative of all the features surveyed. Typically, this presented itself as contours not corresponding to surveyed spot levels and no definition of the kerbs and gutters at the sides of roads.

Using 12d software, Hyder manually created three-dimensional strings and points based on levels in the Rygate and Company Pty Ltd survey to improve the definition of the existing surface in areas of particular importance (Darling Drive, Hay Street car park entrances, the plaza and Harbour Street adjacent to the Entertainment Centre and the area around Pier Street). The existing kerb types (mountable kerb, kerb and gutter, barrier kerb, dish gutter et cetera) were recorded during site visits and their principle dimensions taken. The kerbs modelled represent the idealised shape of the kerbs (i.e. based on standard kerb construction details). Variations in kerb heights have not been possible to model. This data can only be recorded by detailed topographical survey.

The three-dimensional points and strings were triangulated to create a more representative existing surface model. This surface was then used to supersede the Rygate and Company Pty Ltd triangulation in the location that they overlapped.

Build-up of the existing surface model

The existing surface model is made up from a number of datasets each with an increasing level of accuracy. Each dataset replaces data from the preceding dataset.

The first surface is the Lidar/ALS data provided by City of Sydney. This data set covers approximately 4x4km. This is replaced by the Lidar/ALS provided by Worley Parsons (and used in their flood modelling). In turn, this is replaced by the Rygate and Company topographical survey triangulation and then by the Hyder manually created survey.

Build-up of the proposed re-development surface model

The existing surface model was modified to include the surface representation of the SICEEP site development proposal.

SYDNEY INTERNATIONAL CONVENTION, EXHIBITION AND ENTERTAINMENT PRECINCT

WP-FL-0001 COVER SHEET AND DRAWING SHEET

WP-FL-0101	5 YEAR ARI EXISTING CONDITIONS FLOOD DEPTH AND LEVEL CONTOURS
WP-FL-0102	20 YEAR ARI EXISTING CONDITIONS FLOOD DEPTH AND LEVEL CONTOURS
WP-FL-0103	100 YEAR ARI EXISTING CONDITIONS FLOOD DEPTH AND LEVEL CONTOURS
WP-FL-0104	PMF EXISTING CONDITIONS FLOOD DEPTH AND LEVEL CONTOURS

WP-FL-0111	5 YEAR ARI EXISTING CONDITIONS FLOOD DEPTH AND LEVEL CONTOURS INCLUDING POTENTIAL CLIMATE CHANGE
WP-FL-0112	20 YEAR ARI EXISTING CONDITIONS FLOOD DEPTH AND LEVEL CONTOURS INCLUDING POTENTIAL CLIMATE CHANGE
WP-FL-0113	100 YEAR ARI EXISTING CONDITIONS FLOOD DEPTH AND LEVEL CONTOURS INCLUDING POTENTIAL CLIMATE CHANGE
WP-FL-0114	PMF EXISTING CONDITIONS FLOOD DEPTH AND LEVEL CONTOURS INCLUDING POTENTIAL CLIMATE CHANGE

WP-FL-0121	5 YEAR ARI PROPOSED DEVELOPMENT FLOOD DEPTH AND LEVEL CONTOURS
WP-FL-0122	20 YEAR ARI PROPOSED DEVELOPMENT FLOOD DEPTH AND LEVEL CONTOURS
WP-FL-0123	100 YEAR ARI PROPOSED DEVELOPMENT FLOOD DEPTH AND LEVEL CONTOURS
WP-FL-0124	PMF PROPOSED DEVELOPMENT FLOOD DEPTH AND LEVEL CONTOURS

WP-FL-0131	5 YEAR ARI PROPOSED DEVELOPMENT FLOOD DEPTH AND LEVEL CONTOURS INCLUDING POTENTIAL CLIMATE CHANGE
WP-FL-0132	20 YEAR ARI PROPOSED DEVELOPMENT FLOOD DEPTH AND LEVEL CONTOURS INCLUDING POTENTIAL CLIMATE CHANGE
WP-FL-0133	100 YEAR ARI PROPOSED DEVELOPMENT FLOOD DEPTH AND LEVEL CONTOURS INCLUDING POTENTIAL CLIMATE CHANGE
WP-FL-0134	PMF PROPOSED DEVELOPMENT FLOOD DEPTH AND LEVEL CONTOURS INCLUDING POTENTIAL CLIMATE CHANGE

