APPENDIX A SUPPLEMENT TO QUDM

A1.0 INTRODUCTION

The purpose of this Supplement is to provide information that will enable stormwater design to be carried out in accordance with the requirements of the Brisbane City Council. Designers will be required to certify that they have prepared design and documentation for stormwater systems in accordance with *QUDM* and this supplement.

Designers should note the two major design relaxation in this supplement.

1. The velocity x depth limit increased from 0.4 to 0.6.
2. The major system design standard reduced from ARI of 100 years to 50 years.

Designers must incorporate the Standard Drawings prepared by Brisbane City Council in the design of roadworks and stormwater drainage in Brisbane. In producing this supplement Brisbane City Council has refined *QUDM*'s requirements specifically to the Brisbane City area.

A2.0 URBAN DRAINAGE

A2.1 FRACTION IMPERVIOUS

TABLE BA2.1.1 C_{10} VS DEVELOPMENT CATEGORY

Development Category	**C_{10}**
Central Business	0.90
Commercial and Industrial	0.88
Significant Paved Areas (eg roads and carparks)	0.88
Low-medium to High Density Residential Areas (Note 2)	0.86 (Note 2)
Low Density Residential Area (mainly one or two storey single houses, including roads)	
Average Lot ≥ 750 m^2	0.77
Average Lot ≥ 600 m^2 < 750 m^2	0.79
Average Lot ≥ 450 m^2 < 600 m^2	0.81
Average Lot ≥ 300 m^2 < 450 m^2	0.83
Low Density Residential Area (mainly one or two storey single houses, excluding roads)	
Average Lot ≥ 750 m^2	0.76
Average Lot ≥ 600 m^2 < 750 m^2	0.78
Average Lot ≥ 450 m^2 < 600 m^2	0.80
Average Lot ≥ 300 m^2 < 450 m^2	0.82
Rural/Environmental Protection Areas (2-5 dwelling units per hectare)	0.74
Open Space (eg parks)	0.70

Notes:

1. Table BA2.1.1 above combines *QUDM* Tables 5.04.1 and 5.04.2.
2. This area is designated for mainly multi-unit dwellings with density >20 dwelling units per hectare. The designer should determine the actual fraction impervious for the particular development under consideration and calculate the coefficients of runoff from these values. Alternatively use C_{10} = 0.86.

A2.2 TIME OF CONCENTRATION

Refer *QUDM* Section 5.05. Use standard inlet times (*QUDM* Section 5.05.4) except where approval is given to utilise other methods. The average slopes referred to are the slopes along the predominant flow paths for the catchment in its developed state. The kinematic wave and the Bransby-Williams equations must not be used. The time of concentration must take due account of partial area effects in accordance with *QUDM* Section 5.02.2, particularly where there is open space within a residential area or for developments with significant directly connected impervious areas.

A2.3 MAJOR SYSTEM ARI AND FLOW DEPTH

Refer *QUDM* Tables 5.06.1, 5.08.1 and 5.09.1. The major system ARI is 50 years.

$d_g\ V_{ave} \leq 0.6\ m^2/s$ except where there is an obvious danger of pedestrians being swept away and drowned, then $d_g\ V_{ave} \leq 0.4\ m^2/s$.

Refer Section 6.2.3 and Section 2.3 of Part B of this document, for drainage requirements of major and minor roads.

A2.4 PIPE AND MATERIAL STANDARDS

Refer *QUDM* Section 5.13. Materials that will be accepted for use in stormwater pipes include:

- Steel reinforced concrete pipe minimum Class 2.
- Fibre reinforced concrete pipe minimum Class 1.
- UPVC sewer pipe minimum Class SN6 for roofwater drainage.

A2.5 ROOF AND ALLOTMENT DRAINAGE

Refer Section 6.2.3 and *QUDM* Section 5.18. For the location of roofwater drainage see Standard Drawing No. UMS 351. See Standard Drawing No. UMS 353 for roof and surface water drainage for site developments.

A2.6 PUBLIC UTILITIES

Refer *QUDM* Section 5.19. See Standard Drawing Nos. UMS 121, UMS 122, UMS 123 and UMS 124 for the recommended locations of public utilities.

