SNOWY RIVER SHIRE COUNCIL

HANDBOOK OF DRAINAGE DESIGN CRITERIA

SUPPLEMENT TO DEVELOPMENT DESIGN SPECIFICATION D5 **STORMWATER DRAINAGE DESIGN**

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Intensity, Frequency, Duration Relationships

The following Intensity, Frequency, Duration Relationships charts and tables are provided for various locations within the Snowy River Shire.

Where drainage designs are prepared for other locations, designers should source IFD data from the Bureau of Meterology.

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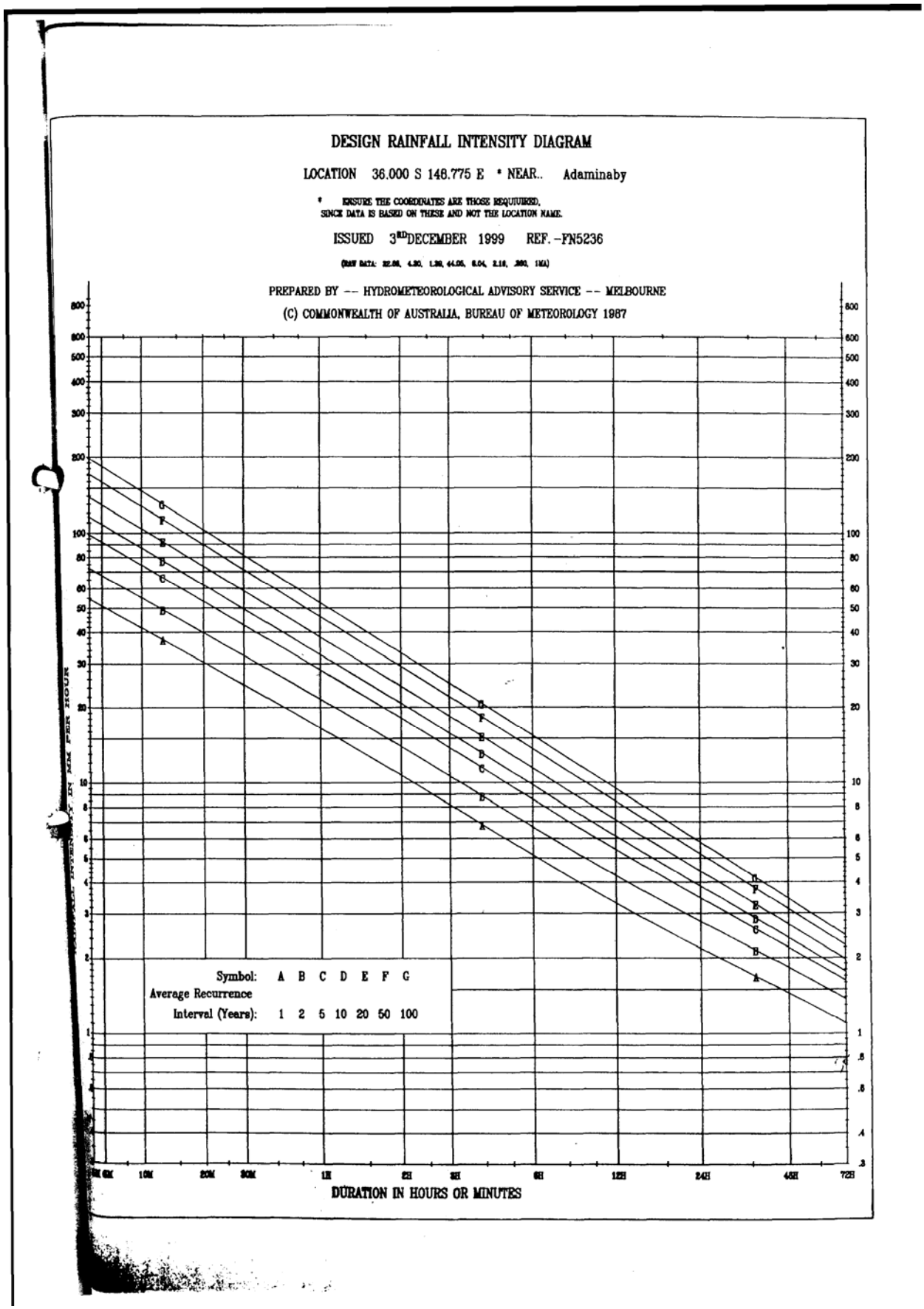
DESIGN RAINFALL INTENSITY DIAGRAM
LOCATION 36.000 S 148.775 E * NEAR.. Adaminaby
* ENSURE THE COORDINATES ARE THOSE REQUIURED,
SINCE DATA IS BASED ON THESE AND NOT THE LOCATION NAME.
ISSUED 3RD DECEMBER 1999 REF. -FN5236
PREPARED BY -- HYDROMETEOROLOGICAL ADVISORY SERVICE -- MELBOURNE
(C) COMMONWEALTH OF AUSTRALIA, BUREAU OF METEOROLOGY 1987
Symbol: A B C D E F G
Average Recurrence
Interval (Years): 1 2 5 10 20 50 100
DURATION IN HOURS OR MINUTES

