SINCLAIR KNIGHT MERZ

Brisbane City Council
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Brisbane River Flood Study

FINAL REPORT
Volume 1

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Acknowledgments

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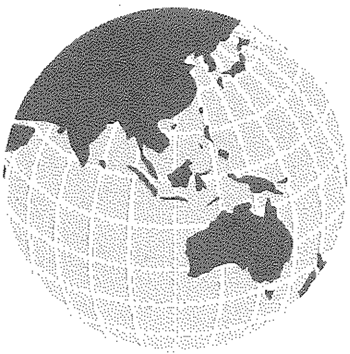
Department of Natural Resources (DNR)
Bureau of Meteorology (BOM)
South East Queensland Water Board (SEQWB)

In particular, we would like to thank Terry Malone (BOM), John Ruffini (DNR) and Garry Grant (SEQWB) for without their help and supply of information our task would have been much more difficult.



Executive Summary

Executive Summary

Sinclair Knight Merz were commissioned on the 5 November 1996 by Brisbane City Council to undertake a flood study of Brisbane River.

The **primary objectives** of the study were;

- to provide technically based flood development levels along the length of the Brisbane River within the confines of the Brisbane City Boundary, and
- develop a Flood Forecasting Model.

The **secondary objectives** of the study were to;

- set flood regulation lines, and
- to develop a revegetation strategy compatible with hydraulic constraints.

The modelling and investigation undertaken in this study will form the basis for a floodplain management strategy for the Brisbane River.

The study involved the collection and analysis of available rainfall, survey and hydrographic data. Using this data a hydrologic and hydraulic model was developed, calibrated and tested using four historical flood events. These floods were;

- January 1974
- May 1996
- June 1983 and
- Late April 1989

Following calibration, the models were then verified against the following historical events:

- February 1931
- March 1955
- Early April 1989 and
- July 1973

Data for the February 1931 and March 1955 historical events was not available during the calibration/verification phase of the study and verification of these events was performed at a later date.

The hydrologic modelling has been carried out using the XP-RAFTS hydrologic model. This model converts rainfall to runoff after considering catchment storage effects and losses.

The MIKE 11 hydrodynamic hydraulic model was selected for the hydraulic analysis.

Calibration of the hydrologic and hydraulic models has been carried out in parallel to ensure the river storage in the two models is consistent. Parameters within the hydrologic model were adjusted until a good match between continuous historical streamflow records and predicted streamflows were achieved. These flows were then used in the hydraulic model and calibration was conducted until predicted flood levels provided a good match between continuous historical flood level data and peak flood levels. The discharge hydrographs routed through MIKE 11 were then compared to the discharge hydrographs produced by RAFTS. This process was repeated until the peak discharges of the hydrographs produced by each model were consistent to within 10%.

The MIKE 11 hydraulic model was calibrated to recorded historical flood levels primarily through variation of Manning's n roughness parameters along the river.

Good calibration of both the hydrologic and hydraulic models have been obtained. These results were achieved on the basis of;

- maintaining realistic rainfall loss rates over the entire catchment
- maintaining realistic river roughness parameters representative of the current river configuration and
- obtaining a satisfactory hydraulic performance of the major structures.

An analysis of design storm events was then performed to establish design flood characteristics in the Brisbane River using the calibrated hydrologic RAFTS model and the hydraulic MIKE 11 model. A range of varying average recurrence intervals from 2 year ARI through to Probable Maximum Precipitation were analysed.

The hydrologic analysis was performed for existing catchment conditions to determine inflow hydrographs for the calculation of design flood profiles for the Brisbane River. These design events were analysed assuming simplified operations of Wivenhoe and Somerset Dams as RAFTS cannot model the complex operations associated with these dams. The design flood profiles have been prepared using MIKE 11. The tabulated results from these profiles provide peak flood levels and discharges at each cross section within the extent of the hydraulic model (river mouth to upstream city boundary).

Major hydraulic structures along the Brisbane River were assessed individually and it was found that three of these structures generated affluxes in excess of the 150 mm for the 100 year ARI flood event. It was concluded that no upgrades of these structures should occur due to the high costs involved in undertaking such a project.

The waterway management component of this study required application of the hydraulic model of the Brisbane River to delineate flood regulation lines, determine a revegetation strategy and to assess stream rehabilitation.

Regulation Line Strategy
Regulation lines are used by Council as a control on development encroaching onto the floodplains of major rivers and creeks. They are set to ensure that works such as placement of fill does not compromise existing flood immunity.

As no interim regulation lines were in place for the Brisbane River, regulation lines were set using the calibrated hydraulic MIKE 11 model. This work was principally based on the 'worst case' design scenario of the 100 year ARI flood event with regulation lines and revegetation strategy in place.

Revegetation Strategy
A revegetation strategy for the Brisbane River (river mouth to upper city boundary) has been developed which complies with the current Strategic Plan for the Management of Brisbane Waterways. The testing was conducted using the 100 year ARI design flood.

The approach taken was generally to adhere to the interim Waterway Corridor widths for the Brisbane River. These widths are generally practical in terms of width of river corridor to private property boundaries. They also provide a sufficient width to act as wildlife corridors.

The proposed revegetation strategy applies to areas both within and beyond the waterway corridors. Tree planting has been proposed and tested for areas beyond the waterway corridor as private landholders may revegetate these areas. It has been assumed that this will create the worst case scenario.

All proposed revegetation has been tested by adding 0.15 to existing case Manning's n roughness parameters as this was assumed to be the worst case tree planting density. The maximum increase in flood levels throughout the reach due to proposed revegetation was predicted to be 20 mm.

In some reaches several solutions to the regulation line location and the revegetation strategy satisfy the hydraulic constraints. In these areas the most practical solution was adopted considering planning, environmental and economic criteria.

A flood forecasting model has also been developed for the Brisbane River in conjunction with an assessment of possible escape routes and areas within the city boundary that become isolated during flood events. Since the Brisbane River system is effected by tidal influences, a hydrologic and hydraulic model had to be developed. These models will form an integral part of the PROPHET flood warning system that will enable the forecasting of flood levels at key locations on the Brisbane River. These models require rainfall information from radio telemetry gauges within the confines of the city boundary and inflow hydrographs provided by the DNR at the upstream Brisbane City Boundary and Bremer River inflow points. These hydrographs account for the complex dam operations that cannot be simply modelled by the RAFTS hydrologic model.

A flood contouring exercise was conducted using MIKE 11 predicted flood levels and super-elevation formula to produce a two dimensional flood surface along the hydraulic reach of the Brisbane River. Initially it was proposed that the two dimensional hydrodynamic model FastTABS would be used to post process one dimensional results generated by MIKE 11 to produce these contours however due to the size of the river, FastTABS was unable cope with the amount of digital terrain data that was required to complete this process.

Finally a community consultation process was conducted during the course of the study. An Information Bulletin/Questionnaire was distributed to 13 community groups offering these groups the opportunity to respond to a survey which was primarily concerned with the revegetation and rehabilitation of the river corridor. The response from the community groups was considered to be poor however 100% of the respondents agree with revegetation of the river corridor.

1. Introduction

1. Introduction

The Brisbane River Flood Study is a major initiative of the Brisbane City Council to establish design flood levels along the lower reach of Brisbane River. Additional outcomes of the investigation shall be the setting of flood regulation lines, a revegetation strategy compatible with hydraulic constraints and a flood forecasting model.

This is the final report which comprises the four (4) progress reports generated throughout the study. These progress reports consisted of:

- Calibration Report
- Design Event Report
- Waterway Management Report
- Flood Mapping Report.

2. Catchment Description

2. Catchment Description

The extent of the Brisbane River catchment is shown in **Figure 2-1 - Locality Plan**. It covers an area of 13 570 square kilometres and is bounded to the west by the Great Dividing Range and by a number of smaller coastal ranges to the east and north. Most of the catchment comprises of forest and grazing land, with the exception of the Brisbane - Ipswich metropolitan areas and numerous small rural townships.

Cooyar Creek, Emu Creek and Cressbrook Creek are the main tributaries of the upper Brisbane River and have headwaters in the Great Dividing Range. Cooyar Creek is the most northerly of the upper Brisbane River tributaries and tends to have the lowest annual rainfalls recorded within the catchment.

The Stanley River is the only major tributary of the Brisbane River that flows westwards and its source is the Conandale and D'Aguilar Ranges near the coast. This part of the Brisbane River catchment is relatively steep and receives the highest rainfall.

Lockyer Creek is the largest tributary of the Brisbane River in terms of catchment size, with a total area of 2 600 square kilometres. The lower floodplains of the Lockyer Valley are used for intensive agriculture, including vegetables and small crops. The hilly upper parts of the catchment to the south and west is mainly forest.

The Bremer River occupies the south west corner of the Brisbane Valley and has its headwaters in the Little Liverpool Range. Its catchment is generally hilly and lightly forested. A major tributary of the Bremer River is Warrill Creek. The lower reaches of the Bremer River flow through the City of Ipswich.

The Brisbane River and its major tributaries are regulated by several dams and reservoirs. A list of major dam structures is given in **Table 2-1 - Major Dams in the Brisbane Valley**. The largest storages are associated with Somerset Dam and Wivenhoe Dam.

Table 2-1 - Major Dams in the Brisbane Valley

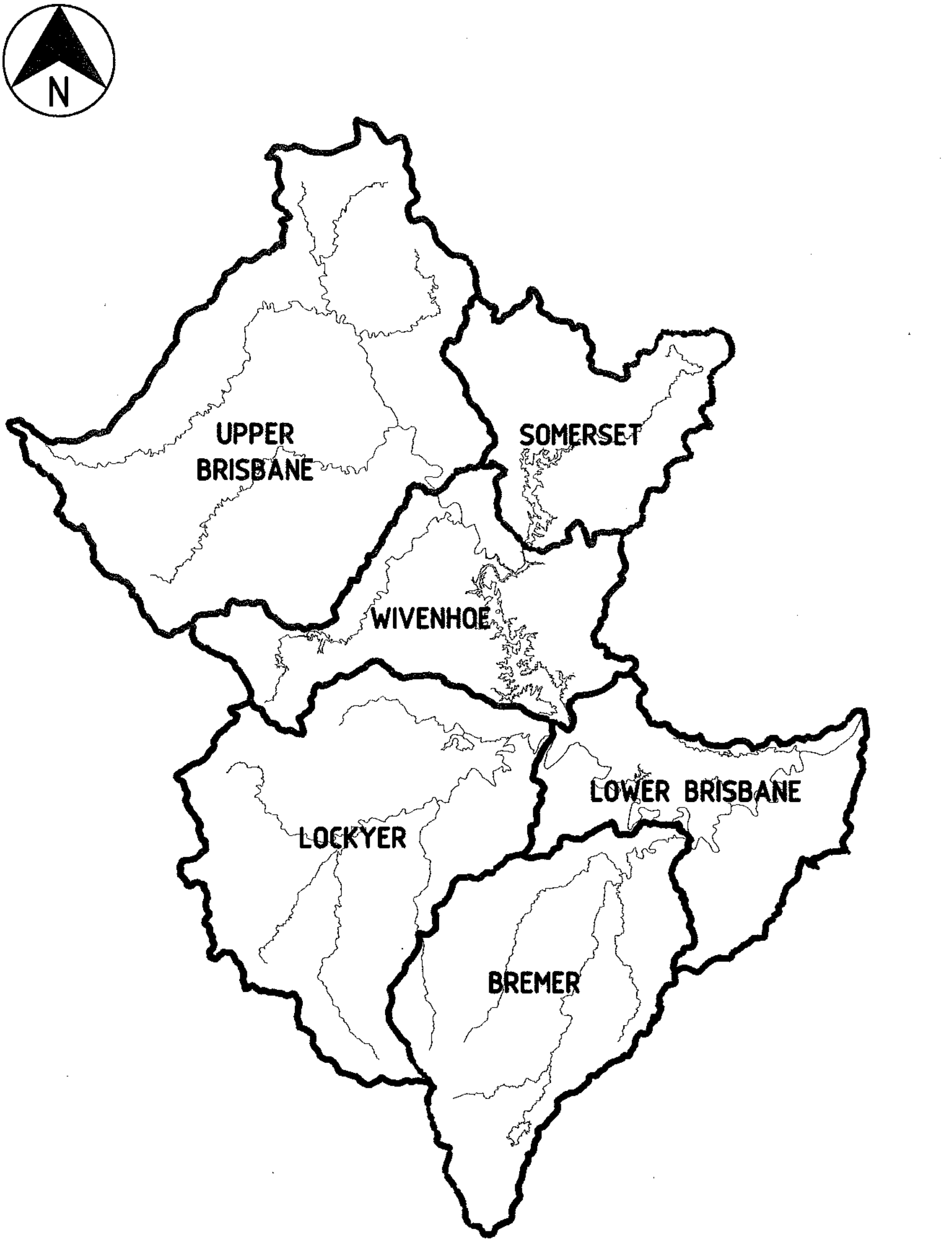
Damsite	River/Creek	Year of Completion	Capacity at Full Supply Level (ML)
Wivenhoe	Brisbane	1985	1 150 000
Somerset	Stanley	1959	369 750
Cressbrook	Cressbrook	1982	78 300
Perseverance	Perseverance	1965	30 300
Atkinson	Buaraba	1970	31 300
Lake Manchester	Cabbage Tree	1916	25 700
Mt Crosby Weir	Brisbane	1901	2 590
Moongerah Dam	Reynolds	1961	92 500
Enoggera Creek	Enoggera	1866	4 500

Somerset Dam is a multi-purpose dam owned by the South East Queensland Water Board and operated by Brisbane City Council. It supplies water for Brisbane, Ipswich and adjacent shires, has a limited power generation capacity and is also used for recreation purposes. A major role of the dam is for flood mitigation and a temporary flood storage of 524 000 ML is available.

Wivenhoe Dam is the largest dam structure in the Brisbane Valley and commands about half of the total Brisbane River catchment. It has a major effect on river hydrology due to its large flow regulation capacity. About 1 450 000 ML of flood storage is available at the dam.

For the purpose of hydrologic modelling the Brisbane River catchment can be divided into six broad subcatchments. The boundary of each subcatchment; defined as Upper Brisbane, Somerset, Wivenhoe, Lockyer, Bremer and Lower Brisbane, are shown in **Figure 2-2 - Brisbane River Subcatchments**

FIGURE 2.2
BRISBANE RIVER FLOOD STUDY
BRISBANE RIVER SUBCATCHMENTS



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3. Available Data

3. Available Data

3.1 Stream Gauges

Available Stream Gauges

Recorded flood hydrographs at key locations in the Brisbane River system are required for the purpose of hydrologic model calibration.

The network of stream gauges associated with the Brisbane River catchment is shown in **Figure 3-1 - Stream Gauge Locations** and detailed in **Table 3-1 - Brisbane River Stream Gauge Summary**. Several stream gauges have historical records extending over a period of more than eighty years. The majority of stream recorders were installed during the post 1960 period. Some gauges have been decommissioned including Brisbane River at Middle Creek, Cressbrook Creek at Damsite (both due to dam construction) and Warrill Creek at Kalbar.

Table 3-1 - Brisbane River Stream Gauge Summary

Number	Stream	Site	Record	% Catchment Area
Upper Brisbane River				
143015	Cooyar Creek	Damsite	1968 - date	7
143007	Brisbane River	Linville	1964 - date	15
143010	Emu Creek	Boat Mtn	1976 - date	7
143009	Brisbane River	Gregors Creek	1962 - date	29
143002	Brisbane River	Fulham Vale	1920 - 1965	29
Somerset and Wivenhoe				
143305	Stanley River	Somerset Dam	1935 - date	10
143008	Brisbane River	Middle Creek	1962 - 1982	49
143036	Brisbane River	Wivenhoe Dam	1986 - date	52
143901	Stanley River	Woodford	1918 date	2
143303	Stanley River	Peachester	1927 - date	1
143013	Cressbrook Creek	Damsite	1965 - 1981	2
143006	Tinton	Cressbrook Ck	1928 - 1980	3
143302	Stanley River	Silverton	1919 - 1968	10

Table 3-1 - Brisbane River Stream Gauge Summary (Continued)

Lockyer				
143203	Lockyer Creek	Helidon	1926 - date	3
143212	Tenthill Creek	Tenthill	1968 - date	3
143225	Laidley Creek	Showground	1984 - date	2
143210A	Lockyer Creek	Lyons Bridge	1909 - date	19
143210B	Lockyer Creek	Rifle Range	1988 - date	19
143907	Brisbane River	Lowood	1909 - date	77
143905	Lockyer Creek	Glenore Grove	1955 - date	16
143904	Lockyer Creek	Gatton	1929 - date	12
143204	Lockyer Creek	Wilsons Weir	1953 - 1982	12
143206	Brisbane River	Brightveiw Weir	1953 - 1973	18
Bremer and Lower Brisbane				
143001	Brisbane River	Savages Cross	1909 - date	78
143003	Brisbane River	Mt Crosby	1900 - date	78
143110	Bremer River	Adams Bridge	1968 - date	1
143107	Bremer River	Walloon	1961 - date	5
143102	Warrill Creek	Kalbar	1912 - 1973	3
143108	Warrill Creek	Amberley	1961 - date	7
143113	Purga Creek	Loamside	1973 - date	2
143911	Bremer River	David Trumpy	1893 - date	14
143915	Brisbane River	Moggill	1965 - date	94
143982	Brisbane River	Jindalee	1974?	95
143919	Brisbane River	Port Office	1841 - date	100
143101	Warrill Creek	Mudtapilly	1914 - 1953	6

Note: % catchment area estimated as proportion of total Brisbane River Catchment (equal to 13 570 km^2) upstream of the stream gauge.

Several stream gauges are located in the upper tributaries of the Brisbane River system and command a relatively small fraction of the total catchment draining to the City of Brisbane. About ten gauges have drainage areas less than 5 percent of the total Brisbane Valley catchment and are of secondary importance in the RAFTS model calibration process.

The primary stream gauges used for model calibration purposes include:

- Brisbane River at Linville - includes Cooyar Creek and headwaters of Brisbane River.

- Brisbane River at Gregors Creek - downstream of Linville and includes streamflows from Emu Creek, Maronghi Creek and Ivory Creek.

- Brisbane River at Middle Creek - is sited downstream of the Stanley River confluence and was closed in August 1982 due to the construction of Wivenhoe Dam. Records since 1959 include the flow regulation effects of Somerset Dam,

- Brisbane River at Lowood - is sited downstream of the confluence of Brisbane River and Lockyer Creek.

- Brisbane River at Savages Crossing and Mt Crosby - are both long term stream gauge sites and are important in isolating flow travel times and channel routing effects along the mid-reach section of the Brisbane River (between the Lockyer Creek and Bremer River junctions).

- Brisbane River at Moggill, Jindalee and Post Office Gauge are downstream of the Bremer River and are located within the coverage of the Brisbane River MIKE 11 model.

- Lockyer Creek at Glenore Grove - accounts for about 85% of the Lockyer Creek catchment (which in turn is of the order of 20% of the total Brisbane River catchment).

- Lockyer Creek at Lyons Bridge and Rifle Range are sited near the Brisbane River. Gauge heights are subject to backwater effects associated with Brisbane River floodwaters.

- Warrill Creek at Amberley measures streamflows at a major tributary of the Bremer River catchment.

- Bremer River at David Trumpy Bridge is located near the Brisbane River and gauge heights are affected by the incidence of flooding within the Brisbane River. The Bremer River catchment contributes to about 15 percent of the total Brisbane River catchment area.

A series of telemetric alert gauges have been established within the catchment for flood warning purposes and are utilised by the Department of Natural Resources and the Bureau of Meteorology. Most of these stream gauges have been installed in the last five years and are also shown in **Figure 3-1 - Stream Gauge Locations**. A listing of selected gauges is given in **Table 3-2 - Brisbane River Flood Alert Gauges**.

Table 3-2 - Brisbane River Flood Alert Gauges

Alert Number	Stream	Site
Upper Brisbane		
6709	Brisbane River	Devon Hills
6515	Brisbane River	Gregors Creek
Somerset and Wivenhoe		
6554	Cressbrook Creek	Rosentreters Bridge
6575	Brisbane River	Caboonbah
Lockyer		
6634	Lockyer Creek	Lyon
21019	Laidley Creek	Thornton
7078	Laidley Creek	Mulgowie
7167	Laidley Creek	Warrego Highway
Bremer and Lower Brisbane		
21025	Western Creek	Kuss Road
7020	Bremer River	Rosewood
6572	Warrill Creek	Harrisville
6740	Purga Creek	Washpool

Note: This table excludes alert stations located in Brisbane metropolitan area.

Stream Gauge Rating Curves
Stage discharge curves are available at the majority of stream gauges and were supplied by the Hydrology Section, Bureau of Meteorology. These rating curves are presented in **Figure 3-2 - Brisbane River Catchment Rating Curves**. All original rating curves were used in the RAFTS hydrological model except where identified on **Figure 3-2**.

Somerset Dam and Wivenhoe Dam Discharges
Inflow and outflow hydrographs associated with Somerset Dam and Wivenhoe Dam for several floods were supplied by Surface Water Assessment, Department of Natural Resources. The inflows are synthetic hydrographs derived from historical lake level data and storage outflow records.

3.2 Rainfall Data

Daily rainfall data and representative pluviograph data is required to describe the areal and temporal distribution of rainfall associated with historical flood events.

A total of about 60 rainfall stations were applied in this flood study and the coverage of these stations within and adjacent to the catchment is shown in **Figure 3-3 - Rainfall Station Locations**. A listing of stations is compiled in **Appendix A**.

Pluviometers, which record the temporal variation of rainfall during a storm, are distributed within the catchment as indicated on **Figure 3-4 - Pluviometer Locations**. These recorders are owned and operated by various authorities including the Bureau of Meteorology, Department of Natural Resources, Brisbane City Council, Toowoomba City Council and CSIRO. Several pluviometers have been recently installed as part of a flood alert system for the Brisbane River. A listing of pluviometers is also compiled in **Appendix A** along with pluviograph data overlaid onto IFD curves for each event at representative locations.

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LEGEND

● STREAM GAUGE LOCATION

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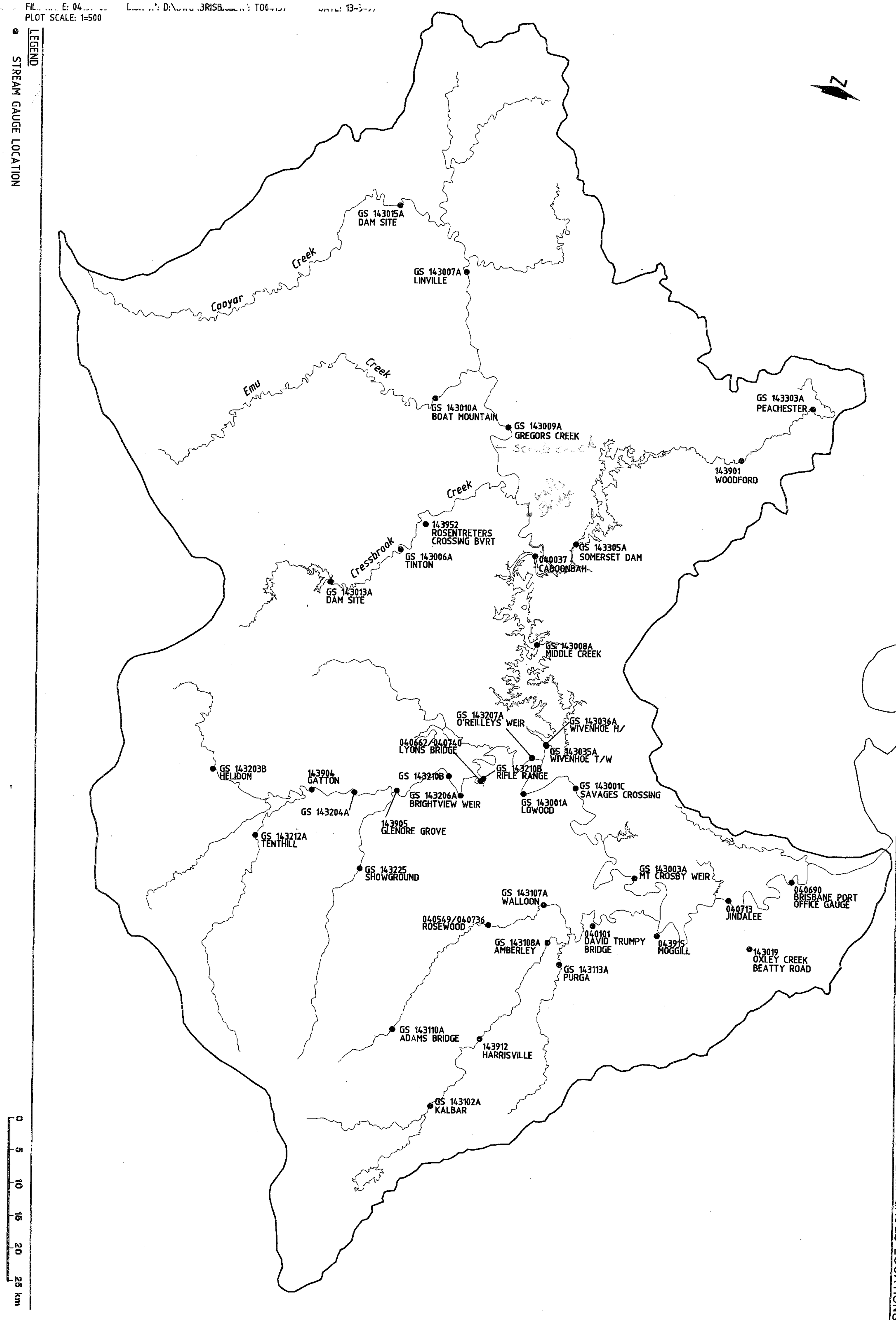


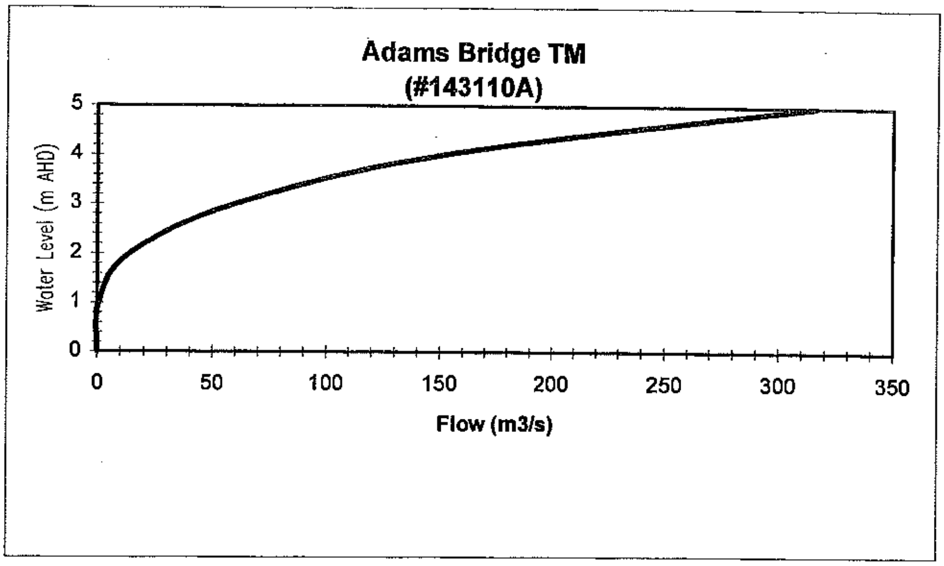
FIGURE 3.1
BRISBANE RIVER FLOOD STUDY
STREAM GAUGE LOCATIONS

BCC.121.0414

Figure 3.2 - Brisbane River Catchment Rating Curves

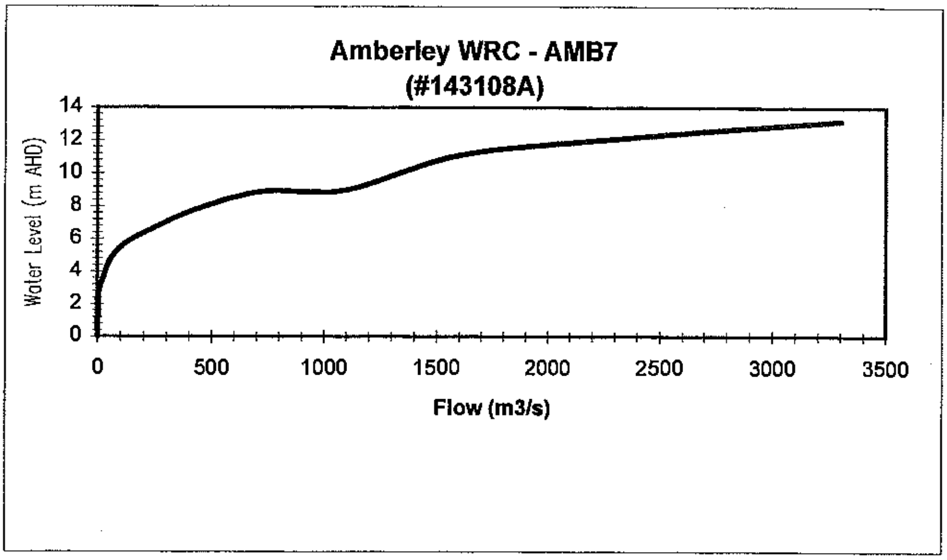
Bremer River at ADAMS BRIDGE TM - WAL4

Level (m)	Discharge (m^3/s)
0	0
1	0.5
2	14
3	60
4	150
5	316



Warrill Creek at Amberley WRC - AMB7

Level (m)	Discharge (m^3/s)
0	0
1.8	1
2.8	5
3.8	30
4.8	60
5.8	130
6.8	265
7.9	450
8.9	730
9	1100
11.1	1600
12.1	2300
13.2	3300



Warrill Creek at Amberley - CBM

Level (m)	Discharge (m^3/s)
1	0
2	5
3	30
4	60
5	130
6	265
7	450
8	730
9	1100
10	1600
11	2300
12	3300

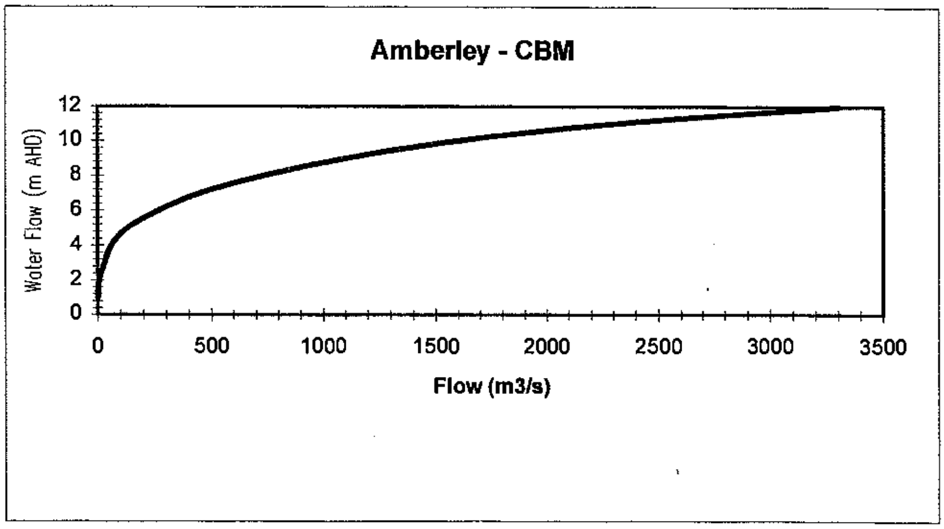
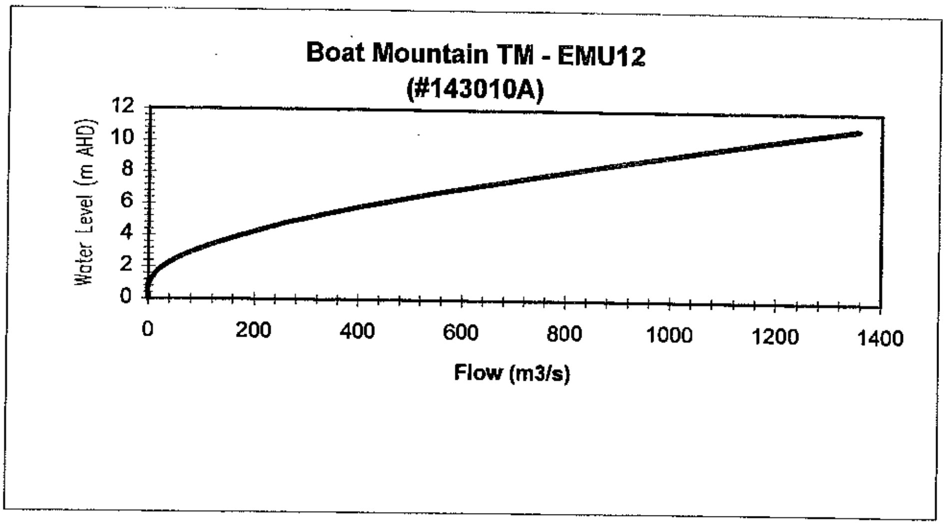


Figure 3.2 - Brisbane River Catchment Rating Curves

Emu Creek at BOAT MOUNTAIN TM - EMU12

Level (m)	Discharge (m^3/s)
0	0
1	1
2	27
3	83
4	172
5	284
6	427
7	592
8	775
9	958
10	1150
11	1356

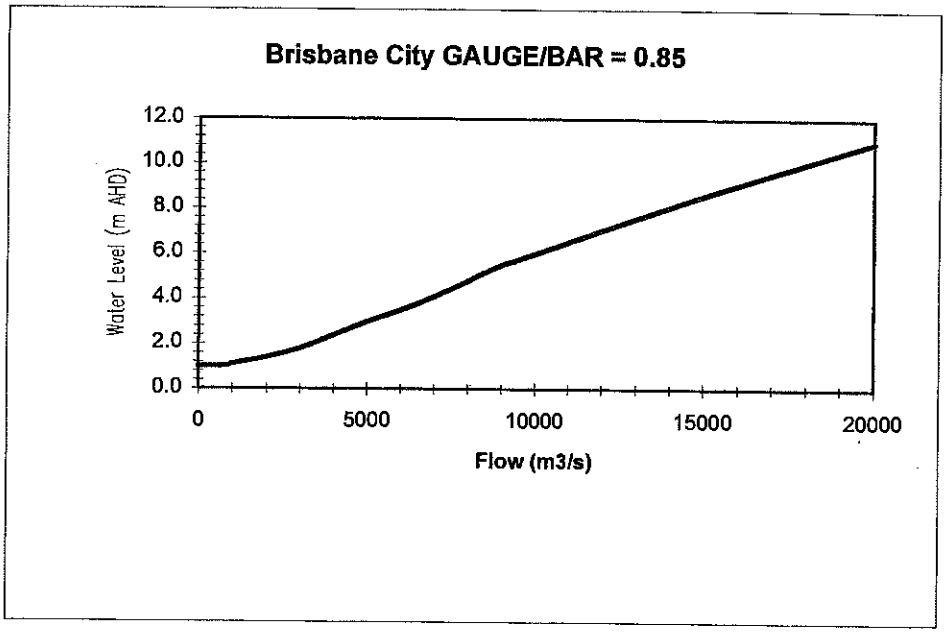


Brisbane City GAUGE

BAR = -1.15

AHD=GAUGE D

Level (m)	Discharge (m^3/s)
-0.9	0
-0.7	500
-0.4	1000
0.3	2000
1	3000
1.6	4000
2.3	5000
2.9	6000
3.5	7000
4.2	8000
4.9	9000
5.5	10000
8.6	15000
11	20000



Brisbane City GAUGE

BAR = 0.15

AHD=0.15

Level (m)	Discharge (m^3/s)
0	0
0.01	500
0.2	1000
0.8	2000
1.4	3000
2	4000
2.5	5000
3.2	6000
3.8	7000
4.5	8000
5.2	9000
5.7	10000
8.6	15000
11	20000

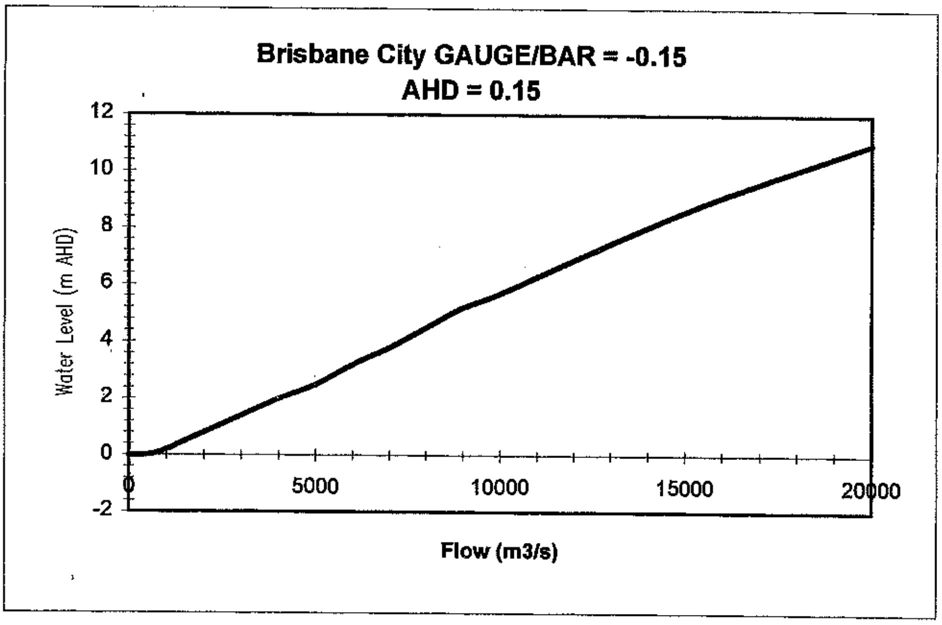
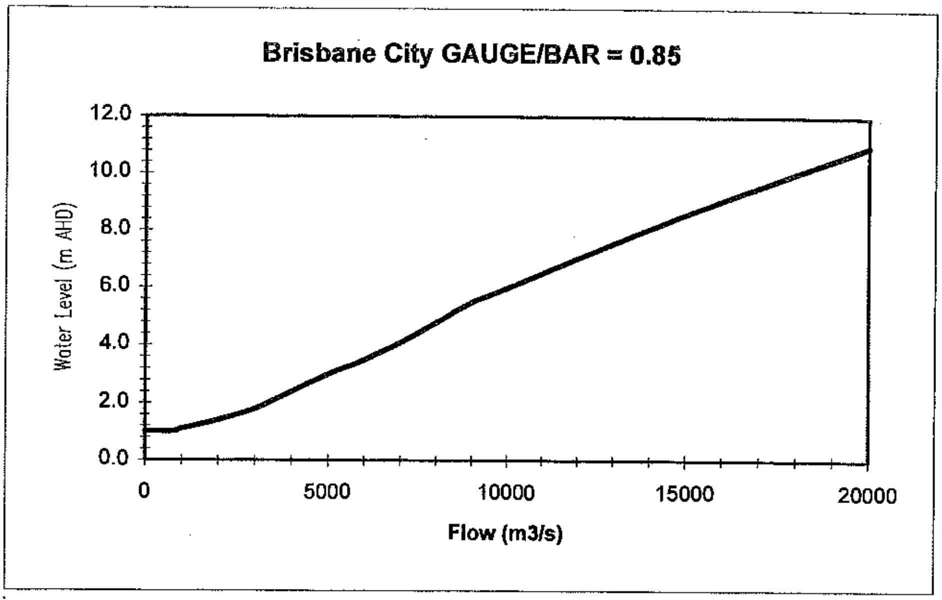


Figure 3.2 - Brisbane River Catchment Rating Curves

Brisbane City GAUGE

BAR = 0.85

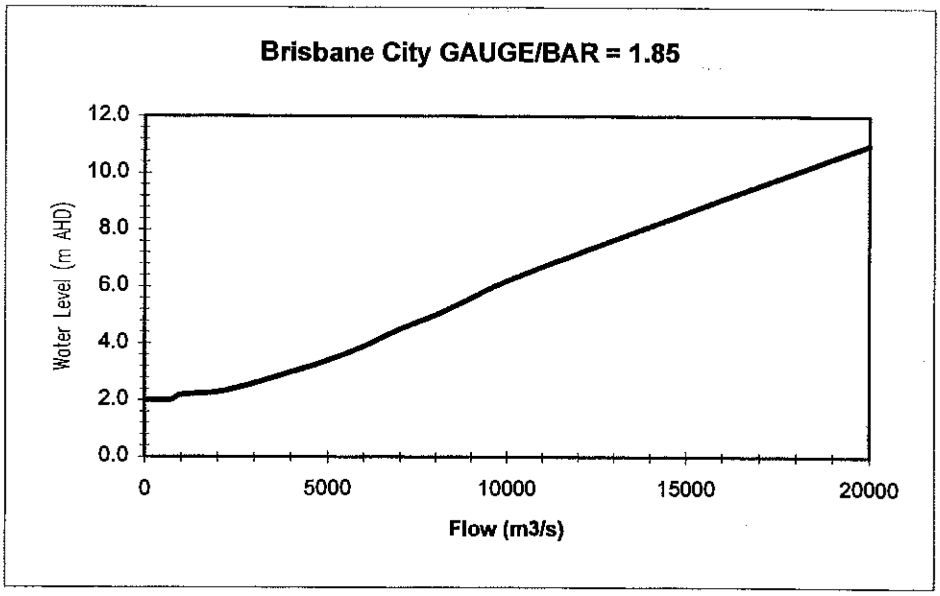
Level (m)	Discharge (m^3/s)
1	0
1.01	800
1.1	1000
1.4	2000
1.8	3000
2.4	4000
3	5000
3.5	6000
4.1	7000
4.8	8000
5.5	9000
6	10000
8.6	15000
11	20000



Brisbane City GAUGE

BAR = 1.85

Level (m)	Discharge (m^3/s)
2	0
2.01	700
2.2	1000
2.3	2000
2.6	3000
3	4000
3.4	5000
3.9	6000
4.5	7000
5	8000
5.6	9000
6.2	10000
8.6	15000
11	20000



Brisbane City GAUGE

BAR = 2.85

Level (m)	Discharge (m^3/s)
3	0
3.01	800
3.1	1000
3.2	2000
3.4	3000
3.5	4000
3.8	5000
4.3	6000
4.8	7000
5.3	8000
5.9	9000
6.4	10000
8.6	15000
11	20000

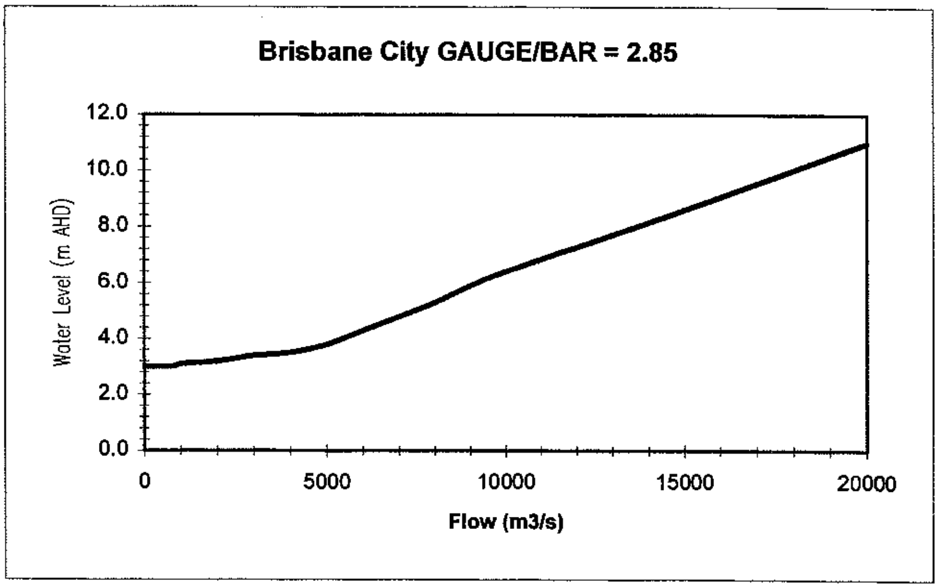
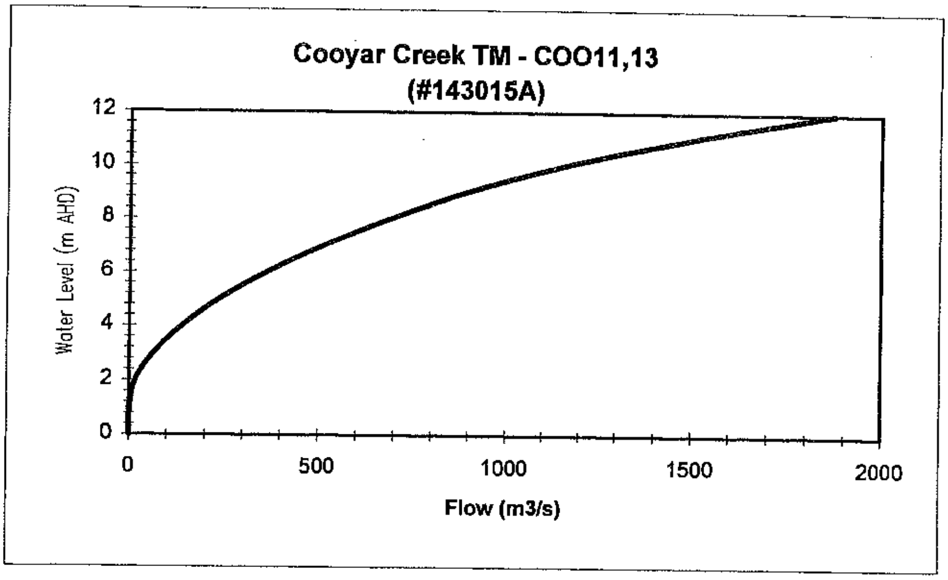


Figure 3.2 - Brisbane River Catchment Rating Curves

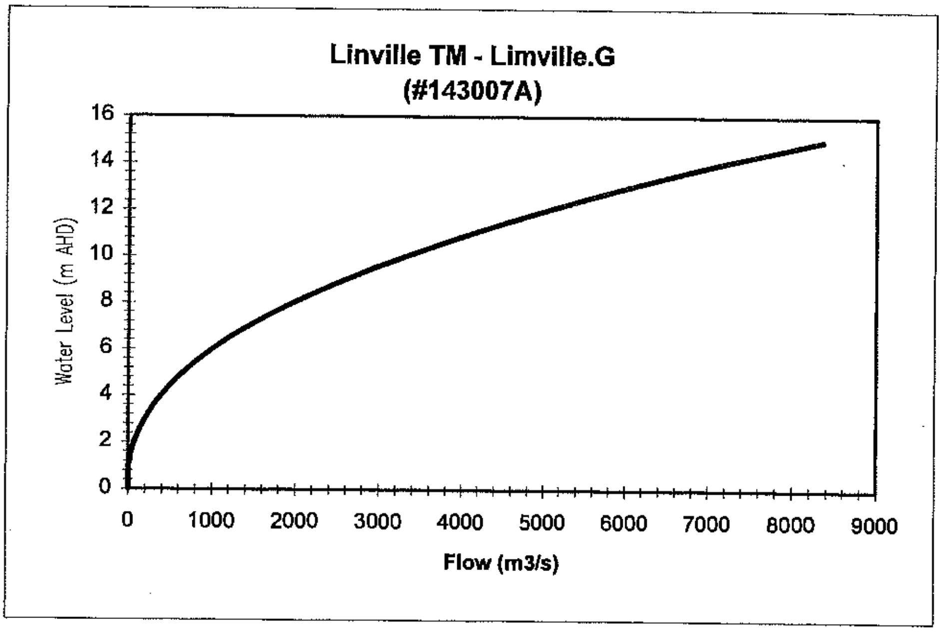
Cooyar Creek at COOYAR CREEK TM - COO11,13

Level (m)	Discharge (m^3/s)
0	0
1	1
2	15
3	65
4	139
5	237
6	361
7	511
8	687
9	889
10	1149
11	1484
12	1873



BRISBANE at LINVILLE TM - LIMVILLE.G

Level (m)	Discharge (m^3/s)
0	0
1	3
2	64
3	195
4	390
5	657
6	1000
7	1439
8	1966
9	2586
10	3299
11	4108
12	5016
13	6024
14	7134
15	8348



LOCKYER CREEK at GATTON - GAT10

Level (m)	Discharge (m^3/s)
0	0
1	5
2	15
3	40
4	60
5	80
6	140
7	180
8	260
9	400
10	630
11	860
12	1125
13	1350
14	1550
15	2500
16	3000

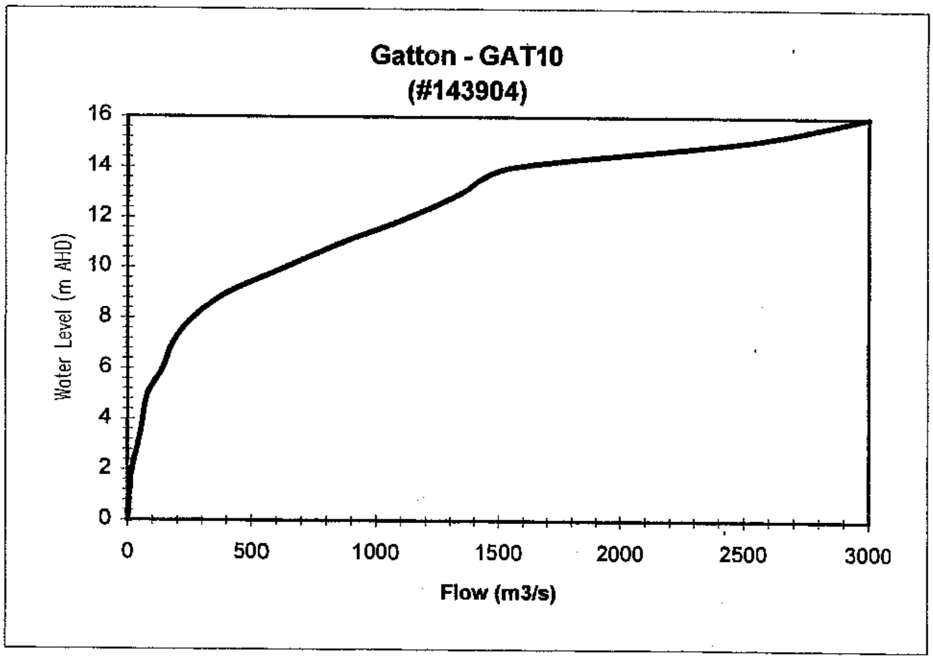
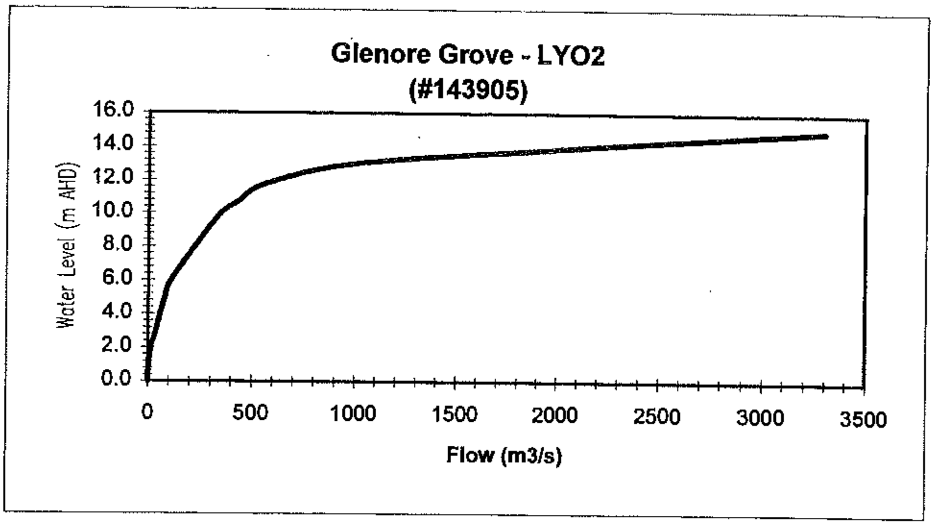


Figure 3.2 - Brisbane River Catchment Rating Curves

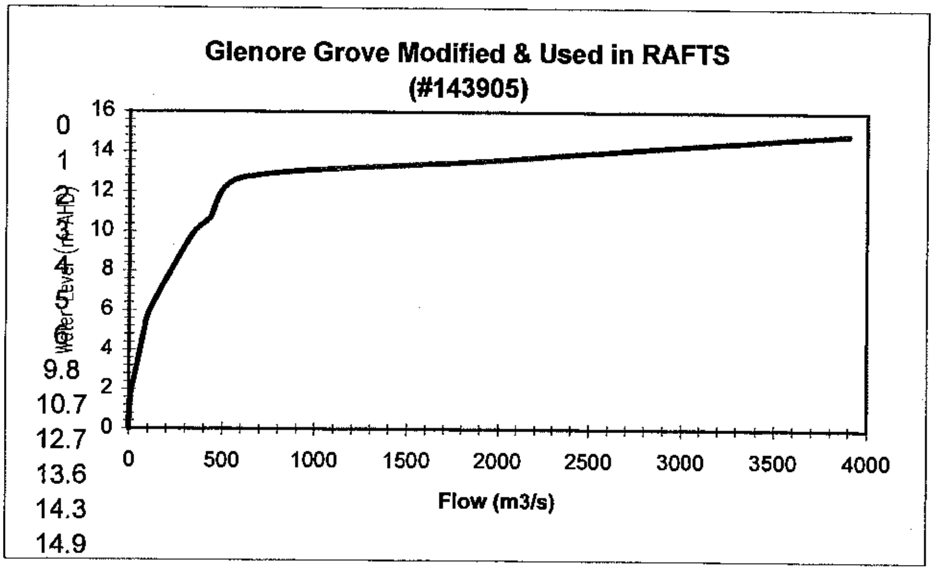
LOCKYER CREEK at GLENORE GROVE - LYO2

Level (m)	Discharge (m^3/s)
0	0
1	1
2	13
3	37
4	57
5	80
6	110
9.8	333
10.7	433
11.7	550
13	1000
14	2100
15	3300



LOCKYER CREEK at GLENORE GROVE - LYO2 Modified & used in RAFTS

Level (m)	Discharge (m^3/s)
0	0
1	1
2	13
3	37
4	57
5	80
6	110
9.8	333
10.7	433
12.7	600
13.6	1950
14.3	3000
14.9	3900



BRISBANE RIVER at GREGOR CREEK CBM - GRE 17

Level (m)	Discharge (m^3/s)
0	0
1	1
2	10
3	50
4	85
5	190
6	400
7	600
8	850
9	1200
10	1600
11	2000
12	2400
13	3000
14	3500

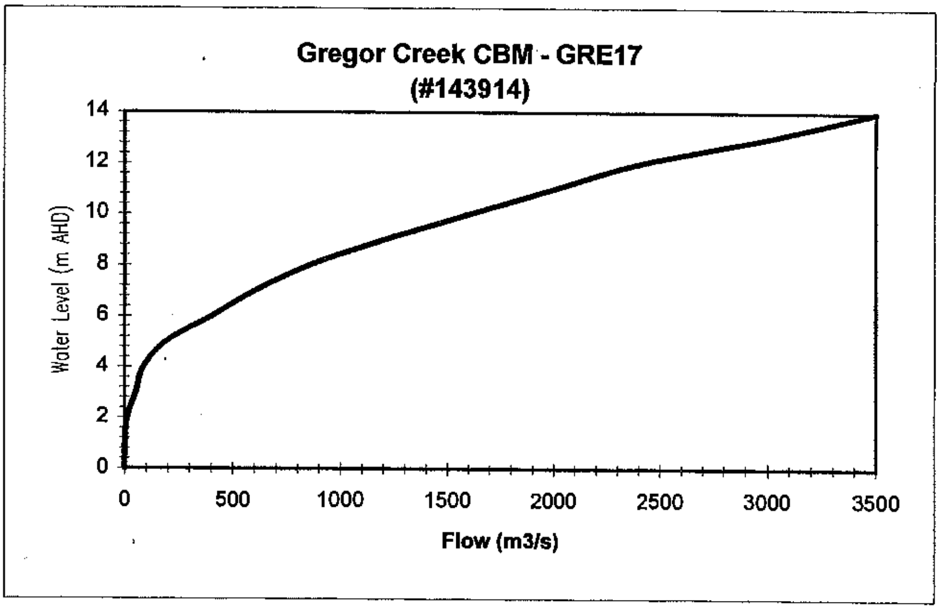
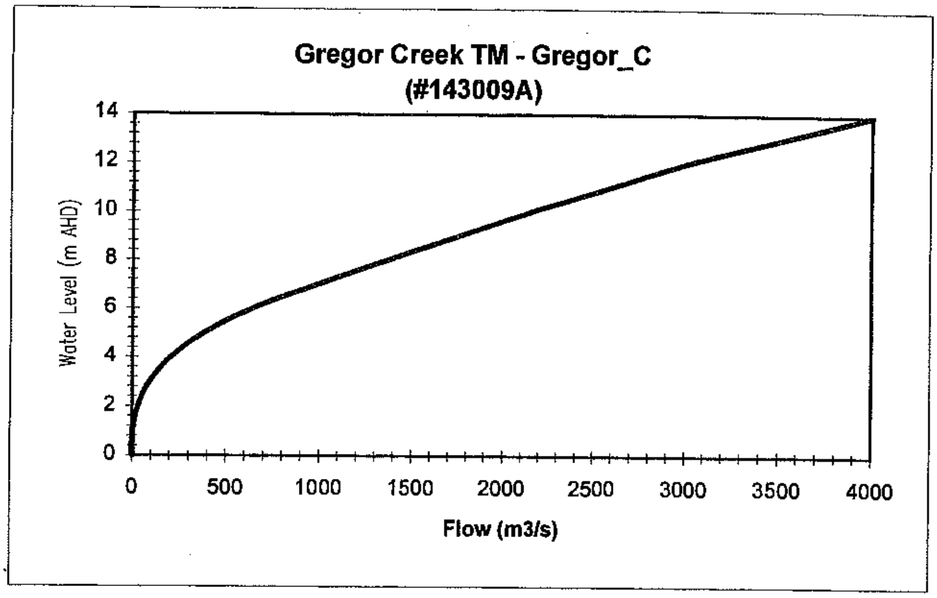


Figure 3.2 - Brisbane River Catchment Rating Curves

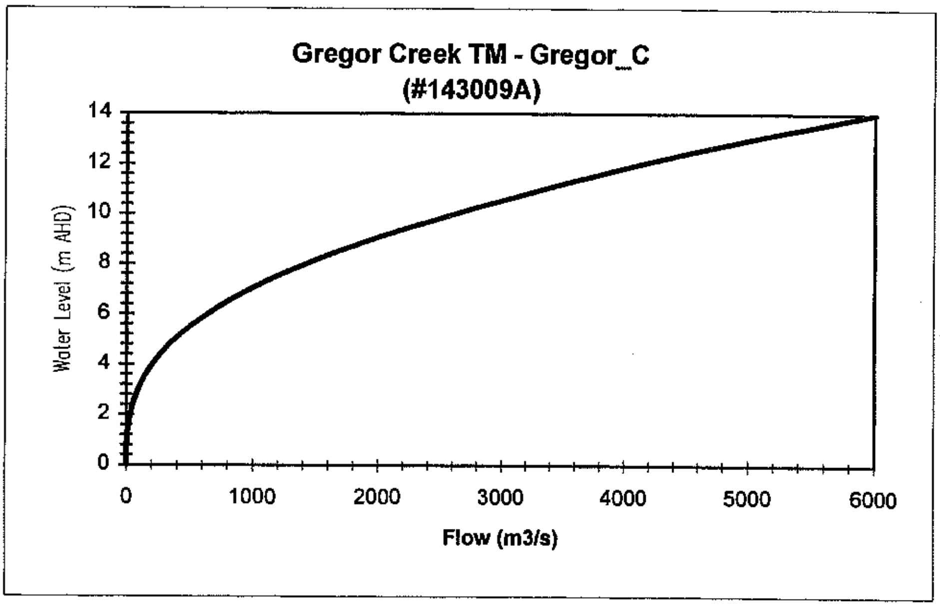
BRISBANE RIVER at GREGOR CREEK TM - GREGOR_C

Level (m)	Discharge (m^3/s)
0	0
1	2
2	29
3	93
4	206
5	381
6	638
7	981
8	1360
9	1750
10	2140
11	2580
12	3000
13	3500
14	4000



BRISBANE RIVER at GREGOR CREEK TM - GREGOR_C

Level (m)	Discharge (m^3/s)
0	0
1	2
2	29
3	93
4	206
5	381
6	638
7	981
8	1419
9	1960
10	2612
11	3328
12	4121
13	5013
14	6000



WARRILL CK at HARRISVILLE

Level (m)	Discharge (m^3/s)
0	0
1	5
2	25
3	40
4	75
5	150
5.5	200
6	400
7	1000

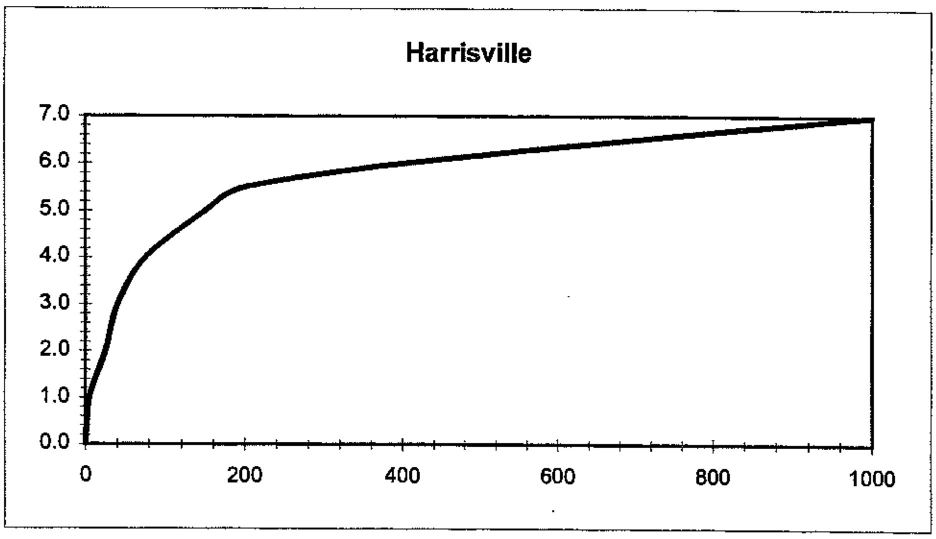
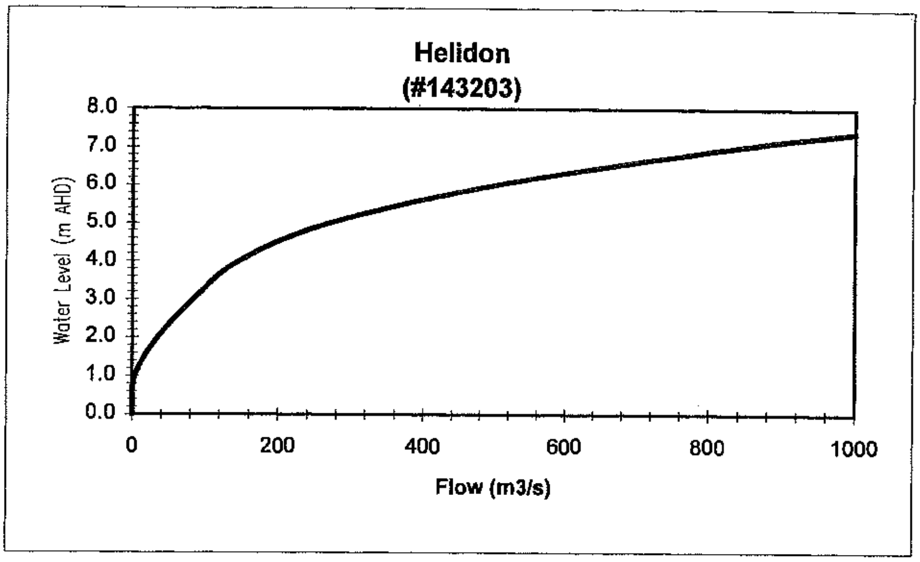


Figure 3.2 - Brisbane River Catchment Rating Curves

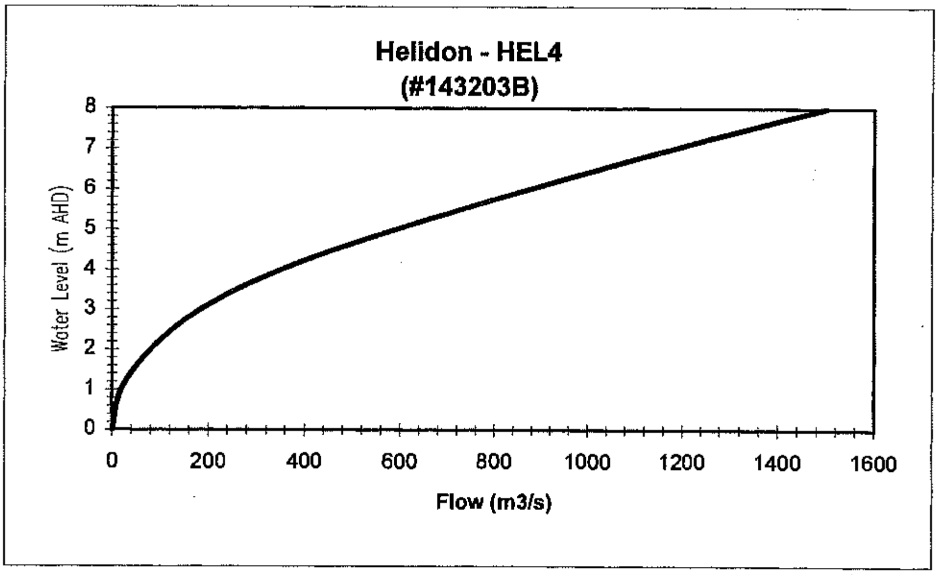
LOCKYER Ck at HELIDON

Level (m)	Discharge (m^3/s)
0	0
1	3
2	35
3	84
4	146
5	270
6	499
7	833
7.4	1000



LOCKYER CREEK at HELIDON - HEL4

Level (m)	Discharge (m^3/s)
0	0
1	18
2	80
3	184
4	351
5	591
6	875
7	1180
8	1500



Bremer River at IPSWICH - 143911

MOGGILL = 0.0

Level (m)	Discharge (m^3/s)
0	0
5.5	500
8.8	1000
13.3	2000
16	3000
17.9	4000

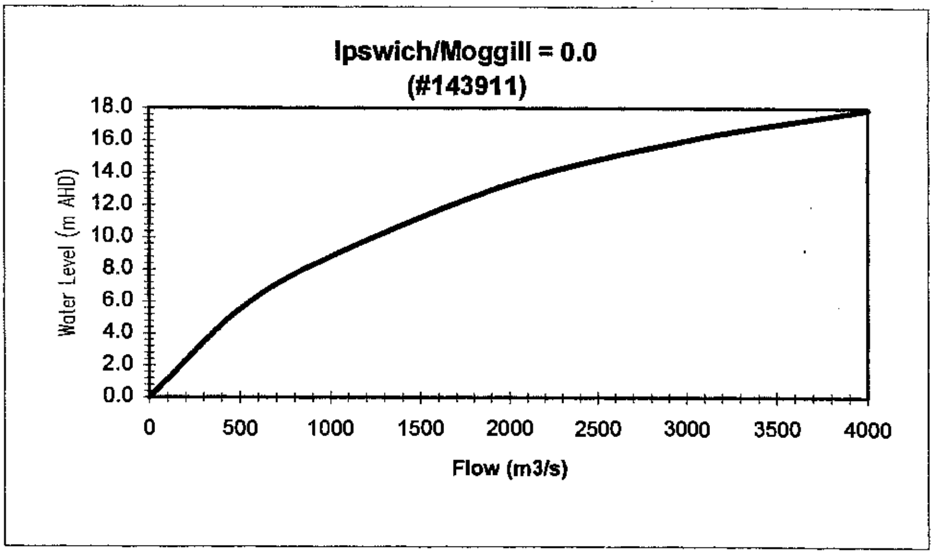
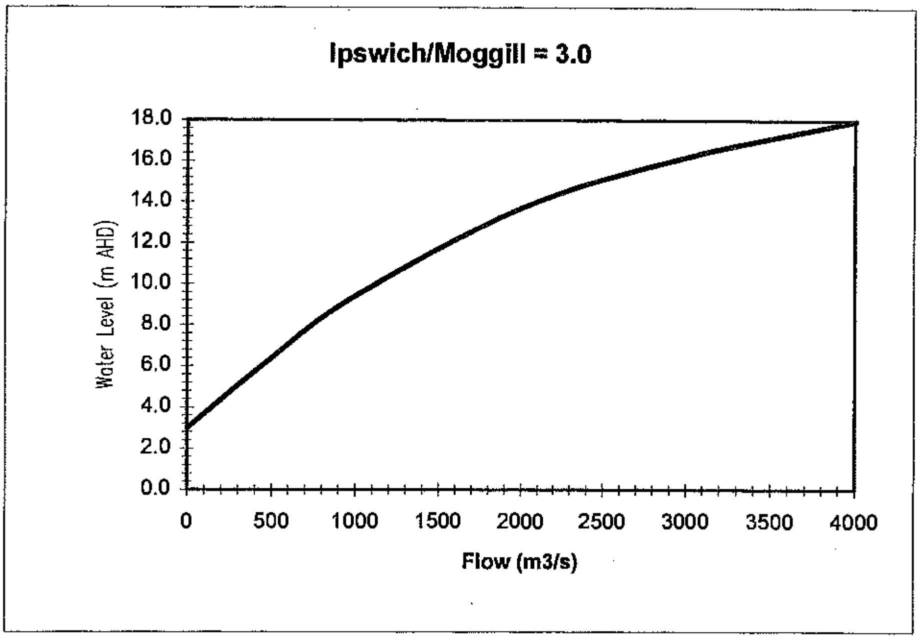


Figure 3.2 - Brisbane River Catchment Rating Curves

Bremer River at IPSWICH - 143911

MOGGILL = 3.0

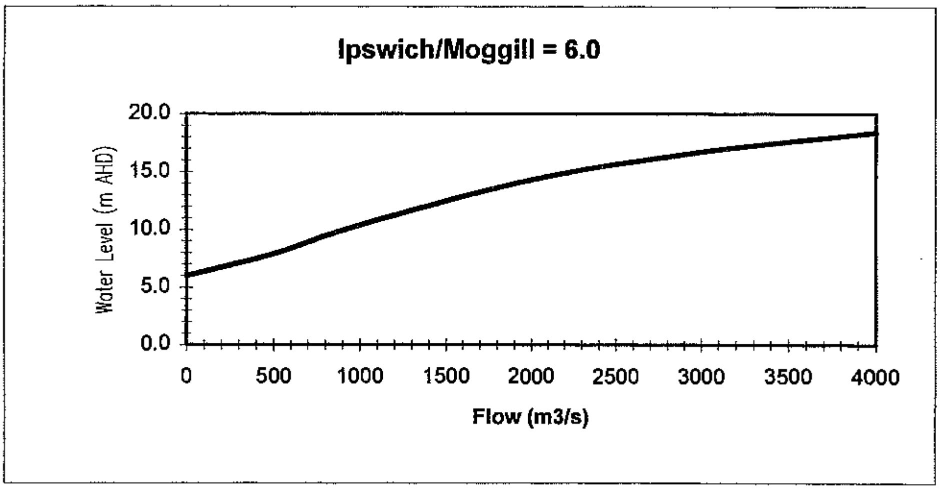
Level (m)	Discharge (m^3/s)
3	0
6.4	500
9.4	1000
13.7	2000
16.2	3000
18	4000



Bremer River at IPSWICH - 143911

MOGGILL = 6.0

Level (m)	Discharge (m^3/s)
6	0
7.9	500
10.4	1000
14.3	2000
16.7	3000
18.4	4000



Bremer River at IPSWICH - 143911

MOGGILL = 9.0

Level (m)	Discharge (m^3/s)
9	0
10	500
11.9	1000
15.2	2000
17.3	3000
18.7	4000

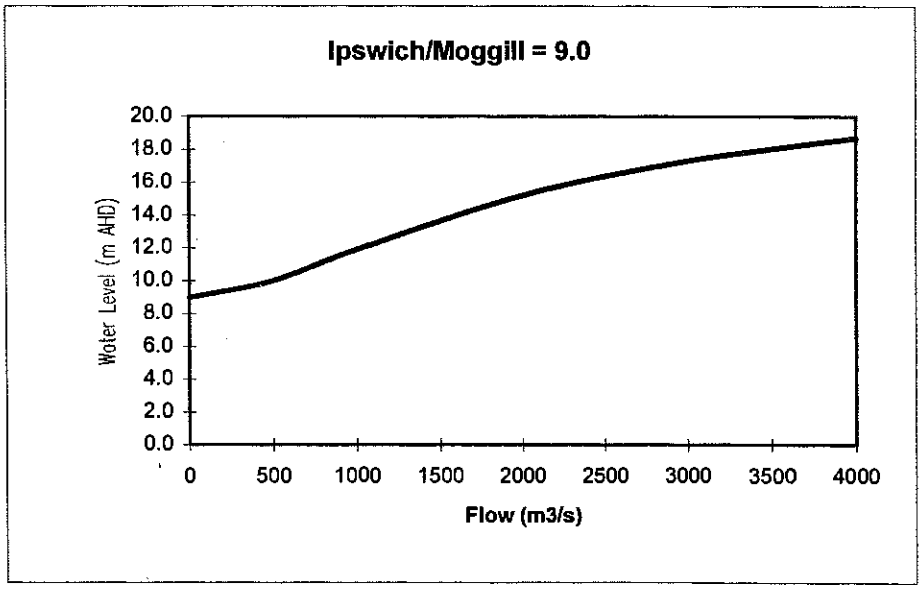
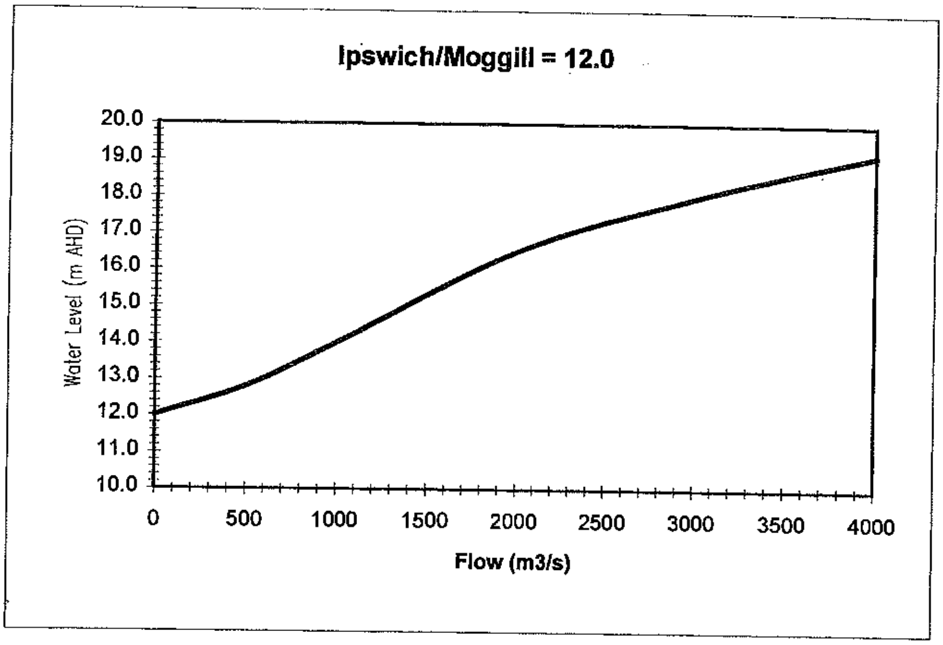


Figure 3.2 - Brisbane River Catchment Rating Curves

Bremer River at IPSWICH - 143911

MOGGILL = 12.0

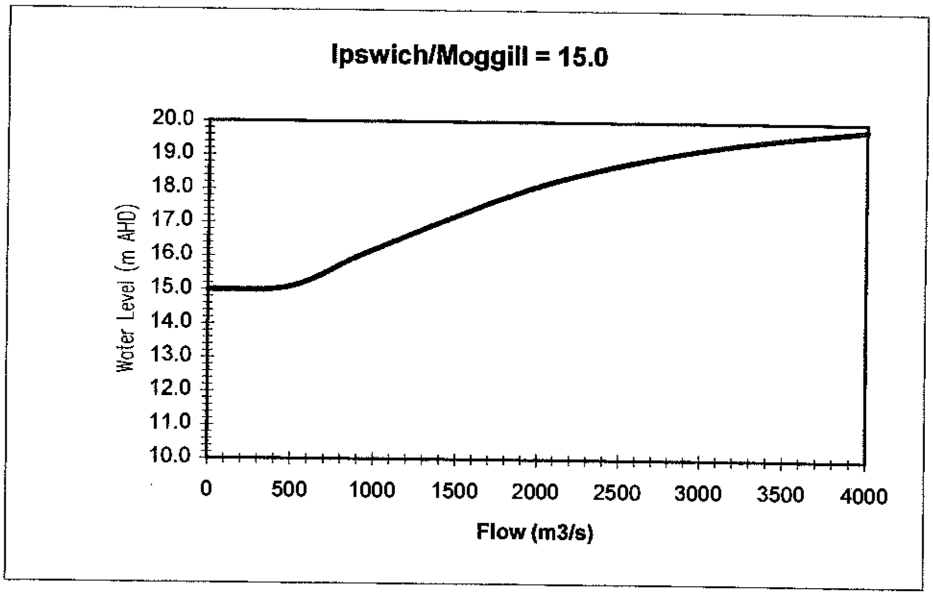
Level (m)	Discharge (m^3/s)
12	0
12.8	500
14	1000
16.5	2000
18	3000
19.2	4000



Bremer River at IPSWICH - 143911

MOGGILL = 15.0

Level (m)	Discharge (m^3/s)
15	0
15.1	500
16.2	1000
18.1	2000
19.2	3000
19.8	4000



Bremer River at IPSWICH - 143911

MOGGILL = 20.0

Level (m)	Discharge (m^3/s)
20	0
21.2	4000

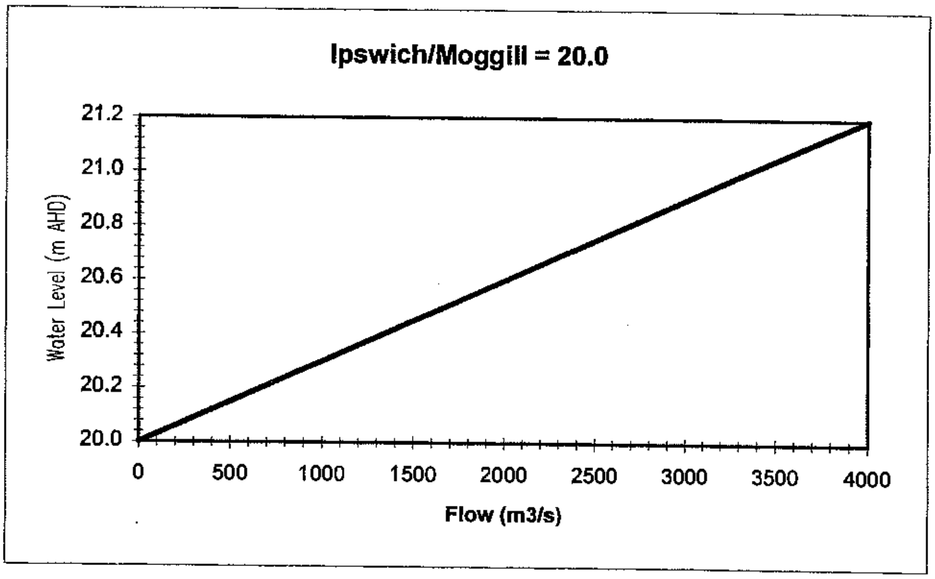
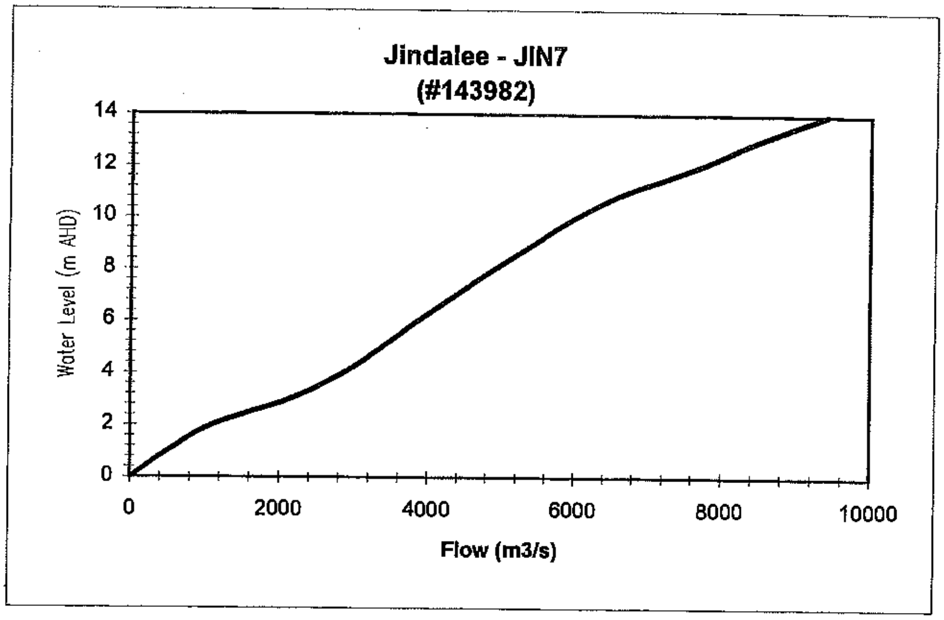


Figure 3.2 - Brisbane River Catchment Rating Curves

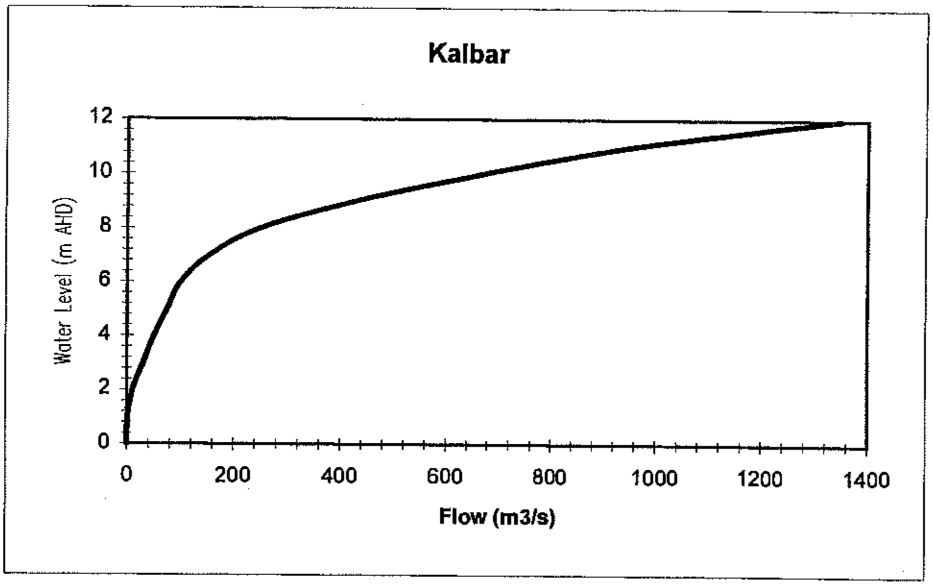
BRISBANE RIVER at JINDALEE - JIN7

Level (m)	Discharge (m^3/s)
0	0
1	500
2	1100
3	2140
4	2860
5	3380
6	3860
7	4370
8	4890
9	5440
10	6000
11	6710
12	7670
13	8470
14	9400



WARRILL CK at KALBAR

Level (m)	Discharge (m^3/s)
0	0
1	1
2	10
3	30
4	50
5	75
6	100
7	155
8	250
9	430
10	670
11	950
12	1350



BREMER RIVER at KUSS RD

Level (m)	Discharge (m^3/s)
0	0
7	110
7.8	370

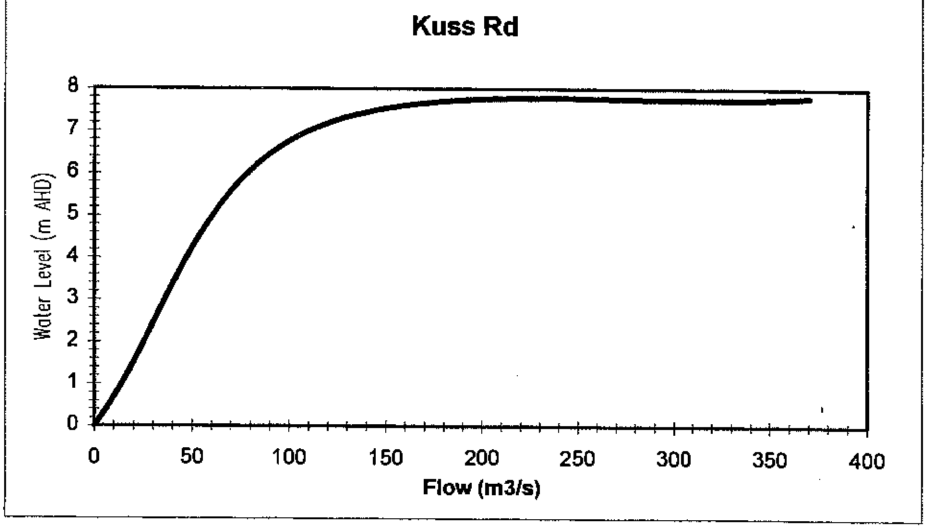
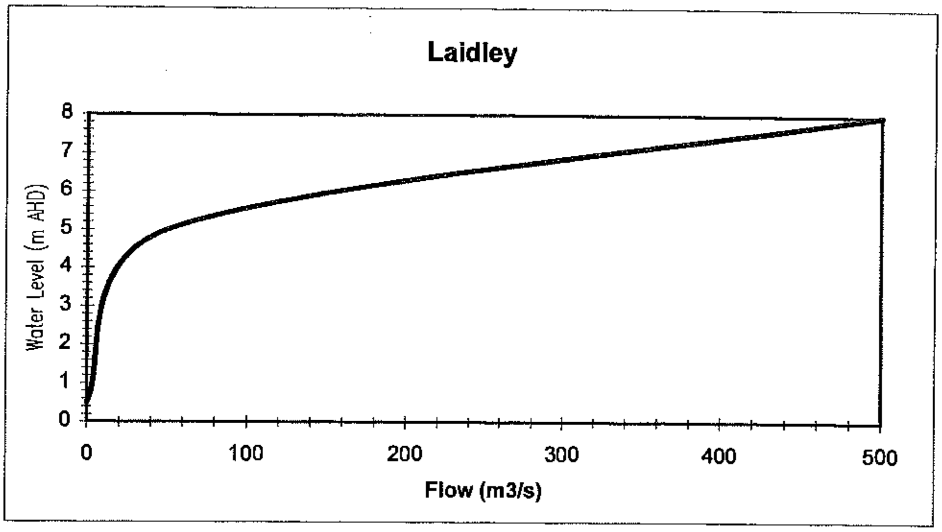


Figure 3.2 - Brisbane River Catchment Rating Curves

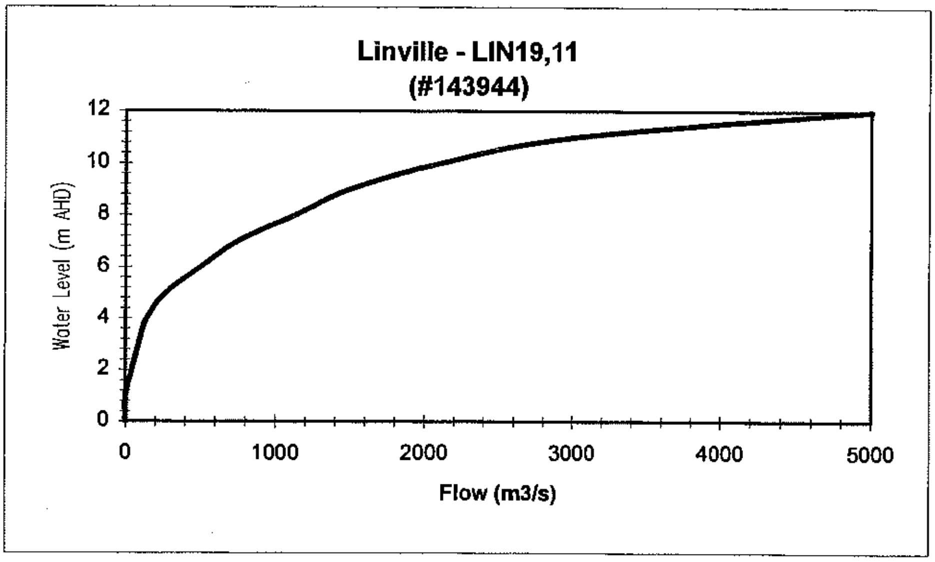
LAIDLEY CREEK at LAIDLEY

Level (m)	Discharge (m^3/s)
0.5	0
5	50
8	500



BRISBANE at LINVILLE - LIN19,11

Level (m)	Discharge (m^3/s)
0	0
1	1
2	40
3	85
4	140
5	270
6	500
7	750
8	1130
9	1500
10	2100
11	3000
12	5000



BRISBANE at LINVILLE TM

Level (m)	Discharge (m^3/s)
0	0
1	3
2	64
3	195
4	390
5	657
6	1000
7	1439
8	1966
9	2586
10	3299
11	4108
12	5016
13	6024
14	7134
15	8348

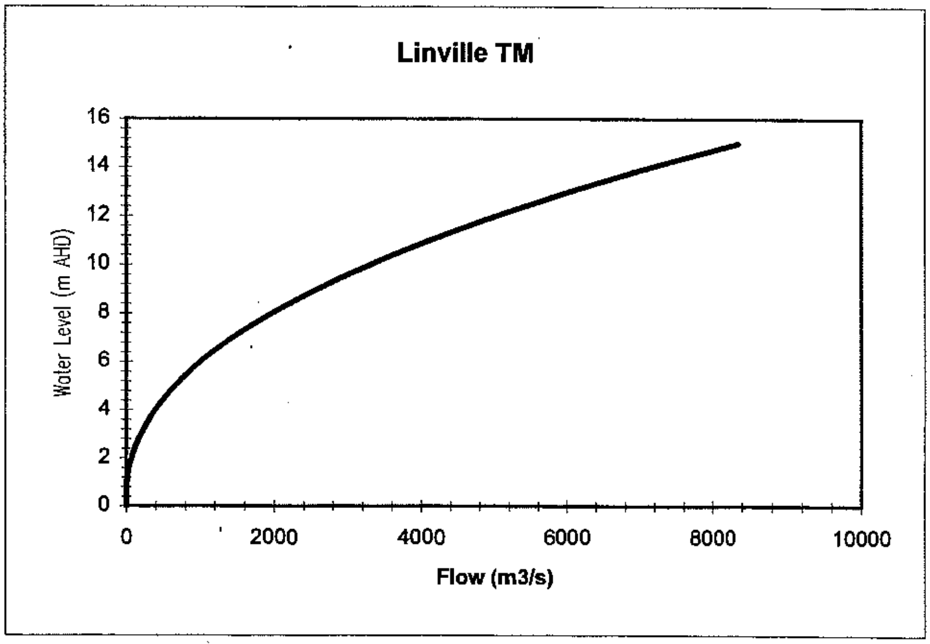
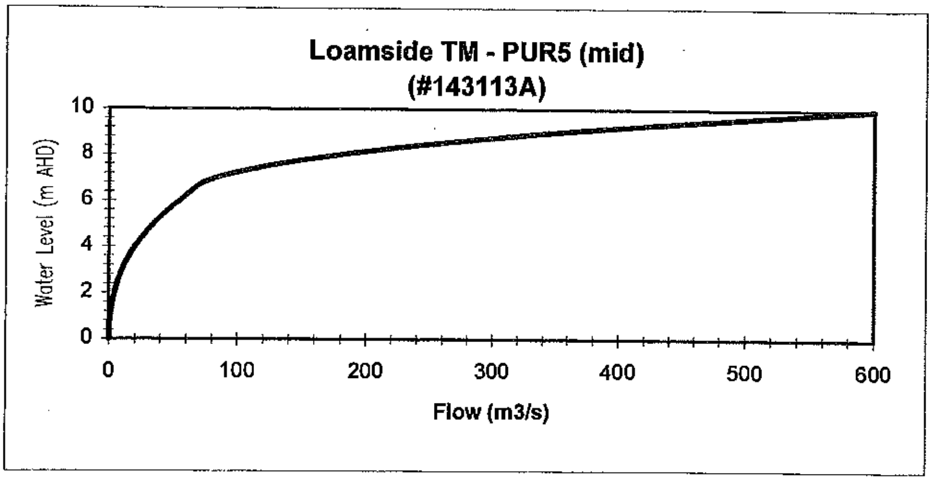