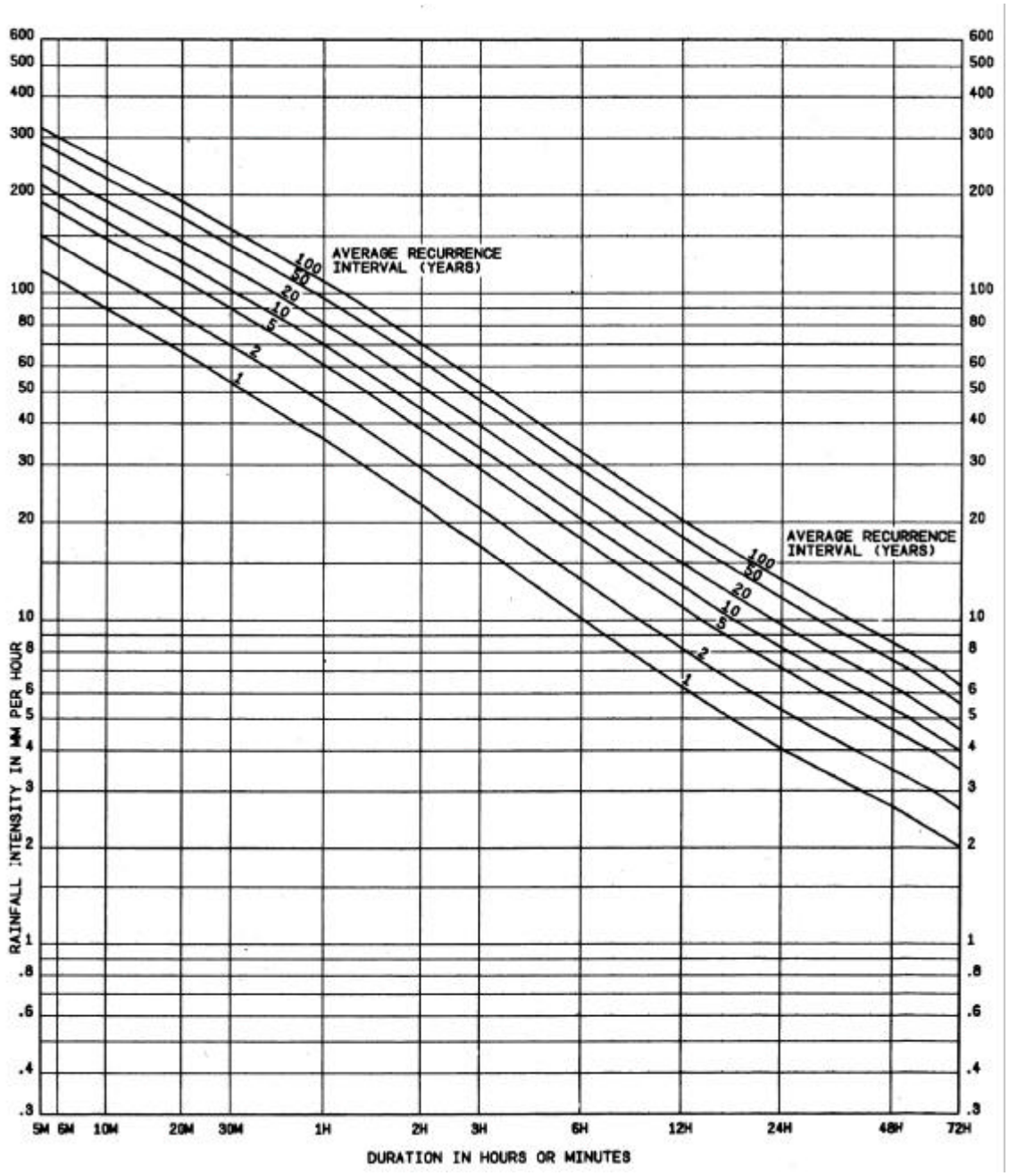
A2.7 RAINFALL INTENSITY

Refer *QUDM* Section 5.07.