WP-FL-0201	5 YEAR ARI PROPOSED DEVELOPMENT FLOOD LEVEL IMPACT
WP-FL-0202	20 YEAR ARI PROPOSED DEVELOPMENT FLOOD LEVEL IMPACT
WP-FL-0203	100 YEAR ARI PROPOSED DEVELOPMENT FLOOD LEVEL IMPACT

WP-FL-0211	5 YEAR ARI PROPOSED DEVELOPMENT FLOOD LEVEL IMPACT INCLUDING POTENTIAL CLIMATE CHANGE
WP-FL-0212	20 YEAR ARI PROPOSED DEVELOPMENT FLOOD LEVEL IMPACT INCLUDING POTENTIAL CLIMATE CHANGE
WP-FL-0213	100 YEAR ARI PROPOSED DEVELOPMENT FLOOD LEVEL IMPACT INCLUDING POTENTIAL CLIMATE CHANGE

WP-FL-0401	5 YEAR ARI EXISTING CONDITIONS PROVISIONAL HYDRAULIC HAZARD
WP-FL-0402	20 YEAR ARI EXISTING CONDITIONS PROVISIONAL HYDRAULIC HAZARD
WP-FL-0403	100 YEAR ARI EXISTING CONDITIONS PROVISIONAL HYDRAULIC HAZARD
WP-FL-0404	PMF EXISTING CONDITIONS PROVISIONAL HYDRAULIC HAZARD

WP-FL-0411	5 YEAR ARI EXISTING CONDITIONS PROVISIONAL HYDRAULIC HAZARD INCLUDING POTENTIAL CLIMATE CHANGE
WP-FL-0412	20 YEAR ARI EXISTING CONDITIONS PROVISIONAL HYDRAULIC HAZARD INCLUDING POTENTIAL CLIMATE CHANGE
WP-FL-0413	100 YEAR ARI EXISTING CONDITIONS PROVISIONAL HYDRAULIC HAZARD INCLUDING POTENTIAL CLIMATE CHANGE
WP-FL-0414	PMF EXISTING CONDITIONS PROVISIONAL HYDRAULIC HAZARD INCLUDING POTENTIAL CLIMATE CHANGE

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WP-FL-0422	20 YEAR ARI PROPOSED DEVELOPMENT PROVISIONAL HYDRAULIC HAZARD
WP-FL-0423	100 YEAR ARI PROPOSED DEVELOPMENT PROVISIONAL HYDRAULIC HAZARD
WP-FL-0424	PMF PROPOSED DEVELOPMENT PROVISIONAL HYDRAULIC HAZARD

WP-FL-0431	5 YEAR ARI PROPOSED DEVELOPMENT PROVISIONAL HYDRAULIC HAZARD INCLUDING POTENTIAL CLIMATE CHANGE
WP-FL-0432	20 YEAR ARI PROPOSED DEVELOPMENT PROVISIONAL HYDRAULIC HAZARD INCLUDING POTENTIAL CLIMATE CHANGE
WP-FL-0433	100 YEAR ARI PROPOSED DEVELOPMENT PROVISIONAL HYDRAULIC HAZARD INCLUDING POTENTIAL CLIMATE CHANGE
WP-FL-0434	PMF PROPOSED DEVELOPMENT PROVISIONAL HYDRAULIC HAZARD INCLUDING POTENTIAL CLIMATE CHANGE

WP-FL-0501 8th NOVEMBER 1984 FLOOD ASSESSMENTS

WP-FL-0601	100 YEAR ARI PROPOSED DEVELOPMENT FLOOD DEPTH AND LEVEL CONTOURS WITHOUT CULVERT AMPLIFICATION
WP-FL-0602	100 YEAR ARI PROPOSED DEVELOPMENT FLOOD LEVEL IMPACT WITHOUT CULVERT AMPLIFICATION
WP-FL-0603	100 YEAR ARI PROPOSED DEVELOPMENT PROVISIONAL HYDRAULIC HAZARD WITHOUT CULVERT AMPLIFICATION
WP-FL-0611	100 YEAR ARI PROPOSED DEVELOPMENT FLOOD DEPTH AND LEVEL CONTOURS WITHOUT CULVERT AMPLIFICATION INCLUDING POTENTIAL CLIMATE CHANGE
WP-FL-0612	100 YEAR ARI PROPOSED DEVELOPMENT FLOOD LEVEL IMPACT WITHOUT CULVERT AMPLIFICATION INCLUDING POTENTIAL CLIMATE CHANGE
WP-FL-0613	100 YEAR ARI PROPOSED DEVELOPMENT PROVISIONAL HYDRAULIC HAZARD WITHOUT CULVERT AMPLIFICATION INCLUDING POTENTIAL CLIMATE CHANGE

1. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.
2. ALL COORDINATES TO MGA. ALL LEVELS TO AHD.
3. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT CONTRACTS, SPECIFICATIONS AND DRAWINGS.
4. PRECINCT BOUNDARIES ARE INDICATIVE ONLY AND ARE SUBJECT TO CHANGE

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PROJECT
**SICEEP
DARLING HARBOUR
PROJECT PRECINCT**

COVER SHEET AND
DRAWING SHEET

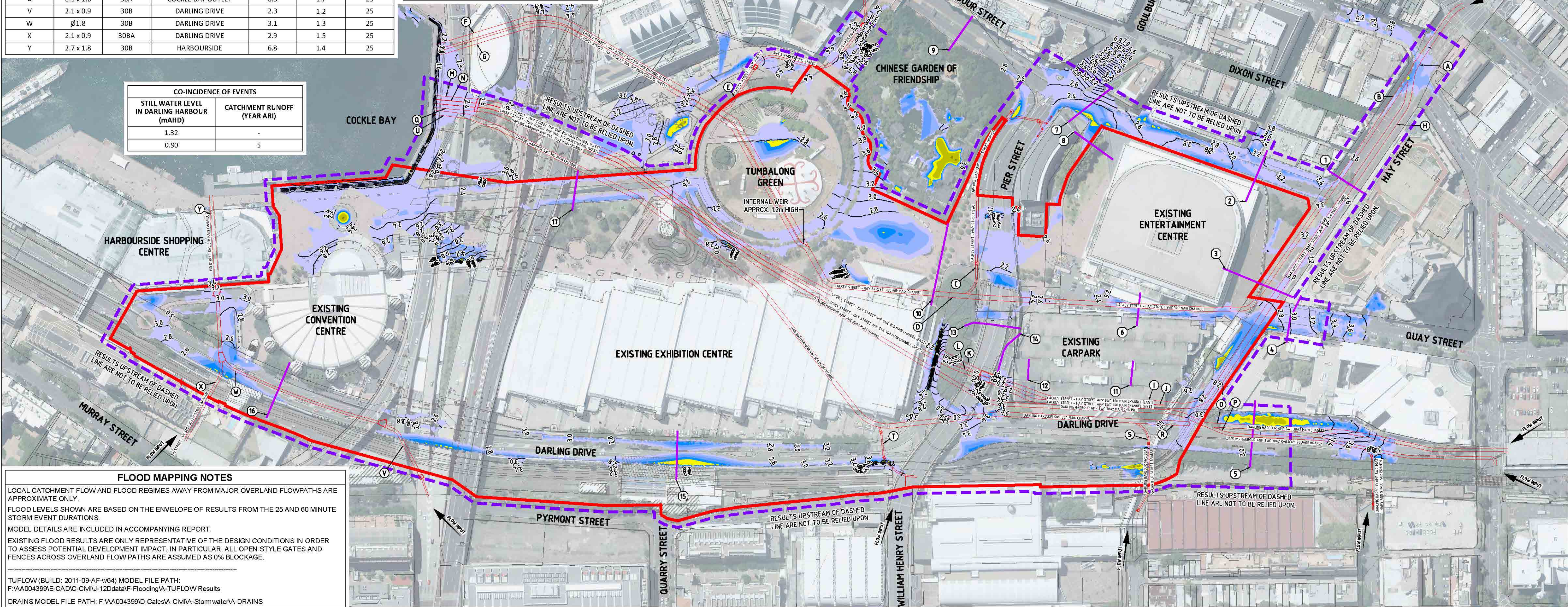
PRELIMINARY ONLY

SCALE @ A1	DRAWN	DESIGNED	REVIEWED	APPROVED
-	RD	CM	BC	JH
PROJECT NUMBER	DRAWING NUMBER			REV
AA004399	WP-FL-0001			01

CONDUIT LABEL	CONDUIT DIMENSION (m)	SYDNEY WATER CHANNEL	LOCATION	Q (m³/s) ¹	V (m/s) ²	STORM DURATION (MIN)
A	3.6 x 2.1	300	HAY STREET	25.6	3.4	60
B	3.1 x 2.0	30P	HAY STREET	9.1	3.2	60
C	Ø1.5	30P	PIER STREET	2.1	1.2	25
D	3.7 x 2.2	30P	PIER STREET	10.8	1.4	60
E	1.5 x 1.5	30P	TUMBALONG PARK	4.2	4.3	25
F	3.9 x 2.2	30P	IMAX THEATRE	8.1	1.1	60
G	3.1 x 2.2	30P	IMAX THEATRE	7.5	1.3	60
H	4.3 x 2.4	300	HAY STREET	17.3	1.9	60
I	3.0 x 2.4	300	DARLING DRIVE (CARPARK)	9.0	1.4	60
J	3.0 x 2.4	300	DARLING DRIVE (CARPARK)	9.1	1.4	60
K	3.0 x 2.4	300	PIER STREET	9.0	1.3	60
L	3.0 x 2.4	300	PIER STREET	9.1	1.3	60
M	3.0 x 2.4	300	COCKLE BAY OUTLET	9.1	1.3	60