Figure 3.2 - Brisbane River Catchment Rating Curves

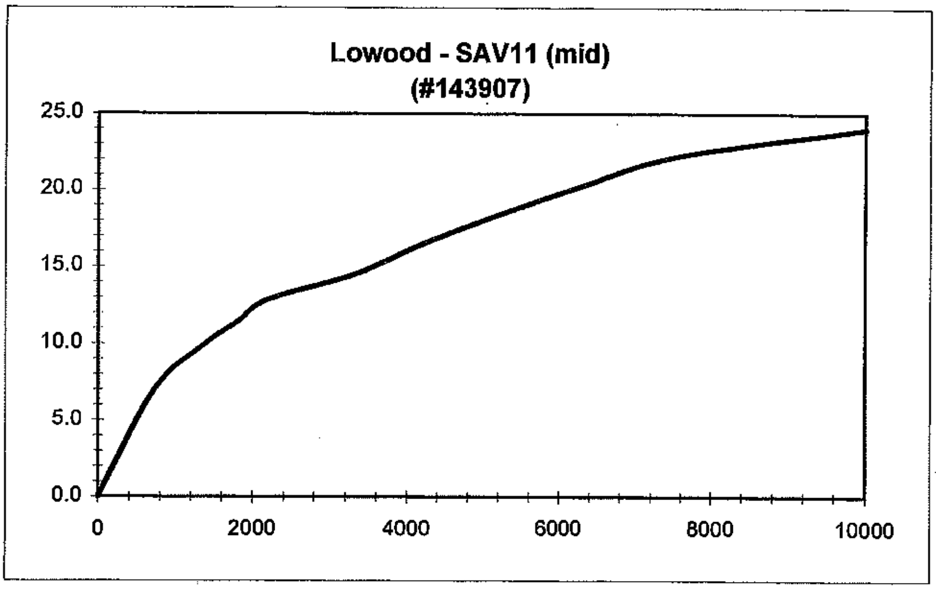
PURGA CREEK at LOAMSIDE TM - PUR5(mid)

Level (m)	Discharge (m^3/s)
0	0
1	1
2	4
3	10
4	20
5	35
6	55
7	83
8	179
9	350
10	600



BRISBANE RIVER at LOWOOD - SAV11(mid)

Level (m)	Discharge (m^3/s)
0	0
5.5	541
6.7	684
7.5	802
8.5	987
9.4	1238
10.5	1518
11.5	1826
12.8	2163
14.5	3313
16.5	4209
18.4	5210
20.3	6316
22.2	7525
24	10000



LOCKYER CREEK at LYONS BRIDGE - LYO6, LYONS_BR

Level (m)	Discharge (m^3/s)
0	0
1	1
2	6
3	13
4	23
5	37
6	57
7	81
8	110
9	145
10	184
11	251
12	333
13	433
14	552
15	750
16	1000
17.5	2000

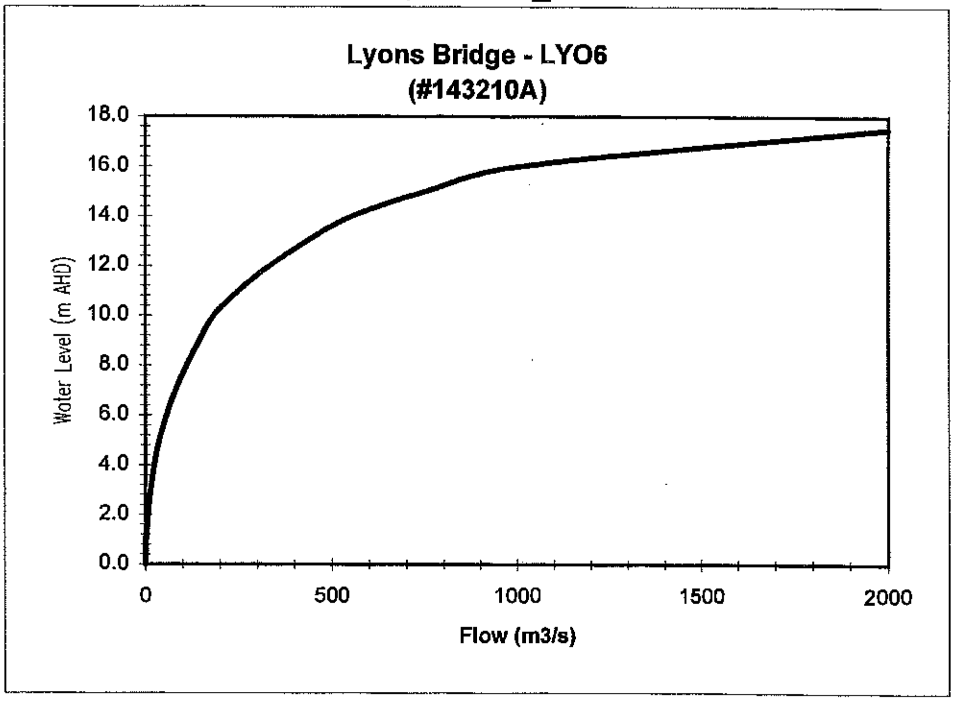
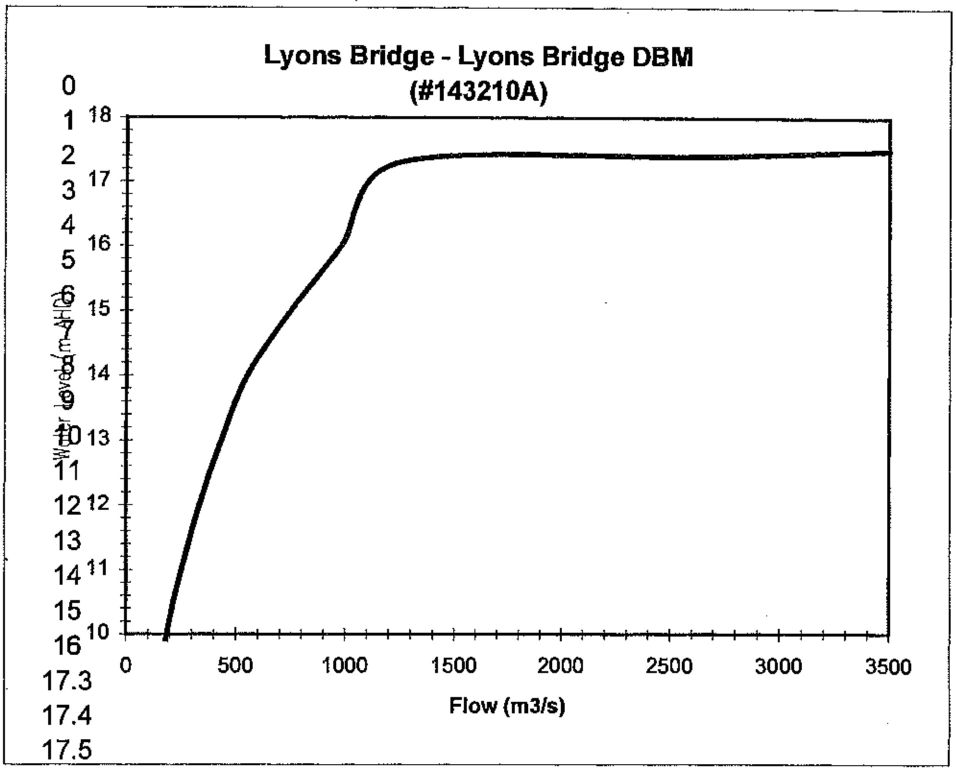


Figure 3.2 - Brisbane River Catchment Rating Curves

LOCKYER CREEK at LYONS BRIDGE CBM used in RAFTS - LYO6, LYONS_BR

Level (m)	Discharge (m^3/s)
0	0
1	1
2	6
3	13
4	23
5	37
6	57
7	81
8	110
9	145
10	184
11	251
12	333
13	433
14	552
15	750
16	980
17.3	1250
17.4	2650
17.5	3500



BRISBANE RIVER at MIDDLE CREEK

Level (m)	Discharge (m^3/s)
0	0
1	6
2	47
3	115
4	212
5	338
6	491
7	672
8	880
9	1115
10	1376
11	1665
12	1980
13	2321
14	2688
15	3082
16	3501
17	3946
18	4417
19	4914
20	5436

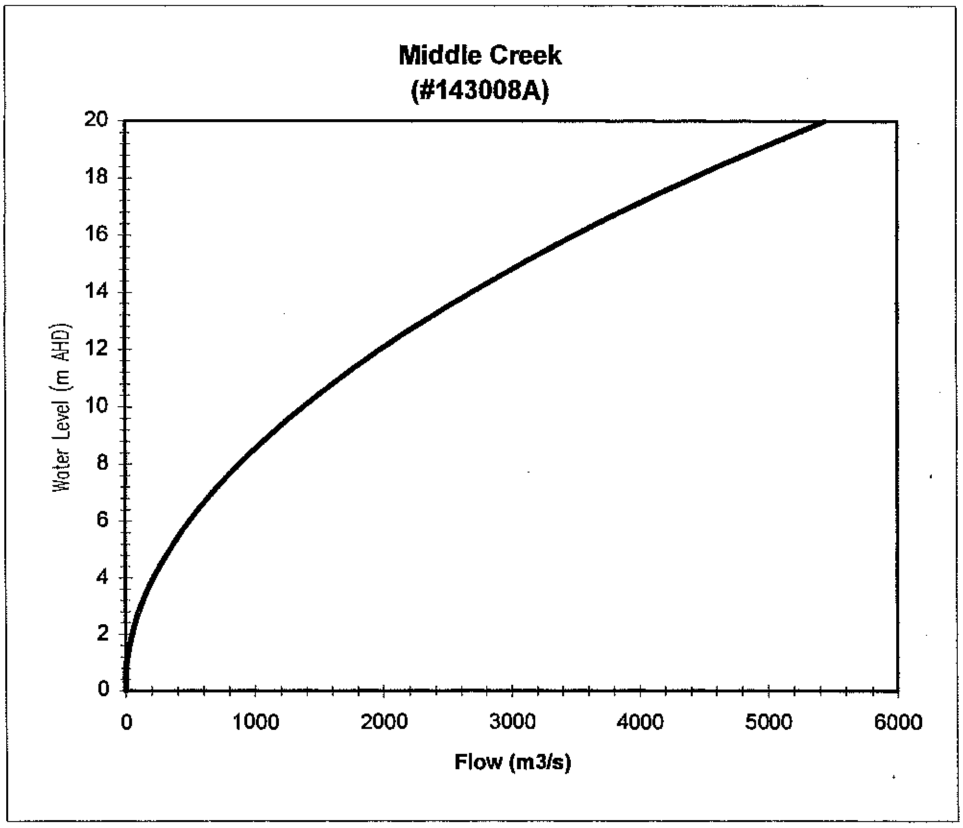
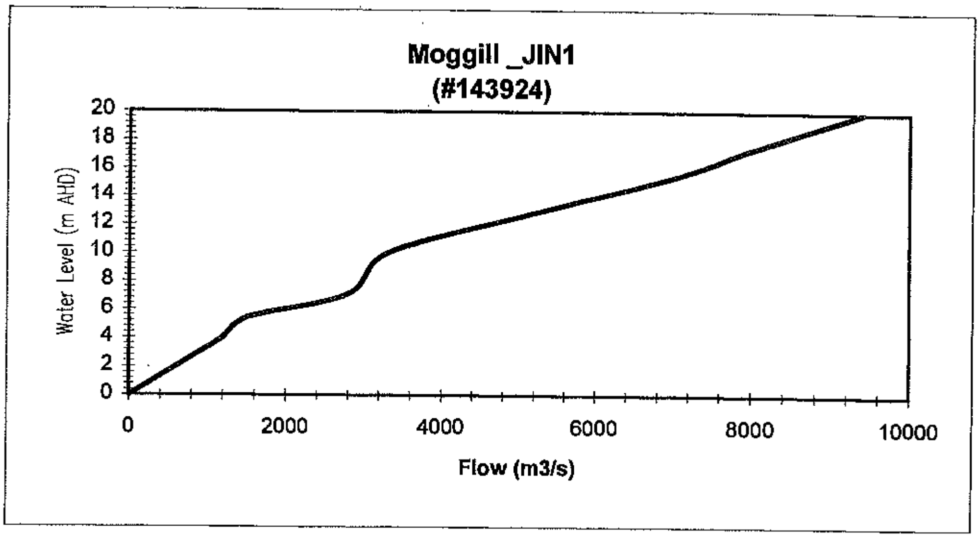


Figure 3.2 - Brisbane River Catchment Rating Curves

BRISBANE RIVER at MOGGILL - JIN1

Level (m)	Discharge (m^3/s)
0	0
1	300
2	600
3	900
4	1200
5.4	1500
7.1	2800
10	3300
12.6	5000
15.4	7000
17.4	8000
20	9400



MT CROSBY WEIR - MTC7

Level (m)	Discharge (m^3/s)
0	0
1	220
2	498
3	804
4	1129
5	1470
6	1822
7	2186
8	2559
9	2941
10	3330
11	3726
12	4129
13	4538
14	4953
15	5373
16	5798
17	6228
18	6663
19	7102
20	7545
21	7992
22	8443
23	8897
24	9356
25	9817
26	10282
27	10751
28	11222
29	11696

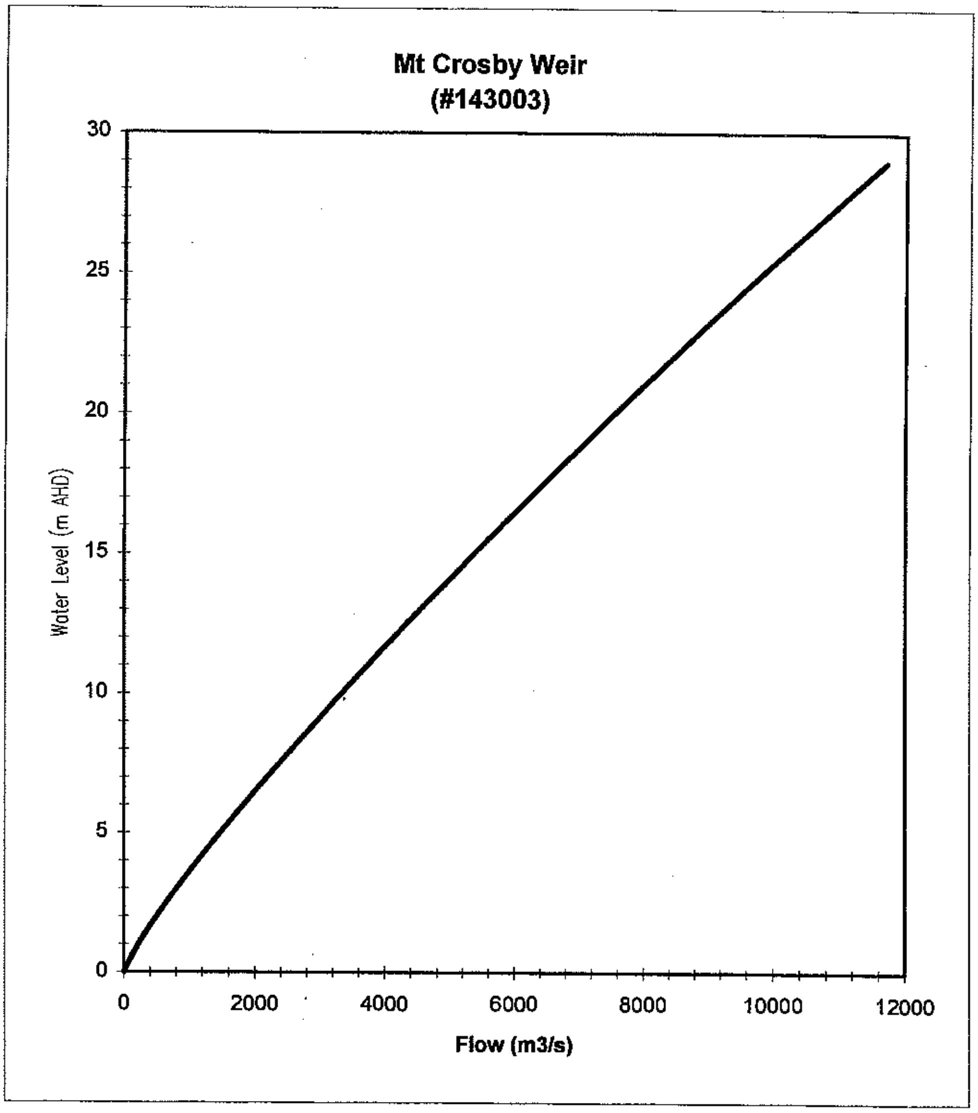
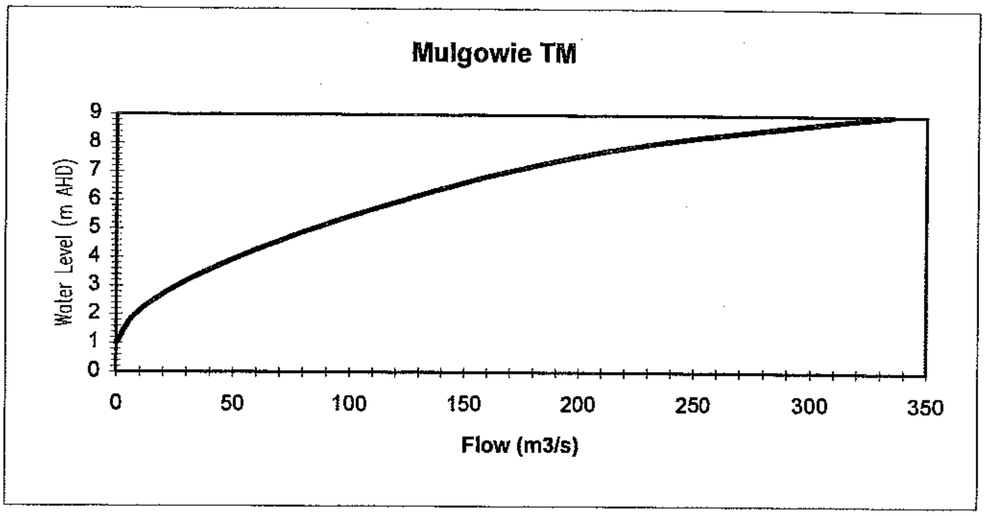


Figure 3.2 - Brisbane River Catchment Rating Curves

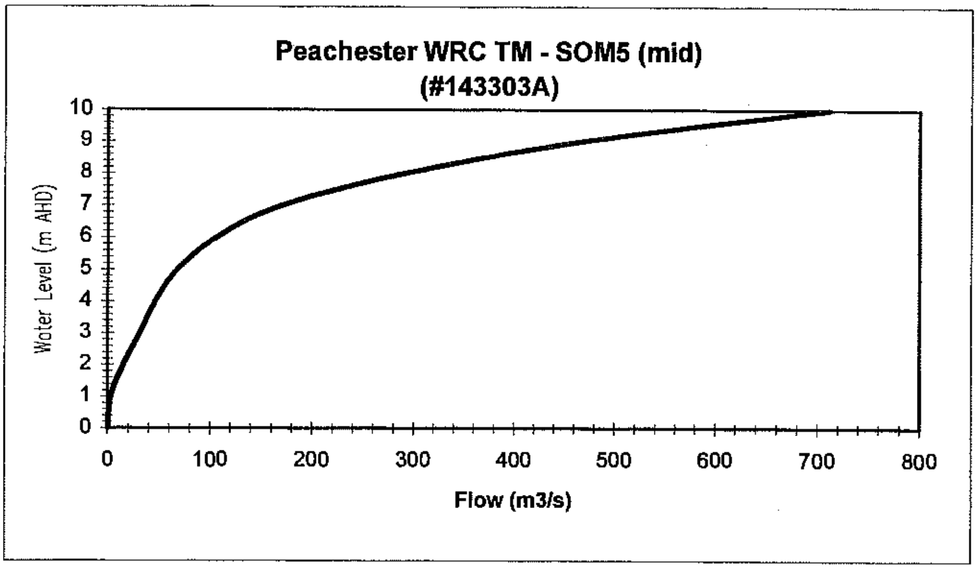
LAIDLEY CREEK at MULGOWIE TM

Level (m)	Discharge (m^3/s)
1	0
2	8
3	26
4	52
5	84
6	123
7	168
8	231
9	335



STANLEY RIVER at PEACHESTER WRC TM - SOM5(mid)

Level (m)	Discharge (m^3/s)
0	0
1	3
2	15
3	31
4	46
5	68
6	106
7	170
8	290
9	466
10	711



LOCKYER CREEK at LYONS BRIDGE (QWRC) TM - LYO6

Level (m)	Discharge (m^3/s)
0	0
1	1
2	8
3	17
4	28
5	40
6	60
7	85
8	115
9	149
10	193
11	263
12	348
13	450
14	571
15	712
16	900
17	1100
18	1400

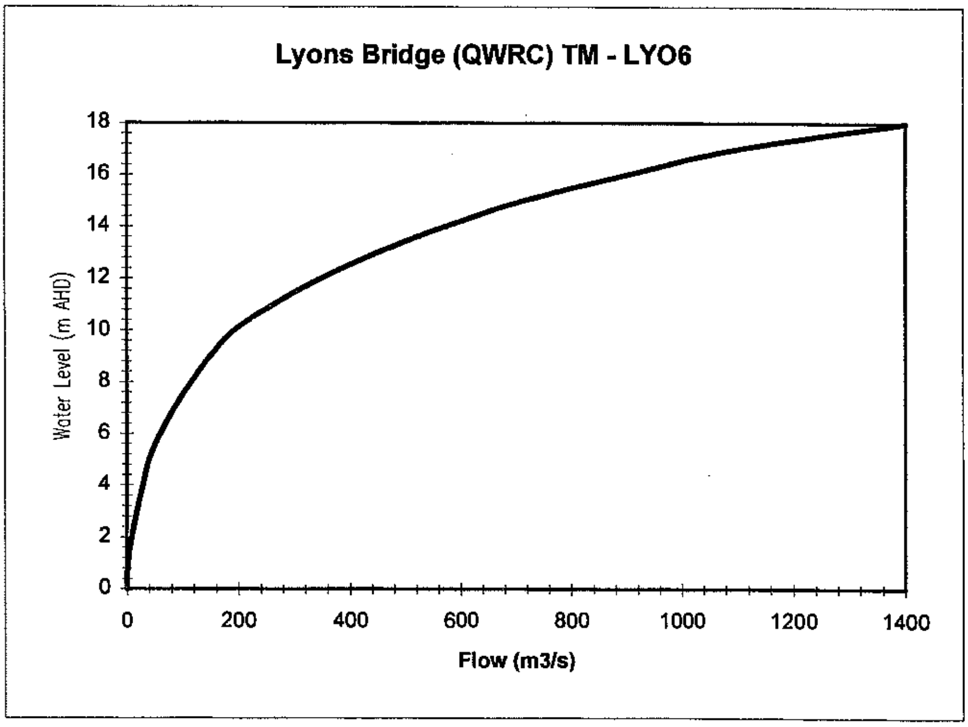
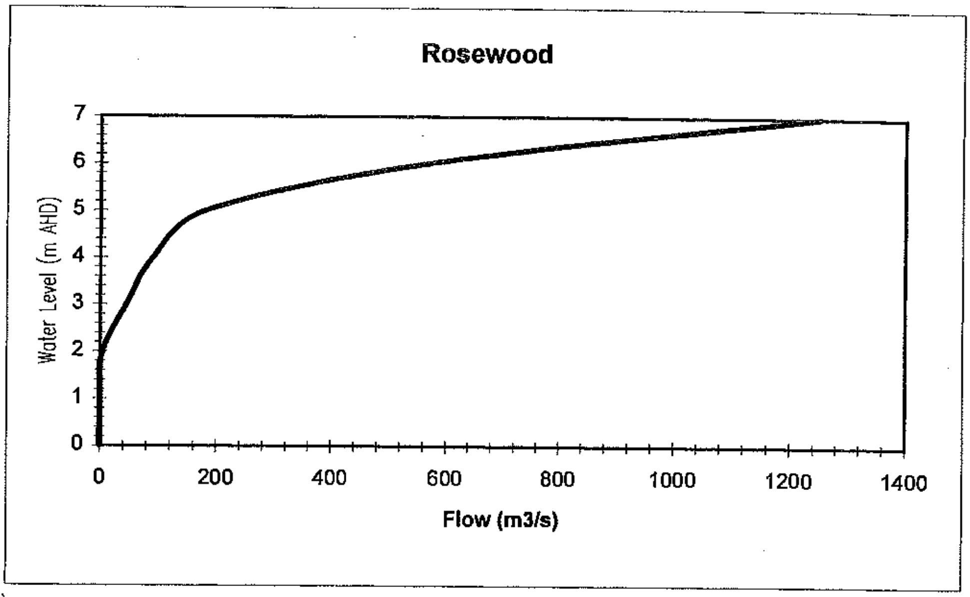


Figure 3.2 - Brisbane River Catchment Rating Curves

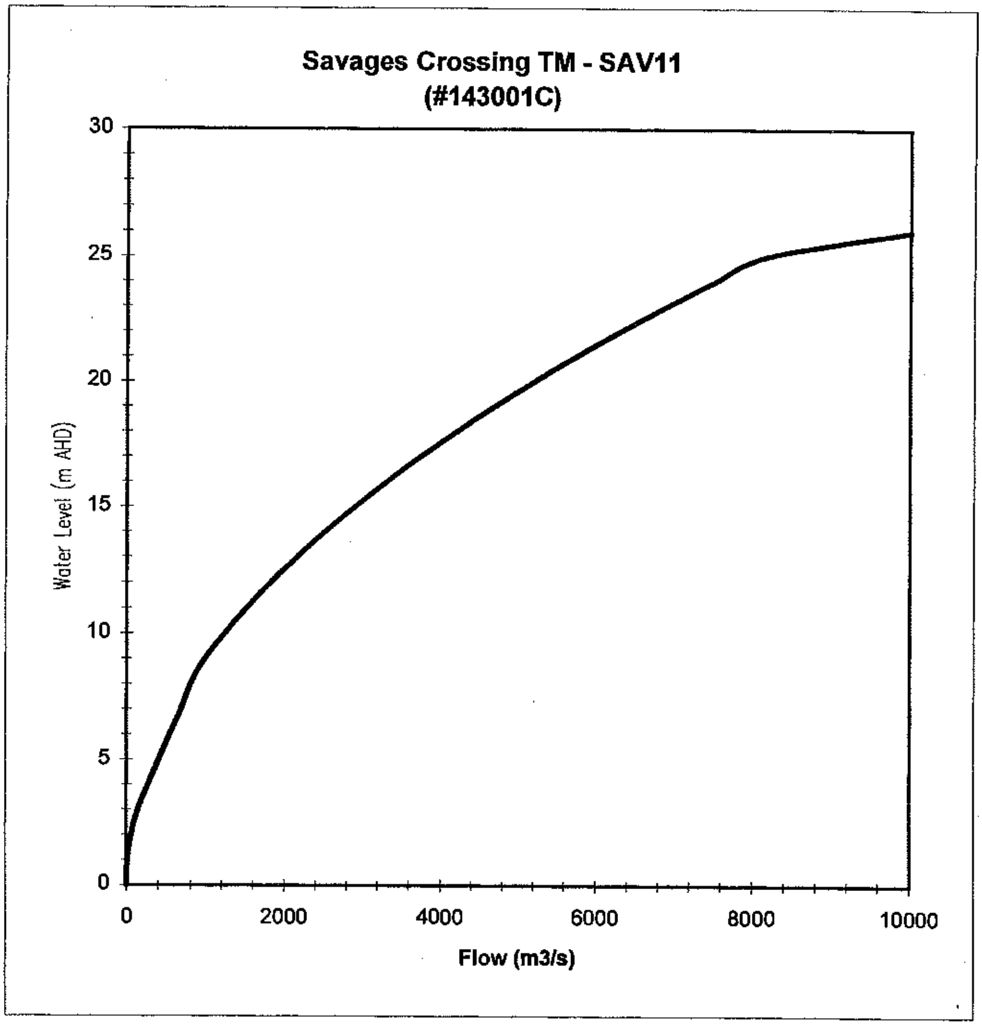
ROSEWOOD

Level (m)	Discharge (m^3/s)
0	0
1	0.2
2	4
3	45
4	90
5	180
6	560
7	1250



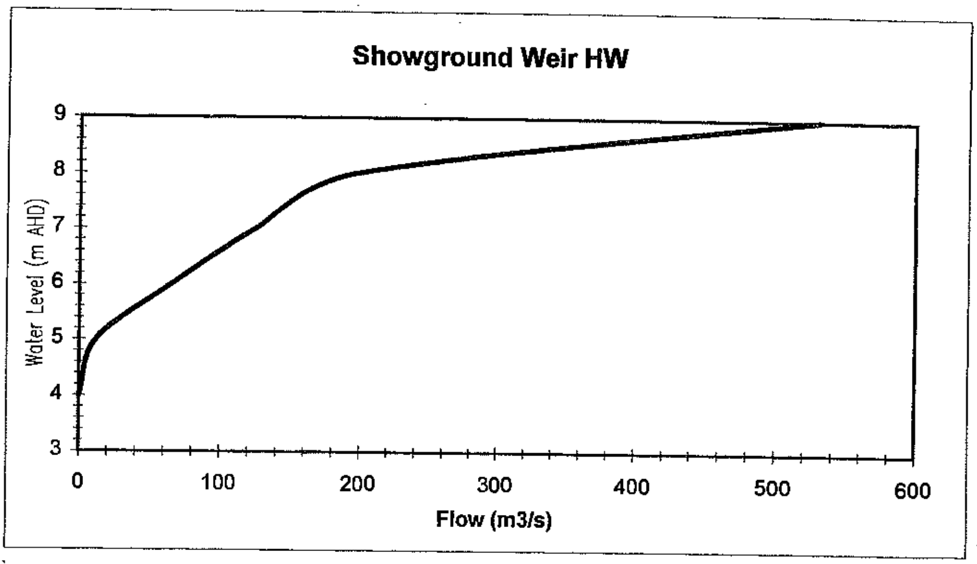
BRISBANE RIVER at SAVAGES CROSSING TM - SAV11

Level (m)	Discharge (m^3/s)
0	0
1	8
2	56
3	142
4	274
5	403
6	541
7	684
8	802
9	987
10	1238
11	1518
12	1826
13	2163
14	2522
15	2904
16	3313
17	3748
18	4209
19	4697
20	5210
21	5750
22	6316
23	6907
24	7525
25	8169
26	10000



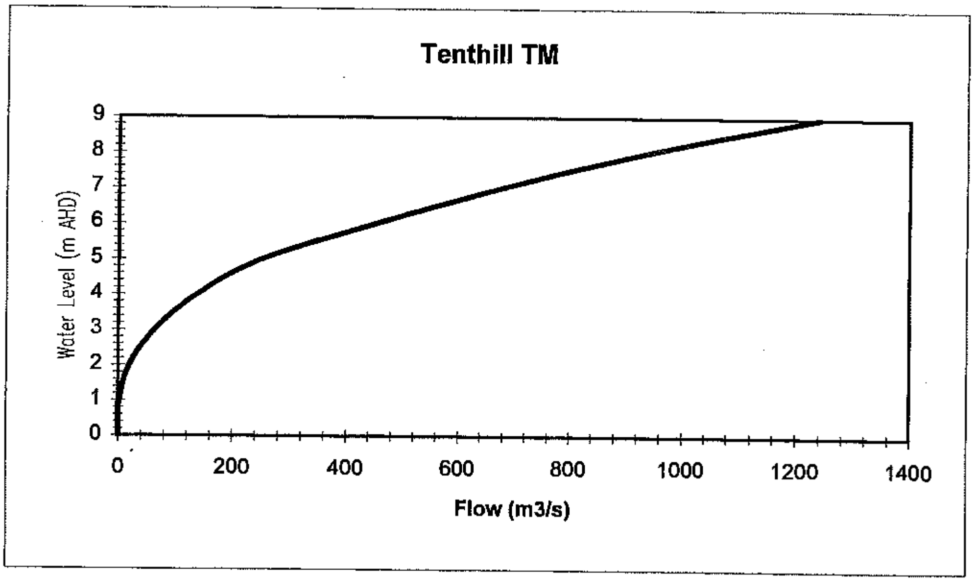
LAIDLEY CREEK at Showground Weir HW

Level (m)	Discharge (m^3/s)
4	0
5	12
6	65
7	125
8	196
9	530



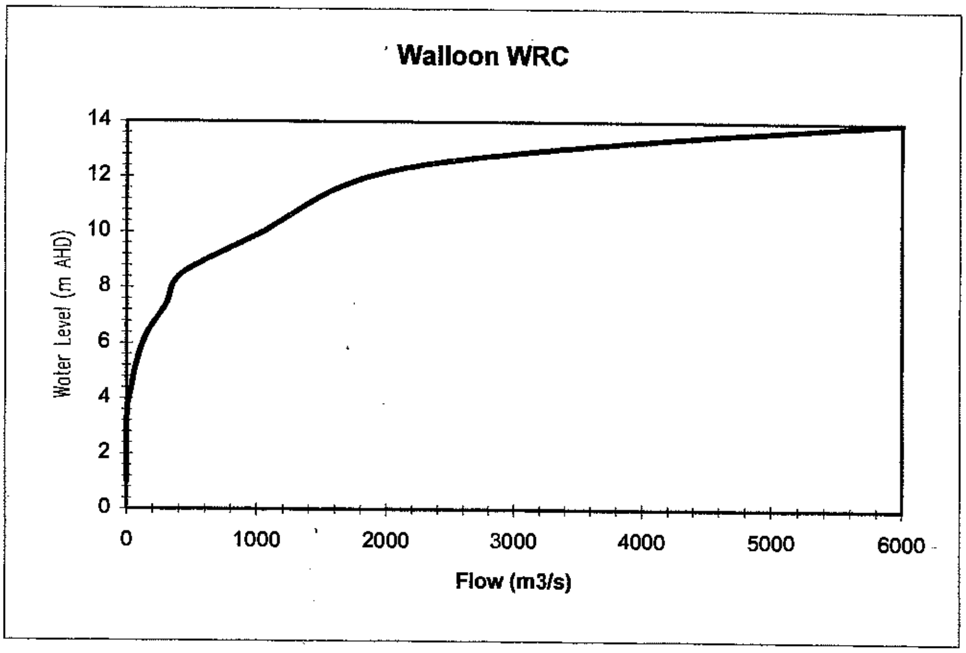
TENTHILL CREEK at TENTHILL TM

Level (m)	Discharge (m^3/s)
0	0
1	1
2	19
3	63
4	137
5	252
6	451
7	675
8	934
9	1240



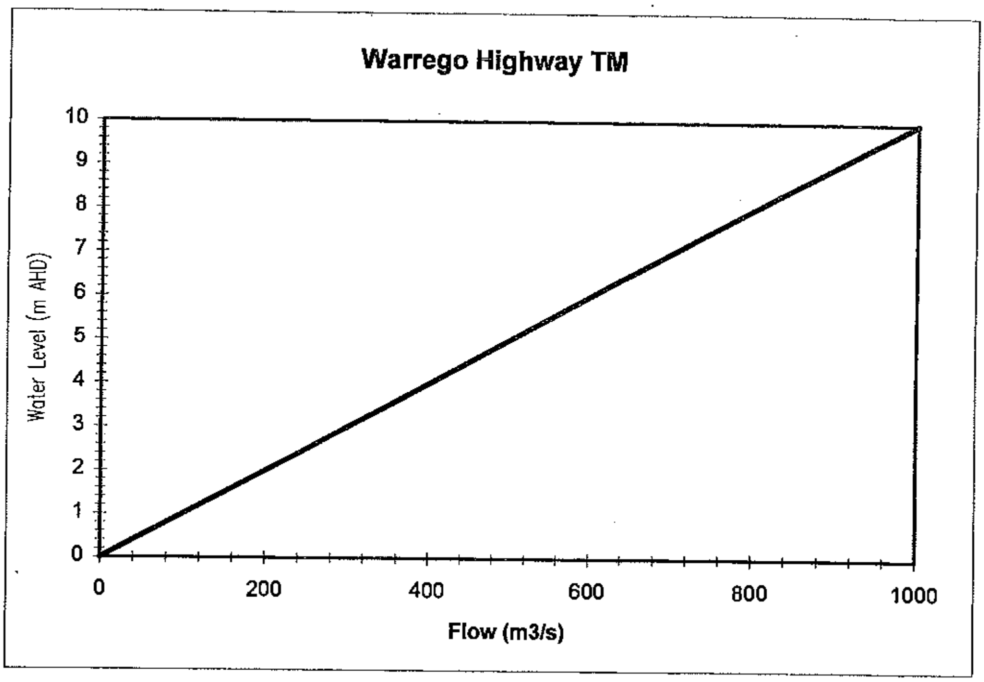
BREMER at WALLOON WRC

Level (m)	Discharge (m^3/s)
1	0
3.6	2
4.3	30
5.3	75
6.3	150
7.4	300
8.5	420
9.9	1000
12	1850
13	3300
14	6000



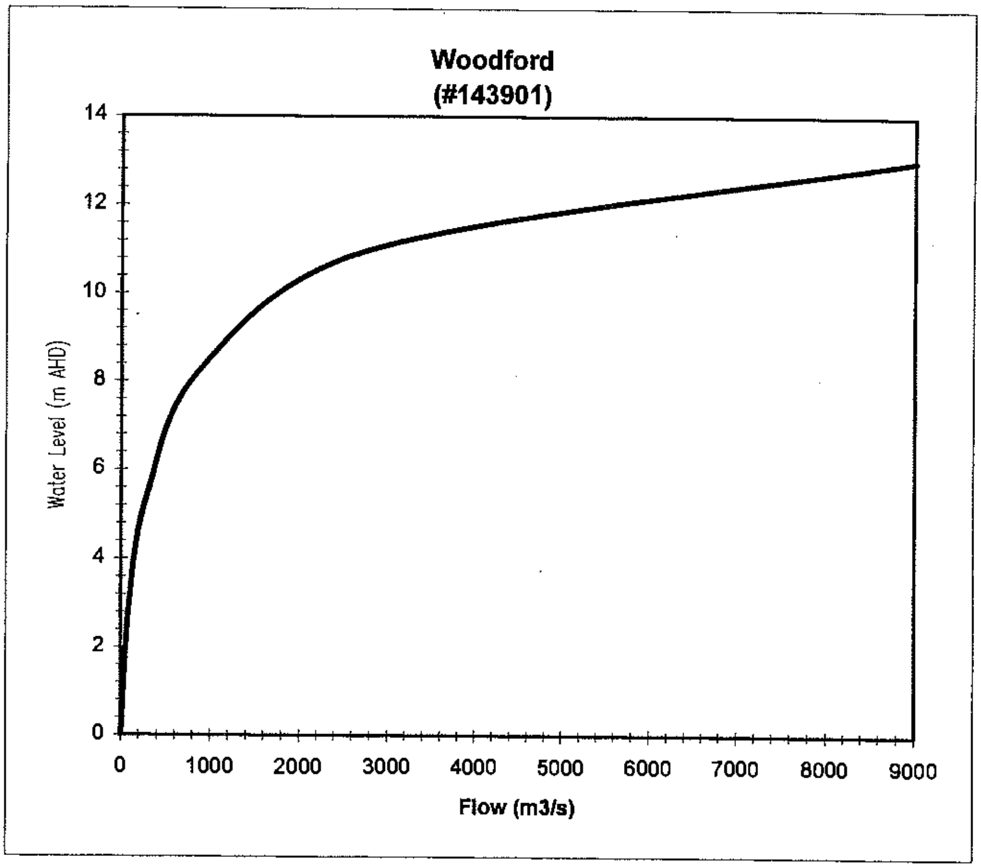
LAIDLEY CREEK at WARREGO HIGHWAY TM

Level (m)	Discharge (m^3/s)
0	0
10	1000



STANLEY RIVER at WOODFORD

Level (m)	Discharge (m^3/s)
0	0
3	90
5.5	300
8.3	900
11	2800
13	9000



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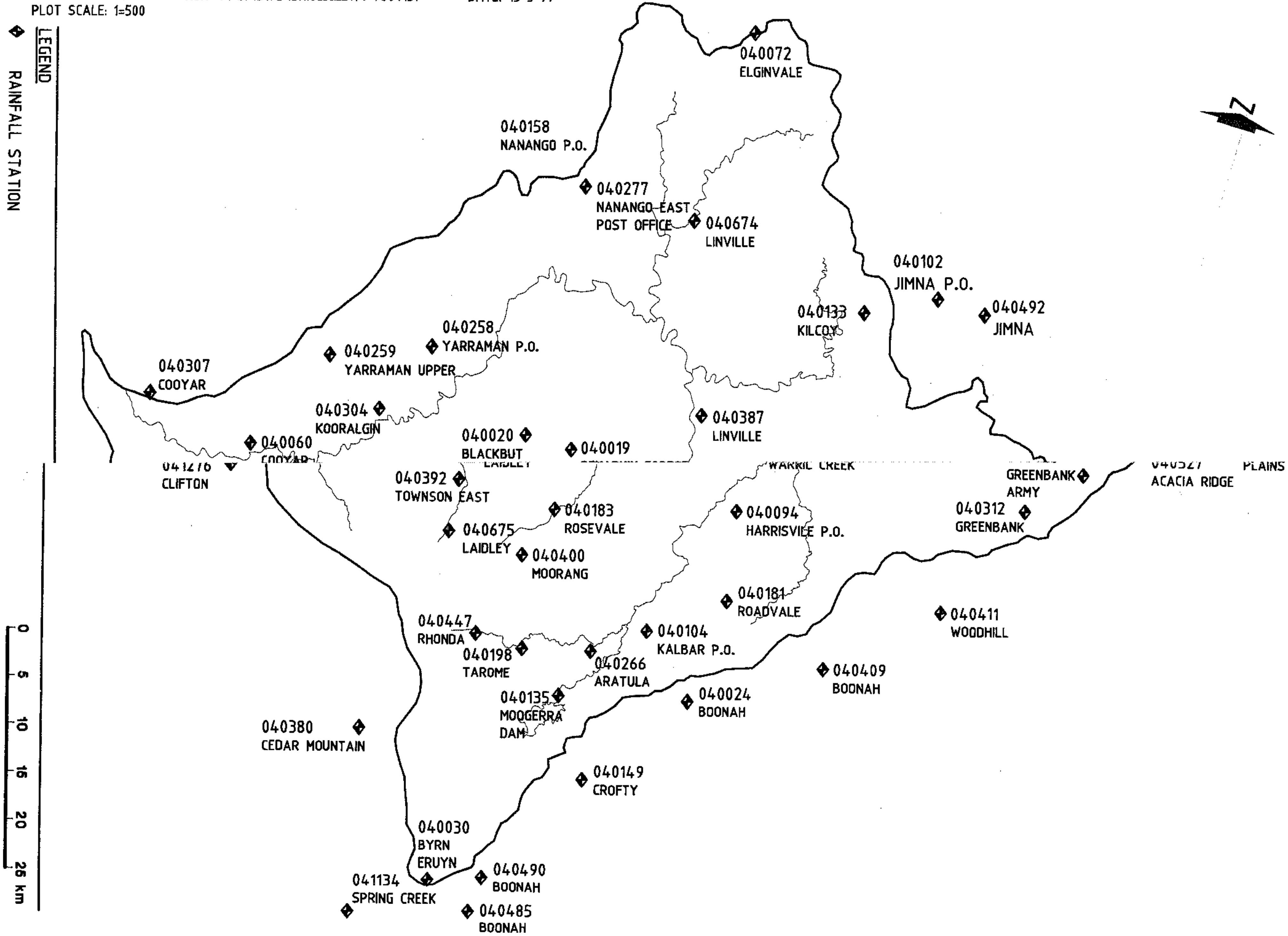
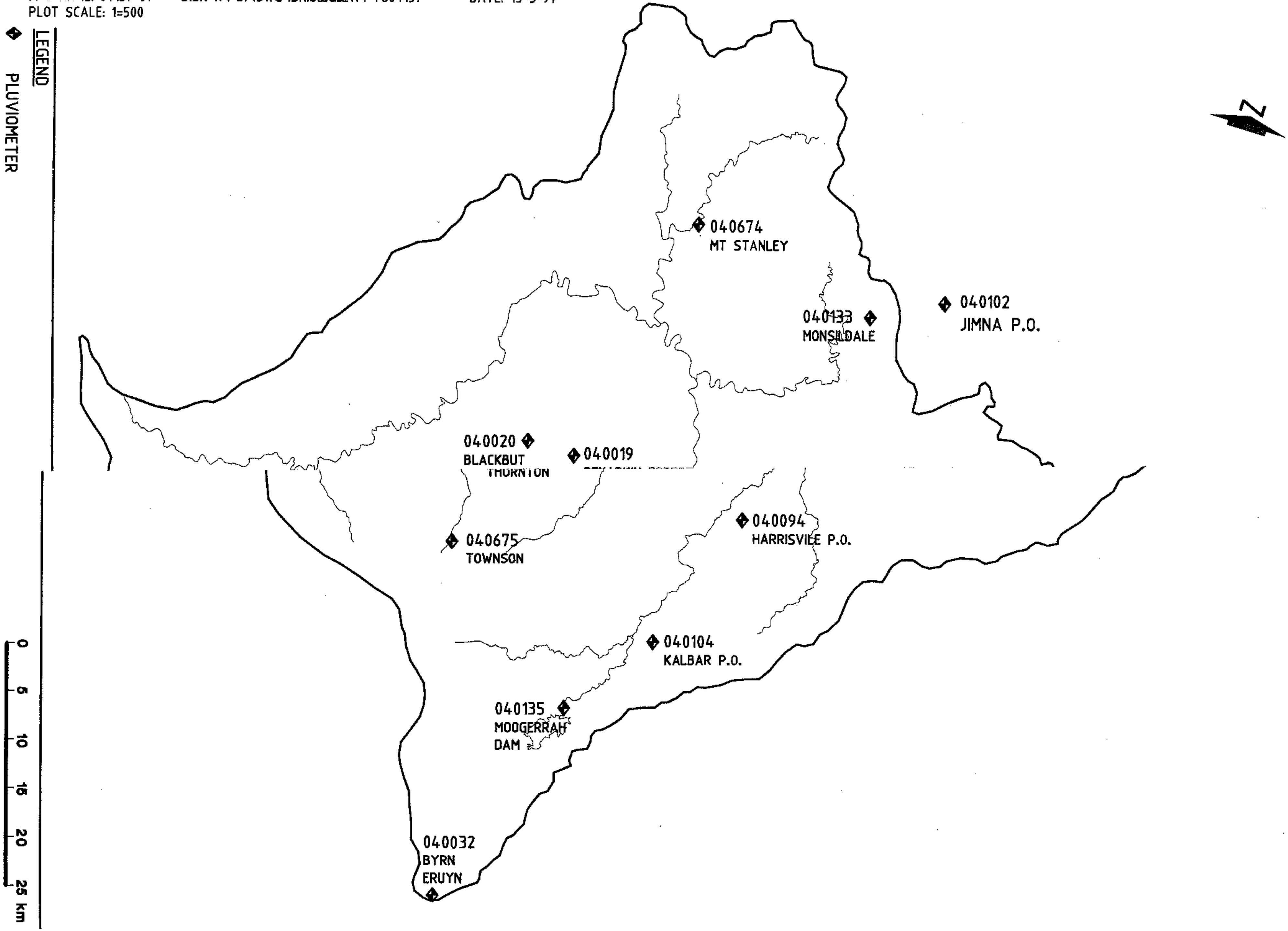
PLOT SCALE: 1=500



SINCLAIR KNIGHT MERZ

FIGURE 3.3
BRISBANE RIVER FLOOD STUDY
RAINFALL STATION LOCATIONS

FI...ME: 0... 7 ... N°: D:\DWG\BRIS... N°: T0... DATE: 13-5-97
PLOT SCALE: 1=500



SINCLAIR KNIGHT MERZ

FIGURE 3.4
BRISBANE RIVER FLOOD STUDY
PLUVIOMETER LOCATIONS

4. Review of Previous Hydrologic Studies

4. Review of Previous Hydrologic Studies

4.1 Overview

The most significant past study of the Brisbane River catchment was undertaken by the Department of Primary Industries (now Department of Natural Resources or DNR) for the South East Queensland Water Board during the period 1991 to 1994. The study was associated primarily with Somerset Dam and Wivenhoe Dam and included a revision of design floods, the development of runoff routing and hydraulic models and a management system for the flood operation of the dams.

This section summarises the main hydrologic outcomes of the DNR study associated with model calibration.

4.2 Hydrologic Model Calibration

The development of hydrologic models by DNR is documented in `Brisbane River Flood Hydrology - Runoff Routing Model Calibration' (Vol 1 and 2, September 1991).

An overview of past flood investigations associated with Somerset Dam and Wivenhoe Dam was provided in the DNR report. The most significant of these studies were the original design flood estimates for Wivenhoe Dam completed in 1977 (Hausler and Porter, 1977) and a 1983 revision of these design flows (Weeks, 1983).

Runoff routing model techniques were applied in the 1983 revision and involved calibration against seven historical floods; July 1965, March 1967, June 1967, January 1968, December 1971, January 1971 and January 1976.

WT42PC, a RORB type runoff routing model, was used by DNR in their 1991 study. A total of 24 individual models were set up corresponding to stream gauge locations and calibrated against historical data.

The seven floods used by Weeks (1983) were applied by DNR in addition to floods in June 1983, early April 1989 and late April 1989.

The subdivision of the Brisbane River catchment into 24 separate models which are then linked together such that hydrographs from upstream models form inputs into downstream models is a technique adopted by DNR from flood analysis done for Warragamba Dam, Sydney (Deen, Craig, Sable 1988).

During the calibration phase, recorded hydrographs were used as upstream inflows into several of the WT42PC models in preference to predicted hydrographs. For example, recorded hydrographs available for Brisbane River at Linville and Emu Creek at Boat Mountain were used as direct inflows into the WT42PC model of the Brisbane River upstream of Gregors Creek (refer to **Figure 3-1 - Stream Gauge Locations** for gauge locations).

The preferential use of recorded hydrographs in place of predicted hydrographs from upstream WT42PC models made it difficult to review the performance of the full network model of the Brisbane River (comprising of the individual WT42PC models linked together) in predicting flood hydrographs at the lower reaches of the catchment.

Calibration of the individual WT42PC models was based on matching of peak discharges and flood volumes by adjusting rainfall loss rates and catchment storage parameters (k and m).

The initial loss - continuing loss type of rainfall loss was used in the model calibration. Initial loss rates were adjusted to match the rising limb of the recorded hydrograph. A significant variability in loss rates was noted, both between the individual models for the same storm and over the range of storms that were modelled. Generally the initial loss ranged from 0 to 300 mm and continuing loss rate varied from 0.1 to 9.7 mm/hr. The upper end of the adopted losses are higher than expected for South East Queensland (AR&R, 1987).

The catchment storage parameter, k, was varied within each WT42PC model for each calibration event, generating an extensive set of k values. A k value was nominated for each individual model based on a weighted average; the bias being in proportion to the peak discharge of the calibration event. On this basis, the model parameters were weighted towards larger magnitude floods.

5. Hydrologic Modelling

5. Hydrologic Modelling

5.1 RAFTS Model Description

The objective of the hydrologic analysis was to develop a model that would adequately reproduce historical storm events and reliably predict design flood discharge hydrographs for the Brisbane River catchment.

The runoff routing model, RAFTS, was used for hydrologic modelling purposes. This program was originally developed by Willing and Partners and the Snowy Mountains Engineering Corporation in 1974 and was first distributed as the Regional Stormwater Model (RSWM).

RAFTS has been applied to watersheds ranging from rural to fully urban with catchment areas varying from less than 1 hectare to several thousand square kilometres. Since the 1980's, WP Software have added refinements to the RAFTS software including an EXPERT graphical environment, unsteady flow routing and simulation of retarding basin storages.

5.2 Comparison with URBS Model

As outlined in Section 4, the Department of Natural Resources developed a series of WT42 models of the Brisbane River catchment as part of the flood management of Wivenhoe Dam and Somerset Dam. This program has become the basis of a runoff routing model, URBS, developed jointly by the Brisbane City Council and Department of Natural Resources. URBS has been modified to become an integrated flood forecasting model and is used for this purpose by the Bureau of Meteorology. Presently, the Bureau has an operational URBS model of the Brisbane River catchment as part of its flood alert system.

Both URBS and RAFTS have the capacity to model separately the catchment storage effects (ie routing along overland flowpaths and minor tributaries draining to the major creeks) and channel storage (ie routing associated with the major creeks and channels). The URBS and RAFTS modelling approaches are different and some of these differences are summarised in **Table 5-1 - Comparison of URBS and RAFTS Storage Routing**.

Table 5-1 - Comparison of URBS and RAFTS Storage Routing

RAFTS Model	URBS Model
Catchment Storage	
$S = \left[\dfrac{0.285A^{0.52}}{(1+U)^{1.97} S_c^{0.5}} \right] Q^m$	$S = \left[\dfrac{\beta A^{0.5} (1+F)^2}{(1+U)^2} \right] Q^m$
where S = storage (m^3h/s) A = catchment area (km^2) Q = discharge (m^3/s) U = fraction urbanisation S_c = drainage slope (%) m = storage non-linearity exponent (default = 0.715)	where S = storage (m^3h/s) A = catchment area (km^2) Q = discharge (m^3/s) U = fraction urbanisation F = fraction forest β = lag parameter m = storage non-linearity exponent (default = 0.8)
Also RAFTS has optional storage factor, PERN, based on the average roughness of the catchment.	
Channel Routing	
Two options are available	One option
1. Simple lag where flood hydrograph is displaced in time by a user-specified delay with zero attenuation. 2. Muskingum - Cunge Routing with routing parameters are calculated from slope, geometry and roughness.	1. Muskingum Routing with direct user inputs of routing parameters (x and α)

5.3 RAFTS Model Setup

Model Layout

A RAFTS model of the Brisbane River catchment was developed to predict runoff hydrographs from rainfall for both historic and design storms.

The schematisation of the model is shown in the following series of four plans included in this report:

- **Figure 5-1a - RAFTS Layout - Bremer and Lower Brisbane**
- **Figure 5-1b - RAFTS Layout - Lockyer**
- **Figure 5-1c - RAFTS Layout - Somerset and Wivenhoe**
- **Figure 5-1d - RAFTS Layout - Upper Brisbane**

Generally, the majority of nodes are schematised in RAFTS format (subcatchment to subcatchment), however there are some exceptions:

- At the catchment headwaters where there are 2 subareas joining together (eg WAL1 and WAL2 compared to KAL8 which is a single headwater subarea). In this case, the link lags are set to zero but a link is shown on **Figure 5-1** for clarity.
- Dummy nodes (zero catchment area) were inserted between RAFTS nodes and these are shown as intermediate nodes. An example is MTC### which is used to sum hydrographs.

The RAFTS model is based on a RORB type model which is centroid to centroid based. During the model setup the RORB type link lags were converted to a RAFTS subarea boundary to subarea boundary type lag. (This involved measuring the river reach distance between subarea boundaries and then checking if the total tributary length is the same as what DNR estimated.)

A single RAFTS model was setup that has full coverage of the Brisbane River catchment. The breakup of the model layout into the four main geographical areas shown in **Figure 5.1a** to **5.1d** was done for presentation only.

The RAFTS model consists of several major elements as follows:

- **General Nodes** - the `building blocks' of the model. Routing of flows from each catchment local to each node is routed through a conceptual storage (see **Table 5-1** for details on catchment storage). Many of the nodes coincide (or are close to) stream gauges which enable comparison between recorded and predicted hydrographs.

- **Basin Nodes** - are a special type of RAFTS node in which inflow hydrographs are routed through a user specified storage. In the case of the Brisbane River Flood Study, basin nodes were used to model dam storages and significant temporary flood storage zones within the river system.

- **Links** - provide a connection between nodes and include channel routing effects (see **Table 5-1** for details on channel routing).

The delineation of RAFTS subarea boundaries, and hence the basic model structure, is based on the DNR WT42 models used for real time flood forecasting. A consistent node numbering system has been applied. In several cases `dummy' nodes have been added (these are denoted with the suffix with one or more `#' or `+').

RAFTS Model Parameters

During the model setup phase, the input of several types of model parameters was required prior to undertaking RAFTS calibration and verification:

- **Subarea Properties** - include the local catchment area, the percentage impervious of the catchment surface, the vectored slope of the subcatchment and a surface roughness factor (PERN).

- **Link Properties** - generally, hydrographs were lagged between subarea nodes based on travel time.

The subarea and link properties were incorporated into the RAFTS model based on available data. Parameters including area, percentage impervious, and slope were fixed. Surface roughness factor and link travel times were subject to adjustment during the course of model calibration.

The basis of parameter selection during the RAFTS model setup phase was:

- **Catchment areas** - the area of the local catchment assigned to each node was based on the catchment subdivision of the DNR flood forecasting models. These node areas were typically of the order of 5 000 to 10 000 ha.

- **Percentage impervious** - zero percentage impervious was adopted for most of the catchment, given its predominant rural and natural landuses. RAFTS derives an equivalent fraction urbanisation (referred to as U in **Table 5-1**) using the percentage impervious assigned to each node. On this basis, the majority of the catchment also had a zero fraction urbanisation. In the Brisbane metropolitan area, the assumed percentage impervious varied from 20 to 50% to account for catchment urbanisation.

- **Slope** - a slope of 2% was globally applied throughout the RAFTS model. This assumption leads to a constant factor in the catchment storage relationship, making it more consistent with the URBS model approach.

- **Surface roughness** - this is an empirical factor based on the average Mannings n of the catchment surface. A Mannings n value of 0.05, consistent with rural landuse, were globally applied in the RAFTS model. This factor was varied during model calibration.

- **Link lag** - initial estimates of lags between nodes were based on interpretation of travel time plots between stream gauges supplied by the Hydrology Section, Bureau of Meteorology. These plots were based on the time difference of the incidence of peak gauge height for a range of historical floods.

Rainfall Losses

An initial loss and continuing loss model was employed for the RAFTS calibration. These losses are used to predict the runoff volume generated from the catchment in response to rainfall and includes two components:

- **Initial Loss** - a loss (in mm) accounting for infiltration effects that is deducted from rainfall prior to the occurrence of surface runoff. Typical values of Initial loss range from 0 to 150 mm.

- **Continuing Loss** - a constant loss rate (in mm/hr) that is deducted from the rainfall over the duration of the storm. Typical continuing loss rates fall in a range from 0 to 3.5 mm/hr.

Initial loss and continuing losses were assumed to be uniform within each of the six broad areas shown in **Figure 2-2 - Brisbane River Subcatchments.**

Basin Nodes

Basin nodes were used in the RAFTS model to account for temporary flood storage effects at key locations within the Brisbane River and its tributaries. The stage-storage discharge relationship assigned to each of these nodes was based on matching the shape and peak discharge of predicted and gauged hydrographs downstream of the nodes.

Basin nodes were also used in the RAFTS model to simulate existing dam storages. For the smaller dams, a simple stage-storage volume - outflow discharge curve based on the dam outlet configuration and the storage volume was used. This data was supplied by DNR and was applied to the dams listed in **Table 2-1 - Major Dams in the Brisbane Valley** with the exception of Wivenhoe and Somerset Dams. It was assumed that the dam storage level was at full supply level at the start of each calibration flood.

Somerset Dam and Wivenhoe Dam are major flood mitigation structures and the regulation of outflows by setting of the dam spillway gates is governed by a set of flood operation rules. Spillway operation depends in part on flooding conditions prevailing downstream of Wivenhoe Dam due to less regulated tributary flows such as Lockyer Creek.

During the RAFTS model calibration phase, recorded or synthetic hydrographs of Somerset and Wivenhoe Dam outflows were used as direct inputs. This approach effectively divided the Brisbane Valley catchment into the following (based on the subcatchments shown on **Figure 2-2**):

- **Somerset** - upstream of Somerset Dam and hence modelling inflows to this dam.

- **Upper Brisbane and Wivenhoe** - upstream of Wivenhoe Dam including upper Brisbane River, Cooyar Creek, Emu Creek and Cressbrook Creek. Regulated flows from Somerset Dam were directly input based on historical data.

- **Lockyer, Bremer and Lower Brisbane** - the remainder of the Brisbane River catchment including Lockyer Creek, Bremer River and the lower Brisbane River. In this case, outflow hydrographs from Wivenhoe Dam were used as direct inputs.

For the case of historical floods prior to the completion of Wivenhoe Dam in 1985, the division of the Brisbane Valley catchment simplified to:

- **Somerset** - upstream of Somerset Dam

- **Upper Brisbane, Wivenhoe, Lockyer, Bremer and Lower Brisbane** - the remainder of the Brisbane River catchment and downstream of Somerset Dam. Recorded outflow hydrographs from this dam were used as inputs.

5.4 RAFTS Model Validation

General Approach

The approach taken in model validation, in accordance to the study brief, was to derive a single set of catchment and channel routing parameters that would be applicable to the entire range of historical floods under consideration. Rainfall loss rates could be adjusted depending on antecedent moisture conditions and other factors.

Calibration against data recorded for a minimum of four floods was required including the January 1974 flood. Another four floods of varying magnitude were used to verify the model performance.

Achieving a consistency between RAFTS and MIKE 11 prediction of flood discharge at key points within the Brisbane River was also a requirement of the calibration process.

The focus of the RAFTS modelling is to generate inflow hydrographs for the Brisbane River MIKE 11 model which extends from the Inner Bar to upstream of the Moggill gauge. A high priority was achieving an acceptable calibration at locations towards the lower reaches of the Brisbane River and also at stream gauges distributed within the catchment at key points of interest (refer to primary stream gauges in **Section 3.1**).

Selection of Calibration and Verification Floods

A summary of major Brisbane River floods and the availability of hydrological data (rainfalls and streamflows) and hydraulic data (flood levels and discharges in the Brisbane metropolitan area) is given in **Table 5-2 - Data Availability for Major Historical Floods**.

Table 5-2 - Data Availability for Major Historical Floods

Flood	Hydrologic Data	Hydraulic Data
February 1931	✓	✓
March 1955	✓	✓
July 1965	✓	
March 1967	✓	
June 1967	✓	✓
January 1968	✓	✓
December 1971	✓	
July 1973	✓	✓
January 1974	✓	✓
January 1976	✓	✓
June 1983	✓	✓
April 1989 a	✓	✓
April 1989 b	✓	✓
May 1996	✓	✓

Note:
1. Floods modelled by DNR for validation of WT42 and RUBICON models are shaded.
2. Limited data also available for the February 1893 flood.

The historical floods can be grouped as:

- **Pre-Somerset Dam** - Floods that occurred prior to the construction of Somerset Dam. There is some confusion regarding the date in which Somerset Dam was constructed. Although the dam was completed in 1959, construction began in 1943 and it is believed that the war caused construction to be ceased. At this point, it is believed that the dam was completed, except for the radial area flood spillway gates.

- **Pre-Wivenhoe Dam** - floods that occurred prior to the construction of Wivenhoe Dam which was operational in 1985. The June 1983 flood occurred during the construction phase when the dam spillway was at a near completion stage.

- **Post-Wivenhoe Dam** - floods that occurred after completion of Wivenhoe Dam in 1985.

Table 5-3 - Historical Calibration and Verification Events provides a list of the events used in the RAFTS and MIKE 11 model validation. The selection of historical floods took into account various factors including the availability of both hydrologic and hydraulic datasets for the same flood. A higher weighting towards recent floods was applied as these tended to have more data available for calibration purposes, however the 1931 and 1955 events were included as these were the only floods considered to be of medium magnitude.

A selection of floods to have full coverage of both pre-Wivenhoe Dam and post-Wivenhoe Dam conditions was also undertaken. The floods used for RAFTS and MIKE 11 model validation covered a historical period from 1931 to 1996.

Table 5-3 - Historical Calibration and Verification Events

Event	Period of Event	Type
January 1974	24/01/74 to 28/01/74	Calibration
June 1983	20/06/83 to 23/06/83	Calibration
Late April 1989	24/04/89 to 27/04/89	Calibration
May 1996	31/04/96 to 07/05/96	Calibration
February 1931	01/02/31 to 06/02/31	Verification
March 1955	26/03/55 to 29/03/55	Verification
July 1973	01/07/73 to 09/07/73	Verification
Early April 1989	31/3/89 to 04/04/89	Verification

Major Dam Discharges

A major consideration in the RAFTS calibration was the flood regulation characteristics of the two major dams; Somerset Dam and Wivenhoe Dam. The hydrologic effect of Somerset Dam started after its completion in 1959 and full operation of the larger Wivenhoe Dam was initiated in 1985.

Estimates of inflow and outflow hydrographs at both dams for a range of historical floods were available and are compiled as **Figure 5-2 - Wivenhoe Dam Discharges** and **Figure 5-3 - Somerset Dam Discharges.** These are synthetic hydrographs produced by Brisbane City Council and estimated from measured storage levels and records of spillway gate settings. In the case of Wivenhoe releases, DNR suggests that the outflow hydrographs may be over estimated by between 15 to 20 percent, especially for the lesser floods that occurred in early and late April 1989 (SEQWB, October 1994) which correspond to outflows of the order of 1 200 to 1 500 m^3/s.

Wivenhoe Dam releases are derived by a theoretical rating curve based on the hydraulics of the four spillway radial gates. To resolve the potential outflow discrepancy, DNR recommended that the clear gate opening be measured for a range of gate settings and that sensors be installed at each spillway gate.

In the case of RAFTS modelling for the early and late April 1989 floods, both the DNR and Council derived hydrographs were tested. The selection of the Wivenhoe Dam outflow hydrograph used was based on matching the recorded hydrograph at the Savages Crossing streamgauge, particularly after the recession of Lockyer Creek discharges. On this basis, the Council hydrograph was used for the early April 1989 flood and the DNR hydrograph was applied in the late 1989 flood analysis.

No dam releases for both Wivenhoe Dam and Somerset Dam were reported for the May 1996 flood. Data on Somerset Dam releases during the July 1973 flood was unavailable.

5.5 RAFTS Calibration - January 1974 Flood

The January 1974 flood was the first event used in the calibration process and is by far the largest of the floods considered. A significant amount of historical data is available for calibration; including rainfalls, streamflows and flood levels in the Brisbane River.

The 1974 flood occurred prior to construction of Wivenhoe Dam and is thus representative of pre-Wivenhoe Dam conditions. This is also the case for the July 1973 verification flood.

Rainfall

Rainfall occurred over a four day period commencing on mid 24 January 1974. **Figure 5-4 - Rainfall Distribution - January 1974 Storm** presents the spatial distribution of rainfall across the Brisbane River catchment.

Rainfall tended to increase in an easterly direction, with highest values being recorded at stations along the D'Aguilar Range and further south at Mount Glorious and Mount Nebo. Total four day rainfalls ranged from 120 mm to 1 306 mm. Selected pluviograph patterns are shown on **Figure 5-5- Representative Pluviographs - January 1974 Flood**. Peak rainfall intensities tended to occur on 26 January. The Brisbane metropolitan area recorded a sequence of three storms, the first and largest burst occurring on 25 January.

Rainfall Losses

The losses used to reproduce the rising limb and total volume of the recorded hydrograph at key stream gauge are given in **Table 5-4 - Rainfall Losses - January 1974 Calibration**.

Table 5-4 - Rainfall Losses - January 1974 Calibration

Sub-Catchment	Initial Loss (mm)	Continuing Loss (mm/hr)
Upper Brisbane	0	2.5
Somerset	0	2.5
Wivenhoe	0	2.5
Lockyer	0	2.5
Bremer	0	0
Lower Brisbane	0	2.5

Catchment Storage

By calibration to the 1974 flood data, especially against the general shape of recorded hydrographs, the following PERN values were applied:

- PERN equal to 0.11 - was used for Wivenhoe and Upper Brisbane subcatchments.
- PERN equal to 0.05 - was used for Somerset, Lockyer Bremer and Lower Brisbane subcatchments.

Channel Routing

A simple lag time assigned to each RAFTS link was found generally to reproduce the channel routing behaviour as recorded by the available stream gauges. For example, the Brisbane River stream gauge data at Savages Crossing and Mt Crosby shows no attenuation of peak discharge. This trend was also the case between the Moggill and Jindalee gauge sites.

On this basis, link lag times were adjusted to match the recorded timing of hydrographs. Hydrograph attenuation due to local storage effects was found to be significant at the following three key sites:

- **Lowood** - Lockyer Creek enters the Brisbane River upstream of Lowood. The lower reaches of Lockyer Creek are low lying floodplain subject to extensive inundation during major floods. Thus, the Lockyer Creek confluence represents a large temporary flood storage and its ponding effect is controlled by Brisbane River backwater.
- **Moggill** - The Bremer River enters the Brisbane River upstream of the Moggill gauge. On a similar basis as the Lockyer Creek - Brisbane River confluence, a significant amount of temporary flood storage is available in the lower Bremer River which is regulated by local backwater conditions from the Brisbane River.
- **Harrisville** - The Warrill Creek floodplain near Harrisville has substantial storage routing effects, based on recorded hydrographs in this area.

Channel storage effects at the above locations were modelled by basin nodes. A stage-storage-discharge relationship was derived at each storage, based on achieving a match against predicted and recorded downstream hydrographs. The storage relationships are shown as:

- **Figure 5-6 - Channel Storage Curves at Lowood**
- **Figure 5-7 - Channel Storage Curves at Moggill**
- **Figure 5-8 - Channel Storage Curves at Harrisville**

Storage Curve A at Lowood (presented in **Figure 5-6**) gave the best fit against recorded stream gauge data for the January 1974 flood.

Recorded and Predicted Hydrographs

Plots of recorded and RAFTS predicted hydrographs for the January 1974 calibration are compiled in **Appendix B** (Figure B-1a to B-1d). A summary is given in **Table 5-5 - RAFTS Calibration - January 1974 Flood.**

Predicted peak discharges within the coverage of the MIKE 11 model (ie at Moggill, Jindalee and Port Office) are within 1 to 3 percent of recorded peaks, RAFTS estimates hydrograph volumes are 13 to 14 percent below measured volumes at Moggill and Jindalee. Part of this volume mismatch can be attributed to inconsistently high flows recorded at Moggill after the hydrograph recession and, similarly, high flows at Jindalee prior to the start of the hydrograph rising limb. At Port Office gauge, the predicted and measured flood volume are within 2 percent.

At other key sites in the Brisbane Valley, predicted peak discharges are within 0 to 13 percent of gauged discharges, except for Lockyer Creek at Lyons Bridge, Bremer River at David Trumpy Bridge and Warrill Creek at Amberley. The Lockyer Creek and Bremer River gauges are subject to backwater effects from Brisbane River.

Table 5-5 - RAFTS Calibration - January 1974 Flood

Number	Stream	Site	Peak Discharge (m^3/s)			Discharge Volume (GL)			Comments
			Gauged	Predicted	Diff(%)	Gauged	Predicted	Diff(%)	
Upper Brisbane									
143015	Cooyar Ck	Damsite	967	585	-40	105	94	-10	
143007	Brisbane Rv	Linville	2 100	1 912	-9	181	220	+22	
143010	Emu Ck	Boat Mtn	1 054	882	-16	151	131	-13	
143009	Brisbane Rv	Gregors	3 750	3 829	+2	651	556	-15	
Somerset & Wivenhoe									
143305	Stanley Rv	Somerset Dam	3 587	3 119	-13	591	465	-21	
143008	Brisbane Rv	Middle Ck	4 813	5 429	+13	1 055	1 054	0	
143901	Stanley Rv	Woodford	1 111	1 332	+20	186	148	-20	
143303	Stanley Rv	Peachester	360	500	+39	77	56	-27	
143013	Cressbrook	Damsite	202	410	+103	33	48	+45	
Lockyer									
143203	Lockyer Ck	Helidon	1 308	858	-34	108	60	-44	
143210A	Lockyer Ck	Lyons Bridge	2 650	3 750	+42	492	475	-3	Backwater effect at gauge
143905	Lockyer Ck	Glenore Grove	3 900	3 466	-11	395	398	0	
143904	Lockyer Ck	Gatton	2 120	2 400	+13	132	200	+52	
143907	Brisbane Rv	Lowood	7 397	7 471	+1	1 891	1 743	-8	
Bremer & Lower Brisbane									
143001	Brisbane Rv	Savages Cross	7 340	7 497	+2	2 031	1 836	-10	
143003	Brisbane Rv	Mt Crosby	7 456	7 503	0	2 185	1 983	-9	
143110	Bremer Rv	Adams Bridge	349	531	+52	46	65	+41	
143108	Warrill Ck	Amberley	1 576	2 132	+35	294	385	+31	
143113	Purga Ck	Loamside	400	868	+117	55	106	+93	Poor rating at high flows
143019	Oxley Ck	Beatty Rd	985	966	-2	98	85	-13	
143911	Bremer Rv	David Trumpy	4 000	4 891	+22	994	876	-11	Backwater effect at gauge
143915	Brisbane Rv	Moggill	9 346	9 663	+3	3 472	2 971	-14	Gauge flow high at end
143982	Brisbane Rv	Jindalee	9 493	9 670	+2	3 567	3 111	-13	Gauge flow high at start
143919	Brisbane Rv	Port Office	9 800	9 675	-1	3 343	3 269	-2	

Note: 1. Primary stream gauges are shaded.

5.6 RAFTS Calibration - June 1983 Flood

The June 1983 flood was a significant flood in the Upper Brisbane and Wivenhoe parts of the Brisbane Valley. Wivenhoe Dam was under construction and four of the five spillway monoliths were built to final crest level. The flood occurred prior to the installation of spillway gates and thus outflow from the dam was unregulated.

The 1983 flood data represents a transition between pre-Wivenhoe Dam and post-Wivenhoe Dam conditions.

Rainfall

Rainfall occurred over a period of three days commencing 20 June 1983. The spatial distribution of rainfall within the Brisbane River catchment is presented in **Figure 5-9 - Rainfall Distribution - June 1983 Storm**. Rainfalls varied from about 40 mm to 240 mm.

As shown in **Figure 5-10 - Representative Pluviographs - June 1983 Storm**, two rainfall peaks occurred with the latter burst recorded on the morning of 22 June generally being dominant.

Rainfall Losses

The losses applied during the June 1983 flood calibration are given in **Table 5-6 - Rainfall Losses - June 1983 Calibration.**

Table 5-6 - Rainfall Losses - June 1983 Calibration

Subcatchment	Initial Loss (mm)	Continuing Loss (mm/hr)
Upper Brisbane	0	2.5
Somerset	0	1.5
Wivenhoe	0	2.5
Lockyer	0	2.5
Bremer	0	0
Lower Brisbane	0	2.5

Catchment Storage

A PERN coefficient of 0.05 was applied to all subcatchments.

Channel Routing

Link lag times used in the 1974 calibration were used except for upstream of the partially constructed Wivenhoe Dam. Faster travel times were used in the drowned reach of the Brisbane River from Somerset Dam to Wivenhoe Dam (Node WIV12 to WIV-OUT) to account for flood wave celerity effects.

At the channel storage nodes assigned at Lowood, Moggill and Harrisville, the storage curves used for the January 1974 flood calibration were applied except for a modified storage relationship at Lowood. This is shown as Storage Curve B on **Figure 5-6 - Channel Storage Curves at Lowood.**

Recorded and Predicted Hydrographs
Plots of recorded and RAFTS predicted hydrographs for the June 1983 calibration are compiled in **Appendix B (Figure B-2a** to **B-2c**) and summarised in **Table 5-7 - RAFTS Calibration - June 1983 Flood.**

The match between predicted and recorded flows at key sites are generally within acceptable limits. Flows based on the Brisbane River gauge at Moggill are substantially lower than RAFTS predicted discharge. This trend was also present in the analysis of both the early and late April 1989 events (refer to Section 5.7 and 5.13). These three floods of the lower Brisbane River were of similar magnitude and less than 2 000 m^3/s.

Also the Moggill hydrograph volume based on the gauge data is substantially less than the volume recorded upstream at Savages Creek. On this basis, it is suggested that the Moggill rating curve be adjusted for moderate floods (less than 2 000 m^3/s). There also may be a need to have a rating curve dependent on downstream tide levels at this site.

Table 5-7 - RAFTS Calibration - June 1983 Flood

Number	Stream	Site	Peak Discharge (m^3/s)			Discharge Volume (GL)			Comments
			Gauged	Predicted	Diff(%)	Gauged	Predicted	Diff(%)	
Upper Brisbane									
143015	Cooyar Ck	Damsite	707	1 159	+64	51	70	+37	
143007	Brisbane Rv	Linville	2 090	2 204	+5	148	146	-1	
143010	Emu Ck	Boat Mtn	885	1 188	+34	47	75	+60	
143009	Brisbane Rv	Gregors Ck	3 850	4 118	+7	332	309	-7	
Somerset & Wivenhoe									
143305	Stanley Rv	Somerset Dam	2 236	2 316	+4	260	177	-32	
143036	Brisbane Rv	Wivenhoe Dam	5 900	5 849	-1	776	739	-5	Synthetic gauged hydrograph
143303	Stanley Rv	Peachester	310	362	+17	27	16	-41	
Lockyer									
143203	Lockyer Ck	Helidon	619	540	-13	41	29	-29	
143212	Tenthill Ck	Tenthill	183	345	+89	15	21	+40	
143210A	Lockyer Ck	Lyons Bridge	2 290	2 379	+4	166	156	-6	Backwater effect at gauge
143905	Lockyer Ck	Glenore Grove	2 100	2 261	+8	218	126	-42	
Bremer & Lower Brisbane									
143001	Brisbane Rv	Savages Cross	1 641	1 513	-8	721	614	-15	
143110	Bremer Rv	Adams Bridge	132	128	-3	10	12	+20	
143107	Bremer Rv	Walloon	387	830	+114	33	72	+118	
143108	Warrill Ck	Amberley	383	398	+4	50	79	+58	
143113	Purga Ck	Loamside	141	235	+67	12	21	+75	
143911	Bremer Rv	David Trumpy	2 045	1 405	-31	119	184	+55	Gauge record incomplete
143915	Brisbane Rv	Moggill	1 457	2 029	+39	450	855	+90	Recorded volume < Savages Crossing

Note: 1. Primary stream gauges are shaded.

5.7 RAFTS Calibration - Late April 1989 Flood

The late April 1989 flood was a significant event in the Upper Brisbane and Somerset parts of the catchment. It occurred about three weeks after the incidence of a flood of similar magnitude (early April 1989 flood used for verification).

The flood regulation function of Wivenhoe Dam was in full operation during the 1989 floods as indicated by the dam outflow hydrographs presented in **Figure 5-2 - Wivenhoe Dam Discharges**. Releases from Wivenhoe Dam during the late 1989 flood continued for a period of four days after the cessation of dam inflows.

On this basis, the late April 1989 flood (in addition to the early April 1989 verification and May 1996 calibration events) are representative of post-Wivenhoe Dam conditions.

Rainfall

As shown in **Figure 5-11 - Rainfall Distribution - Late 1989 Storm**, the highest rainfalls were recorded in the upper parts of the Somerset subcatchment. Total rainfalls up to 355 mm were recorded over a three day period. In the Lockyer and Bremer areas of the catchment, rainfalls were substantially less and generally fell in the range of 50 to 100 mm.

Selected rainfall temporal patterns are presented in **Figure 5-12 - Representative Pluviographs - Late April 1989 Storm.** All stations recorded a storm burst during mid 26 April and at some locations including Ravensbourne, Moongerah Dam and Kirkleagh, this burst was preceded by a similar rainfall pattern on 25 April.

Rainfall Losses

Table 5-8 - Rainfall Losses - Late April 1989 Calibration lists the initial and continuing losses applied in the hydrograph calibration.

Table 5-8 - Rainfall Losses - Late April 1989 Calibration

Subcatchment	Initial Loss (mm)	Continuing Loss (mm/hr)
Upper Brisbane	30	2.5
Somerset	30	0
Wivenhoe	30	2.5
Lockyer	30	2.5
Bremer	10	0
Lower Brisbane	30	2.5

Catchment Storage

A PERN coefficient of 0.05 was applied to all subcatchments.

Catchment Routing

The late April 1989 flood was the first event analysed that incorporated controlled flood regulation at Wivenhoe Dam.

Link lag times were a modified set of travel times used in the June 1983 flood when the dam was under construction. In the case of the late April 1989 flood calibration, travel times were reduced in the Brisbane River reach from the dam wall to the upstream extent of the Wivenhoe Dam storage (Node WIV7 to WIV-OUT).

During the calibration process, travel times were also reduced in the Brisbane River reach from Linville to Scrub Creek (Node GRE1 to GRE-OUT).

At the channel storage nodes assigned at Lowood, Moggill and Harrisville, the storage curves used in the June 1983 flood calibration were used.

Recorded and Predicted Hydrographs
Plots of recorded and RAFTS predicted hydrographs for the late April 1989 calibration are presented in **Appendix B** (**Figure B-3a** to **B-3d**). Further details are given in **Table 5-9 - RAFTS Calibration - Late April 1989 Flood**.

Recorded and predicted discharge peaks at key sites are generally matched within about 15 percent.

The synthetic inflow hydrograph at Wivenhoe Dam has an unrealistic discharge `spike' and this accounts for the discrepancy with RAFTS peak discharge at this location.

Table 5-9 - RAFTS Calibration - Late April 1989 Flood

Number	Stream	Site	Peak Discharge (m^3/s)			Discharge Volume (GL)			Comments
			Gauged	Predicted	Diff(%)	Gauged	Predicted	Diff(%)	
Upper Brisbane									
143015	Cooyar Ck	Damsite	436	648	+49	34	47	+38	
143007	Brisbane Rv	Linville	2 214	2 178	-2	116	128	+10	
143010	Emu Ck	Boat Mtn	610	612	0	39	45	+15	
143009	Brisbane Rv	Gregors Ck	3 250	3 457	+6	297	238	-20	Lag error in gauge
Somerset & Wivenhoe									
143305	Stanley Rv	Somerset Dam	3 639	2 620	-28	337	273	-19	
143036	Brisbane Rv	Wivenhoe Dam	9 632	4 750	-50	792	682	-14	Spike in synthetic hydrograph
143901	Stanley Rv	Woodford	642	1 089	+70	201	111	-45	
143303	Stanley Rv	Peachester	431	729	+69	34	53	+56	
Lockyer									
143203	Lockyer Ck	Helidon	499	184	-63	19	11	-42	
143212	Tenthill Ck	Tenthill	89	70	-17	15	7	-53	
143225	Laidley Ck	Showground	119	46	-61	16	4.3	-73	
143905	Lockyer Ck	Glenore Grove	422	409	-3	67	34	-49	
Bremer & Lower Brisbane									
143001	Brisbane Rv	Savages Cross	1 406	1 210	-14	815	753	-8	
143110	Bremer Rv	Adams Bridge	96	79	-18	6.3	9	+43	
143107	Bremer Rv	Walloon	259	521	+101	20	51	+155	
143108	Warrill Ck	Amberley	252	290	+15	41	64	+56	
143113	Purga Ck	Loamside	112	169	+51	11	15	+36	
143911	Bremer Rv	David Trumpy	773	873	+13	74	139	+88	Gauge record incomplete
143915	Brisbane Rv	Moggill	1 200	1 400	+17	752	931	+24	

Note: 1. Primary stream gauges are shaded.

5.8 RAFTS Calibration - May 1996 Flood

The flood of May 1996 caused extensive flooding of rural areas throughout the Brisbane Valley, especially in the Laidley and Lockyer Creek areas. Significant flows were also recorded along the Bremer River and Warrill Creek and this caused moderate flooding at Ipswich. A full description of the meteorological and hydrologic aspects of the May 1996 flood has been prepared by the Bureau of Meteorology (BOM, 1996).

No dam releases during the May 1996 flood were reported at both Somerset Dam and Wivenhoe Dam.

Rainfall

Rainfall associated with the May 1996 flood occurred over a period of several days. Eight day rainfall totals within the Brisbane Valley are shown in **Figure 5-13 - Rainfall Distribution - May 1996 Storm.** Maximum rainfalls of in excess of 1 000 mm were recorded at Mount Glorious. As shown in **Figure 5-14 - Representative Pluviographs - May 1996 Storm**, the rainfall pattern was multi-peaked with recorded intensities generally less than 4 mm/hr with peaks of the order of 10 mm/hr.

Rainfall Losses

Table 5-10 - Rainfall Losses - May 1996 Calibration lists the rainfall losses assigned to each Brisbane River subcatchment.

Table 5-10 - Rainfall Losses - May 1996 Calibration

Subcatchment	Initial Loss (mm)	Continuing Loss (mm/hr)
Upper Brisbane	150	2.5
Somerset	150	2.0
Wivenhoe	150	2.5
Lockyer	140	1.2
Bremer	100	1.5
Lower Brisbane	100	1.5

Catchment Storage

A PERN coefficient of 0.05 was applied to all subcatchments.

Channel Routing

Link lag times within the RAFTS model and channel storage properties at Lowood, Moggill and Harrisville were identical to those used in the late April 1989 flood calibration.

Recorded and Predicted Hydrographs

Plots of recorded and RAFTS predicted hydrographs for the May 1996 calibration are presented in **Appendix B** (**Figures B-4a** to **B-4d**). Further summary information is compiled in **Table 5-11 - RAFTS Calibration - May 1996 Flood.** For the lower reaches of the Brisbane River, peak discharges are predicted by RAFTS to within 5 percent of gauged flows.

Table 5-11 - RAFTS Calibration - May 1996 Flood

Number	Stream	Site	Peak Discharge (m^3/s)			Discharge Volume (GL)			Comments
			Gauged	Predicted	Diff(%)	Gauged	Predicted	Diff(%)	
Upper Brisbane									
143015	Cooyar Ck	Damsite	41	74	+80	9.3	6.4	-31	Relatively low flow
143007	Brisbane Rv	Linville	57	75	+32	17.4	6.9	-60	Relatively low flow
143010	Emu Ck	Boat Mtn	388	198	-49	39	18	-54	
143009	Brisbane Rv	Gregors Ck	479	340	-29	76	52	-32	
Somerset & Wivenhoe									
143036	Brisbane Rv	Wivenhoe Dam	2 386	2 644	+11	343	232	-32	
Lockyer									
143203	Lockyer Ck	Helidon	739	259	-65	93	34	-63	
143212	Tenthill Ck	Tenthill	628	592	-6	71	107	+51	
143225	Laidley Ck	Showground	540	485	-10	66	76	+15	
143907	Brisbane Rv	Lowood	2 020	2 088	+3	525	578	+10	
143905	Lockyer Ck	Glenore Grove	2 460	2 253	-8	475	410	-14	
Bremer & Lower Brisbane									
143001	Brisbane Rv	Savages Cross	2 011	2 102	+5	532	609	+14	
143110	Bremer Rv	Adams Bridge	225	199	-12	35	24	-31	
7020	Bremer Rv	Rosewood	781	766	-2	155	126	-19	
6572	Warrill Ck	Harrisville	376	568	+51	88	80	-9	
143107	Bremer Rv	Walloon	726	837	+15	127	140	+10	
143102	Warrill Ck	Kalbar	426	533	+25	52	56	+8	
143108	Warrill Ck	Amberley	402	384	-4	129	100	-22	
143019	Oxley Ck	Beatty Rd	237	297	+25	49	42	-14	
143915	Brisbane Rv	Moggill	2 792	2 807	0	761	1 028	+35	Record incomplete

Note: 1. Primary stream gauges are shaded.

5.9 RAFTS Verification - February 1931

The 1931 historical flood event commenced on the 1 Feb 1931 and continued for a period of five days. This event was the second largest flood recorded this century and was considered to be an important flood in the verification process.

Limited stream gauge information was available in the lower reaches of the Brisbane River however it was considered that there was sufficient information to provide some indication of the reliability of the RAFTS model output.

Wivenhoe and Somerset Dams were not constructed for this event and the RAFTS model was adjusted accordingly.

Rainfall

One of the main concerns modelling this event was the lack of pluviograph information. Pluviographs provide temporal variation throughout the catchment during a storm.

To account for spatial variation, rainfall depths for the event were calculated and these depths were input into Civilcad where isohyetal maps were generated. **Figure 5-15 - Isohyetal Map - February 1931 Flood** illustrates the rainfall depths for the Brisbane River Catchment.

Rainfall depths were then interpolated at each sub-area and input into the software package HYDCON where appropriate temporal patterns were applied. HYDCON is a software package produced by Sinclair Knight Merz specifically for this study.

A single temporal pattern was applied over the entire catchment for the 1931 flood which was measured at Brisbane Regional Office. This was the only temporal pattern (other than daily rainfall information) available for this flood event.

After inspection of the daily rainfall data it was considered that the temporal pattern over the catchment was reasonably consistent for the lower part of the catchment. However for the upper catchment the rainfall commenced half to a full day earlier than in the lower catchments (Lower Brisbane and Bremer catchments). To account for these effects the temporal pattern for the upper catchments was applied half a day earlier as illustrated in **Figure 5-16 - Representative Pluviographs - February 1931 Storm**.

Rainfall Losses

Table 5-12 - Rainfall Losses - February 1931 Verification lists the initial and continuing losses used for the pre Wivenhoe and pre Somerset Dam verification event.

Table 5-12- Rainfall Losses - February 1931 Verification

Subcatchment	Initial Loss (mm)	Continuing Loss (mm/hr)
Upper Brisbane	150	3.5
Somerset	120	3.0
Wivenhoe	150	3.5
Lockyer	100	2.5
Bremer	40	1.0
Lower Brisbane	40	1.0

The above losses are consistent with the loss rates used for the previous calibration/verification events although the maximum continuing loss had to be increased from a previous maximum of 3 mm/hr to 3.5 mm/hr.

Catchment Storage

The PERN value applied to the catchment were applied as follows:

- PERN equal to 0.11 - was used for Wivenhoe, Somerset and the Upper Brisbane subcatchments.

- PERN equal to 0.05 - was used for Lockyer, Bremer and Lower Brisbane subcatchments.

These PERN values reflect the absence of Wivenhoe and Somerset Dams.

Channel Routing

Channel routing within the Somerset subcatchment were modified to account for the effects of Somerset Dam not being constructed during this event. Lag times were adjusted until a good match of the Savages Crossing hydrograph was achieved.

Storage properties assigned at Lowood, Moggill and Harrisville basin nodes were identical to those used in the 1974 flood calibration.

