8. Flood Storage and Conveyance

8.1 Flood detention

A key flood management objective is to ensure post-development 10 year and 100 year ARI flows from the study area are consistent with the current flows from the area in its rural condition. It is proposed that flows will be attenuated through offline detention basins located both within and near the outlet to each sub-catchment.

Estimates of uncompensated post-development peak flows were calculated using kinetic wave equation and rational method for each catchment.

An estimate of compensation volumes required at the base of each catchment to meet the design peak flow criteria was estimated in accordance with Australian Rainfall and Runoff (ARR, 2001). A summary of these calculations and results is presented in Table 6

Table 6 Required Compensation Volumes

Catchment	Design Peak Flow (m^3/s)	Post Development Runoff			Assumed Storm Volume (m^3)	Required Storage (m^3) *ARR2001-B5, Eq. 1.43*
		Time of Concentration (mins)	Intensity (mm/hr)	Peak Flow (m^3/s)		
Yule1	0.75	27	83	3.8	6204	4962
Yule2	1.40	40	66	7.0	16643	13297
Yule3	0.68	35	71	5.0	10534	9094
Yule4	1.06	36	71	8.5	18235	15957
Yule5	1.52	25	88	12.6	19303	16976
Yule4 + Yule5	2.58	42	63	17.5	44298	37786
Yule6	0.59	19	105	3.0	3483	2793
Yule7	0.61	23	93	3.8	5355	4498
Bickley2	1.54	31	78	10.6	19505	16685
Bickley3	1.57	36	71	8.1	17553	14154

As proposed by the Drainage Concept Plan compensation of peak flows from the development should be distributed throughout each catchment in the form of on-site stormwater retention (OSR) systems. Following finalisation of structure plans and development guidelines, Multiple Use Corridors located at the end of each

subcatchment (in addition to function in stormwater quality improvement) may need to provide additional compensation capacity for the 100 year ARI event.

In the event that Multiple Use Corridors are required to detain significant volumes of water, detailed design should ensure that the 10 year ARI storage is provided below spillway level and the 100 year ARI storage is provided below top of basin. Preliminary calculations suggest that the proposed property bioretention basins are likely to provide sufficient detention capacity within each subcatchment to compensate the 10 year ARI and 100 year events to pre-development peak flows.

8.2 Flood Conveyance

Conveyance of the 1 in 100 year ARI flood is provided by existing and assumed road and drainage reserves as shown on Figure 7. For the purposes of calculating flood levels and fill requirements, it has been assumed that the following road and drainage reserves are available:

» All existing roads in the area are retained;

» A new road parallel with and between Brentwood Road and Victoria Road;

» A new road parallel with Victoria Road and at the rear of lots fronting Victoria Road.

Final design of these roads must maintain their role as floodways. Should these roads not be constructed, equivalent floodways should be provided along the same routes.

Preliminary calculations performed as part of this study suggest that the 100 year flood depth along these floodways is relatively shallow due to the compensating capacity of the proposed onsite retention measures. More detailed flood modelling should be conducted at detailed design phase to ensure protection of property and infrastructure for the 1 in 100 year flood.

8.3 Fill requirements

A large part of the proposed Maddington-Kenwick Industrial Area is situated on palusplain that is periodically inundated during high rainfall events. Preliminary calculations performed as part of this study suggest that the 100 year flood depth along the roadways is relatively shallow due to the compensating capacity of the proposed onsite retention measures. To ensure protection of property, building floor levels should be raised 0.3 m above the 100 year ARI flood level, this will generally be 0.5m above the road shoulder level.

This fill requirement makes no allowance for foundation condition which may require increased fill levels in areas where the underlying soil has a high clay content. In addition, it is likely that areas of the development will require additional fill to provide sufficient clearance from the groundwater table. It is recommended that prior to development of each location a detailed investigation of groundwater levels be conducted to determine Average Annual Maximum Groundwater Level (AAMGL) and recommended fill levels be adjusted to ensure maintenance of 1.5m clearance from this level.

Table 7 Subcatchment Drainage Characteristics

Sub-catchment	Area (ha)	Outlet	Storage required (m^3)		OSR Volume (m^3)	Area of proposed MUC (ha)
			10yr ARI	100yr ARI		
Yule1	22.7	Yule Brook	3070	4962	6100	-
Yule2	48.8	MUC 1 to Yule Brook	6770	13297	13200	0.88
Yule3	35.4	MUC 2 to Yule Brook Nature Reserve	5847	9094	9600	0.52
Yule4	56.8	Existing drain to Binley Brook	10306	15957	15400	-
Yule5	68.5	MUC 3 to MUC 2 to Yule Brook Nature Reserve	10600	16976	18500	3.65 (MUC3)
Yule6	13.6		1675	2793	3600	
Yule7	19.9	Existing drain to Binley Brook	2730	4498	5300	-
Bickley2	66.1	MUC 5 to existing drain to Bickley Brook	10424	16685	17900	0.65
Bickley3	66.2	MUC 4 to existing drain to Bickley Brook	8925	14154	17900	2.55