LOCATION 36.000 S 148.775 E * NEAR.. Adaminaby ISSUED 3RD DECEMBER 1999 REF.-FN5236

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LIST OF COEFFICIENTS TO EQUATIONS OF THE FORM

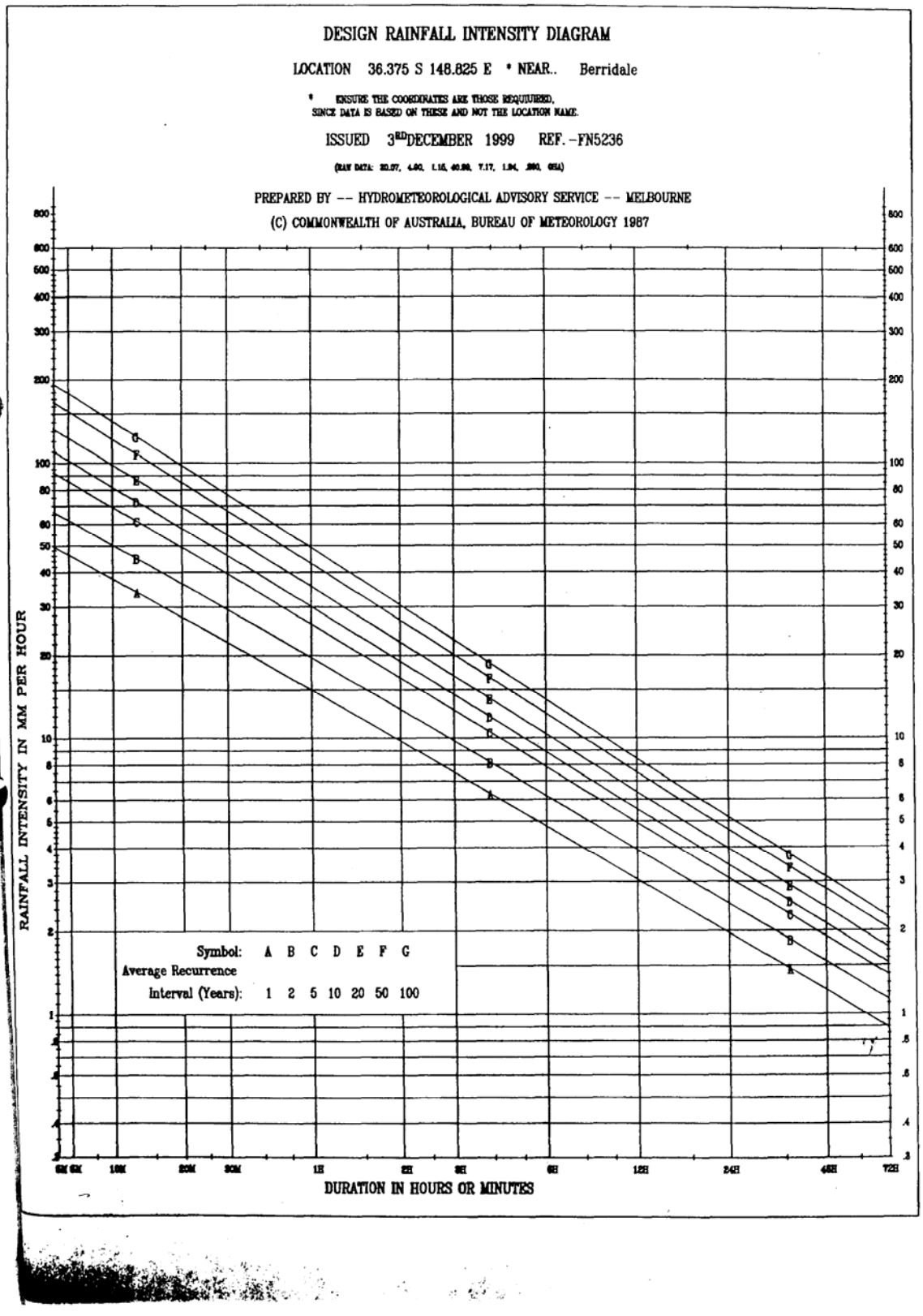
$$LN(I) = A + B*(LN(T)) + C*(LN(T))**2 + D*(LN(T))**3 + E*(LN(T))**4 + F*(LN(T))**5 + G*(LN(T))**6$$