Recorded and Predicted Hydrographs

Plots of recorded and RAFTS predicted hydrographs for the February 1931 flood are compiled in **Appendix B - RAFTS Results (Figure B-5)** and summary details are given in **Table 5-13 - RAFTS Verification - February 1931 Flood Event.**

Table 5-13 - Rafts Verification - February 1931 Flood

Number	Stream	Site	Peak Discharge (m^3/s)			Discharge Volume (GL)			Comments
			Gauged	Predicted	Diff (%)	Gauged	Predicted	Diff (%)	
Upper Brisbane									
143002	Brisbane	Fulham Vale	3005	3150	+4.9	338340	287870	-15.0	
Somerset and Wivenhoe									
143303	Stanley	Peachester	625	640	+2.9	59330	35760	-40.0	
Lockyer									
143203	Lockyer	Helidon	370	545	+45.0	33310	23230	-30.0	
Bremer and Lower Brisbane									
143102	Warrill	Kalbar	40	245	+499	1920	16620	+765	Poor Data
143101	Warrill	Mudtapilly	260	285	+9.7	20970	27930	+33.0	Key Location
143001	Brisbane	Savages Crossing	5575	5685	+2.0	1009760	915750	-9.0	Key location

The main object of this verification was to match hydrographs at Savages Crossing and Mudtapilly as these locations directly influence the inflow into the Lower Brisbane River.

5.10 RAFTS Verification - March 1955

The 1955 flood event commenced on the 26 March 1955 and was the third largest recorded flood event this century. The event continued over a period of three days. Although Somerset Dam was not fully completed for the 1955 flood event, it was modelled because the dam storage was completed.

Rainfall

A similar procedure to that adopted for the 1931 flood event was used for the 1955 event. An isohyetal map was generated and rainfall depths were interpolated using Civilcad. HYDCON was used to apply the temporal patterns at each sub area. **Figure 5-17 - Isohyetal Map - March 1955 Flood** presents rainfall depths over the Brisbane River Catchment

For this event a temporal pattern was available at the Brisbane Regional Office and Somerset Dam hence temporal variation over the catchment could be better represented in the 1931 event. The Theissen polygon method was applied to the catchment to determine the area of influence for each of these temporal patterns. **Figure 5-18 - Representative Pluviographs - March 1955 Storm** illustrates each of these temporal patterns.

Rainfall Losses

Table 5-14 - Rainfall Losses - March 1955 Verification lists the initial and continuing losses used for the pre Wivenhoe and Somerset Dam verification events.

Table 5-14 - Rainfall Losses - March 1955 Verification

Subcatchment	Initial Loss (mm)	Continuing Loss (mm/hr)
Upper Brisbane	20	1.8
Somerset	130	2.5
Wivenhoe	20	1.8
Lockyer	85	2.5
Bremer	50	1.5
Lower Brisbane	100	2.5

The loss parameters used for this verification event conform to the values used for the previous calibration and verification events.

Catchment Storage

The PERN value applied to the catchment was 0.5 except for Wivenhoe and the Upper Brisbane subcatchment where a PERN coefficient of 0.11 was used. These PERN values reflect the absence of Wivenhoe Dam.

Channel Routing

The link travel times and storage properties assigned at Lowood, Moggill and Harrisville basin nodes were identical to those used in the January 1974 flood calibration.

5.11 Recorded and Predicted Hydrographs

Plots of recorded and RAFTS predicted hydrographs for the March 1955 flood are compiled in **Appendix B (Figure B-6a to B-6b)** and summary details are given in **Table 5-15 - RAFTS Verification - March 1955 Flood Event.**

Table 5-15 - Rafts Verification - March 1955 Flood

Number	Stream	Site	Peak Discharge (m^3/s)			Discharge Volume (GL)			Comments
			Gauged	Predicted	Diff (%)	Gauged	Predicted	Diff (%)	
Upper Brisbane									
143002	Brisbane	Fulham Vale	5090	4800	-5.6	437310	414570	-5.2	
Somerset and Wivenhoe									
143006	Cressbrook Ck	Tinton	485	480	-1.2	27120	44680	+65.0	
143303	Stanley	Peachester	455	425	-6.9	104690	15870	-85.0	
Lockyer									
143206	Lockyer	Brightview Weir	620	800	+31.0	48850	45230	-7.4	
143204	Lockyer	Wilsons Weir	934	931	-0.3	201470	65950	-67.0	
143203	Lockyer	Helidon	225	235	+4.5	14930	10100	-32.0	
Bremer and Lower Brisbane									
143102	Warrill	Kalbar	3314	348	+5.1	32220	19600	-39.0	Key location
143001	Brisbane	Savages Crossing	5270	5085	-3.5	1125840	758900	-33.0	Key Location

Again most emphasis for the matching of hydrographs was placed on two primary stream gauges, Savages Crossing and Kalbar. These gauges were the predominant gauges for estimating inflows into the Lower Brisbane River for the 1955 flood event.

5.12 RAFTS Verification - July 1973 Flood

The July 1973 flood was the first of two floods used to verify the RAFTS model. It is representative of pre-Wivenhoe conditions and the RAFTS assumptions used in the January 1974 flood calibration were checked against recorded July 1973 flood data.

Records on Somerset Dam outflows were not available for this verification event.

Rainfall

The spatial distribution of rainfalls over a eight day period commencing 1 July 1973 is shown in **Figure 5-19 - Rainfall Distribution - July 1973 Storm.** Highest rainfalls were registered in the upper Somerset area and the lowest readings were associated with the southern parts of the Bremer River subcatchment.

Rainfall temporal patterns recorded in the Brisbane Valley were highly variable as indicated in **Figure 5-20 - Representative Pluviographs - July 1973 Storm.**

Rainfall Losses

Table 5-16 - Rainfall Losses - July 1973 Verification lists the initial and continuing losses used in the pre-Wivenhoe Dam verification analysis.

Table 5-16 - Rainfall Losses - July 1973 Verification

Subcatchment	Initial Loss (mm)	Continuing Loss (mm/hr)
Upper Brisbane	100	3.0
Somerset	100	2.5
Wivenhoe	100	3.0
Lockyer	100	1.2
Bremer	120	2.5
Lower Brisbane	100	2.5

Catchment Storage

A PERN coefficient of 0.05 was applied, except for the Wivenhoe and Upper Brisbane areas where a PERN coefficient of 0.11 was used.

Channel Routing

The link travel times and storage properties assigned at Lowood, Moggill and Harrisville basin nodes were identical to those used in the January 1974 flood calibration.

Recorded and Predicted Hydrographs

Plots of recorded and RAFTS predicted hydrographs for the July 1973 flood are compiled in **Appendix B** (**Figures B-7a** to **B-7b**) and summary details are given in **Table 5-17 - RAFTS Verification - July 1973 Flood.**

Table 5-17 - RAFTS Verification - July 1973 Flood

Number	Stream	Site	Peak Discharge (m^3/s)			Discharge Volume (GL)			Comments
			Gauged	Predicted	Diff(%)	Gauged	Predicted	Diff(%)	
Upper Brisbane									
143015	Cooyar Ck	Damsite	430	399	-7	43	35	-19	High gauged flows prior to flood
143007	Brisbane Rv	Linville	373	1 492	+300	71	127	+80	Gauged flow less than Cooyar Ck
143010	Emu Ck	Boat Mtn	354	337	-5	33	29	-12	
143009	Brisbane Rv	Gregors Ck	2 702	2 559	-5	255	228	-10	
Somerset & Wivenhoe									
143008	Brisbane Rv	Middle Ck	2 442	2 871	+18	632	298	-53	Somerset Dam outflow not modelled
143013	Cressbrook	Damsite	30	67	+120	6.9	7.1	+3	
Lockyer									
143203	Lockyer Ck	Helidon	96	94	-2	23	5.3	-80	High gauged flows prior to flood
143210A	Lockyer Ck	Lyons Bridge	130	563	+330	32	66	+110	Backwater effect at gauge
Bremer & Lower Brisbane									
143001	Brisbane Rv	Savages Cross	2 711	2 610	-4	788	796	+1	
143003	Brisbane Rv	Mt Crosby	2 484	2614	+5	736	824	+12	
143107	Bremer Rv	Walloon	71	114	+60	10.0	7.3	-27	
143108	Warrill Ck	Amberley	3.3	6.4	+90	0.7	0.6	-14	Very low flows

Note: 1. Primary stream gauges are shaded.

5.13 RAFTS Verification - Early April 1989 Flood

To validate the post-Wivenhoe Dam assumptions established by RAFTS calibration against the late April 1989 and May 1996 floods, available data for the early April 1989 flood was used as a model verification.

The early April 1989 flood was a minor event in the western Brisbane Valley and only small flows were recorded for Cooyar Creek, Emu Creek and Lockyer Creek. The flood regulation effect of Wivenhoe Dam was evident during the flood as indicated in **Figure 5-2 - Wivenhoe Dam Discharges**.

Rainfall

Total rainfalls recorded at various stations within the Brisbane Valley are presented as **Figure 5-21 - Rainfall Distribution - Early April 1989 Storm**. The western part of the catchment generally received less than 100 mm of rainfall over the five day period from 31 March to 4 April 1989. Highest rainfalls were recorded at the headwaters of the Stanley River (Somerset) and further south towards Mount Glorious.

Figure 5-22 - Representative Pluviographs - Early April 1989 Storm indicates that peak rainfall intensities occurred during a period from late 31 March to mid 1 April 1989.

Rainfall Losses

Rainfall losses used in the post-Wivenhoe Dam verification analysis are given in **Table 5-18 - Rainfall Losses - Early April 1989 Verification**.

Table 5-18 - Rainfall Losses - Early April 1989 Verification

Subcatchment	Initial Loss (mm)	Continuing Loss (mm/hr)
Upper Brisbane	50	2.5
Somerset	50	1.5
Wivenhoe	50	2.5
Lockyer	120	0
Bremer	120	0
Lower Brisbane	120	0

Catchment Storage

A PERN coefficient of 0.05 was applied globally in the RAFTS model.

Channel Routing

The link travel times and storage properties assigned at Lowood, Moggill and Harrisville basin nodes were the same as those used in the post-Wivenhoe calibration against the late April 1989 and May 1996 floods.

Recorded and Predicted Hydrographs

Plots of recorded and RAFTS predicted hydrographs are compiled in **Appendix B (Figures B-8a** to **B-8c**). A summary of peak flows and hydrograph volumes is given in **Table 5-19 - RAFTS verification - Early April 1989 Flood.**

Table 5-19 - RAFTS Verification - Early April 1989 Flood

Number	Stream	Site	Peak Discharge (m^3/s)			Discharge Volume (GL)			Comments
			Gauged	Predicted	Diff(%)	Gauged	Predicted	Diff(%)	
Upper Brisbane									
143015	Cooyar Ck	Damsite	35	30	-14	4.3	3.1	-28	Relatively low flow
143007	Brisbane Rv	Linville	1 307	1 452	+11	98	69	-30	
143010	Emu Ck	Boat Mtn	27	5	-81	4.0	0.5	-88	Relatively low flow
143009	Brisbane Rv	Gregors Ck	1 711	1 587	-7	141	109	-23	
Somerset & Wivenhoe									
143036	Brisbane Rv	Wivenhoe Dam	4 722	3 644	-23	639	594	-7	Synthetic gauged hydrograph
Lockyer									
143212	Tenthill Ck	Tenthill	37	62	+68	6.8	2.5	-63	Relatively low flow
143225	Laidley Ck	Showground	95	121	+27	11.4	8.2	-28	
143210A	Lockyer Ck	Lyons Bridge	91	196	+115	14	20	+43	Backwater effect at gauge
143905	Lockyer Ck	Glenore Grove	104	174	+67	33	15	-55	Record in error
Bremer & Lower Brisbane									
143001	Brisbane Rv	Savages Cross	1 434	1 525	+6	677	696	+3	
143110	Bremer Rv	Adams Bridge	78	22	-72	5.8	1.3	-78	
143107	Bremer Rv	Walloon	164	503	+207	24	36	+50	
143108	Warrill Ck	Amberley	211	157	-26	33	24	-27	
143113	Purga Ck	Loamside	112	234	+109	11	15	+36	
143911	Bremer Rv	David Trumpy	530	612	+15	61	83	+36	
143915	Brisbane Rv	Moggill	1 080	1 773	+64	382	840	+120	Record incomplete

Note: 1. Primary stream gauges are shaded.

5.14 Adopted RAFTS Model Parameters

RAFTS Storage

By a process of calibration and verification against a series of historical floods, a set of RAFTS storage parameters were determined. These parameters tended to fall into three groups; pre-Somerset Dam conditions prior to 1943, pre-Wivenhoe Dam conditions prior to 1985 and post-Wivenhoe Dam conditions following completion of the dam. **Table 5-20 - Summary of RAFTS Storage Parameters** provides an overview of adopted storage properties.

Table 5-20- Summary of RAFTS Storage Parameters

Storage Type	Pre-Somerset Dam Conditions	Pre-Wivenhoe Dam Conditions	Post-Wivenhoe Dam Conditions
Catchment Storage	PERN = 0.05 except PERN =0.11 for Upper Brisbane	PERN = 0.05 except PERN = 0.11 for Wivenhoe and Upper Brisbane	PERN = 0.05
Channel Routing	Link travel times based on timing of record hydrographs	Link times based on timing of recorded hydrographs	Link travel times as per Pre-Wivenhoe conditions, modified to account for Wivenhoe Dam drowned reach
	Basin node storage at Lowood (storage curve A), Moggill and Harrisville as shown in Figures 5-6,5-7 and 5-8	Basin node storage at Lowood (storage curve A), Moggill and Harrisville as shown in Figures 5-6,5-7 and 5-8	Basin node storage as per Pre-Wivenhoe conditions, except storage curve B used at Lowood.

Notes:

1. Pre-Wivenhoe conditions based on calibration against January 1974 flood and verified against June 1973 flood.
2. Post-Wivenhoe conditions based on calibration against late April 1989 and May 1996 floods. Verified against early April 1989 flood.

The difference in model factors, such as faster link travel times upstream of the dam for post-Wivenhoe Dam conditions, can be directly attributed to the physical presence of the Wivenhoe Dam lake. Other factors, such as the adopted PERN coefficient in the Wivenhoe and Upper Brisbane areas, are due to the state of vegetative growth in the catchment at the time of flood.

As a check on the sensitivity of predicted hydrographs to assumptions on storage parameters, the January 1974 and June 1973 events were rerun assuming post-Wivenhoe Dam storage conditions (except for link travel times). A PERN value of 0.05 was applied throughout the RAFTS model and storage curve A was used at the Lowood basin node.

Plots of predicted hydrographs are compiled in **Appendix B** (**Figure B-9a** for July 1973 flood and **Figure B-10a** and **B-10b** for January 1974 flood). Summary details at key gauges are given in **Table 5-21 - July 1973 and January 1974 Flood - Post Wivenhoe PERN Values Sensitivity Analysis**.

Table 5-21 - July 1973 and January 1974 - Post Wivenhoe PERN Values Flood Sensitivity Analysis

Number	Stream	Site	Peak Discharge (m^3/s) Gauged	Predicted	Diff (%)
July 1973 Flood					
143009	Brisbane Rv	Gregors Ck	2 702	3 276	+21
143008	Brisbane Rv	Middle Ck	2 242	3 561	+59
143001	Brisbane Rv	Savages Cross	2 711	2 274	-16
143003	Brisbane Rv	Mt Crosby	2 484	2 276	-8
January 1974 Flood					
143007	Brisbane Rv	Linville	2 100	2 430	+16
143009	Brisbane Rv	Gregors Ck	3 750	4 358	+14
143008	Brisbane Rv	Middle Ck	4 813	5 903	+23
143907	Brisbane Rv	Lowood	7 397	7 840	+6
143001	Brisbane Rv	Savages Cross	7 340	7 868	+7
143003	Brisbane Rv	Mt Crosby	7 456	7 874	+6
143915	Brisbane Rv	Moggill	9 346	10 226	+12
143919	Brisbane Rv	Port Office	9 800	10 247	+5

Note: Wivenhoe storage not included in the analysis.

The reduced catchment storage within the Upper Brisbane and Wivenhoe areas tended to increase predicted discharge peaks compared to the calibrated values (refer to **Tables 5.21** and **5.5**). Towards the lower reaches of the Brisbane River, the difference between predicted and recorded peaks are less than 10 percent. The change in node storage properties at Lowood introduces a steeper hydrograph in the January 1974 flood.

Rainfall Losses

An overview of initial and continuing losses used in the RAFTS calibration and verification analysis is given in **Table 5-22 - Summary of RAFTS Rainfall Losses.**

Table 5-22 - Summary of RAFTS Rainfall Losses

Subcatchment	February 1931	March 1955	July 1973	January 1974	June 1983	Early April 1989	Late April 1989	May 1996
Upper Brisbane	150 & 3.5	20 & 1.8	100 & 3.0	0 & 2.5	0 & 2.5	100 & 3.0	30 & 2.5	150 & 2.5
Somerset	120 & 3.0	130 & 2.5	100 & 2.5	0 & 2.5	0 & 1.5	100 & 2.5	30 & 0	150 & 2.0
Wivenhoe	150 & 3.5	20 & 1.8	100 & 3.0	0 & 2.5	0 & 2.5	100 & 3.0	30 & 2.5	150 & 2.5
Lockyer	100 & 2.5	85 & 2.5	100 & 1.2	0 & 2.5	0 & 2.5	100 & 1.2	30 & 2.5	140 & 1.2
Bremer	40 & 1.0	50 & 1.5	120 & 2.5	0 & 0	0 & 0	120 & 2.5	10 & 0	100 & 1.5
Lower Brisbane	40 & 1.0	100 & 2.5	100 & 2.5	0 & 2.5	0 & 2.5	100 & 2.5	30 & 2/5	100 & 1.5

Note: 0 & 2.5 denotes 0 mm initial loss and 2.5 mm continuing loss.

The above losses fall in the expected range for South East Queensland and shall be used as input into the selection of appropriate losses for design flood analysis.

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FIGURE 5.1a
BRISBANE RIVER FLOOD STUDY
RAFTS LAYOUT - BREMER AND LOWER BRISBANE

LIST OF STREAM GAUGES

NODE	GAUGE
MTC-OUT	BRISBANE RIVER AT MT CROSBY
JIN#	BRISBANE RIVER AT MOGGILL
JIN-OUT	BRISBANE RIVER AT JINDALEE
POG-OUT	BRISBANE RIVER AT PORT OFFICE
WAL4	BREMER RIVER AT ADAMS BRIDGE
WAL###	BREMER RIVER AT ROSEWOOD
WAL-OUT	BREMER RIVER AT WALLOON
IPS##	BREMER RIVER AT DAVID TRUMPY
KAL-OUT	WARRILL CREEK AT KALBAR
AMB#	WARRILL CREEK AT HARRISVILLE
AMB-OUT	WARRILL CREEK AT AMBERLY
PUR-OUT	PURGA CREEK AT LOAMSIDE
PUR2	PURGA CREEK AT WASHPOOL
WAL##	WESTERN CREEK AT KUSS ROAD

LEGEND
- CATCHMENT BOUNDARY
- RAFTS SUB-AREA BOUNDARY
- RAFTS GENERAL NODE
- RAFTS LINK
- RAFTS NODE AT STREAM GAUGE
- RAFTS BASIN NODE

0 1 2 3 4 5 10 15 km

FILE PLOT SCALE: 1=300

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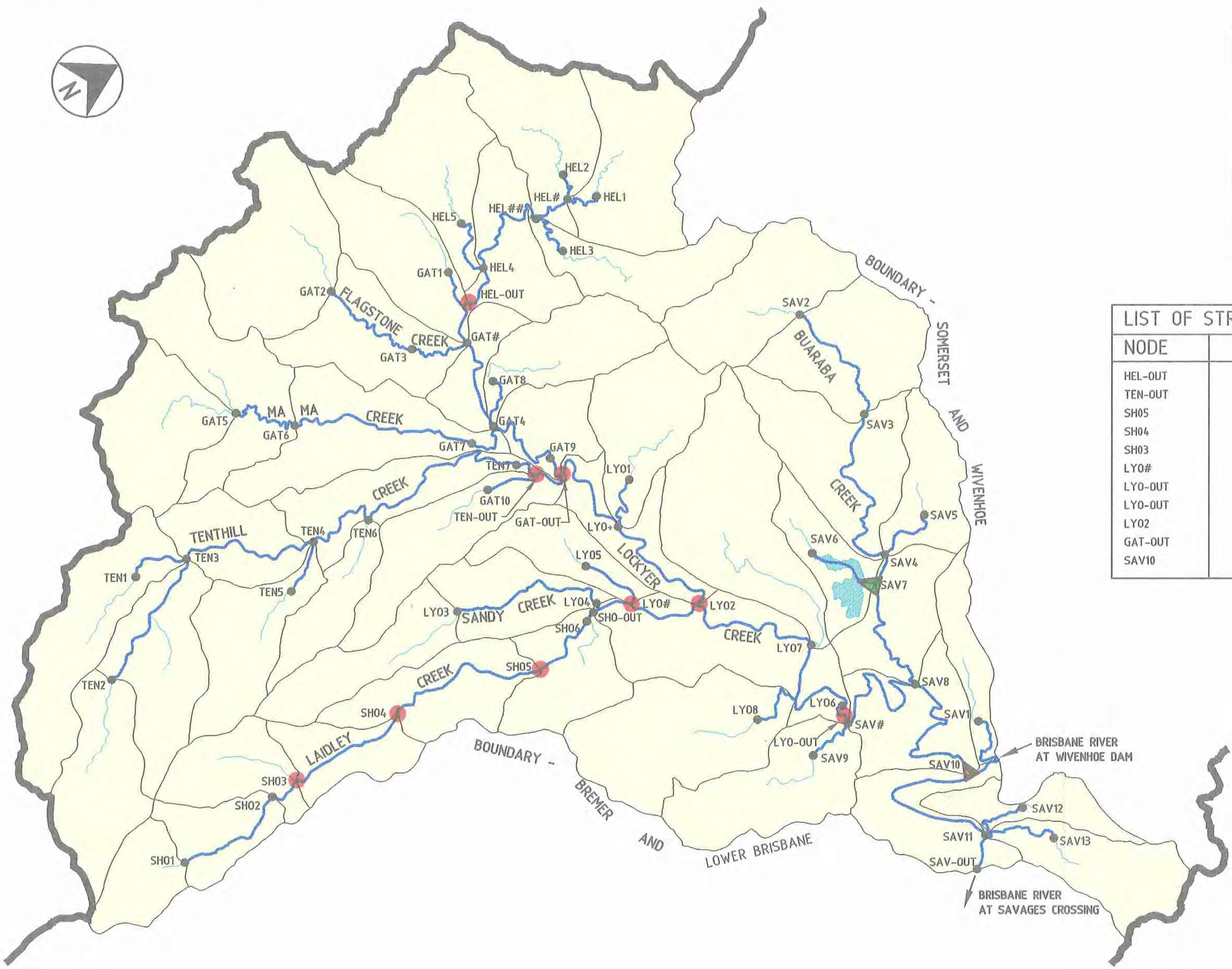
FIGURE 5.1b
BRISBANE RIVER FLOOD STUDY
RAFTS LAYOUT - LOCKYER

KEY MAP

NOT TO SCALE



LIST OF STREAM GAUGES

NODE	GAUGE
HEL-OUT	LOCKYER CREEK AT HELIDON
TEN-OUT	TENTHILL CREEK AT TENTHILL
SH05	LAIDLEY CREEK AT SHOWGROUND
SH04	LAIDLEY CREEK AT MULGOWIE
SH03	LAIDLEY CREEK AT THORNTON
LYO#	LAIDLEY CREEK AT WARREGO HIGHWAY
LYO-OUT	LOCKYER CREEK AT LYONS BRIDGE
LYO-OUT	LOCKYER CREEK AT RIFLE RANGE
LYO2	LOCKYER CREEK AT GLENORE GROVE
GAT-OUT	LOCKYER CREEK AT GATTON
SAV10	BRISBANE RIVER AT LOWOOD

LEGEND

- CATCHMENT BOUNDARY
- RAFTS SUB-AREA BOUNDARY
- RAFTS GENERAL NODE
- RAFTS LINK
- RAFTS NODE AT STREAM GAUGE
- RAFTS BASIN NODE

0 1 2 3 4 5 10 15 km

FILE 0415 PLOT SCALE: 1=300

BCC.121.0471

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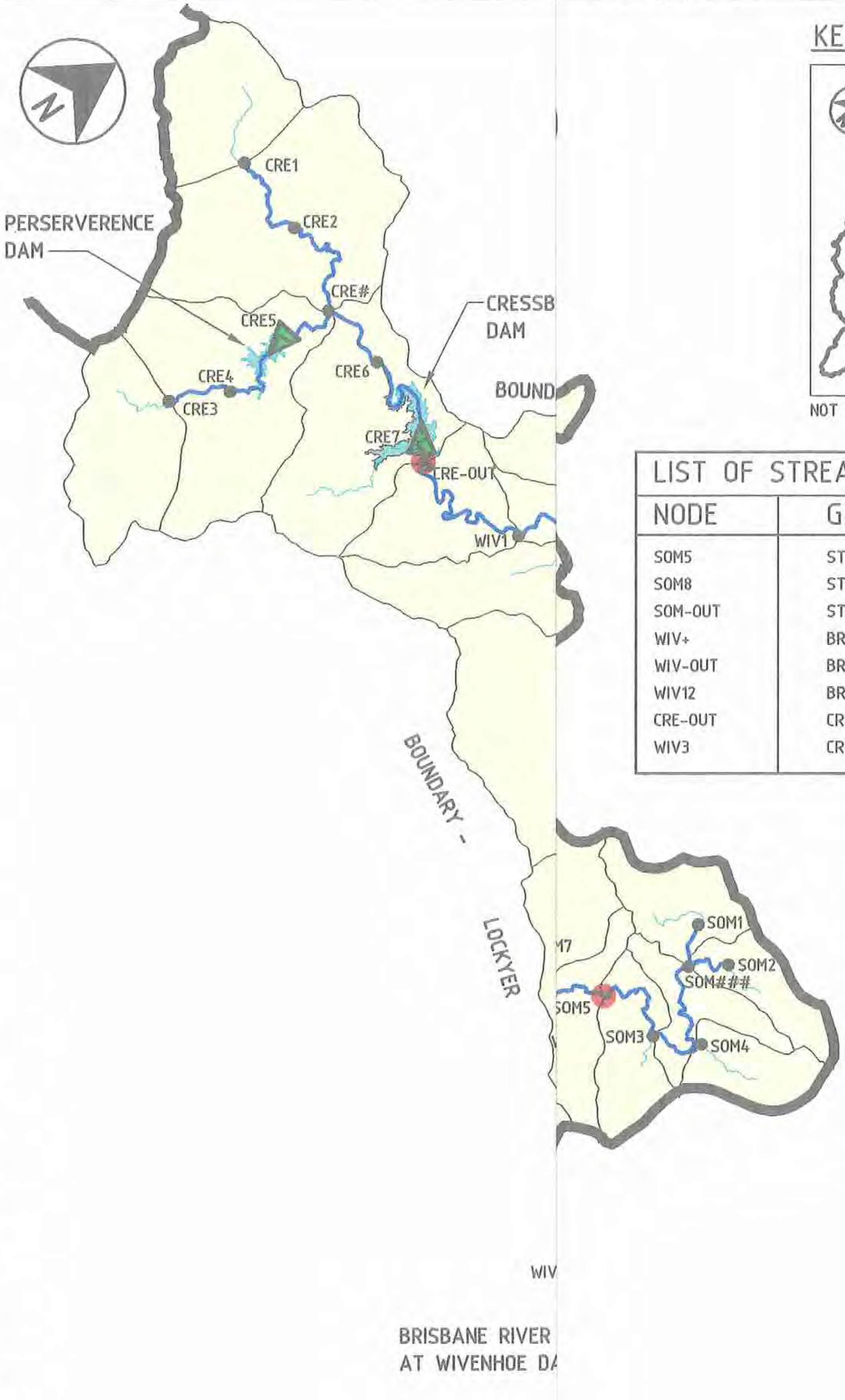
FIGURE 5.1c

BRISBANE RIVER FLOOD STUDY
RAFTS LAYOUT - SOMERSET AND WIVENHOE



KEY MAP

NOT TO SCALE

LIST OF STREAM GAUGES	
NODE	GAUGE
SOM5	STANLEY RIVER AT PEACHESTER
SOM8	STANLEY RIVER AT WOODFORD
SOM-OUT	STANLEY RIVER AT SOMERSET DAM
WIV+	BRISBANE RIVER AT MIDDLE CREEK
WIV-OUT	BRISBANE RIVER AT WIVENHOE DAM
WIV12	BRISBANE RIVER AT CABOONBAH
CRE-OUT	CRESSBROOK CREEK AT DAM SITE
WIV3	CRESSBROOK CREEK AT ROSENTRETERS

LEGEND
- CATCHMENT BOUNDARY
- RAFTS SUB-AREA BOUNDARY
- RAFTS GENERAL NODE
- RAFT
- RAFT
- RAFT

0 1 2 3 4 5 10 15km

FILE 0415 PLOT SCALE: 1=300 DIS D:\DI ISBAD T004: D

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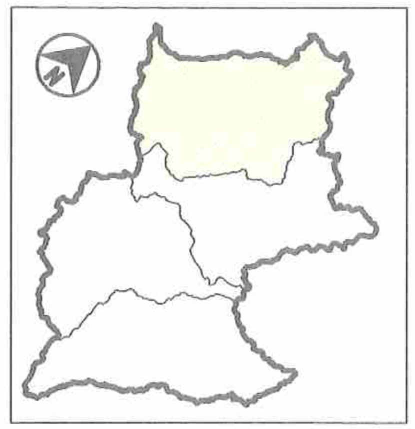
FIGURE 5.1d

BRISBANE RIVER FLOOD STUDY

RAFTS LAYOUT - UPPER BRISBANE RIVER



LIST OF STREAM GAUGES

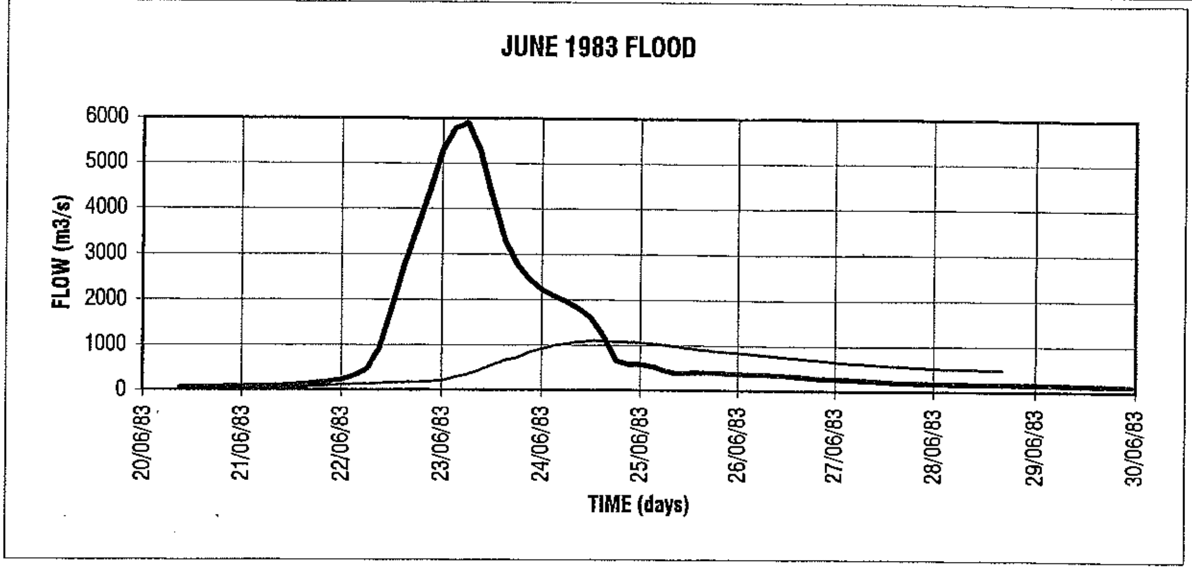
NODE	GAUGE
COO-OUT	COOYER CREEK AT DAM SITE
LIN-OUT	BRISBANE RIVER AT LINVILLE
GRE18	BRISBANE RIVER AT GREGORS CREEK
EMU-OUT	EMU CREEK AT BOAT MOUNTAIN
GRE2	BRISBANE RIVER AT DEVON HILLS

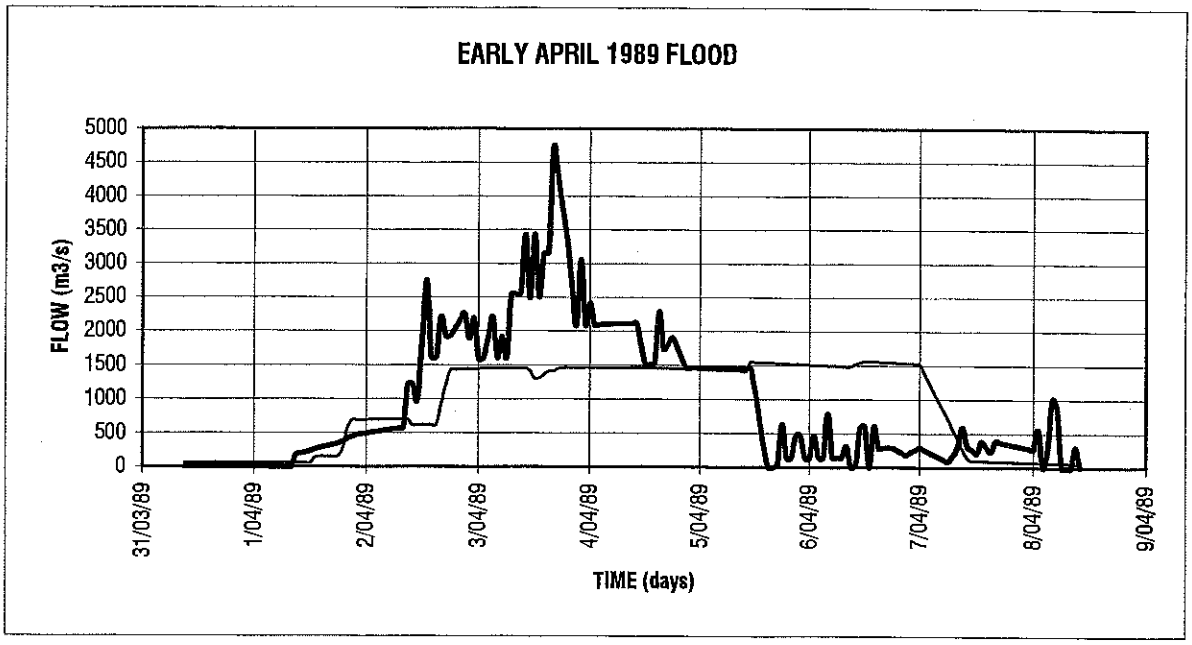
LEGEND

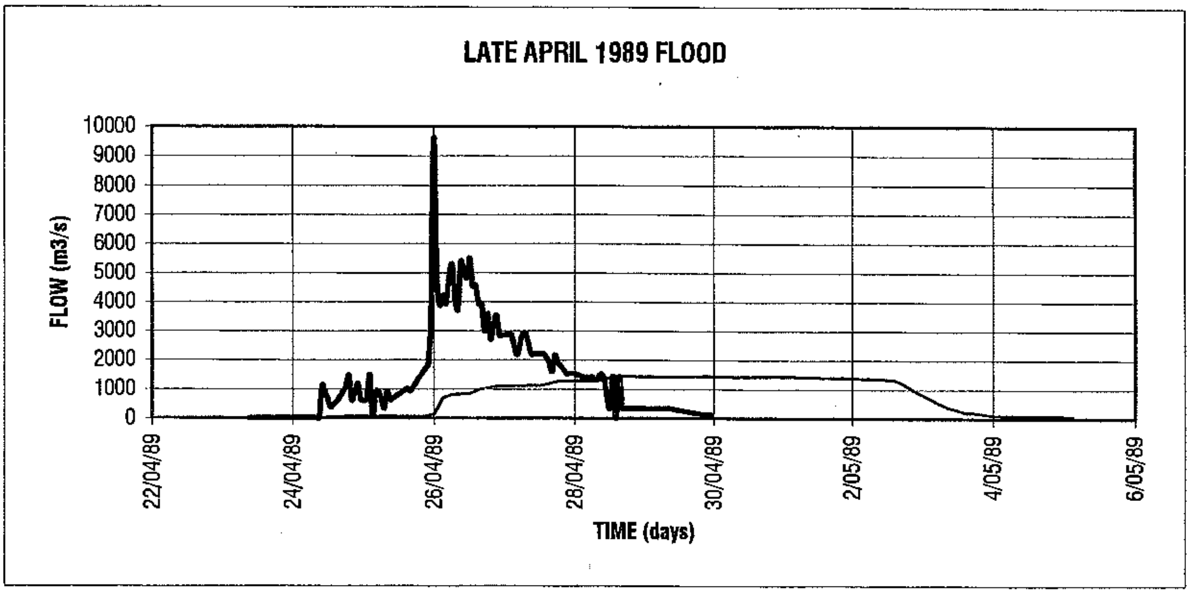
- CATCHMENT BOUNDARY
- RAFTS SUB-AREA BOUNDARY
- RAFTS GENERAL NODE
- RAFTS LINK
- RAFTS NODE AT STREAM GAUGE
- RAFTS BASIN NODE

PLOT SCALE: 1=300

Figure 5-2 - Wivenhoe Dam Discharges

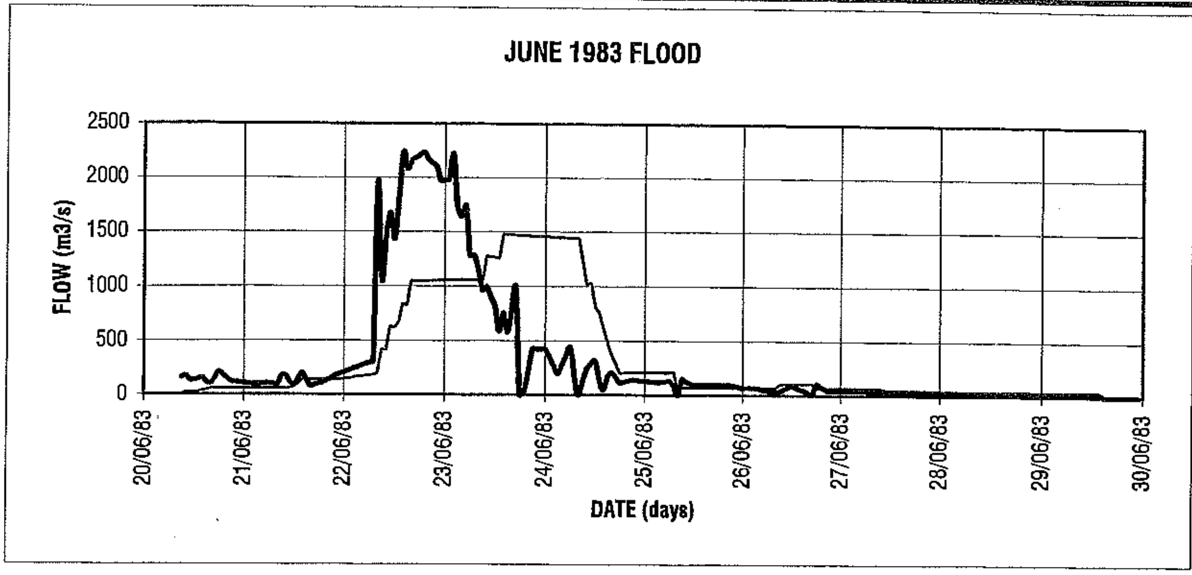


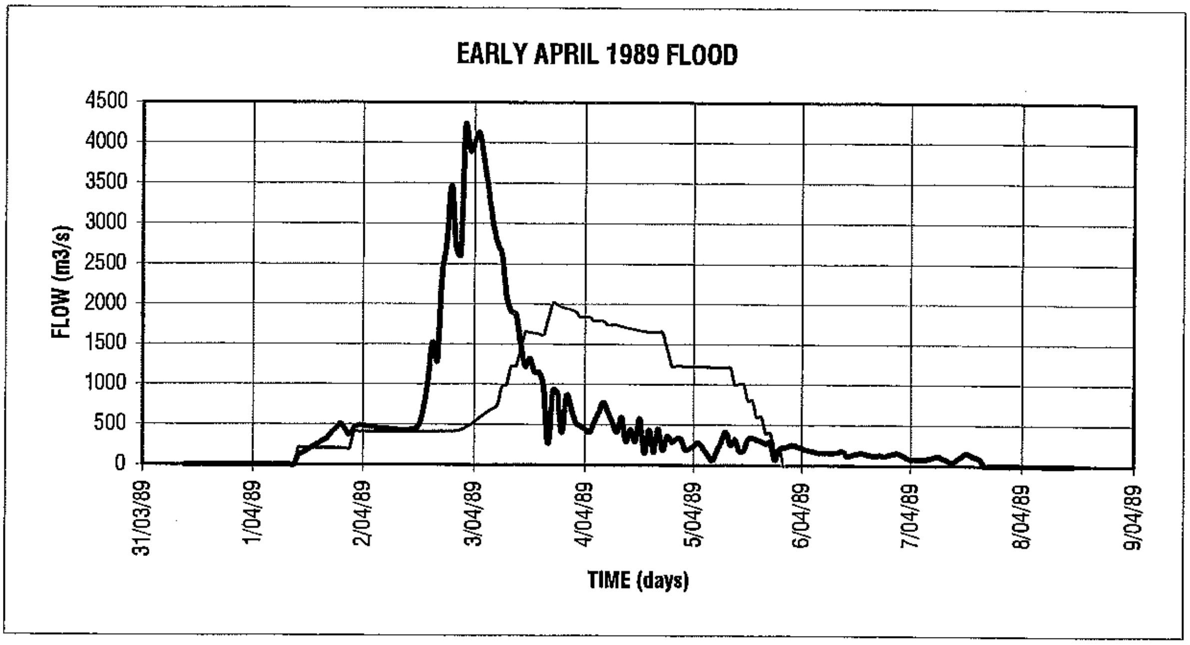


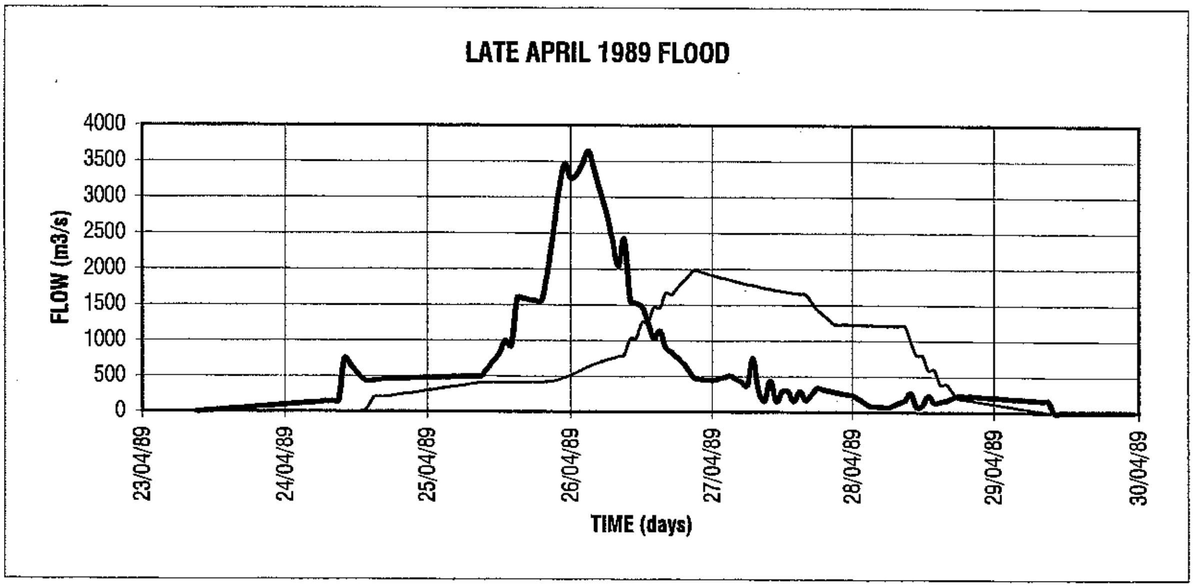


LEGEND
Inflow
Outflow

Figure 5-3 - Somerset Dam Discharges







LEGEND
Inflow
Outflow

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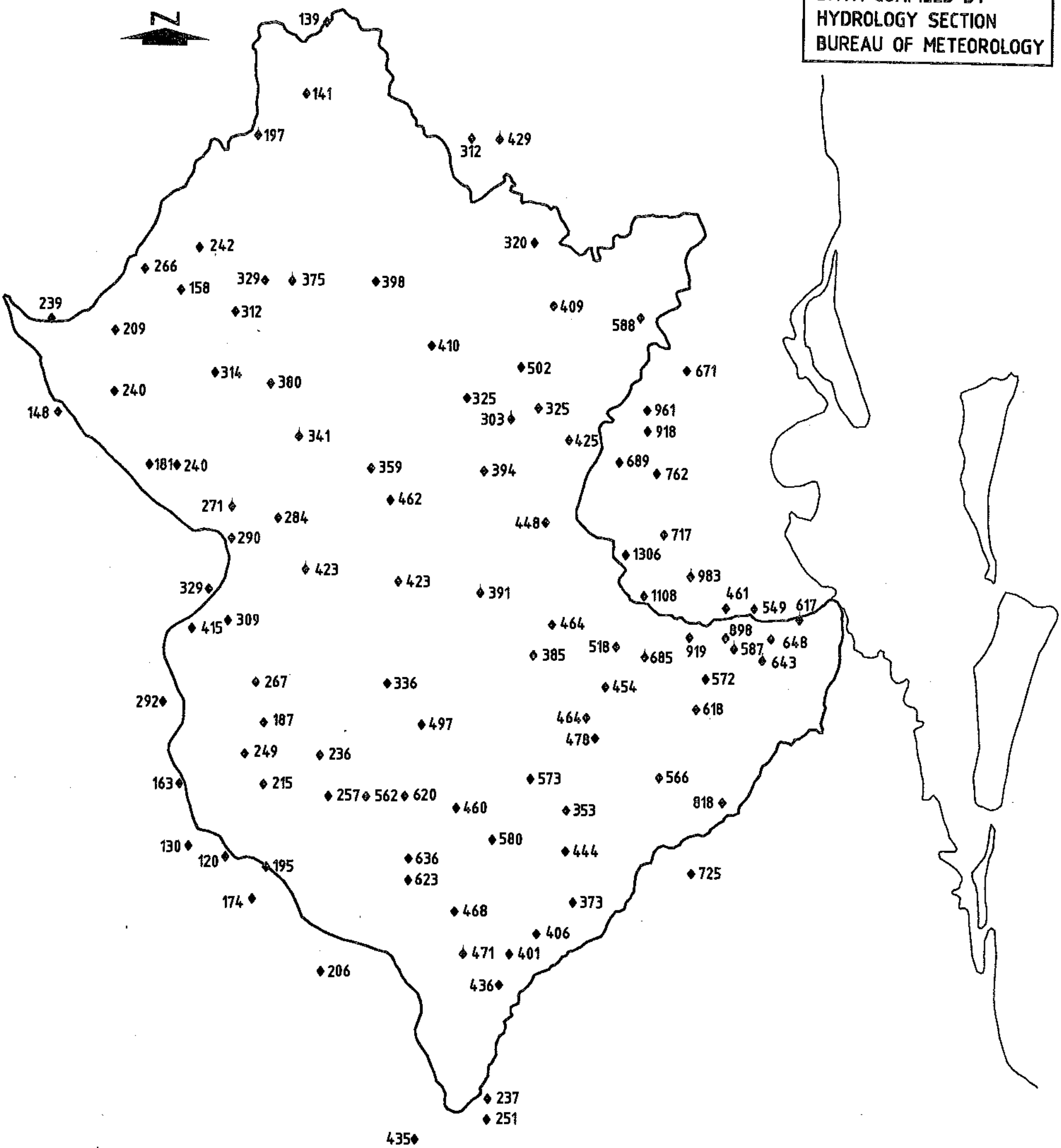
FIGURE 5.4
BRISBANE RIVER FLOOD STUDY
RAINFALL DISTRIBUTION - JANUARY 1974 STORM

DATA COMPILED BY
HYDROLOGY SECTION
BUREAU OF METEOROLOGY



STORM DURATION - 9am 24/01/74 TO 9am 28/01/74

LEGEND

◆ 70 RAINFALL (mm)

0 10 20 30 40 50 km

FILE NAME: 04157-09 DISK N°: D:\DWG\BRISBANE PLATE N°: T004157 DATE: 10-3-97 SCALE:

FILE NAME: 04157-10 DISK N°: D:\DWG\BRISB N°: TD04157 DATE: 14/3/97
PLOT SCALE: 1-

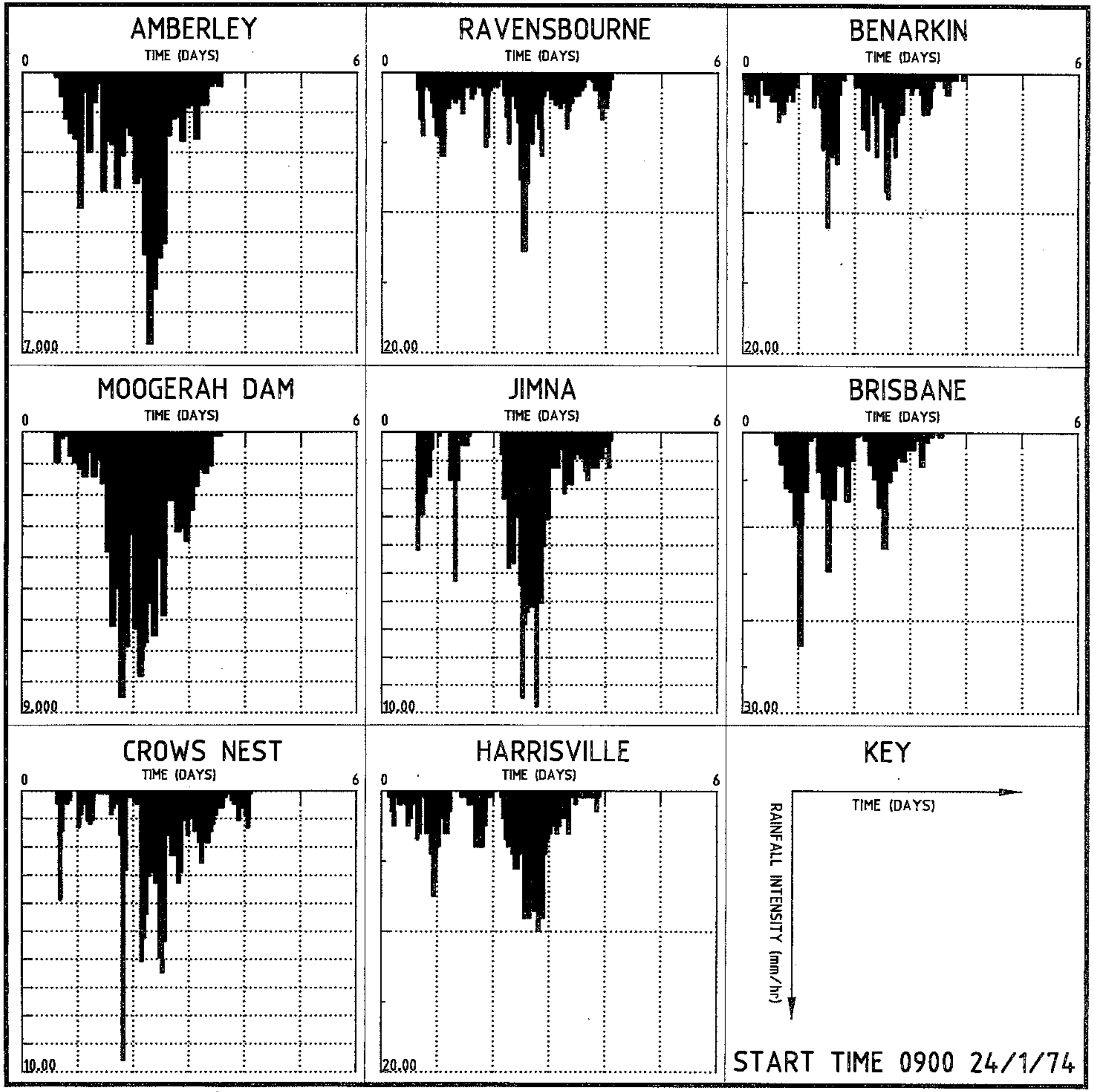


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FIGURE 5.5
BRISBANE RIVER FLOOD STUDY
REPRESENTATIVE PLUVIOGRAPHS
- JANUARY 1974 STORM

BCC.121.0477

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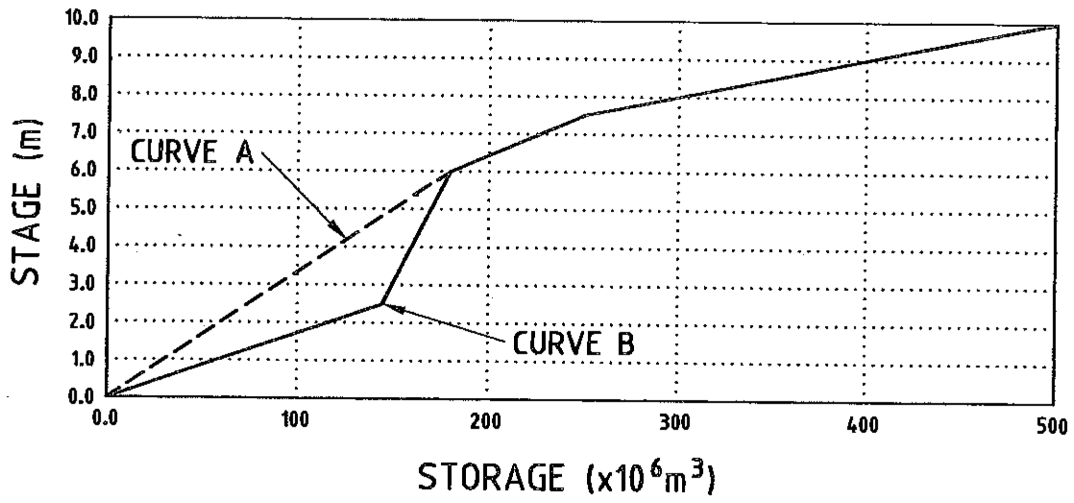
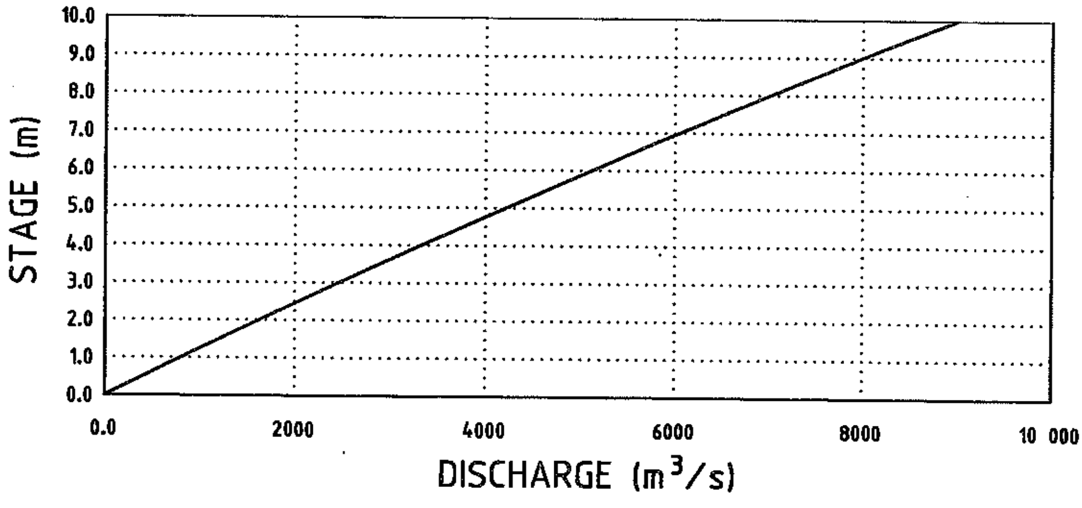
FIGURE 5.6

BRISBANE RIVER FLOOD STUDY
CHANNEL STORAGE CURVES AT LOWOOD



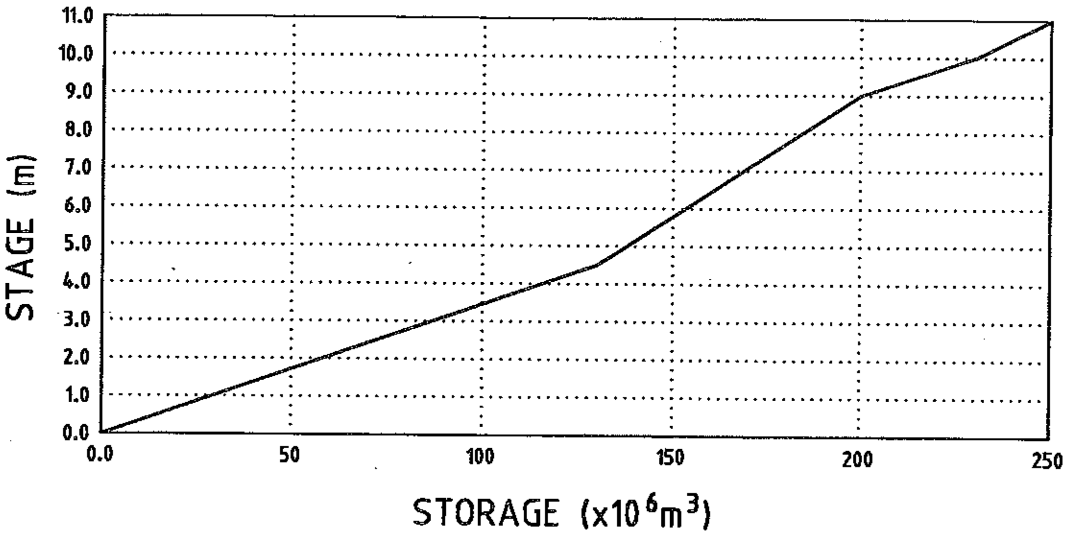


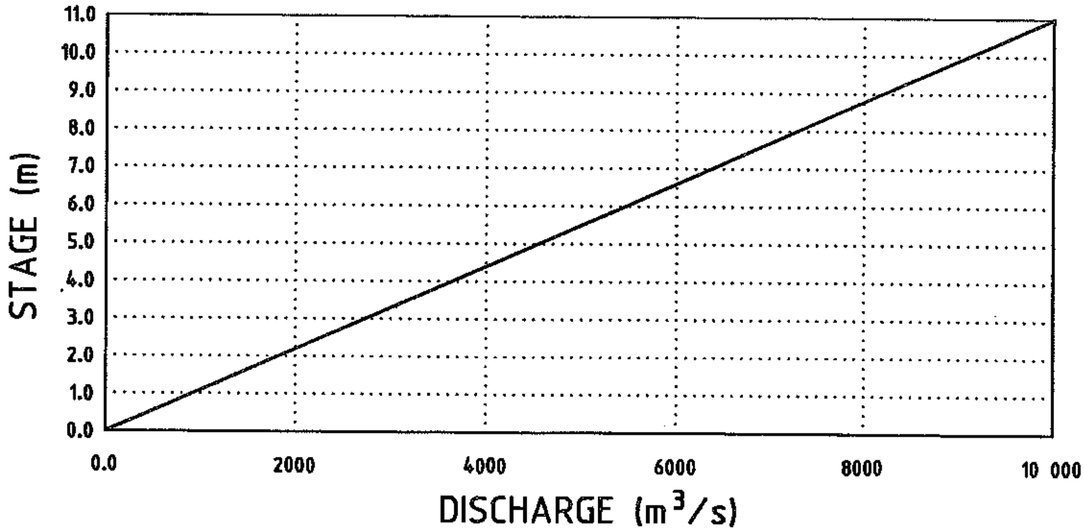
FILE NAME: 04157-28 DISK N°: D:\DWG\BRISBANE N°: T004157 DATE: 14/3/97
PL ALE:

SINCLAIR KNIGHT MERZ

FIGURE 5.7

BRISBANE RIVER FLOOD STUDY
CHANNEL STORAGE CURVES AT MOGGILL





FILE NAME: 04157-28 DISK N°: D:\DWG\BRISBANE N°: T004157 DATE: 14/3/97

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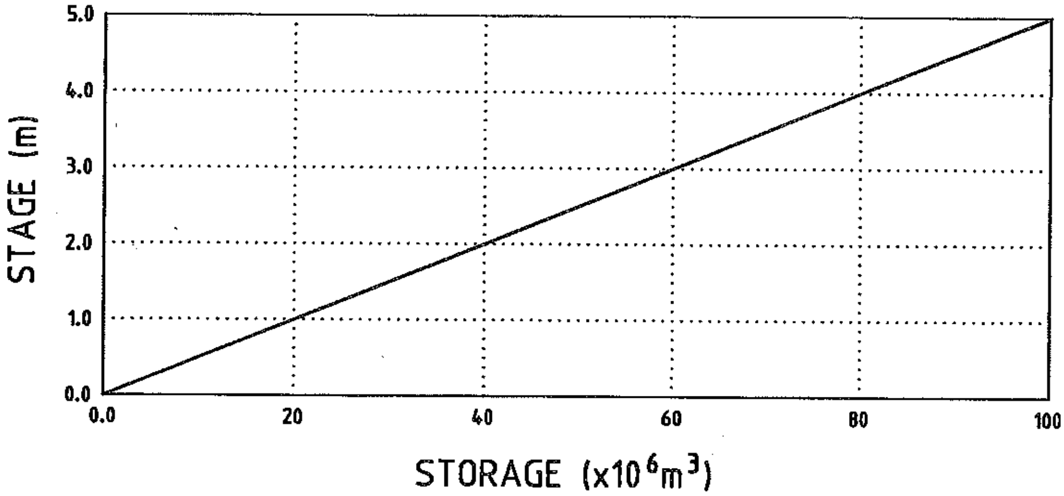
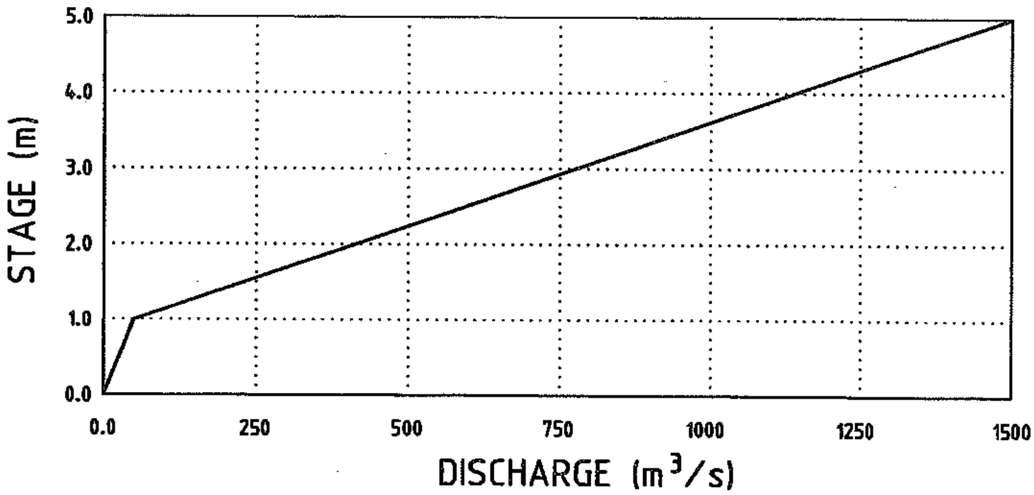
FIGURE 5.8

BRISBANE RIVER FLOOD STUDY
CHANNEL STORAGE CURVES AT HARRISVILLE





FILE NAME: 04157-28 DISK N°: D:\DWG\BRISBANE N°: T00457 DATE: 14/3/97
PLOT SCALE: 1:1

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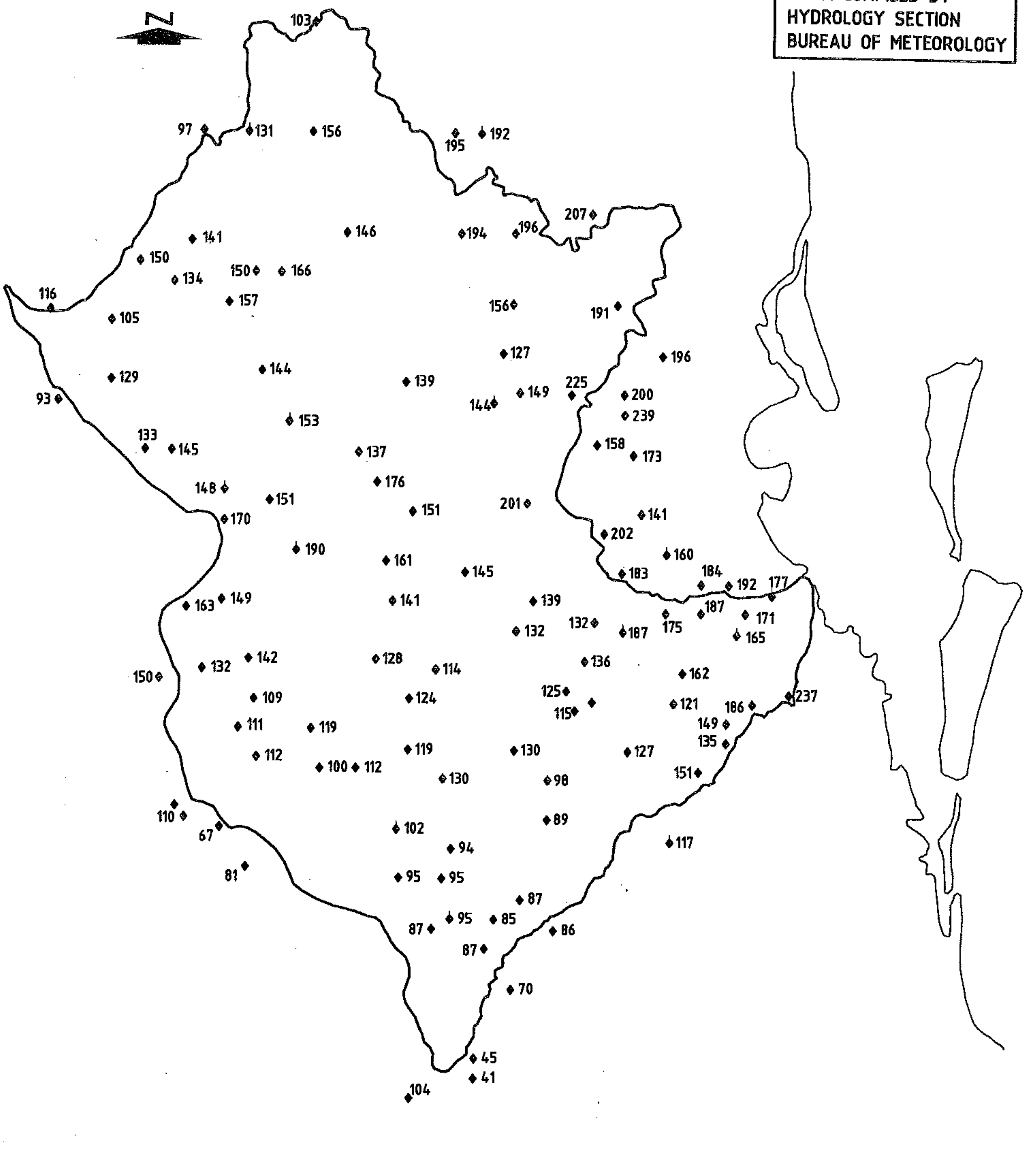
FIGURE 5.9

BRISBANE RIVER FLOOD STUDY RAINFALL DISTRIBUTION - JUNE 1983 STORM

DATA COMPILED BY
HYDROLOGY SECTION
BUREAU OF METEOROLOGY



STORM DURATION - 9am 20/06/83 TO 9am 23/06/83

LEGEND

◆ 70 RAINFALL (mm)

0 10 20 30 40 50 km

FILE NAME: 04157-11 PLOT SCALE: 1 DISK N°: D:\DWG\BRISBANE N°: T004157 DATE: 10-3-97

FILE NAME: 04157-12 DISK N°: D:\DWG\BRISBJOBE N°: T004157 DATE: 14/3/97
PL ALE:

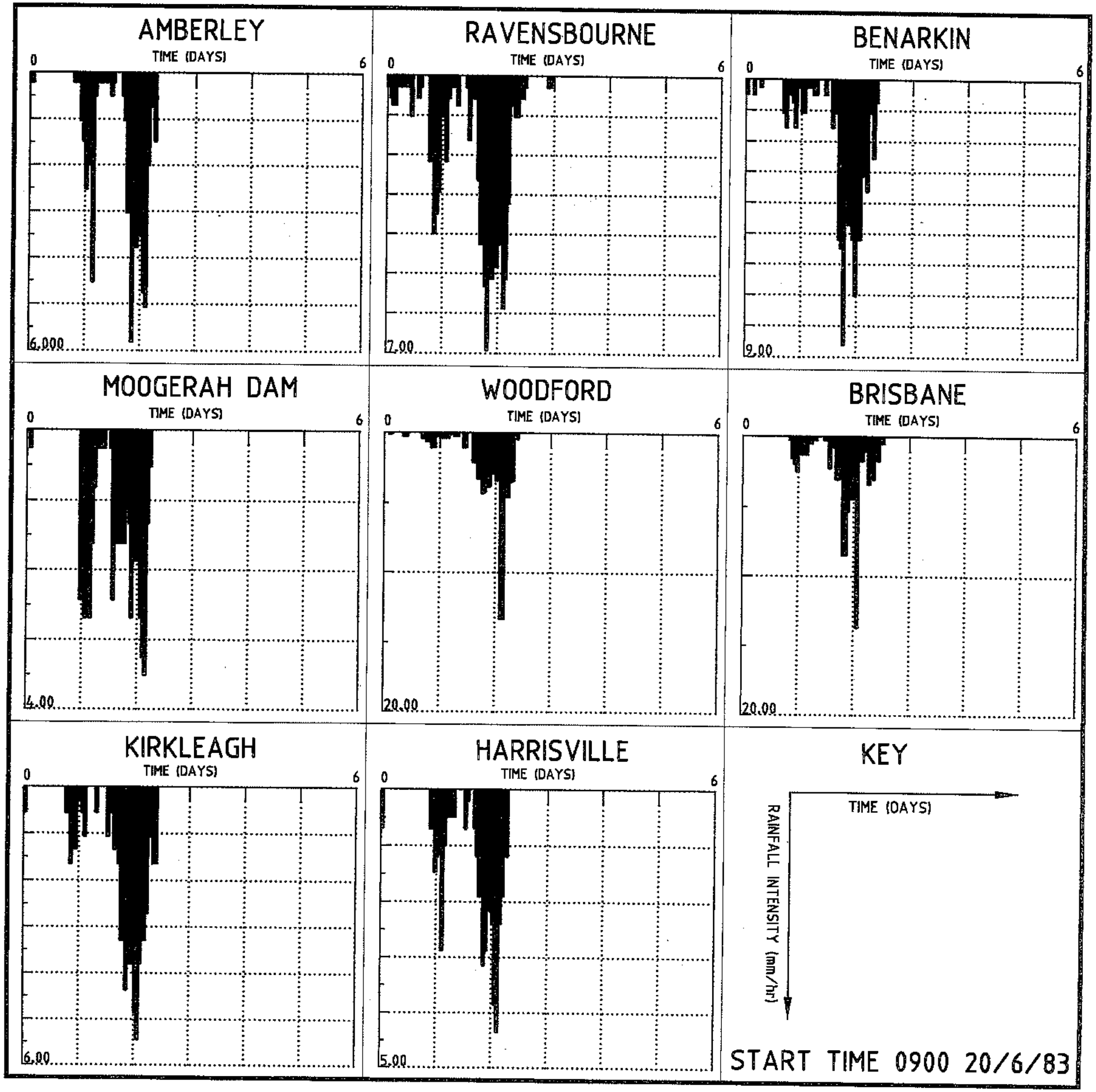


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FIGURE 5.10
BRISBANE RIVER FLOOD STUDY
REPRESENTATIVE PLUVIOGRAPHS
- JUNE 1983 STORM

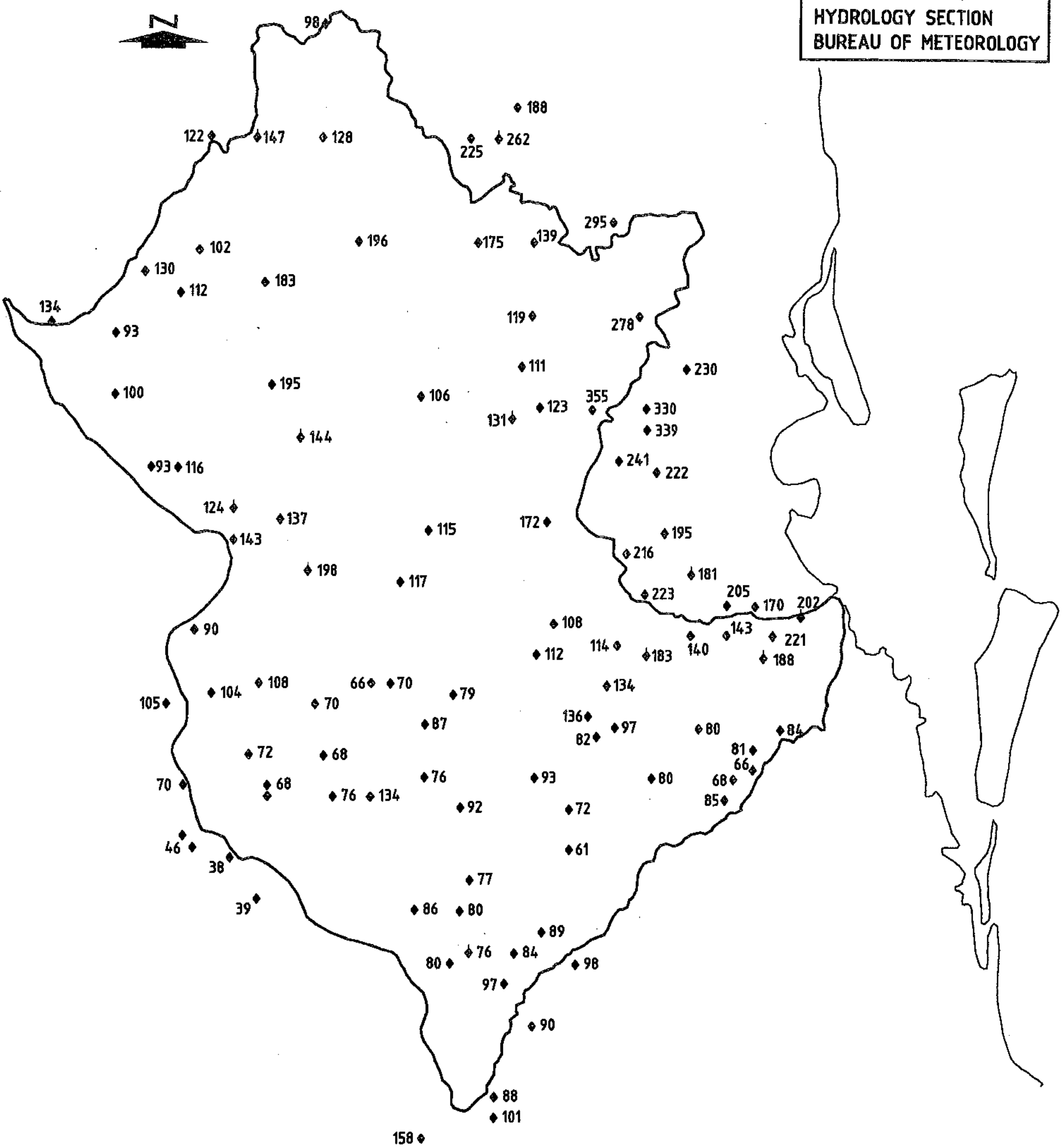
BCC.121.0482

FIGURE 5.11

BRISBANE RIVER FLOOD STUDY
RAINFALL DISTRIBUTION
- LATE APRIL 1989 STORM

SINCLAIR KNIGHT MERZ

DATA COMPILED BY
HYDROLOGY SECTION
BUREAU OF METEOROLOGY



STORM DURATION - 9am 24/04/89 TO 9am 27/04/89

LEGEND

◆ 70 RAINFALL (mm)

0 10 20 30 40 50 km

FILE NAME: 04157-13 PLOT SCALE: 1=1000 DISK No: D:\DWG\BRISBANE No. T00457 DATE: 10-3-97

FILE NAME: 04157-14 DISK Nº: D:\DWG\BRISB... Nº: T00/157 DATE: 14/3/97
PLOT SCALE: 1=60

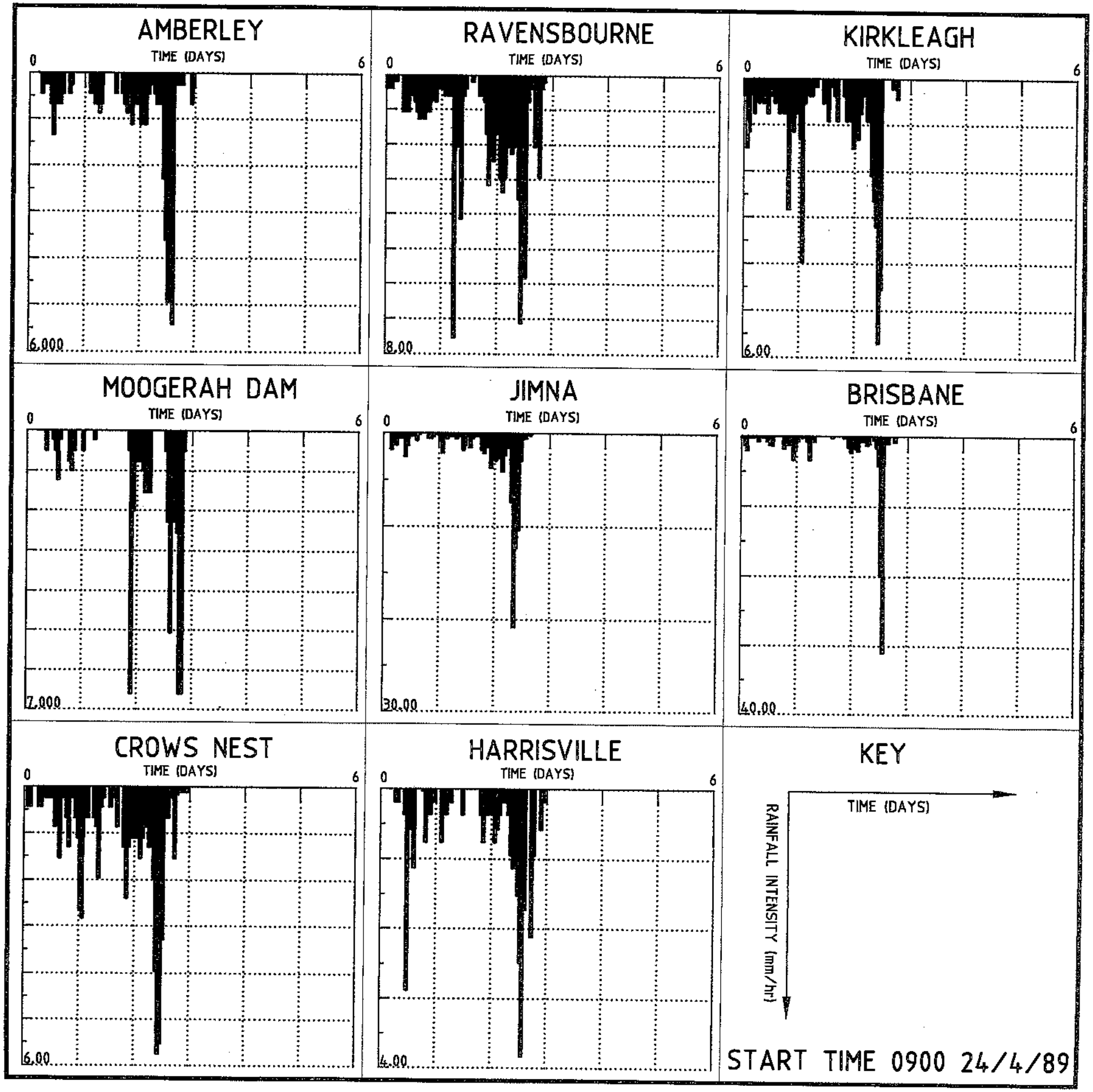


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FIGURE 5.12
BRISBANE RIVER FLOOD STUDY
REPRESENTATIVE PLUVIOGRAPHS
- LATE APRIL 1989 STORM

BCC.121.0484

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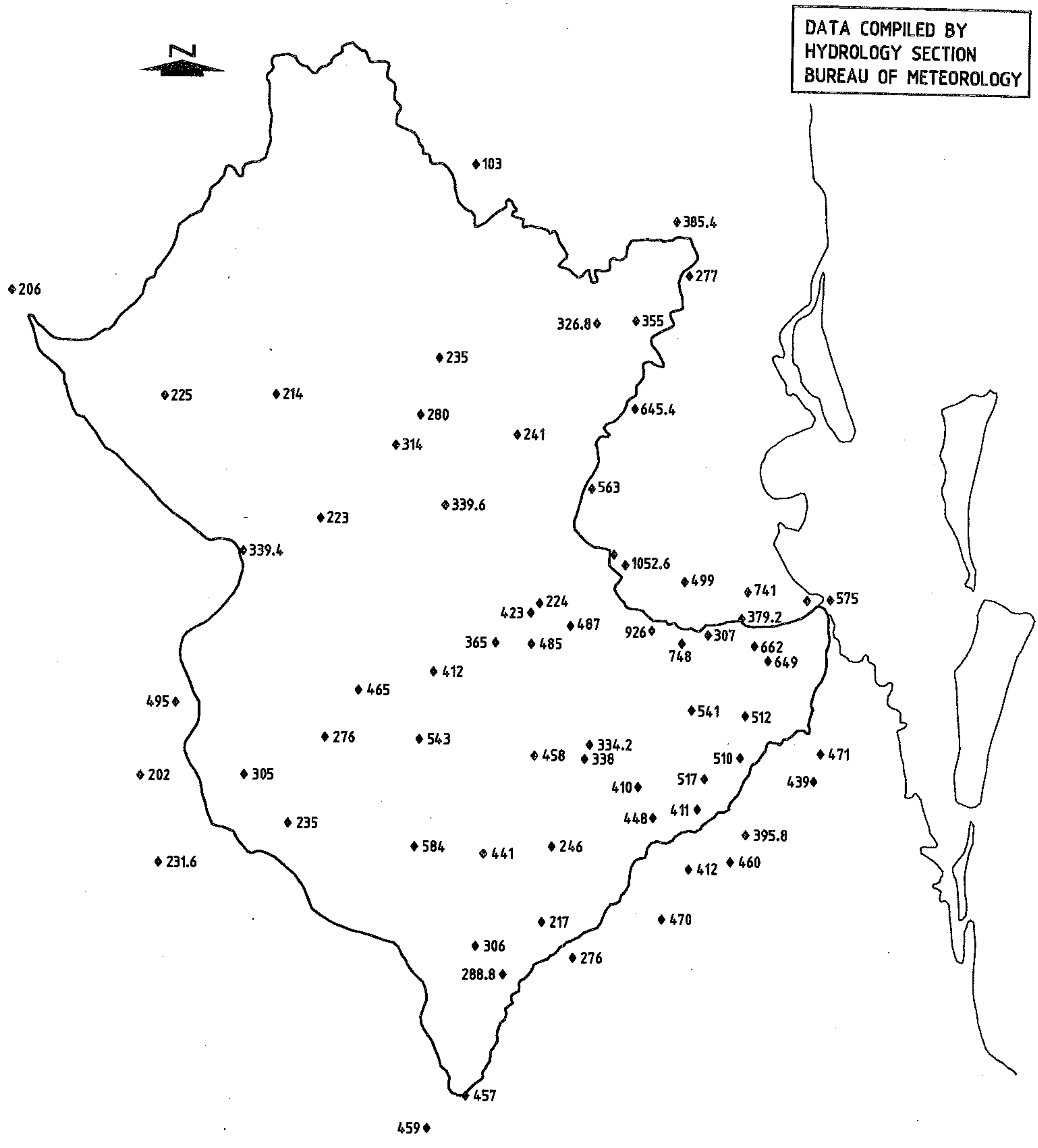
FIGURE 5.13
BRISBANE RIVER FLOOD STUDY RAINFALL DISTRIBUTION - MAY 1996 STORM



STORM DURATION - 9am 31/04/96 TO 9am 07/05/96

LEGEND

◆ 70 RAINFALL (mm)

0 10 20 30 40 50 km

DATE: 10-3-97

DISK N°: D:\DWG\BRISBANE FILE N°: T004157

FILE NAME: 04157-15

P[illegible] SCALE:

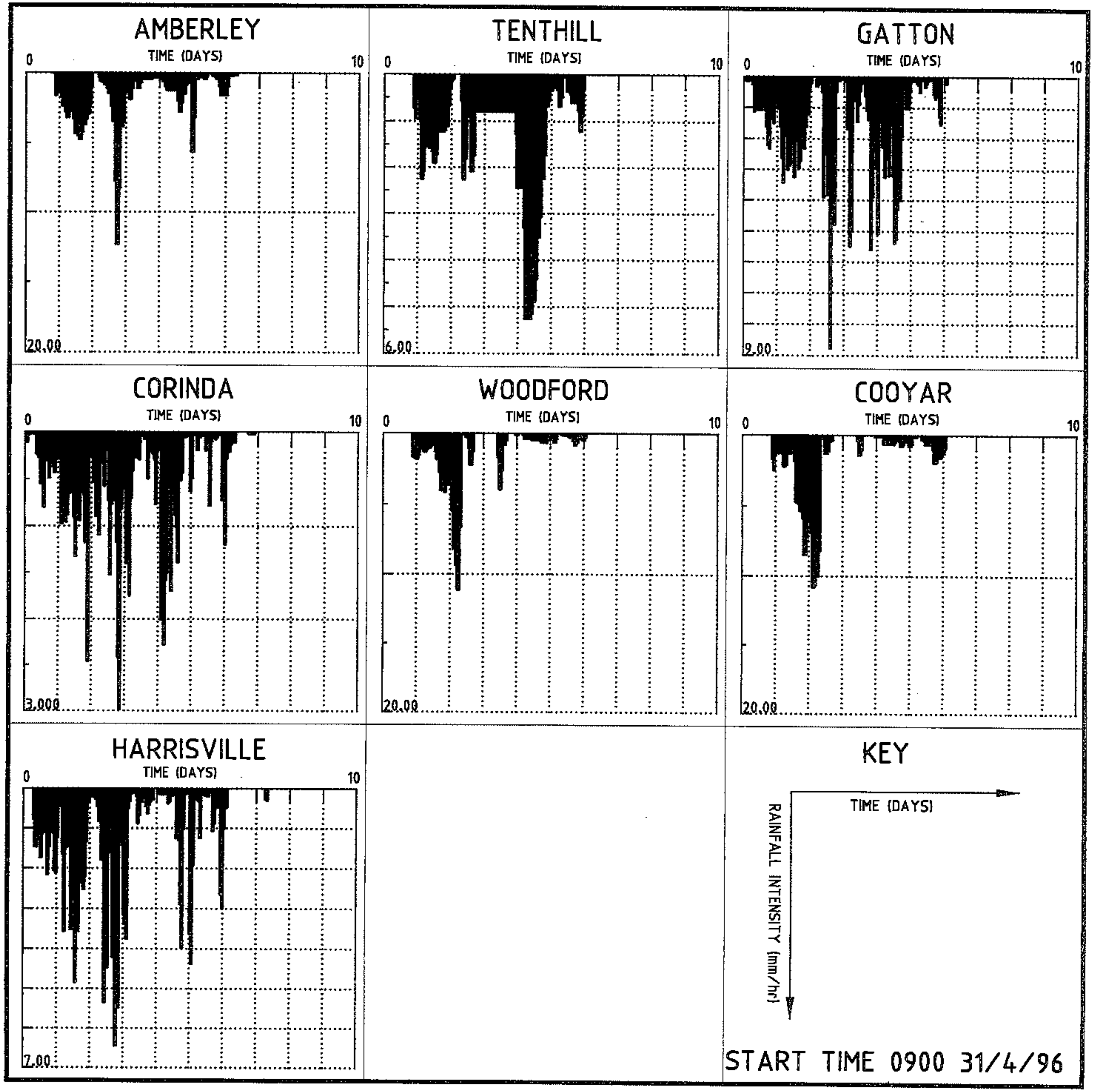


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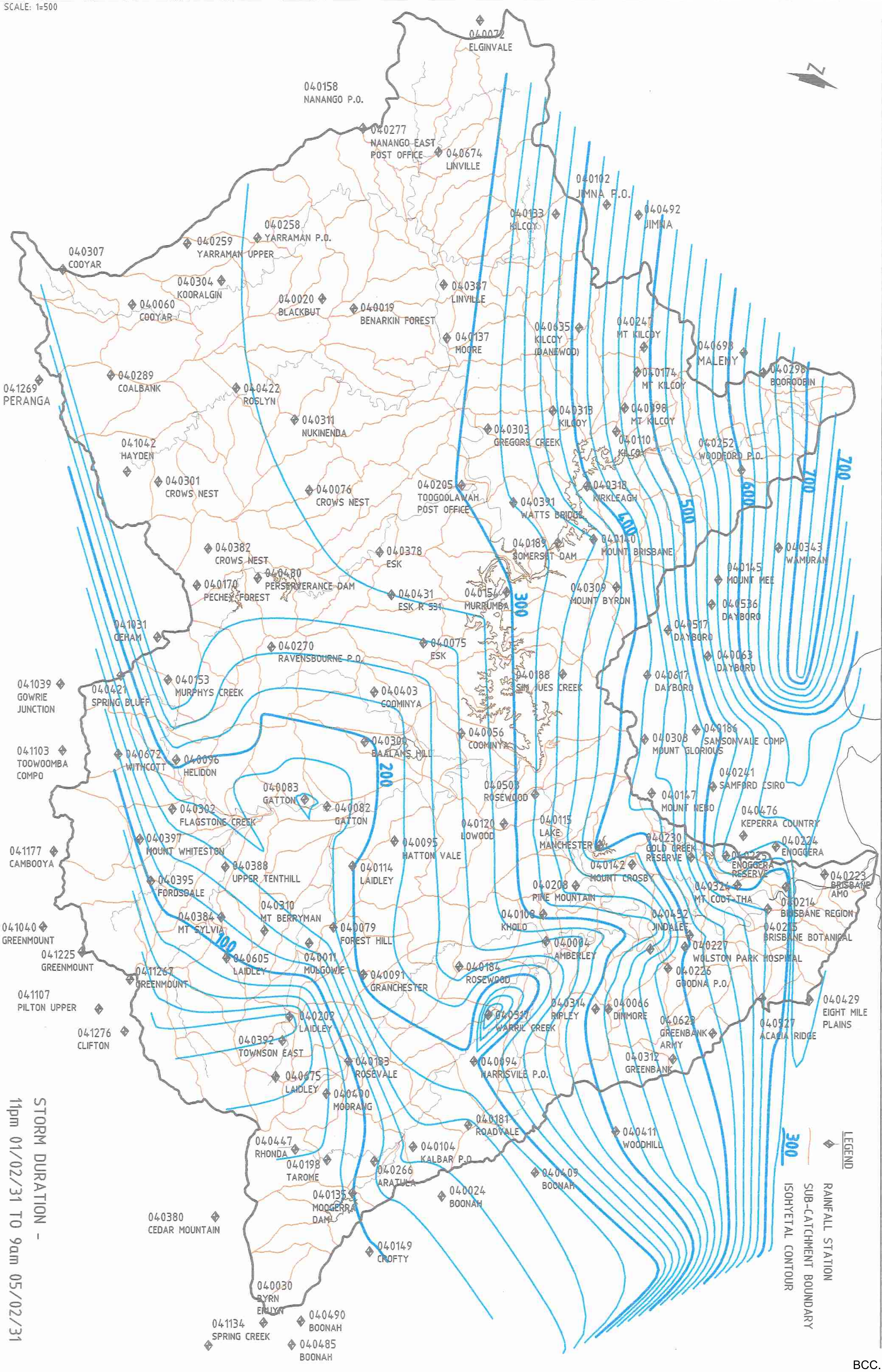
FIGURE 5.14
BRISBANE RIVER FLOOD STUDY
REPRESENTATIVE PLUVIOGRAPHS
- MAY 1996 STORM