N	3.0 x 2.4	300	COCKLE BAY OUTLET	9.1	1.3	60
O	3.1 x 1.6	30A2	DARLING DRIVE	8.4	1.7	25
P	2.1 x 1.8	30A2	DARLING DRIVE	7.7	2.0	25
Q	3.0 x 2.4	30A2	COCKLE BAY OUTLET	13.6	1.9	25
R	3.1 x 1.6	30A	DARLING DRIVE	2.6	0.7	25
S	Ø0.9	30A	DARLING DRIVE	1.4	2.2	25
T	Ø1.1	30A	DARLING DRIVE	1.8	2.2	25
U	3.5 x 1.6	30A	COCKLE BAY OUTLET	6.8	1.7	25
V	2.1 x 0.9	30B	DARLING DRIVE	2.3	1.2	25
W	Ø1.8	30B	DARLING DRIVE	3.1	1.3	25
X	2.1 x 0.9	30BA	DARLING DRIVE	2.9	1.5	25
Y	2.7 x 1.8	30B	HARBOURSIDE	6.8	1.4	25

OVERLAND FLOW LABEL	LOCATION	Q (m³/s) ¹
1	HAY STREET	0.0
2	HARBOUR STREET	0.0
3	HAY STREET	0.0
4	QUAY STREET	0.5
5	DARLING DRIVE (SOUTH)	0.2
6	BETWEEN EC AND CAR PARK/THE BOULEVARD	0.0
7	HARBOUR STREET	0.2
8	LITTLE PIER STREET	0.0
9	HARBOUR STREET	0.0
10	CHINESE GARDENS	0.0
11	EC CAR PARK FLOW PATH	0.0
12	EC CAR PARK FLOW PATH	0.0
13	PIER STREET	0.0
14	PIER STREET	0.0
15	DARLING DRIVE	0.1
16	DARLING DRIVE (NORTH)	0.0
17	DARLING QUARTER	0.0

TABLE NOTES		
¹ FLOW IS PEAK FOR MODELLED DESIGN CONDITION		
² VELOCITY IS AT CORRESPONDING DESIGN FLOW		



DARLING HARBOUR LIVE

0 30 60 90 120 150m

1 : 1500

NOTES:

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01	ISSUE FOR DEVELOPMENT APPLICATION	11/03/2013
REV	DESCRIPTION	DATE