T = TIME IN HOURS I = INTENSITY IN MILLIMETRES PER HOUR

RETURN PERIOD (YEARS)	A	B	C	D	E	F	G
1	2.6067	-.6052	-.0447	.00657	.002385	-.0000077	-.0000993
2	3.0738	-.6103	-.0438	.00634	.002289	.0000207	-.0001044
5	3.3443	-.6257	-.0397	.00733	.001485	-.0001016	-.0000628
10	3.4859	-.6340	-.0378	.00789	.001070	-.0001775	-.0000392
20	3.6481	-.6416	-.0360	.00864	.000707	-.0002675	-.0000157
50	3.8364	-.6501	-.0340	.00904	.000343	-.0003098	-.0000008
100	3.9655	-.6556	-.0327	.00932	.000087	-.0003445	.0000112

RAINFALL INTENSITY IN MM/HR FOR VARIOUS DURATIONS AND RETURN PERIODS

DURATION (HOURS)	RETURN PERIOD 1 YEAR	2 YEARS	5 YEARS	10 YEARS	20 YEARS	50 YEARS	100 YEARS
.083	54.7	72.5	96.8	116.	139.	172.	196.
.100	51.2	67.8	92.2	108.	129.	160.	184.
.167	41.7	55.1	74.5	87.2	104.	128.	147.
.333	30.3	39.9	53.3	62.1	73.7	89.9	103.
.500	24.6	32.3	42.8	49.6	58.7	71.4	81.5
1.000	16.6	21.6	28.3	32.7	38.4	46.4	52.7
2.000	10.7	13.9	18.1	20.7	24.3	29.2	33.1
3.000	8.17	10.6	13.7	15.7	18.4	22.0	25.0
6.000	5.14	6.66	8.56	9.78	11.4	13.6	15.4
12.000	3.30	4.26	5.41	6.13	7.11	8.44	9.49
24.000	2.18	2.79	3.47	3.87	4.44	5.21	5.81
48.000	1.45	1.83	2.20	2.40	2.72	3.12	3.44
72.000	1.10	1.37	1.62	1.76	1.97	2.24	2.45


DESIGN RAINFALL INTENSITY DIAGRAM
LOCATION 36.375 S 148.825 E * NEAR.. Berridale
* ENSURE THE COORDINATES ARE THOSE REQUIRED, SINCE DATA IS BASED ON THESE AND NOT THE LOCATION NAME.
ISSUED 3RD DECEMBER 1999 REF. -FN5236
PREPARED BY -- HYDROMETEOROLOGICAL ADVISORY SERVICE -- MELBOURNE
(C) COMMONWEALTH OF AUSTRALIA, BUREAU OF METEOROLOGY 1987
RAINFALL INTENSITY IN MM PER HOUR
DURATION IN HOURS OR MINUTES
Symbol: A B C D E F G
Average Recurrence Interval (Years): 1 2 5 10 20 50 100