FILE 0415 DIS D:\D' ISBA T004' D 29-7-
PLOT SCALE: 1=500



SINCLAIR KNIGHT MERZ

FIGURE 5-15
BRISBANE RIVER FLOOD STUDY
ISOHYETAL MAP - FEBRUARY 1931 STORM

LEGEND
RAINFALL STATION
SUB-CATCHMENT BOUNDARY
300 ISOHYETAL CONTOUR

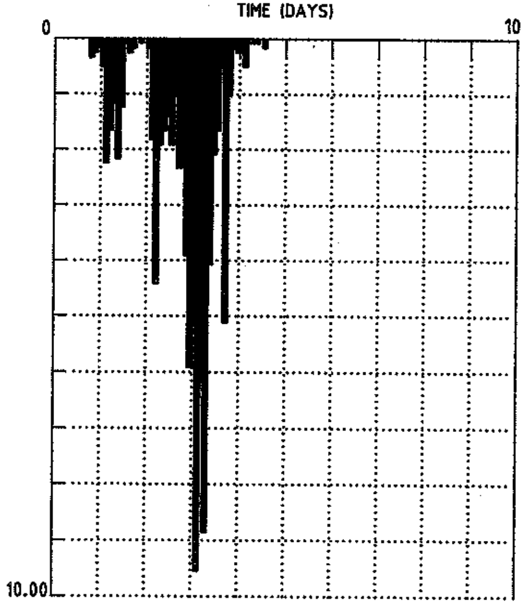
STORM DURATION -
11pm 01/02/31 TO 9am 05/02/31

0 5 10 15 20 25 km

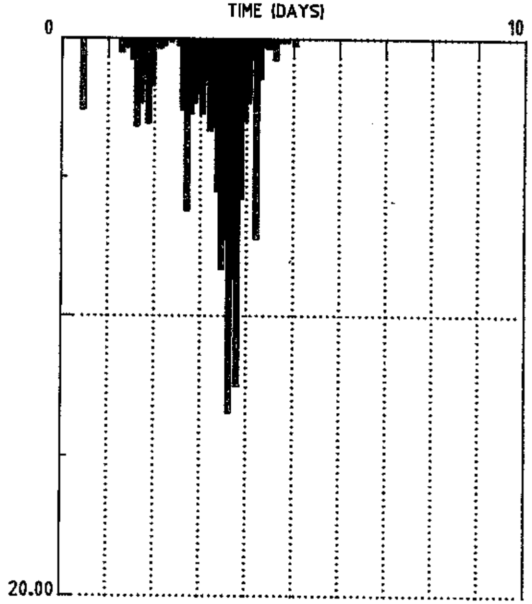
BCC.121.0487

FILE NAME: 04157-56 DISK N°: D:\DWG\BRISBANE N°: T004157 DATE: 21/8/97
PLOT SCALE: 1-00

*STANLEY RIVER AT SOMERSET DAM

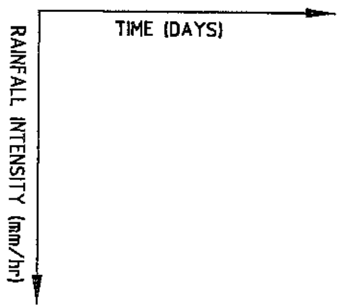


BRISBANE RIVER AT PORT OFFICE



* NOTE: PORT OFFICE PLUVIOGRAPH PATTERN BROUGHT FORWARD HALF A DAY

KEY

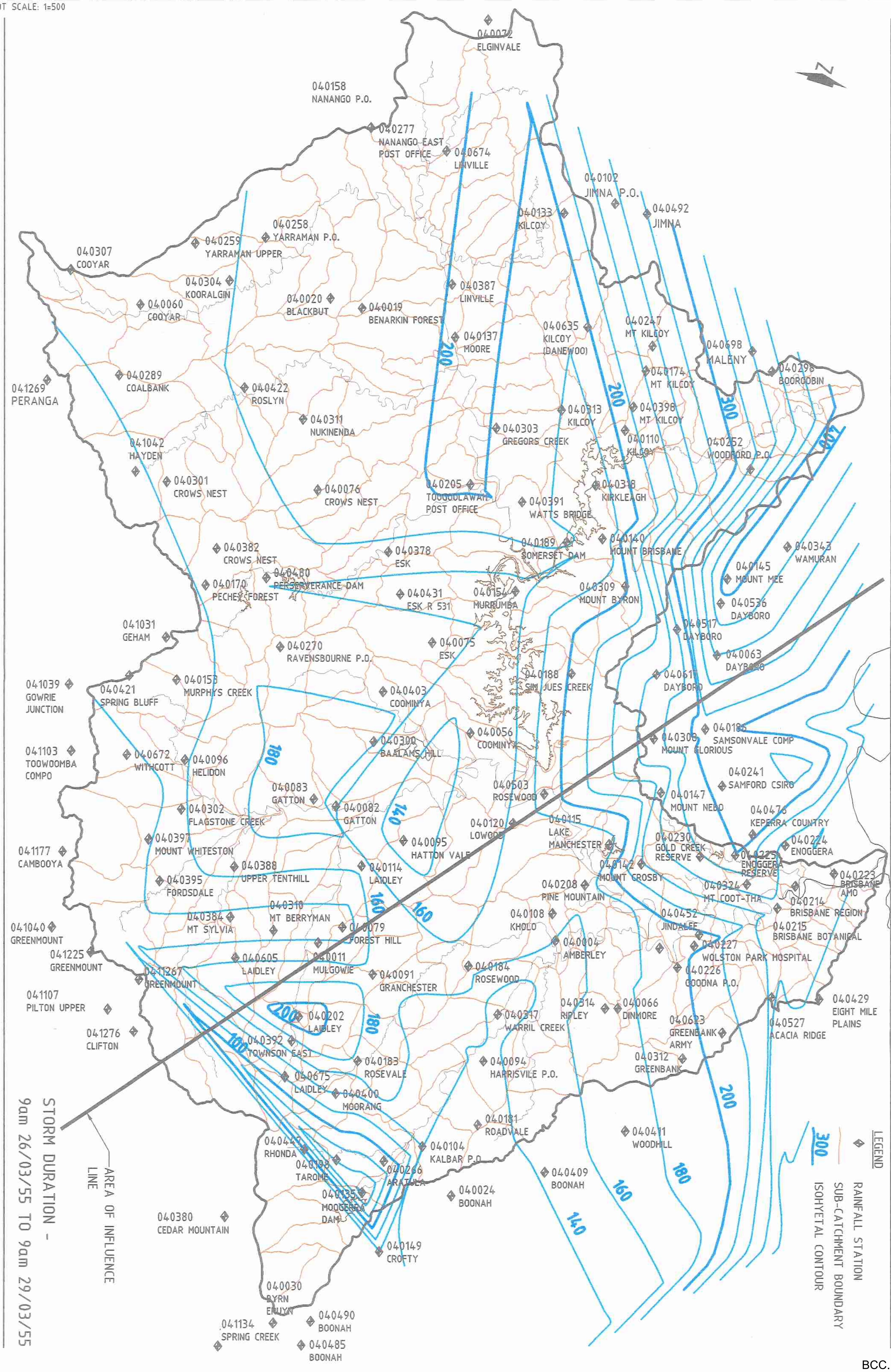


START TIME 2100 01/02/31

SINCLAIR KNIGHT MERZ

FIGURE 5-16
BRISBANE RIVER FLOOD STUDY
REPRESENTATIVE PLUVIOGRAPHS
- FEBRUARY 1931 STORM

FILE 0415 DIS D:\D ISBU T004 D -7-9
PLOT SCALE: 1=500



STORM DURATION -
9am 26/03/55 TO 9am 29/03/55

LEGEND

◆ RAINFALL STATION

SUB-CATCHMENT BOUNDARY

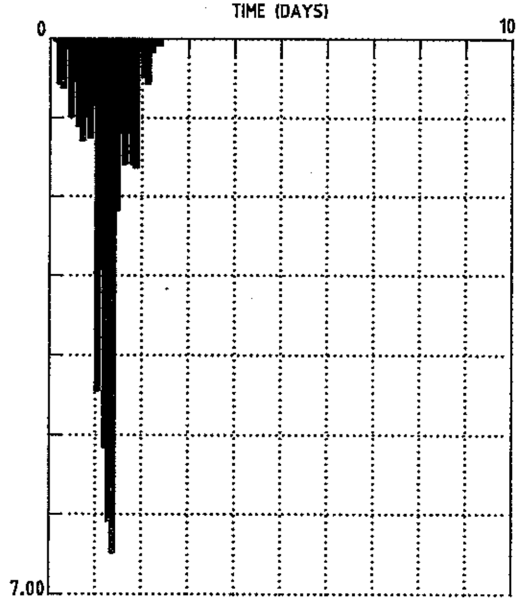
300 ISOHYETAL CONTOUR

FIGURE 5-17

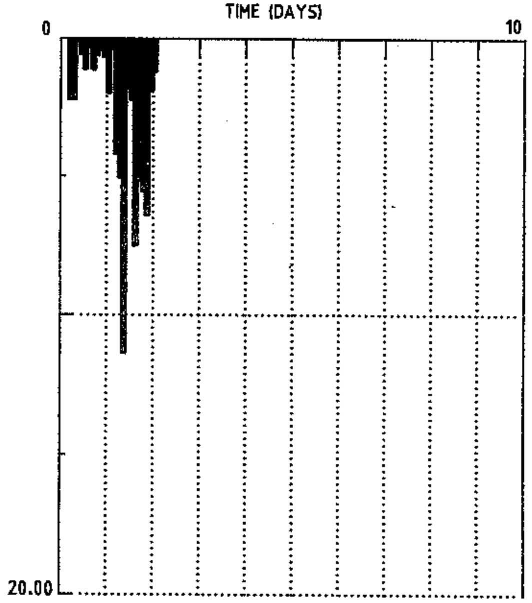
BRISBANE RIVER FLOOD STUDY
ISOHYETAL MAP - MARCH 1955 STORM

FILE NAME: 04157-56 DISK N°: D:\DWG\BRISB... N°: T00/157 DATE: 21/8/97
PLOT SCALE: 1=80

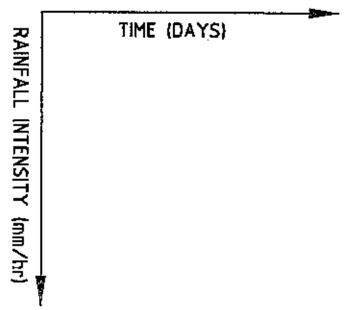
STANLEY RIVER AT SOMERSET DAM



BRISBANE RIVER AT PORT OFFICE



KEY



START TIME 0900 26/03/55

SINCLAIR KNIGHT MERZ

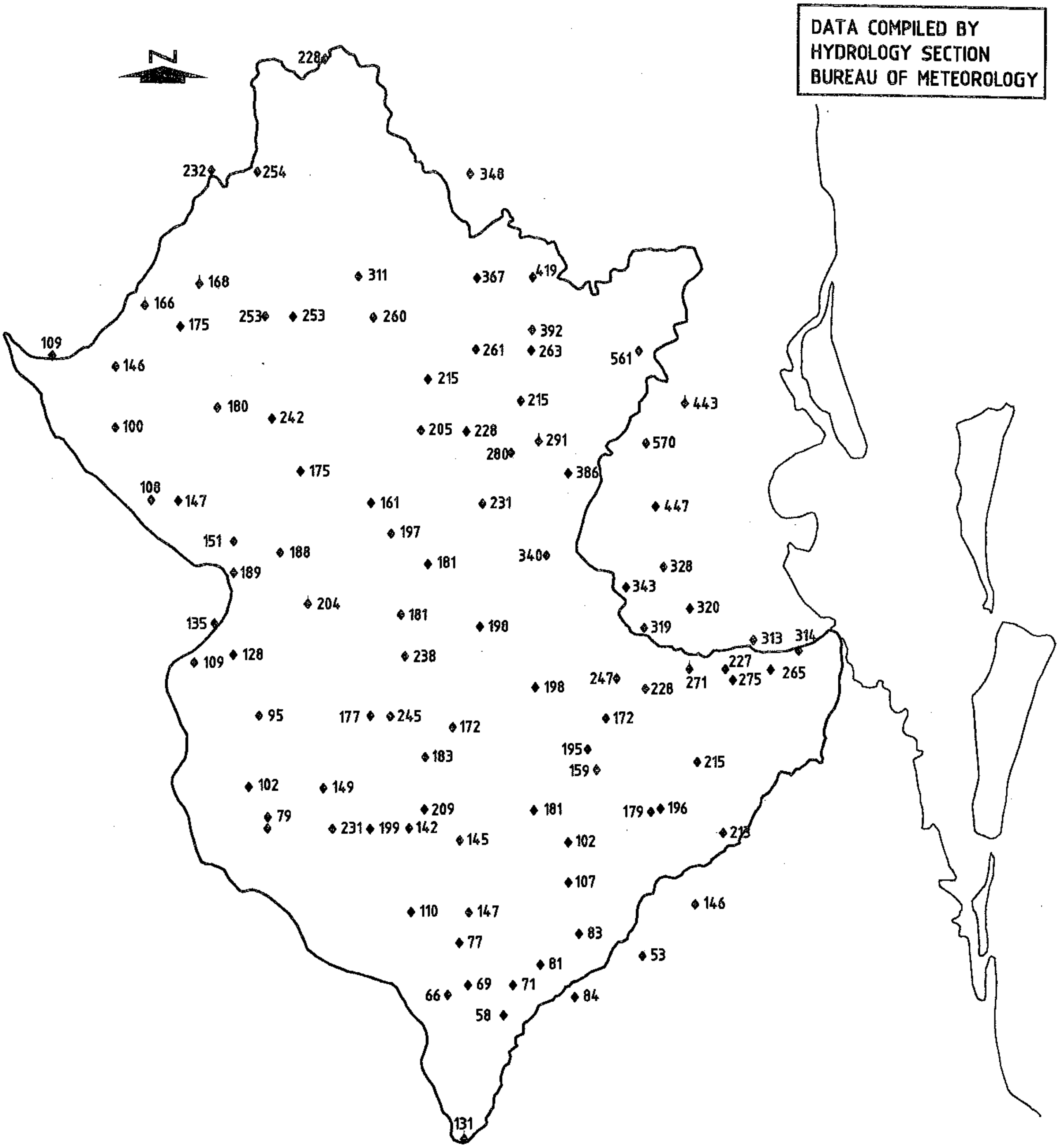
FIGURE 5-18
BRISBANE RIVER FLOOD STUDY
REPRESENTATIVE PLUVIOGRAPHS
- MARCH 1955 STORM

BCC.121.0490

SINCLAIR KNIGHT MERZ

FIGURE 5-19

BRISBANE RIVER FLOOD STUDY
RAINFALL DISTRIBUTION
- JULY 1973 STORM



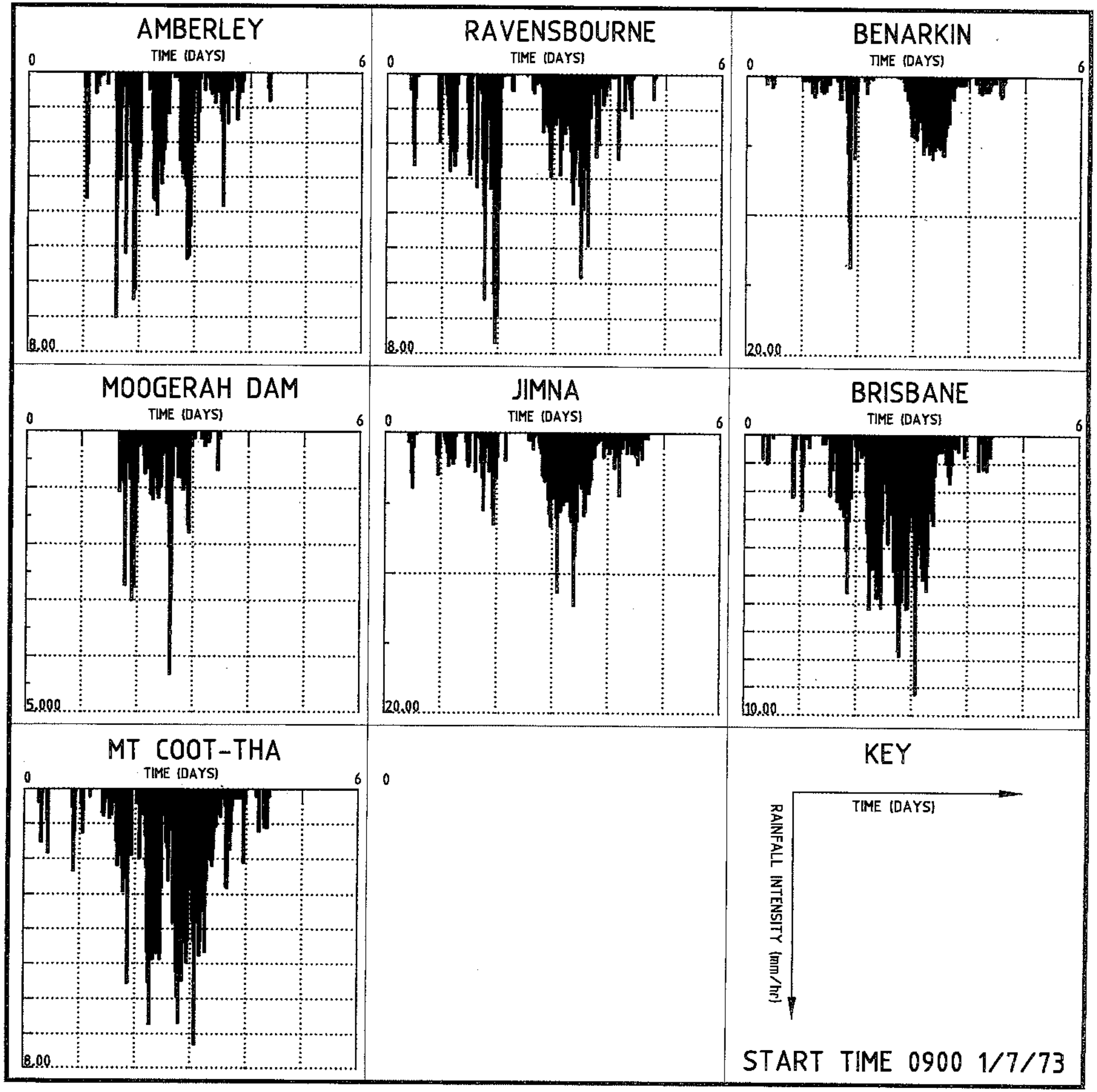
STORM DURATION - 9am 01/07/73 TO 9am 09/07/73

LEGEND

◆ 70 RAINFALL (mm)

0 10 20 30 40 50 km

FILE NAME: 04157-17 PLOT SCALE: 1:1000 DISK N°: D:\DWG\BRISBANE N°: T004157 DATE: 10-3-97



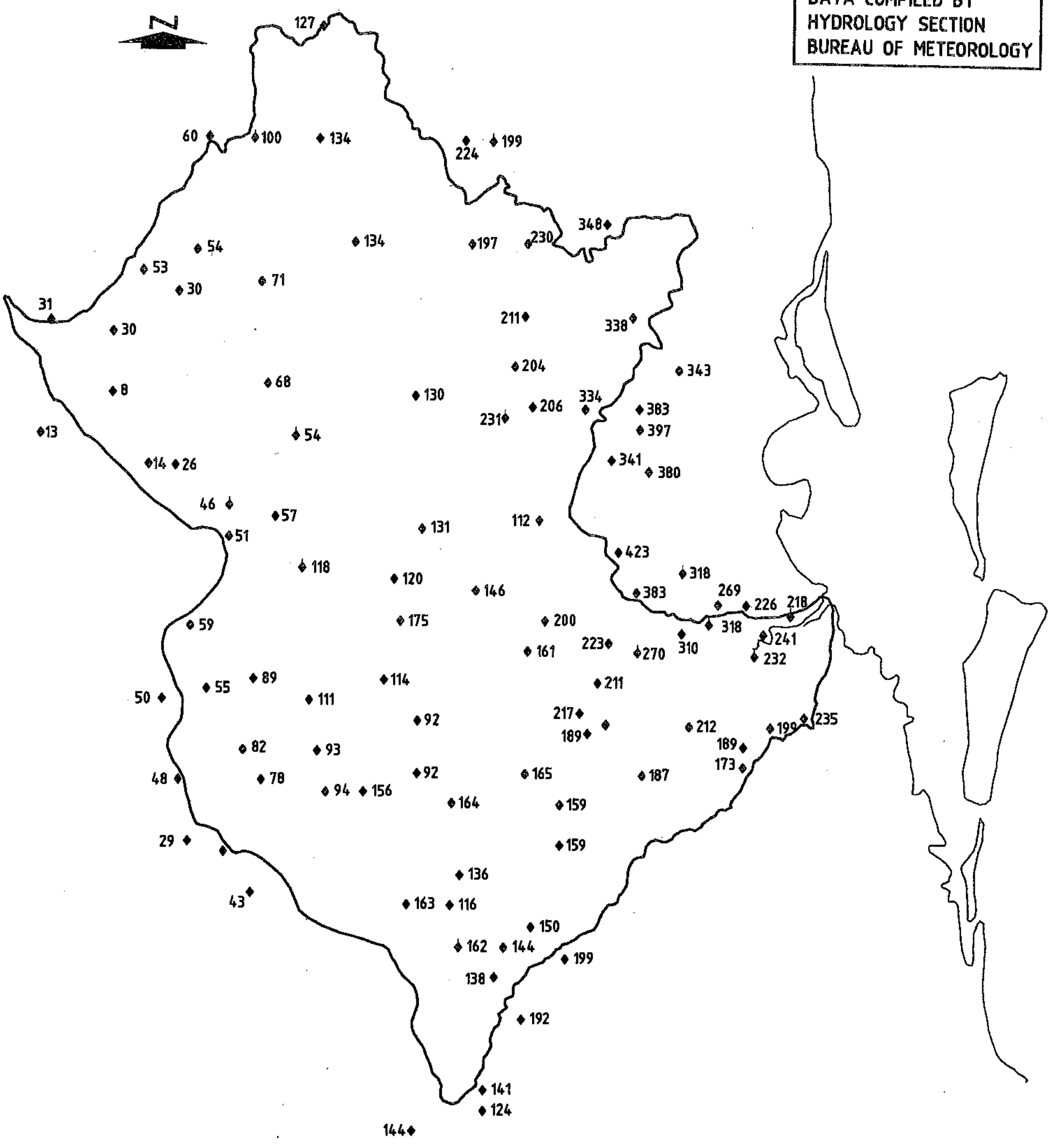
SINCLAIR KNIGHT MERZ

FIGURE 5-20
BRISBANE RIVER FLOOD STUDY
REPRESENTATIVE PLUVIOGRAPHS
- JULY 1973 STORM

FIGURE 5-21

BRISBANE RIVER FLOOD STUDY
RAINFALL DISTRIBUTION
- EARLY APRIL 1989 STORM

DATA COMPILED BY
HYDROLOGY SECTION
BUREAU OF METEOROLOGY



STORM DURATION - 9am 31/03/89 TO 9am 04/04/89

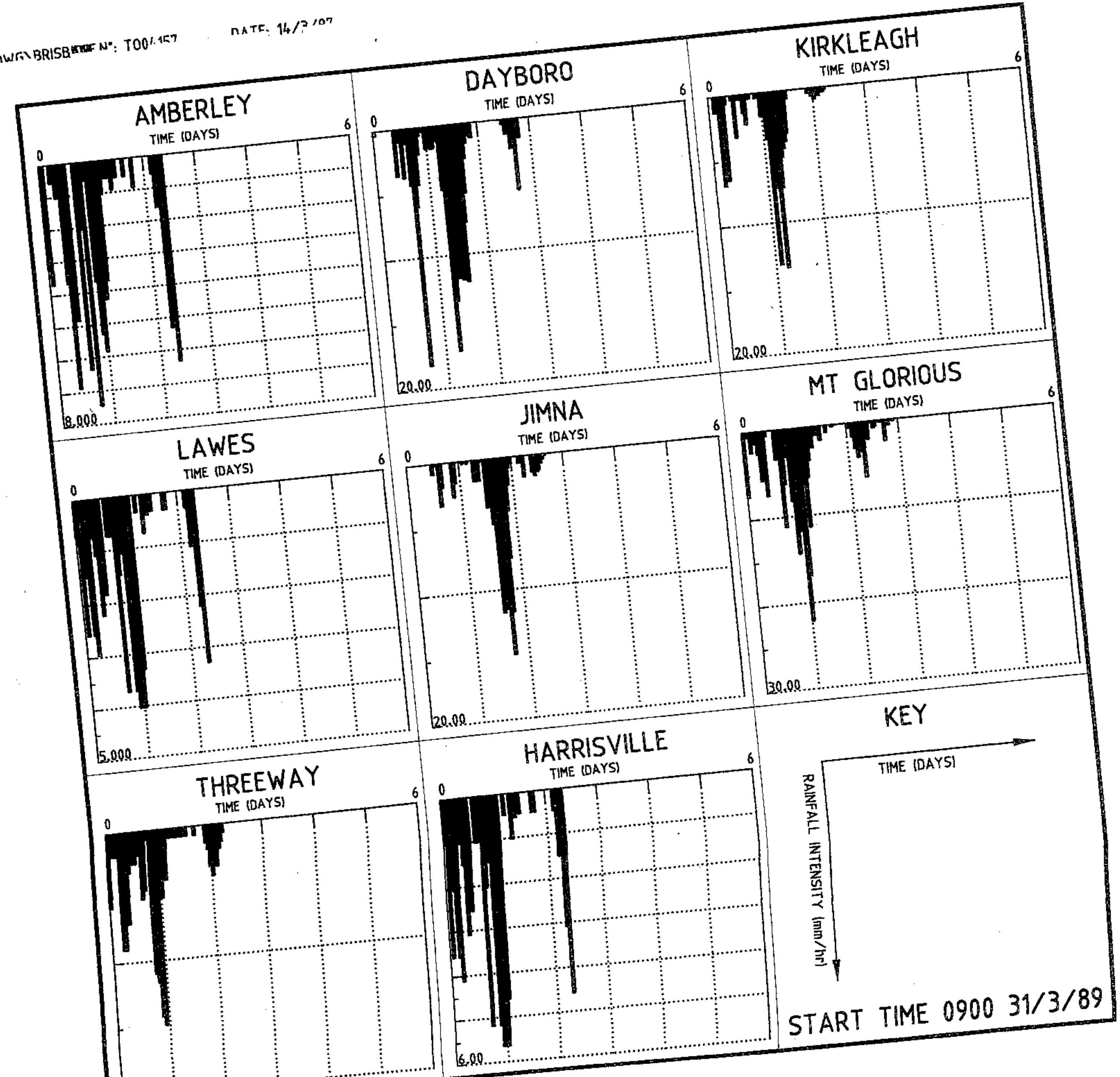
LEGEND

◆ 70 RAINFALL (mm)

0 10 20 30 40 50 km

FILE NAME: 04157-19 DISK N°: D:\DWG\BRISBANE PLATE N°: T004157 DATE: 10-3-97

FILE NAME: 04157-20 DISK N°: D:\DWG\BRISB JOB N°: T004157 DATE: 14/3/97



SINCLAIR KNIGHT MERZ

FIGURE

BRISBANE RIVER FLOOD STUDY
REPRESENTATIVE PLUVIOGRAPHS
- EARLY APRIL 1989 STORM

6. Hydraulic Model

6. Hydraulic Model

6.1 Overview

The overall purpose of any hydraulic modelling is to describe the movement or behaviour of floods as they pass through the channel system and associated floodplains. Flood levels, extent of inundation and flow velocities at various locations along the study reach are computed in the process.

In order for the model results to be reliable, it is necessary to calibrate and verify the hydraulic model. The calibration process involves the matching of calculated levels with recorded levels for as many recorded events as possible. Characteristics such as channel roughness parameters and appropriate model schematisation are derived in the calibration process.

The next major step after calibrating the model is to test or verify the model by using the model parameters derived during the calibration phase. This process is necessary in order to ensure that the model accurately describes the hydraulic behaviour of the channel system both for recorded events as well as for design events.

The one-dimensional hydrodynamic model, MIKE 11 developed by the Danish Hydraulic Institute was selected for the hydraulic analysis. HEC-RAS, the industry standard steady-state one-dimensional model was used to check the hydraulic behaviour of major structures located along the river in the study area.

This section of the report describes the hydraulic modelling of the Brisbane River system with respect to the calibration and verification processes.

6.2 MIKE 11 Model Description

The MIKE 11 hydrodynamic model was developed by the Danish Hydraulic Institute and it is a one-dimensional unsteady-state model used to simulate flows in channels of various configurations.

The model is based on an implicit finite-difference approach and can be applied to looped networks and quasi two-dimensional flow simulations. The model is capable of simulating sub-critical as well as super-critical flow conditions through a numerical scheme which adapts according to local flow conditions.

Inputs to the model include discharge hydrographs at various inflow points, water level or discharge hydrographs at the downstream boundary of the model, cross-sectional data and channel roughness values.

6.3 HEC-RAS Model Description

HEC-RAS has been developed to predict water surface profiles for steady flow in natural or constructed channels. The computational procedure is based on the solution of the one dimensional energy equation with energy losses due to friction evaluated from Manning's equation. Effects of hydraulic structures such as bridges, culverts and weirs can be readily incorporated. For the purpose of this study, HEC-RAS has been used to check the performance of the MIKE 11 model at bridge structures.

6.4 Model Establishment

6.4.1 Brisbane River System Schematisation

Brisbane River was represented by one main branch in the MIKE 11 model which extends from the Western Inner Bar to the Brisbane City Council boundary which is located approximately 79 km upstream.

Additional branches located at the confluences of the Bremer River, Oxley Creek , Enoggera Creek and Bulimba Creek were included in the model to allow major inflows and storages from these tributaries to be taken into account. Storages associated with smaller tributaries were not considered to be significant and therefore were not included in the model.

This was considered to be a reasonable representation as peak inflows from major tributaries within the hydraulic model reach occur well before peak inflows from the upper Brisbane River catchment (ie. upstream of the Brisbane City Boundary). This allowed floodwater to be backed up into each tributary and provided a simulated storage at each confluence. Model branches and major confluence locations are shown in **Figure 6-1a to 6-1g - MIKE 11 Model Structure**.

Surveyed data provided by Brisbane City Council was used to describe the cross-sectional geometry of the Brisbane River system in the model. The geometry of the adjoining tributaries consisted of Brisbane River survey data (connection to Brisbane River) and derived levels from topographical information for the upstream cross sections. Locations of the cross-sections used in the model are shown in **Figure 6-1a to 6-1g - MIKE 11 Model Structure.** A total of 197 cross-sections were used to represent the geometry of the Brisbane River system and a further 8 cross sections for the four adjoining tributaries being modelled.

6.4.2 Boundary Conditions

Discharge hydrographs simulated by the hydrologic model, RAFTS, for the various recorded events were used as boundary conditions at the upstream ends of the hydraulic model and 4 intermediate locations representing sub-catchment inflows along the creeks. These locations are illustrated on **Figure 6-1a to 6-1g - MIKE 11 Model Structure**.

Recorded water levels in the Brisbane River at the Western Inner Bar were used as the downstream boundary conditions for the events being modelled.

6.4.3 Hydraulic Structures

A total of 8 waterway crossings are located within the Brisbane River study area as shown in **Figure 6-1a to 6-1g - MIKE 11 Model Structure.** Geometry and hydraulic capacity vary considerably between crossings, but they can all be grouped into bridge structure types.

Bridge Structures consist of a road decking supported by piers. This type of structure has the highest capacity to accommodate flood discharges without overtopping. Changes to waterway geometry are usually minor compared to other structures such as culverts, except for the piers and encroachment of the creek by the bridge abutments.

Two types of flow regimes were allowed for in the hydraulic modelling of waterway structures:

Weir Type Flow is the flow over a crest such as a road or top of a pipeline. This occurs when the roadway is overtopped and may be either free flow (low downstream water levels causing critical flow conditions at the structure) or submerged flow (high downstream water levels `drowning' out the weir flow). The weirs for this study were modelled within a separate link branch. This allowed weir flow to be estimated at each bridge structure.

Culvert Type Flow is the flow through a culvert opening. The hydraulics of culvert flow are dependent on factors such as downstream submergence, culvert dimensions and geometry, friction effects and whether the culvert is flowing partially full or is pressurised.

The modelling approach for each bridge structure was a combination of culvert and weir flow. Flows below the bridge deck were assumed to approximate a culvert type regime.

A relationship between water level and available waterway width was developed from cross sectional information. Reductions in waterway area due to piers and bridge skewness were taken into account. The level-width curve was then input into MIKE 11.

This approach was applied to flows below the bridge deck. For overtopping conditions, the road crest geometry was specified directly into MIKE 11 and modelled as a broad crested weir.

A brief description of each structure is provided below.

1. Centenary Bridge - A multi span structure consisting of a constant deck depth with 6 piers and abutments encroaching within the waterway area. During the 1974 flood event a barge was sunk immediately upstream of the bridge to avoid bridge damage occurring. This may have caused a reduction of the conveyance through the waterway.

2. Indooroopilly Bridge - There are three bridges in this location these being the Walter Taylor Bridge and two Indooroopilly Rail Bridges. For modelling purposes these three bridges were combined and assumed to be a composite structure. Anecdotal evidence suggests that the combination of these three structures reduce the waterway area and cause a choking effect.

3. The Merivale Bridge - This rail bridge was constructed after the 1974 flood event. It has been included for all events occurring after 1974.

4. William Jolly Bridge - This bridge is situated approximately 250 m downstream of the Merivale bridge. The bridge is a multi span bridge with arched chords joining the piers at low levels. It is considered that these arched chords may cause some minor afflux to occur due to the reduction in waterway area.

5. Victoria Bridge - The Victoria Bridge is located approximately 700 m downstream of the William Jolly Bridge. The bridge is a solid arch bridge which reduces the waterway area considerably at higher flood levels.

6. Captain Cook Bridge - This bridge is similar to the Victoria Bridge however the reduction in waterway area is less due to the flat arch shape of the deck.

7. Story Bridge - The deck level of the Story Bridge is such that weir flow is unlikely for most floods. Any restriction of flow is due to the piers and abutments only, hence major affluxes at this location are not expected.

8. Gateway Bridge - This bridge was not included in the model as the deck is suspended at a very high level. The effect of the piers on afflux was considered to be negligible due to the extent of waterway area at this location.

A list of the modelled structures and how they were represented in MIKE 11 are presented in **Table 6-1 - List of Hydraulic Structures**.

Table 6-1 - List of Hydraulic Structures

No	Structure Location	Chainage (km)	Structure Description	Modelled in MIKE 11 as:
1	Centenary Highway	1028.720	Major Public Bridge	Irregular culvert + weir
2	Indooroopilly Bridges	1037.110	Major Public Bridge	Irregular culvert + weir
3	Merivale Bridge	1052.37	Major Public Bridge	Irregular culvert + weir
4	William Jolly Bridge	1052.625	Major Public Bridge	Irregular culvert + weir
5	Victoria Bridge	1053.355	Major Public Bridge	Irregular culvert + weir
6	Captain Cook Bridge	1054.660	Major Public Bridge	Irregular culvert + weir
7	Story Bridge	1056.920	Major Public Bridge	Irregular culvert + weir

6.5 MIKE 11 Model Calibration

6.5.1 General

Model calibration involves the selection of appropriate model schematisation and model parameters in order to match simulated and recorded water levels and discharges. This involves an iterative process and the careful selection of roughness parameters which reflect channel and floodplain conditions and an accurate description of flow movement.

Channel roughness values (Manning's `n') selected were primarily based on site visits, examination of aerial photographs and past experience from other flood studies. These were modified in some cases to reflect the hydraulic behaviour of the flood, (such as a change in vegetation or the presence of a sharp bend), as it moved downstream in order to achieve a reasonable match between recorded and predicted flood levels.

Four recorded events covering a variable range of floods, with rainfall and water level data were used to calibrate the hydraulic model. These flood events were;

- 24 January 1974
- 01 May 1996
- 23 April 1989
- 20 June 1983

The calibration events can be classified into a large flood event (1974) and small flood events (1983, 1989, and 1996). The peak discharge of the 1974 flood event was approximately 10 000 m^3/s, while the other events discharges range from 1 500 m^3/s to 3 000 m^3/s. Unfortunately no historical records for mid range flood events were available at the time of calibration.

Adopted Manning's 'n' values used in the hydraulic model are shown in **Figure 6-2 - Hydraulic Model Channel Roughness & Relative Resistance Values.** From **Figure 6-2** it can be seen that two sets of Manning's 'n' data were required to achieve a good calibration. The higher set of Manning's 'n' values were required to match the predicted water levels to the recorded water levels for the 1974 flood. Since MIKE 11 does not directly allow for bend losses, Manning's 'n' values had to be increased at bends to account for these losses. Furthermore, the predicted velocities in the 1974 flood were double that of the smaller events, hence increasing bend losses further. To account for the greater bend losses, the Manning's 'n' values had to be increased for the calibration of the 1974 flood event. Further discussion of the adopted Manning's 'n' values is provided later in this report.

Initial roughness estimates were based on site inspection and refined during the calibration process to achieve a best fit across the range of the four calibration events analysed.

Generally, the upper reach of the Brisbane River from MIKE 11 model chainage 1 000 km to 1 040 km consists of mainly open grassed and treed floodplains with severe meanders at various locations. Residential properties are located at various intervals and levels along this reach. These residential properties could be described as being in low density areas.

From chainage 1 040 km to 1 070 km a reach could be described as medium to high density residential areas which include the inner city area. The general shape of the river could be described as severely meandering.

The lower reach of the Brisbane River from 1 070 km to 1 078.66 km is relatively uniform with no major bends. Industry and residential properties line the banks along with mangrove swamps close to the river outlet.

Generally the overall river bed profile could be described as irregular which is probably due to dredging. This form roughness may cause a slight increase to the expected Manning's 'n' values.

The floodplain roughnesses varied significantly along the extent of the Brisbane River. Generally, the Manning's 'n' values varied from 0.025 at the Inner Bar, 0.035 for open grassed floodplains, 0.075 for treed floodplains to 0.47 for complete flow retardation in the inner city area.

Hydrographs exported from the RAFTS model were used as direct inputs into the MIKE 11 model.

Downstream boundary conditions (tailwater) were based on available data for the Brisbane River. Continuous data from the Bureau of Meteorology was used to set tailwater levels. This allowed tidal influences to be included in the modelling however the quality of the data for the late April 1989 and the May 1996 flood events was considered to be poor and water levels had to be derived to complete each of these data sets.

Each of the floods selected for calibration purposes was simulated using the MIKE 11 model. A comparison of recorded and computed flood levels at the gauge and spot level locations is tabulated in **Appendix C - MIKE 11 Model Results - Calibration/Verification (Table C-1 - Predicted & Recorded Flood Levels for Calibration and Verification Events)**. Corresponding discharges are presented in **Table C-2 Predicted Discharges for Calibration/Verification Events**. Longitudinal profiles of peak flood levels for the calibration events are also presented in **Appendix C as Figures C-1a to C1i - Flood Calibration Profiles** and **Drawings W10581 - Sheets 01 to 09.**

6.5.2 January 1974 Flood Event

The January 1974 flood event was the largest flood that has occurred in the Brisbane River in recent times. This event was considered to be the primary calibration event because a large amount of recorded flood level information was available.

At the time of this flood Wivenhoe Dam had not been constructed and this enabled good calibration of the discharge hydrographs to be achieved.

For this calibration the Merivale Bridge was not included in the model as it was not constructed until 1975.

Due to extensive dredging in the river system it was appropriate to compare surveyed cross sections taken directly after the 1974 flood with surveyed cross sections taken in 1995. A number of cross sections were compared at various locations and although each set of the compared sections were not at an exact corresponding location, the general trend suggested that the river system previously had a lower bed level (up to 1.5 m). This was not expected to cause significant differences in flood levels because the additional volume due to the increase in depth would already be accounted for by the tidal prism.

The Manning's 'n' values were input at each cross section using preliminary values obtained from the site inspection. At bend locations these values were increased by a factor of 1.3 (Chow, 1973) to model the additional losses not accounted for in MIKE 11. These parameters were adjusted incrementally until a good calibration was obtained. On completion of this calibration event, generally predicted levels were within 0.1 m of continuous recorded levels and within 0.2 m recorded spot levels.

For continuous records the rise, peak and recession of the hydrographs generally provided a good match to the recorded levels. The recorded spot levels varied significantly depending on whether the level was taken on the outside or inside of a bend. The predicted levels outside the maximum allowable tolerance of 0.2 m were checked and in most cases were deemed to be likely to be due to superelevation at bends or incorrect recorded level information (see **Section 6.10** for further discussion). This was primarily decided by looking at surrounding levels and identifying any outliers in the recorded levels.

A comparison of recorded and predicted hydrographs is given in **Appendix C (Figure C-3a to C-3d - Predicted & Recorded Hydrograph Comparison - January 1974)**.

The Manning's 'n' values adopted for this calibration were considered to be slightly higher than expected. This was considered further during other calibration events.

6.5.3 May 1996 Flood Event

This event was considered to be a small event approximately 10 percent the size of the 1974 flood. Discharge hydrographs calculated by the RAFTS model were used as inflows at each inflow boundary and recorded level information was used as the downstream water level at the downstream boundary. For this event the Merivale Bridge was included in the MIKE 11 model.

Only two continuous recorded water level records and no spot level information were available for the 1996 flood. The continuous recorded water levels were available at Moggill gauging station and the Western Inner Bar. The primary objective of the calibration for this flood was to match the recorded water level at Moggill.

The Manning's 'n' values obtained from 1974 flood calibration were used for the model run where it was found that the predicted water level at Moggill was well above the recorded water levels. The difference in water levels was so great that the Bureau of Meteorology was contacted to check if a datum shift at the Moggill gauge had been overlooked. This was not the case and further investigations revealed the difference was due to lower bend losses caused by lower flow velocities for the smaller floods.

To check that reducing the Manning's 'n' value was a reasonable assumption a MIKE 11 model of one of the Brisbane River bends was set up and a bend loss for three Manning's 'n' values were determined. The three Manning's 'n' values used were;

- 0.07- Value adopted for the 1974 flood at bend.
- 0.05 - Value adopted for the 1996 flood at bend
- 0.035 - Value expected in channel if no bend was present.

The bend loss was considered to be the change in water level from the downstream exit of the bend to the upstream entrance to the bend.

These bend losses were recorded and the following equation was used and a comparison made to check the validity of the adopted roughness values.

Using the bend loss equation:

$$h_b = C_L.V^2/2.g$$

where

$$C_L = 2.b/r$$

and

b = width of flow at bend
r = radius of bend,

the estimated bend losses were calculated for the 1996 flood and the 1974 flood.

The results are presented in **Table 6-2 - Comparison of Bend Losses**.

Table 6-2 - Comparison of Bend Losses

Flood	b (m)	r (m)	C_L	V (m/s)	Calculated h_b (m)	MIKE 11 h_b (m)
1996	250	600	0.8	1.2	0.06	0.07
1974	700	600	2.3	1.8	0.39	0.38

It can be seen from **Table 6-2** that both the coefficient C_L and the velocity increase significantly at the bend for the larger flood. Since MIKE 11 cannot directly account for bend losses it was therefore necessary to reduce the Manning's 'n' value for the lesser flood to achieve a good calibration.

The rise of the recorded level hydrograph at Moggill matched reasonably well with the predicted rising limb calculated by MIKE 11. The predicted peak water level is however 0.28 m above and approximately 18 hours behind the recorded water level at this location. This was the best calibration that could be obtained within MIKE 11 given the RAFTS model calculated boundaries available.

It was therefore considered that the difference between the recorded and predicted levels was due to the predicted inflows at Moggill by the RAFTS model. As the RAFTS model has matched the recorded hydrograph at Moggill (refer **Table 5-11**), it appears that the rating curve at this site is in error in this flow range.

Appendix C (Figure C4 - Predicted & Recorded Hydrograph Comparison - May 1996) illustrates the match of hydrographs achieved.

6.5.4 Late April 1989 Flood Event

Hydrographs generated by the RAFTS model were used at each inflow location and the adopted Manning's 'n' values used for the 1996 calibration event were used for the calibration of this flood. The Merivale Bridge was also included in the MIKE 11 model for this calibration.

The only available flood level data was located at the Moggill gauge and the Western Inner Bar. As shown in **Table C-1** and **Figure C-5 - Predicted & Recorded Hydrograph Comparison - Late April 1989**, the magnitude of the predicted peak flood level was 0.25 m lower than the peak recorded flood level at Moggill.

This flood event included a large component of Wivenhoe Dam outflows which is evident in **Figure B-3b**. It can be seen from this figure that the tail of the hydrograph remains constant for a period of 8 days and that the variation between the recorded and the RAFTS predicted hydrograph is significant. These variations imply that the direct inflow from Wivenhoe Dam input into the RAFTS model does not represent discharges from the dam. The discrepancy in predicted water level determined in MIKE 11 could probably be explained by the predicted discharge hydrograph calculated by the RAFTS model which is heavily influenced by Wivenhoe Dam flows.

6.5.5 June 1983 Flood Event

The Manning's 'n' values adopted for the smaller flood events was again used to calibrate the 1983 flood. Wivenhoe Dam had been constructed and the Merivale Bridge was also included in the model.

Table C-1 and Figure C-6 - Predicted & Recorded Hydrograph Comparison show a good match between MIKE 11 peak predicted levels and levels recorded by the gauge at Moggill. The only recorded level information for this event was located at Moggill and the Western Inner Bar.

The comparison of predicted and recorded hydrographs illustrates that the rising limb of the water level hydrograph matches well with the MIKE 11 predicted rising limb. The peaks occur at virtually the same time and match to within 0.01 m. The recession of the predicted level hydrograph is however well above the recorded levels and this again questions the sensitivity of the Wivenhoe outflow gauging station to dam water levels and release strategies.

6.6 MIKE 11 Model Verification

6.6.1 General

Verification of the hydraulic model was the next phase in the modelling process after calibration. The model was tested by simulating other recorded flood events which were not used to calibrate the model without adjusting model specific parameters. This was done to determine the overall performance and robustness of the model in simulating a range of flood events.

The Brisbane River hydraulic model was verified using the hydraulic parameters derived from the calibration process to simulate the following events;

- February 1931
- March 1955
- 01 April 1989
- 04 July 1973.

The 1989 and 1973 events were considered to be small events and the Manning's 'n' values adopted for the calibration of the small events were used for the verification.

The model verification for the 1931 and 1955 flood events was carried out using the calibrated parameters used for the 1974 flood event. These parameters were considered to be the most appropriate as flood waters would be well out of the river proper similar to the 1974 event. It was therefore assumed that bend losses and Manning's n roughnesses would also be similar.

All existing structures detailed in **Table 6-1 - List of Hydraulic Structures** were included in the hydraulic model for the 1989 flood verification event however the Merivale Bridge was removed for the 1973 verification event.

The absence of some structures during the 1931 and 1955 flood events required that the MIKE 11 model be modified. The only structure that was constructed for the 1931 event was the William Jolly Bridge and for the 1955 flood event the in place structures were Indooroopilly Bridge, William Jolly Bridge, Victoria Bridge and the Story Bridge. The MIKE 11 model was adjusted accordingly for each event to account for the absence of the relevant structures.

Model boundaries at Brisbane River for the verification events consisted of RAFTS discharge hydrographs for model inflows and recorded water levels for the tailwater level at the Western Inner Bar.

Recorded and predicted verification flood levels at various locations are tabulated in **Appendix C - MIKE 11 Model Results - Calibration/ Verification**. Longitudinal flood level profiles are also included as **Sheets C.10 to C.18**. A comparison of recorded and computed flood levels at the gauge and spot level locations is tabulated in **Appendix C - MIKE 11 Model Results - Calibration/Verification (Table C-1 - Predicted & Recorded Flood Levels for Calibration and Verification Events)**. Corresponding discharges are presented in **Table C-2 - Predicted Discharges for Calibration/Verification Events**. Longitudinal profiles for the Verification Events are also presented in **Appendix C as Figures C-2a to C-2i - Flood Verification Profiles** and **Drawings W10581 - Sheets 10 to 18.**

6.6.2 February 1931

The February 1931 flood was the second largest recorded flood event used for any of the verification or calibration events.

Calculated hydrographs for this event from the RAFTS model were input into the MIKE 11 model and predicted water levels were computed. The adopted tailwater level at the Western Inner Bar for this event was 1.5 m AHD which was considered to be reasonable. This tailwater level assumes a 2 year ARI storm surge in Moreton Bay (Mallon TD, 1987). Using this tailwater level the predicted water levels are generally within 150 mm which was considered to be a good result given the age of the basic data.

Predicted water levels above the Indooroopilly Bridge are generally within 300 mm below the recorded flood levels however the reliability of these recorded levels are in question due to annotations on recorded flood level maps. These annotations indicate that some form of extrapolation may have been carried out and hence the reliability of this information is questionable.

Time series level data was not available for this event and therefore a hydrograph comparison could not be conducted however **Table C-1 - Predicted & Recorded Flood Levels for Calibration and Verification Events** presents a comparison between recorded peak flood levels and predicted values.

6.6.3 March 1955

The March 1955 flood was the third largest recorded flood event used for the verification or calibration events in this study.

Calculated hydrographs for this event from the RAFTS model were input into the MIKE 11 model and predicted water levels were computed. The adopted tailwater level at the Western Inner Bar for this event was 1.3 m AHD which was considered to be reasonable as this level was below the 1 year ARI storm surge level for Moreton Bay (Mallon TD, 1987). Using this tailwater level the water levels are generally within 150 mm which was considered to be a good result.

Flood Profiles for the 1955 event are presented in **Appendix C (Figures C-7 - Predicted & Recorded Hydrograph comparison - March 1955).**

6.6.4 Early April 1989

The April 1989 flood was the smallest flood used for any of the verification or calibration events.

Calculated hydrographs for this event using the RAFTS model were input to the MIKE 11 model. Computed water levels are summarised in **Table C-1** and indicate a poor level of model performance. Predicted levels were 0.97 m above the recorded level at Moggill. This difference can be attributed to the over estimation of the discharge hydrograph (see **Figure B-8C**) determined by RAFTS at Moggill. This is again probably due to the use of the Wivenhoe Dam recorded outflow as input to the RAFTS model. A comparison between recorded and predicted hydrographs is presented in **Figure C-8 - Predicted and Recorded Hydrograph Comparison - Early April 1989.**

6.6.5 July 1973

The July 1973 event was again classed in the small flood category however a reasonable amount of flood level information was available for the event.

Figure C-9 - Predicted & Recorded Hydrograph Comparison and **Table C-1** illustrates that a level of model performance similar to the calibration process was achieved with this event. Recorded flood levels were matched to within the tolerances specified except for two locations where the maximum difference between recorded and predicted was +0.16 m at Cairncross Dock and 0.2 m at the Port Office Gauge.

6.7 Hydrologic and Hydraulic Model Consistency

Due to the absence of stream gauging data on the Brisbane River, direct comparisons between historical hydrographs and calculated RAFTS and MIKE 11 hydrographs could not be made. To ensure consistency between the hydrologic and hydraulic models direct comparisons of the calculated hydrographs from each model were made at three locations along the creek, these being Moggill, Centenary Bridge and the Port Office.

These comparisons are illustrated in the following figures:

- **Figure 6-3 - Hydrologic and Hydraulic Model Consistency - January 1974**
- **Figure 6-4 - Hydrologic and Hydraulic Model Consistency - June 1983**
- **Figure 6-5 - Hydrologic and Hydraulic Model Consistency - Late April 1989**
- **Figure 6-6 - Hydrologic and Hydraulic Model Consistency - May 1996**

- **Figure 6-7 - Hydrologic and Hydraulic Model Consistency - February 1931**
- **Figure 6-8 - Hydrologic and Hydraulic Model Consistency - March 1955**
- **Figure 6-9 - Hydrologic and Hydraulic Model Consistency - July 1973**
- **Figure 6-10 - Hydrologic and Hydraulic Model Consistency - Early April 1989.**

Figures 6-3 to **6-10** represent the calculated hydrographs from both models at the three locations along Brisbane River.

Figures 6-3 to **6-10** illustrate that a general consistency between the models has been attained. The variation in peak discharges is generally within ±10% and the timing of the peak is reasonably accurate.

6.8 HEC-RAS Check of Major River Crossings

A total of seven HEC-RAS models were set up for the major structures in the Brisbane River Study area. The location of these structures are listed in **Table 6-1 - List of Hydraulic Structures**.

Each of these HEC-RAS models provide an accurate estimate of headloss through the structure and includes factors such as pier shape and geometry. These models were used to check the MIKE 11 approach to modelling structures, using the following methodology.

- The MIKE 11 model was run for two of the calibration events. Water levels upstream and downstream of the structure and flow discharges were output at the peak of the hydrograph.

- The HEC-RAS model was run using these flow and tailwater conditions. The water levels upstream of the bridge estimated by HEC-RAS were compared against MIKE 11 predictions to check if there was a reasonable match between predicted affluxes.

The results of the HEC-RAS structure afflux check are given in **Table 6-3 - HEC-RAS Check of MIKE 11 on Headloss through Major Structures**. These results illustrates that all of the model comparisons achieved a match to within ±0.12 m.

Table 6-3 - HEC-RAS Check of MIKE 11 on Headloss Through Major Structures

Structure ID	1974 Afflux			1983 Afflux		
Bridge	Mike 11	HEC-RAS	Difference (m)	Mike 11	HEC-RAS	Difference (m)
Centenary	0.15	0.06	-0.07	0.05	0.01	-0.04
Indooroopilly	0.10	0.10	-0.00	0.01	0.02	+0.01
Merivale	-	-	-	0.03	0.01	+0.02
William Jolly	0.54	0.61	+0.07	0.01	0.07	+0.06
Victoria	0.19	0.07	+0.12	0.01	0.02	0.01
Captain Cook	0.08	0.10	+0.02	0.01	0.01	+0.00
Story	0.11	0.04	-0.07	0.03	0.00	-0.03

This match was considered reasonable given the significant differences in the analytical techniques used by MIKE 11 and HEC-RAS. The major model differences that contribute to the variation in headloss through the structures are:

- An irregular waterway shape can be specified in MIKE 11 which is useful in modelling bridges spanning natural creeks. By comparison, HEC-RAS simplifies the waterway shape as a trapezoid which will introduce a water level difference at flows below the bridge deck.

- Both models assume critical conditions over the bridge deck. However there are considerable differences between the methods employed to determine energy head loss in critical flow. HEC-RAS adopts a standard broad crested weir relationship using an effective weir length (ie assumes MIKE 11 rectangular flow area). MIKE 11 uses the critical flow area over the roadway (ie assumes a variable flow area). The MIKE 11 methodology is considered to be a better technique, especially for overtopping of roads that have a complicated longitudinal profile.

The performance of the MIKE 11 model to match recorded flood levels (where available) in the vicinity of structures and the consistency of MIKE 11 and HEC-RAS results indicates that the MIKE 11 model is adequately reproducing structure hydraulics.

6.9 MIKE 11 Model Performance

Performance of the hydraulic model over the range of calibration events is considered to be reasonable. The brief specified acceptable calibration as matching predicted levels to recorded levels to within the following ranges:

- Continuous records, 0.10 m

- MHI records, 0.15 m

- Other flood levels, 0.20 m.

A summary of the performance of the MIKE 11 model is given in **Table 6-4 - Hydraulic Model Performance Summary** as mean absolute water level differences over the selected calibrated and verification floods. Considering the contents of **Table 6-4** the model generally meets accuracy requirements. Some non-conformances are evident and these were discussed in Section 6.5. These results were achieved on the basis of:

- Maintaining realistic channel roughness and variation of roughness along the length of the river. These roughness factors are representative of the current creek configuration, however an adjustment had to be made to reduce the roughness values for smaller flood events, due to reduced bend losses.

- The verification events for the 1931 and 1955 flood events generally showed good correlation with recorded flood levels given the changes to the river system over time (ie. dredging).

- Satisfactory checks were performed on the hydraulics of the major structures as described in Sections 6.8.

Table 6-4 - Hydraulic Model Performance Summary

Gauge ID	MIKE 11 Chainage (km)	Water Level Difference (m)								Mean Absolute Difference (m)
		Calibration Events				Verification Events				
		1974	1996	1989b	1983	1931	1955	1989a	1973	
Moggill	1006.30	-0.04	0.28	-0.25	0.01	-	-	0.97	0.02	0.26
Goodna Hos	1014.61	-0.02	-	-	-	-	-	-	-0.03	0.03
Mt Ommaney	1026.68	0.00	-	-	-	-	-	-		0.00
Darra Wharf	1031.70	-0.10	-	-	-	-	-	-	-0.06	0.08
Sherwood	1034.89	-0.12	-	-	-	-	-	-	-	0.12
Clarence Rd	1037.29	-0.09	-	-	-	-	-	-	-	0.09
Oxley Ck	1039.57	0.10	-	-	-	-	-	-	-	0.10
King Arthur Tce	1040.09	-0.01	-	-	-	-	-	-	-	0.01
Tennyson PH	1041.46	-0.04	-	-	-	-	-	-	0.04	0.04
Yeronga St	1042.52	-0.11	-	-	-	-	-	-	-	0.11
Sandy Ck	1044.06	0.05	-	-	-	-	-	-	-	0.05
Dutton Pk Cemetery	1046.34	-0.45	-	-	-	-	-	-	-	0.45
Highgate Hill	1047.92	-0.10	-	-	-	-	-	-	-	0.10
St Lucia Ferry	1048.89	-0.01	-	-	-	-	-	-	0.14	0.08
Montague Rd	1053.90	-0.34	-	-	-	-	-	-	-	0.34
Port Office	1055.96	-0.04	-	-	-	-	-	-	0.23	0.14
Cresent Rd	1063.65	0.06	-	-	-	-	-	-	-0.06	0.06
Cairncross Dock	1065.99	0.03	-	-	-	-	-	-	0.16	0.10
Bulimba PH	1069.54	0.00	-	-	-	-	-	-	-	0.00
Western Inner Bar	1078.66	0.00	0.00	0.00	0.00	-	-	0.00	0.00	0.00

6.10 Superelevation Calculations

Superelevation calculations were performed at three (3) locations to provide an indicative estimate of the magnitude of superelevations at bends. These calculations were performed using:

$$\Delta h = \frac{V^2_{max}}{g}\left[\frac{20r_c}{3b} - \frac{16r_c^{\,3}}{b^3} + \left(\frac{4r_c^{\,2}}{b^2} - 1\right)\ln\left\{\frac{2r_c + b}{2r_c - b}\right\}\right]$$

where:

Δh = change in water level (m)

$V^2{}_{max}$ = maximum velocity at bend (m/s)

g = gravity (9.81 m/s^2)

r_c = radius of bend at centre of river

b = width of river (m) (generally assumed to be the distance between the cadastral boundaries defined for the river corridor)

Table 6-5 - Superelevation Calculations lists the parameters used and results for the three locations where superelevations were predicted.

Table 6-5 - Superelevation Calculations

Location	Cross section No.	MIKE 11 (km)	AMTD (km)	V max (m/s)	rc (m)	b (m)	Δh (mm)
Darra Wharf	1 280	1 031.7	46.96	3.28	410	190	± 270
Indooroopilly Bridge	1 140	1 037.09	41.57	2.68	400	170	± 170
Newstead Park	320	1 063.31	15.35	2.18	580	380	± 170

From **Table 6-5** it can be seen that the bend situated at Darra Wharf has an estimated Δh of ± 270 mm. This assumes that from the centre of the river to the outside of the bend the water level increases by 270 mm. Similarly from the centre of the river to the inside of the bend the water level reduces by 270 mm. Therefore the total change in water level from the inside of the bend to the outside of the bend at Darra Wharf was estimated to be 540 mm.

Recorded water levels and superelevations at these locations have been summarised in **Table 6-6 - Superelevation Comparison**, and compared to the predicted water levels and superelevations, estimated by the superelevations calculations.

Table 6-6 - Superelevation Comparison

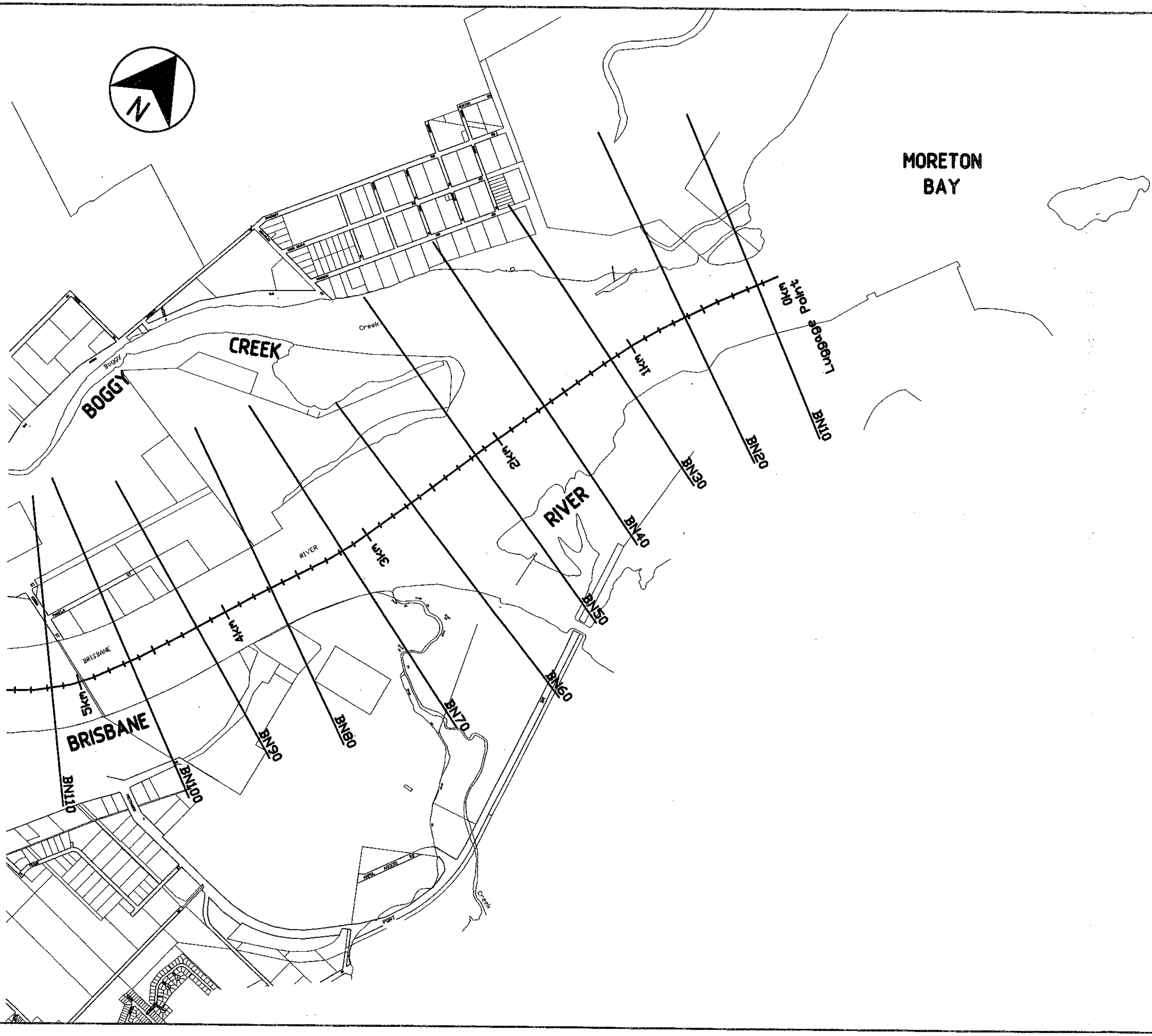
Location	Cross section No.	MIKE 11	AMTD	Recorded			Predicted		
		(km)	(km)	Inside (m AHD)	Outside (m AHD)	Δh total (mm)	Inside (m AHD)	Outside (m AHD)	Δh total (mm)
Darra Wharf	1 280	1 031.7	46.96	13.36	13.79	430	13.14	13.68	540
Indooroopilly	1 140	1 037.09	41.57	11.20	11.84	640	11.09	11.43	340
Newstead Park	320	1 063.31	15.35	2.60	3.3	900	2.79	3.13	340

From **Table 6-5** it can be seen that at Darra Wharf the superelevation calculations over predict the total change in water level by approximately 20%. Upstream of Indooroopilly Bridge, the superelevation calculations under predict the total change in water level by 50% and similarly at Newstead Park by 60%.

These calculations indicate that superelevations at bends in the Brisbane River would be significant, however the magnitude of these superelevations predicted by the calculations do not show good correlation to recorded levels on the inside and outside of the investigated bends. These discrepancies are most likely due to the assumed width of the river (ie b) which could effect the calculated superelevation. There may have also been errors in the recording of the actual flood levels.

This exercise demonstrates that significant superelevations can occur along the Brisbane River thus accounting for variations in calibration performance of the model where recorded flood levels are available at the outside and inside of river bends.

FIGURE 6.1a
BRISBANE RIVER FLOOD STUDY
MIKE 11 MODEL STRUCTURE



CROSS SECTION NUMBER	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 10	1078.525	0.135
BN 20	1078.040	0.620
BN 30	1077.510	1.150
BN 40	1077.010	1.650
BN 50	1076.495	2.165
BN 60	1076.000	2.660
BN 70	1075.480	3.180
BN 80	1074.985	3.675
BN 90	1074.460	4.200
BN 100	1074.000	4.660

LEGEND

BN10 SURVEYED CROSS SECTION

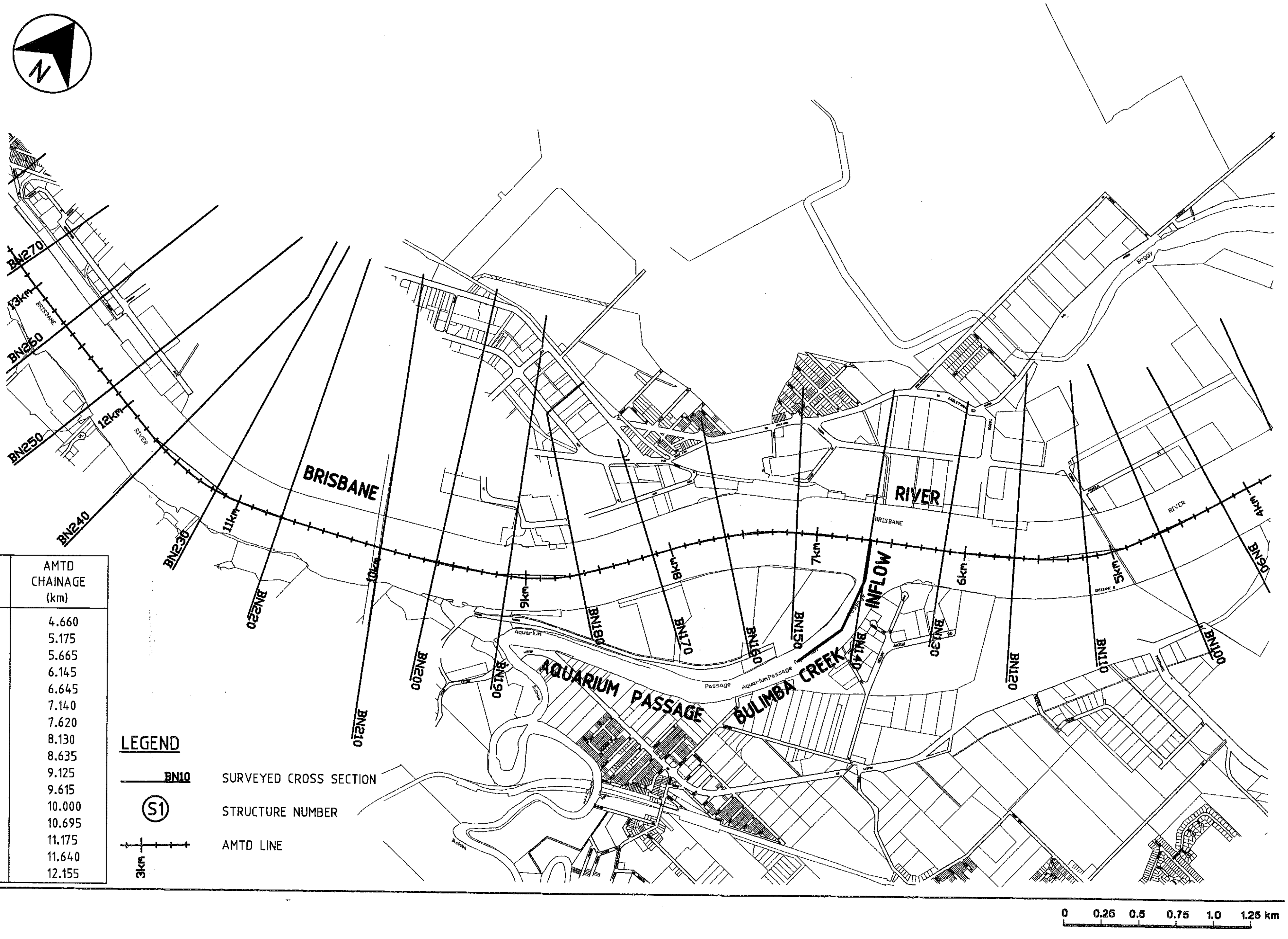
(S1) STRUCTURE NUMBER

3km AMTD LINE

0 0.25 0.5 0.75 1.0 1.25 km

FIL... IE: 04 PLOT SCALE: 1=25

FIGURE 6.1b
BRISBANE RIVER FLOOD STUDY
MIKE 11 MODEL STRUCTURE



CROSS SECTION NUMBER	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 100	1074.000	4.660
BN 110	1073.485	5.175
BN 120	1072.995	5.665
BN 130	1072.515	6.145
BN 140	1072.015	6.645
BN 150	1071.520	7.140
BN 160	1071.040	7.620
BN 170	1070.530	8.130
BN 180	1070.025	8.635
BN 190	1069.535	9.125
BN 200	1069.045	9.615
BN 210	1068.660	10.000
BN 220	1067.965	10.695
BN 230	1067.485	11.175
BN 240	1067.020	11.640
BN 250	1066.505	12.155

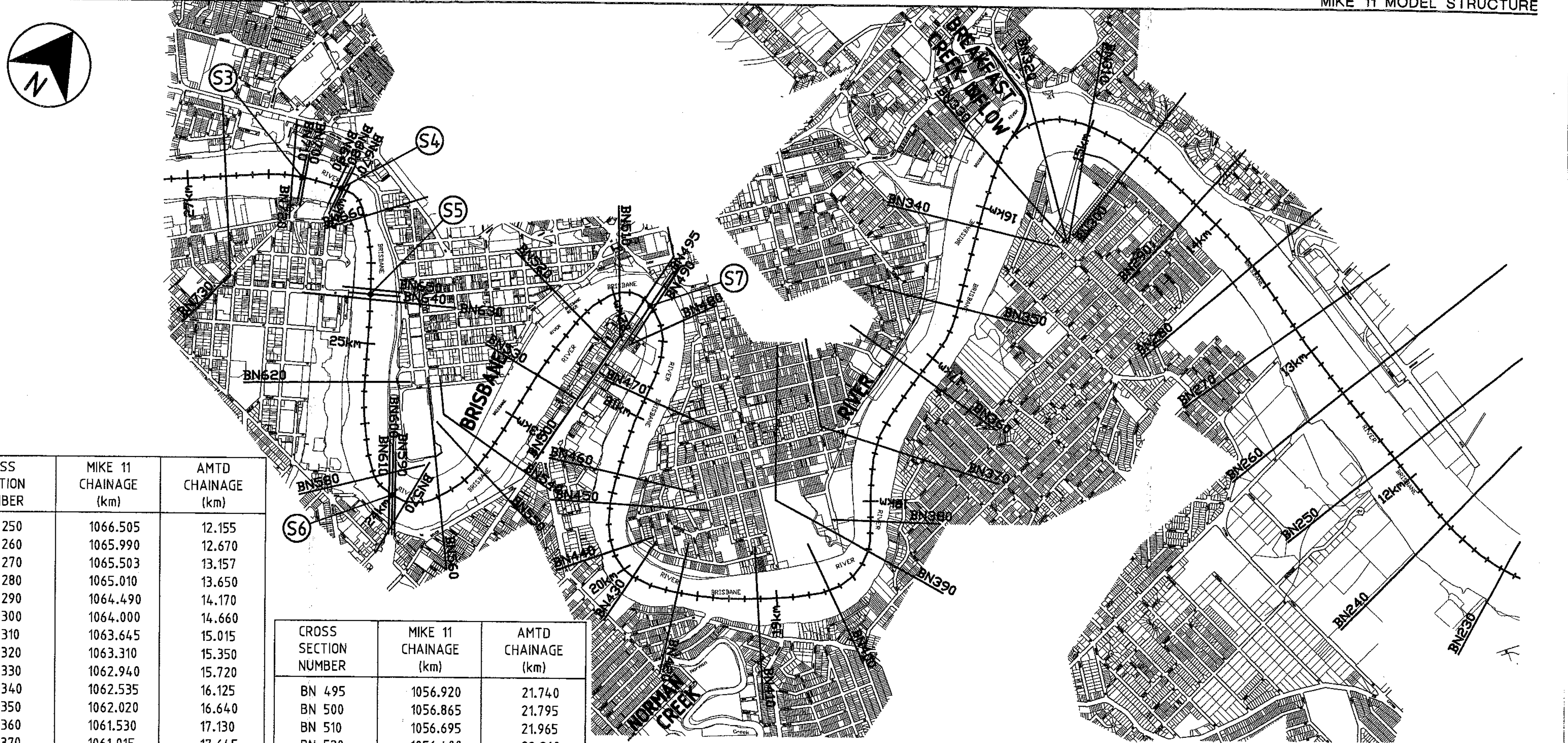
LEGEND

BN10 — SURVEYED CROSS SECTION
S1 — STRUCTURE NUMBER
3km — AMTD LINE

PLOT SCALE: 1=25

SINCLAIR KNIGHT MERZ

FIGURE 6.1c
BRISBANE RIVER FLOOD STUDY
MIKE 11 MODEL STRUCTURE



CROSS SECTION NUMBER	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 250	1066.505	12.155
BN 260	1065.990	12.670
BN 270	1065.503	13.157
BN 280	1065.010	13.650
BN 290	1064.490	14.170
BN 300	1064.000	14.660
BN 310	1063.645	15.015
BN 320	1063.310	15.350
BN 330	1062.940	15.720
BN 340	1062.535	16.125
BN 350	1062.020	16.640
BN 360	1061.530	17.130
BN 370	1061.015	17.645
BN 380	1060.535	18.125
BN 390	1060.345	18.315
BN 400	1059.990	18.670
BN 410	1059.540	19.120
BN 420	1059.035	19.625
BN 430	1058.735	19.925
BN 440	1058.530	20.130
BN 450	1058.230	20.430
BN 460	1058.040	20.620
BN 470	1057.530	21.130
BN 480	1057.090	21.570
BN 490	1056.950	21.710

CROSS SECTION NUMBER	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 495	1056.920	21.740
BN 500	1056.865	21.795
BN 510	1056.695	21.965
BN 520	1056.400	22.260
BN 530	1055.960	22.700
BN 540	1055.420	23.240
BN 550	1055.280	23.380
BN 560	1054.970	23.690
BN 570	1054.760	23.900
BN 580	1054.490	24.170
BN 590	1054.680	23.980
BN 600	1054.660	24.000
BN 610	1054.640	24.020
BN 620	1053.900	24.760
BN 630	1053.385	25.275
BN 640	1053.355	25.305

CROSS SECTION NUMBER	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 650	1053.320	25.340
BN 660	1052.865	25.795
BN 670	1052.640	26.020
BN 680	1052.625	26.035
BN 690	1052.595	26.065
BN 700	1052.390	26.270
BN 710	1052.370	26.290
BN 720	1052.310	26.350
BN 730	1051.895	26.765

TABLE OF STRUCTURES

STRUCTURE NUMBER	CROSS SECTION NUMBER	STRUCTURE LABEL
S3	BN 710	MERIVALE BRIDGE
S4	BN 680	WILLIAM JOLLY BRIDGE
S5	BN 640	VICTORIA BRIDGE
S6	BN 600	CAPTAIN COOK BRIDGE
S7	BN 495	STOREY BRIDGE

LEGEND

BN10 — SURVEYED CROSS SECTION

(S1) — STRUCTURE NUMBER

3km — AMTD LINE

0 0.25 0.5 0.75 1.0 1.25 km

PLOT SCALE: 1=25

BCC.121.0517

FIGURE 6.1d

BRISBANE RIVER FLOOD STUDY

MIKE 11 MODEL STRUCTURE

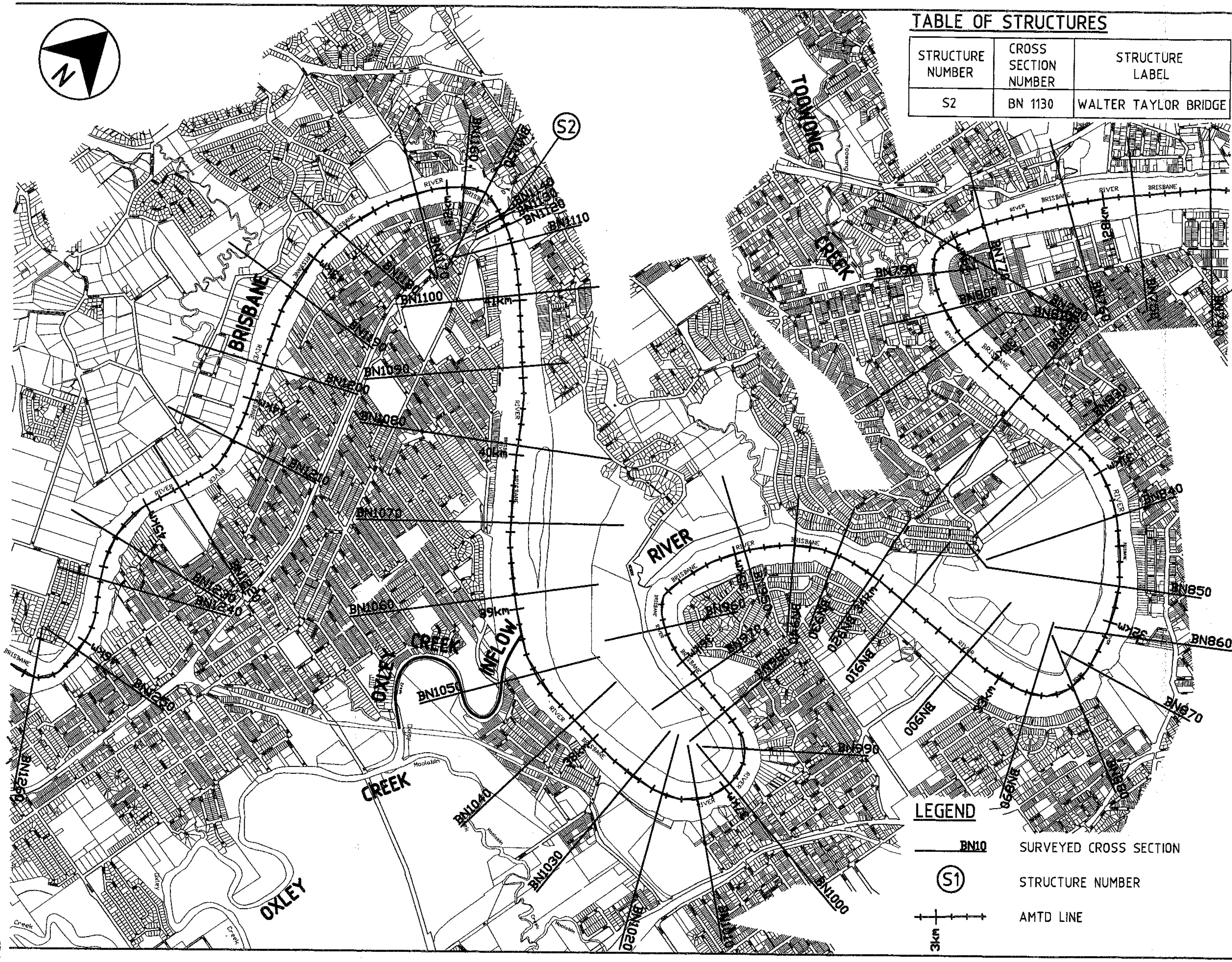


TABLE OF STRUCTURES

STRUCTURE NUMBER	CROSS SECTION NUMBER	STRUCTURE LABEL
S2	BN 1130	WALTER TAYLOR BRIDGE

LEGEND

- BN10 — SURVEYED CROSS SECTION
- (S1) — STRUCTURE NUMBER
- AMTD LINE (3km)

CROSS SECTION NUMBER	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 740	1051.360	27.300
BN 750	1050.860	27.800
BN 760	1050.430	28.230
BN 770	1049.870	28.790
BN 780	1049.590	29.070
BN 790	1049.370	29.290
BN 800	1049.120	29.540
BN 810	1048.890	29.770
BN 820	1048.375	30.285
BN 830	1047.915	30.745
BN 840	1047.350	31.310
BN 850	1046.900	31.760
BN 860	1046.580	32.080
BN 870	1046.340	32.320
BN 880	1046.180	32.480
BN 890	1045.885	32.775
BN 900	1045.400	33.260
BN 910	1044.860	33.800
BN 920	1044.605	34.055
BN 930	1044.340	34.320
BN 940	1044.060	34.600
BN 950	1043.725	34.935
BN 960	1042.910	35.750
BN 970	1042.515	36.145
BN 980	1042.235	36.425
BN 990	1041.960	36.700
BN 1000	1041.700	36.960
BN 1010	1041.460	37.200
BN 1020	1041.230	37.430
BN 1030	1041.010	37.650
BN 1040	1040.490	38.170
BN 1050	1040.090	38.570
BN 1060	1039.565	39.095
BN 1070	1039.100	39.560
BN 1080	1038.600	40.060
BN 1090	1038.085	40.575
BN 1100	1037.625	41.035
BN 1110	1037.285	41.375
BN 1120	1037.175	41.485
BN 1130	1037.110	41.550
BN 1140	1037.090	41.570
BN 1150	1036.915	41.745
BN 1160	1036.770	41.890
BN 1170	1036.460	42.200
BN 1180	1035.900	42.760
BN 1190	1035.414	43.246
BN 1200	1034.890	43.770
BN 1210	1034.370	44.290
BN 1220	1033.900	44.760
BN 1230	1033.370	45.290
BN 1240	1033.080	45.580
BN 1250	1032.585	46.075
BN 1260	1032.230	46.430

0 0.25 0.5 0.75 1.0 1.25 km

PLOT SCALE: 1=25

DATE: 14/3/97

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FIGURE 6.1e

BRISBANE RIVER FLOOD STUDY

MIKE 11 MODEL STRUCTURE

CROSS SECTION NUMBER	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 1260	1032.230	46.430
BN 1270	1031.995	46.665
BN 1280	1031.700	46.960
BN 1290	1031.260	47.400
BN 1300	1030.870	47.790
BN 1310	1030.220	48.440
BN 1320	1029.680	48.980
BN 1330	1029.200	49.460
BN 1340	1028.760	49.900
BN 1350	1028.720	49.940
BN 1360	1028.680	49.980
BN 1370	1028.180	50.480
BN 1380	1027.680	50.980
BN 1390	1027.160	51.500
BN 1400	1026.900	51.760
BN 1410	1026.680	51.980
BN 1420	1026.170	52.490
BN 1430	1025.590	53.070
BN 1440	1025.360	53.300
BN 1450	1025.070	53.590
BN 1460	1024.563	54.097
BN 1470	1024.080	54.580
BN 1480	1023.570	55.090
BN 1490	1023.040	55.620
BN 1500	1022.575	56.085
BN 1510	1022.105	56.555
BN 1520	1021.895	56.765
BN 1530	1021.715	56.945
BN 1540	1021.539	57.121
BN 1550	1021.095	57.565
BN 1560	1020.830	57.830
BN 1570	1020.525	58.135
BN 1580	1020.115	58.545
BN 1590	1019.865	58.795
BN 1600	1019.490	59.170

TABLE OF STRUCTURES

STRUCTURE NUMBER	CROSS SECTION NUMBER	STRUCTURE LABEL
S1	BN 1350	CENTENARY BRIDGE

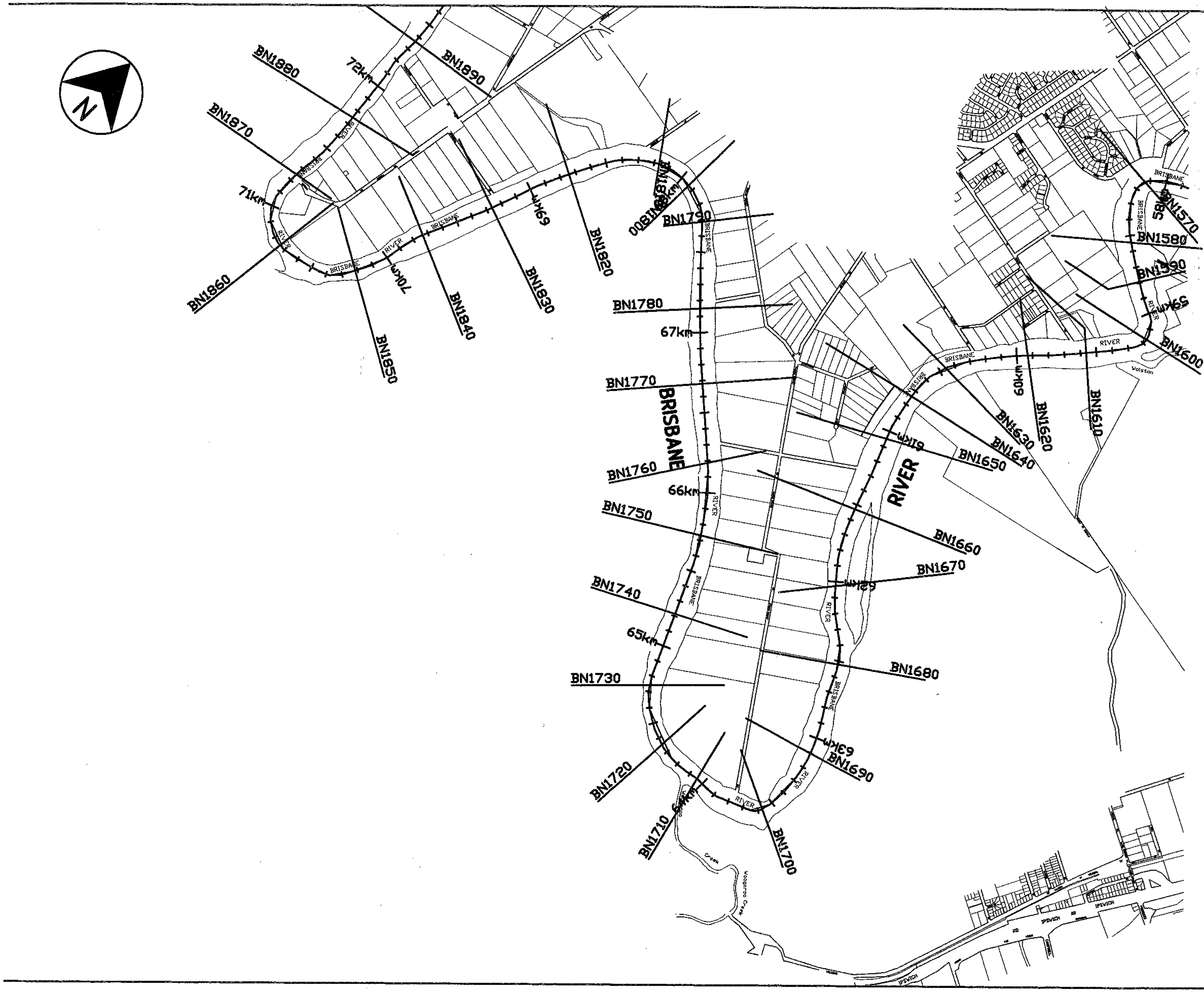
LEGEND

- BN10 — SURVEYED CROSS SECTION
- (S1) — STRUCTURE NUMBER
- 3km — AMTD LINE

0 0.25 0.5 0.75 1.0 1.25 km

PLOT SCALE: 1=25

FIGURE 6.1f
BRISBANE RIVER FLOOD STUDY
MIKE 11 MODEL STRUCTURE



CROSS SECTION NUMBER	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 1600	1019.490	59.170
BN 1610	1019.095	59.565
BN 1620	1018.725	59.935
BN 1630	1018.200	60.460
BN 1640	1017.920	60.740
BN 1650	1017.610	61.050
BN 1660	1017.130	61.530
BN 1670	1016.640	62.020
BN 1680	1016.140	62.520
BN 1690	1015.560	63.100
BN 1700	1015.090	63.570
BN 1710	1014.610	64.050
BN 1720	1014.310	64.350
BN 1730	1013.910	64.750
BN 1740	1013.445	65.215
BN 1750	1012.935	65.725
BN 1760	1012.475	66.185
BN 1770	1011.980	66.680
BN 1780	1011.510	67.150
BN 1790	1010.980	67.680
BN 1800	1010.725	67.935
BN 1810	1010.490	68.170
BN 1820	1009.720	68.940
BN 1830	1009.400	69.260
BN 1840	1008.925	69.735
BN 1850	1008.445	70.215
BN 1860	1007.920	70.740
BN 1870	1007.410	71.250
BN 1880	1006.910	71.750