TABLE BA2.7.1 RAINFALL INTENSITY FOR BRISBANE

Duration (Minutes)	Average Recurrence Interval						
	1 year mm/h	2 year mm/h	5 year mm/h	10 year mm/h	20 year mm/h	50 year mm/h	100 year mm/h
5.0	117	151	191	215	248	291	325
5.2	116	149	189	212	244	287	320
5.4	114	147	186	209	241	283	316
5.6	113	145	184	207	238	279	312
5.8	111	143	181	204	235	276	308
6.0	110	141	179	202	232	273	304
6.2	108	139	177	199	229	269	300
6.4	107	138	175	197	227	266	297
6.6	106	136	173	195	224	263	294
6.8	105	135	171	193	222	261	291
7.0	103	133	169	190	219	258	288
7.2	102	132	167	189	217	255	285
7.4	101	130	166	187	215	253	282
7.6	100	129	164	185	213	250	279
7.8	99	128	162	183	211	248	277
8.0	98	126	161	181	209	246	274
8.5	96	123	157	177	204	240	269
9.0	94	121	154	173	200	236	263
9.5	92	118	150	170	196	231	258
10.0	90	116	147	167	192	227	253
10.5	88	113	145	164	189	222	249
11.0	86	111	142	161	185	219	244
11.5	85	109	139	158	182	215	240
12.0	83	107	137	155	179	212	237
12.5	82	105	135	153	176	208	233
13.0	80	104	133	150	174	205	229
13.5	79	102	131	148	171	202	226
14.0	78	100	129	146	169	199	223
14.5	77	99	127	144	166	196	220
15.0	75	97	125	142	164	194	217
15.5	74	96	123	140	162	191	214
16.0	73	95	122	138	160	189	211
16.5	72	93	120	136	158	186	209
17.0	71	92	118	134	156	184	206
17.5	70	91	117	133	154	182	204
18.0	69	90	115	131	152	180	201
18.5	68	88	114	129	150	178	199
19.0	68	87	113	128	148	176	197
19.5	67	86	111	126	147	174	195
20.0	66	85	110	125	145	172	193
20.5	65	84	109	124	143	170	191
21.0	64	83	108	122	142	168	189
21.5	64	82	106	121	140	166	187
22.0	63	81	105	120	139	165	185
22.5	62	81	104	118	137	163	183
23.0	62	80	103	117	136	161	181
23.5	61	79	102	116	135	160	179
24.0	60	78	101	115	133	158	178
24.5	60	77	100	114	132	157	176
25.0	59	76	99	113	131	155	174
26.0	58	75	97	111	128	152	171
27.0	57	74	95	108	126	150	168

Duration (Minutes)	Average Recurrence Interval						
	1 year mm/h	2 year mm/h	5 year mm/h	10 year mm/h	20 year mm/h	50 year mm/h	100 year mm/h
28.0	56	72	94	107	124	147	165
29.0	55	71	92	105	122	145	162
30.0	54	70	90	103	120	142	160
31	53	68	89	101	118	140	157
32	52	67	87	100	116	138	155
33	51	66	86	98	114	136	152
34	50	65	85	96	112	133	150
35	49	64	83	95	111	131	148
36	49	63	82	94	109	130	146
37	48	62	81	92	107	128	144
38	47	61	80	91	106	126	142
39	47	60	79	90	104	124	140
40	46	59	77	88	103	123	138
45	43	56	72	83	97	115	129
50	40	52	68	78	91	108	122
55	38	49	64	74	86	103	115
60	36	47	61	70	82	97	110
90	28	36	47	54	63	76	85
120	23	29	39	45	52	62	71
150	19	25	33	38	45	54	61
180	17	22	29	34	39	47	53
210	15	20	26	30	35	42	48
240	14	18	24	27	32	39	44
Based on coefficients issued by the Bureau of Meteorology(Ref FN2615) for 27475 S 152025 E Calculated in accordance with Australian Rainfall and Runoff (1987 Edition)							



Location 27475S 152025E
Based on diagram prepared by Hydrology Branch, Bureau of Meteorology, Melbourne
Issued 29 April 1988 Ref FN2615

FIGURE BA2.7.1
RAINFALL INTENSITY DIAGRAM FOR BRISBANE

A2.8 DRAINAGE CALCULATIONS

Refer *QUDM* Section 5.00.