LOCATION 36.375 S 148.825 E * NEAR.. Berridale ISSUED 3RD DECEMBER 1999 REF. -FN5236

PREPARED BY -- HYDROMETEOROLOGICAL ADVISORY SERVICE -- MELBOURNE

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LIST OF COEFFICIENTS TO EQUATIONS OF THE FORM

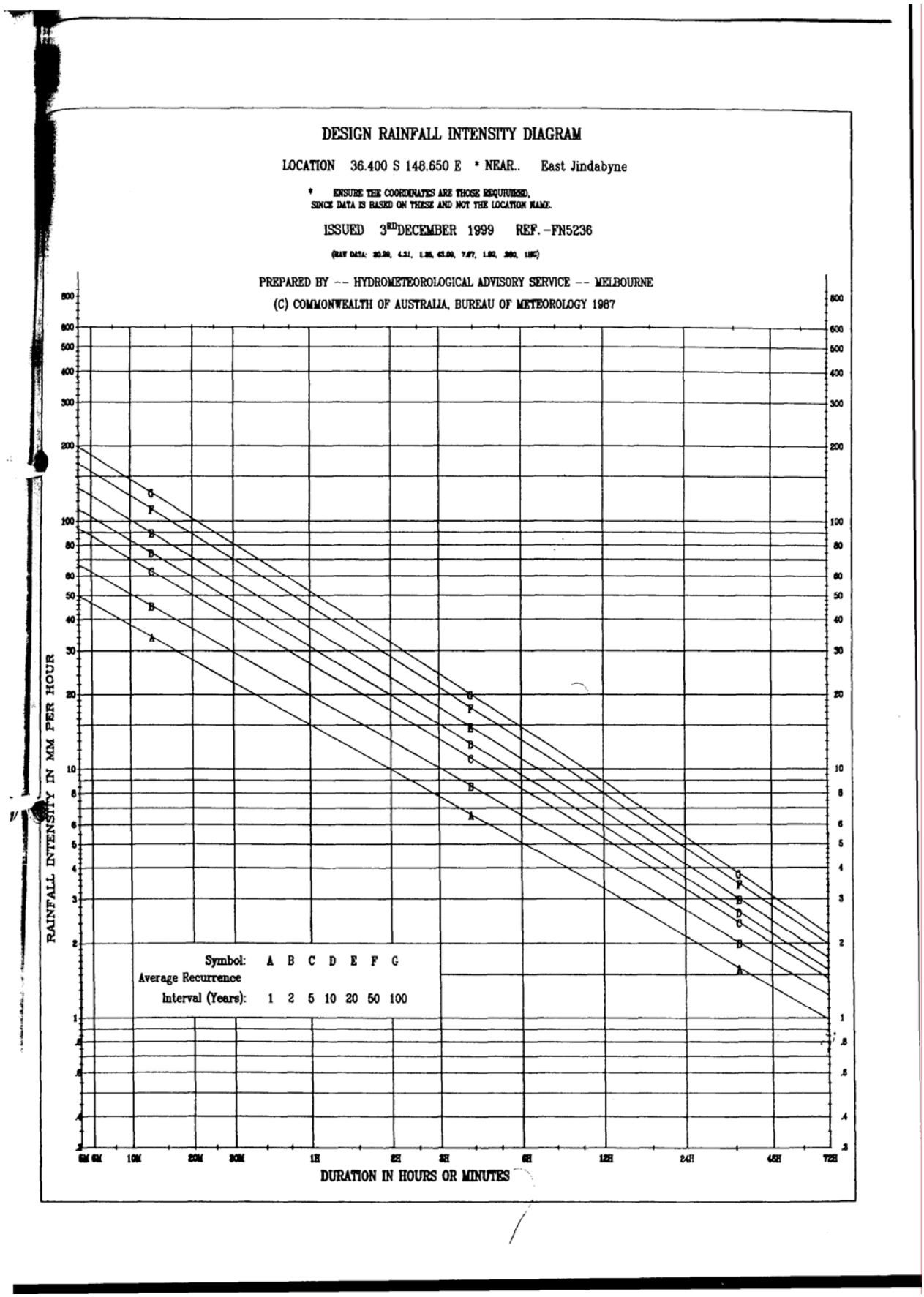
$$LN(I) = A + B*(LN(T)) + C*(LN(T))**2 + D*(LN(T))**3 + E*(LN(T))**4 + F*(LN(T))**5 + G*(LN(T))**6$$

T = TIME IN HOURS I = INTENSITY IN MILLIMETRES PER HOUR

RETURN PERIOD (YEARS)	A	B	C	D	E	F	G
1	2.7072	-.5995	-.0358	.00787	.000838	-.0002428	-.0000250
2	2.9777	-.6060	-.0356	.00795	.000761	-.0002482	-.0000206
5	3.2586	-.6315	-.0356	.00876	.000597	-.0003055	-.0000041
10	3.4054	-.6436	-.0364	.00837	.000803	-.0002279	-.0000259
20	3.5727	-.6537	-.0368	.00824	.000880	-.0001933	-.0000348
50	3.7662	-.6664	-.0369	.00848	.000840	-.0001972	-.0000317
100	3.8995	-.6744	-.0374	.00827	.000953	-.0001614	-.0000424