LEGEND

BN10 — SURVEYED CROSS SECTION

(S1) — STRUCTURE NUMBER

3km — AMTD LINE

0 0.25 0.5 0.75 1.0 1.25 km

PLOT SCALE: 1=25

FIGURE 6.1g
BRISBANE RIVER FLOOD STUDY
MIKE 11 MODEL STRUCTURE

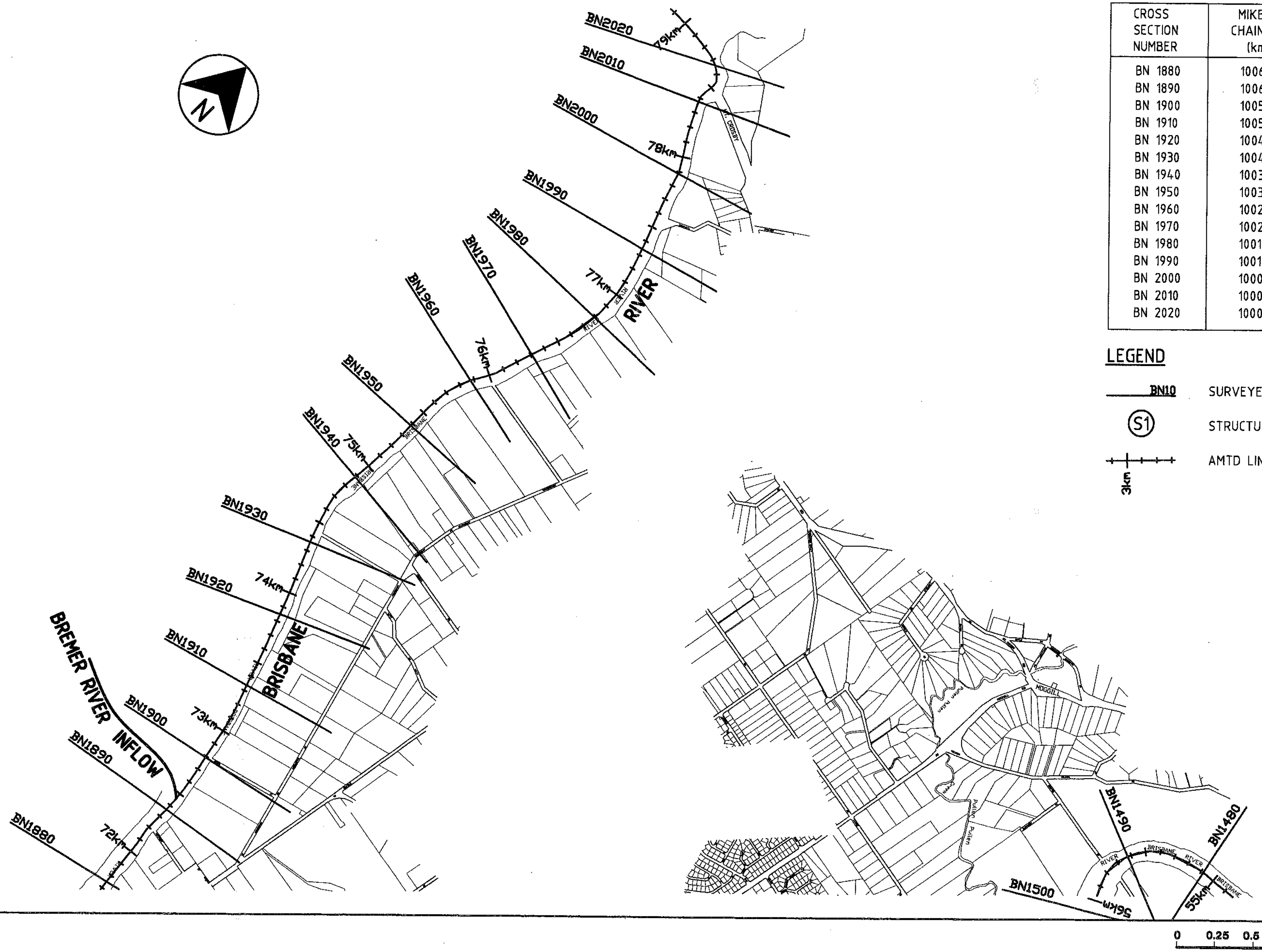
CROSS SECTION NUMBER	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 1880	1006.910	71.750
BN 1890	1006.300	72.360
BN 1900	1005.870	72.790
BN 1910	1005.325	73.335
BN 1920	1004.810	73.850
BN 1930	1004.300	74.360
BN 1940	1003.775	74.885
BN 1950	1003.275	75.385
BN 1960	1002.785	75.875
BN 1970	1002.350	76.310
BN 1980	1001.865	76.795
BN 1990	1001.315	77.345
BN 2000	1000.775	77.885
BN 2010	1000.285	78.375
BN 2020	1000.000	78.660

LEGEND

BN10 SURVEYED CROSS SECTION

S1 STRUCTURE NUMBER

3km AMTD LINE



PLOT SCALE: 1=25

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FIGURE 6.2
BRISBANE RIVER FLOOD STUDY
MANNINGS HYDRAULIC MODEL CHANNEL ROUGHNESS
AND RELATIVE RESISTANCE VALUES

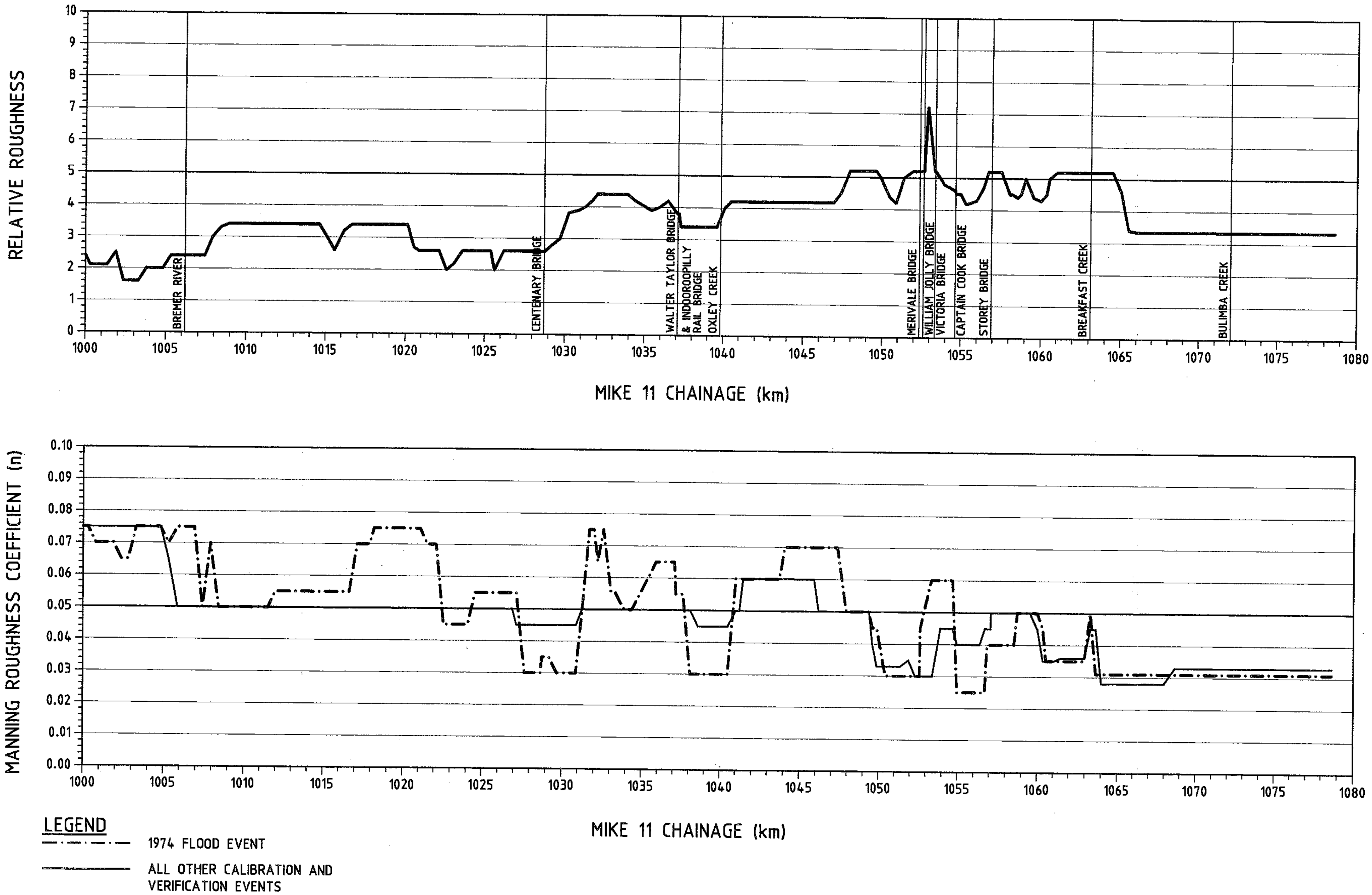

FIGURE 6-3

BRISBANE RIVER FLOOD STUDY
HYDROLOGIC AND HYDRAULIC MODEL CONSISTENCY
- JANUARY 1974

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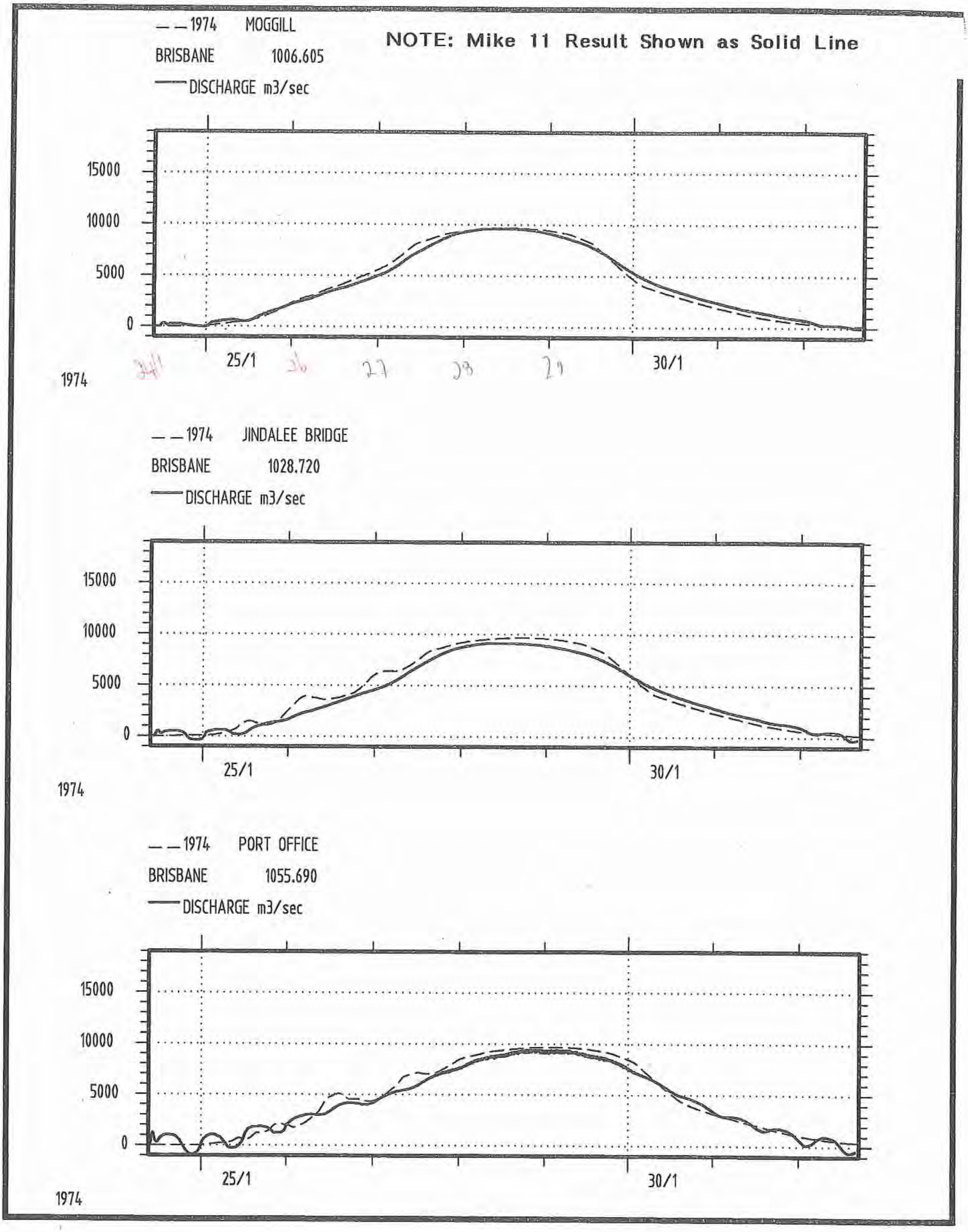

FILE NAME: 4157-222
DISK N°: G:\

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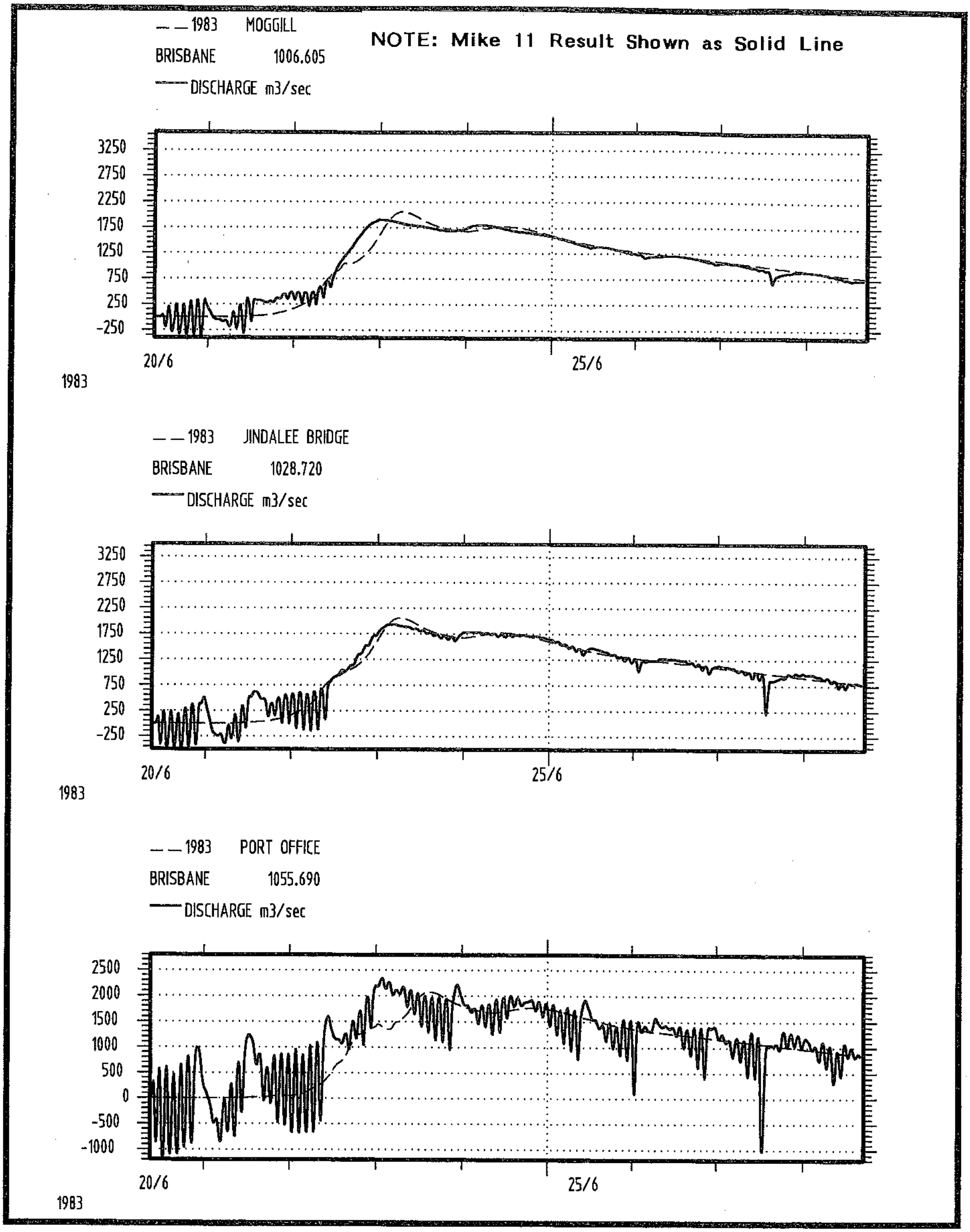
FIGURE 6-4

BRISBANE RIVER FLOOD STUDY
HYDROLOGIC AND HYDRAULIC MODEL CONSISTENCY
- JUNE 1983



FILE NAME: 4157-223 DISK N°: G:\ JOB N°: T004157 DATE: 17-7-98
PL… …ALE: …

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FIGURE 6-5

BRISBANE RIVER FLOOD STUDY
HYDROLOGIC AND HYDRAULIC MODEL CONSISTENCY
- LATE APRIL 1989

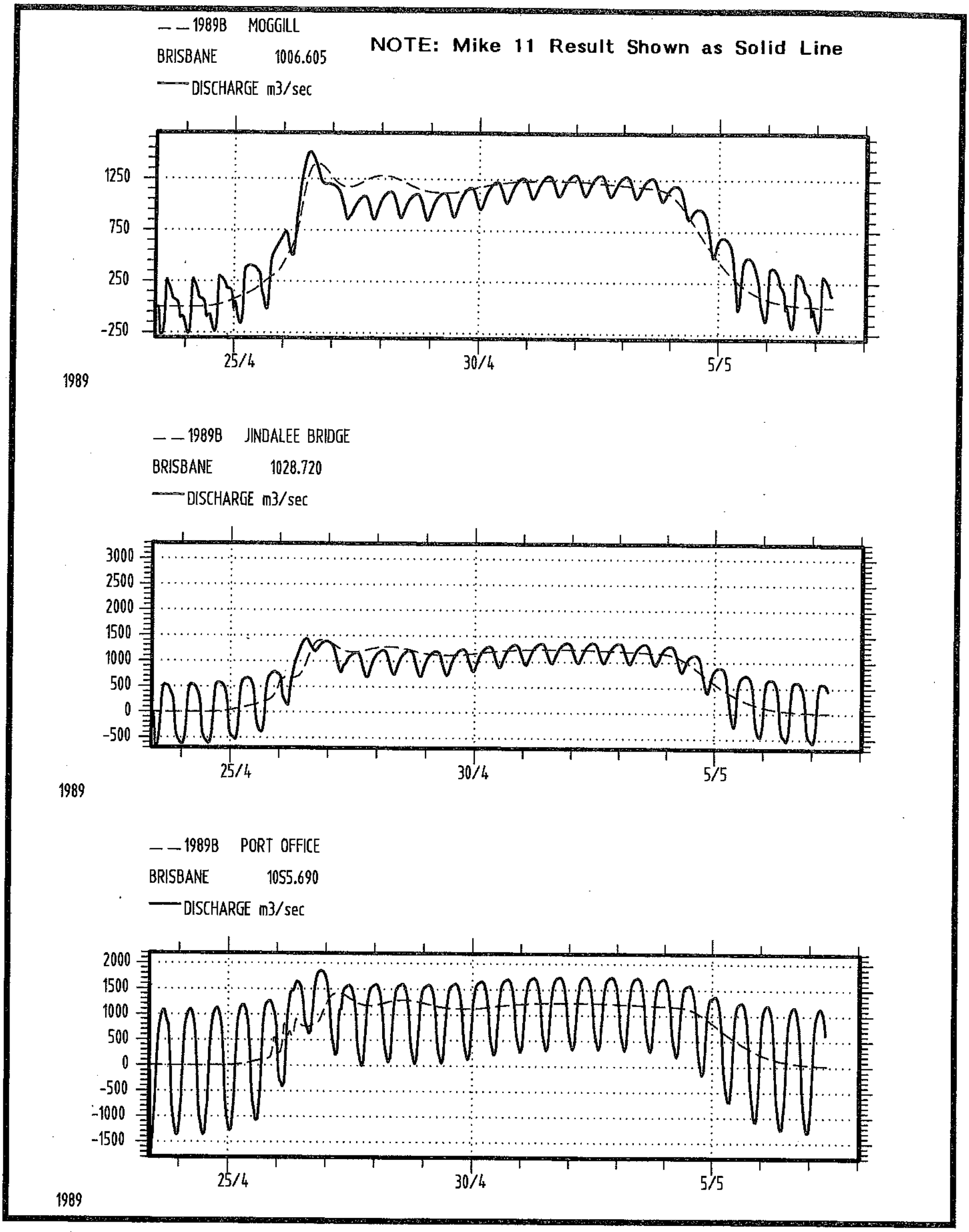
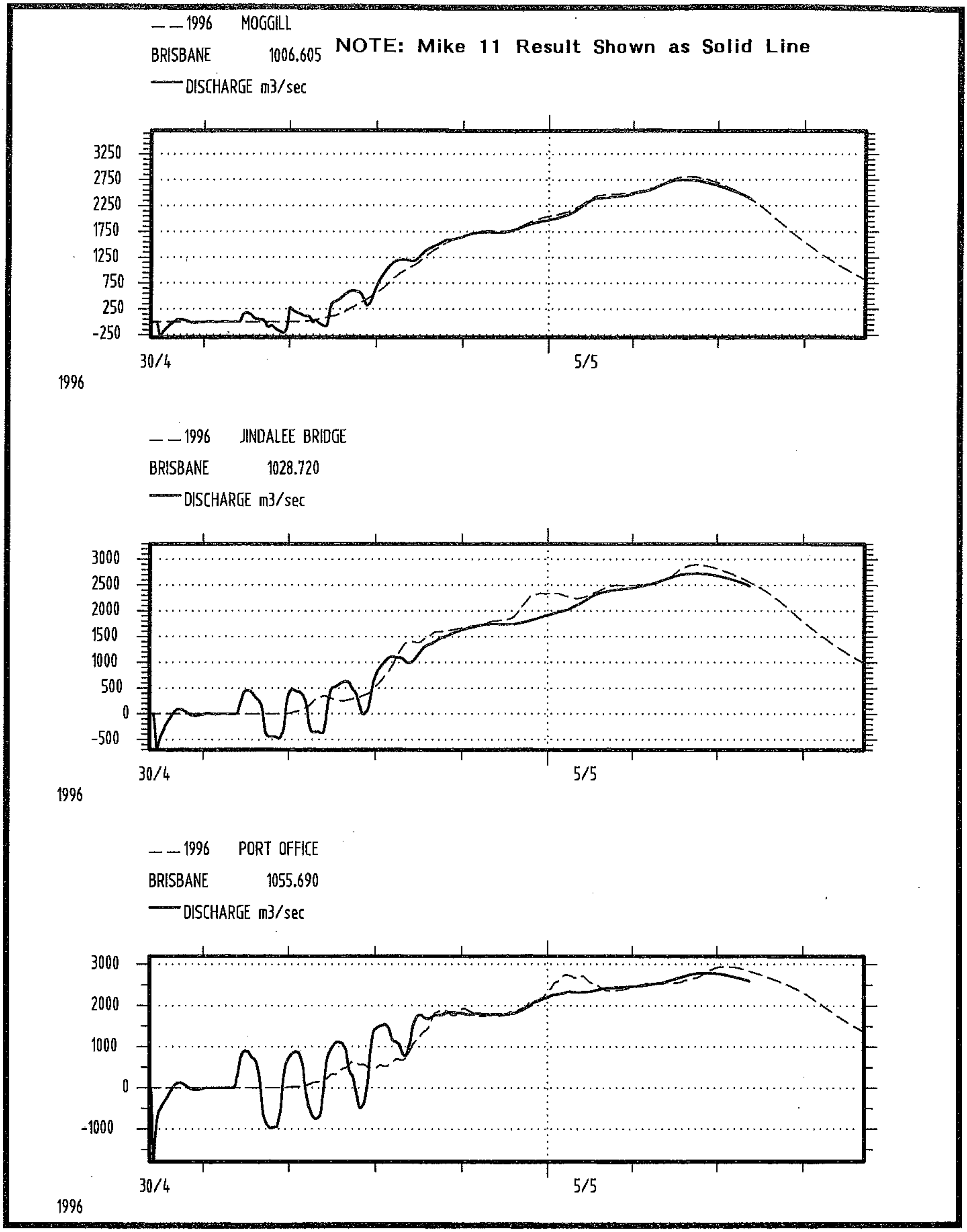


FIGURE 6-6

BRISBANE RIVER FLOOD STUDY
HYDROLOGIC AND HYDRAULIC MODEL CONSISTENCY
- MAY 1996

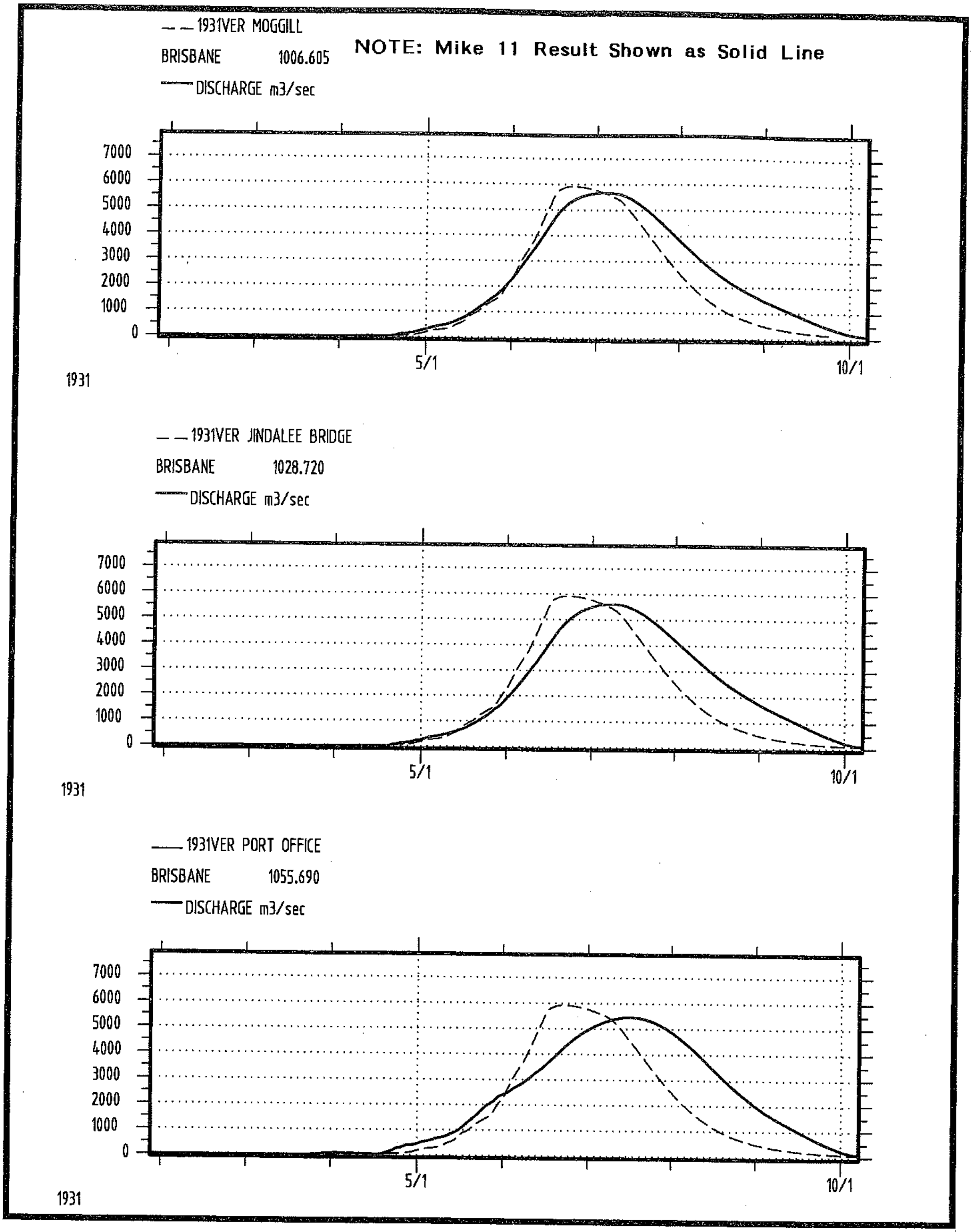


FILE NAME: 4157-225 PLOT SCALE: 1=1 DISK No: G:\ JOB No: T00457 DATE: 17-2-98

FIGURE 6-7

SINCLAIR KNIGHT MERZ

BRISBANE RIVER FLOOD STUDY
HYDROLOGIC AND HYDRAULIC MODEL CONSISTENCY
- FEBRUARY 1931

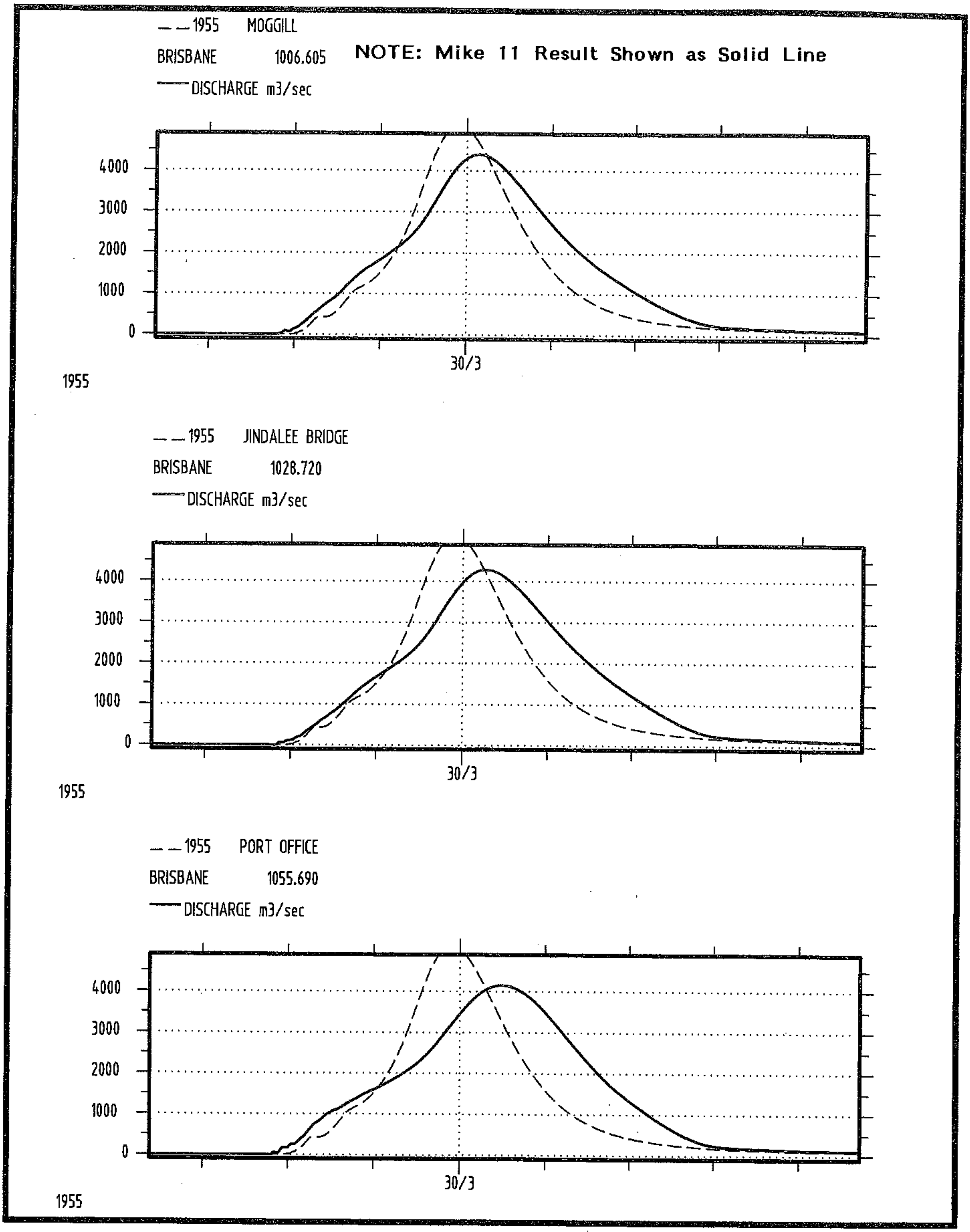


FILE NAME: 4157-226 DISK N°: G:\ JOB N°: T004157 DATE: 17-7-98
P CALE:

SINCLAIR KNIGHT MERZ

FIGURE 6-8

BRISBANE RIVER FLOOD STUDY
HYDROLOGIC AND HYDRAULIC MODEL CONSISTENCY
- MARCH 1955

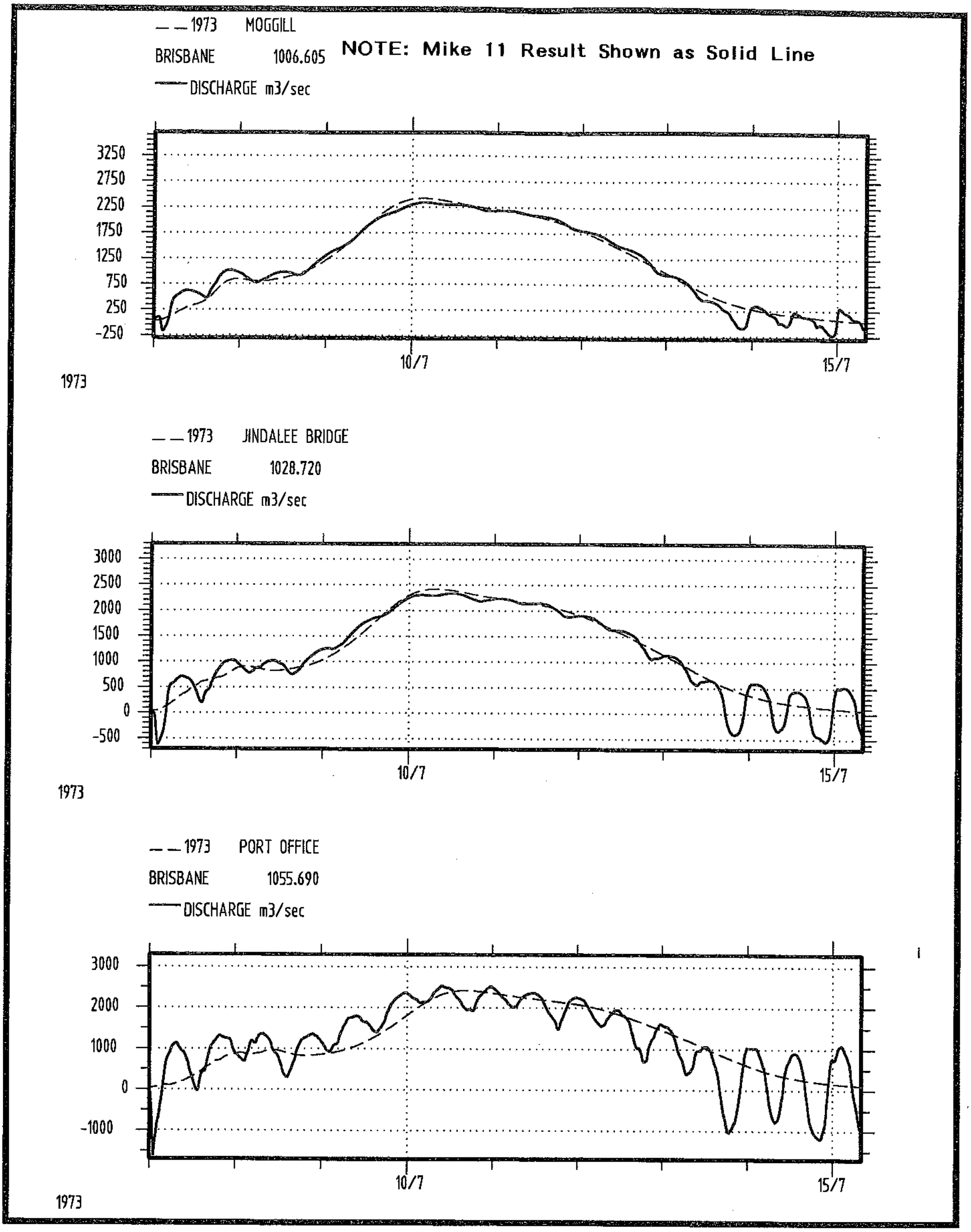


FILE NAME: 4157-227 DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98
PL :ALE:

FIGURE 6-9

SINCLAIR KNIGHT MERZ

BRISBANE RIVER FLOOD STUDY
HYDROLOGIC AND HYDRAULIC MODEL CONSISTENCY
- JULY 1973

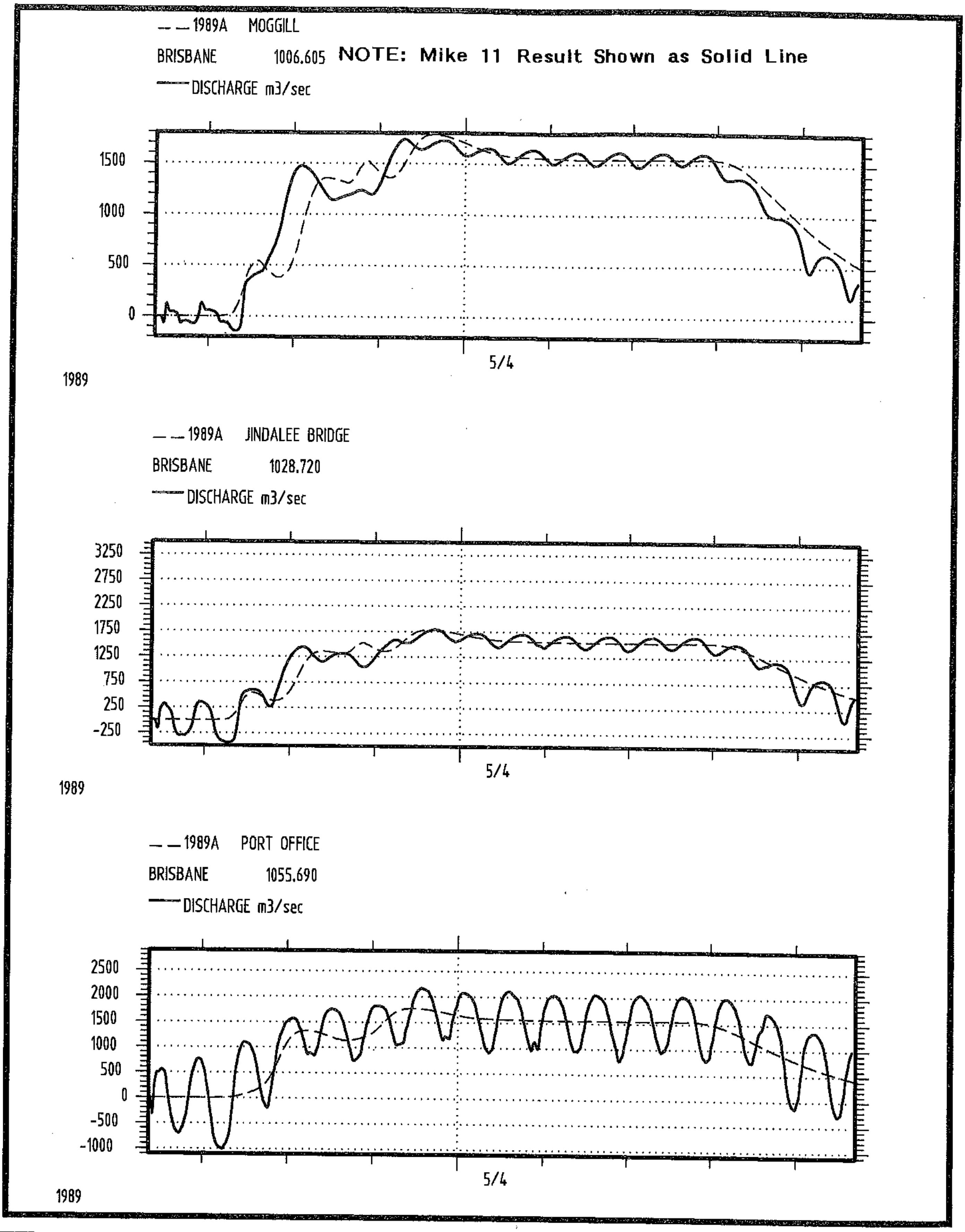


FILE NAME: 4157-228 DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98
PL.. SCALE: ..

SINCLAIR KNIGHT MERZ

FIGURE 6-10

BRISBANE RIVER FLOOD STUDY
HYDROLOGIC AND HYDRAULIC MODEL CONSISTENCY - EARLY APRIL 1989



PLOT SCALE: 1=1

7. Design Events Hydrology

7. Design Events Hydrology

7.1 Design Storm Requirements

An analysis of design storm events was performed to establish design flood characteristics in the Brisbane River. A range of average recurrence intervals (ARI) from 1 in 2 years ARI to the Probable Maximum Precipitation (PMP) were assessed. Temporal patterns and rainfall intensities were based on Australian Rainfall and Runoff (1987) guidelines and hydrologic data supplied by the Department of Natural Resources.

This assessment considers only the existing extent of urbanisation for the Brisbane River Catchment.

7.2 Catchment Urbanisation

The majority of the Brisbane River Catchment was considered to be rural and was therefore allocated a zero percent impervious. In the Brisbane Metropolitan area the assumed percentage impervious varied from 20 to 50% to account for the catchment urbanisation.

The potential effect of urbanisation in the middle and upper reaches of the river even in the long term is likely to be negligible. However, there is potential for significant urbanisation in the lower reaches of the river. Future urbanisation in Brisbane and surrounding areas would cause the peak runoff from these areas to occur earlier than at present. As the time of concentration of the Brisbane River as a whole is large compared to that of the urban areas of Brisbane, it is slightly conservative to retain the present level of urbanisation rather than the potential ultimate level.

7.3 Design Event Rainfall

Design Event rainfall data was required to determine inflow hydrographs for the calculation of flood profiles in the Brisbane River. The distribution of rainfall over the catchment for the calibration events identified that significant variations of rainfall occurred over the catchment. This variation in rainfall was attributed to the size and topography of the catchment.

Design rainfall intensities were derived using Intensity-Frequency-Duration (IFD) techniques used in Chapter 2 of Australian Rainfall and Runoff 1987 (AR&R). Design rainfall intensities were derived at 130 rainfall gauge locations throughout the catchment to account for the variation of rainfall. Isoheytal maps for the catchment were derived for recurrence intervals ranging from 2 year ARI to 100 Year ARI using CivilCAD and the calculated design rainfalls.

The following figures present Isoheytal maps and rainfall depths for critical duration storms ranging from 2 year ARI to 100 year ARI.

- **Figure 7-1 - 2 Year ARI 30 Hour Duration Rainfall Event - Brisbane River Catchment.**
- **Figure 7-2 - 5 Year ARI 30 Hour Duration Rainfall Event - Brisbane River Catchment.**
- **Figure 7-3 - 10 Year ARI 30 Hour Duration Rainfall Event - Brisbane River Catchment.**
- **Figure 7-4 - 20 Year ARI 30 Hour Duration Rainfall Event - Brisbane River Catchment.**
- **Figure 7-5 - 50 Year ARI 30 Hour Duration Rainfall Event - Brisbane River Catchment.**
- **Figure 7-6 - 100 Year ARI 30 Hour Duration Rainfall Event - Brisbane River Catchment.**

For large catchments it is unlikely that rainfall intensity will remain constant across the catchment. To account for this variation, AR&R suggests use of an areal reduction factor which reduces the depth of rainfall over the catchment.

The problem with this method is that the areal reduction factor method presented in AR&R is based on work conducted in the United States and virtually no work has been conducted for durations greater than 24 hours or catchments with areas greater than 1 000 km^2.

Since the Brisbane River Catchment is approximately 13 500 km^2 and has a critical duration of approximately 24 hours it was considered that spatial variation would have to be accounted for using an alternate method.

As previously stated design rainfalls were calculated at approximately 130 locations over the entire catchment. These rainfalls were then used to calculate rainfall depths at the centroid of each sub-area (ie approximately 250 locations) using interpolation facilities within CIVILCAD. This method ensured that the majority of rainfall variation was accounted for by a blanket coverage of the catchment which in turn minimised the effects of rainfall variation.

Given that the total catchment area of the Brisbane River is approximately 13 500 km^2 and that this area has been broken down into about 250 sub areas, then the average sub area is around 50 km^2. The areal reduction factor for an area of 50 km^2 (24 hour duration) was determined to be 0.98. Since the areal reduction factor was almost equal to one, areal reduction factors were not applied to any of the sub-areas. The rainfall intensities used in this study are therefore considered to be slightly conservative.

Australian Rainfall and Runoff temporal patterns for zone 3 apply to the Brisbane River Catchment.

The Probable Maximum Precipitation (PMP) rainfall depth and corresponding temporal pattern were provided by the Bureau of Meteorology for the DNR study. The adopted PMP rainfall depth for the Brisbane River Catchment is presented in **Table 7-1 - PMP Rainfall Depth, Brisbane River Catchment.**

Table 7-1 - PMP Rainfall Depth - Brisbane River Catchment

Duration	PMP Rainfall Depth
12	370
24	530
48	680
72	830
96	1010
120	1050
144	1070
168	1160

Review of the relevant reports and files suggested that PMP investigations conducted by the Department of Natural Resources used the total PMP rainfall depth over the entire catchment. This method provides a conservative result which may be applicable when considering dam safety. For this study spatial variation was accounted for by use of **Figure D-1 - Generalised Tropical Storm Method (GTSM) Design Isohyetal Pattern for the Distribution of PMP for Areas > 2 000 km^2**. The procedural method for the GTSM is also provided in **Appendix D - Generalised Tropical Storm Method.**

An analysis to determine the critical duration PMP rainfall event was performed. The critical duration storm for the PMP was found to be 168 hours. Peak discharges for the durations ranging from 24 hour to 168 hour storms are presented in **Table 7-2 - Peak Discharges for PMP at Lowood, Moggill & Port Office**. A plot of these results are presented in **Figure 7-7 - Critical Duration Storms at Lowood, Moggill & Port Office.**

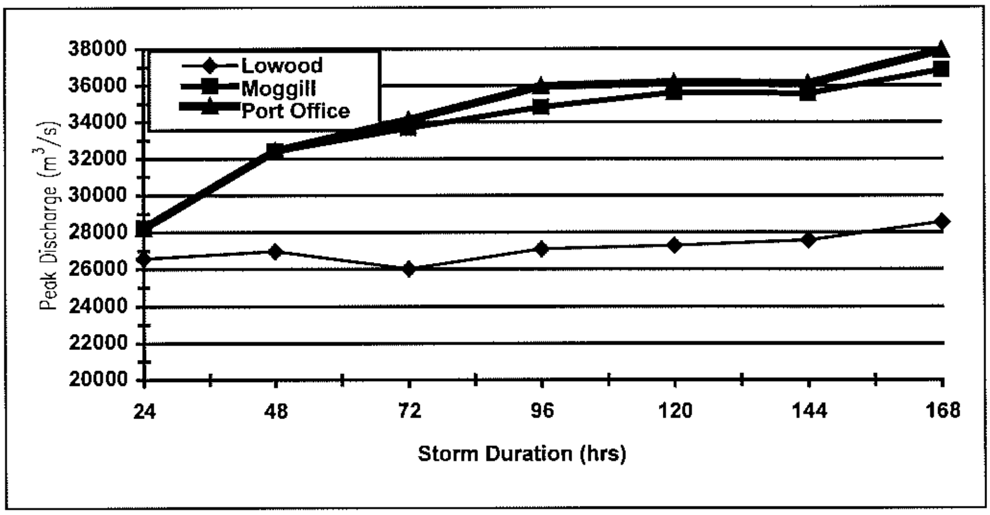
Table 7-2 - Peak Discharges for PMP at Lowood, Moggill & Port Office

Duration (hrs)	Lowood (m^3/s)	Moggill (m^3/s)	Port Office (m^3/s)
24	26580	28230	28230
48	26980	32410	32430
72	26020	33680	34130
96	27100	34830	35960
120a	27290	35620	36160
144a	27580	35570	36110
168c	28560	36860	37910

Note: The subscripts for the 120, 144 and 168 hour duration storms relate to the adopted temporal pattern which produced the peak discharge.

As previously mentioned the critical storm duration for the PMP event was 168 hours with only six percent variation in peak discharges predicted for the range of longer durations from 96 hours to 168 hours. As there was a significant difference between the critical durations found for the 100 year ARI and PMP events, a number of checks were conducted to ensure basic data had been interpreted and applied correctly.

Figure 7-7 - Critical Duration Storms at Lowood, Moggill & Port Office



The average intensities for each PMP duration were examined to ensure that the average rainfall intensity decreased as the storm duration increased.

The maximum rainfall intensity within each duration was checked to make sure that the temporal pattern was reasonably uniform without any uncharacteristic high intensities contained throughout the duration of the rainfall event.

A final check of sensitivity of time increment within the duration was conducted. This made little difference to the peak discharges and therefore it was considered that the effects of time increment were negligible.

The RAFTS model output for these events showed that the larger volumes of water associated with longer duration events caused peak discharges to occur over a longer period of time which resulted in the coincidence of peak discharges at major confluences. Conversely, the coincident peak effects for the shorter duration events were not as pronounced hence resulting in smaller peak discharges for the shorter duration storms.

Previous investigations conducted by the Department of Natural Resources found that the critical duration storm for the PMP was 120 hours and the critical duration storm for the 100 year ARI event was 24 hours. As the DNR found that there was significant differences in duration between the two recurrence intervals, it was considered that this was inherent of the catchment configuration and the rainfall variability in the catchment and the 168 hour event was adopted as the critical duration storm for the PMP event for this study. Initial and continuing losses have been applied which is consistent with the parameter set used for the 100 year ARI storm. Investigations carried out by the DNR used a continuing loss rate of 2.5 mm/hr and found that the peak discharge at the Port Office for the PMP was 31950 m^3/s. A continuing loss of 2.5 mm/hr was applied to the Sinclair Knight Merz model (120 hour storm) and the resulting peak discharge for the PMP at the Port Office was estimated to be 29960 m^3/s. This comparison shows that the Sinclair Knight Merz result is within 7% of the DNR result.

The adoption of the 168 hour duration storm for the PMP presented a problem in the calculation of the intermediate flood events if a rainfall based method was used. Since the critical duration of the PMP differed from the 100 year and 50 year ARI events, an extrapolation to 168 hours would have had to be done for the 100 and 50 year IFD curves. As no recognised methodology was available, the rainfall based calculation of intermediate events was not considered further.

An alternate method was to use peak discharges from the PMP, 100 year and 50 year ARI events using the methodology set down in Australian Rainfall and Runoff (AR&R). This method eliminated the problems associated with varying duration events. The intermediate events were calculated using this method at Lowood, Moggill and Port Office. The following figures illustrate the peak discharges with respect to recurrence interval at Lowood, Moggill and the Port Office.

- **Figure 7-8 - Design Peak Discharges at Lowood.**
- **Figure 7-9 - Design Peak Discharges at Moggill.**
- **Figure 7-10 - Design Peak Discharges at Port Office.**

It should be noted that the stage-storage and stage-discharge curves within RAFTS were extended to account for the larger design flood events. The extension of these curves was done assuming vertical banks and hence the only additional storage was confined to within the creek proper. The stage discharge curves were extended linearly following the general trend of the calibrated curves. These assumptions were considered to be a conservative estimate however given the available information (ie cross sectional and topograpical) these assumptions were considered to be appropriate.

The return period for the PMP was determined to be 100 000 years ARI using **Table 13.1 of AR&R**. This calculation was performed using the Generalised Method with a catchment area of approximately 13 500 km^2.

Figure 7-8 - Design Peak Discharges at Lowood

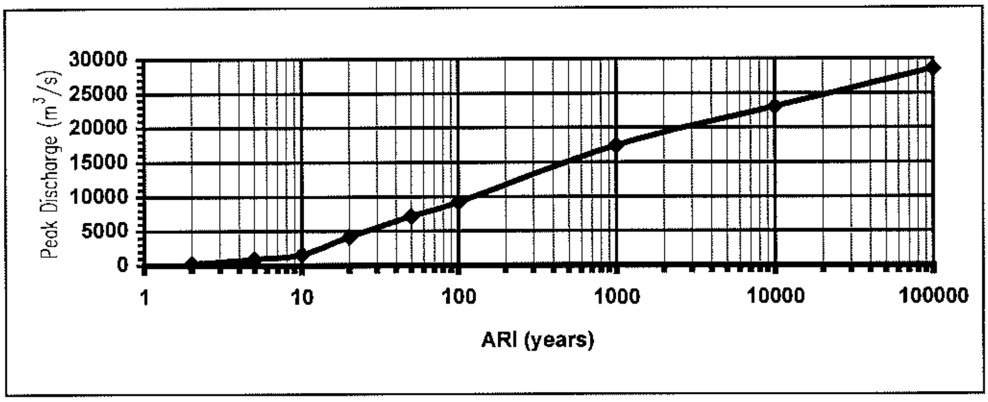


Figure 7-9 - Design Peak Discharges at Moggill

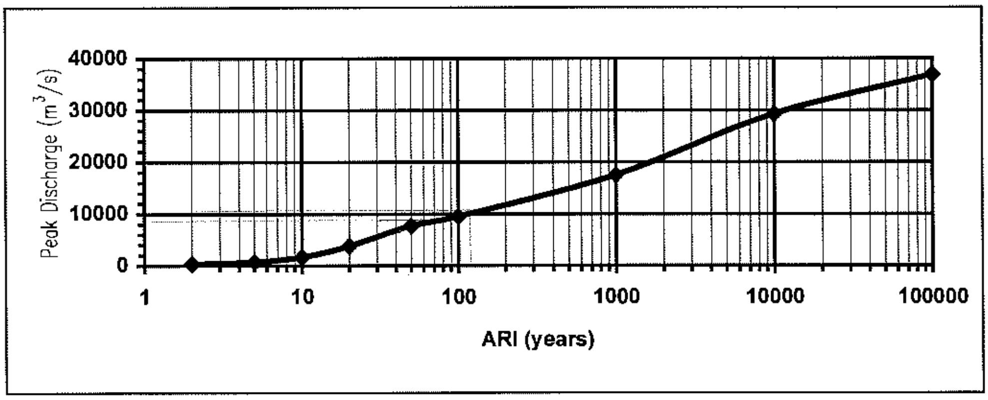
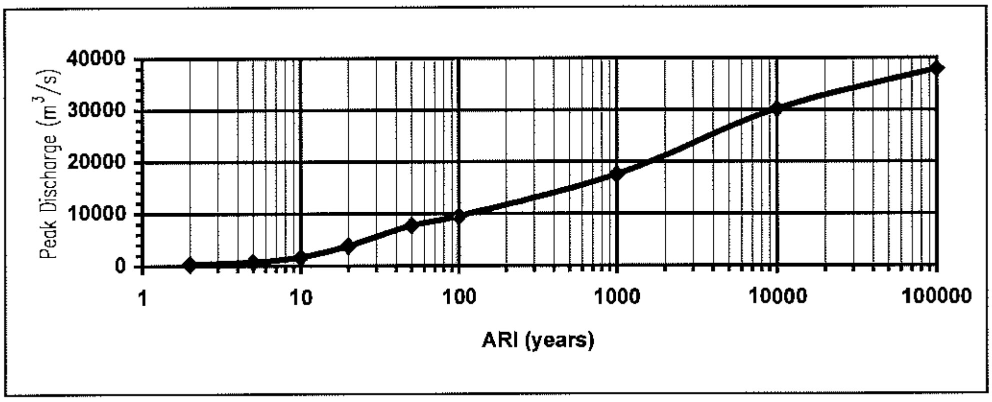


Figure 7-10 - Design Peak Discharges at Port Office



Once the peak discharges for these events were calculated, an average ratio was determined and the PMP rainfall depths were scaled and applied to the catchment. The 168 hour temporal pattern was adopted and the scaled intermediate storms were run through RAFTS. These scaling factors were adjusted for each recurrence interval until a good match between the AR&R peak calculated discharges and the peak RAFTS discharges was achieved. **Table 7-3 - Peak Predicted Discharges for the PMF, 10000, and 2000 Year ARI Events at Lowood, Moggill and Port Office** and **Table 7-4 Peak Predicted Discharges for the 1000, 500 and 200 Year ARI Events at Lowood, Moggill and Port Office** present the outcomes of this analysis.

Table 7-3 - Peak Predicted Discharges for the PMF, 10000 and 2000 Year ARI Events at Lowood, Moggill and Port Office

Location	PMF			10000 Year ARI			2000 Year ARI		
	Calc (m^3/s)	RAFTS (m^3/s)	% error	Calc (m^3/s)	RAFTS (m^3/s)	% error	Calc (m^3/s)	RAFTS (m^3/s)	% error
Lowood	-	28560	-	25090	23020	-8.3	18250	17880	-2.0
Moggill	-	36860	-	28140	29300	+4.1	18660	19490	+4.4
Port Office	-	37910	-	28640	30140	+5.2	18800	19500	+3.7

Table 7-4 - Peak Predicted Discharges for the 1000, 500, 200 Year ARI Events at Lowood, Moggill and Port Office

Location	1000 Year ARI			500 Year ARI			200 Year ARI		
	Calc (m^3/s)	RAFTS (m^3/s)	% error	Calc (m^3/s)	RAFTS (m^3/s)	% error	Calc (m^3/s)	RAFTS (m^3/s)	% error
Lowood	17400	16290	-6.4	12840	11600	-9.7	10100	9420	-6.7
Moggill	17480	17540	+0.4	13080	13910	+6.4	10440	10870	+4.1
Port Office	17580	17550	-0.2	13120	14020	+6.8	10450	10880	+4.1

Table 7-3 and 7-4 show that the calculated discharges are within 10% of the RAFTS predicted discharges at the three locations hence they were considered to be acceptable.

7.4 Flood Frequency Analysis

A flood frequency analysis was performed to ensure consistency between the rainfall and streamflow based estimates of design discharges. The analysis also produced appropriate rainfall loss rates to ensure consistency between the two analysis methods.

Flood frequency analyses were conducted at Moggill, Lowood and Brisbane City at the Port Office Gauge. The omission of Jindalee for the analyses was due to limited available historical information at the site.

The locations for the flood frequency analyses are presented in **Figure 7-11 - Flood Frequency Analysis Location Layout**.

7.5 Historical Data

Historical events were derived from streamflow data recorded at Bureau of Meteorology gauging stations for Brisbane City (Port Office gauge) and Moggill. This data was in the form of peak instantaneous water levels which were converted to discharges using rating curves provided by the Bureau of Meteorology. The data for Lowood was obtained from the Department of Natural Resources in the form of peak instantaneous monthly discharges.

The Brisbane City (Port Office) gauge is influenced by tidal fluctuations and hence rating curves at the Port Office gauge vary to account for the changing tidal conditions. To determine peak discharges during flooding, it was therefore necessary to know the corresponding tide level at the time and date for each event. This information was not available. Discharges were determined by using two rating curves supplied by the Bureau of Meteorology. These rating curves used the following tailwater levels:

(i) -0.15 m AHD, and
(ii) 1.85 m AHD (highest Astronomical Tide +0.15 m).

One of the problems associated with performing the flood frequency analysis for this catchment was the influence that Wivenhoe and Somerset Dams would have on the downstream locations. To minimise these effects the flood frequency analysis was performed using a data series prior to the construction of Wivenhoe Dam (1985).

To account for the effects of Somerset Dam (constructed in 1943), it was necessary to adjust the series of peak discharges. As the adopted data series ended prior to 1985, the effects of Wivenhoe Dam did not need to be considered. However, all data between 1943 and 1985 had to be adjusted to remove the effects of the construction of Somerset Dam.

In order to establish a relationship between the flow upstream of Somerset Dam and flow downstream of the dam site prior to its construction, peak monthly discharges obtained at Woodford (upstream) were plotted against the discharge at the Silverton Gauge (downstream), prior to 1943. A line of best fit was then formulated and a correlation of 91.5% was achieved. This correlation is graphically represented in **Figure E-1 - Relationship Between Discharges of Woodford and Silverton**. The data for Woodford and Silverton used in this study and the resulting adjustment factors due to the construction of Somerset Dam are illustrated in **Appendix E - Adjustment of Historical Streamflows to Account for the Effects of Somerset Dam.** Historical data and adjusted discharges are presented in the following tables:

- **Table E-1 - Calculation of Adjustment Factor for Post Wivenhoe Dam Flows**
- **Table E-2 - Historical Data at Woodford and Silverton (1920 - 1985)**
- **Table E-3 - Historical and Adjusted Data at Moggill (1965 - 1983)**
- **Table E-4 - Historical and Adjusted Data at Port Office (1841 - 1974)**
- **Table E-5 - Historical and Adjusted Discharge at Lowood.**

Each of the corresponding adjusted values were applied at Lowood, Moggill and the Port Office and Flood Frequency Curves were constructed for the no dams effective catchment (ie effects of Wivenhoe and Somerset Dams removed).

7.6 Construction of Flood Frequency Curves

In constructing the flood frequency curves, annual series of peak discharges were utilised in all analyses. An annual series was adopted because of the emphasis of the study in regard to design flood estimation involving ARI's of greater than 10 years. This is in accordance with the recommendations of Chapter 10 of Australian Rainfall and Runoff, (1987).

The flood frequency curves for the annual series data were constructed in accordance with the methods outlined in Australian Rainfall and Runoff, 1987. For each location the historical peak discharges were ranked in descending order and the plotting position for each discharge was then calculated. Using the ranked discharges and their associated plotting positions, the values were plotted on Log Normal paper and the flood frequency curves were then fitted by eye.

A Log-Pearson Type III distribution together with 5% and 95% confidence limits was also fitted to all of the annual series data using the procedures outlined in Chapter 10 of Australian Rainfall and Runoff, 1987. The fit by eye curve was adopted at each location however the Log Pearson Distribution and 5% and 95% confidence limits have been plotted for comparison.

The flood frequency curves generated from the historical annual data series at the three nominated locations are presented in the following figures:

- **Figure 7-12 - Flood Frequency Curve at Lowood - No Dams Effective**
- **Figure 7-13 - Flood Frequency Curve at Moggill - No Dams Effective**
- **Figure 7-14 - Flood Frequency Curve at Port Office (-0.15 m AHD) - No Dams Effective** and
- **Figure 7-15 - Flood Frequency Curve at Port Office (1.85m AHD, Highest Astronomical Tide +0.15 m) - No Dams Effective**.

Results for the fit by eye peak discharge estimates are presented in the following tables:

- **Table 7-5 - Flood Frequency Estimates at Lowood - No Dams Effective**
- **Table 7-6 - Flood Frequency Estimates at Moggill - No Dams Effective**
- **Table 7-7 - Flood Frequency Estimates at Port Office (-0.15 m AHD) - No Dams Effective** and
- **Table 7-8 - Flood Frequency Estimates at Port Office (1.85 m AHD, - Highest Astronomical Tide +0.15 m) - No Dams Effective**

Two flood frequency curves were generated at the Port Office Gauge, incorporating the two tide events mentioned previously.

Table 7-5 - Flood Frequency Estimates at Lowood - No Dams Effective

AEP %	ARI (years)	FFA Fit by Eye Estimate (m^3/s
50	2	800
20	5	2 900
10	10	3 800
5	20	5 100
2	50	6 900
1	100	8 200

Data at the Lowood site was reasonable, with 75 years of data being available and 62 annual floods on record. Again, the annual series had to be adjusted for those years where there was very little or no flow recorded.

Table 7-6 - Flood Frequency Estimates at Moggill - No Dams Effective

AEP %	ARI (years)	FFA Fit by Eye Estimate (m^3/s
50	2	1 630
20	5	4 250
10	10	6 500
5	20	8 500
2	50	11 000
1	100	13 700

Data at the Moggill site was poor. A period of 18 years has been analysed, with only 11 annual floods in this time period recorded. The frequency chart thus had to be adjusted for the years of zero data in accordance with Section 10.7.2 of Australian Rainfall and Runoff, 1987.

Table 7-7 - Flood Frequency Estimates at Port Office (-0.15 m AHD) - No Dams Effective

AEP %	ARI (years)	FFA Fit by Eye Estimate (m^3/s
50	2	500
20	5	3 300
10	10	5 700
5	20	8 100
2	50	11 200
1	100	13 700

Table 7-8 - Flood Frequency Estimates at Port Office (Highest Astronomical Tide) - No Dams Effective

AEP %	ARI (years)	FFA Fit by Eye Estimate (m^3/s
50	2	-
20	5	1 000
10	10	3 500
5	20	6 250
2	50	9 750
1	100	12 500

The two flood frequency estimates for the Port Office Gauge are shown in **Tables 7-7** and **7-8**. Data from 1841 was available at this site, with 142 years of data being analysed and adjustments made for the years of zero or low flow.

7.7 Initial and Continuing Losses

To determine appropriate initial and continuing loss values, the RAFTS model was run excluding Wivenhoe and Somerset Dams. The critical storm duration was determined by running each ARI without losses.

Once the critical duration was determined initial and continuing losses were applied uniformly over the catchment until the peak discharges produced by RAFTS matched the peak discharges found in the fit by eye flood frequency curves (**Section 7.6**). The adopted loss parameters are presented in **Table 7-9 - Initial and Continuing Losses for Brisbane River Catchment**.

Table 7-9 - Initial and Continuing Losses for Brisbane River Catchment

AEP (Years)	Initial Loss (mm)	Continuing Loss (mm/hr)
PMP	0.0	0.0
10 000	0.0	0.0
2 000	0.0	0.0
1 000	0.0	0.0
500	0.0	0.0
200	0.0	0.0
100	0.0	0.0
50	0.0	1.0
20	20	2.5
10	60	2.5
5	80	2.5
2	80	2.5

A comparison of RAFTS with loss rates applied and fit by eye peak discharges at Lowood, Moggill and Port Office are presented in **Table 7-10 - Peak Discharge Comparison Between RAFTS and Flood Frequency Curves for Lowood, Moggill and Port Office - No Dams Effective** for events up to and including the 100 year ARI.

Table 7-10 - Peak Discharge Comparison Between RAFTS and Flood Frequency Curves for Lowood, Moggill and Port Office - No Dams Effective

	Lowood			Moggill			Port Office *		
ARI (years)	RAFTS (m^3/s)	FFA (m^3/s)	Diff (%)	RAFTS (m^3/s)	FFA (m^3/s)	Diff (%)	RAFTS (m^3/s)	FFA (m^3/s)	Diff (%)
100	12 280	8 200	+33.2	13 590	13 700	-0.8	13 600	13 700	-0.7
50	10 370	6 900	+33.5	11 280	11 120	-1.4	11 120	11 200	-0.7
20	7 510	5 100	+32.1	8 060	8 500	-5.5	8 060	8 100	-0.5
10	5 830	3 800	+34.8	5 770	6 500	-12.7	5 770	5 700	+1.2
5	3 770	2 900	+23.1	3 150	4 500	-30.2	3 150	3 300	-5.1
2	1 060	800	+24.5	1 020	2 000	-51.0	1 020	500	+49.0

Note: (1) Comparison for Port Office conducted for -0.15 m AHD Rating Curve Case.

From **Table 7-10** it can be seen that for Moggill and Port Office the comparison yields a good result however for low flows the percentage difference varies considerably. This variance would be most likely influenced by tidal fluctuations at these sites. As the study objectives are generally related to the large flood events greater importance was placed on results consistency for the 10 year ARI flood and above.

At Lowood RAFTS over estimates flows by between about 23 and 41%. Loss rates above Lowood were increased, however this resulted in a reduction in flows at Moggill and the Port Office. Given that the main aim of this study was to produce development design flood levels within the Brisbane City Boundary it was considered that the loss parameters presented in **Table 7-9** were the most appropriate as they produced the best results at Moggill and Port Office.

7.8 Wivenhoe and Somerset Dam Operations

The RAFTS model was used to predict design hydrographs for the MIKE 11 hydraulic model. Prior to the commencement of the design events modelling, dam operational procedures for Wivenhoe and Somerset dams had to be established. These procedures were developed after discussions with Brisbane City Council and South East Queensland Water Board officers.

Given the complex release procedures for Somerset and Wivenhoe Dams, it was decided that the following assumptions be adopted for this study.

- The starting water level for both dams are assumed to be Wivenhoe RL 67.0 m AHD and Somerset RL 100.5 m AHD which is full supply level and spillway level respectively.

- During a flood event all communication between Wivenhoe and Somerset would be cut. When communications are cut during a flood event, the procedure is to employ uncontrolled releases for both dams.

It is evident that the above assumptions are conservative, however these were considered to be the most appropriate when setting development regulation lines. Storage curves and stage-discharge curves used in this study are presented in **Appendix F - Dam Operations**. These curves were input into the RAFTS model and the design events modelling was conducted.

7.9 Design RAFTS Modelling

Wivenhoe and Somerset Dams were included in the RAFTS model and the 24 hour, 30 hour and 36 hour storms for the 100 year ARI event were rerun. Using no losses it was found that the critical storm duration for the dams effective case was 30 hours which is consistent with the no dams effective case.

Floods ranging from 2 year ARI through to PMP were run assuming loss parameters presented in **Table 7-9**. Peak discharges at Lowood, Moggill and the Port Office are presented in **Table 7-11 - Peak Discharges at Lowood, Moggill and the Port Office - Losses and Dams Effective**. Peak discharges presented in the Department of Natural Resources Report are also presented in **Table 7-11** at the Port Office for comparison.

Table 7-11 - Peak Discharges at Lowood, Moggill and the Port Office - Losses and Dams Effective

ARI (Years)	Lowood SKM (m^3/s)	Moggill SKM (m^3/s)	Port Office SKM (m^3/s)	Port Office DNR (m^3/s)	Difference @ PO (m^3/s)
PMP	28 560	36 860	37 910	31950(1)	+5 960
10 000	23 020	29 300	30 140	27560(1)	+2 580
2 000	17 880	19 490	19 500	-	-
1 000	16 290	17 540	17 550	20100(1)	-2 550
500	11 590	13 910	14 010	17 510(1)	-3 500
200	9 420	10 870	10 880	11 840(1)	-960
100	9 190	9 650	9 560	9 120(2)	+440
50	7 140	7 750	7 750	7 990(2)	-240
20	4 190	3 860	3 860	3 950(2)	-90
10	1 610	1 680	1 680	2 840(2)	-1 160
5	920	760	760	-	-
2	280	320	330	-	-

Note (1) - DNR 120a hour duration storm assuming 2.5 mm/hr continuing loss.
(2) - DNR 24 hour duration storm assuming varying loss rates.

The comparison between the Sinclair Knight Merz (SKM) and Department of Natural Resources (DNR) discharges up to and including the 100 year ARI event are generally within 5%, however, the SKM 10 year ARI flood is approximately 42% below that predicted by the DNR. This is most likely due to the loss parameters used. The loss rates used for the 10 year ARI flood by SKM are, IL = 60 mm, CL = 2.5 mm/hr whereas the losses used by DNR are IL = 22.9 mm and CL = 2.5 mm/hr.

As previously mentioned the PMF and intermediate results from the different sources vary considerably. However when loss rates applied by DNR were applied in the SKM model for the PMF flood event, this resulted in the outcomes for both models being within 7% of each other.

Given that the loss parameters for the no dams effective case generally yield discharges within 1% of the flood frequency analysis at the Port Office gauge (**Table 7-10**), the loss parameters adopted by SKM were considered the most appropriate.

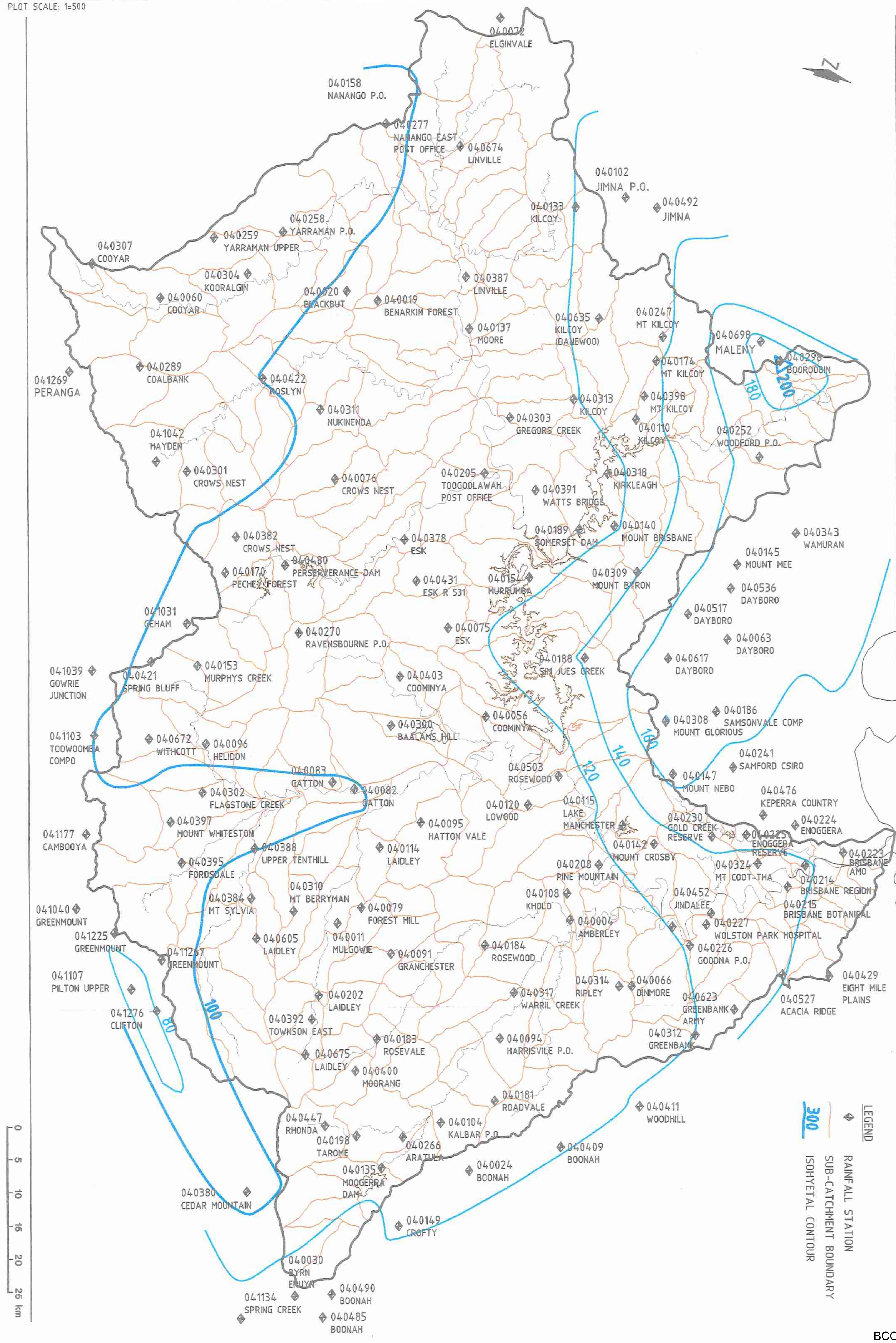
7.10 Comparison of DNR and SKM Discharges

It was proposed that a comparison between design flood hydrographs between DNR and SKM be conducted. Upon determination of the critical duration event, it became evident that the DNR critical duration was estimated at 24 hours whereas the SKM analysis resulted in a critical duration of 30 hours.

This meant that it was not appropriate to compare the two hydrographs as the 24 hour duration storm has a different temporal pattern to that of the 30 hour duration storm, hence a comparison was not conducted.

RAFTS hydrographs for the range of ARI storms at the Brisbane City Boundary, Inflow Boundaries and the Port Office gauge are presented in the following figures:

- **Figure G-1 - Hydrographs for the 2 Year ARI Flood Event**
- **Figure G-2 - Hydrographs for the 5 Year ARI Flood Event**
- **Figure G-3 - Hydrographs for the 10 Year ARI Flood Event**
- **Figure G-4 - Hydrographs for the 20 Year ARI Flood Event**
- **Figure G-5 - Hydrographs for the 50 Year ARI Flood Event**
- **Figure G-6 - Hydrographs for the 100 Year ARI Flood Event**
- **Figure G-7 - Hydrographs for the 200 Year ARI Flood Event**
- **Figure G-8 - Hydrographs for the 500 Year ARI Flood Event**
- **Figure G-9 - Hydrographs for the 1 000 Year ARI Flood Event**
- **Figure G-10 - Hydrographs for the 2 000 Year ARI Flood Event**
- **Figure G-11 - Hydrographs for the 10 000 Year ARI Flood Event**
- **Figure G-12 - Hydrographs for the PMF (100 000 Year ARI Flood Event)**



SINCLAIR KNIGHT MERZ

LEGEND

RAINFALL STATION

SUB-CATCHMENT BOUNDARY

300 ISOHYETAL CONTOUR

FIGURE 7-1

BRISBANE RIVER FLOOD STUDY

2 YEAR ARI 30 HOUR DURATION RAINFALL EVENT - BRISBANE RIVER CATCHMENT

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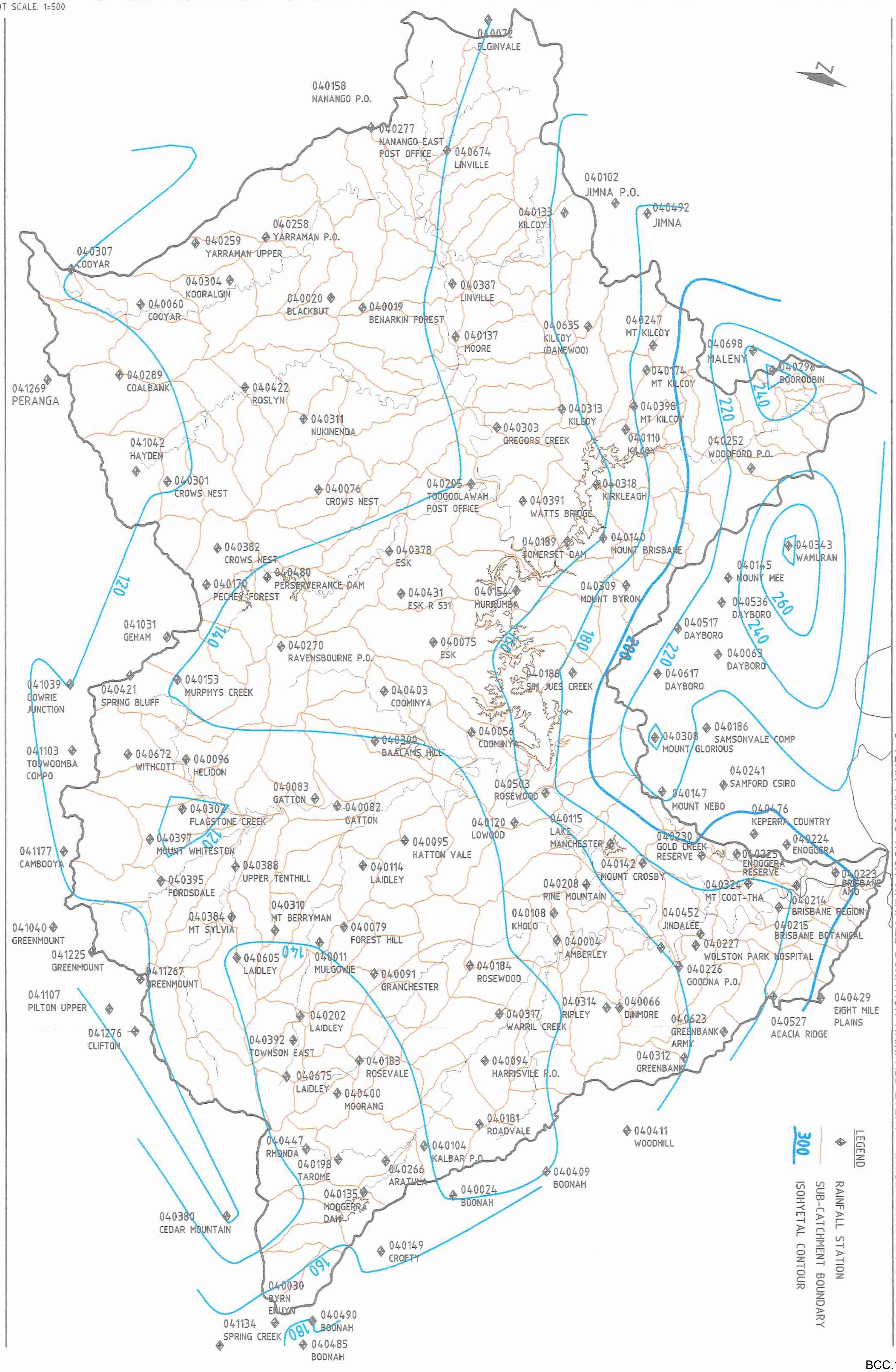

SINCLAIR KNIGHT MERZ

FIGURE 7-2
BRISBANE RIVER FLOOD STUDY
5 YEAR ARI 30 HOUR RAINFALL DURATION RAINFALL EVENT - BRISBANE RIVER CATCHMENT

LEGEND
- RAINFALL STATION
- SUB-CATCHMENT BOUNDARY
- 300 ISOHYETAL CONTOUR

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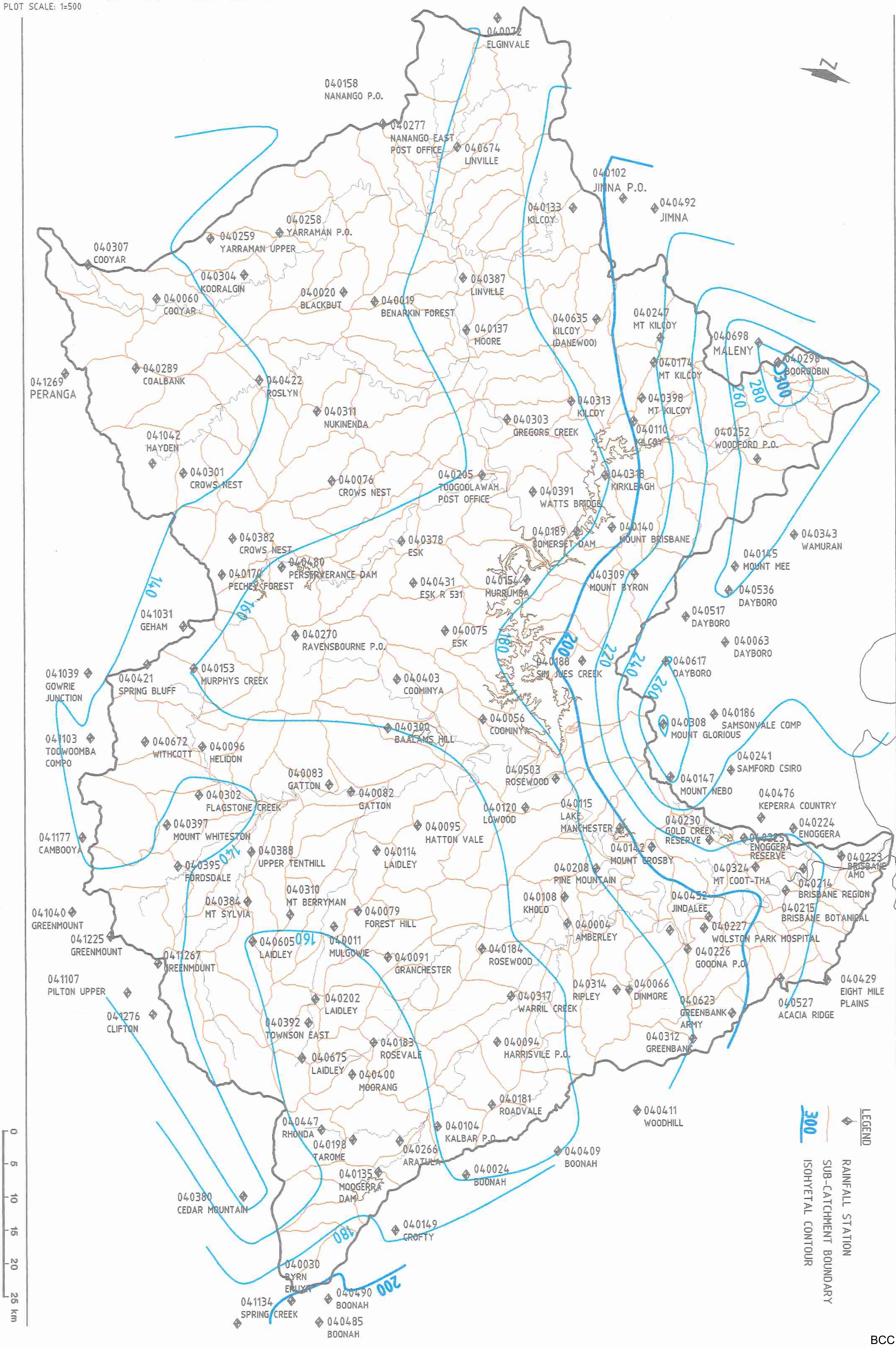

SINCLAIR KNIGHT MERZ

FIGURE 7-3
BRISBANE RIVER FLOOD STUDY
BRISBANE RIVER CATCHMENT
10 YEAR ARI 30 HOUR DURATION RAINFALL EVENT - BRISBANE RIVER CATCHMENT

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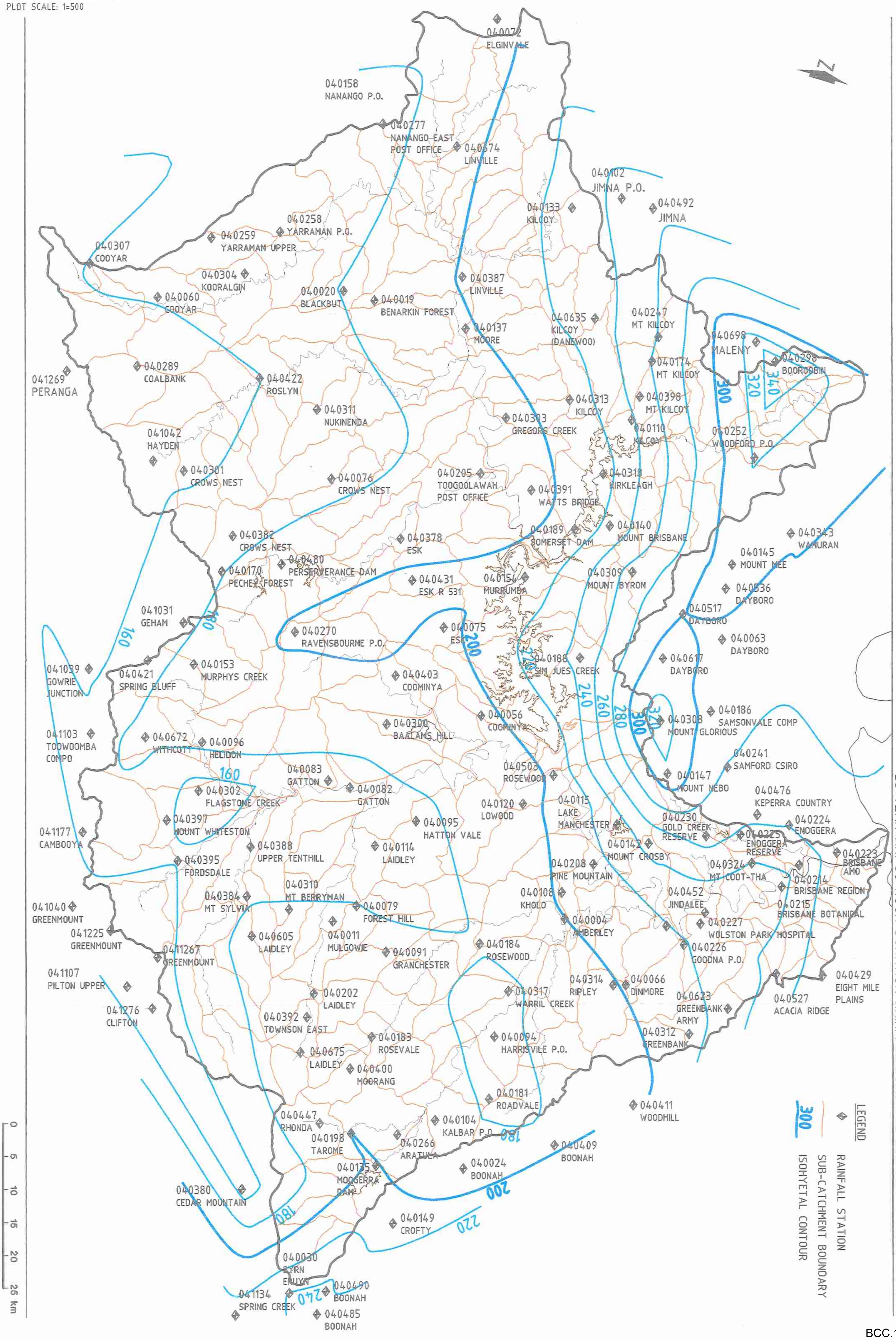
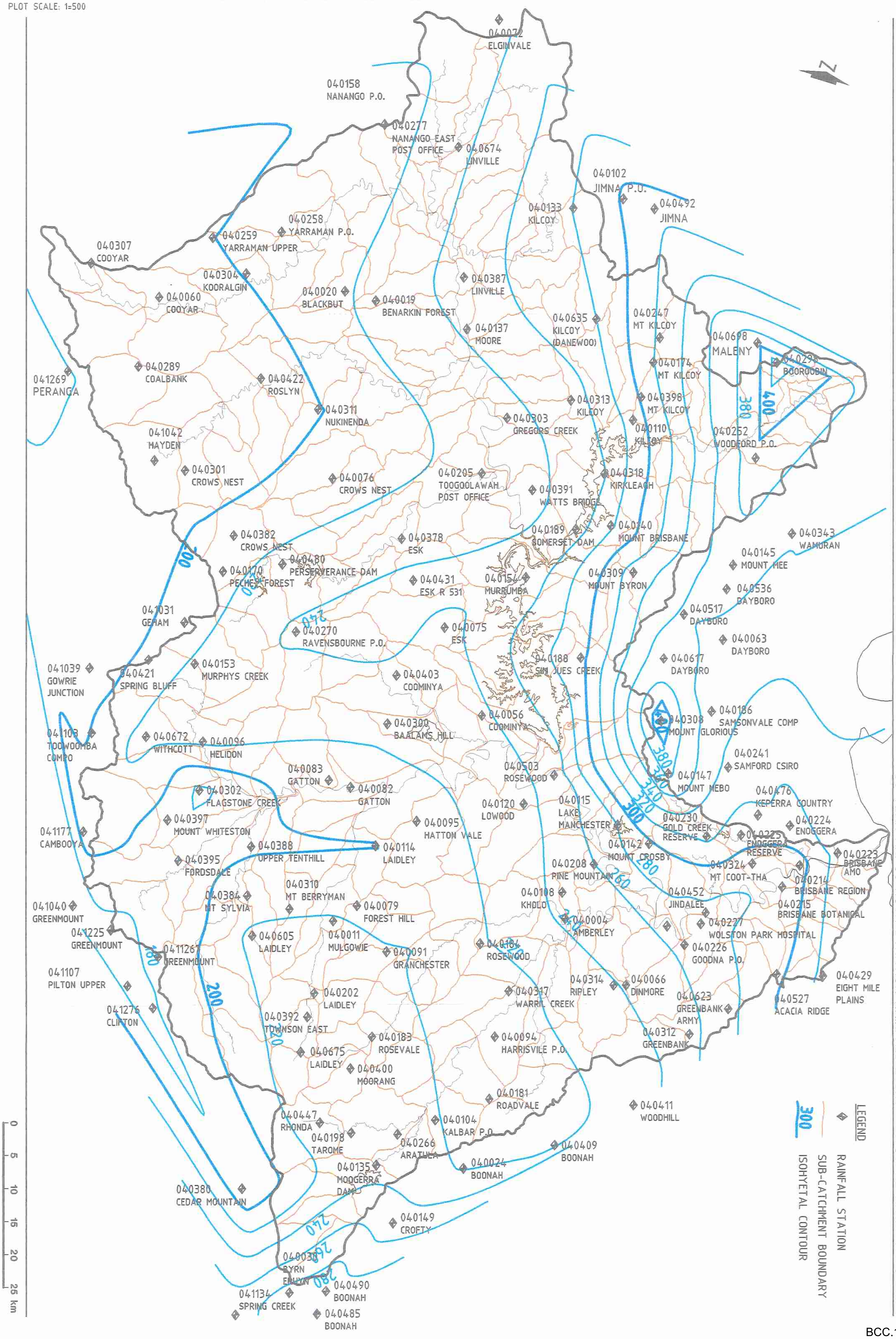


SINCLAIR KNIGHT MERZ

FIGURE 7-4
BRISBANE RIVER FLOOD STUDY
20 YEAR ARI 30 HOUR DURATION RAINFALL EVENT - BRISBANE RIVER CATCHMENT

LEGEND
- ◆ RAINFALL STATION
- SUB-CATCHMENT BOUNDARY
- 300 ISOHYETAL CONTOUR

FILE 0415' DIS D:\D\ ISBAI T0041 D -7-97
PLOT SCALE: 1=500



SINCLAIR KNIGHT MERZ

FIGURE 7-5
BRISBANE RIVER FLOOD STUDY
50 YEAR ARI 30 HOUR DURATION RAINFALL EVENT - BRISBANE RIVER CATCHMENT

BCC.121.0551

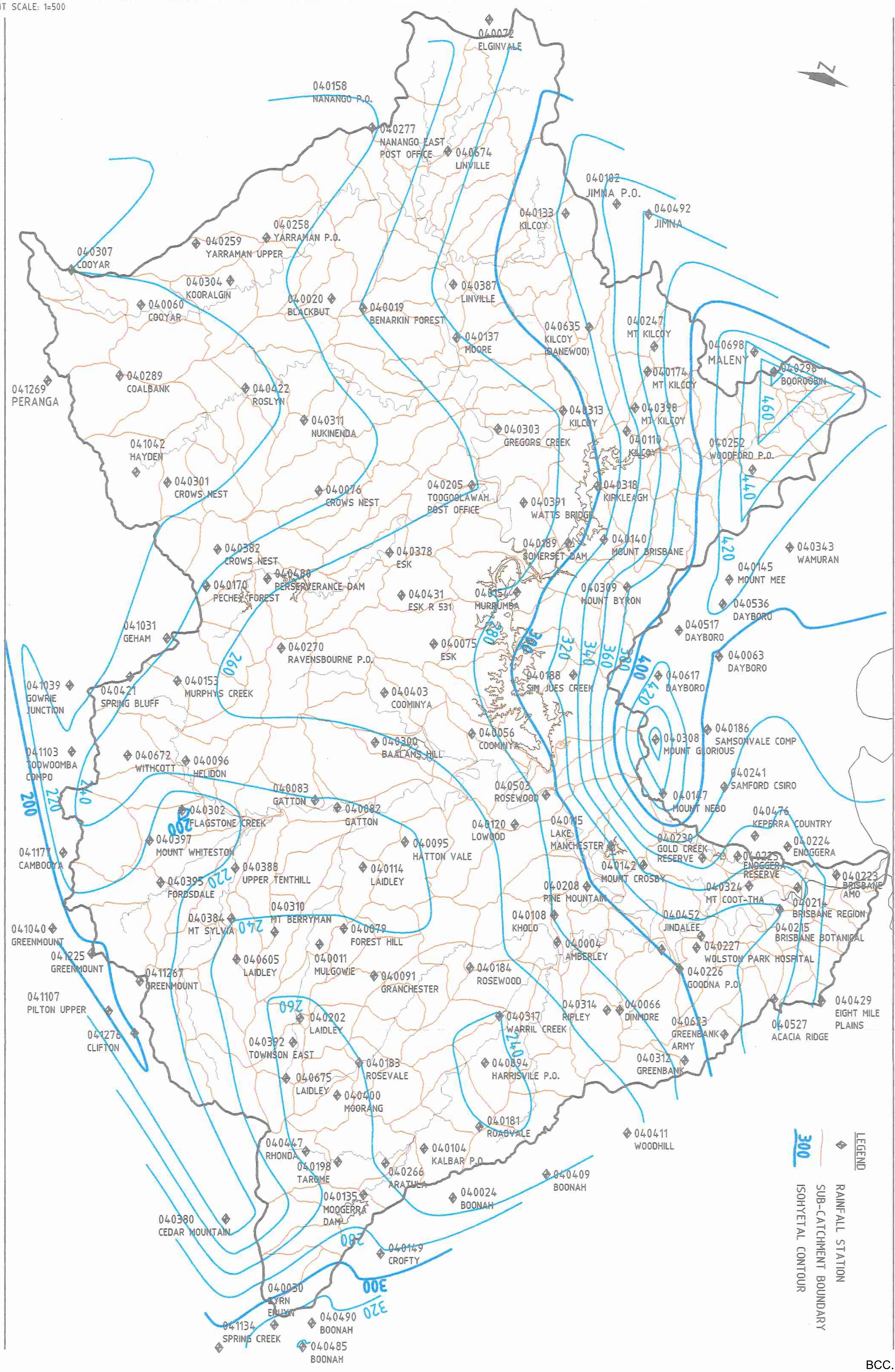


FIGURE 7-6

BRISBANE RIVER FLOOD STUDY

100 YEAR ARI 30 HOUR DURATION RAINFALL EVENT - BRISBANE RIVER CATCHMENT

LEGEND

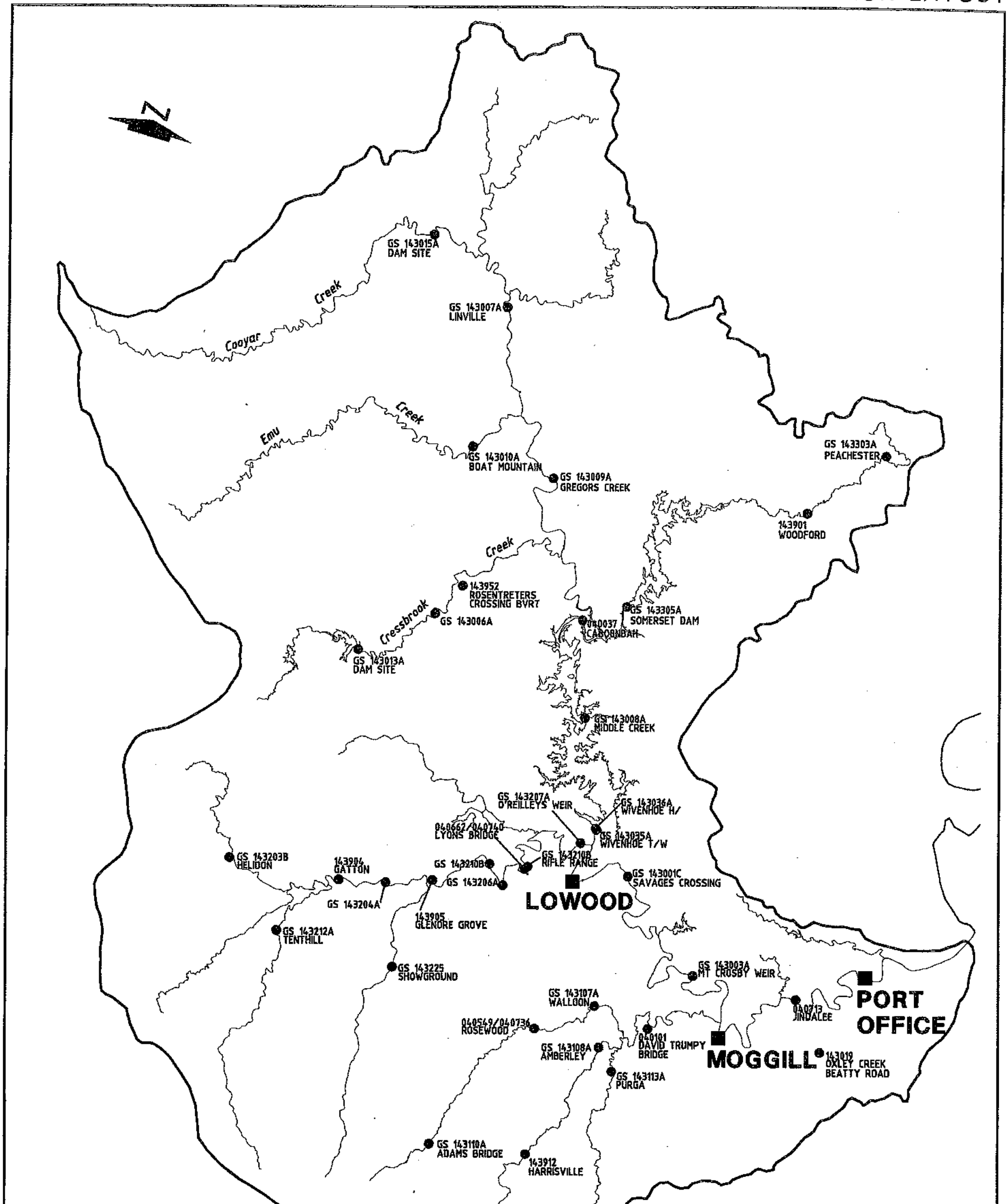
- RAINFALL STATION
- SUB-CATCHMENT BOUNDARY
- 300 ISOHYETAL CONTOUR

SINCLAIR KNIGHT MERZ

SINCLAIR KNIGHT MERZ

FIGURE 7-11

BRISBANE RIVER FLOOD STUDY
FLOOD FREQUENCY ANALYSIS LOCATION LAYOUT



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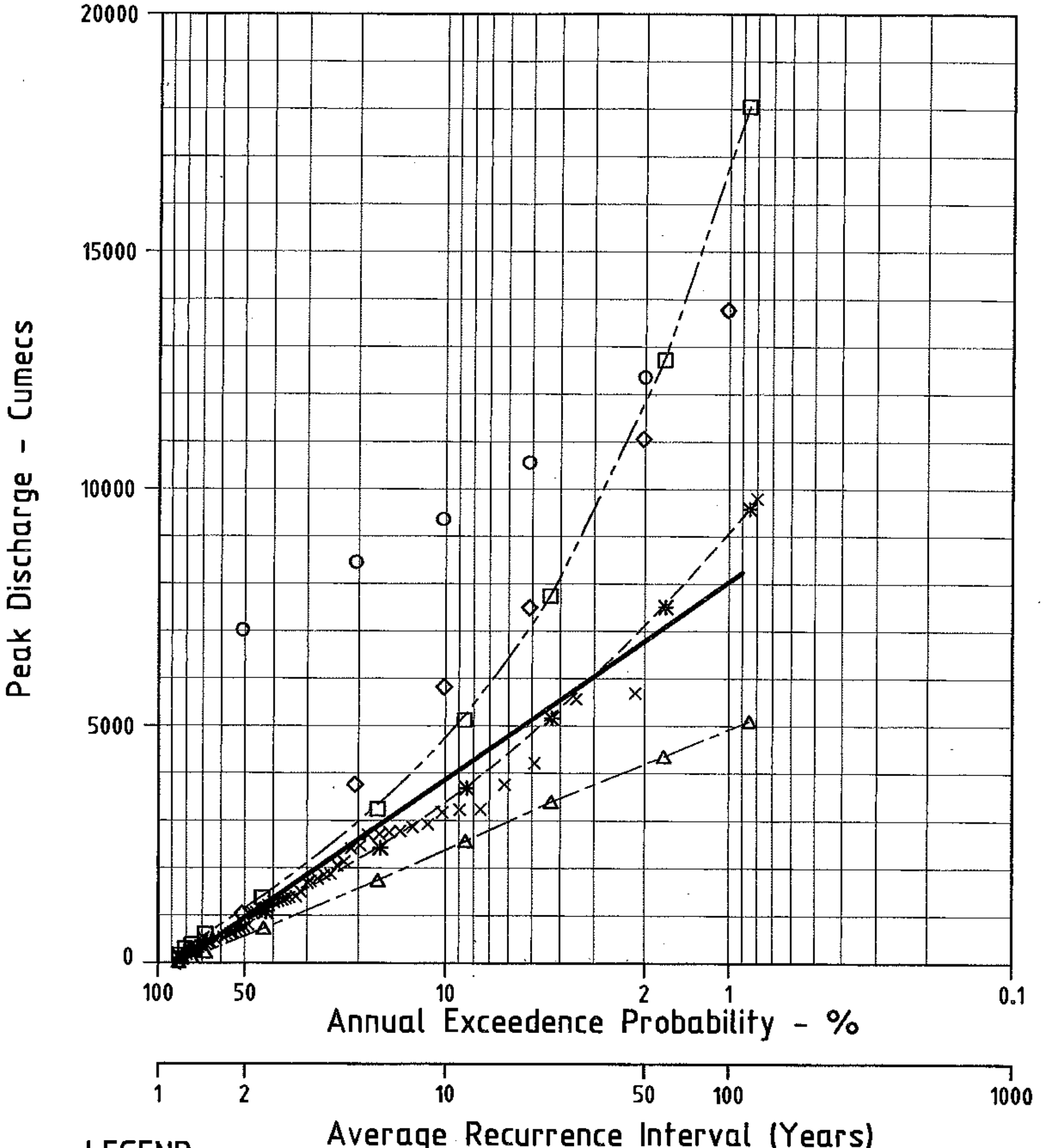
PLOT SCALE: 1 ...