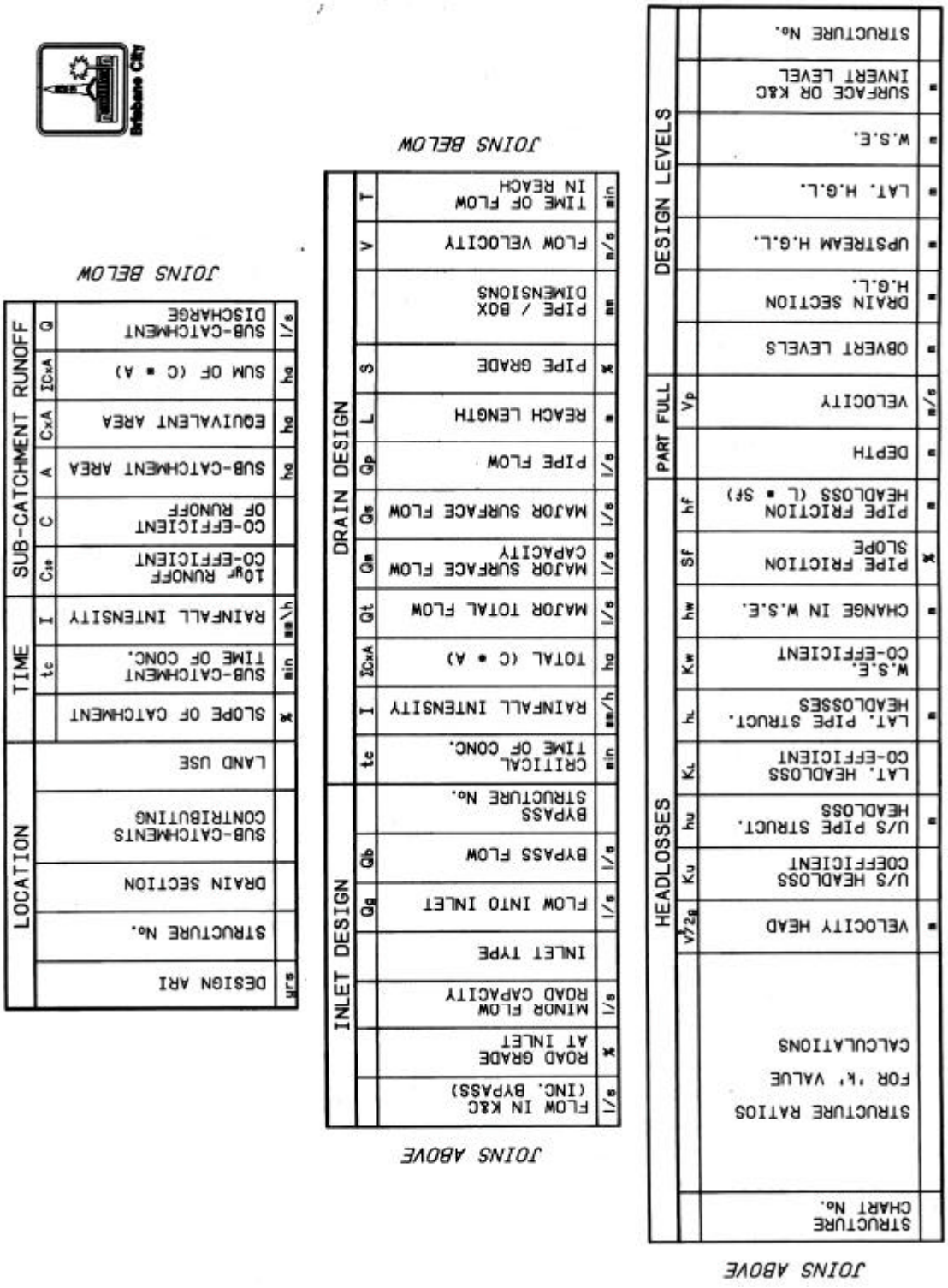


FIGURE BA2.8.1
DRAINAGE CALCULATIONS