RAINFALL INTENSITY IN MM/HR FOR VARIOUS DURATIONS AND RETURN PERIODS

DURATION (HOURS)	RETURN PERIOD 1 YEAR	2 YEARS	5 YEARS	10 YEARS	20 YEARS	50 YEARS	100 YEARS
.083	49.6	66.3	92.2	110.	133.	165.	192.
.100	46.4	61.9	85.9	102.	123.	153.	176.
.167	37.5	50.3	69.2	81.9	98.5	122.	141.
.333	27.5	36.4	49.4	57.9	69.2	85.1	98.1
.500	22.3	29.4	39.5	46.1	54.9	67.2	77.2
1.000	15.0	19.6	26.0	30.1	35.6	43.2	49.4
2.000	9.75	12.7	16.6	19.0	22.3	26.8	30.5
3.000	7.51	9.76	12.6	14.4	16.8	20.1	22.8
6.000	4.79	6.19	7.87	8.91	10.3	12.3	13.8
12.000	3.07	3.93	4.94	5.54	6.39	7.53	8.42
24.000	1.96	2.50	3.10	3.46	3.97	4.65	5.16
48.000	1.22	1.55	1.90	2.12	2.41	2.82	3.12
72.000	.890	1.13	1.39	1.53	1.74	2.03	2.24


DESIGN RAINFALL INTENSITY DIAGRAM
LOCATION 36.400 S 148.650 E * NEAR.. East Jindabyne
* ENSURE THE COORDINATES ARE THOSE REQUIRED, SINCE DATA IS BASED ON THESE AND NOT THE LOCATION NAME.
ISSUED 3RD DECEMBER 1999 REF. -FN5236
PREPARED BY -- HYDROMETEOROLOGICAL ADVISORY SERVICE -- MELBOURNE
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RAINFALL INTENSITY IN MM PER HOUR
DURATION IN HOURS OR MINUTES
Symbol: A B C D E F G
Average Recurrence Interval (Years): 1 2 5 10 20 50 100

LOCATION 36.400 S 148.650 E * NEAR.. East Jindabyne ISSUED 3RD DECEMBER 1999 REF.-FN5236

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LIST OF COEFFICIENTS TO EQUATIONS OF THE FORM

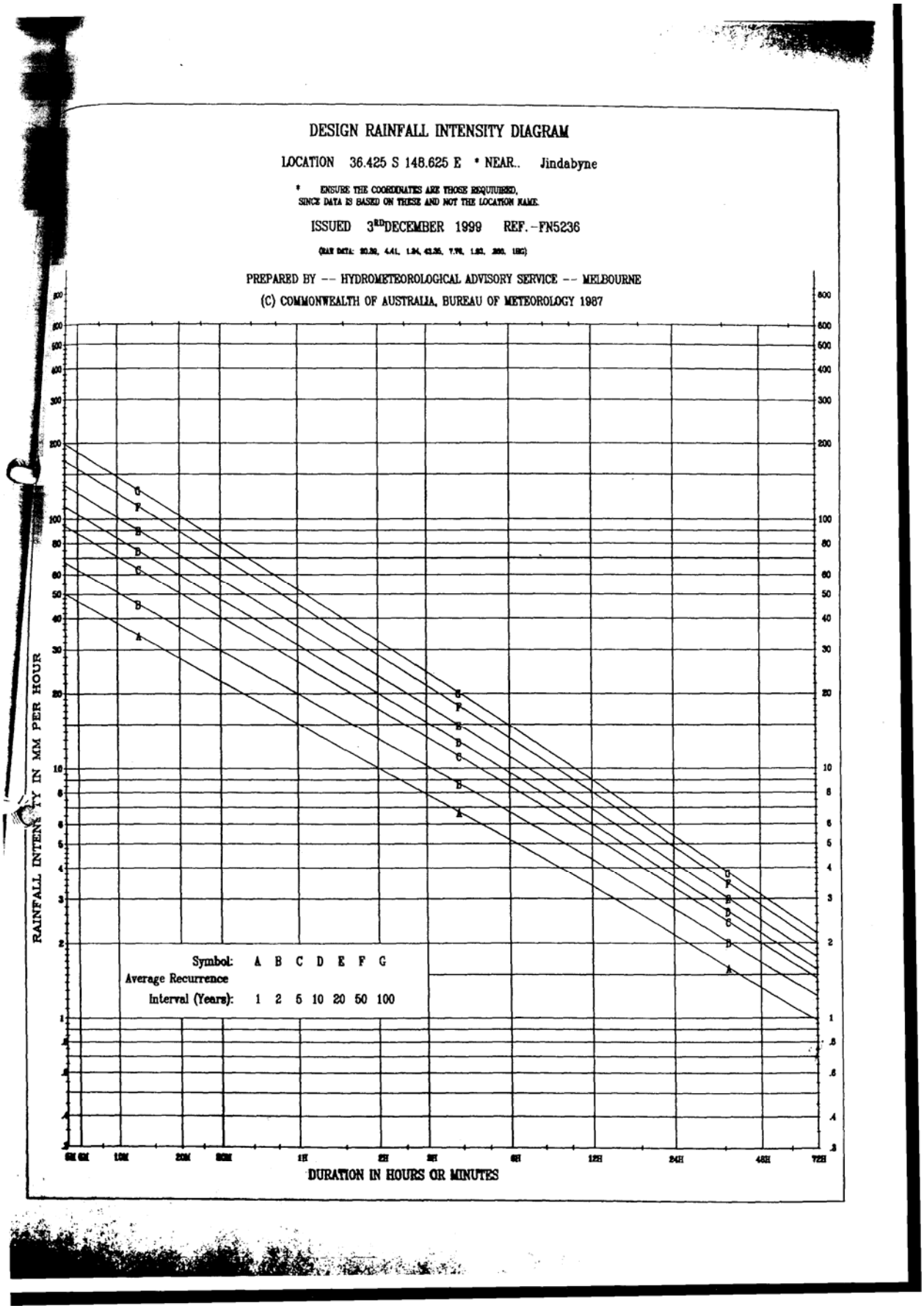
$$LN(I) = A + B*(LN(T)) + C*(LN(T))**2 + D*(LN(T))**3 + E*(LN(T))**4 + F*(LN(T))**5 + G*(LN(T))**6$$