FIGURE 7-12

BRISBANE RIVER FLOOD STUDY
FLOOD FREQUENCY CURVE AT LOWOOD
- NO DAMS EFFECTIVE

SINCLAIR KNIGHT MERZ



LEGEND

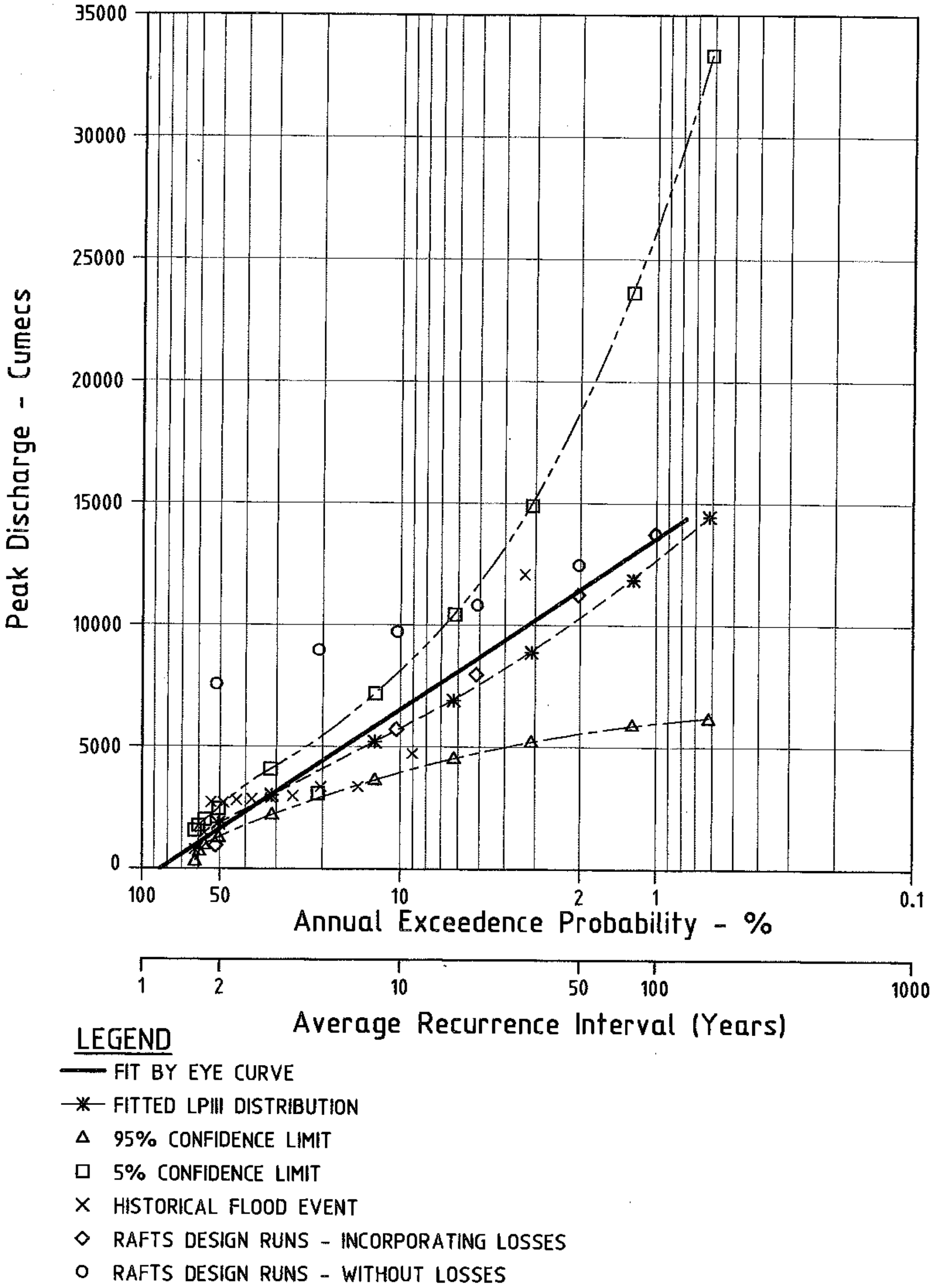
- FIT BY EYE CURVE
- FITTED LPIII DISTRIBUTION
- Δ 95% CONFIDENCE LIMIT
- □ 5% CONFIDENCE LIMIT
- × HISTORICAL FLOOD EVENT
- ◇ RAFTS DESIGN RUNS - INCORPORATING LOSSES
- ○ RAFTS DESIGN RUNS - WITHOUT LOSSES

FILE NAME: 04157-31 DISK N°: D:\DWG\BRISBANE N°: T004157 DATE: 3-7-97

FIGURE 7-13

BRISBANE RIVER FLOOD STUDY
FLOOD FREQUENCY CURVE AT MOGGILL
- NO DAMS EFFECTIVE

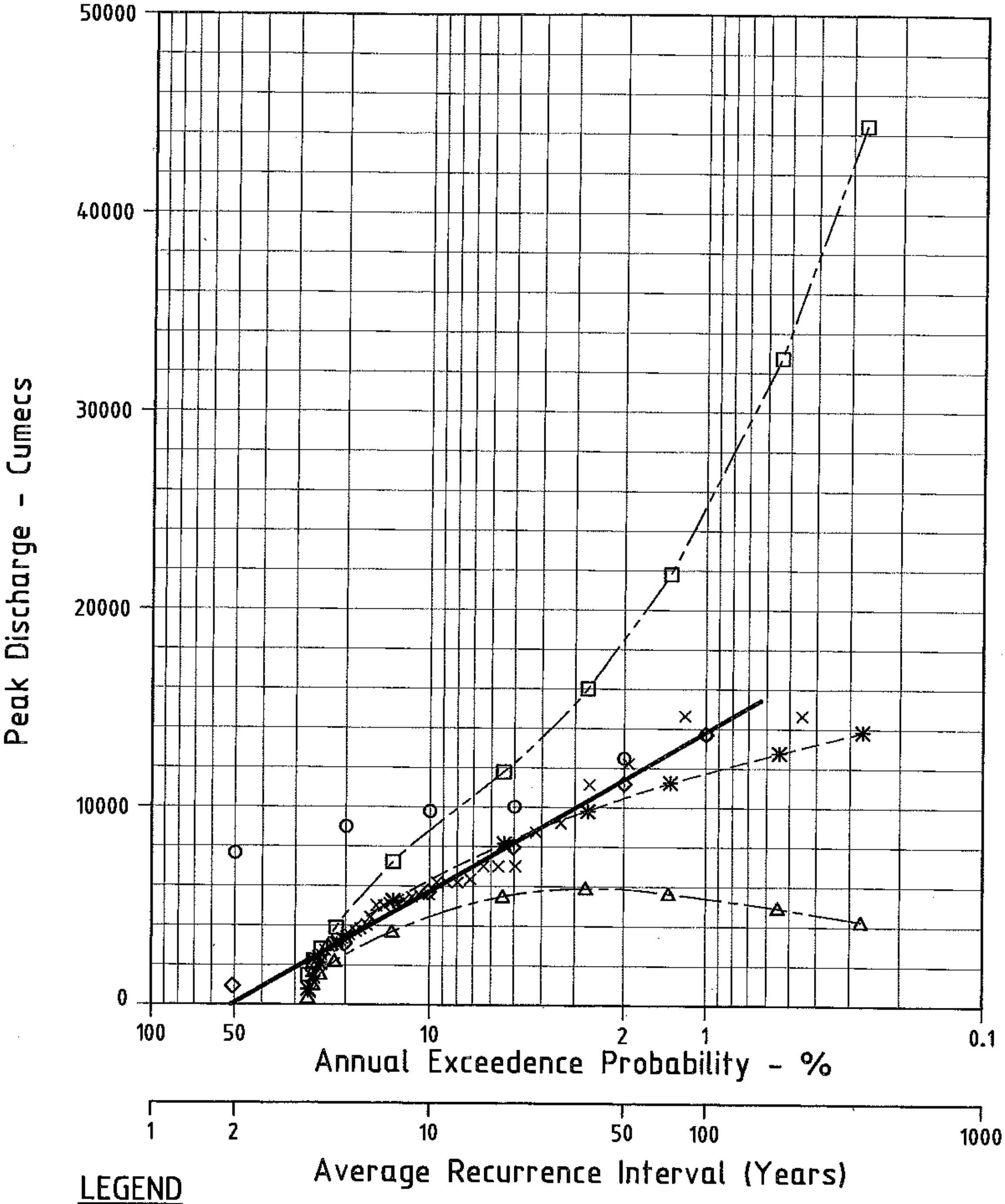
SINCLAIR KNIGHT MERZ



FILE NAME: 04157-31 DISK N°: D:\DWG\BRISBANE N°: T004157 DATE: 3-7-97

FIGURE 7-14

BRISBANE RIVER FLOOD STUDY
FLOOD FREQUENCY CURVE AT PORT OFFICE (-0.15m AHD) - NO DAMS EFFECTIVE



LEGEND

- FIT BY EYE CURVE
- FITTED LPIII DISTRIBUTION
- △ 95% CONFIDENCE LIMIT
- □ 5% CONFIDENCE LIMIT
- × HISTORICAL FLOOD EVENT
- ◇ RAFTS DESIGN RUNS - INCORPORATING LOSSES
- ○ RAFTS DESIGN RUNS - WITHOUT LOSSES

FILE NAME: 04157-31 DISK N°: D:\DWG\BRISBANE FILE N°: T004157 DATE: 3-7-97
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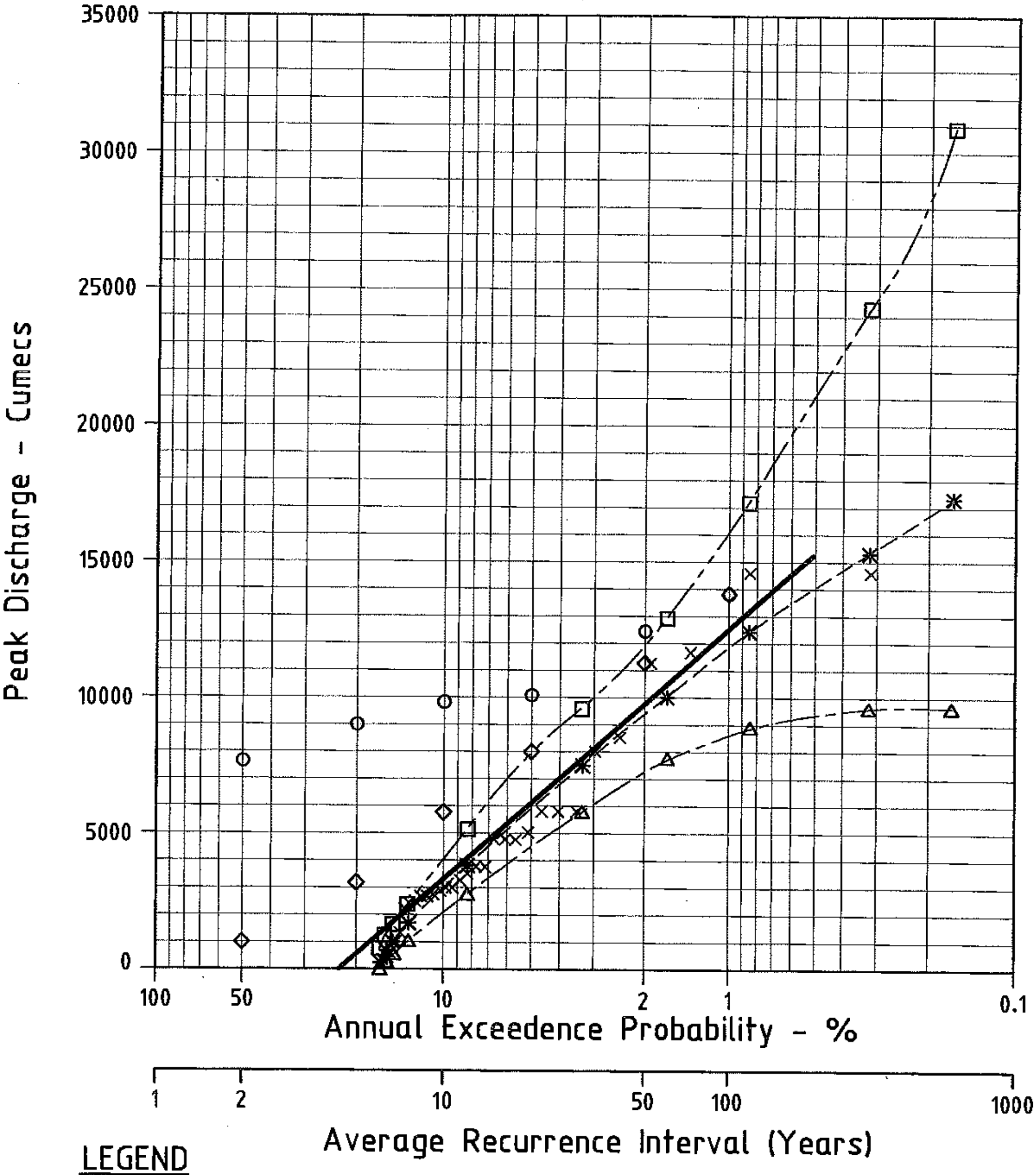
FIGURE 7-15

BRISBANE RIVER FLOOD STUDY
FLOOD FREQUENCY CURVE AT PORT OFFICE
(1.85m AHD, HIGHEST ASTRONOMICAL TIDE +0.15m)
- NO DAMS EFFECTIVE



LEGEND

- FIT BY EYE CURVE
- FITTED LPIII DISTRIBUTION
- △ 95% CONFIDENCE LIMIT
- □ 5% CONFIDENCE LIMIT
- × HISTORICAL FLOOD EVENT
- ◇ RAFTS DESIGN RUNS - INCORPORATING LOSSES
- ○ RAFTS DESIGN RUNS - WITHOUT LOSSES

FILE NAME: 04157-31 DISK N°: D:\DWG\BRISBANE N°: T004157 DATE: 3-7-97
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8. Design Event Hydraulics

8. Design Event Hydraulics

8.1 Tailwater Boundary Conditions

Tailwater boundary conditions for design model runs were selected for a number of tidal conditions at the Western Inner Bar. These conditions were:

- Mean High Water Spring Tide (RL 0.92 m AHD) and

- Mean Low Water Spring Tide (RL -0.89 m AHD).

These levels were used at the downstream end of the Brisbane River as boundary conditions for the MIKE 11 hydraulic model.

It was recognised that varying conditions at the mouth of the Brisbane River (Western Inner Bar) may be caused by storm surges in Moreton Bay. These conditions are likely to impact on flood profiles within the lower reaches of the Brisbane River and were therefore investigated. The storm surge conditions analysed in this study were;

(i) 100 year ARI river flood coinciding with a 20 year ARI Moreton Bay storm surge

(ii) 20 year ARI river flood coinciding with a 100 year ARI Moreton Bay storm surge

(iii) 100 year ARI river flood coinciding with a 100 year ARI Moreton Bay storm surge.

Peak storm surge levels for the Western Inner Bar (post Wivenhoe Dam) were supplied by Council and are presented in **Table 8-1 - Western Inner Bar Flood Levels**.

Table 8-1 - Western Inner Bar Flood Levels

Design ARI (years)	Storm Surge Level (m AHD)	Storm Surge Level + Greenhouse Effect Levels (m AHD)
20	1.75	2.10
100	2.14	2.50

Brisbane City Council requires that an allowance of 300 mm be added to storm surge levels to account for Greenhouse effects. Once this level was determined it was rounded up to the nearest 0.1 m as required. Design modelling for this study used the adjusted Greenhouse effect tailwater levels presented in **Table 8-1**.

The predicted flood profiles for the three combined flooding cases are presented in **Figure H-1 - Combined Tailwater and River Flooding Conditions - Moreton Bay Storm Surge**. These results are also tabulated in **Table H-1 - Combined Tailwater and River Flooding Conditions - Moreton Bay Storm Surge** in **Appendix H - MIKE 11 Model Results - Design Events**. The assessment assumed handrails at structures were blocked.

It can be seen that for the first case combining a 100 year ARI river flood with a 20 year ARI Moreton Bay storm surge, the tailwater level at the Western Inner Bar results in a 130 mm increase in flood level at the Walter Taylor Bridge (MIKE 11 model chainage 1037.11 km) when compared to a tailwater level of Mean High Water Spring Tide at the Inner Bar. An increase in water levels was predicted over the entire length of the Brisbane River with an increase at the Brisbane City Boundary of 30 mm.

The second case combined a 20 year ARI river flood with a 100 year ARI Moreton Bay storm surge. This case resulted in a significant increase in water levels throughout the lower Brisbane River reach when compared to the 20 year ARI design flood (MHWS). The increase in flood levels at the Walter Taylor Bridge and the Brisbane City Boundary were estimated to be 790 mm and 150 mm respectively.

The final configuration combined a 100 year ARI river flood with a 100 year Moreton Bay Storm surge. This combination caused an increase in water level of 190 mm at the Walter Taylor Bridge and 40 mm at the Brisbane City Boundary. Again the base case for this comparison was MHWS at the bar. This flooding combination of river flow and storm surge in Moreton Bay resulted in the highest predicted flooding levels throughout the Brisbane City Council Local Government Area of all the flooding cases considered. The joint probability of these events was considered to be in excess of 100 years ARI.

Following review of the cases assessed, due to the uncertainty of a storm surge occurring coincidentally with the peak flow in the river, Council advised that the 100 year ARI flood profile be generated as follows:

- Determine the 100 year ARI river flood profile for a mean high water springs tailwater.

- Establish the flood profile for the 100 year ARI storm surge level with zero river flow.

- Adopt the highest predicted levels from each profile to establish the design flood profile.

8.2 Design Flood Profiles

The inflow hydrographs calculated by the RAFTS model for the full range of design storms were run through the MIKE 11 model for the current extent of urbanisation to generate a series of design flood profiles. The flood profiles for the Brisbane River have been plotted for the range of return periods and are presented in the following figures and drawing sheets:

- **Figure H-2 - Design Profiles for the Brisbane River - Combined** and **Drawing Sheet W10581-55**
- **Figures H-3a to H-3i - MIKE 11 Design Flood Profiles for the 5, 20 & 100 Year ARI Events (MHWS)** and **Drawing Sheets W10581-19 to 27.**
- **Figures H-4a to H-4i - MIKE 11 Design Flood Profiles for the 2, 10 & 50 Year ARI Events (MHWS)** and **Drawing Sheets W10581- 28 to 36.**
- **Figures H-5a to H-5i - MIKE 11 Design Flood Profiles for the PMF & 10 000 Year ARI Events (MHWS)** and **Drawing Sheets W10581-37 to 45.**
- **Figures H-6a to H-6i - MIKE 11 Design Flood Profiles for the 2 000, 1 000, 500 & 200 Year ARI Events (MHWS)** and **Drawing Sheets W1058-46 to 54.**

Design flood discharges and peak water levels are presented in **Table H-2 - MIKE 11 Predicted Design Flood Levels (MHWS)** and **Table H-3 - MIKE 11 Predicted Design Discharges (MHWS).** It has been assumed that the handrails at all structures would be fully blocked by debris during the design events. A sensitivity analysis has been performed to test the sensitivity of this assumption and it was found that the effects of blocked handrails were negligible.

8.3 HEC-RAS Model Construction and Calibration

During the model calibration phase of this study, it was decided that the HEC-RAS model would only be used to check the performance of the MIKE 11 model at major river crossings. This process is detailed in **Section 6.8 - HEC-RAS Check of Major Creek Crossings** in the this report.

The construction of the HEC-RAS model involved linking the structures analysed in the calibration phase of this report to the remaining cross sectional information used in the MIKE 11 model. The HEC-RAS and MIKE 11 models are essentially a duplicate of each other in all aspects.

Following the model setup, the 100 year ARI peak water levels and discharges were taken from the MIKE 11 model. The peak discharges varied along the length of the Brisbane River due to attenuation effects and adjoining river branches. To account for this phenomenon discharges were placed at strategic locations in order to accurately represent the river flow regime throughout the model.

To account for the complex interaction of storage within Oxley Creek and the link branches across Indooroopilly Golf course, the Oxley Creek inflow had to be adjusted in the HEC-RAS model. The MIKE 11 model could model this area in a dynamic process, however, as HEC-RAS is only a steady state model flood levels from BN1060 (AMTD 34.935) to BN950 (AMTD 39.095) were significantly underestimated. The flow at Oxley Creek was reduced significantly in MIKE 11 (approx 900 m^3/s), however this was due to storage and the link branch across the floodplain. HEC-RAS is unable to account for storage and automatic flow distribution into link branches cannot be achieved. The flow predicted by MIKE 11 at BN950 was therefore input into HEC-RAS at BN950 and the Oxley Creek inflow was neglected. This produced results within the required tolerances.

Peak water levels extracted from MIKE 11 were inserted at each cross section in the HEC-RAS model. These levels were used in a comparison role during the calibration of the HEC-RAS model. The calibration of the HEC-RAS model was based on altering Manning's n values used in the MIKE 11 model by a constant scaling factor of 0.85.

Using this scaling factor the water levels determined by the HEC-RAS model were generally within 150 mm of that predicted by MIKE 11 with an absolute average difference of 105 mm for the 100 year ARI event and an absolute average difference of 27 mm for the 10 year ARI event. These results are presented in **Appendix I - HEC-RAS Model Results** in **Table I-1 - HEC-RAS Model Calibration**. The roughness coefficients adopted in the HEC-RAS model are summarised in **Table I-2 - Comparison of MIKE 11 & HEC-RAS Manning's n Roughnesses**

8.4 River Hydraulic Characteristics

The HEC-RAS model was used to determine the bank full channel flood by using a range of flows and identifying the bank full flow at each cross section. Bank full flow was considered to be the first low bank which is located above the 2 year ARI flood level. MIKE 11 results for the 100 year ARI and 20 year ARI floods were inserted at strategic locations in the HEC-RAS model to determine the velocities and conveyance at each section.

Left bank, right bank and main channel velocities for the 100 year ARI and bank full flood were determined using HEC-RAS. Conveyances for the left bank, right bank and channel for the 100 year ARI and 20 year ARI floods were determined. The results for velocities and conveyance are tabulated in **Table I-3 - HEC-RAS Predicted Velocities and Table I-4 - HEC-RAS Predicted Conveyances.**

It should be noted that these conveyances and velocities relate to the channel proper being at the extent of the tidal zone. During the calibration phase of the study, the MIKE 11 model was developed by defining the channel proper on the basis of roughness rather than a topographical basis. This was considered to be justified due to the significant differences between the roughness within the tidal zone and the roughness on the river banks and floodplains.

For consistency the calibration of the HEC-RAS model used the same parameters as those adopted by the MIKE 11 model and hence the channel proper is defined by the tidal zone within each cross section. This approach was also considered to be suitable for HEC-RAS as the model defines each cross section into three segments, these being:

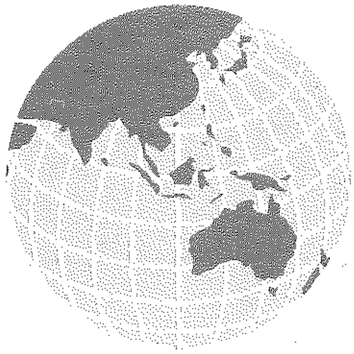
- left overbank,
- channel, and
- right overbank.

Each of these segments define the distinct roughness appropriate to each cross section. This became a problem when the hydraulic characteristics had to be assessed. If the left and right overbanks are placed at bank full condition (based on topographical interpretation), then the HEC-RAS model calculates a composite roughness for the main channel using the formula:

$$n=\Sigma((P_i n_i)^{3/2})/P)^{2/3}$$

Due to both high wetted perimeters and relatively high Manning's n values along the Brisbane River banks, the composite channel roughnesses calculated by the HEC-RAS model were considered to be over estimated. This over estimation caused significant increases in water levels and decreases in conveyances for the entire cross section if roughness values consistent with MIKE 11 were used.

This meant that the HEC-RAS model would have to be calibrated as a stand alone model using a different Manning's n parameter set to that used in MIKE 11. After discussions with Brisbane City Council Officers, it was decided that it was most appropriate to use a consistent parameter set for this investigation.



9. Waterway Management

9. Waterway Management

9.1 General Strategy

This component of the study required application of the calibrated hydraulic model for the lower Brisbane River to determine a revegetation strategy and delineate flood regulation lines.

The brief required that the combined effect of revegetation and rehabilitation, encroachment of development on the floodplain outside the regulation line and crossings of the river (upgraded as necessary) does not increase the 100 year ARI flood level by more than approximately 150 mm. After discussions with council it was decided that increases in water level up to 170 mm would be acceptable in selected locations provided private residences were not significantly effected.

9.2 Collation of Environmental Data

Prior to the commencement of the Waterway Management Strategy it was necessary to liaise with the Bikeway, Transport Planning Section and the Environment Management and Planning Sections of the Brisbane City Council.

Through contact with the Environmental Management and Planning Departments a data sheet containing various names and addresses of Environmental Groups throughout Queensland was obtained.

Specific groups were identified according to their proximity to the Brisbane River and questionnaires were prepared and sent to these groups. Approximately 500 questionnaires to members of the specific community groups were sent however the response was considered poor.

Discussions with the Bikeway, Transport Planning Section revealed that no major works have been planned over the next five years with the exception of the construction of a new bikeway along Coronation Drive between the William Jolly Bridge and Victoria Bridge. These works involve the construction of a structure approximately 4.5 metres in width and about 1 metre above high tide level. The structure is to be built outside the existing freeway structure to avoid problems with freeway foundations.

This structure was not included in the hydraulic modelling as the decrease in conveyance due to the decrease in channel area would be negligible. Similarly due to the location and size of this structure it was considered that the resulting impacts would be negligible as the structure would be drowned out during a 100 year ARI event.

The existing bikeway running adjacent to Coronation Drive is also to be upgraded within the next few years however this project is in the preliminary phase and therefore no information was available.

9.3 Revegetation Strategy

It was proposed that the revegetation strategy would be developed primarily from information supplied by each of the surveyed community groups however due to the poor response limited revegetation locations were identified. Other areas had to therefore be located using photographic maps, topographical information and field surveys.

Most of the locations that have been identified for revegetation are currently open space areas. Revegetation of private residential areas has not been investigated as it was considered that these areas would generally be small and therefore have a negligible effect on the floodplain.

The combination of community groups input and the additional investigation resulted in a proposed revegetation strategy. This proposed revegetation strategy is presented in **Drawings W10581 Sheets 84 to 90**.

Drawings W10581 Sheets 84 to 90 also present locations where significant areas of vegetation currently exist. These locations may or may not represent areas of ecological significance. It is recommended that should development occur at any of the above locations some form of environmental investigation be undertaken to assess the possible ecological impacts.

The approach used to investigate the revegetation strategy for the Brisbane River was to increase mannings n roughness parameters within the calibrated hydraulic model (MIKE 11) to reflect changes imposed by the proposed revegetation.

Since the hydraulic model bank roughnesses at most locations exceeded 0.15 (to allow for bend losses), a sensitivity analysis was conducted to assess the impacts that revegetation would have on the 100 year flood level.

The sensitivity analysis was carried out by reducing the roughness values to 0.15 at the proposed revegetation locations. It was found that this reduction in roughness values caused the existing case 100 year ARI flood levels to decrease by 0 to 20 mm at these locations. The roughness values were then increased to their original values and 0.15 was added. This resulted in an increase in flood levels at these locations of between 0 to 20 mm above the existing 100 year ARI case. It was therefore concluded that the river was not sensitive to changes in bank roughness conditions.

The proposed revegetation strategy applies to locations where revegetation is below the 100 year ARI flood inundation level. Tree planting has been tested in all proposed locations as fully uncontrolled revegetation.

Fully unconstrained revegetation for the Brisbane River was defined as uncontrolled planting where manning roughnesses have been applied in the hydraulic model to a value of 0.15 above those values determined during the calibration of the MIKE 11 hydraulic model.

Extent of revegetation will be discussed on an individual reach basis in **Section 9-5 - Hydraulic Testing of Waterway Strategy Options** of this report.

9.4 Regulation Line Assessment

Regulation lines are used by council as a control on development encroaching onto the floodplains of major creeks and rivers. They are set to ensure that works such as placement of fill does not compromise existing flood immunity.

Interim regulation lines can be defined as offsets from real property boundaries. Interim lines for the Brisbane River have not been previously set by Council, hence regulation lines have been set using the calibrated MIKE 11 hydraulic model results.

This work was principally based on the worst case design scenario of the occurrence of the 100 year ARI flood under current catchment development superimposed with the regulation lines and revegetation strategy in place. The geometry of river cross sections was adjusted to reflect flood conveyance and storage in the areas outside the regulation lines. The combined effect of this encroachment and the revegetation strategy was considered as described in **Section 9-5 - Hydraulic Testing of Waterway Strategy Options** of this report.

In some reaches, several solutions to the regulation line location and revegetation strategy satisfy the hydraulic constraints. In these locations practical regulation lines were adopted after consideration of planning, environmental and economic criteria.

A final check was made to ensure that regulation lines provided a minimum 15 m buffer to the top of the river bank to manage future erosion and sedimentation problems. After discussions with Council it was decided that the top of bank was considered to be the first bank which was above the 2 year ARI flood level.

Development levels were then set at 300 mm above the 100 year ARI flood with the revegetation and regulation lines in place. Where the Moreton Bay 100 year ARI storm surge levels were higher than the 100 year ARI river levels the surge levels were used.

9.5 Hydraulic Testing of Waterway Strategy Options

The regulation lines were finalised on the above basis to produce a reasonable balance between regulation line requirements and water level increases.

Most emphasis was placed on existing developed areas and any recommended zoning adjustments have been based purely on a hydraulic basis and prior to a change of rezoning other factors should be considered.

Placement of the regulation lines are presented in **Drawings W10581 - Sheets 98 to 104** and corresponding flood level information is presented in **Table J-1 - Flood levels for the Regulation Lines and Revegetation Case for Flood Events 100 Year ARI to 2 Year ARI.** Corresponding flows are presented in **Table J-2 - Discharges for the Regulation Lines and Revegetation Case for Flood Events 100 Year ARI to 2 Year ARI.**

The following Tables present affluxes, placement of regulation lines and development levels for the Brisbane River:

- **Table J-3 - Affluxes Due to Regulation Lines, Revegetation Strategy and Combined Effects for the 100 Year ARI Flood.**
- **Table J-4 - Development Levels and Location of Regulation Lines for the Brisbane River.**

Flood profiles for the Regulation Lines and Revegetation Strategy are presented in the following figures and Drawings:

- **Figure J-1a to J1i - MIKE 11 Design Flood Profiles for the 5, 20 and 100 Year ARI Flood Profiles (MHWS) - Regulation Lines and Revegetation Strategy Case** and **Drawings W10581 Sheets 56 to 64.**

- **Figure J-2a to J2i - MIKE 11 Design Flood Profiles for the 2, 10 and 50 Year ARI Flood Profiles (MHWS) - Regulation Lines and Revegetation Strategy Case** and **Drawings W10581 Sheets 65 to 73.**

- **Figure J-3a to J3i - Afflux for the 100 Year ARI Design Flood (MHWS) - Regulation Lines and Revegetation Strategy Case** and **Drawings W10581 Sheets 74 to 82.**

During the regulation line assessment, it was found that the hydraulic model was sensitive to the placement of the regulation lines above the Centenary Bridge.

This sensitivity was most likely due to the regulation lines forming a relatively consistent cross section which in turn increased the peak discharges downstream in the order of 200 to 300 m^3/s.

This increase in discharge had a significant impact on flood levels downstream of the Centenary Bridge and hence the moving of regulation line upstream of Centenary Bridge was very restrictive. Generally the amount of fill required at most locations upstream of Centenary Bridge was significant and hence was considered to be impractical.

A summary of the processes involved and the decisions made in preparing the combined regulation line and revegetation strategy is provided in this section. References to potential flooding are based on the 100 year ARI inundation. The assessment is detailed on a reach by reach description.

Reach 1 - Upper Boundary

Cross Sections: BN2020 to BN1980
Chainages: 1000 km to 1001.865 km
AMTD: 78.66 km to 76.795 km

Potential Flooding

No flooding of residences will occur in this reach. Any flooding which does occur will only inundate open space within the Brisbane City Boundary.

Revegetation

- No revegetation was assessed in this reach.
- As there is considerable natural vegetation throughout this reach, the riverbanks could be considered as areas of ecological importance.

Regulation Lines

- Regulation lines were generally set at the extent of inundation as major encroachments onto the floodplain caused an increase in discharge which increased affluxes to greater than 150 mm at the Merivale Bridge and downstream of the Centenary Bridge.
- BN1990 used a combination of moving the regulation line on the one bank and extent of inundation on the other bank to achieve the maximum allowable afflux.
- The range of affluxes in this reach with revegetation and regulation lines in place was from 0 to 30 mm.

Zoning Adjustments

- Current zoning through this reach is predominantly Open Space and Non-Urban. As no private residences are affected by the inundation lines, no rezoning for this reach has been recommended.

Reach 2 - Barellan Point

Cross Sections: BN1970 to BN1910
Chainages: 1002.35 km to 1005.325 km
AMTD: 76.310 km to 73.335 km

Potential Flooding

From BN1970 to BN1930, flooding will affect those properties along Hawkesbury Road. From BN1920 to BN1910, several properties in Hawkesbury Road, and one in Matfield Street will be affected by flooding during a 100 year ARI flood event.

Revegetation

- No revegetation was assessed in this reach.
- As there is considerable natural vegetation throughout this reach, the riverbanks could be considered as areas of ecological importance.

Regulation Lines

- Regulation lines were generally set at the extent of inundation as major encroachments onto the floodplain caused an increase in discharge which increased affluxes to greater than 150 mm at the Merivale Bridge and downstream of the Centenary Bridge.
- BN1970 used a combination of moving the regulation line on the one bank and extent of inundation on the other bank to achieve the maximum allowable afflux.
- The range of affluxes in this reach with revegetation and regulation lines in place was from 0 to 20 mm.

Zoning Adjustments

- Current zoning throughout this reach is Open Space and Non-Urban. As no private dwellings are affected by the inundation lines, no rezoning for this reach has been recommended.

Reach 3 - Riverview

Cross Sections:	BN1900 to BN1870
Chainages:	1005.87 km to 1007.41 km
AMTD:	72.79 km to 71.25 km

Potential Flooding

Properties along Hawkesbury Road, Myora Street, Aitcheson Street and Moggill Road will be partially affected by flooding during a 100 year ARI flood event.

Revegetation

- At BN1870 (reserve at Moggill Ferry), full tree planting was tested with flood level increases of 20 mm.
- All revegetation is to a standard of roughness, n = 0.15
- As there is considerable existing vegetation throughout this reach, the riverbanks could be considered as areas of ecological significance.

Regulation Lines

- Regulation lines were generally set at the extent of inundation as major encroachments onto the floodplain caused an increase in discharge which increased affluxes to greater than 150 mm at the Merivale Bridge and downstream of the Centenary Bridge.
- BN1900, BN1880 and BN1870 used a combination of moving the regulation line on the one bank and extent of inundation on the other bank to achieve the maximum allowable afflux.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from -60 to 0 mm.

Zoning Adjustments

- Zoning in this reach is predominantly Open Space along the riverbank and Future Urban.
- No rezoning has been recommended for this reach.

Reach 4 - Redbank

Cross-Sections: BN1860 to BN1770
Chainages: 1007.920 km to 1011.980 km
AMTD: 70.740 km to 66.680 km

Potential Flooding

The majority of flooding in this reach occurs onto open space.

At BN1860, flooding occurs back onto the start of Moggill Road, however the extent of flooding appears to occur over open space.

From BN1840 to BN1820, a localised area of flooding spreads back into Moggill Road inundating any properties in Aitcheson Street.

Flooding from BN1820 to BN1810 reaches Moggill / Malfield Road, but there does not appear to be any dwellings affected.

Properties along the river side of Prior's Pocket Road will be affected by flooding to some extent.

Revegetation

- No revegetation was assessed in this reach.
- There is considerable existing vegetation along the riverbanks, and also a large patch from BN1770 to BN1820, therefore the riverbanks could be considered zones of ecological significance.

Regulation Lines

- Regulation lines were generally set at the extent of inundation as major encroachments onto the floodplain caused an increase in discharge which increased affluxes to greater than 150 mm at the Merivale Bridge and downstream of the Centenary Bridge.
- BN1860, BN1830, BN1820, BN1780 and BN1770 used a combination of moving the regulation line on the one bank and extent of inundation on the other bank to achieve the maximum allowable afflux.
- From BN1840 to BN1830, regulation lines extend into some rural residential properties and non urban properties to a minor extent.
- From BN1860 to BN1850, regulation lines significantly affect several rural residential properties.
- The range of affluxes in this reach with revegetation and regulation lines in place was from -120 to -60 mm.

Zoning Adjustments

- From BN1860 to BN1850, sections of those Rural Residential zoned properties significantly affected by the regulation lines should be rezoned to Open Space (OS).
- Non Urban properties within this reach should be assessed on an individual basis and rezoned to Open Space if appropriate.

Reach 5 - Goodna

Cross Section: BN1760 to BN 1720
Chainage: 1012.475 km to 1014.110 km
AMTD: 66.185 km to 64.550 km

Potential Flooding

Considerable flooding will occur during a 100 year ARI event on Prior's pocket.

From BN1750 to BN1710, flooding extends right back to the kink in Priors Pocket Road, covering the entire point, except for two patches of higher ground.

Revegetation

- No revegetation was assessed in this reach.
- Considerable vegetation exists right along the riverbanks in this reach. The riverbanks could be considered as areas of ecological significance.

Regulation Lines

- Regulation lines were generally set at the extent of inundation as major encroachments onto the floodplain caused an increase in discharge which increased affluxes to greater than 150 mm at the Merivale Bridge and downstream of the Centenary Bridge.
- BN1750 used a combination of moving the regulation line on the one bank and extent of inundation on the other bank to achieve the maximum allowable afflux.
- The point at the end of Priors Pocket Road is almost completely inundated from BN1730 to BN1670.
- The range of affluxes in this reach with revegetation and regulation lines in place was from -40 to -20 mm.

Zoning Adjustments

- Properties throughout this reach are generally zoned Open Space.
- Non Urban and Particular Development properties within this reach should be assessed on an individual basis and rezoned to Open Space if appropriate.

Reach 6 - Wacol

Cross Section: BN1710 to BN 1610
Chainages: 1014.610 km to 1019.095 km
AMTD: 64.050 km to 59.565 km

Potential Flooding

From BN1710 to BN1670, Priors Pocket is flooded back until the kink in Priors Pocket Road.

From BN1660 to BN1650, properties in Priors Pocket Road and part of Avonmore Street will be affected by flooding in a 100 year ARI flood event.

From BN1640 to BN1630, flooding follows an unnamed creek (adjacent Stratford Street), and inundates the rear of several properties west of Livesay Road, inundation spreads north to Ellerby Street.

From BN1620 to BN1610, properties along Vanwall and Zelita Road will suffer inundation to some extent, as will the Department of Primary Industry Land.

Revegetation

- No revegetation was assessed in the Wacol reach.
- From BN1610 to BN1700 there is considerable existing vegetation. The riverbanks in these areas could be considered as areas of considerable ecological significance.

Regulation Lines

- Regulation lines were generally set at extent of inundation as encroachment onto the floodplain caused an increase in flood levels at the Merivale Bridge and downstream of the Centenary Bridge.
- BN 1690, BN1680, BN 1670 and BN 1660 used a combination of moving the regulation line on the one bank and extent of inundation on the other bank to achieve the maximum allowable afflux.
- BN 1650, BN1640 and BN 1630 used a combination of moving the regulation line on both banks to achieve the maximum allowable afflux.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from -60 to 70 mm.

Zoning Adjustments

- Non Urban and Special Use properties within this reach should be assessed on an individual basis and rezoned to Open Space if appropriate.

Reach 7 - Riverhills

Cross Section: BN1600 to BN1530
Chainage: 1019.49 km to 1021.715 km
AMTD: 59.170 km to 59.945 km

Potential Flooding

At BN1530, a localised area of flooding inundates those properties adjacent to the park bounded by Juba and Zambesi Streets, with flooding extending up into Horizon Drive.

From BN1540 to BN1550, flooding extends over the largely undeveloped areas bounded by Pauluna, Loddon Streets and Westlake Drive. Numerous residences will also be inundated during a 100 year ARI flood event. On the western side of the river properties in Lather Road will suffer some extent of flooding.

From BN1570 to BN1600, an extensive area of flooding occurs in the Moggill Country Club, Booker Place and the swimming pool. However flooding does extend into a significant number of residential areas in Sugarwood Street, Ghost Gum Street up to Moggill Road, Birkin Road and across into Banyan Street.

At BN1600, flooding follows Wolston Creek, however the majority of this flooded area appears to be undeveloped.

Revegetation

- From BN1530 to BN1540 (Juba Street Park), full tree planting was tested with flood level increases of 20 mm.
- All revegetation is to a standard of roughness, n = 0.15
- From BN1560 to BN1600, there is considerable existing vegetation, therefore the riverbanks in this area could be considered zones of ecological significance.

Regulation Lines

- Regulation lines were generally set at the extent of inundation as major encroachments onto the floodplain caused an increase in discharge which increased affluxes to greater than 150 mm at the Merivale Bridge and downstream of the Centenary Bridge.
- BN1600, BN1590, BN1580, BN1570 and BN1540 used a combination of moving the regulation line on the one bank and extent of inundation on the other bank to achieve the maximum allowable afflux.
- BN1560, BN1550 and BN1530 used a combination of the 15 m buffer rule and extent of inundation to achieve the maximum allowable afflux.
- From BN1550 to BN1530, a block of property zoned as Future Urban will be affected considerably by the regulation lines.
- From BN1580 to BN1530, numerous residential properties will be affected by the regulation lines.

- The range of affluxes in this reach with revegetation and regulation lines in place ranges from 40 to 60 mm.

Zoning Adjustments

- The block of Future Urban property from BN1600 to BN1590 should be rezoned to Open Space
- From BN1580 to BN1530, those waterfront Residential A properties in Lather Street and Sumner Road should be rezoned to Open Space (OS).
- From BN1560 to BN1530, sections of those Rural Residential zoned properties significantly affected by the regulation lines should be rezoned to Open Space (OS).

Reach 8 - Westlake

Cross Section: BN1520 to BN1410
Chainages: 1021.895 km to 1026.680 km
AMTD: 56.765 km to 51.980 km

Potential Flooding

From BN1510 to BN1500, flooding generally follows Pullen Pullen Creek, with those properties bordering the creek suffering inundation during a 100 year ARI flood event. This area appears to be largely open space.

From BN1470 to BN1480, those properties in Westlake Drive will experience varying degrees of flooding.

Significant flooding occurs from BN1470 to BN1460, with floodwaters extending into Westlake and the properties surrounding it. Properties as far south as Raeside Street, east to Pending Street and west to the end of Westlake Drive will suffer flooding.

Another very large area of flooding occurs between BN1450 and BN1440 due to Mt Omaney Creek. The McLeod Country Golf Course, park, treatment works and the Jamboree Heights Primary school will all be inundated during a 100 year ARI flood event. Properties into Horizon Drive, Westlake Drive and Arrabri Avenue will also all suffer flooding.

At BN1400 flooding will occur along an unnamed creek (adjacent to Moggill Creek), with floodwaters extending into largely undeveloped land. Properties on the northern side of Moggill Creek will also suffer problems with inundation as will the University of Queensland Veterinary Farm.

Revegetation

- At BN1410 (Jindalee Park), full tree planting was tested with flood level increases of 10 mm.
- All revegetation is to a standard of roughness n = 0.15.
- There is considerable existing vegetation along the riverbanks throughout this reach. Therefore, the banks in this reach could be classified as zones of ecological significance.

Regulation Lines

- The regulation lines at BN1470, BN1430 and BN1420 have been set using the 15 m buffer rule as this is the governing criteria.
- BN1520, BN1510, BN1490, BN1460 and BN1440 used a combination of the 15 m buffer rule and extent of inundation to achieve the maximum allowable afflux.
- BN1500 and BN1450 used a combination of moving the regulation line on the one bank and extent of inundation on the other bank to achieve the maximum allowable afflux.

- BN1500, BN1480 and BN1410 used a combination of the buffer rule on one bank and the moving of the regulation line on the other bank until the maximum allowable afflux was obtained
- The range of affluxes in this reach with revegetation and regulation lines in place varies from -40 to 70 mm.

Zoning Adjustments

- From BN1520 to BN1410, those riverside properties zoned Residential A should be rezoned to Open Space. Those properties in Callabonah Street, Barcoorah Street, Westlake Drive, Carnegie Street, Mt Omaney Drive and Coolaroo Drive will be most effected should rezoning occur.
- From BN1520 to BN1500 those properties zoned Rural Residential should be rezoned to Open Space.
- From BN1490 to BN1410 those properties zoned Special Use should be rezoned to Open Space

Reach 9 - Mermaid Reach

Cross Section: BN1400 to BN1270
Chainages: 1026.900 km to 1031.995 km
AMTD: 51.76 km to 44.665 km

Potential Flooding

Extensive flooding of properties occurs throughout the whole of this reach. Between BN1270 and BN1280, a localised area of flooding inundates properties as far south as Cliveden Avenue with flooding occurring in parts of Teesdale Street, Richmond Street and Oxley Terrace and west to properties in Blackheath Road.

From BN1290 to BN1340, the largely undeveloped area bounded by Seventeen Mile Rocks Road will be inundated during a 100 year ARI flood event. Also in this region, properties in Newland Street and the Fig Tree Pocket Pony Club will also suffer flooding.

From BN1340 to BN1360 flooding occurs through the watercourse (located near Jindalee Bridge) and extends past Oldfield Road. Properties in Yallambee Road, Capitol Drive, Sinnamon Road and parts of Oldfield Road will all be inundated during a 100 year ARI flood event.

From BN1370 to BN1400, a large area of flooding occurs through a highly developed residential area. Flooding will extend as far South as Curragundi Road and into a section of Arabri Avenue between sections BN1380 and BN1390. From BN 1390 to BN1400, this flooding is limited to properties along Mt Omaney Drive and Bareena Avenue. On the northern side of the river, flooding occurs through mostly undeveloped land north into Scenic Road.

Revegetation

- At BN1400 (Jindalee Park), full tree planting was tested with flood level increases 0.01 m. All revegetation is to a standard of roughness, n = 0.15.
- There is considerable existing vegetation throughout this reach and the riverbanks may therefore be considered areas of ecological significance.

Regulation Lines

- The 15 meter buffer rule was generally used for cross sections in this reach.
- BN1400, BN1370 and BN1330 on one bank regulation line used the 15 m buffer rule and the other bank regulation line has been moved until the maximum allowable afflux has been achieved.
- At BN1360 one bank regulation line has been set at inundation and the other bank has been set using the 15 m buffer rule.
- From BN1270 through to BN1300, regulation lines are set along the riverbank affect Residential A and Future Urban areas.

- Regulation lines extend significantly into areas zoned as Residential A and Non Urban between sections BN1330 and BN1320.
- Between BN1300 and BN1310 a significant amount of General Industry land is affected by the regulation lines.
- Between BN1330 and BN1400 significant amounts of Residential A, Future Urban, Rural Residential, Particular Development and CN land is affected by the regulation lines.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from -40 to 120 mm.

Zoning Adjustments

- The property zoned General Industry and Future Industry between sections BN1290 and BN1310, should be rezoned to Open Space, extending back to Sinnamon Road.
- Residential A properties within this reach should be assessed as to the extent to which regulation lines affect the properties and zoned Open Space as appropriate.
- Properties zoned Future Urban should be rezoned to Open Space.
- Particular development and CN properties should be assessed on an individual basis and rezoned to Open Space as appropriate.

Reach 10 - Sherwood Reach

Cross Section: BN1260 to BN1200
Chainage: 1032.230 km to 1034.890 km
AMTD: 46.430 km to 43.770 km

Potential Flooding

From BN1200 to BN1210, properties bounding Cubberla Creek will all suffer flooding during a 100 year ARI flood event, especially those properties in Jesmond Drive, Needham Street, Ningana Street, Aminga Street and Sprenga, Karella and Thiesfield Streets. On the Eastern side of the River, some properties in Molonga Terrace, Long Street and Kianga Streets will all experience flooding.

From BN1220 to BN1230, Sherwood Forest Park and those streets bounding it, will suffer inundation, especially Turner, Jolimont, Ferry and Joseph Streets. On the Western side, some properties in Jesmond road will experience a degree of flooding.

In the 100 year ARI event, extensive flooding into residential areas will occur between BN1240 and BN1260, with only the higher properties in the Cylene Court and Michelangelo / Botticelli Street vicinity being unaffected.

Revegetation

- From BN1250 to BN1260 (Mandalay Park) and at BN1220 (Sherwood Forest Park), full tree planting was tested with no increase in flood levels.
- All revegetation is to standard of roughness of n = 0.15
- From BN1240 to BN1260, there is considerable existing vegetation and therefore, the riverbanks may be considered as areas of ecological significance.

Regulation Lines

- The 15 m buffer rule has been applied to regulation lines throughout this reach.
- Between BN1200 and BN1210, regulation lines will extend into existing private residences and also into an area of land zoned as Non Urban.
- From BN1210 to BN1260, numerous private residences will be affected by the regulation lines to a certain extent.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from 90 to 150 mm.

Zoning Adjustments

- The property designated as Future Urban should be partially rezoned to incorporate an Open Space corridor to the extent of the regulation lines between BN1210 and BN1220.
- From BN1200 to BN1260, properties zoned Residential A should be assessed to determine the extent to which regulation lines affect properties. Those properties significantly affected by the regulation lines should be rezoned to Open Space.
- Special Use, Particular Development and Non Urban properties should be assessed on an individual basis and rezoned as appropriate.

Reach 11 - Chelmer Reach

Cross Section: BN1190 to BN1150
Chainage: 1035.474 km to 1036.915 km
AMTD: 43.246 km to 41.745 km

Potential Flooding

In this reach, flooding is limited to a localised pocket between sections BN1160 and BN1170, with some flooding on the Eastern side.

The localised flooding between sections BN1160 and BN1170 extends as far inwards as Moggill Road and is bounded on the southern side by Boundary Road, with some flooding into Market and Minkara Streets. Flooding on the Northern side generally follows Witton Creek, with flooding extending into Kate Street, Vera Street and Aaron Place. On the eastern side, properties in Longman Terrace, Sutton and Morley Streets will all suffer inundation during a 100 year ARI flood.

Between sections BN1170 and BN1180, another localised area of flooding occurs causing inundation in properties located in Brinkworth Place, Jainba and Jerrang Streets.

From BN1180 to BN1190, properties bounding Cubberla Creek will experience flooding problems, especially those properties in Dobell Street and parts of Clandon and Forlong Streets.

Revegetation

- No revegetation was assessed in this reach.
- As there is considerable existing vegetation throughout this whole reach, the riverbanks and the areas bounding Cubberla Creek, could be considered an area of ecological significance.

Regulation Lines

- The 15 m buffer rule has been applied to regulation lines throughout this reach.
- Throughout this reach, regulation lines will extend significantly into private residential properties. Some properties will be affected by the regulation lines to a greater extent than others.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from 110 to 140 mm.

Zoning Adjustments

- Rezone those Residential A and Residential B properties, significantly affected by the regulation lines, to Open Space (OS), especially those properties in Sutton Street and Morley Street.

Reach 12 - Indooroopilly Reach

Cross Section: BN1140 to BN1070
Chainage: 1037.090 km to 1039.100 km
AMTD: 41.570 km to 39.560 km

Potential Flooding

There is an extensive area of flooding of this whole reach, especially on the Chelmer side of the river. From BN1110 to BN1070, flooding occurs as far back as Kitchener / Appel Street with this corridor narrowing at BN1080 to Chanter Street. Chelmer Oval, Faulkner park, Graceville Memorial Park, the Graceville Primary School and a very large number of residences will all be inundated during a 100 year ARI flood event.

On the Eastern side of the river, flooding is limited to Thomas and Sir John Chandler Park, with some properties in Ivy Street, Clarence Road and Glencairn Avenue suffering some flooding.

Revegetation

- No revegetation was assessed in this reach.
- There is considerable existing vegetation throughout this reach, thus the riverbanks could be considered an area of ecological significance.

Regulation Lines

- The 15 m buffer rule has generally been applied to regulation lines throughout this reach.
- BN1140 regulation lines were set using the 15 m buffer rule on one side and adjusted on the other side until the maximum allowable afflux was achieved.
- BN1120 regulation lines were adjusted on both sides until the maximum allowable afflux was achieved.
- Regulation lines at BN1070 used the 15m buffer rule on the left bank and extent of cross section on the right bank due to lack of topographical and cadastral information at this location.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from 60 to 150 mm.

Zoning Adjustments

- Rezone Residential A properties in Leybourne Street and Queenscroft Avenue between BN1070 and BN1080 to Open Space (OS).
- Properties in Ivy and Roseberry Streets should be rezoned from Residential A to Open Space.
- Particular Development and Special Use properties should be assessed on an individual basis and rezoned as appropriate.

Reach 13 - Canoe Reach

Cross Section: BN1060 to BN990
Chainage: 1039.565 km to 1041.960 km
AMTD: 39.095 km to 36.700 km

Potential Flooding

The majority of flooding in this reach is confined to the Oxley Creek / Moolabin Creek areas, with some localised pockets of inundation.

From BN1060 to BN1040, properties bounding Oxley Creek will all suffer inundation with the limits being Tweedale/Blackwood Street to the west and David Street to the east with those higher properties in King Arthur Terrace, Merlin and Camelot Streets being immune to flooding. Sir John Chandler Park and the Indooroopilly Golf Course will be completely inundated during a 100 year ARI flood event.

From BN1020 to BN1010, flooding occurs through the Yeerongpilly Animal Research Institute and floods some properties in Paragon and Ortive Streets. Flooding along Moolabin Creek is also a problem in this area, with the Brisbane Golf Course and properties back to Tennyson Memorial Avenue and Station Road being affected.

From BN1000 to BN990, the main problem areas in a 100 year ARI flood event will be Stevens Street and Nelson Street back to Fairfield Road. Some properties in Yeronga, Feez and Astolat Streets will also be affected by flooding to some extent.

Revegetation

- From BN1020 to BN1030 (adjacent Yeerongpilly Animal Research Institute), full tree planting was tested with flood level increases of the order of 0.01 m.
- All revegetation is to a standard of roughness of n = 0.15.
- There is considerable existing vegetation throughout this reach, thus the riverbanks could be considered an area of ecological significance.

Regulation Lines

- Regulation lines at BN1060 to BN 990 used the 15 m buffer rule on the left bank and extent of cross section on the right bank due to lack of topographical and cadastral information at these locations.
- From BN990 to BN1010 and from BN1030 to BN1050, regulation lines will extend into the rear of numerous private dwellings.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from 80 to 130 mm.

Zoning Adjustments

- Rezoning of Residential B dwellings in Rome Street south, Astolat Street, Feez, Yeronga and Steven Streets to Open Space (OS) is recommended between BN990 and BN1010.
- It is also recommended that from sections BN1040 and BN1060, those Residential A properties in King Arthur Terrace, Verney Road East, Jarda Street and White Street should be rezoned to Open Space (OS).

Reach 14 - Long Pocket Reach

Cross Section: BN980 to BN910
Chainage: 1042.235 km to 1044.860 km
AMTD: 36.425 km to 33.800 km

Potential Flooding

The majority of flooding in this reach is confined to the Indooroopilly Golf Course, with some local flooding in the Yeronga area.

From BN980 to BN970, some minor flooding will occur to properties located in Instow Street and the Yeronga Animal Hospital will also be affected.

From BN960 to BN950, the flooding becomes more widespread with properties along the Esplanade, Diane Street, Ormadale Street, Oriana Crescent and Aranui Street all being affected. Flooding on the eastern side of the river will affect the CSIRO to some extent.

From BN940 to BN930, flooding is limited to Brisbane Corso and Orlando Road with some properties in Otaki and Ormuz Roads also being affected.

In a 100 year ARI flood event, flooding will extend to Hyde Road from BN920 to BN910, affecting properties as far south as Utzon, Grounds and Siedler Streets. Goodwin Park will also be inundated.

Revegetation

- From BN940 to BN960 (Sandy Creek), full tree planting was tested with flood level increases of the order of 10 mm.
- Community Groups suggest that existing vegetation on the banks around the confluence of Sandy Creek should be revegetated using native flora. This has therefore been included in the modelling to the n = 0.15 standard.
- There is considerable existing vegetation throughout the whole reach, and the riverbanks could therefore be considered an area of ecological significance.

Regulation Lines

- Regulation lines at BN980 to BN960 used the 15 m buffer rule on the left bank and extent of cross section on the right bank due to lack of topographical and cadastral information at these locations.
- From BN950 to BN910, regulation lines have been set using the 15 m buffer rule.
- Regulation lines will pass through numerous private residences throughout the reach.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from 10 to 120 mm.

Zoning Adjustments

- Rezoning of waterfront existing Residential A properties in Brisbane Corso, Ormadale Road and Kadumba Street to Open Space (OS) is recommended throughout this reach.
- Special Use and Particular Development properties should be assessed on an individual basis and rezoned as appropriate.

Reach 15 - Cemetery Reach
Cross Section: BN900 to BN830
Chainage: 1045.400 km to 1047.915 km
AMTD: 33.260 km to 30.745 km

Potential flooding
There is considerable flooding in this reach from BN870 through to BN900.

At BN900, flooding mainly affects the Downs Oval, Leyshan Park and Fehlberg Oval. In a 100 year ARI flood event, properties as far back as the Railway line, Kadumba Street and a small area as far back as Cowper Street will all be affected by flooding. Properties in William Parade, Turner Avenue and Brougham Street will also suffer inundation.

From BN890 to BN880, a large area of flooding extends as far east as the railway line, south to Fairfield Road / Sydney Street/Cruthley Street and north into the cemetery.

Flooding is limited to the riverbank areas with some properties in Rosecliff and Borva Streets being affected by flooding from BN870 to BN840. It is anticipated that the University of Queensland will be affected by flooding as well. However, additional topographical and cadastral information is required before this can be finalised.

At BN830, a small area of localised flooding occurs during a 100 year flood event. Properties in Athens Street, Dudley Street and Glenfield will all be affected by flooding. On the southern side of the river, flooding extends as far back as to affect properties in Underhill Street.

Revegetation
- At BN900 (Brisbane Corso Reserve), full tree planting was tested with flood level increases of the order of 0 mm.
- All revegetation is to a standard of roughness of n = 0.15.
- There is considerable existing vegetation throughout this reach, and thus the riverbanks may be considered an area of ecological significance.

Regulation Lines
- The 15 m buffer rule has been applied to regulation lines throughout this reach.
- BN860 regulation lines have been set using the 15 m buffer rule on one bank and adjusted on the other bank until the maximum allowable afflux was achieved.
- From BN830 to BN860, regulation lines will extend past the Open Space buffer zone and into the rear of numerous Residential B dwellings. The University of Queensland will also be significantly affected by the regulation lines.

- From BN880 to BN890, the 15 m buffer rule causes regulation lines to extend into private residences.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from 60 to 110 mm.

Zoning Adjustments

- Rezone waterfront Residential B dwellings in Dudley Street, Fraser Terrace, Rosecliff and Borva Streets to Open Space (OS).
- From BN880 to BN890, rezone waterfront residences in Brisbane Corso to Open Space (OS).
- Special Use properties within this reach should be assessed on an individual basis and rezoned as appropriate.

Reach 16 - St Lucia Reach

Cross Section: BN820 to BN810
Chainage: 1048.375 km to 1048.890 km
AMTD: 30.285 km to 29.770 km

Potential Flooding

There is a considerable flooding of residential areas in this reach.

On the St Lucia side, properties as far back as Sixth Avenue at BN820 and Sir Fred Schonell Drive at BN810 are inundated during a 100 year ARI flood event. Parts of Mitre, Durham and Warren Streets are also affected.

On the northern side, flooding extends as far as Jumna Street at BN820 and Cordaeux Street at BN810.

Revegetation

- At BN810 (Orliegh Park), full tree planting was tested with increases in flood levels of 10 mm.
- All revegetation is to a standard of roughness of n = 0.15.

Regulation Lines

- The 15 m buffer rule has been applied to regulation lines throughout this reach.
- From BN810 to BN820, due to the 15 m buffer rule, regulation lines will extend into numerous residential dwellings.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from 60 to 80 mm.

Zoning Adjustments

- Although a zone of Open Space along Orliegh, Avebury and Glenfield Streets has already been defined, this should be extended to include those existing waterfront Residential B properties in these streets.
- On the St Lucia side, those waterfront Residential B properties in Hiron, Laurence and Macquarie Streets should be rezoned to Open Space (OS).

Reach 17 - Toowong Reach

Cross Section: BN800 to BN750
Chainage: 1049.120 km to 1050.860 km
AMTD: 29.540 km to 27.800 km

Potential Flooding

Flooding in this reach is concentrated around Toowong Creek and a few small areas of localised flooding. The Hill End / West End side of the River is consistently flooded.

At BN800, a small pocket of flooding occurs as far south as Armadale Street, east to Austral Street and west to Glen Olive Lane. On the northern side of the river, properties back to Drury Street/ Cordeaux Street will suffer inundation.

At BN 790, flooding in a 100 year ARI flood event is concentrated around Toowong Creek. Flooding occurs as far South in places as Whitmore Street and west to Josling Street with some properties in Mayne, Holmes and Herbert Streets being affected.

From BN780 to BN770, the main problems with flooding during a 100 year ARI flood event occurs through Hillend Terrace, Forbes, Drury Streets and Ferry Road. Some properties in Brisbane Street and Glen Road in Toowong will also suffer flooding problems.

From BN760 to BN750 there are large areas of flooding. On the West End side of the river, flooding extends as far back as Montague Road. On the Toowong side, there are two localised flooding areas, one extending along Landsborough Street up to Osyth / Cadell Street and back down to the railway line. The other pocket of flooding extends along Park Avenue to Milton Road and again back to the railway line. Higher properties in the area bounded by Dunmore Terrace, Lang Parade and Chasely Street are immune to flooding.

Revegetation

- From BN790 to BN800 (Orliegh Park) and at BN750 (Scott Street open Space), full tree planting was tested with no increase in flood levels.
- All revegetation is to a standard of roughness of n = 0.15.

Regulation Lines

- The 15 m buffer rule has been applied to regulation lines throughout this reach.
- BN 770 regulation lines were set using the 15 m buffer rule on one bank and adjusted on the other bank until the maximum allowable afflux was achieved.
- BN760 regulation lines have been set adjusting both banks until the maximum allowable afflux was achieved.

- At BN750, regulation lines are located at property boundaries.
- From BN 760 to BN790, regulation lines will pass through a block of Residential B dwellings and through numerous properties zoned Special Development.
- At BN800, regulation lines are located at the riverbank.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from 15 to 100 mm.

Zoning Adjustments

- From BN760 through to BN790, those waterfront Residential B properties should be rezoned to Open Space (OS), particularly those located in Archer Street, Land Street, Glen Road, Brisbane Street and Sandford Street.
- Particular Development and Special Development properties should be assessed on an individual basis and rezoned as appropriate.

Reach 18 - Milton Reach

Cross Section: BN740 to BN700
Chainage: 1051.360 km to 1052.390 km
AMTD: 27.300 km to 26.270 km

Potential Flooding

Flooding in this reach is mainly concentrated on the West End side of the river, but a lack of contour information limits the determination of the extent of actual flooding.

At BN740, there is a localised area of flooding in Milton, extending back to Milton Road with several properties in Baroona Road being affected. This flooding extends out to Park Street at its worst.

From BN720 to BN700, problems with inundation during a 100 year ARI flood event occur as far back as Oxford Street on the eastern side of the river.

Revegetation

- No revegetation was assessed through this reach.

Regulation Lines

- The 15 m buffer rule has been applied to regulation lines throughout this reach.
- At BN730 the regulation lines were adjusted on both sides until the maximum allowable afflux was achieved.
- From BN720 through to BN740, the regulation lines extend into properties zoned as Special Development.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from 80 to 110 mm.

Zoning Adjustments

- The majority of this reach is zoned Special Development, therefore no rezoning of this reach has been recommended.

Reach 19 - South Brisbane Reach

Cross Section: BN690 to BN600
Chainage: 1052.595 km to
AMTD: 26.065 km to

Potential Flooding

Properties along Garden's Point Road and Wharf Road will experience problems with flooding during a 100 year ARI flood event. Southbank will be inundated as will Stanley Street, Grey Street and parts of Melbourne Street.

Revegetation

- No revegetation was assessed throughout this reach.

Regulation Lines

- The 15 m buffer rule has been applied throughout this reach.
- At BN660 the regulation lines were adjusted on both sides until the maximum allowable afflux was achieved.
- From BN600 through to BN690, regulation lines are generally located at the riverbank.
- Affluxes in this reach with revegetation and regulation lines in place range from 50 to 160 mm.

Zoning Adjustments

- As no intrusion into private residences occurs in this reach, no rezoning adjustments are recommended.
- Special Use and Particular Development properties should be assessed on an individual basis and rezoned as appropriate.

Reach 20 - Town Reach

Cross Section: BN590 to BN500
Chainage: 1054.680 km to 1056.865 km
AMTD: 23.980 km to 21.965 km

Potential Flooding

The major areas of concern with respect to inundation during a 100 year ARI flood in this reach are sections of the city and Kangaroo Point.

From BN590 to BN550, properties along River Terrace, Lower River Terrace and Garden's Point Road will all experience problems with flood inundation.

From BN540 to BN530, the Botanic Gardens will be inundated as will the City back to Charlotte Street, with parts of Mary, Margaret, Albert and Edward Streets experiencing flooding. Properties in Felix and Eagle Streets will experience flooding as will parts of Bright, Thornton and Hamilton Streets.

From BN520 to BN500, properties on Kangaroo Point back to the end of Anderson Street will experience problems with flooding during a 100 year ARI flood. On the City side, properties in Howard Street up to Queen Street will suffer inundation. At BN500, some properties in Bowen Street will experience problems with flooding.

Revegetation

- From BN540 to BN560, full tree planting was tested with flood level increases in the order of 10 mm. All revegetation is to a standard of roughness of $n = 0.15$.
- At section BN520, there is considerable existing vegetation and may be classified as an area of ecological significance.

Regulation Lines

- The 15 m buffer rule has been applied throughout this reach.
- From BN500 to BN530, regulation lines will pass through existing properties zoned Special Development.
- From BN540 to BN590, regulation lines extend into property already zoned Open Space.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from 30 to 70 mm.

Zoning Adjustments

- As the regulation lines do not affect any private residences, no rezoning for this reach has been recommended.
- Special Development, Particular Development and Central Business should be assessed on an individual basis and rezoned as appropriate.

Reach 21 - Shaftston Reach

Cross Section: BN490 to BN440
Chainage: 1056.95 km to 1058.530 km
AMTD: 21.71 km to 20.130 km

Potential Flooding

From BN490 to BN480, properties along Bowen Terrace will suffer problems with inundation during a 100 year ARI flood event. From BN480 to BN460, properties along Dockside and Kangaroo point back to Wharf Street will all suffer flooding with Holman and Anderson Streets being completely inundated.

Flooding will be experienced by properties in Sydney and Griffith Streets from BN440 to BN450.

Revegetation

- No revegetation was assessed through this reach.

Regulation Lines

- The 15 m buffer rule has been applied throughout this reach.
- Through this reach, regulation lines are located through properties zoned as Special Development.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from 20 to 40 mm.

Zoning Adjustments

- No residential areas are affected by regulation lines through this reach, however consideration should be given to rezoning the considerable number of waterfront Special Development areas throughout this reach to Open Space (especially along Kangaroo Point).

Reach 22 - Humbug Reach

Cross Section: BN430 to BN400
Chainage: 1058.735 km to 1059.990 km
AMTD: 19.925 km to 18.670 km

Potential Flooding

This reach has localised flooding problems associated with Norman Creek.

From BN420 to BN410, there is extensive flooding associated with properties adjacent to Norman Creek. Properties as far northeast as Overend and Wordsworth Streets will experience inundation, as will properties to the west in Barker, Ashfield and Clarendon Streets to Mowbray Terrace.

At BN420, a localised area of flooding occurs in Moray and Sargent Streets to Mountford Road with Oxlade Drive and parts of Hazelwood Street being inundated.

Revegetation

- No revegetation was assessed through this reach.

Regulation Lines

- The 15 m buffer rule has been applied throughout this reach.
- From BN400 to BN410, the 15m buffer rule has resulted in regulation lines being situated through private dwellings.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from 10 to 20 mm.

Zoning Adjustments

- Properties zoned Residential A along Wynnum Road and Wendell Street should be rezoned Open Space.
- Properties currently zoned Special Development should be assessed on an individual basis and rezoned as appropriate.

Reach 23 - Bulimba Reach

Cross Section: BN390 to BN330
Chainage: 1060.345 km to 1062.940 km
AMTD: 18.315 km to 15.720 km

Potential Flooding

From BN370 to BN350, there is a very large area of flooding primarily covering residential dwellings. The large industrial area bounded by Stuart and Barramul Streets will be flooded and the flooding will extend inwards as far as Riding Road in places, south to Orchard Street and north to Oxford Road.

At BN370, there will be some flooding associated with properties in Gordon, Scott and parts of Malcolm Streets.

From BN350 to BN330, another localised area of flooding extends through a primarily industrial area back to Commercial road, generally following Breakfast Creek Road north to Breakfast Creek. The higher properties in Newstead Avenue and Halford Streets are the exception to the flooding.

Revegetation

- At BN340 (Newstead Terrace Reserve), full tree planting was tested with no increases in flood level.
- All revegetation is a standard of roughness of n = 0.15.
- Sections of BN390 can be considered an area of ecological significance due to the existing vegetation.

Regulation Lines

- The 15 m buffer rule has been applied throughout this reach.
- From BN320 through to BN390, regulation lines are situated through numerous private dwellings and properties zoned service trades.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from -10 to 10 mm.

Zoning Adjustments

- Blocks of Residential A dwellings along Quay Street, Leura Terrace, Barton Road, Gordon Street, Scott Street, Uhlman Street and Aaron Avenue should be rezoned to Open Space.
- Consideration to rezoning all waterfront service industries to Open Space should also be given consideration.

Reach 24 - Hamilton Reach

Cross Section: BN320 to BN260
Chainage: 1068.310 km to 1065.990 km
AMTD: 15.30 km to 12.670 km

Potential Flooding

At BN270, properties in Taylor Street and lower ends of Carbeen, Karthena and Michael Streets will experience flooding during a 100 year ARI flood event.

McConnell Street, Merry Street, Melrose, Cowper, River end of Kenbury, Bulimba, Banya, Johnston, Harrison, Tennyson and Shakespeare Streets will all suffer from flooding.

Revegetation

- No revegetation has been assessed for this reach.
- At BN290 there is existing vegetation and, as such, the riverbank in this area could be considered as a zone of ecological significance.

Regulation Lines

- The 15 m buffer rule has been applied throughout this reach.
- BN270 and BN 260 include a maximum allowance of allowance of 30 m for wharfs in lieu of the 15 m buffer rule.
- From BN290 to BN310, the 15m buffer rule has resulted in the regulation lines being situated through private residences along McConnell Street.
- At BN320, regulation lines are situated along the riverbank edge.
- The affluxes in this reach with revegetation and regulation lines in place are -20 mm.

Zoning Adjustments

- Properties zoned residential in McConnell Street between BN290 and BN300 should be rezoned to Open Space.
- Properties zoned Particular Development, Special Use and General Industry should be assessed on an individual basis and rezoned as appropriate.

Reach 25 - Quarries Reach

Cross Section: BN250 - BN220
Chainage: 1066.505 km to 1067.965 km
AMTD: 12.155 km to 10.695 km

Potential Flooding

At BN250, properties in Riverside Place back to Lytton Street will all suffer from inundation in a 1 in 100 year storm event.

From BN230 to BN220, flooding will occur onto the Royal Queensland Golf Course.

Revegetation

- From BN220 to BN230 (Royal Queensland Golf Course), full tree planting was tested with no increase in flood levels.
- All revegetation is to a standard of roughness of n = 0.15.

Regulation Lines

- Regulation lines in this reach include a maximum allowance of 30m for wharves and associated waterfront development. This is in lieu of the 15 m buffer rule.
- At BN250, regulation lines extend into existing properties. However, the flooding extends into properties zoned waterfront activities and an allowance has been made for wharves in lieu of the 15 m buffer zone.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from -30 to 0 mm.

Zoning Adjustments

- Zoning through this reach is predominantly Waterfront Activities and industrial. As such, no recommendations for rezoning have been made.

Reach 26 - Lytton Reach

Cross Section: BN210 - BN110
Chainage: 1068.660 km to 1073.485 km
AMTD: 10.00 km to 5.175 km

Potential Flooding

At BN190, flooding during a 100 year ARI flood event will affect those properties along Macarthur Avenue.

From BN170 to BN160, flooding occurs into Unwin Road, Randle Street, parts of Macarthur Avenue and back into the airport.

From BN130 to BN120, flooding only appears to occur in open space areas.

Revegetation

- No revegetation was assessed in this reach.

Regulation Lines

- Regulation lines in this reach include an maximum allowance of 30 m for wharves and associated waterfront development. This is in lieu of the 15 m buffer rule.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from -20 to 60 mm.

Zoning Adjustments

- Properties in this reach are predominantly zoned Industrial or Waterfront Industry. No modifications to the zonings is required.

Reach 27 - Lytton Rocks Reach

Cross Section: BN100 to BN70
Chainage: 1074 km to 1075.480 km
AMTD: 4.660 km to 3.180 km

Potential Flooding

This reach experiences extensive flooding, especially from BN110 to BN90, where floodwaters inundate properties in Pritchard Street, South Street, Lytton Road, Trade Street and Export Street. Flooding also affects properties in Pamela and Tingara Streets all the way through to Boggy Creek.

Revegetation

- At BN70 and BN90, full tree planting was tested with no increase in flood levels.
- All revegetation is a standard of roughness of n = 0.15.
- The occurrence of existing vegetation at section BN80 indicates that the riverbanks in this section could be considered a zone of ecological significance.

Regulation Lines

- Regulation lines in this reach include an maximum allowance of 30 m for wharves and associated waterfront development. This is in lieu of the 15 m buffer rule.
- Regulation lines in this reach generally follow the bank profile. From BN70 to BN80, some intrusion into the bank does occur, however in this instance an allowance has been made for wharves and associated waterfront development.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from -10 to 0 mm.

Zoning Adjustments

- As this reach is predominantly zoned Industrial and Waterfront Development, no rezoning recommendations have been made.

Reach 28 - Pelican Banks Reach

Cross Section: BN60 to BN40
Chainage: 1076 km to 1077.010 km
AMTD: 2.66 km to 1.650 km

Potential Flooding

No developed properties appear to be affected by flooding through this reach, although there will be some flooding throughout existing low lying areas.

Revegetation

- From BN40 to BN60, full tree planting was tested with no increase in flood levels.
- All revegetation is to a standard of roughness of n = 0.15.
- Due to the existing natural vegetation, the riverbanks at section BN40 could be considered a zone of ecological significance.

Regulation Lines

- Regulation lines in this reach include a maximum allowance of 30m for wharves and associated waterfront development from BN60. This is in lieu of the 15 m buffer rule.
- Regulation lines in this reach generally follow the riverbank. Some intrusion into the bank occurs at section BN50, however this is into undeveloped swampy land.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from -10 to 0 mm.

Zoning Adjustments

- This reach is predominantly zoned Industrial and Waterfront Development. As such, no recommendations for rezoning have been made for this reach.

Reach 29 - Lower Reach

Cross Section: BN30 to BN0
Chainage: 1077.510 km to 1078.66 km
AMTD: 1.150 km to 0 km

Potential Flooding

During a 100 year ARI flood event, flooding will affect existing grain and container terminals on Fisherman Island to some extent.

Revegetation

- From BN10 to BN30, full tree planting was tested with no increase in flood levels.
- All revegetation is to a standard of roughness of n = 0.15.

Regulation Lines

- Regulation lines in this reach are generally located in low lying areas.
- The range of affluxes in this reach with revegetation and regulation lines in place varies from -10 to 0 mm.

Zoning Adjustments

- This reach is mainly zoned Industrial or Waterfront Industry. No rezoning through this reach is recommended.

10. Hydraulic Assessment of Structures

10. Hydraulic Assessment of Structures

10.1 Hydraulic Capacity of Crossings

The performances of seven major bridges were individually assessed under design flood conditions. These structures are listed in **Table 10-1 - List of Assessed Hydraulic Structures for Brisbane River**.

Table 10-1 - List of Assessed Hydraulic Structures for Brisbane River

No.	Structure Name	Cross Section Number	MIKE 11 Chainage (km)	AMTD (km)	Structure Description
1	Centenary	BN 1350	1 028.72	49.94	Major Public Bridge
2	Indooroopilly	BN 1130	1 037.11	41.55	Major Public Bridge
3	Merivale	BN 710	1 052.37	26.29	Major Public Bridge
4	William Jolly	BN 680	1 052.63	26.03	Major Public Bridge
5	Victoria	BN 640	1 053.36	25.83	Major Public Bridge
6	Captain Cook	BN 600	1 054.66	24.00	Major Public Bridge
7	Story	BN 495	1 056.92	21.74	Major Public Bridge

Note: All structures were modelled in MIKE 11 as irregular culverts and weirs.

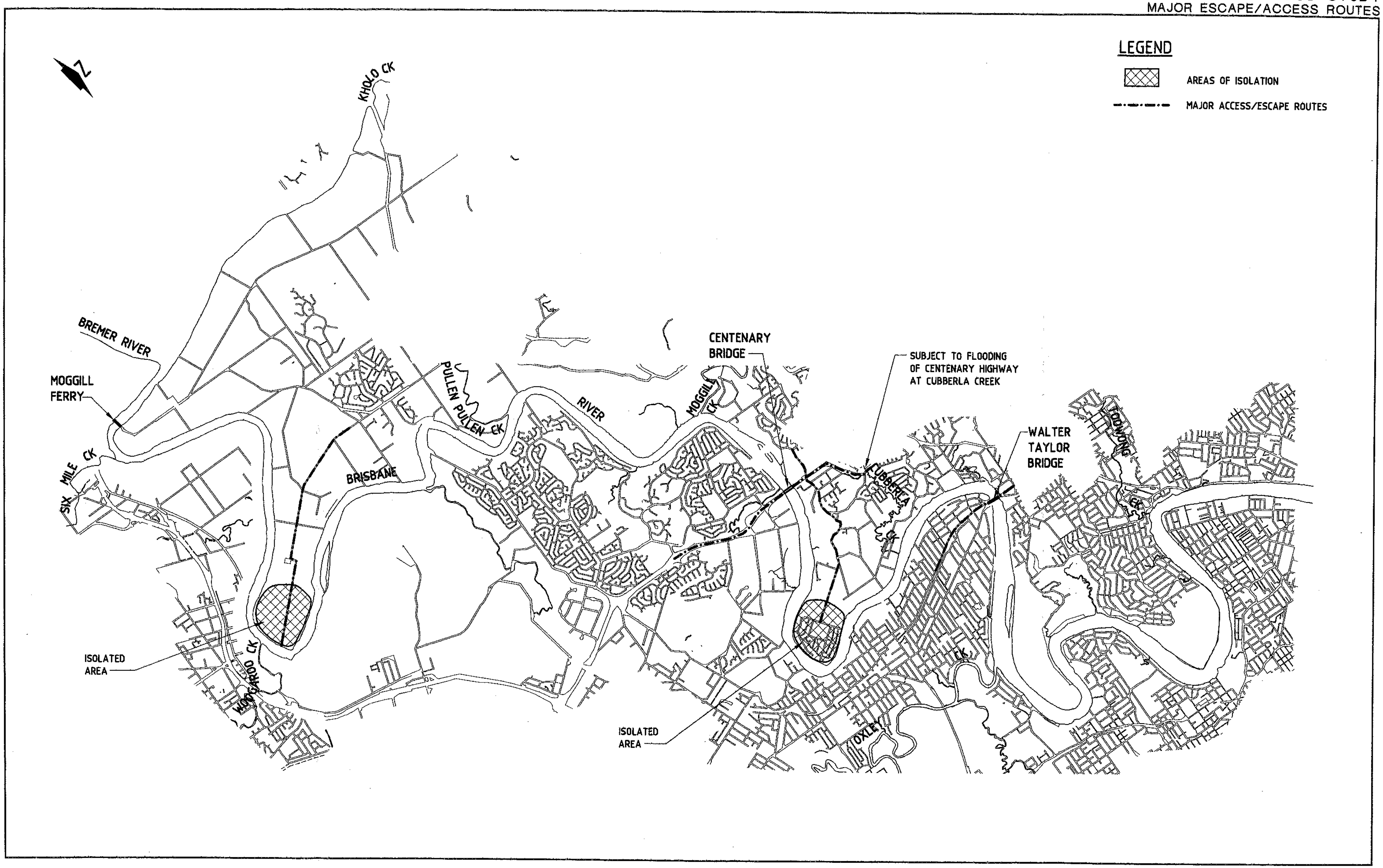
A series of reference sheets were prepared and are compiled in **Appendix K - Hydraulic Structure Reference Sheets**. These are consistent with Council's standard hydraulic structure reference sheets and include:

- Location of Structure
- Structure description and geometry including dimensions and key levels
- Reference to survey data
- Construction date and upgrade information
- General comments

Additional information has been included on the sheets regarding the hydraulic performance of the structure for design flows ranging from 2 year ARI to 100 year ARI.