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DRAWING TITLE

**5 YEAR ARI
EXISTING CONDITIONS
FLOOD DEPTH AND LEVEL CONTOURS**

STATUS

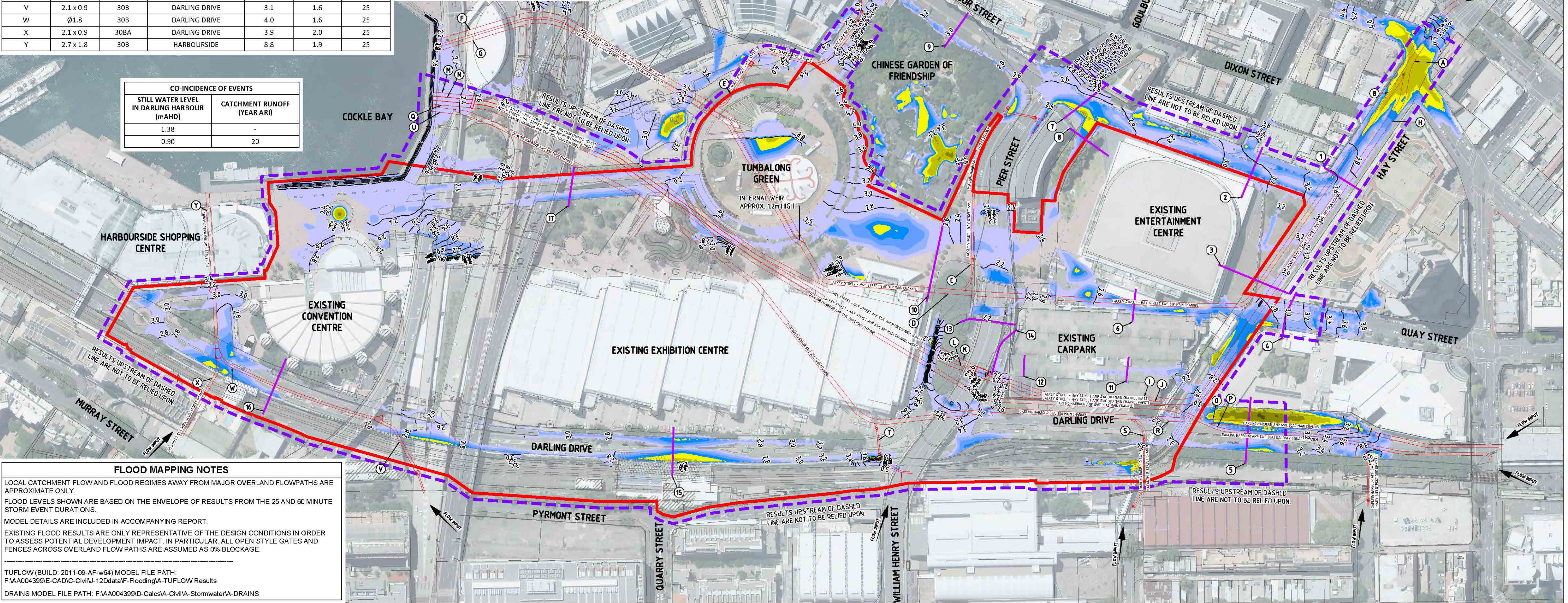
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SCALE @ A1	DRAWN	DESIGNED	REVIEWED	APPROVED
1:1500	RD	CM	BC	JH
PROJECT NUMBER	DRAWING NUMBER	REV		
AA004399	WP-FL-0101	01		