T = TIME IN HOURS I = INTENSITY IN MILLIMETRES PER HOUR

RETURN PERIOD (YEARS)	A	B	C	D	E	F	G
1	2.7146	-.5863	-.0249	.00641	-.000314	-.0003140	.0000220
2	2.9905	-.5968	-.0257	.00909	-.000410	-.0003841	.0000364
5	3.2862	-.6206	-.0295	.00902	-.000187	-.0003624	.0000254
10	3.4410	-.6341	-.0318	.00934	-.000026	-.0003898	.0000229
20	3.6147	-.6458	-.0336	.00974	.000047	-.0004309	.0000265
50	3.8168	-.6596	-.0356	.01014	.000115	-.0004683	.0000298
100	3.9547	-.6687	-.0368	.01039	.000131	-.0004947	.0000337

RAINFALL INTENSITY IN MM/HR FOR VARIOUS DURATIONS AND RETURN PERIODS

DURATION (HOURS)	RETURN PERIOD 1 YEAR	2 YEARS	5 YEARS	10 YEARS	20 YEARS	50 YEARS	100 YEARS
.083	60.0	67.0	93.6	112.	136.	170.	196.
.100	46.6	62.6	87.4	104.	126.	158.	184.
.167	38.1	50.9	70.6	83.9	101.	126.	146.
.333	27.6	36.7	50.4	59.6	71.6	88.8	103.
.500	22.3	29.6	40.4	47.6	57.0	70.4	81.2
1.000	15.1	19.9	26.7	31.2	37.1	45.5	52.2
2.000	10.0	13.0	17.2	19.9	23.4	28.4	32.4
3.000	7.77	10.1	13.2	15.1	17.8	21.4	24.3
6.000	5.06	6.56	8.36	9.49	11.0	13.1	14.8
12.000	3.31	4.24	5.29	5.93	6.81	8.01	8.94
24.000	2.14	2.71	3.30	3.67	4.17	4.84	5.36
48.000	1.34	1.66	2.00	2.19	2.46	2.82	3.09
72.000	.991	1.24	1.45	1.57	1.75	1.99	2.17


DESIGN RAINFALL INTENSITY DIAGRAM
LOCATION 36.425 S 148.625 E * NEAR.. Jindabyne
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ISSUED 3RD DECEMBER 1999 REF.-FN5236
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RAINFALL INTENSITY IN MM PER HOUR
DURATION IN HOURS OR MINUTES
Symbol: A B C D E F G
Average Recurrence Interval (Years): 1 2 5 10 20 50 100