Rating curves for the seven major structures were developed using the MIKE 11 hydraulic model for the Brisbane River. These rating curves were determined by taking the peak discharge and peak level for a range of design events directly upstream of each structure. Structure handrails and guardrails were assumed to be fully blocked by debris.

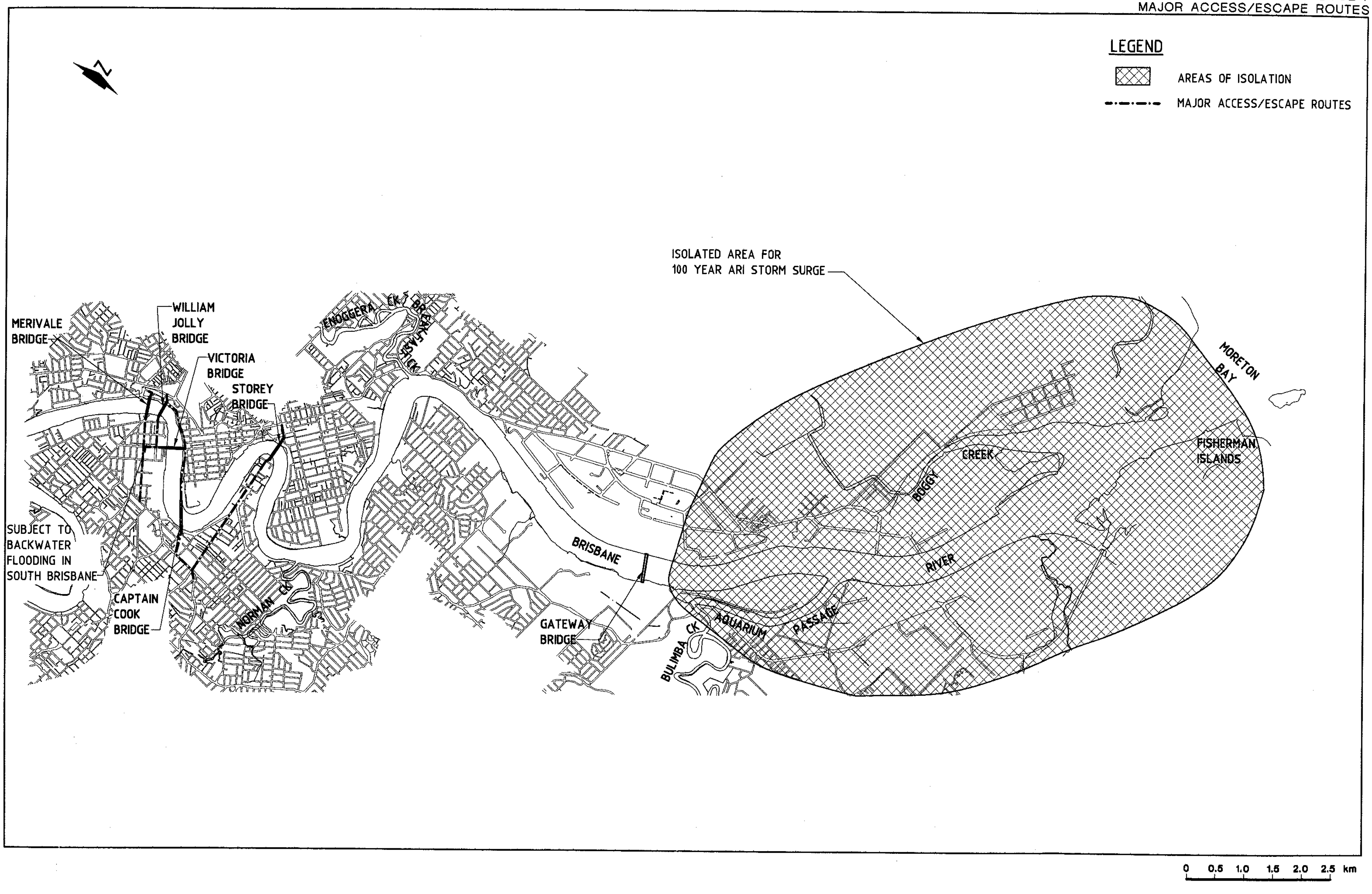
FIGURE 11-2a
BRISBANE RIVER FLOOD STUDY
MAJOR ESCAPE/ACCESS ROUTES



PLOT SCALE: 1=60

FIGURE 11-2b

BRISBANE RIVER FLOOD STUDY
MAJOR ACCESS/ESCAPE ROUTES



PLOT SCALE: 1=60

A rating curve for the Gateway Bridge was not generated as it was considered that the afflux caused would be negligible because of the width of the section and deck level of the structure.

Rating curves were extracted from the reference sheets for incorporation into the Brisbane River Flood forecasting model which is discussed in **Section 11**.

The rating curves provide an indication of the design flood capacity of the structure (ie design flood that just overtops the roadway) and these are summarised in **Table 10-2 - Design Flood Capacities of Major Structures**. The structure capacity was taken as being the design flow having a peak flood level coincident with the lowest point of the structure weir (assuming unblocked handrails).

Appendix L - Rating Curves at Structures tabulates and plots the rating curves that have been generated. The curves also illustrate the recorded historical flood levels and calibrated discharge at the relevant locations. These curves show that some of the smaller historical events data points do not coincide with the generated rating curves. This is most likely due to tailwater conditions at the time of the events. The design events were run using a constant tailwater level of mean high water springs whereas the historical events were subject to varying tailwater levels which occurred at the time of the events. As expected, these effects are more pronounced for the smaller flood events and the structures closer to the river mouth.

Table 10-2 - Design Flood Capacities of Major Structures

No	Structure Name	Design Capacity (Years ARI)
1	Centenary Bridge	41
2	Indooroopilly Bridge	greater than 100
3	Merivale Bridge	greater than 100
4	William Jolly Bridge	greater than 100
5	Victoria Bridge	greater than 100
6	Captain Cook Bridge	greater than 100
7	Story Bridge	greater than 100

10.2 Upgrading of River Crossings

The upgrading of major river crossings was assessed using the following approach:

- Identify structures which have a 100 year ARI afflux exceeding 150 mm. In all cases, blocked handrails have been assumed.

- Based on available ground survey data, determine if these selected structures cause flooding of upstream property or houses for events up to the 100 year ARI flood.

- Discussions with council to determine the practical upgrade potential of some structures.

- Test and recommend upgrades of structures that have high affluxes and contribute to upstream flooding impacts.

The hydraulic structure reference sheets compiled in **Appendix K** were reviewed to identify high afflux structures. Affluxes at each structure are listed in **Table 10-3 - High Afflux Public Structures**.

Table 10-3 - High Afflux Public Structures

No.	Structure	100 Year ARI Afflux (mm)
1	Centenary Bridge	150
2	Indooroopilly Bridge	90
3	Merivale Bridge	170
4	William Jolly Bridge	510
5	Victoria Bridge	180
6	Captain Cook Bridge	80
7	Story Bridge	100

Note: Assumes blocked handrails and guardrails.

Table 10-3 demonstrates that the William Jolly Bridge has an afflux significantly greater than 150 mm for the 100 year ARI flood whilst the Merivale and Victoria Bridges just exceed the 150 mm maximum allowable afflux.

Review of the structure reference sheets indicates that the William Jolly Bridge creates a significant afflux for floods greater than 50 years ARI. This flood coincides with the commencement of inundation of the floodplain on the right bank in the vicinity of the structure. Several properties in this area will be affected by the flooding and the affluxes generated by the William Jolly Bridge and the Merivale Bridge. The exact number of properties affected can not be determined as floor survey data was not available.

Options for upgrading the structures in an efficient manner are limited.

For the Merivale Bridge possible options include improving the hydraulic efficiency of the right overbank area adjacent to the approach or raising the bridge structure. Improving the hydraulic efficiency of the right overbank is not practical due to the large number of buildings that would have to be removed and the associated high costs involved. Raising the bridge is also not practical due to design constraints associated with railway operations and the associated high costs of upgrading. Given that the bridge creates an afflux of 170 mm it is considered that the costs associated with upgrading the structure far exceed the benefits.

The William Jolly Bridge also has limited opportunities for upgrading. Improvement of the right floodplains conveyance is not practical due the large number of properties on the floodplain. Major modifications to the bridge structure such as abutment works or raising the deck are unlikely to be accepted due to the heritage value of the structure.

The Victoria bridge also has limited opportunities for upgrading as the costs involved far out weigh the benefits given that the maximum afflux is 180 mm.

Affluxes associated with the other structures were considered to be acceptable as the cost of upgrading these structures would be high.

11. Flood Forecasting Model

11. Flood Forecasting Model

11.1 Overview

The proposed flood forecasting model was to originally consist of a single RAFTS model which included rating curves derived by the MIKE 11 hydraulic model at structures and stream gauges to predict flood levels at these locations. Since RAFTS cannot account for tidal effects it was assumed that a number of rating curves (dependent on tailwater levels at Brisbane River mouth) would be developed at each structure and stream gauge location. Although RAFTS does not have the facility to link rating curves it was initially envisaged that Council would contract WP Software to develop such a facility. This would enable users to select a tailwater level and RAFTS would then select the appropriate rating curve at each location. Due to time restrictions and the availability of WP Software staff, Council decided that this was not an appropriate option and another methodology was developed.

After discussions with Council it was decided that the most appropriate method was to use both the calibrated RAFTS and calibrated MIKE 11 models. The RAFTS model was used to forecast flood discharge hydrographs at inflow locations and these hydrographs were input into the MIKE 11 model along with an appropriate tailwater level. MIKE 11 was then used to predict flood levels at the required locations.

11.2 RAFTS Model Development

The RAFTS flood forecasting model for the Brisbane River was based on the calibrated RAFTS model developed in the calibration/verification phase of the study.

Radio telemetry gauges within the Brisbane City Boundary were used as rainfall input into the hydrologic model. Each of the gauges were assigned a corresponding RAFTS node dependent on the area of influence of the catchment. The area of influence for each of the radio telemetry stations was determined by the application of a Thiessen polygon. **Table 11-1 - Radio Telemetry Rainfall Stations** presents each of the selected radio telemetry rainfall stations along with the assigned RAFTS node. Each RAFTS node has been assigned a primary gauge and a secondary gauge. The secondary rainfall station has been assigned so that in the event of the primary station failing, the secondary gauge can be used. RAFTS does not automatically select the secondary rainfall station if the primary station fails and therefore the secondary station should be selected manually. The RAFTS nodes assigned to the secondary rainfall station are also presented in **Table 11-1**. **Figure 11-1 - Thiessen Polygons For Radio Telemetry Rainfall Stations** illustrate the areas of influence for each rainfall station.

Radio telemetry rainfall stations in the Bremer and Upper catchments are not accessible and hence inflow hydrographs will have to be used for inflows into the RAFTS model. During flood events it is proposed that the DNR will provide these hydrographs as they have a flood forecasting model for these catchments. The locations of these inflow locations are illustrated on **Figure 11-1**. The main advantage of inputting inflow hydrographs at these locations is that the DNR model accounts for Wivenhoe and Somerset Dam operations.

Previous RAFTS modelling has shown that discharges in the lower reach of the Brisbane River (ie downstream of Mt Crosby) are significantly influenced by the operational procedures used for Wivenhoe and Somerset Dams. The primary effect that dam operations have on the lower Brisbane river is that dam discharges influence water levels at the Brisbane and Bremer Rivers confluence. The water level at this location has a profound impact on the discharge below this confluence due to superimposition of flood hydrographs and the storage effects and therefore an accurate assessment of the release discharge from Wivenhoe Dam was required.

The operational procedures for Wivenhoe and Somerset Dams are quite complex and they cannot be accurately modelled in RAFTS (see **Section 7.8**). The Department of Natural Resources has developed a dam operations model that accurately models dam operations and produces discharge hydrographs at the required locations. It was therefore decided that these inflows be used to complete the input to the MIKE 11 flood forecasting model.

The calibrated RAFTS model was truncated upstream of the Brisbane and Bremer River confluence and each of the nodes were assigned their respective primary rainfall station. Discharge hydrographs predicted by the RAFTS model were then extracted at the following locations:

- JIN1 - Upstream boundary of Brisbane City
- JIN 2 - Bremer River inflow
- POG1 - Oxley Creek inflow
- ENO-OUT - Enoggera Creek inflow
- BUL-OUT - Bulimba Creek inflow

These inflow hydrographs were then used to forecast flood levels using the MIKE 11 hydraulic model.

Table 11-1 - Radio Telemetry Rainfall Stations

	Primary Gauge		Secondary Gauge	
RAFTS Node	Rainfall Station Name	Station Number	Rainfall Station Name	Station Number
JIN1	NA	NA	NA	NA
JIN2	NA	NA	NA	NA
JIN3	Wacol	WSR518	Camira	WGR150
JIN4	Camira	WGR150	Wacol	WSR518
JIN5	Kenmore	GBR017	Kenmore Hills	MVR515
JIN6	Wacol	WSR518	Richlands	BLR116
JIN7	Kenmore Hills	MVR515	Kenmore	GBR017
JIN#	Wacol	WSR518	Camira	WGR150
JIN##	Pullenvale	PLR742	Wacol	WSR518
JIN-OUT	Kenmore	GBR017	Kenmore Hills	MVR515
POG1	Indooroopilly	SIR505	Taringa	TWR027
POG2	Greenbank	OXR104	Forestdale	OXR108
POG3	Forestdale	OXR108	Greenbank	OXR104
POG4	Acacia Ridge	OXR126	Inala	BLR736
POG5	Inala	BLR736	Acacia Ridge	OXR126
POG6	Inala	BLR736	Acacia Ridge	OXR126
POG7	Coopers Plains	SSR130	Calamvale	OXR114
POG8	Corinda	OXR020	Coopers Plains	SSR130
POG9	BAC	BCR015	Taringa	TWR027
POG#	Corinda	OXR020	Coopers Plains	SSR130
POG-OUT	BAC	BCR015	East Brisbane	NMR554
ENO1	Brookfield	GVR718	The Gap	EVR533
ENO2	Brookfield	GVR718	The Gap	EVR533
ENO3	The Gap	EVR533	Brookfield	GVR718
ENO4	The Gap	EVR533	Brookfield	GVR718
ENO5	Mt Coot-tha	IVR512	The Gap	EVR533
ENO6	Alderley	BVR578	Stafford	KVR542
ENO7	Mt Coot-tha	IVR512	The Gap	EVR533
ENO8	Mt Coot-tha	IVR512	Ithana	IVR536
ENO9	Ithana	IVR536	Alderley	BVR578
ENO#	Ithana	IVR536	Alderley	BVR578
ENO##	The Gap	EVR533	Brookfield	GVR718
ENO-OUT	Bowen Hills	BVR524	Toombul	KVR557

Table 11-1 - Radio Telemetry Rainfall Stations (cont)

	Primary Gauge		Secondary Gauge	
RAFTS Node	Rainfall Station Name	Station Number	Rainfall Station Name	Station Number
BUL1	Mt Gravatt	BMR138	Wishart	BMR803
BUL2	Rochedale	BMR709	Wishart	BMR803
BUL3	Carindale	BMR830	Wishart	BMR803
BUL4	Carindale	BMR706	Carindale	BMR830
BUL5	Carindale	BMR706	Morningside	PVR029
BUL6	Hemmant	BMR527	Wynnum	WVR521
BUL7	Hemmant	BMR527	Wynnum	WVR521
BUL#	Wishart	BMR803	Rochedale	BMR709
BUL-OUT	Hemmant	BMR527	Wynnum	WVR521
NRM1	Morningside	PVR029	Bowen Hills	BVR524
NRM2	Hemmant	BMR527	Toombul	KVR557
NRM3	Lytton	BNR739	Hemmant	BMR527

11.3 Conversion of RAFTS Hydrographs to MIKE 11 TXT Format

The Brisbane City Council has supplied the software program RTOM11 which generates a TXT file from the hydrographs exported from the RAFTS model. This RTOM11 program allows users to enter a start date, end date and base flow component and generates a file that can be directly imported into MIKE 11. This file is used to compile boundary series data in MIKE 11.

11.4 Development of the MIKE 11 Flood Forecasting Model

Initially it was conceived that the hydraulic portion of the flood forecasting model would be carried out using HEC-RAS. Preliminary work found that HEC-RAS was unsuitable in this instance due to the dynamic nature of the Brisbane River and hence an alternative approach was sought.

The MIKE 11 hydrodynamic hydraulic model was considered to be the most appropriate model for use as the flood forecasting model for the Brisbane River. The hydraulic flood forecasting model was based on the existing case model developed in the calibration phase of this study. During calibration of this model it was found that two sets of channel roughness parameters had to be adopted, one set for the smaller events and one set for the larger events (**Section 6.5.3**). Basically, two sets of roughness parameters had to be adopted to account for the additional losses at bends during larger flood events.

The requirement to validate the flood forecasting model was to replicate results of two flood events to within 150 mm. This demonstration was to use the largest calibration event since installation of the radio telemetry gauges and one large synthetic event. The two events used for this demonstration were:

- 100 year ARI design event, and
- the May 1996 calibration event.

100 Year ARI Event
The inflow hydrographs predicted by the hydrological flood forecasting model were converted and input into the MIKE 11 model at the five locations specified in **Section 2.2** of this report.

The 100 year flood was considered to be a large event and hence the large set of roughness parameters were used. The flood forecasting model predicted flood levels within 10 mm at all locations of those predicted during the design events phase of the study. A comparison of flood levels is presented in **Table M-1 - Flood Forecasting Model Results.**

1996 Calibration Event
The inflow hydrographs predicted by the hydrological flood forecasting model were converted and input into the MIKE 11 model at the five locations specified in **Section 2.2** of this report.

The 1996 flood was considered to be a small flood and hence the small set of roughness parameters were used. This resulted in predicted flood levels to within 80 mm of those predicted during the calibration phase of the study. A comparison of flood levels is presented in **Table M-1 - Flood Forecasting Model Results**. A comparison between peak flood levels and corresponding time of peak time between the recorded and predicted value is presented in **Table 11-2 - Summary of Recorded and Predicted Results for the May 1996 Event.**

Table 11-2 - Summary of Recorded and Predicted Results for the May 1996 Event

	Small Roughness Parameters		Large Roughness Parameters			
Gauge Location	Predicted Peak (m AHD)	Predicted Time of Peak (day)	Predicted Peak (m AHD)	Predicted Time of Peak (day)	Recorded Peak (m AHD)	Recorded Time of Peak (day)
Moggill	7.37	6/5/96 17:30	8.15	6/5/96 16:10	7.09	6/5/96 0:00
Western Inner Bar	1.51	2/5/96 21:00	1.51	2/5/96 21:00	1.51	2/5/96 21:00

From **Table 11-2** it can be seen that if the small roughness parameter set case is compared to the recorded levels that the flood forecasting model over predicts flood levels by 280 mm and is approximately 18 hours behind the recorded flood level at this location. This was also found to be the case during calibration and the problem was attributed to the poor performance of the rating curve at Moggill within this flow range. **Section 6.5.3** discusses this problem in more detail.

This can be justified by the performance of the RAFTS and MIKE 11 models for larger and smaller flows. **Table 11-3 - Summary of Recorded and Predicted Results for the January 1974 and June 1983 Events** shows that for these two events peak flood levels are within 70 mm and the peak flood levels occur within 2 hours.

The large roughness parameter set has been included in **Table 11-2** for completeness

Since the main influence is on inflows from the Bremer River and the Upper Boundary during long events, the RAFTS inflows produce the peak flood levels rather than the runoff calculated by the RAFTS flood forecasting model from the radio telemetry gauges. The smaller tributaries located within Brisbane City (ie. Oxley Creek) have a much smaller time of concentration than the Upper Brisbane River and therefore floods in the lower catchments are finished prior to the Upper Brisbane River flood arriving. Therefore the inflows from the Bremer River and Upper Brisbane River are generally the driving factor as far as peak flood levels and timing are concerned and this enables a comparison between flood forecasting results and calibration/verification results.

Table 11-3 - Summary of Recorded and Predicted Results for the January 1974 and June 1983 Events

Flood Event	Gauge Location	Predicted Peak (m AHD)	Predicted Time of Peak (day)	Recorded Peak (m AHD)	Recorded Time of Peak (day)
1974	Moggill	19.89	28/1/74 13:40	19.93	28/1/74 11:45
1974	Port Office	5.40	29/1/74 2:00	5.44	29/1/74 2:00
1974	Western Inner Bar	1.55	25/1/74 10:45	1.55	25/1/74 10:45
1983	Moggill	5.27	23/6/83 1:30	5.20	23/6/83 3:00
1983	Western Inner Bar	1.14	21/6/83 8:00	1.14	21/6/83 8:00

Note: 1. 1974 event presents flood levels for large roughness parameters.
2. 1983 event presents flood levels for small roughness parameter set.

A sensitivity check was also conducted to identify the impacts on flood levels if the set of large roughness parameters were used to analyse the small floods. For the 1996 event it was found that flood levels were over estimated by up to 850 mm.

Given the limited extent of flooding experienced within the lower Brisbane River in May 1996, most emphasis was placed on the 100 year ARI event as this size event would cause significant flooding throughout the reach.

The problem with the adoption of two sets of roughness parameters is the uncertainty as to what size flood constitutes the use of the large or small roughness parameter set. It was therefore recommended that one set of roughness parameters be adopted for the flood forecasting model and it was considered that it was most appropriate to adopt the large set of roughness parameters as this would ensure a conservative estimate of flood levels for smaller events.

11.5 Isolated Areas and Escape Routes

The effectiveness of the flood forecasting system for the Brisbane River is dependent upon the assessment of when river crossings are cut by flood waters and the duration of closure.

The majority of Brisbane City is urbanised to some extent and is well serviced by access roads from within and outside the City boundary. The major access/escape routes for all areas within the City boundary and the river crossings which are responsible for servicing these routes are shown on **Figure 11-2a** to **Figure 11-2b - Major Access/Escape Routes - Brisbane City.**

A detailed hydraulic analysis has been conducted for the major public bridges/crossings which are located on the access/escape routes.
Flood immunities , lowest weir level and time of inundation for each structure is listed in **Table 11-4 - Design Flood Capacities of Major Structures.** The structure capacity was taken as being the design flow having a peak flood level coincident with the lowest point of the weir structure. (assuming unblocked handrails). The crossing was assumed to be cut once a depth of flow of 300 mm occurred over the road.

Table 11-4 - Design Flood Capacities of Major Structures

Structure ID	Structure Name	Flood Immunity (years)	Lowest Weir Level (m AHD)	Duration of Closure 50 year ARI (hours)	Duration of Closure 100 year ARI (hours)
1	Centenary	41	10.0	29.5	59.5
2	Indooroopilly	>100	15.0	-	-
3	Merivale	>100	15.1	-	-
4	William Jolly	>100	14.3	-	-
5	Victoria	>100	9.2	-	-
6	Captain Cook	>100	8.8	-	-
7	Story	>100	29.8	-	-
8	Gateway	>PMF	>PMF	-	-

Within the Brisbane City Boundary many escape routes are available to the public. From **Table 11-4** it can be seen that all river crossings have a flood immunity of greater than 100 years except for the Centenary Bridge. The following discussion will relate to the 100 year ARI flood event unless otherwise specified.

Should the Centenary Bridge become inundated, escape routes are available in both directions along the Centenary Freeway. Depending on flood levels (ie 41 to 100 years ARI) the Centenary Freeway may become cut at the Cubberla Creek Crossing isolating the stretch of road between the Centenary Bridge and the Cubberla Creek Crossing. For these cases people may have to be evacuated.

The Merivale, William Jolly and Victoria Bridges have a flood immunity of greater than 100 years ARI however due to the detail of level information the immunity of the South Brisbane approaches for these structures is questionable.

Priors Pocket is another location were the public may become isolated during the 100 year ARI flood. Available topographical information shows that Priors Pocket Road is cut at approximately RL 17.0 m AHD. For the 100 year ARI flood this flood level is reached approximately 85 hours after the commencement of the event. Early warning should therefore provide residents with the opportunity to evacuate along Priors Pocket Road.

Another potential area of isolation is Fig Tree Pocket. Again, topographical information shows that Fig Tree Pocket Road is cut at RL 10.0 m AHD. The flood level is reached approximately 72 hours after the beginning of the 100 year ARI flood event. Residents will be able to escape along Fig Tree Pocket Road if given sufficient warning.

Areas between the River mouth and the Gateway Bridge become significantly inundated during the 100 Year ARI Moreton Bay Storm Surge plus Greenhouse Effects Case (Tailwater Level RL 2.5 m AHD). Should these conditions occur major evacuations would be required as possible escape routes are limited.

Backwater flooding for tributaries may cause the flooding of some escape routes in low lying areas. Although road crossing levels at these locations are unknown and beyond the scope of this study, a list of possible locations where this type of flooding may occur are listed below.

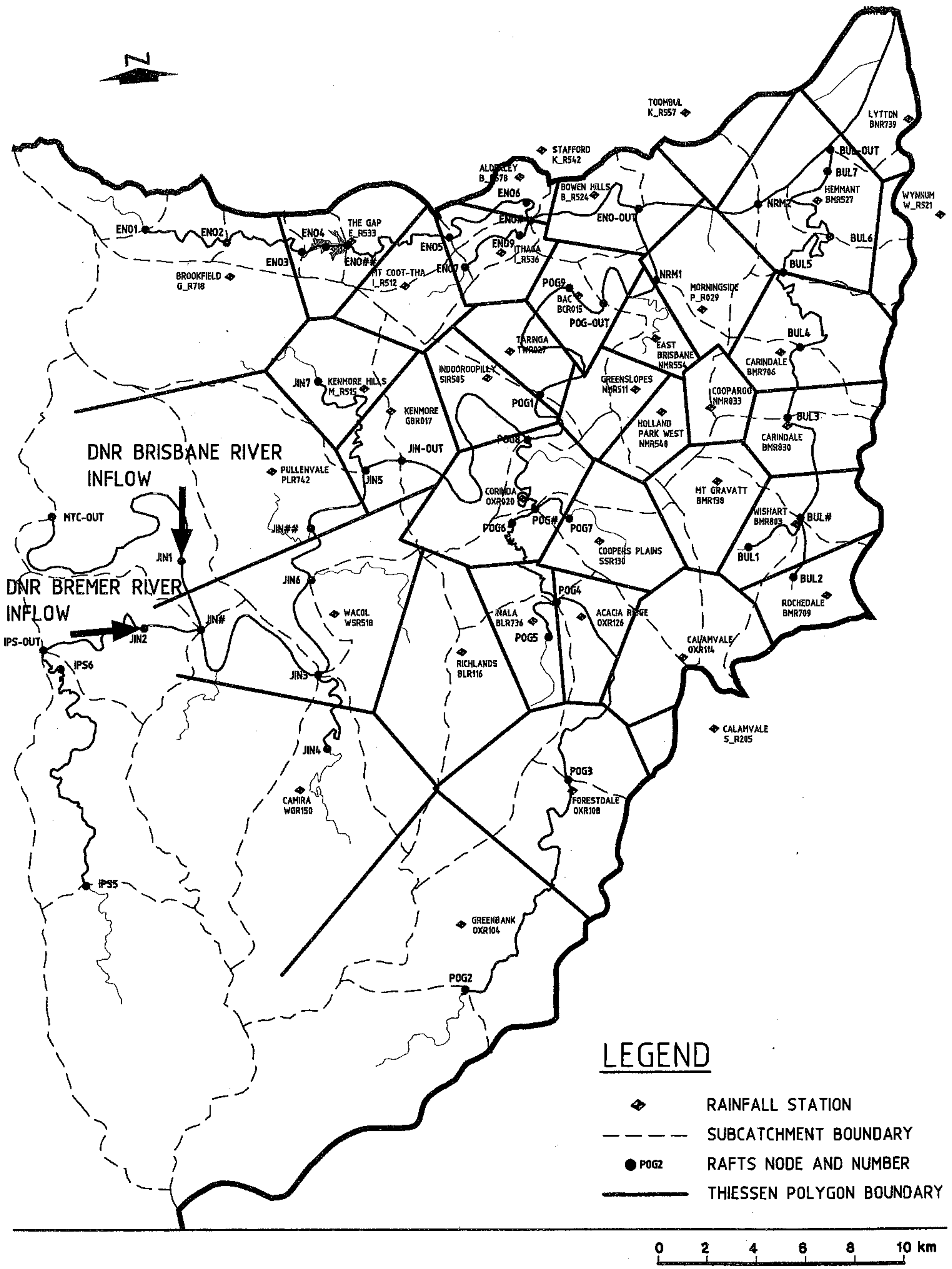
- Breakfast Creek - Kingsford Smith Drive and Breakfast Creek Road.
- Norman Creek - Stanley Street at East Brisbane.
- Hawthorne Road - at Hawthorne.
- South Brisbane - Boundary Road and Grey Street.
- Sandy Creek - Indooroopilly Road at Indooroopilly.
- Oxley Creek - Cunningham Arterial Highway at Rocklea.
- Cubberla Creek - Centenary Highway at Fig Tree Pocket.
- Moggill Creek - Moggill Road at Kenmore.
- Pullen Creek - Moggill Road at Bellbowrie.

These crossings should be monitored during periods of significant flooding to ensure that alternate routes are available should the roads listed above should become flooded.

SINCLAIR KNIGHT MERZ

FIGURE 11-1

BRISBANE RIVER FLOOD STUDY
THIESSEN POLYGONS FOR
RADIO TELEMETRY RAINFALL STATIONS



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PL... SCALE: 1...

12. Flood Mapping

12. Flood Mapping

12.1 Overview

Topographical information provided by BIMAP was used for the flood mapping phase of the Brisbane River Flood Study. Inundation lines, flood contours and high/low hazard maps were generated with the aid of this information.

12.2 Design Flood Inundation Mapping

Following completion of the development level, regulation line and revegetation strategy, a series of 1:10000 scale maps were prepared illustrating the extent of inundation for the 100 year ARI and 20 year ARI flood events.

The maps appear as **Drawings W10581 Sheets 105 to 111** accompanying this report.

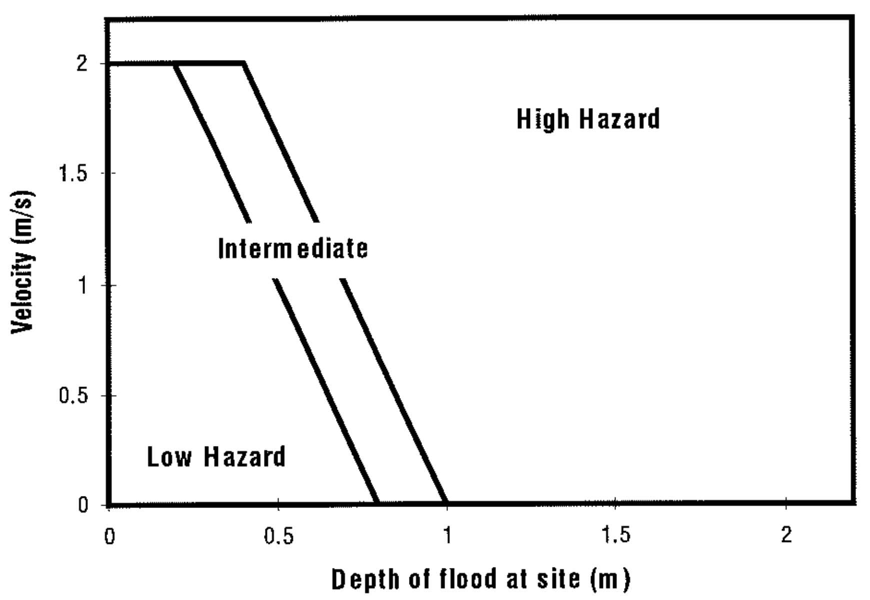
12.3 Flood Hazard Maps

Following the preparation of the HEC-RAS modelling and the inundation maps, the flood hazard mapping was prepared in accordance with the New South Wales Floodplain Development Manual. This manual specifies a depth and velocity criteria which defines whether a water depth and velocity combination is considered high or low flood hazard. **Figure 12-1 - New South Wales Floodplain Hazard Criteria** shows the relationship between depth and velocity when assessing high or low floodplain hazard.

The results from the HEC-RAS model for the 100 year ARI flood show that the overbank velocities are generally below 0.5 m/s with a maximum overbank velocity of 1.1 m/s. At the site where the velocity is 1.1 m/s the maximum allowable depth before the floodplain becomes high hazard according to **Figure 12-1** is approximately 0.75 m. Similarly for velocities below 0.5 m/s the maximum allowable depth before the floodplain becomes high hazard is 0.9 m.

Given these results and the fact that the minimum contour interval on the topographical maps is 1 m, it was considered that depth was the governing factor for high hazard areas on the floodplain. It was therefore assumed that at any site, if the depth of water was 1 m or greater the area was high hazard. This assumption was considered to be slightly conservative.

Figure 12-1 - New South Wales Floodplain Hazard Criteria



The flood hazard maps for the Brisbane River are presented in **Drawings W10581 Sheets 91 to 97** accompanying this report.

12.4 Flood Contouring

Initially the flood contouring phase of the study was to be conducted using the two dimensional hydrodynamic model FasTABS. This model uses digital terrain data (mesh) to generate a two dimensional water surface which can then be output as a DXF file and translated into a flood contour map.

The contour information held in BIMAP was provided in the form of a rectangular mesh over the Brisbane River. As this mesh was based on photogrammetry, no information was available for the river bathometry. In order to form a complete digital terrain model, the BIMAP data was merged with the bathmetric data obtained from the survey of the river.

The merged digital terrain model consisted of approximately 20 000 000 data points which exceeded the number of data points that can be used in the FastTABS model (1 000 000 points). The large amount of data points required for the two dimensional modelling of the Brisbane River, meant that the use of FastTABS would be an inefficient means of predicting two dimensional flow effects and an alternative methodology was developed.

The resulting methodology was to use levels predicted by the MIKE 11 hydraulic model and apply super-elevations at bends to account for the two dimensional flow effects.

Using the flood levels for the 100 year ARI flood event (regulation lines and revegetation in place) flood contours were calculated at 0.1 m flood level intervals along the Lower Brisbane River reach (upper city boundary to the river mouth) using linear interpolation methods between flood levels at model cross sections. These levels were assumed to be located at the AMTD line on the cross section.

Super-elevations at bends were then calculated using the formula (Chow 1959) :

$$\Delta h = V^2_{max}/g[20r_c/3b - 16r_c^3/b^3 + (4r_c^2/b^2 - 1)^2 \ln\{(2r_c + b)/(2r_c - b)\}]$$

where

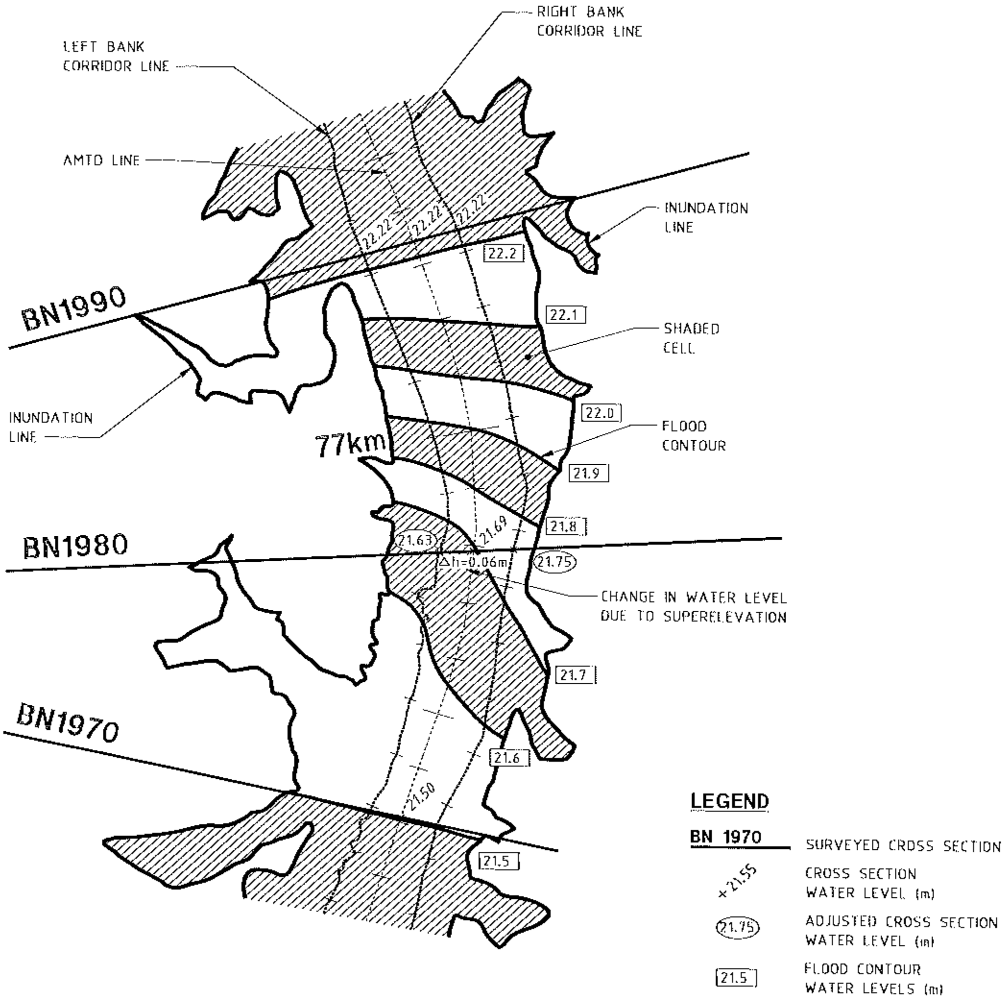
Δh = change in water level (m)
V^2_{max} = maximum velocity at bend (m/s)
g = gravity (9.81 m/s^2)
r_c = radius of bend at center of river (m) (ie AMTD line)
b = width of river (m) (assumed to be the distance between the cadastral boundaries defined for the river corridor)

Once Δh had been calculated this value was added or subtracted to the level at the AMTD line depending on whether the inside or the outside of the bend was being determined.

For example, in **Figure 12-2 - Flood Contouring Example** the MIKE 11 predicted water level at the AMTD line at the mid point of the bend (BN1980) was 21.69 m AHD. At this location a Δh of 0.06 m was calculated and therefore the water level at the inside of the bend was calculated to be 21.63 m AHD and the water level at the outside of the bend was calculated to be 21.75 m AHD. The MIKE 11 predicted water level at BN1990 was calculated to be 22.22 m AHD and this was assumed to be a constant level across the cross section. Water levels at 0.1 m increments were then calculated via linear interpolation between cross sections BN1990 and BN1980 along the left bank creek corridor line, the right bank creek corridor line and the AMTD line. This interpolation was then repeated between cross sections BN1980 and BN1970. Flood contours were then plotted by drawing a line through each point with the same water level along the AMTD, left bank creek corridor line, the right bank creek corridor line. The flood contours were then extended to the inundation lines. This extension of the flood contour lines was based on general trends of the flood contour between the left bank creek corridor line and the right bank creek corridor line.

The above procedure was repeated for each bend from the Brisbane River mouth to the upstream city boundary (BN2020). Flood cells were then formed by shading alternate cells between flood contours to form a database of local flood information.

Figure 12-2 - Flood Contouring Example



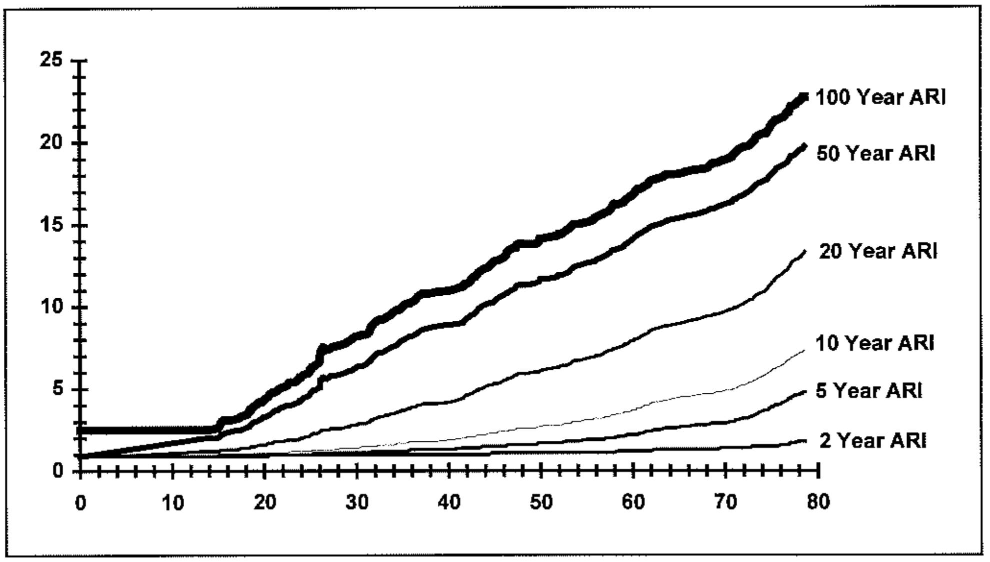
The flood contour maps are presented as **Drawings W10581 Sheets 112 to 121** accompanying this report.

12.5 Applicability of Flood Contours to Smaller Flood Events

The flood contours have been prepared based on the 100 year ARI flood with the regulation lines and revegetation strategy in place. The appropriateness of these contours to the smaller floods (2 year ARI to 50 year ARI) has been determined by comparing each of the respective profiles. **Figure 12-3 - Flood Contour Profile Comparison** illustrates the similarities and differences for the varying ARI flood events.

Below AMTD chainage 14 km (0 to 14 km AMTD) the 100 year ARI profile shows a flood contour level of 2.5 m AHD. This flood contour level reflects the 100 year ARI Moreton Bay storm surge flood level (0.21 m AHD) plus an allowance of 0.3 m for future greenhouse effects. From **Figure 12-3** it can be seen that between 0 - 14 km AMTD the adopted flood contours would not be applicable for floods other than the 100 year ARI event.

Figure 12-3 - Flood Contour Profile Comparison



Between AMTD chainage 14 - 78.6 km it can be seen from **Figure 12-3** that the 100 year and 50 year ARI flood levels are similar in characteristics and the adopted flood contours would generally be applicable with the use of an appropriate correction factor.

For the floods with an ARI less than 50 years the predicted profiles illustrate a high degree of derivation from the 100 year profile and therefore the adopted flood contours would not be applicable.

13. Community Consultation

13. Community Consultation

13.1 Information Bulletin

The community consultation activities programmed for the Brisbane River Flood Study were conducted through means of an Information Bulletin/Questionnaire. These bulletins were sent to various community groups along the Brisbane River. A set of plans was provided to each of the groups coordinators to enabled individuals to mark up areas where they believed riverbank rehabilitation or other works were required.

Approximately 500 Bulletins were sent to 13 community groups. These groups were selected based on proximity to the Brisbane River. The idea of targeting local community groups was due to the following factors:

- The shear number of residents situated close to Brisbane River would require in excess of 100 000 bulletins to be distributed. This would be a study within itself and was beyond the scope of this study.

- Community Groups have generally already discussed environmental issues within their local area and show a genuine interest in helping their environment. It was therefore considered that these groups would provide the Consultant with a good response to the issues being addressed.

From the five hundred Information Bulletins/Questionnaires sent only five were returned to the Consultant. This was considered to be a poor response however given that a total of thirteen groups were approached and if these bulletins were completed at a group meeting (with all members having an input) four responses could be considered good.

A list of the 11 community groups targeted in this study are presented in **Table 13-1 - Community Groups Bulletin List**. The names and addresses of these groups were supplied by the Brisbane City Council.

Table 13-1 - Community Groups Bulletin List

Community Group Name	No of Responses
BCC - Bushland Care Program	0
Brisbane River Management Group	0
Chelmer Bushcare Group	0
Corinda Bushcare	0
St Lucia Bushland Regeneration Group	2
Norman Creek Flood Action Group	0
Allen Creek Action Group	1
Oxley Creek Environment Group	0
Perrin Creek Bushland Group	1
River Mouth Action Group	1
Tenneriffe Bushland Park Group	0
Toowong Creek Working Group	0
Centenary Riverfront Advisory Committee	0

Note: BCC - Bushland Care Program Bulletin was returned as address not correct. Contact was attempted however messages weren't returned.

A copy of the information Bulletin/Questionnaire is presented in **Appendix N - Community Consultation Information Bulletin/Questionnaire.**

13.2 Issues Raised by Community Groups

The following discussion summarises the responses to the Information Bulletin/Questionnaire for the individual community groups.

River Mouth Action Group - BN 340 to River Mouth

The River Mouth Action Group could not identify any damage that has occurred to the river banks after major storms however had strong opinions that revegetation and rehabilitation was required on both sides of the river bank from the Bulimba-Hamilton Area to the Mouth of River.

A number of other issues concerning the quality of industrial drainage, stormwater drainage and sewerage outlets or overflows that are currently entering the river were raised. The number of wharfs along the river mouth area was also of some concern.

Some additional uses for the river corridor along this section of the river were identified as fishing and access to the river. The response indicated that access to the river has been lost and that the edibility of the fish in this section of river is questionable.

14. References

14. References

1. South East Queensland Water Board, `Brisbane River Flood Hydrology - Runoff Routing Model Calibration', Volumes I and II, Qld DPI-Water Resources, September 1991.

2. Hausler G and Porter N, `Report on the Hydrology of Wivenhoe Dam' Qld DPI-Water Resources, 1977.

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4. Deen A R, Craig R W and Sable I C, `Hawkesbury River Flood Model', Hydrology and Water Resources Symposium, Canberra 1988.

5. Australian Rainfall and Runoff, Institution of Engineers, Australia 1987.

6. South East Queensland Water Board `Brisbane River Flood Hydrology - Interim Report on Design Flood Estimation', by Qld DPI-Water Resources, March 1993.

7. South East Queensland Water Board `Brisbane River Flood Hydrology - Final Report on Downstream Flooding Estimation', by Qld DPI-Water Resources, August 1993.

8. SEQWB `Wivenhoe Dam - Moreton Bay Hydraulic Models. Model Calibration Volume III, Appendix II Derivation of Wivenhoe Dam Releases' by Qld DPI-Water Resources, October 1994.

9. Bureau of Meteorology `Severe Weather and Flooding South East Queensland May 1996' July 1996.

SINCLAIR KNIGHT MERZ

Brisbane City Council
June 1998

Brisbane River Flood Study

FINAL REPORT
Volume 2
Appendices

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Acknowledgments

Sinclair Knight Merz would like to thank the following organisations for their assistance throughout this study.

Department of Natural Resources (DNR)
Bureau of Meteorology (BOM)
South East Queensland Water Board (SEQWB)

In particular, we would like to thank Terry Malone (BOM), John Ruffini (DNR) and Garry Grant (SEQWB) for without their help and supply of information our task would have been much more difficult.

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Appendix A - Rainfall and Pluviometer Stations

Appendix A - Rainfall and Pluviometer Stations

Table A-1 - Daily Rainfall Stations

Number	Station	Period
040004	Amberley AMO	1941 - Date
040007	Bald Knob	1927 - Date
040019	Benarkin Forestry	1925 - Date
040020	Blackbutt	1900 - Date
040214	Brisbane RO	1840 - Date
040223	Brisbane AMO	1949 - Date
040030	Bryn Euryn	1917 - 1972
040289	Coalbank	1961 - Date
040056	Coominya	1916 - Date
040060	Cooyar	1895 - Date
040382	Crows Nest	1894 - Date
041028	Emu Vale Railway	1893 - Date
040225	Enoggera Reservoir	1870 - Date
040075	Esk	1886 - Date
040083	Gatton PO	1894 - Date
040082	Gatton - Lawes (CSIRO)	1897 - Date
040091	Grandchester	1894 - Date
041042	Haden	1926 - Date
040094	Harrisville	1896 - Date
040096	Helidon	1870 - Date
040101	Ipswich (Composite)	1870 - Date
040102	Jimna	1927 - Date
040104	Kalbar	1897 - Date
040110	Kilcoy	1890 - Date
040318	Kirkleagh	1953 - Date
040114	Laidley	1889 - Date
040115	Lake Manchester	1917 - Date
040120	Lowood	1887 - Date
040121	Maleny PO	1915 - Date
040133	Monsildale	1913 - 1977
040135	Moongerah Dam	1917 - Date
040136	Mooloolah	1926 - Date
040137	Moore	1913 - 1977
040139	Mt Alford	1912 - Date
040140	Mt Brisbane	1890 - Date
040142	Mt Crosby	1894 - Date
040308	Mt Glorious	1962 - Date
040247	Mt Kilcoy (Lindfield)	1923 - Date
040145	Mt Mee	1909 - Date
040147	Mt Nebo	1947 - Date
040153	Murphy's Creek	1895 - Date

Number	Station	Period
040158	Nanango	1882 - Date
040311	Nukinenda	1961 - Date
040169	Peachester	1915 - Date
040270	Ravensbourne PO	1954 - Date
040183	Rosevale	1915 - Date
040184	Rosewood	1894 - Date
040421	Spring Bluff	1895 - Date
040198	Tarome	1912 - Date
041046	The Head (Riverdale)	1913 - Date
041165	The Head (Bonnie Brae)	1913 - Date
040202	Thornton	1915 - Date
040205	Toogoolawah	1909 - Date
041103	Toowoomba (Fire Stn)	1869 - Date
040227	Wacol (Wolston Pk)	1893 - Date
040424	West Haldon	1915 - Date
040252	Woodford	1887 - Date
040258	Yarraman Ck	1913 - Date

Table A-2 - Pluviometers

Number	Station	Agency	Period of Record
040004	Amberley AMO	BM	1961 - Date
040062	Crohamhurst	BM	1960 - Date
040019	Benarkin Forestry	BM	1961 - Date
040020	Blackbutt	BM	Unknown
040214	Brisbane RO	BM	1911 - Date
040223	Brisbane AMO	BM	1950 - Date
541032	Bryn Euryn	DNR	1985 - Date
040382	Crows Nest	TCC	1965 - Date
040531	Deagon	BCC	1973 - Date
040225	Enoggera Reservoir	BCC	1961 - Date
040075	Esk	BCC	1964 - Date
040082	Gatton - Lawes CSIRO	BM	1963 - Date
040094	Harrisville PO	BM	1971 - Date
040101	Ipswich (Composite)	BM	1975 - Date
040102	Jimna PO	BM	1972 - Date
040104	Kalbar	BM	1978 - Date
040318	Kirkleagh	BM	1959 - Date
040115	Lake Manchester	BCC	1961 - Date
040133	Monsildale	BCC	1963 - 1977
040135	Moongerah Dam	BM	1958 - Date
040308	Mt Glorious	BM	1969 - Date
040526	Mt Nebo	BCC	1966 - Date
040674	Mt Stanley	BM	1977 - Date
040480	Perseverance Dam	TCC	1971 - Date
040270	Ravensbourne	TCC	1965 - Date
040076	Robyn Dale	BM	1972 - Date
040503	Rosewood	BM	1977 - Date
040241	Samford (CSIRO)	CSIRO	1967 - Date
040202	Thornton	BM	1970 - Date
040528	Three Way Catchment	BCC	1970 - Date
041467	Toowoomba	TCC	1954 - Date
040675	Townson	BM	1977 - Date
040628	Woodford (BCC)	BCC	1964 - Date
040079	Forest Hill	DNR	1894 - Date
040095	Hatton Vale	DNR	1908- Date
040107	Beaudesert	DNR	1917 - Date
040124	Marburg	DNR	1887 - Date

Table A-2 - Pluviometers (Continued)

Number	Station	Agency	Period of Record
040149	Boonah	DNR	1924 - 1990
040150	Mundoolun	DNR	1881 - Date
040154	Murrumba (Fairview)	DNR	1926 - 1974
040155	Mudtapilly	DNR	1917 - 1957
040156	Innisplain	DNR	1913 - Date
040159	Narangbar	DNR	1920 - 1987
040163	Rathdowney	DNR	1925 - 1972
040170	Crows Nest (Peachy SF)	DNR	1927 - Date
040171	Petrie (Australian Paper Mills)	DNR	1886 - Date
040179	Redbank	DNR	1888 - 1978
040180	Margate	DNR	1886 - Date
040181	Roadvale	DNR	1907 - 1983
040186	Samsonvale Composite	DNR	1919 - Date
040197	Mount Tamborine	DNR	1888 - Date
040208	Pine Mountain	DNR	1925 - Date
040212	Ascot Racecourse	DNR	1920 - Date
040213	Bald Hills	DNR	1895 - 1993
040215	Brisbane Botanic Gardens	DNR	1890 - 1984
040216	Brisbane Show Grounds	DNR	1889 - Date
040226	Goodna	DNR	1870 Date
040224	Enoggera	DNR	1899 - Date

Note: BM = Bureau of Meteorology
NDR = Department of Natural Resources
TCC = Toowoomba City Council
BCC = Brisbane City Council

January 1974 Flood Event

Date	Benarkin Forrest	Moogerah Dam	Woodford PO	Ravensbourne PO	Mt Glorious	Brisbane Bot
	Daily Rainfall from 9 AM to 9AM (mm)					
24/01/74	75.2	10.2	1.2	0.5	237.2	107.3
25/01/74	104.9	158.9	244.4	101.9	293.6	323.1
26/01/74	139.5	227.4	278.0	115.9	394.0	186.6
27/01/74	51.4	39.2	84.3	35.2	120.2	33.2
28/01/74	0.0	0.0	3.1	1.3	0.0	0.0

July 1973 Flood Event

Date	Brisbane Bot	Moogerah Dam	Benarkin Forest	Ravensbourne PO
	Daily Rainfall from 9 AM to 9AM (mm)			
4/07/73	17.1	0.0	2.8	8.9
5/07/73	90.1	16.5	65.6	67.5
6/07/73	334.7	41.1	16.8	36.1
7/07/73	193.6	2.4	166.7	82.6
8/07/73	14.5	0.0	17.1	8.0

June 1983 Flood Event

Date	Brisbane Bot	Kirkleagh	Benarkin Forest	Ravensbourne PO	Moogerah Dam
	Daily Rainfall from 9 AM to 9AM (mm)				
20/06/83	7.5	15.2	14.1	87.6	5.3
21/06/83	89.4	69.1	84.0	188.9	55.9
22/06/83	73.1	83.2	58.7	141.4	24.6
23/06/83	0.0	0.0	0.0	0.0	0.0

Early April1989A Flood Event

Date	Amberley	Kirkleagh	3 Way Catchment	Gatton Lawes	Blackbutt
	Daily Rainfall from 9 AM to 9AM (mm)				
1/04/89	110.7	63.5	173.3	90.3	7.2
2/04/89	47.5	175.1	31.3	59.7	63.6
3/04/89	38.8	8.6	19.5	0.0	1.2

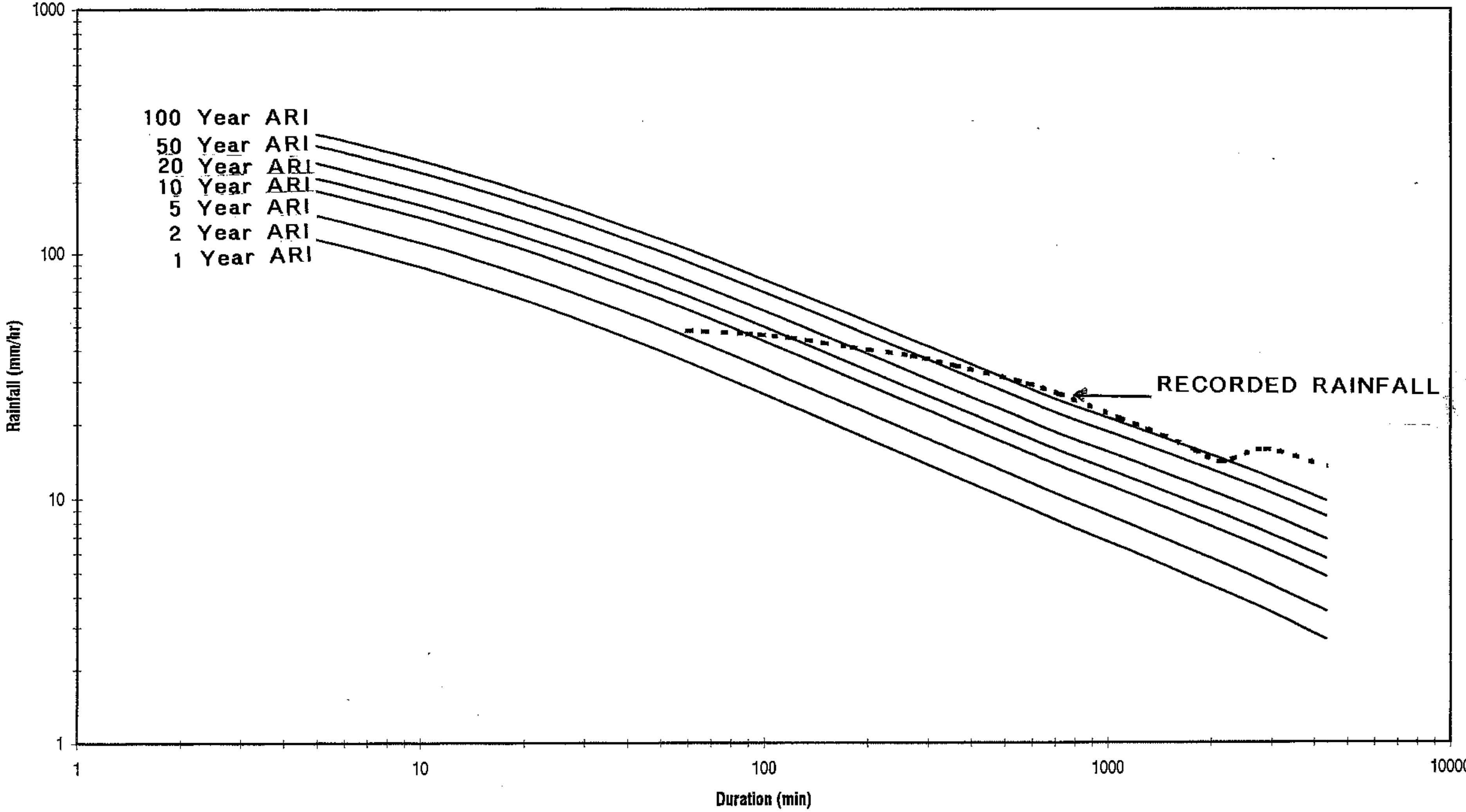
Late April 1989B Flood Event

Date	Amberley	Kirkleagh	Moogerah Dam	Ravensbourne PO
	Daily Rainfall from 9 AM to 9AM (mm)			
23/04/89	12.5	53.4	10.0	30.4
24/04/89	18.1	47.4	19.5	56.1
25/04/89	62.4	91.2	65.4	100.5

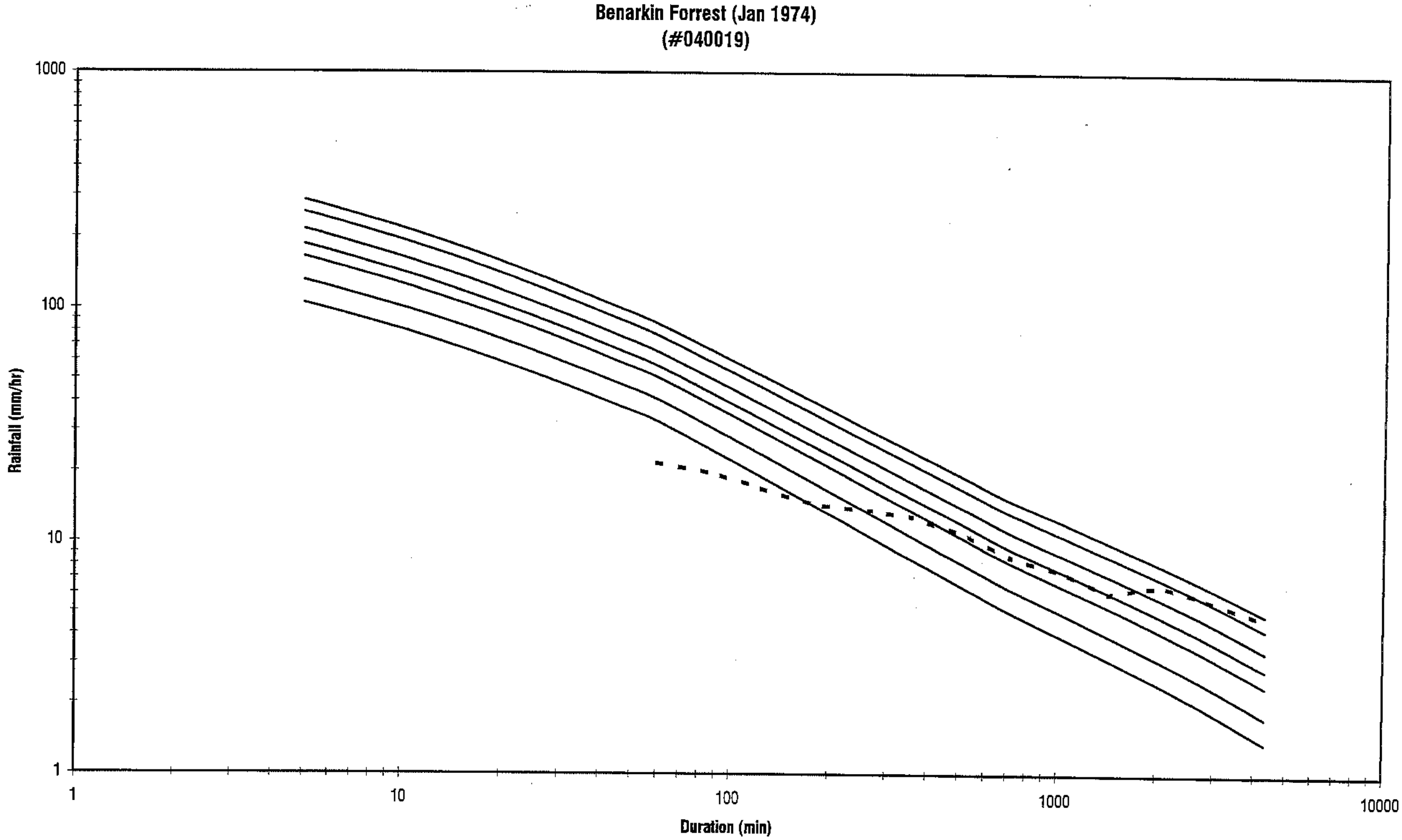
May 1996 Flood Event

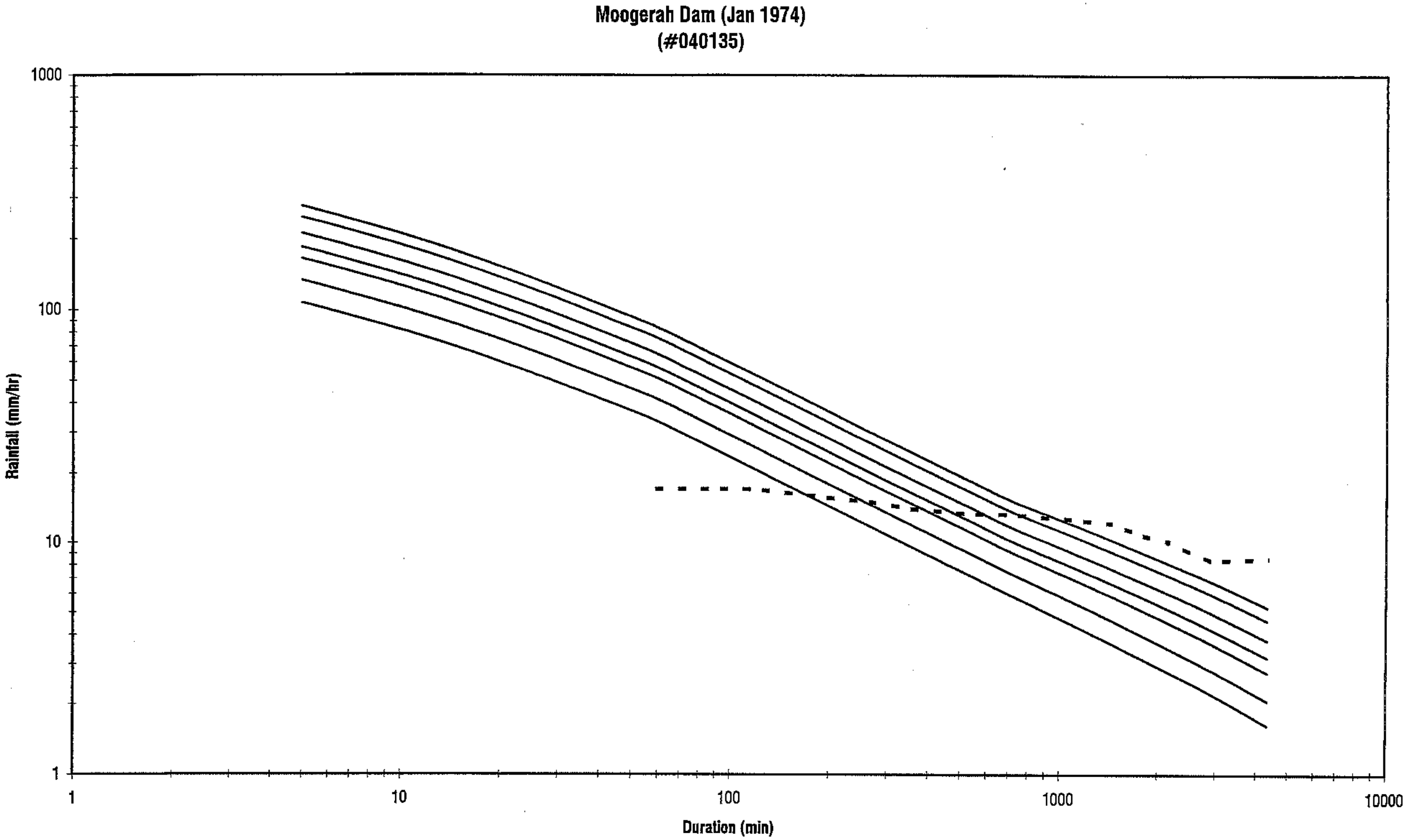
Date	Brisbane	Gatton Lawes	Woodford PO	Amberley
	Daily Rainfall from 9 AM to 9AM (mm)			
30/04/96	47.3	43.5	6.8	5.5
1/05/96	154.8	96.3	96.2	126.7
2/05/96	161.4	80.5	150.9	117.0
3/05/96	79.9	74.8	29.4	29.4
4/05/96	147.0	126.3	21.0	47.9
5/05/96	34.8	16.7	17.9	42.4
6/05/96	24.8	0.9	2.7	9.0

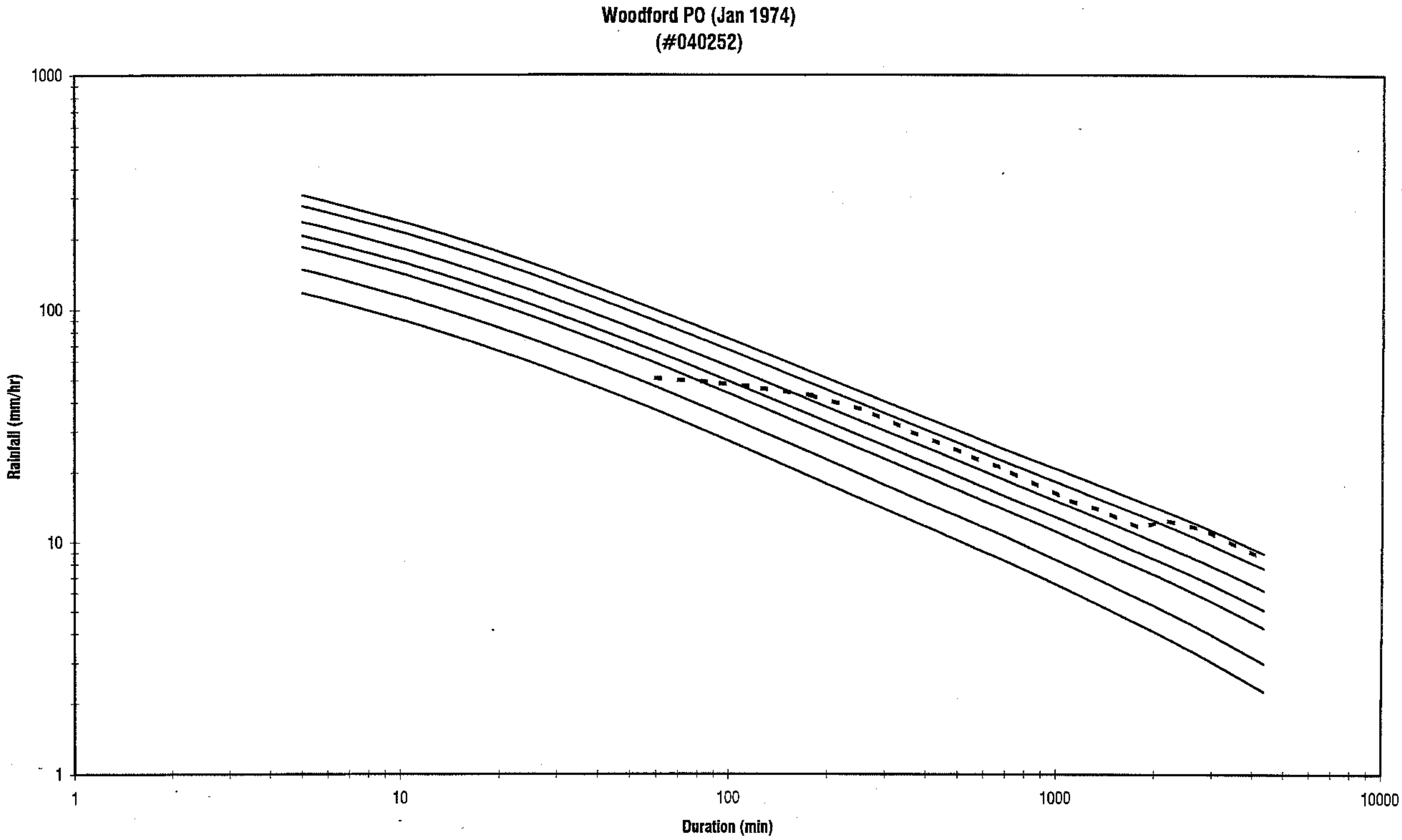
RECORDED RAINFALL/IFD COMPARISON LEGEND



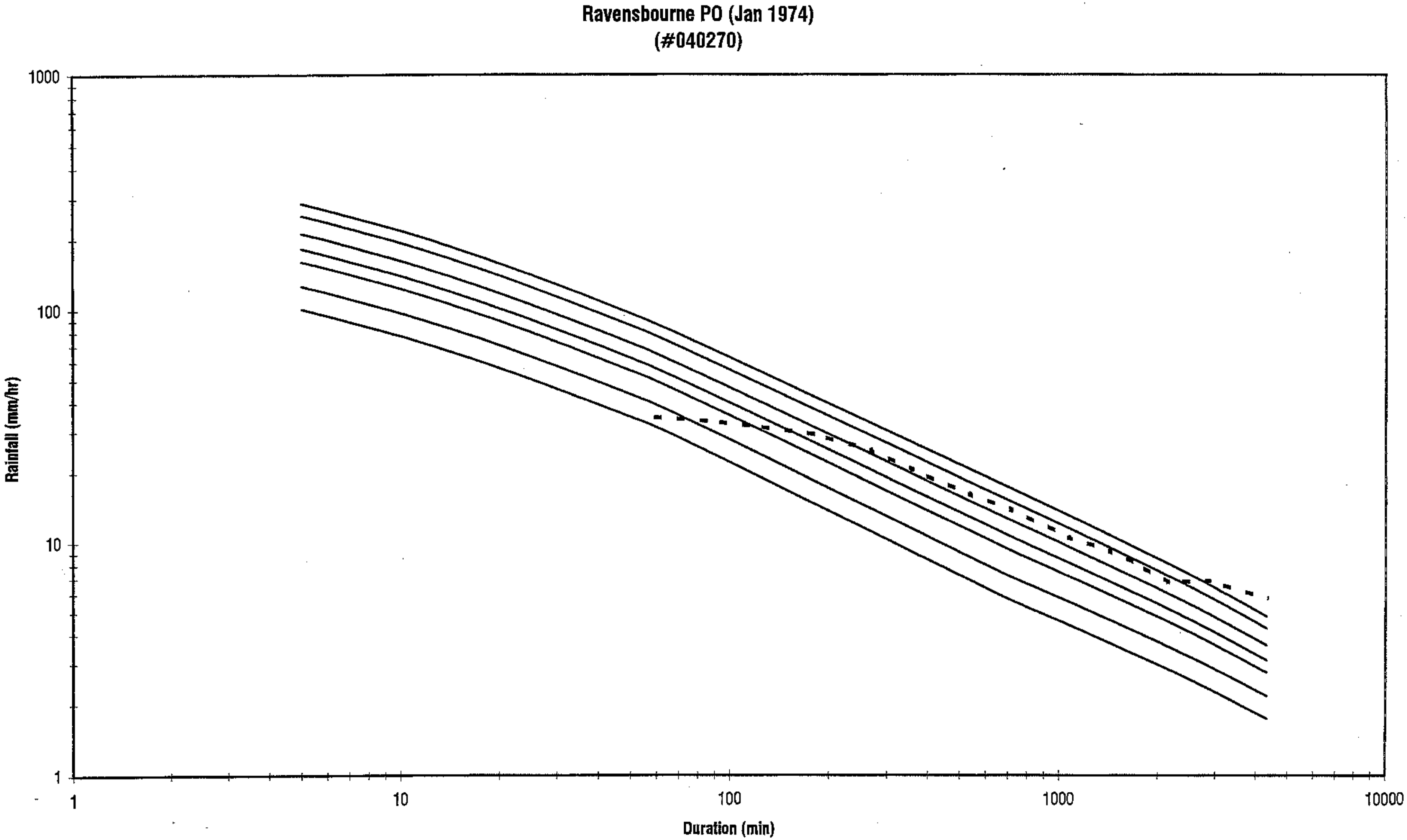
BCC.121.0117

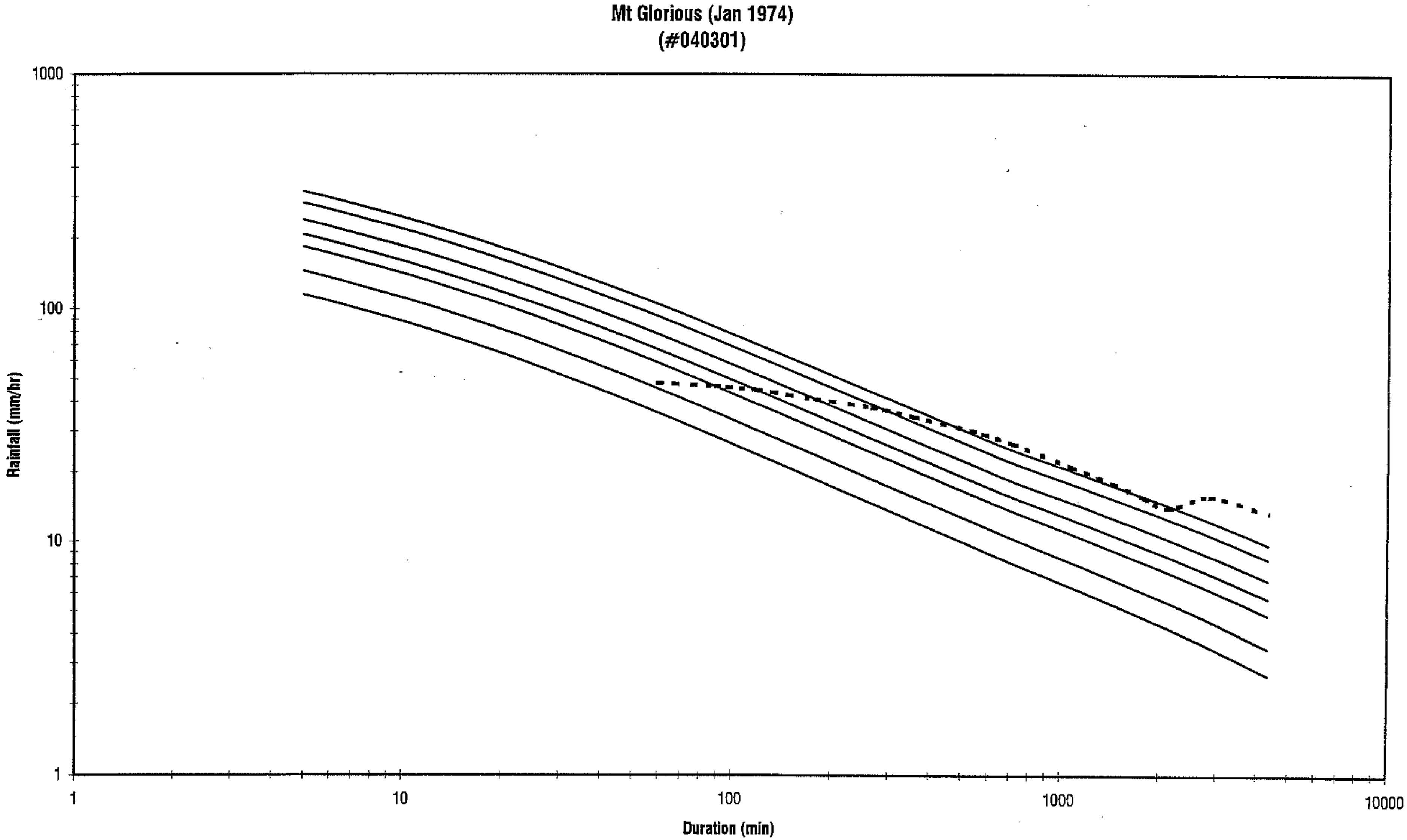

Benarkin Forrest (Jan 1974)
(#040019)
Rainfall (mm/hr)
1000
100
10
1
Duration (min)
1
10
100
1000
10000


Moogerah Dam (Jan 1974)
(#040135)
1000
100
10
1
1
10
100
1000
10000
Rainfall (mm/hr)
Duration (min)



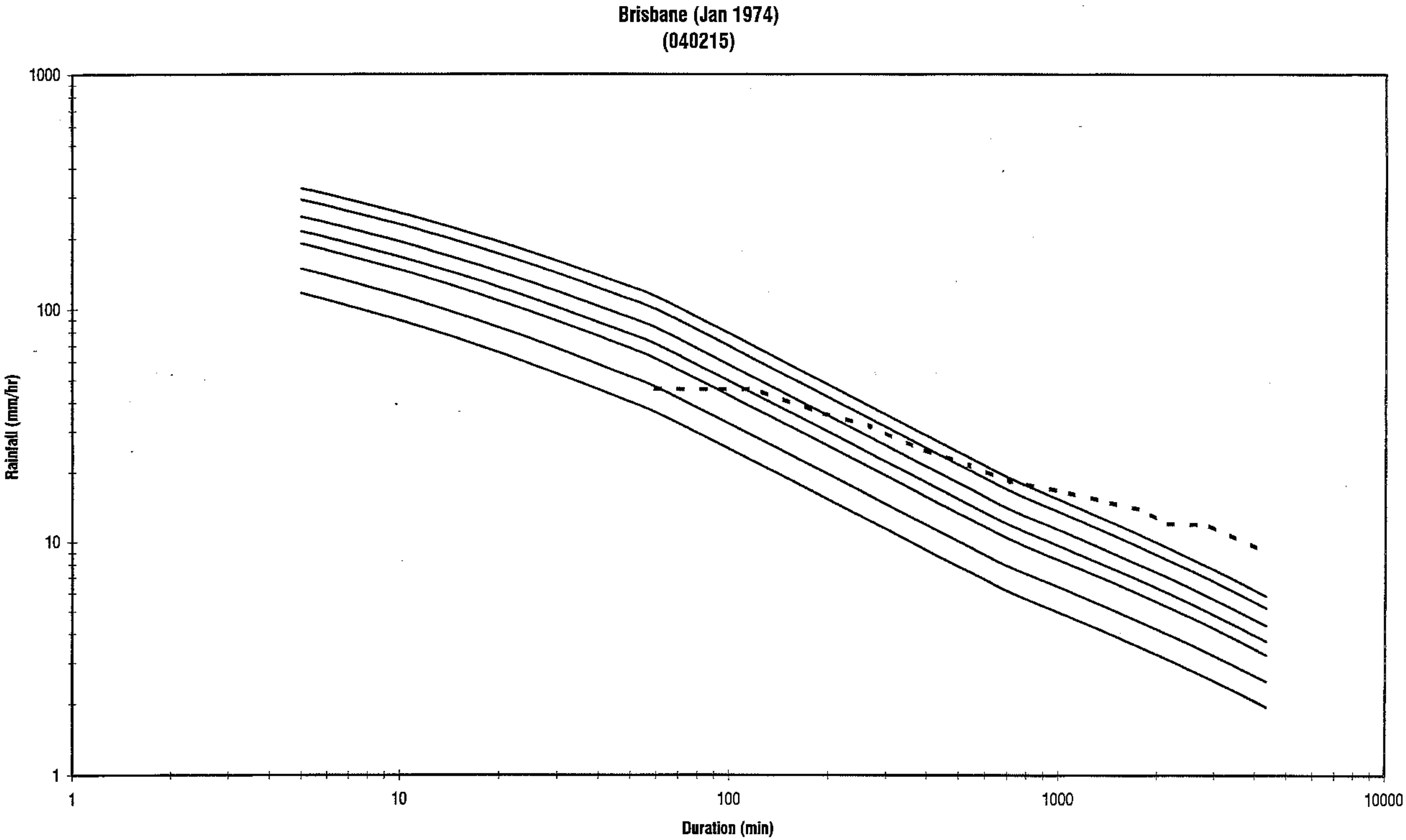
Woodford PO (Jan 1974)
(#040252)
Rainfall (mm/hr)
1000
100
10
1
Duration (min)
1
10
100
1000
10000

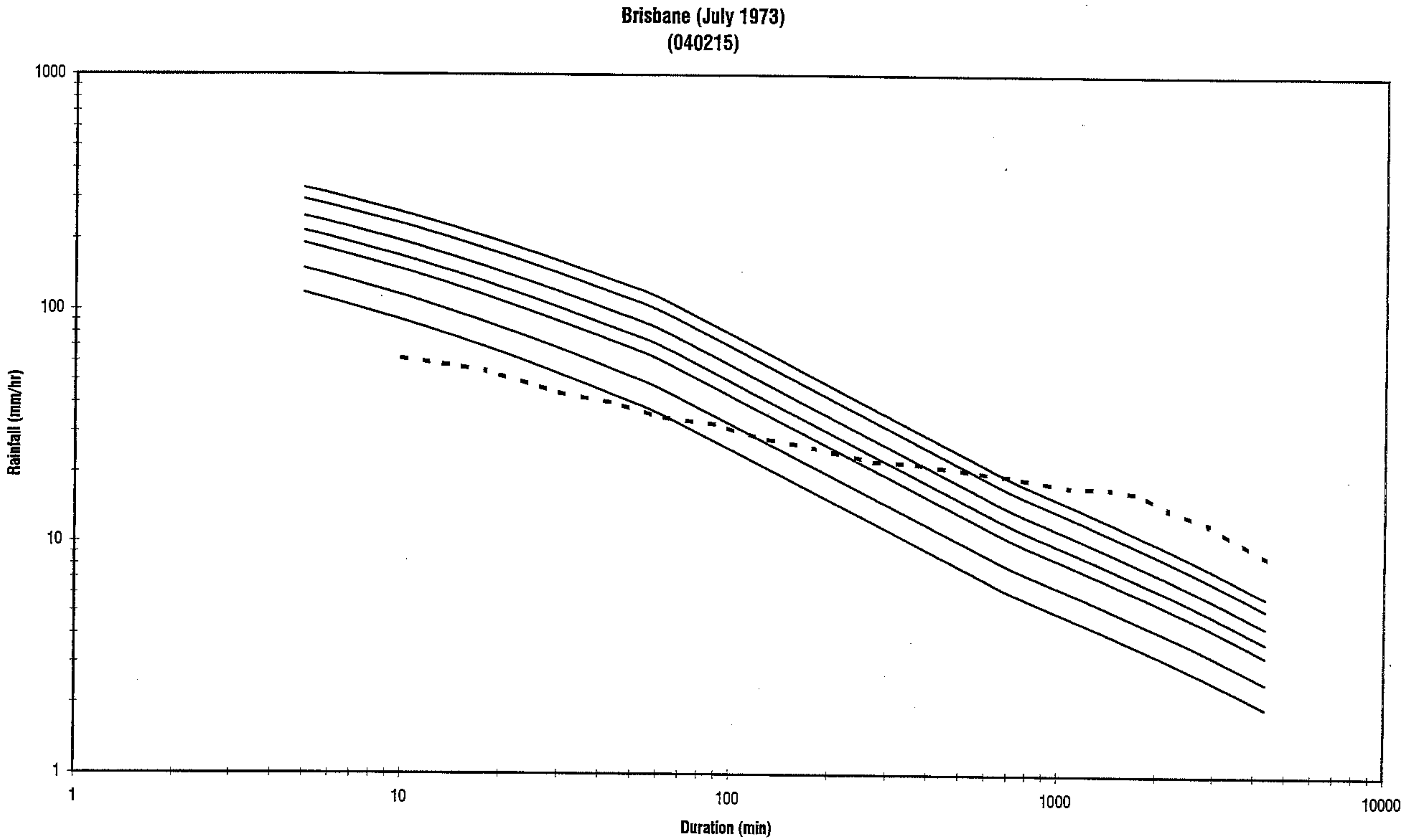

Ravensbourne PO (Jan 1974)
(#040270)
1000
100
10
1
Rainfall (mm/hr)
1
10
100
1000
10000
Duration (min)

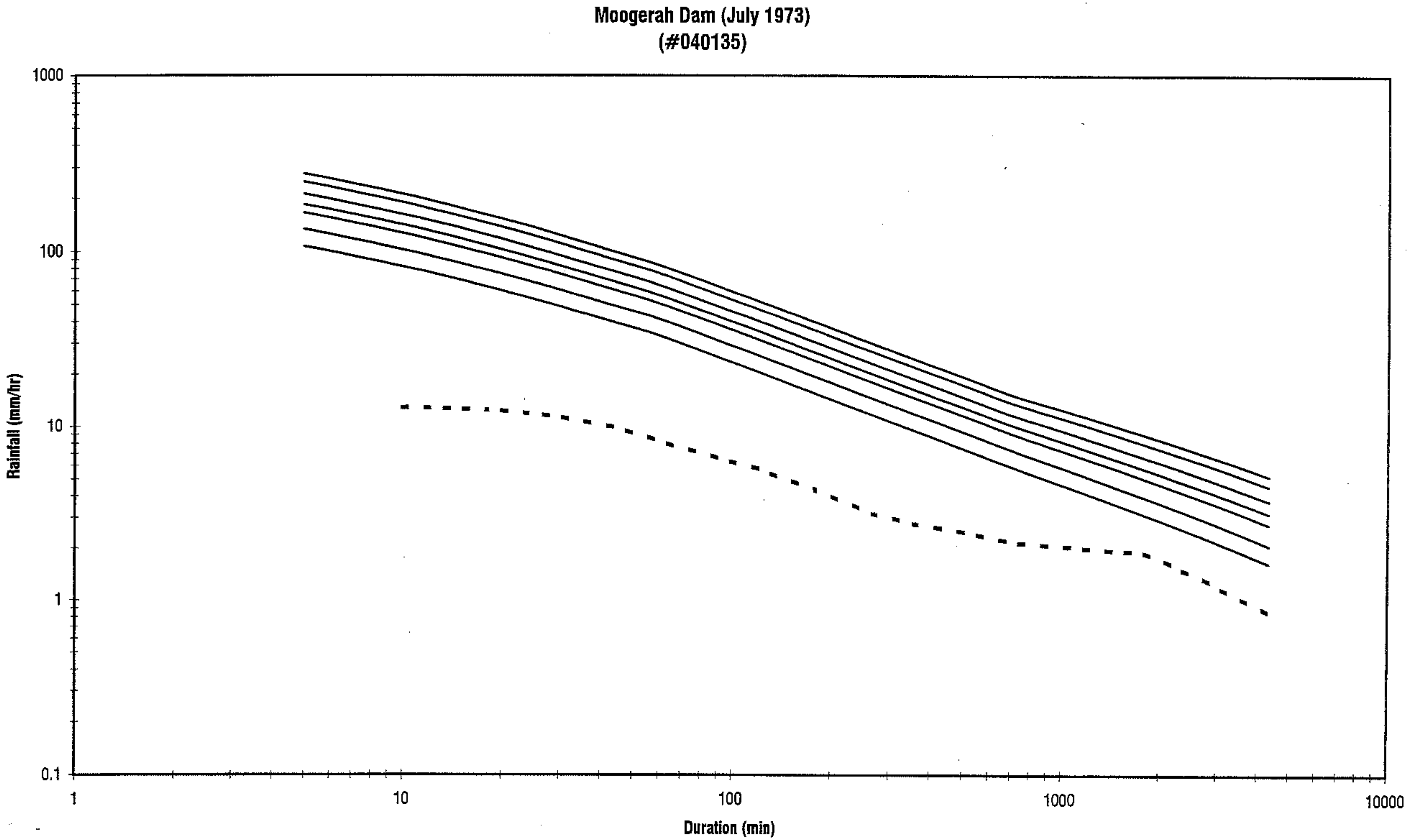


Mt Glorious (Jan 1974)
(#040301)
1000
100
10
1
Rainfall (mm/hr)
1
10
100
1000
10000
Duration (min)