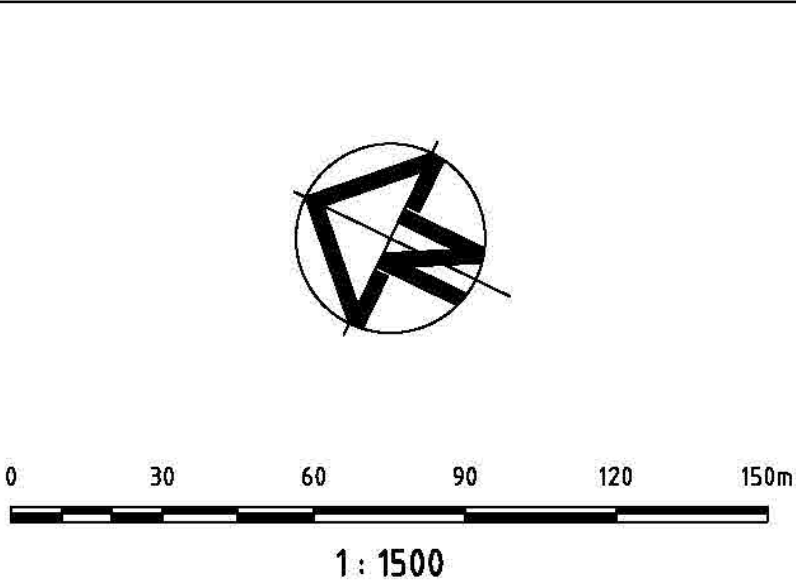
CONDUIT LABEL	CONDUIT DIMENSION (m)	SYDNEY WATER CHANNEL	LOCATION	Q (m³/s) ¹	V (m/s) ²	STORM DURATION (MIN)
A	3.6 x 2.1	300	HAY STREET	31.6	4.2	60
B	3.1 x 2.0	30P	HAY STREET	11.3	2.0	60
C	Ø1.5	30P	PIER STREET	2.6	1.5	25
D	3.7 x 2.2	30P	PIER STREET	13.5	1.6	60
E	1.5 x 1.5	30P	TUMBALONG PARK	4.3	4.6	25
F	3.9 x 2.2	30P	IMAX THEATRE	10.1	1.4	60
G	3.1 x 2.2	30P	IMAX THEATRE	9.0	1.6	60
H	4.3 x 2.4	300	HAY STREET	21.7	2.1	60
I	3.0 x 2.4	300	DARLING DRIVE (CARPARK)	11.3	1.6	60
J	3.0 x 2.4	300	DARLING DRIVE (CARPARK)	11.4	1.6	60
K	3.0 x 2.4	300	PIER STREET	11.4	1.6	60
L	3.0 x 2.4	300	PIER STREET	11.4	1.6	60
M	3.0 x 2.4	300	COCKLE BAY OUTLET	11.5	1.6	60
N	3.0 x 2.4	300	COCKLE BAY OUTLET	11.4	1.6	60
O	3.1 x 1.6	30A2	DARLING DRIVE	10.1	2.1	25
P	2.1 x 1.8	30A2	DARLING DRIVE	9.3	2.5	25
Q	3.0 x 2.4	30A2	COCKLE BAY OUTLET	15.9	2.3	25
R	3.1 x 1.6	30A	DARLING DRIVE	3.6	0.8	25
S	Ø0.9	30A	DARLING DRIVE	1.8	2.9	25
T	Ø1.1	30A	DARLING DRIVE	2.4	2.8	25
U	3.5 x 1.6	30A	COCKLE BAY OUTLET	8.4	2.2	25
V	2.1 x 0.9	30B	DARLING DRIVE	3.1	1.6	25
W	Ø1.8	30B	DARLING DRIVE	4.0	1.6	25
X	2.1 x 0.9	30BA	DARLING DRIVE	3.9	2.0	25
Y	2.7 x 1.8	30B	HARBOURSIDE	8.8	1.9	25

OVERLAND FLOW LABEL	LOCATION	Q (m³/s) ¹
1	HAY STREET	0.9
2	HARBOUR STREET	0.7
3	HAY STREET	0.0
4	QUAY STREET	0.8
5	DARLING DRIVE (SOUTH)	0.7
6	BETWEEN EC AND CAR PARK/THE BOULEVARD	0.1
7	HARBOUR STREET	0.2
8	LITTLE PIER STREET	0.0
9	HARBOUR STREET	0.1
10	CHINESE GARDENS	0.0
11	EC CAR PARK FLOW PATH	0.0
12	EC CAR PARK FLOW PATH	0.0
13	PIER STREET	0.0
14	PIER STREET	0.0
15	DARLING DRIVE	0.2
16	DARLING DRIVE (NORTH)	0.0
17	DARLING QUARTER	0.0

TABLE NOTES	
¹ FLOW IS PEAK FOR MODELLED DESIGN CONDITION	
² VELOCITY IS AT CORRESPONDING DESIGN FLOW	



DARLING HARBOUR LIVE



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PROJECT
**SICEEP
DARLING HARBOUR
PROJECT PRECINCT**

DRAWING TITLE
**20 YEAR ARI
EXISTING CONDITIONS
FLOOD DEPTH AND LEVEL CONTOURS**

STATUS
PRELIMINARY ONLY

SCALE @ A1 1:1500	DRAWN RD	DESIGNED CM	REVIEWED BC	APPROVED JH
PROJECT NUMBER AA004399	DRAWING NUMBER WP-FL-0102	REV 01		