LOCATION 36.425 S 148.625 E * NEAR.. Jindabyne ISSUED 3RD DECEMBER 1999 REF.-FN5236

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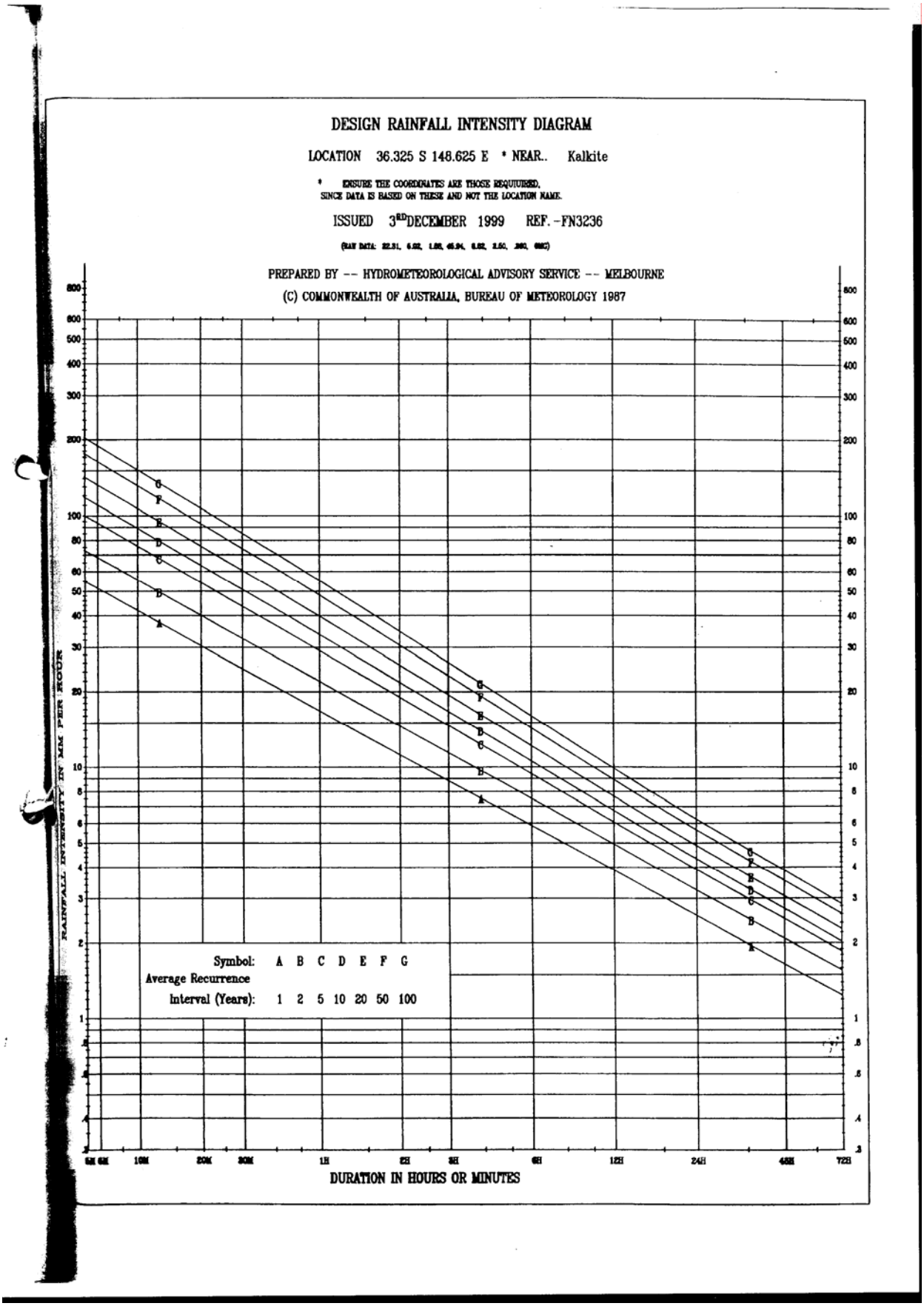
$$LN(I) = A + B*(LN(T)) + C*(LN(T))**2 + D*(LN(T))**3 + E*(LN(T))**4 + F*(LN(T))**5 + G*(LN(T))**6$$

T = TIME IN HOURS I = INTENSITY IN MILLIMETRES PER HOUR

RETURN PERIOD (YEARS)	A	B	C	D	E	F	G
1	2.7192	-.5834	-.0200	.00949	-.001155	-.0004633	.0000701
2	2.9960	-.5938	-.0221	.00978	-.001006	-.0004770	.0000670
5	3.2916	-.6162	-.0273	.00944	-.000537	-.0004213	.0000438
10	3.4468	-.6321	-.0304	.00969	-.000255	-.0004419	.0000365
20	3.6207	-.6447	-.0322	.01038	-.000268	-.0005156	.0000502
50	3.8229	-.6577	-.0353	.01000	.000059	-.0004600	.0000302
100	3.9606	-.6674	-.0369	.01030	.000143	-.0004836	.0000315

RAINFALL INTENSITY IN MM/HR FOR VARIOUS DURATIONS AND RETURN PERIODS

DURATION (HOURS)	RETURN PERIOD 1 YEAR	2 YEARS	5 YEARS	10 YEARS	20 YEARS	50 YEARS	100 YEARS
.083	50.2	67.2	94.1	112.	136.	171.	199.
.100	46.9	62.8	87.7	105.	127.	158.	184.
.167	38.3	51.1	70.9	84.2	102.	127.	147.
.333	27.7	36.9	50.7	59.9	72.0	89.2	103.
.500	22.4	29.8	40.6	47.6	57.3	70.7	81.6
1.000	15.2	20.0	26.9	31.4	37.4	45.7	52.5
2.000	10.1	13.2	17.3	20.0	23.6	28.6	32.6
3.000	7.86	10.3	13.3	15.3	17.9	21.6	24.4
6.000	5.19	6.69	8.49	9.61	11.1	13.2	14.9
12.000	3.39	4.33	5.36	6.02	6.90	8.09	9.02
24.000	2.16	2.75	3.35	3.71	4.21	4.88	5.41
48.000	1.33	1.68	2.01	2.20	2.47	2.84	3.13
72.000	.960	1.23	1.46	1.57	1.76	2.00	2.20


DESIGN RAINFALL INTENSITY DIAGRAM
LOCATION 36.325 S 148.625 E * NEAR.. Kalkite
* ENSURE THE COORDINATES ARE THOSE REQUIURED,
SINCE DATA IS BASED ON THESE AND NOT THE LOCATION NAME.
ISSUED 3RDDECEMBER 1999 REF.-FN3236
PREPARED BY -- HYDROMETEOROLOGICAL ADVISORY SERVICE -- MELBOURNE
(C) COMMONWEALTH OF AUSTRALIA, BUREAU OF METEOROLOGY 1987
RAINFALL INTENSITY IN MM PER HOUR
Symbol: A B C D E F G
Average Recurrence
Interval (Years): 1 2 5 10 20 50 100
DURATION IN HOURS OR MINUTES

LOCATION 36.325 S 148.625 E * NEAR.. Kalkite ISSUED 3RD DECEMBER 1999 REF. -FN3236

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T = TIME IN HOURES I = INTENSITY IN MILLIMETRES PER HOUR

RETURN PERIOD (YEARS)	A	B	C	D	E	F	G
1	2.8182	-.5716	-.0183	.00741	-.000608	-.0001721	.0000079
2	3.0695	-.5815	-.0214	.00763	-.000337	-.0001789	.0000013
5	3.3716	-.6049	-.0279	.00730	.000320	-.0001138	-.0000282
10	3.5190	-.6180	-.0319	.00738	.000730	-.0001046	-.0000425
20	3.6865	-.6292	-.0348	.00747	.000950	-.0001139	-.0000458
50	3.8805	-.6427	-.0386	.00771	.001303	-.0001192	-.0000553
100	4.0138	-.6513	-.0411	.00772	.001537	-.0001155	-.0000626

RAINFALL INTENSITY IN MM/HR FOR VARIOUS DURATIONS AND RETURN PERIODS

	RETURN PERIOD						
DURATION (HOURS)	1 YEAR	2 YEARS	5 YEARS	10 YEARS	20 YEARS	50 YEARS	100 YEARS
.083	55.0	72.9	100.	118.	142.	176.	203.
.100	51.5	68.3	93.6	110.	133.	164.	189.
.167	42.0	55.6	75.8	89.1	107.	131.	151.
.333	30.4	40.1	54.2	63.5	75.7	92.9	107.
.500	24.6	32.5	43.6	50.9	60.6	74.1	85.1
1.000	16.7	22.0	29.1	33.7	39.9	48.4	55.4
2.000	11.2	14.6	18.9	21.7	25.4	30.5	34.7
3.000	8.82	11.4	14.6	16.6	19.4	23.1	26.1
6.000	5.86	7.51	9.40	10.5	12.1	14.3	16.0
12.000	3.90	4.95	6.07	6.73	7.67	8.93	9.91
24.000	2.57	3.25	3.93	4.33	4.90	5.66	6.25
48.000	1.65	2.06	2.49	2.73	3.08	3.54	3.89
72.000	1.24	1.56	1.85	2.02	2.27	2.60	2.85