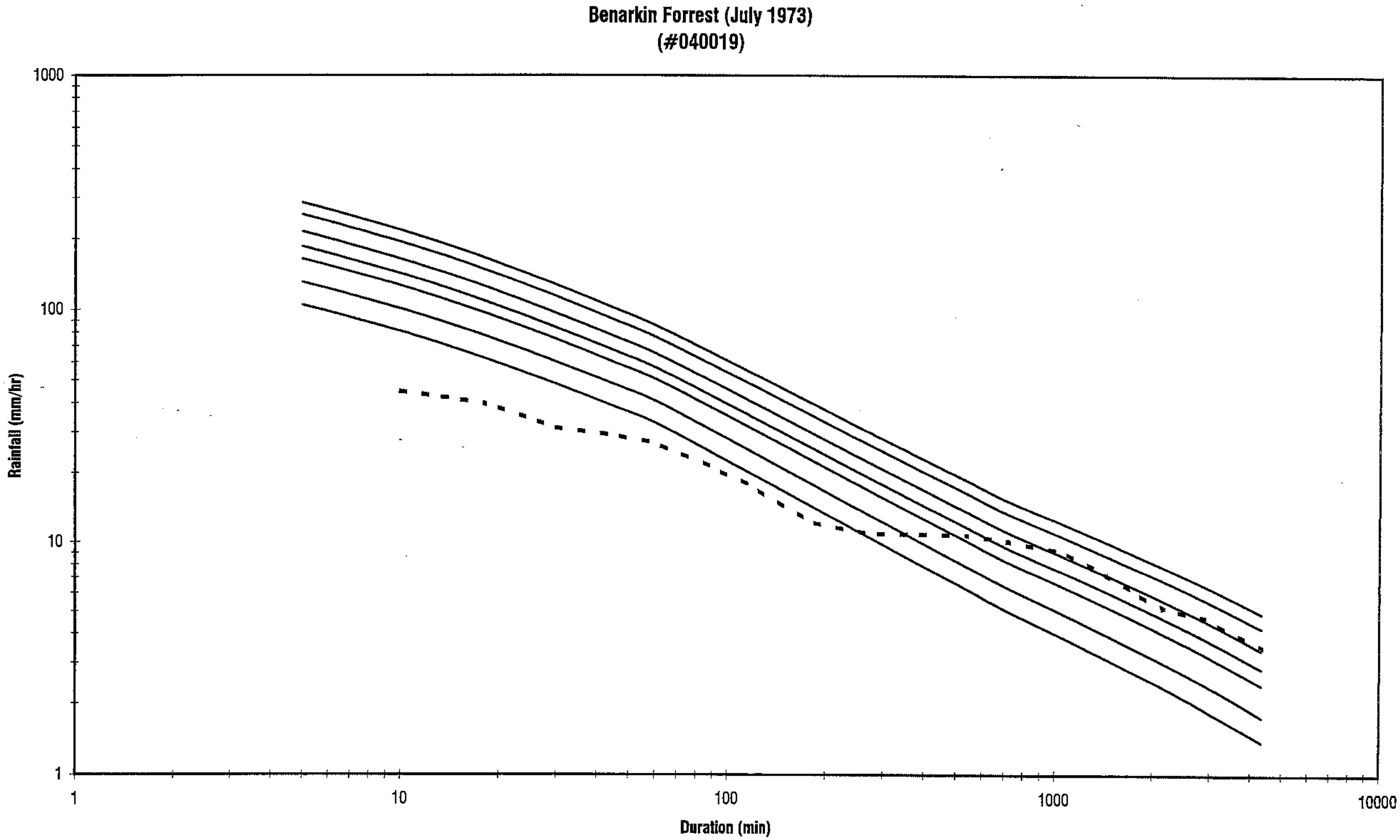
BCC.121.0122

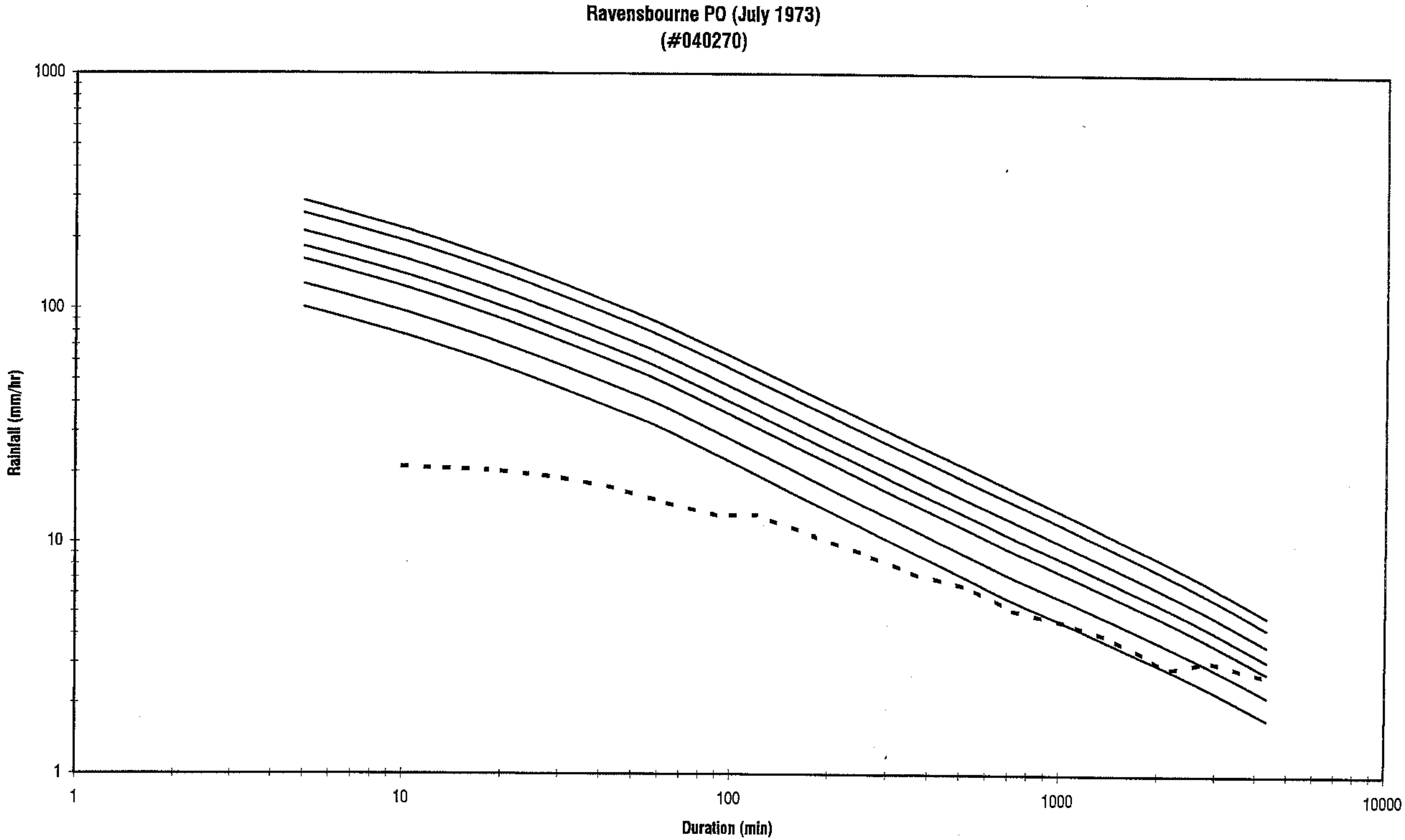

Brisbane (Jan 1974)
(040215)
1000
100
10
1
Rainfall (mm/hr)
1
10
100
1000
10000
Duration (min)


Brisbane (July 1973)
(040215)
1000
100
10
1
Rainfall (mm/hr)
1
10
100
1000
10000
Duration (min)

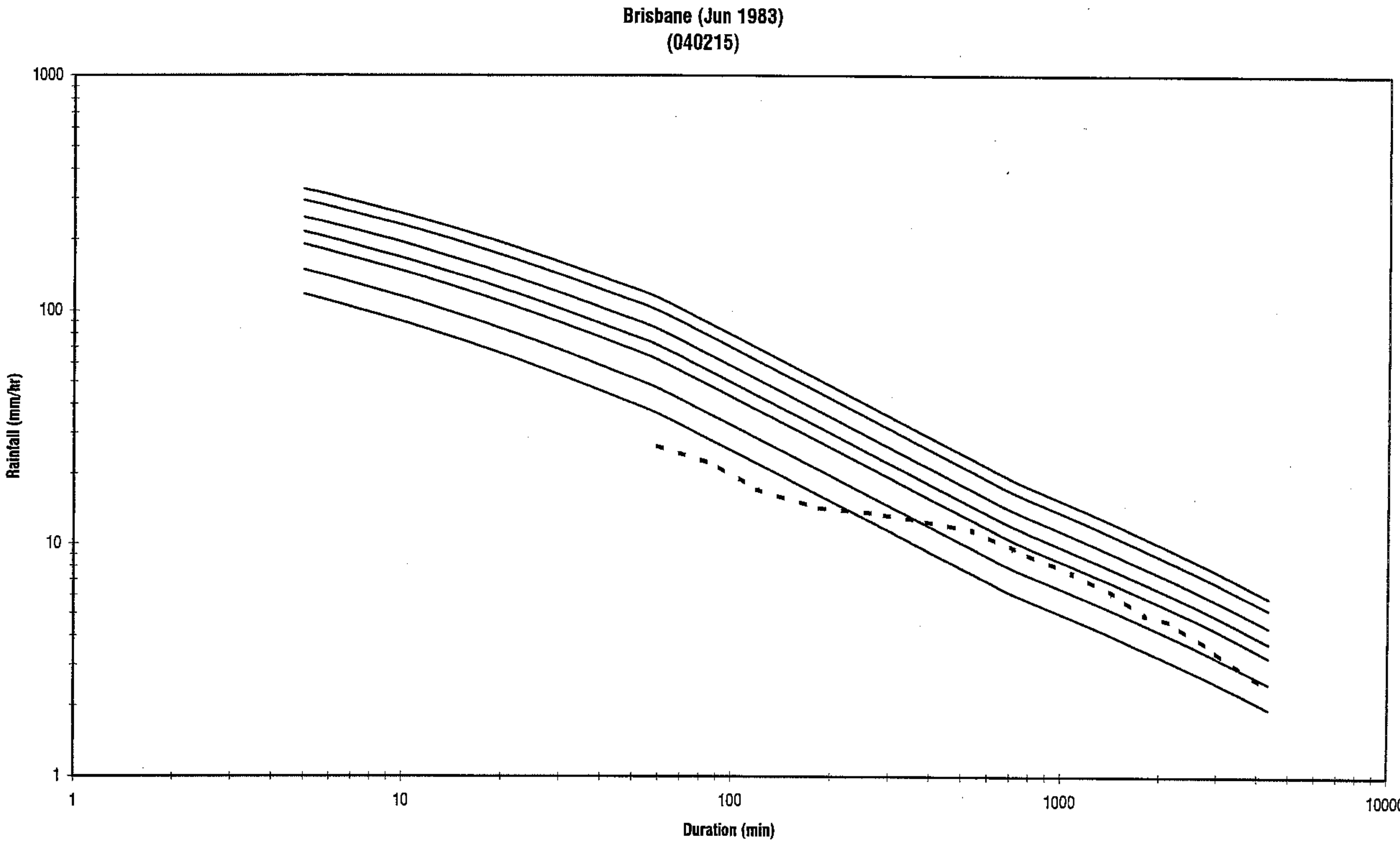

Moogerah Dam (July 1973)
(#040135)
1000
100
10
1
0.1
Rainfall (mm/hr)
1
10
100
1000
10000
Duration (min)

BCC.121.0125

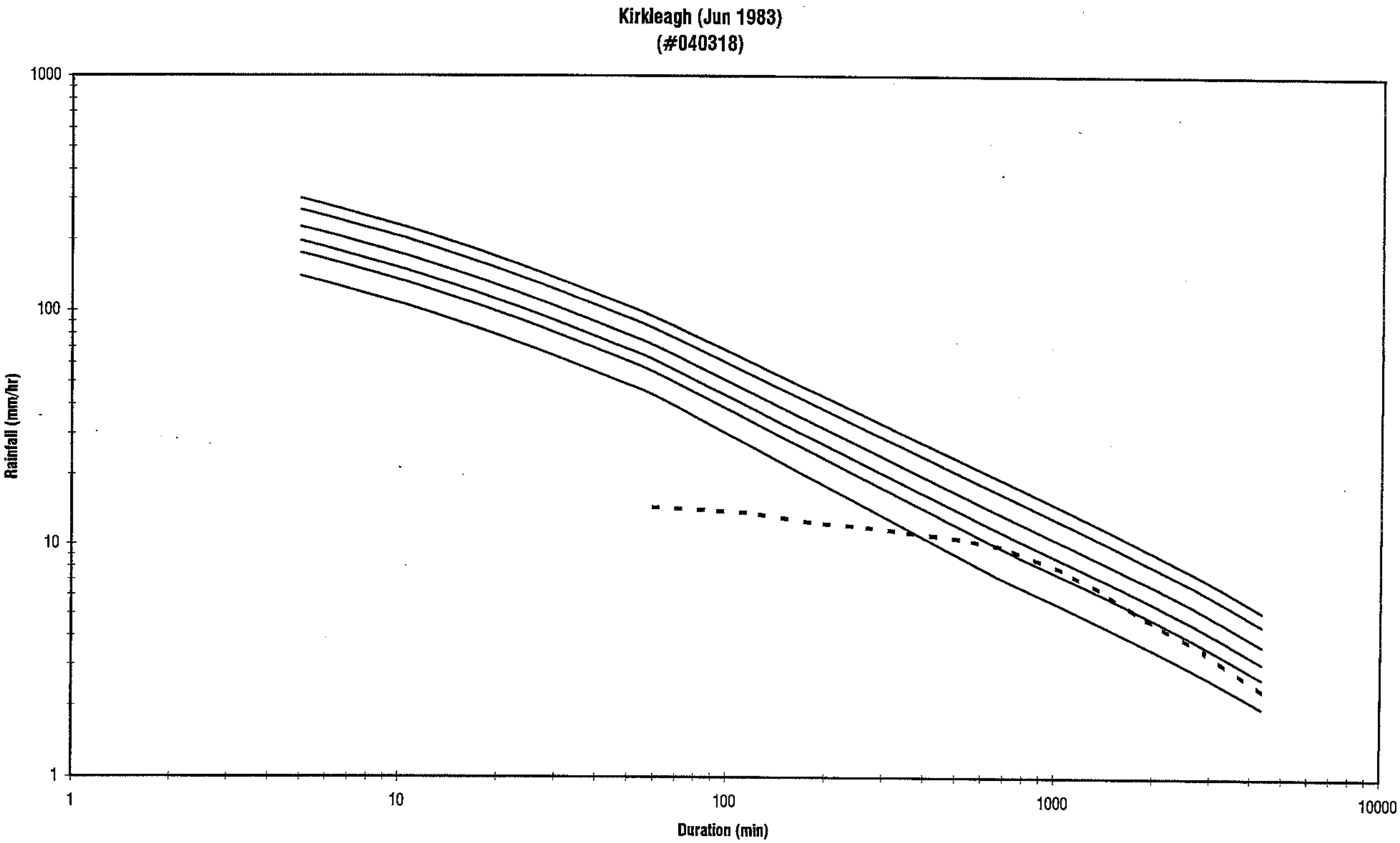

Benarkin Forrest (July 1973)
(#040019)
1000
100
10
1
Rainfall (mm/hr)
1
10
100
1000
10000
Duration (min)

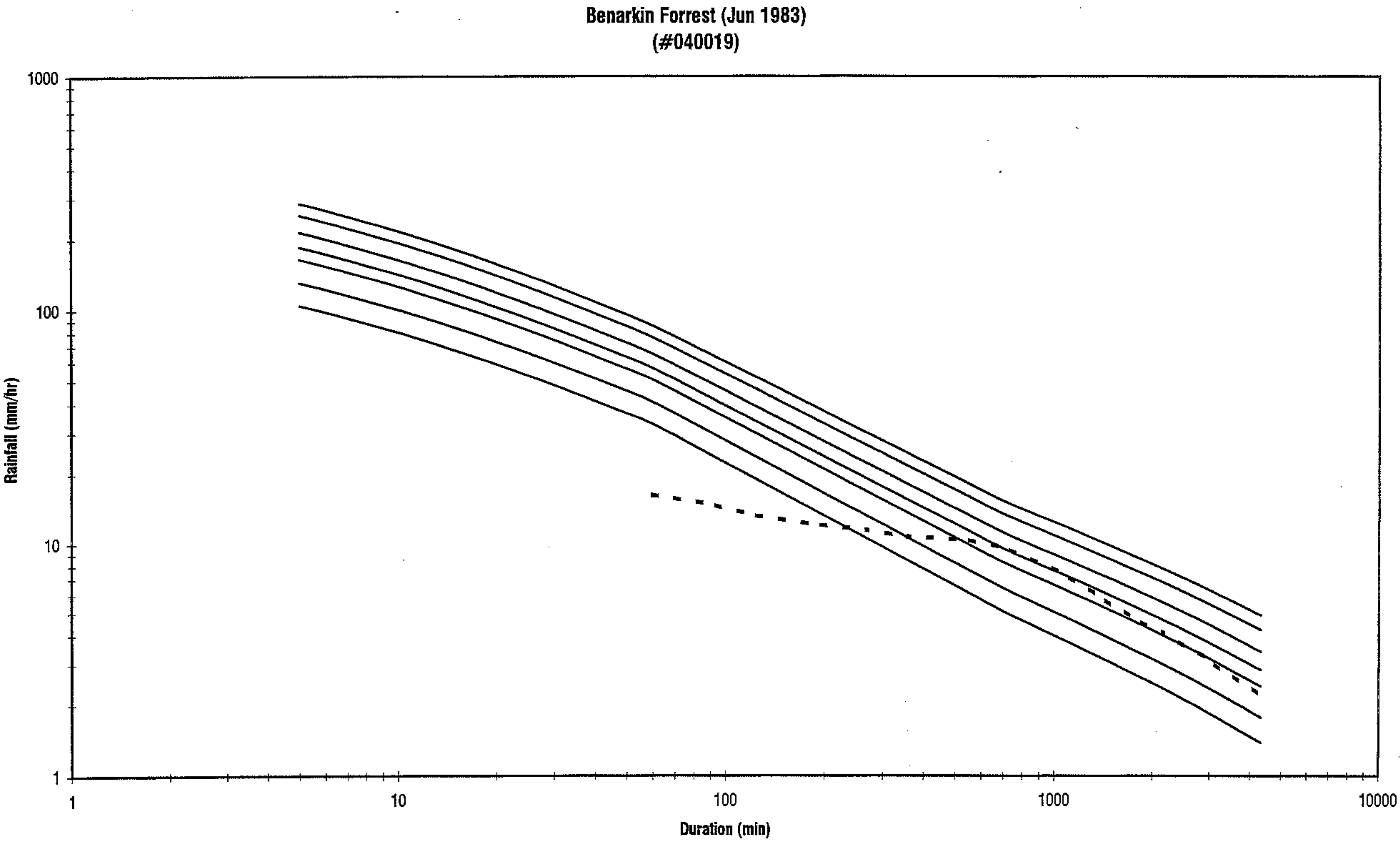

Ravensbourne PO (July 1973)
(#040270)
1000
100
10
1
Rainfall (mm/hr)
1
10
100
1000
10000
Duration (min)

BCC.121.0127


Brisbane (Jun 1983)
(040215)
1000
100
10
1
Rainfall (mm/hr)
1
10
100
1000
10000
Duration (min)

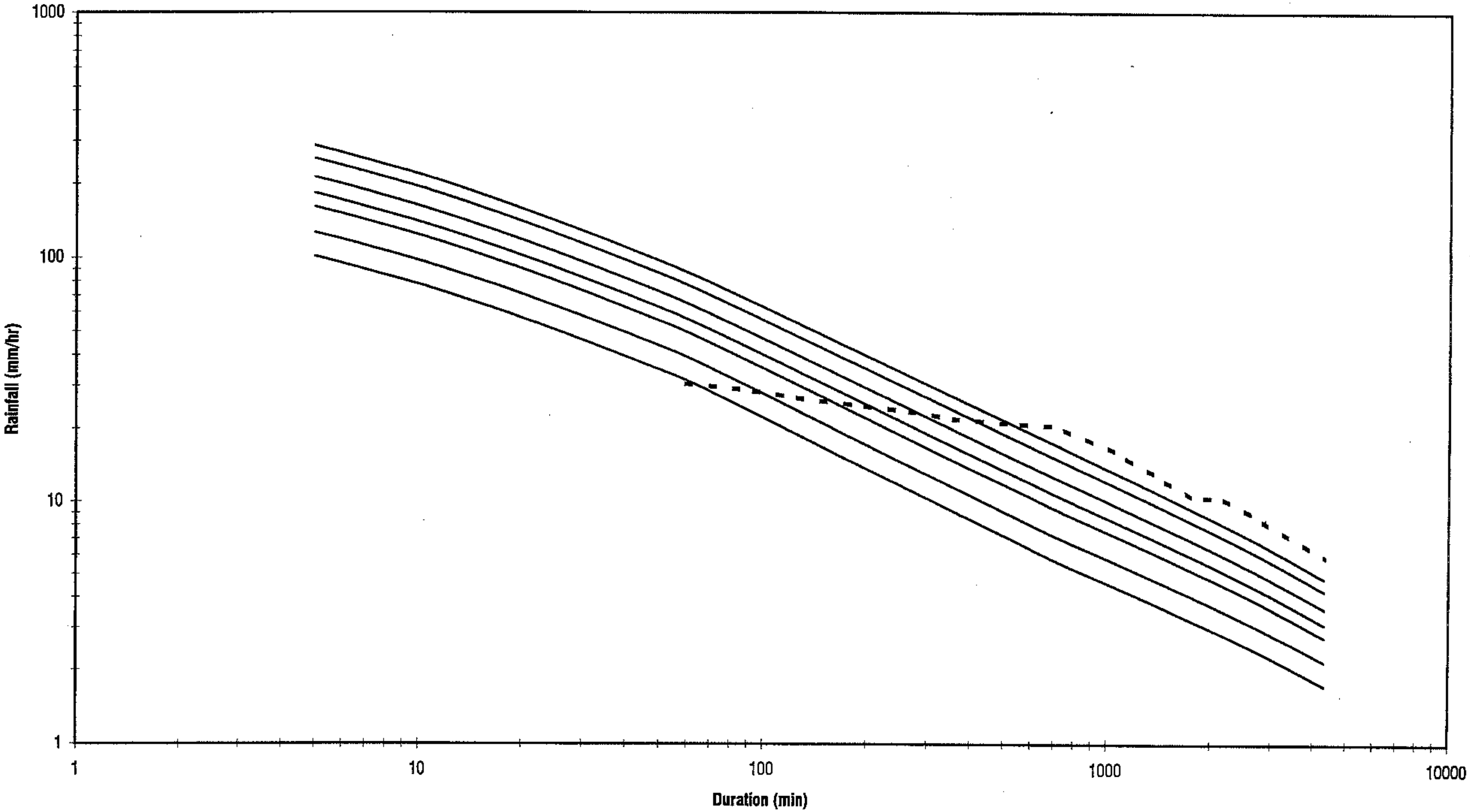
BCC.121.0128

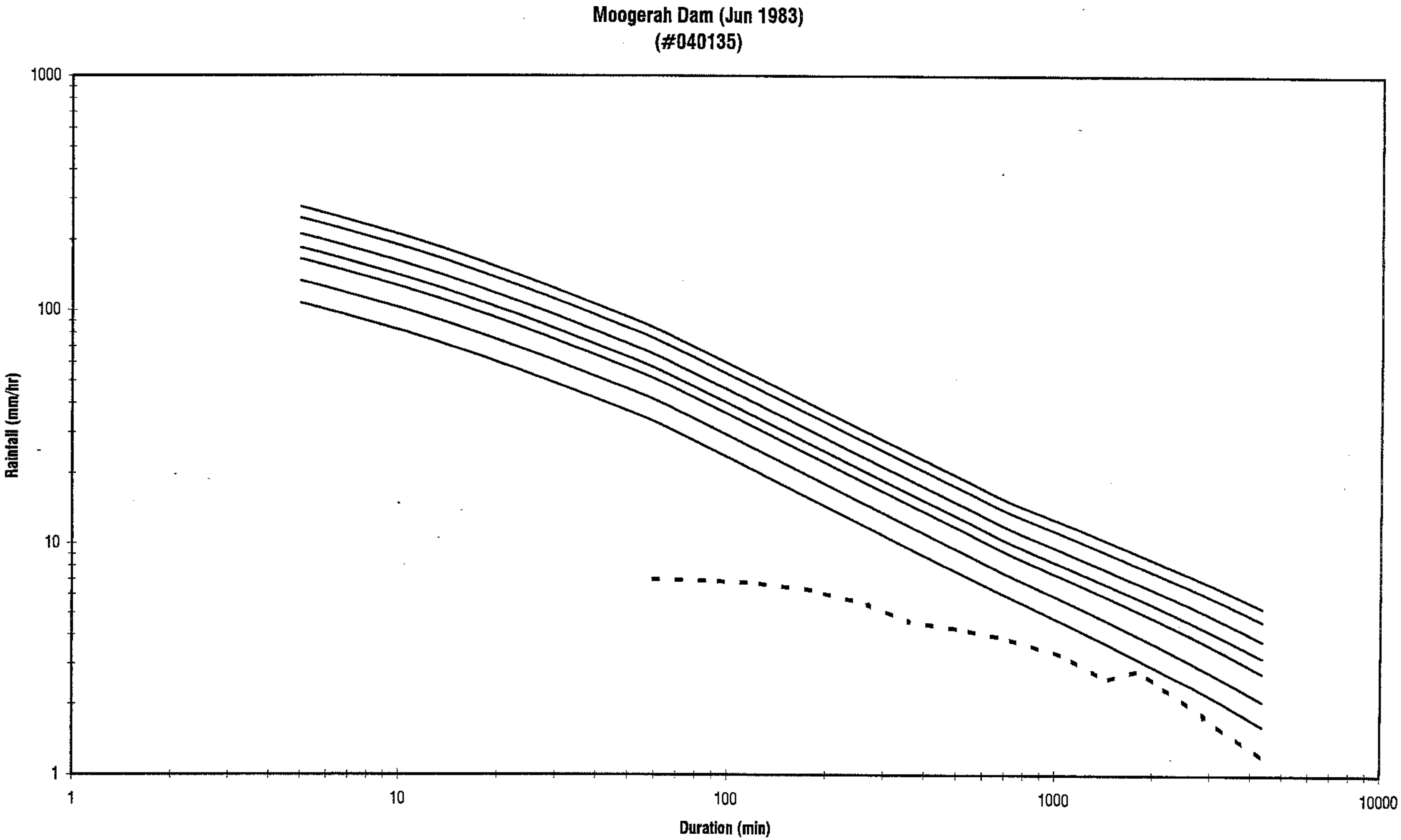

Kirkleagh (Jun 1983)
(#040318)
1000
100
10
1
Rainfall (mm/hr)
1
10
100
1000
10000
Duration (min)

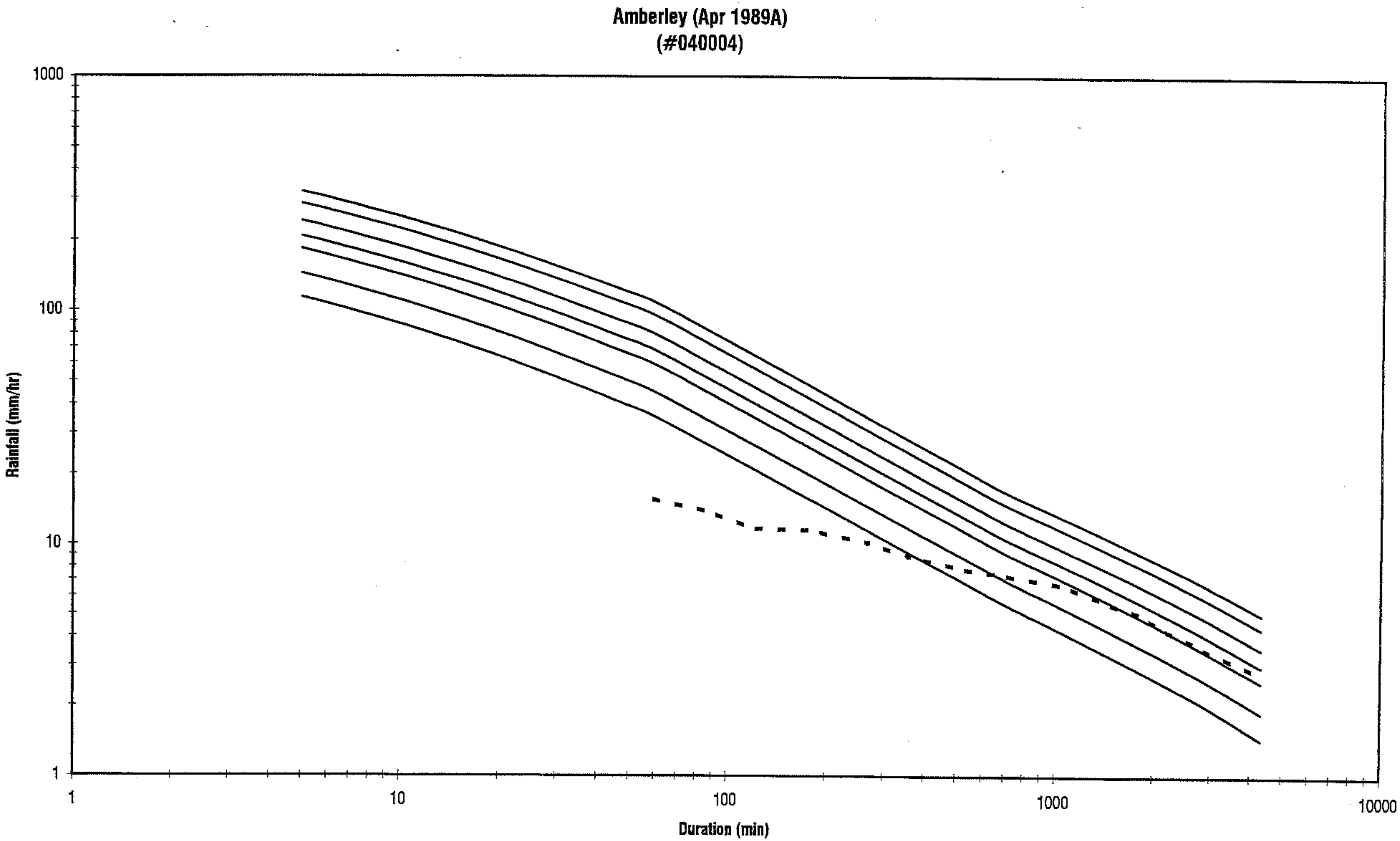

Benarkin Forrest (Jun 1983)
(#040019)
Rainfall (mm/hr)
1000
100
10
1
Duration (min)
1
10
100
1000
10000

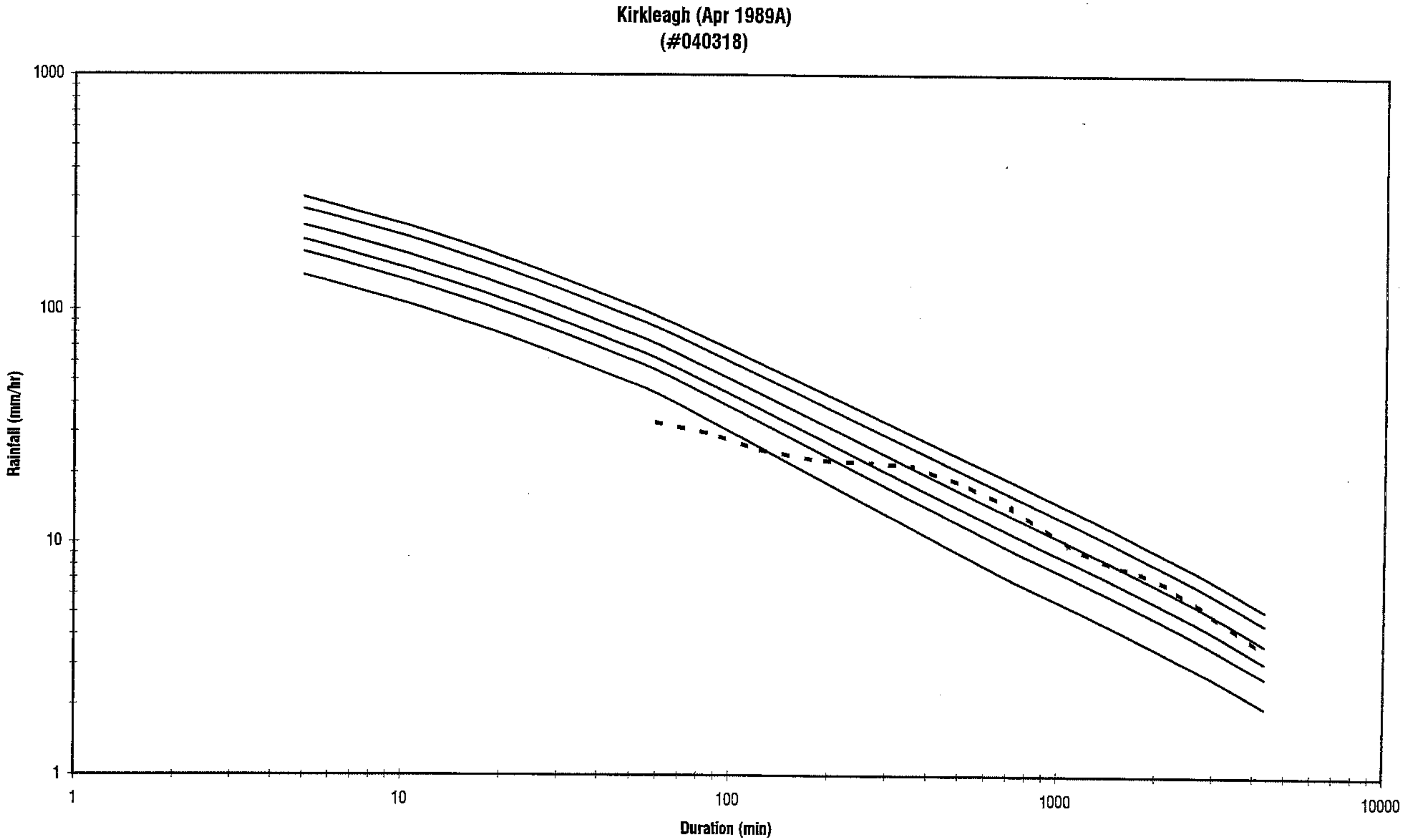
BCC.121.0130

Ravensbourne PO (Jun 1983)
(#040270)

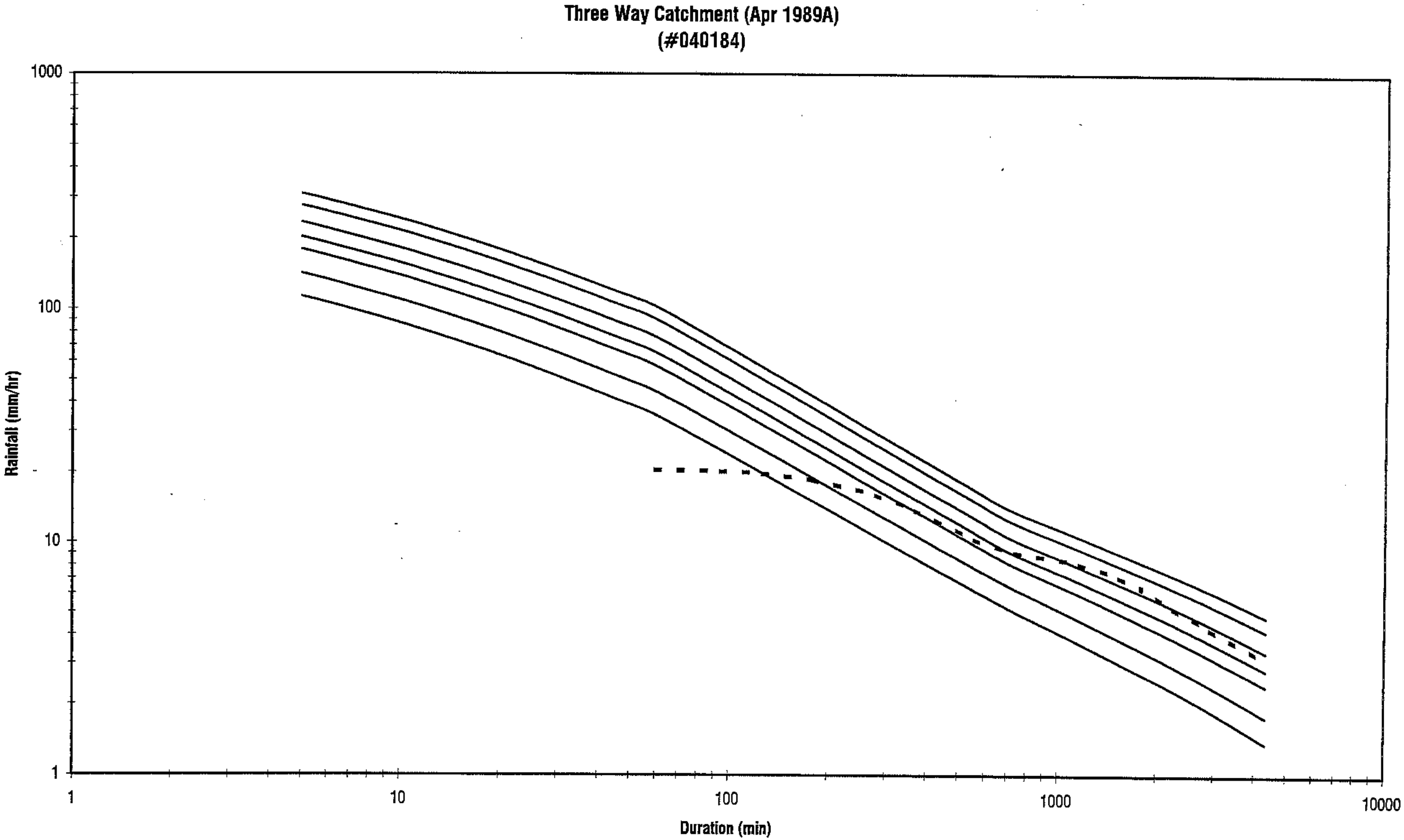


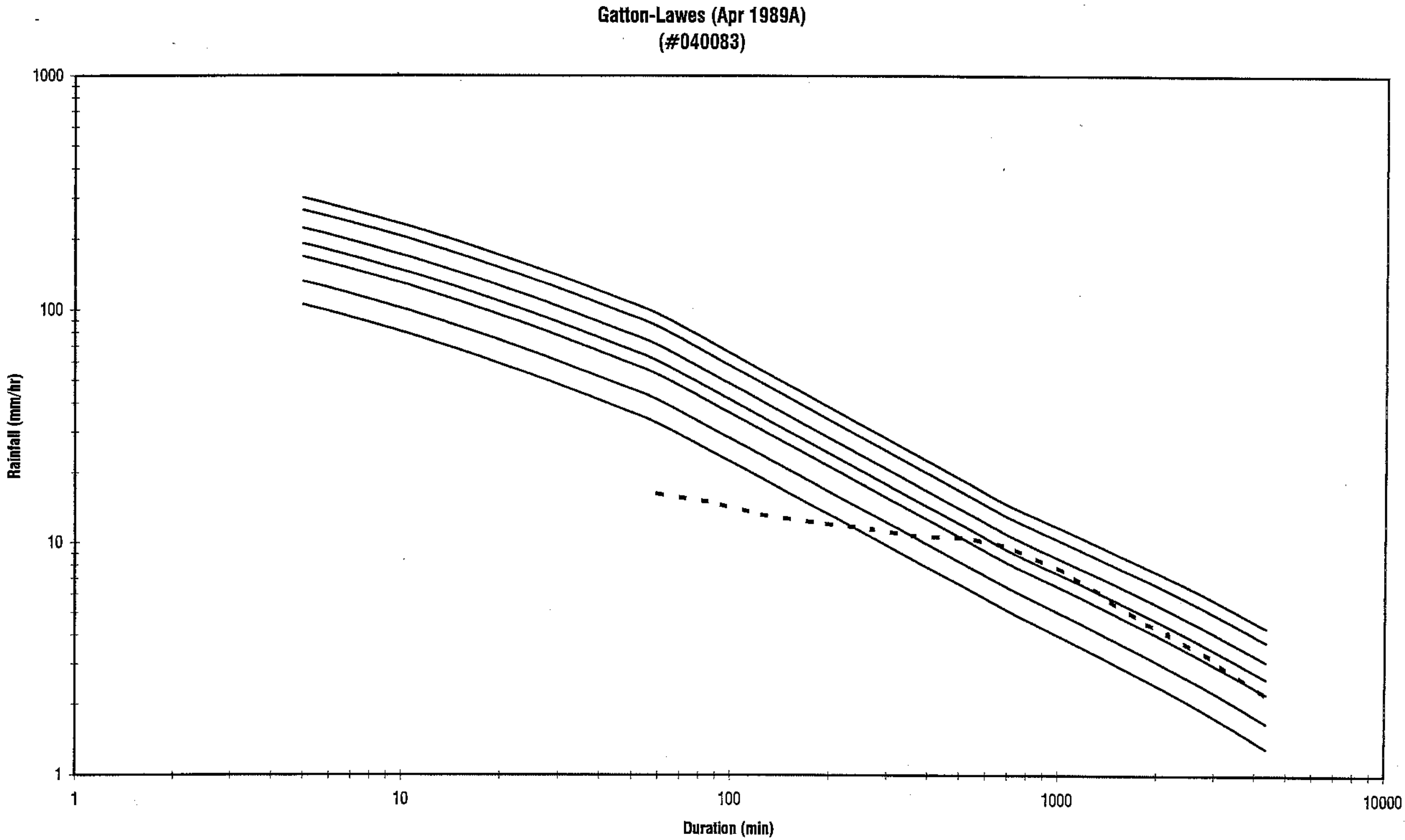

Moogerah Dam (Jun 1983)
(#040135)
1000
100
10
1
Rainfall (mm/hr)
1
10
100
1000
10000
Duration (min)


Amberley (Apr 1989A)
(#040004)
Rainfall (mm/hr)
1000
100
10
1
1
10
100
1000
10000
Duration (min)

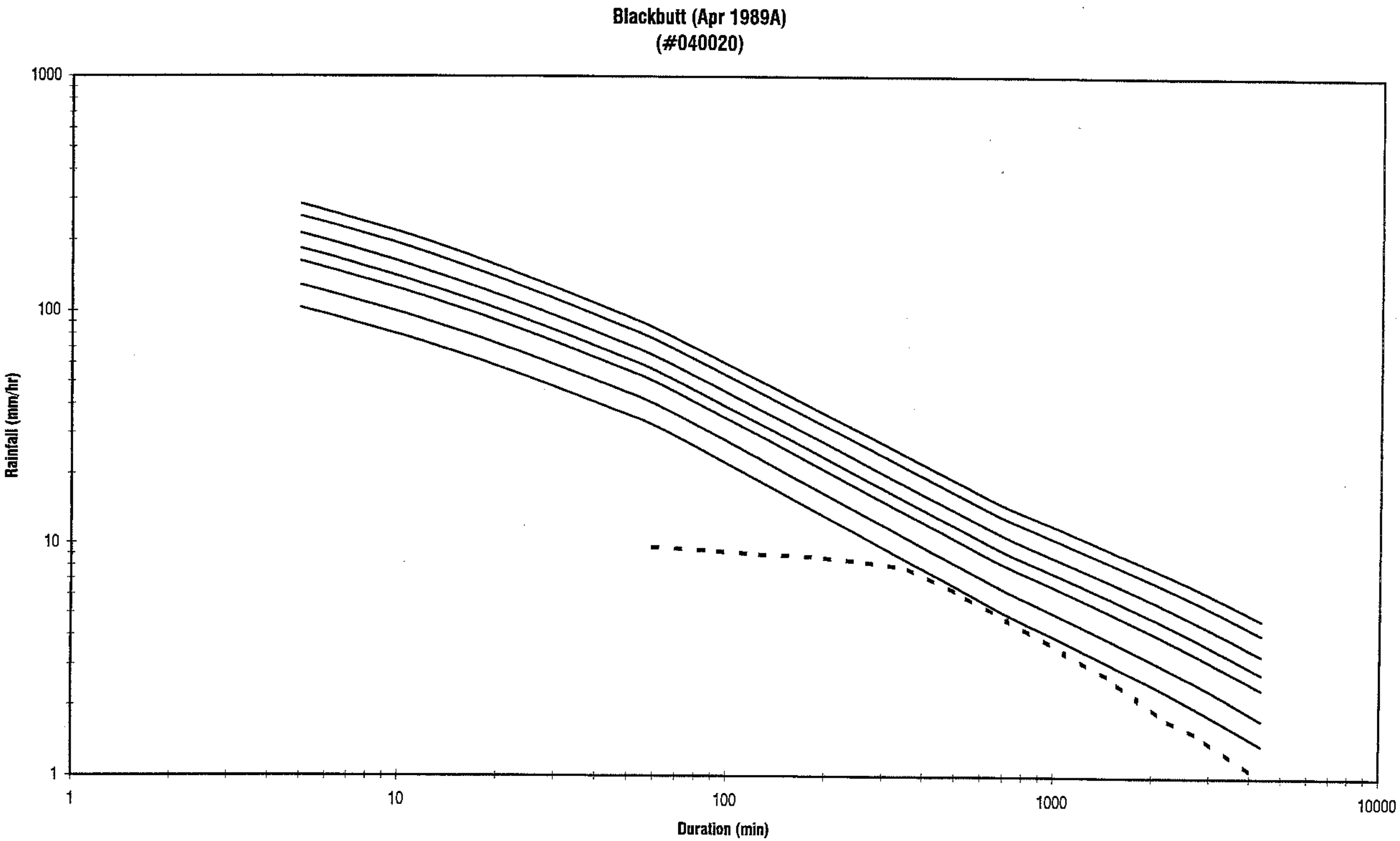

Kirkleagh (Apr 1989A)
(#040318)
1000
100
10
1
Rainfall (mm/hr)
1
10
100
1000
10000
Duration (min)

BCC.121.0134

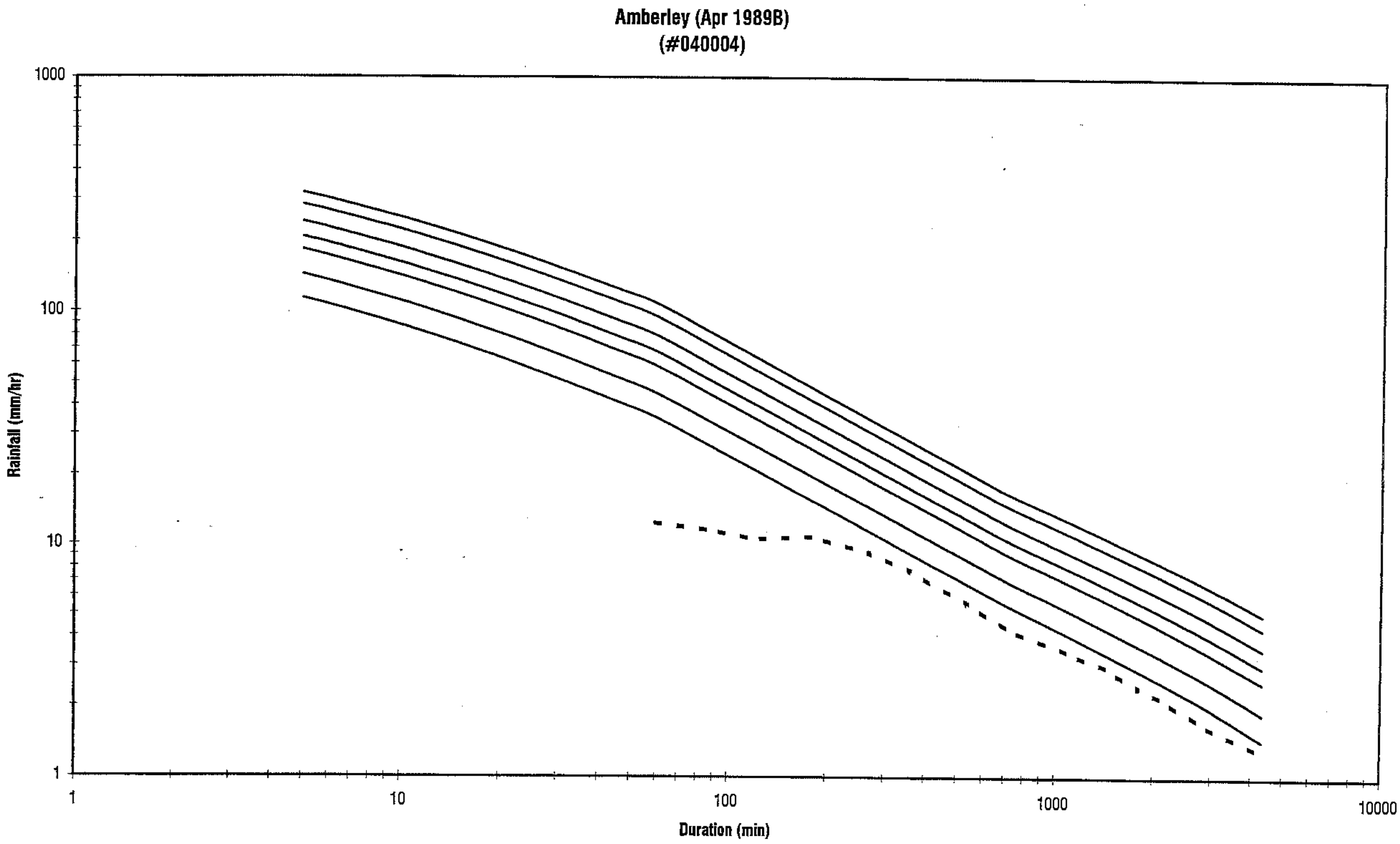

Three Way Catchment (Apr 1989A)
(#040184)
Rainfall (mm/hr)
1000
100
10
1
1
10
100
1000
10000
Duration (min)


Gatton-Lawes (Apr 1989A)
(#040083)
Rainfall (mm/hr)
1000
100
10
1
1
10
100
1000
10000
Duration (min)

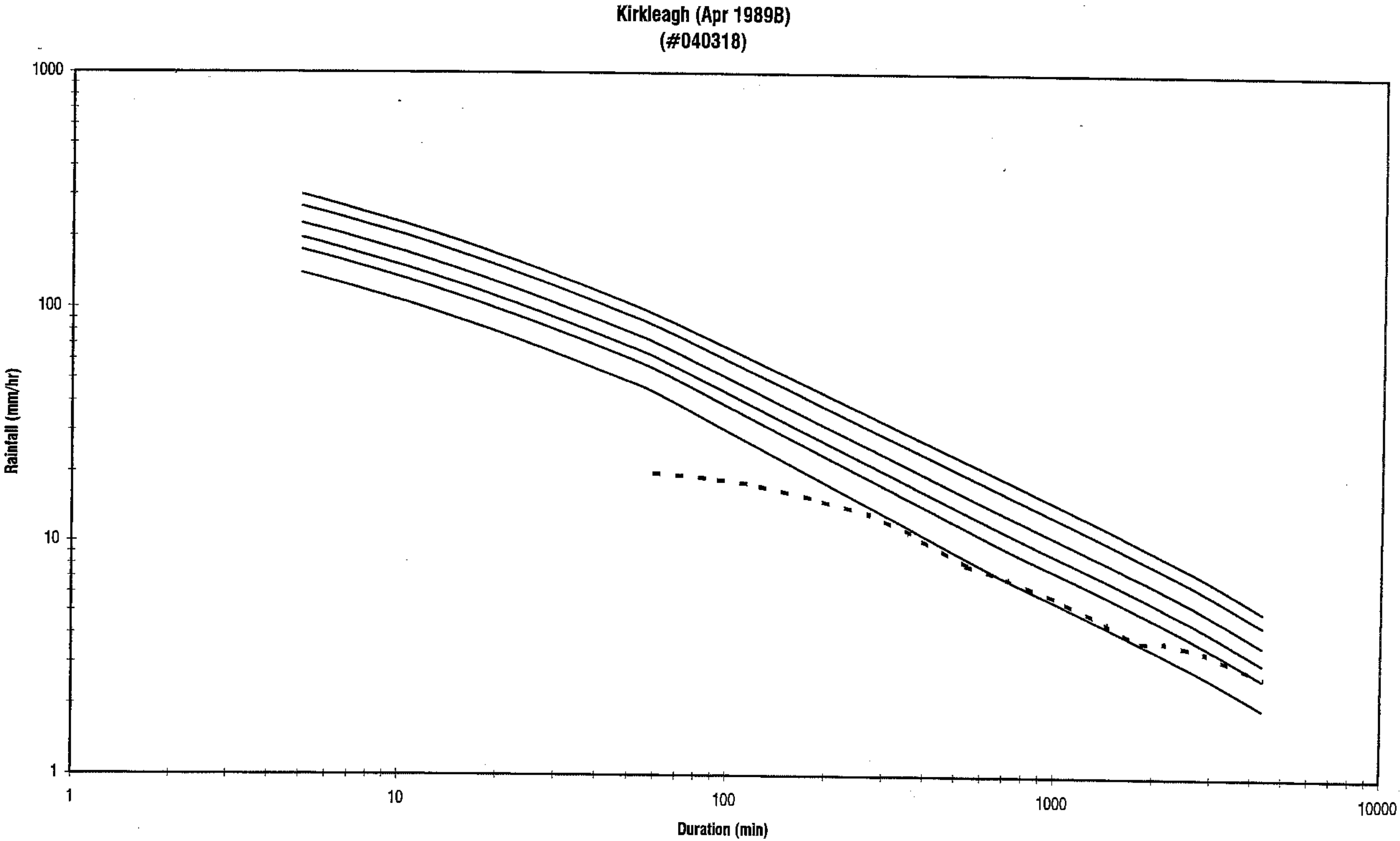
BCC.121.0136

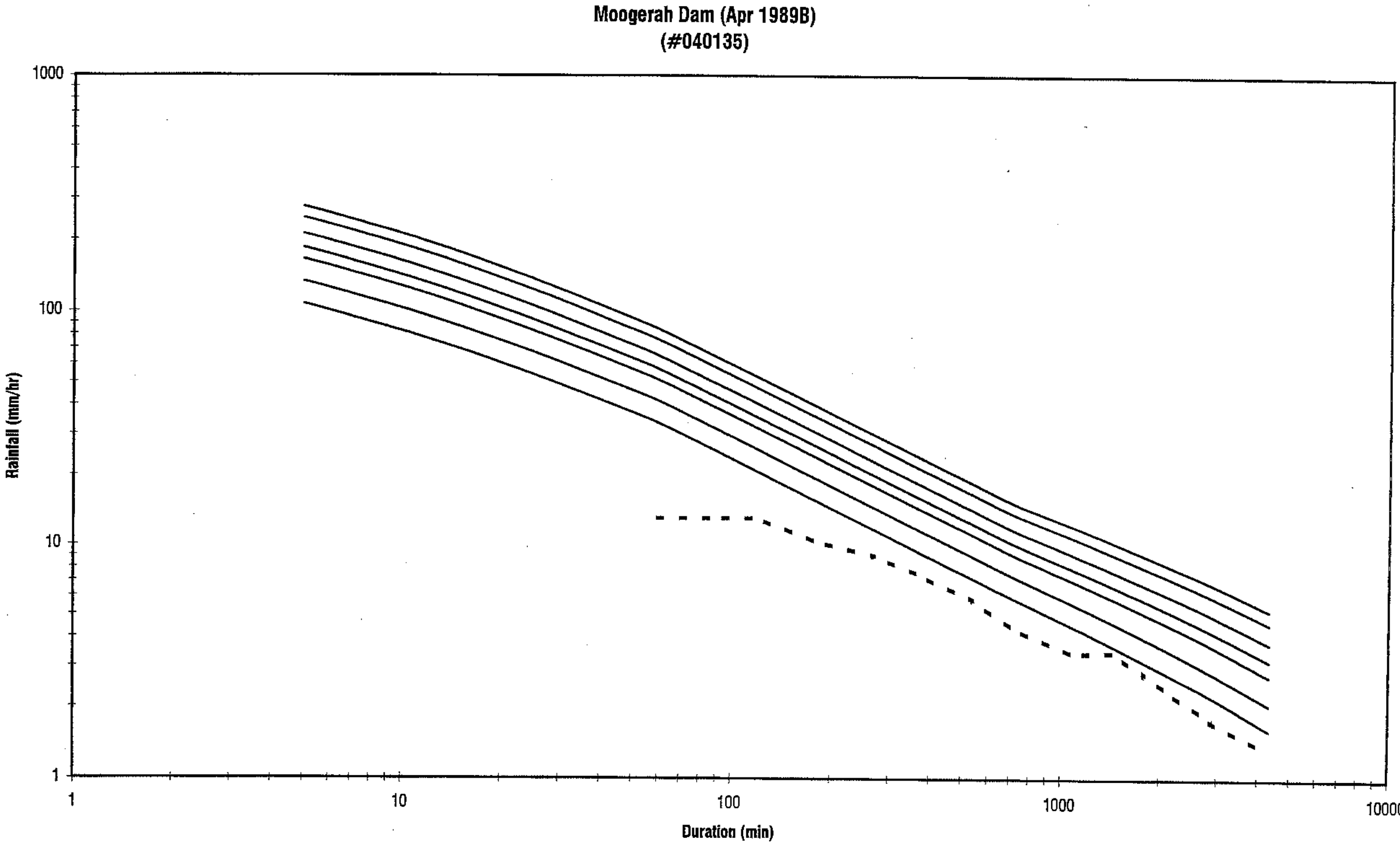

Blackbutt (Apr 1989A)
(#040020)
1000
100
10
1
1
10
100
1000
10000
Rainfall (mm/hr)
Duration (min)

BCC.121.0137



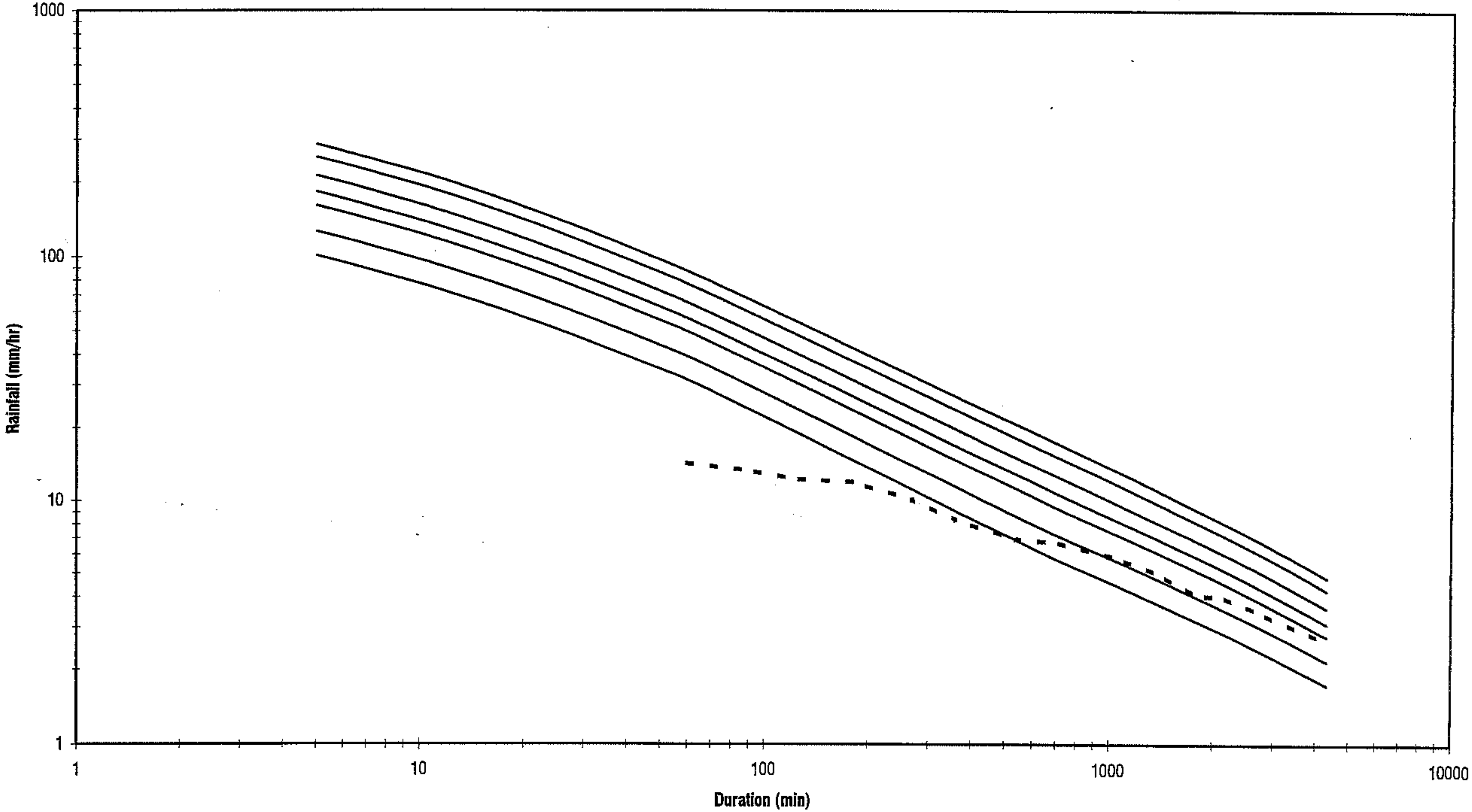
Amberley (Apr 1989B)
(#040004)
1000
100
10
1
Rainfall (mm/hr)
1
10
100
1000
10000
Duration (min)

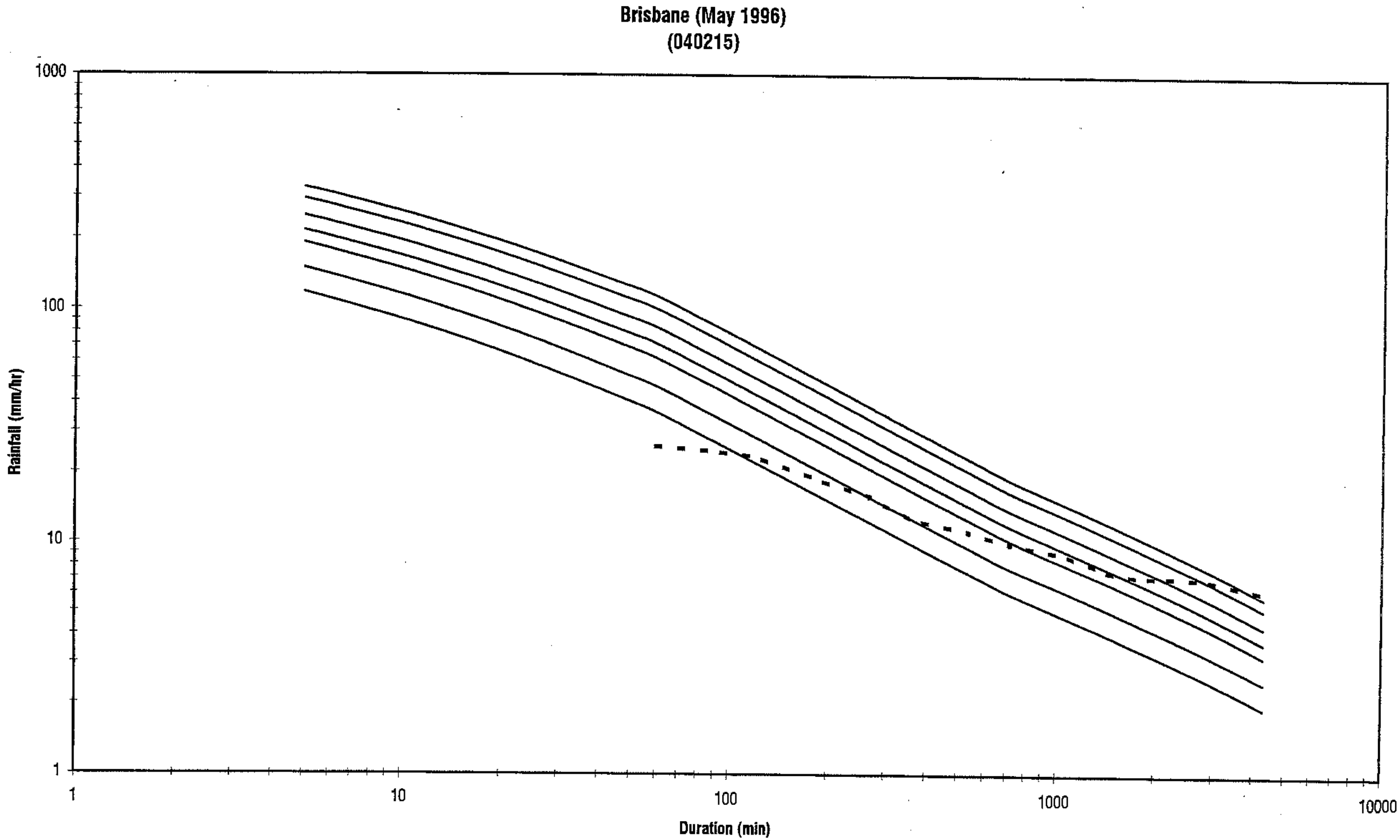

Kirkleagh (Apr 1989B)
(#040318)
1000
100
10
1
Rainfall (mm/hr)
1
10
100
1000
10000
Duration (min)


Moogerah Dam (Apr 1989B)
(#040135)
1000
100
10
1
Rainfall (mm/hr)
1
10
100
1000
10000
Duration (min)

BCC.121.0140

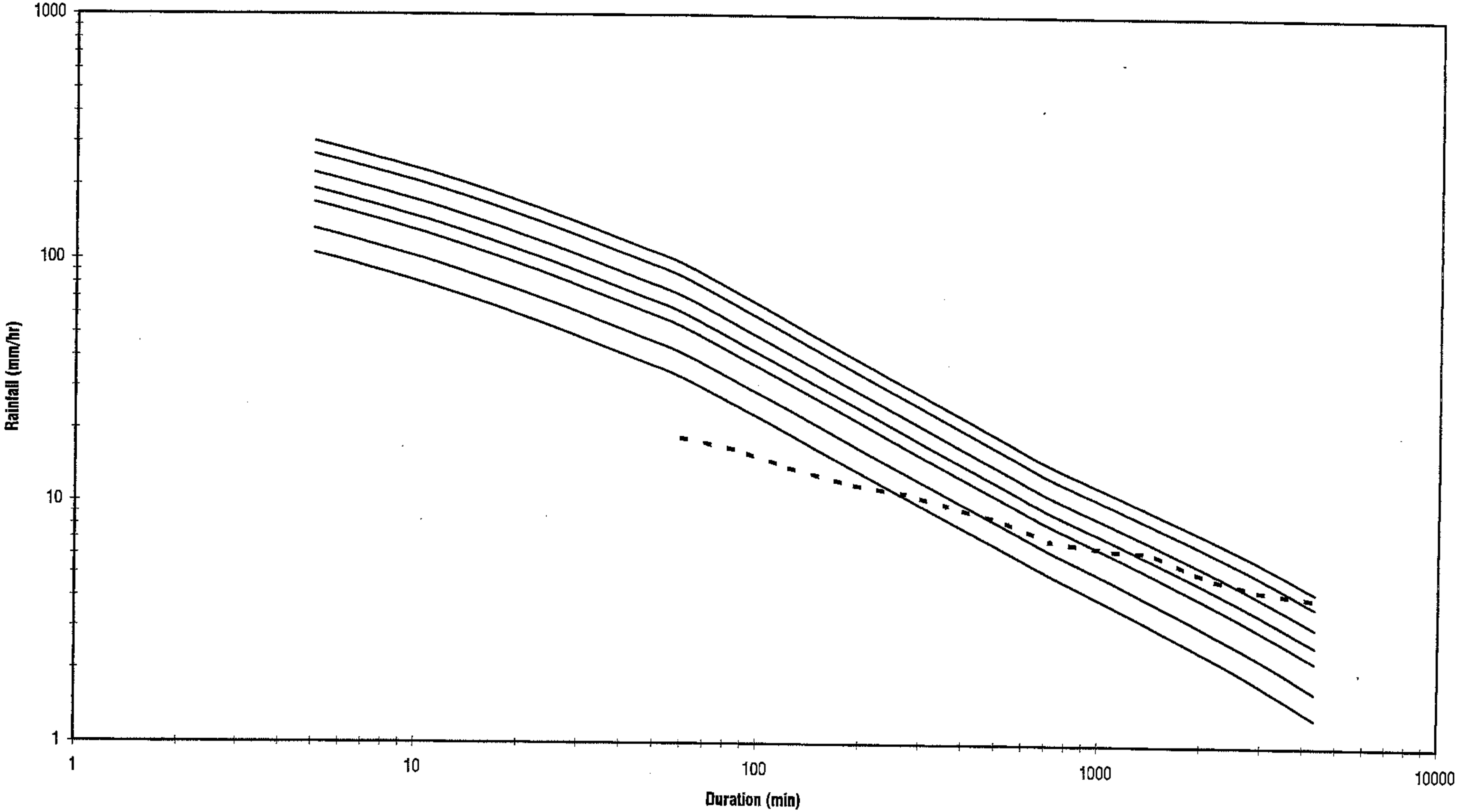
Ravensbourne PO (Apr 1989B)
(#040270)

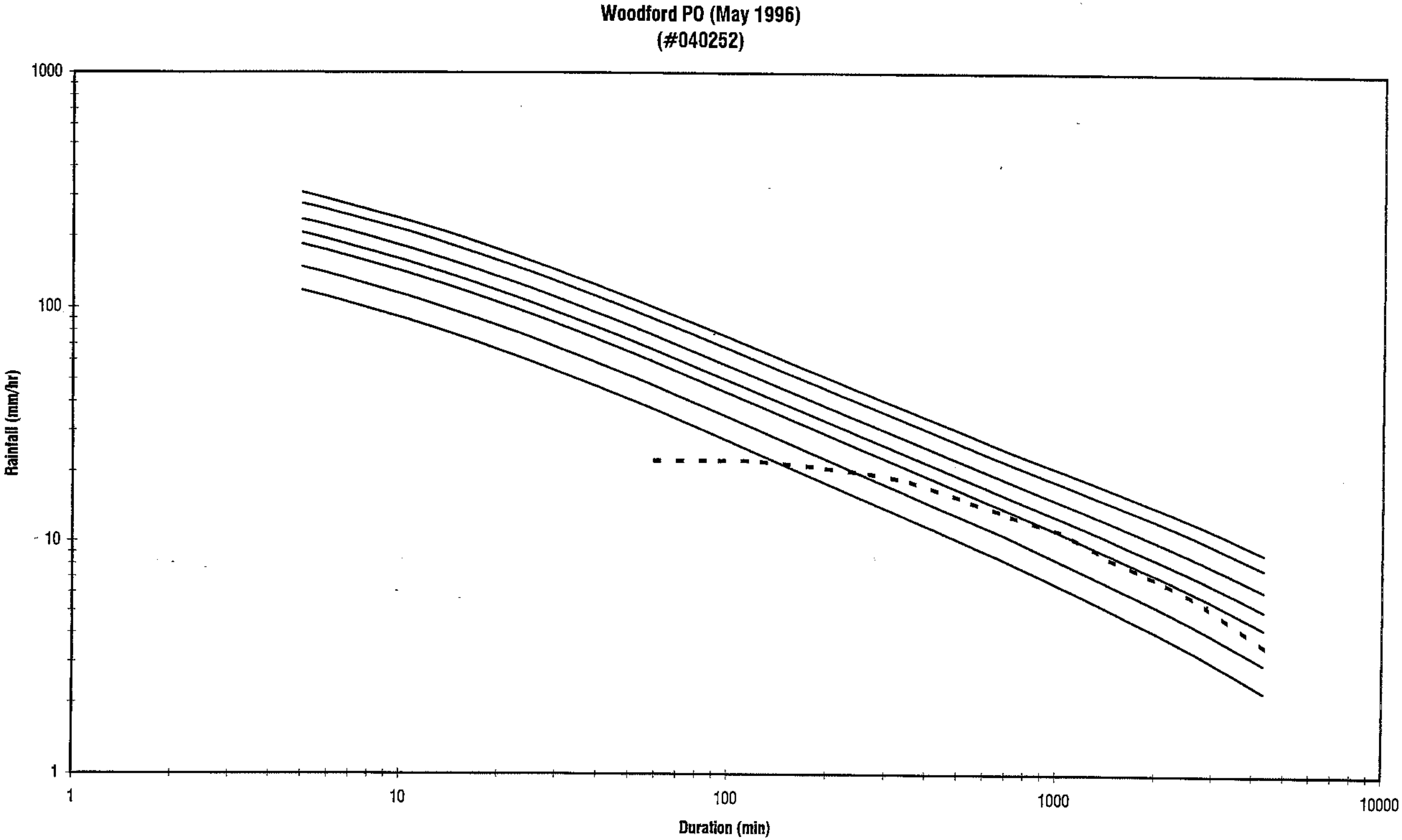


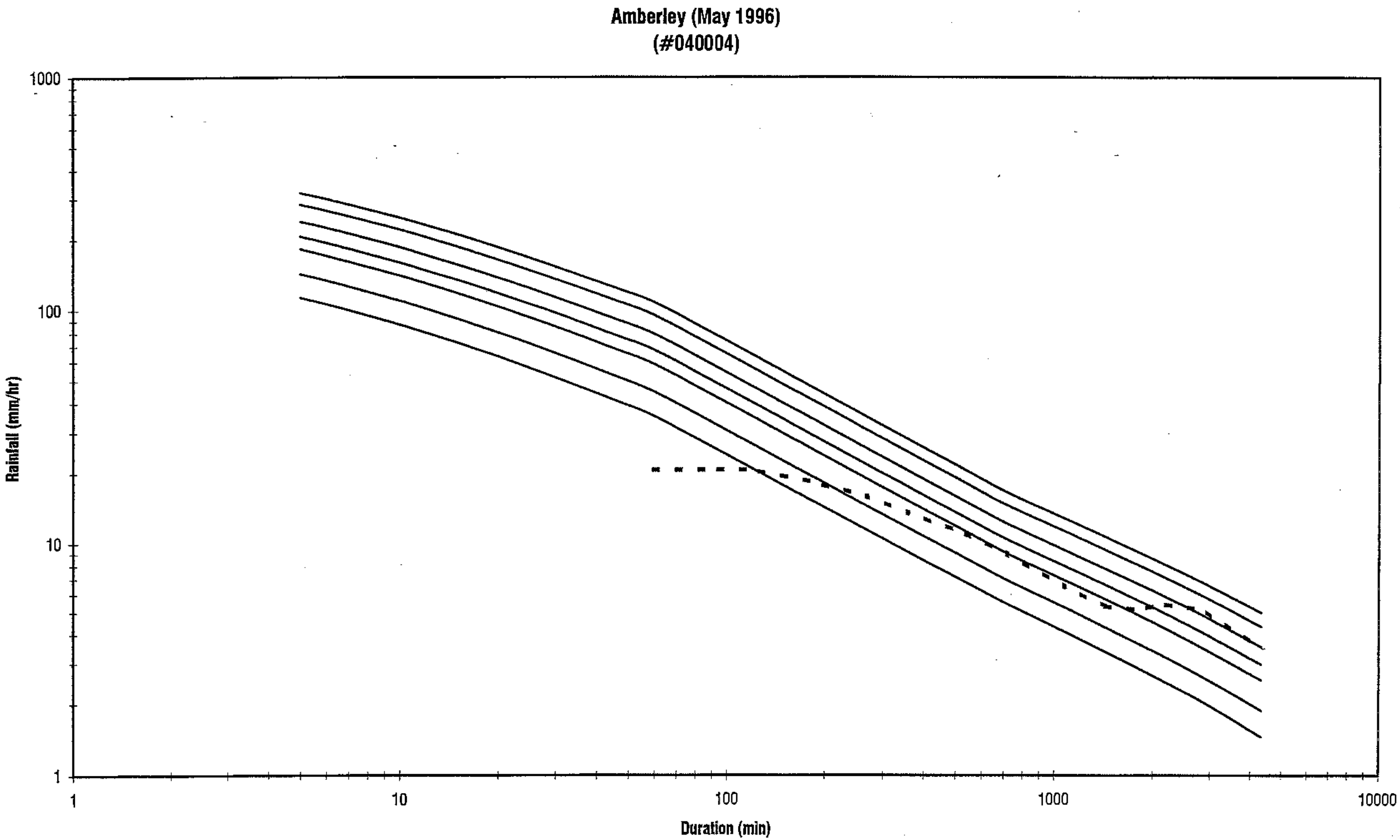

Brisbane (May 1996)
(040215)
Rainfall (mm/hr)
1000
100
10
1
1
10
100
1000
10000
Duration (min)

BCC.121.0142

Gatton-Lawes (May 1996)
(#040083)




Woodford PO (May 1996)
(#040252)
1000
100
10
1
Rainfall (mm/hr)
1
10
100
1000
10000
Duration (min)

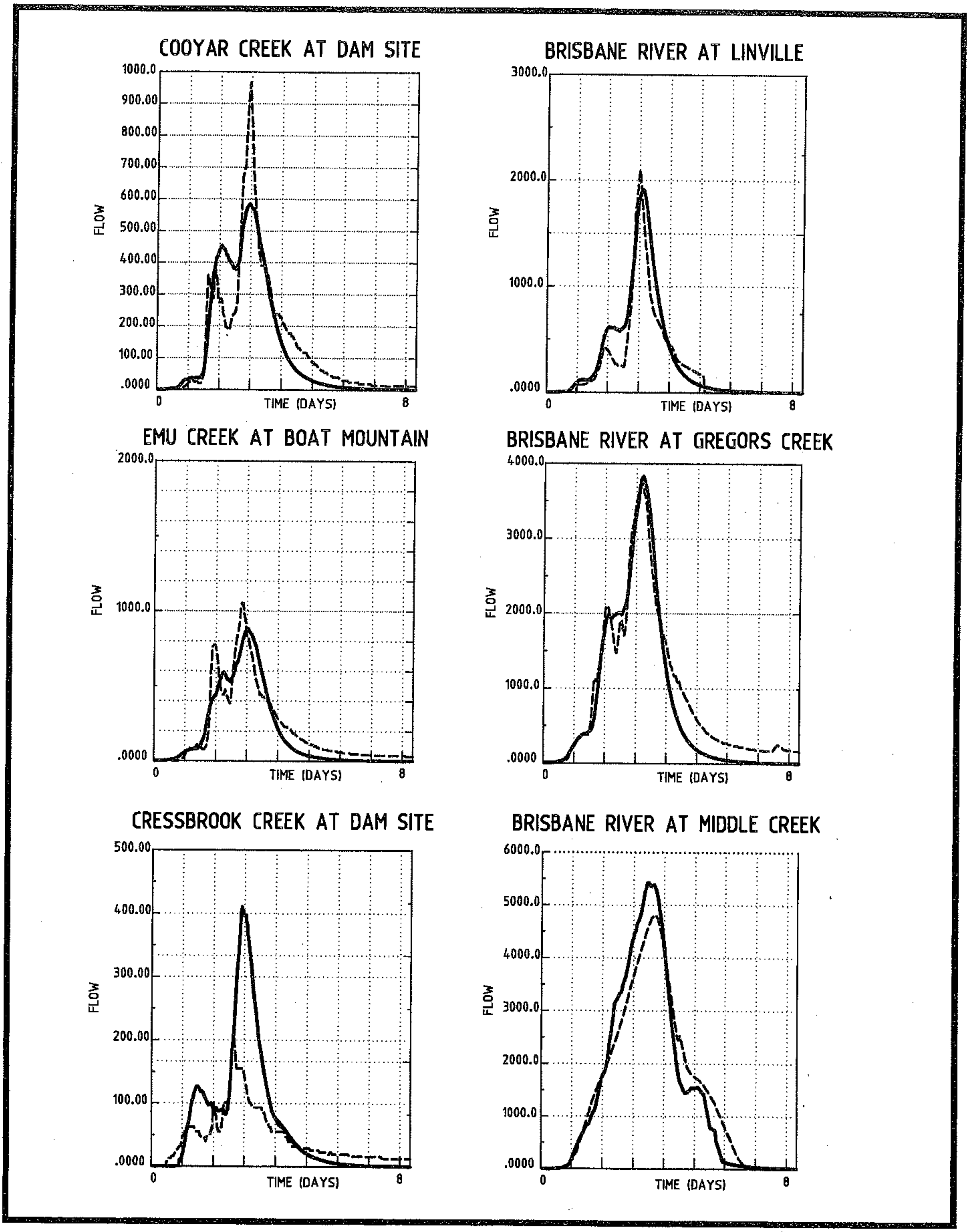


Amberley (May 1996)
(#040004)
Rainfall (mm/hr)
1000
100
10
1
1
10
100
1000
10000
Duration (min)

Appendix B - Recorded and RAFTS Predicted Hydrographs

FIGURE B-1a

BRISBANE RIVER FLOOD STUDY
JANUARY 1974 FLOOD HYDROGRAPHS



LEGEND

- - - - - - - RECORDED DISCHARGE

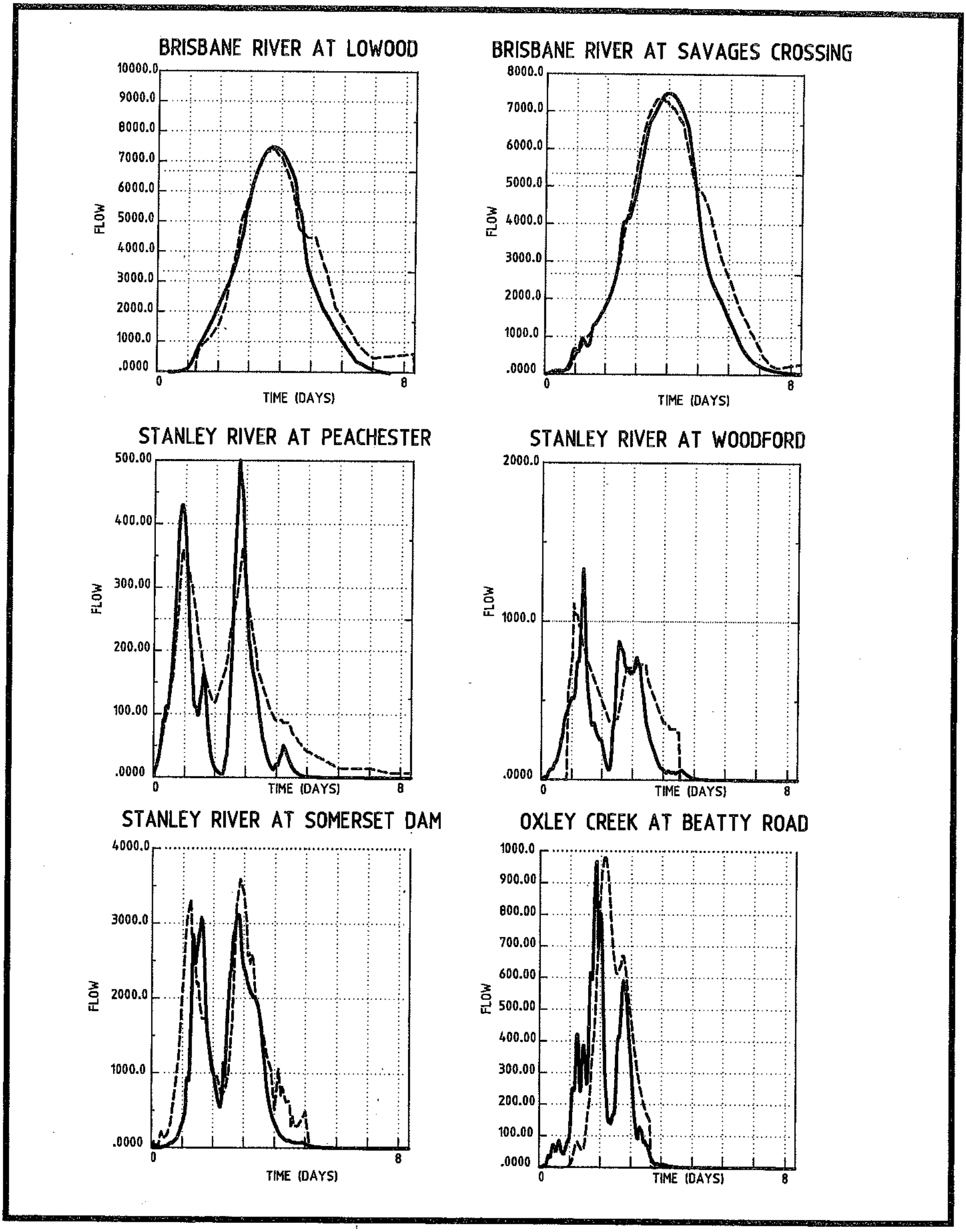
———————— PREDICTED DISCHARGE

FILE NAME: FIG-R1

DISK N°: G:\

FIGURE B-1b

BRISBANE RIVER FLOOD STUDY
JANUARY 1974 FLOOD HYDROGRAPHS



LEGEND

- - - - - - - - RECORDED DISCHARGE

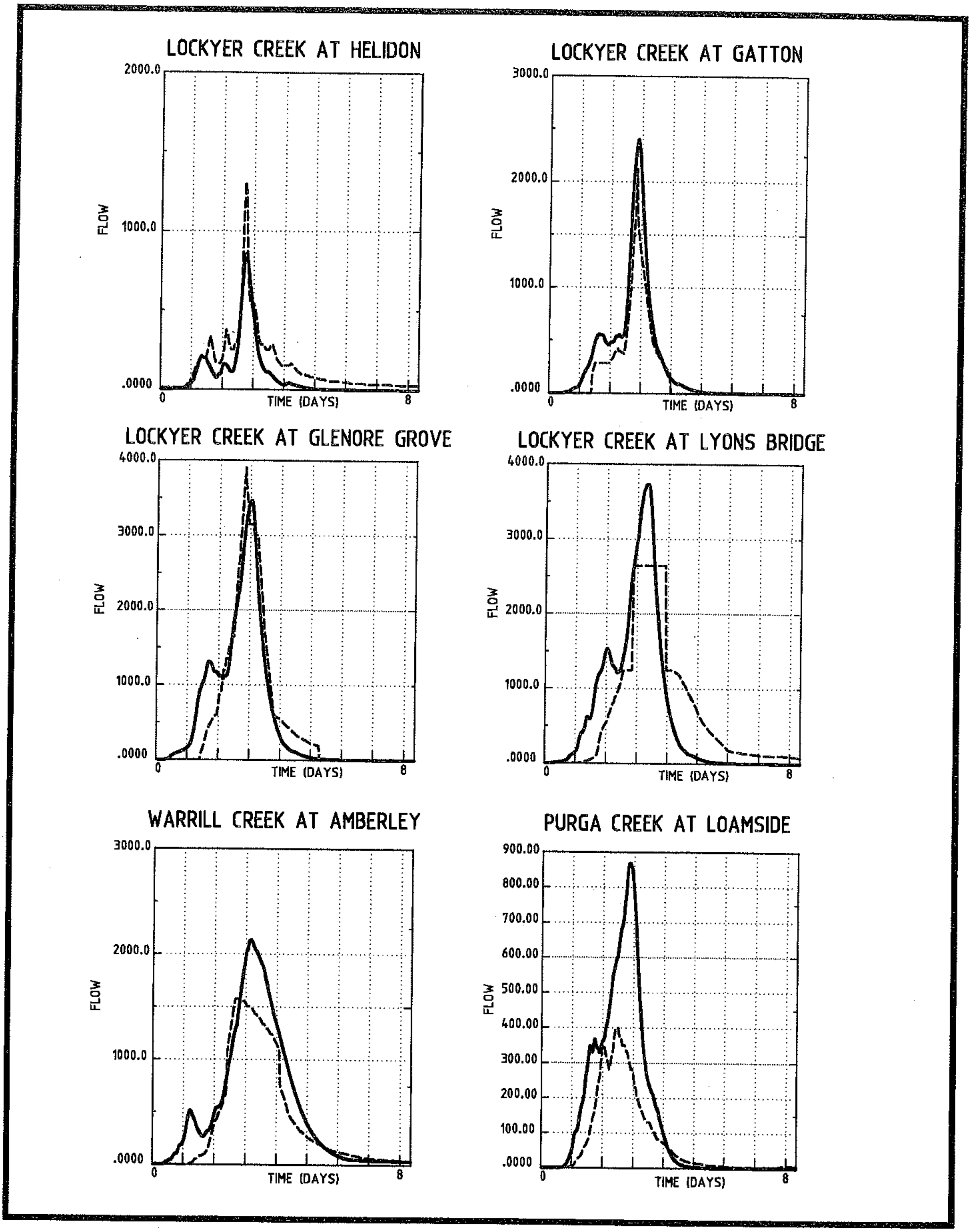
———————— PREDICTED DISCHARGE

FILE NAME: FIG-B1 PLOT SCALE: 1=

DISK N°: G:\ JOB N°: T004 DATE 17-2-

FIGURE B-1c

BRISBANE RIVER FLOOD STUDY
JANUARY 1974 FLOOD HYDROGRAPHS



LEGEND

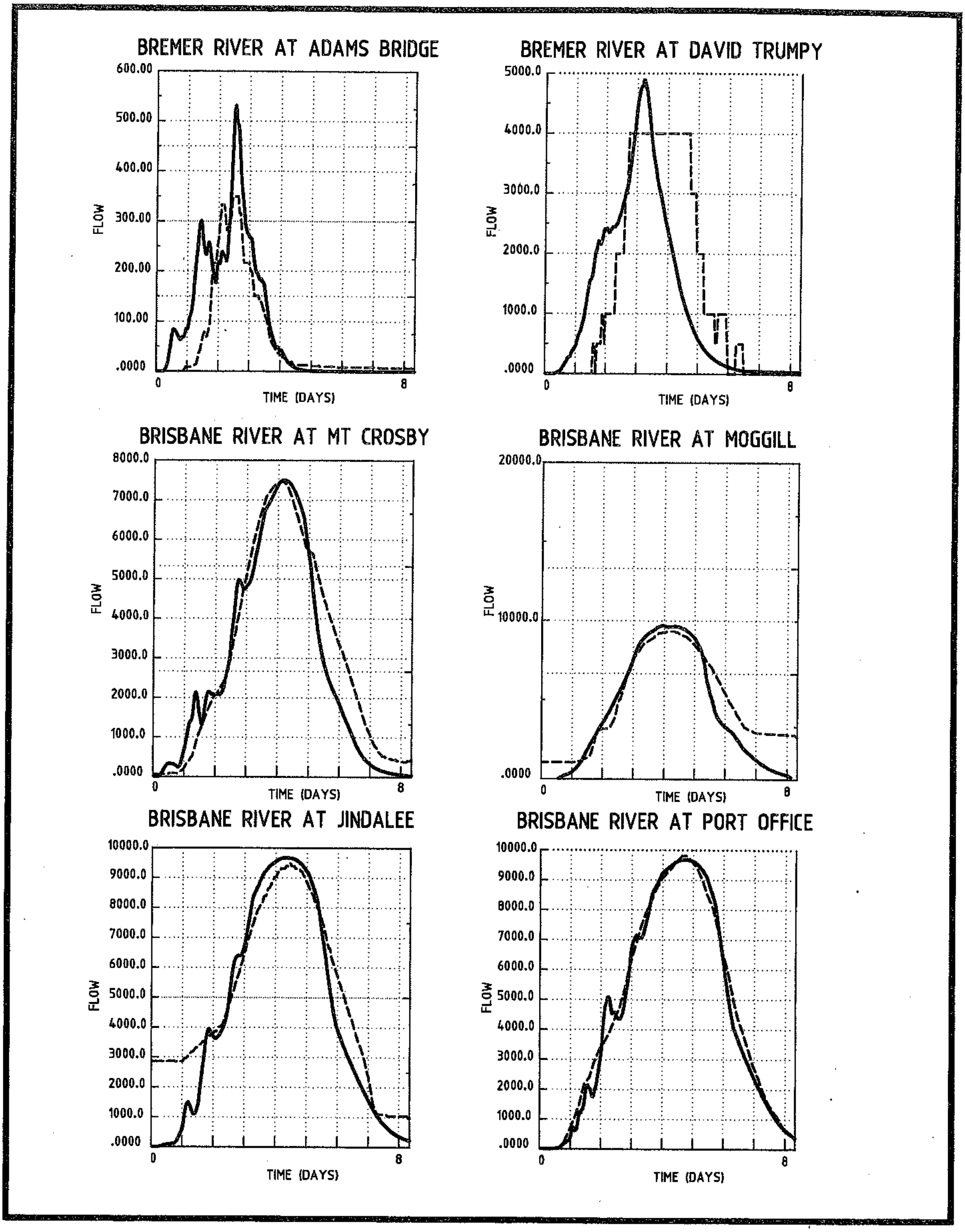
- - - - - - - - RECORDED DISCHARGE

———————— PREDICTED DISCHARGE

FILE NAME: FIG-B1 DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98

PLO LE: 1=

FIGURE B-1d
BRISBANE RIVER FLOOD STUDY
JANUARY 1974 FLOOD HYDROGRAPHS



LEGEND

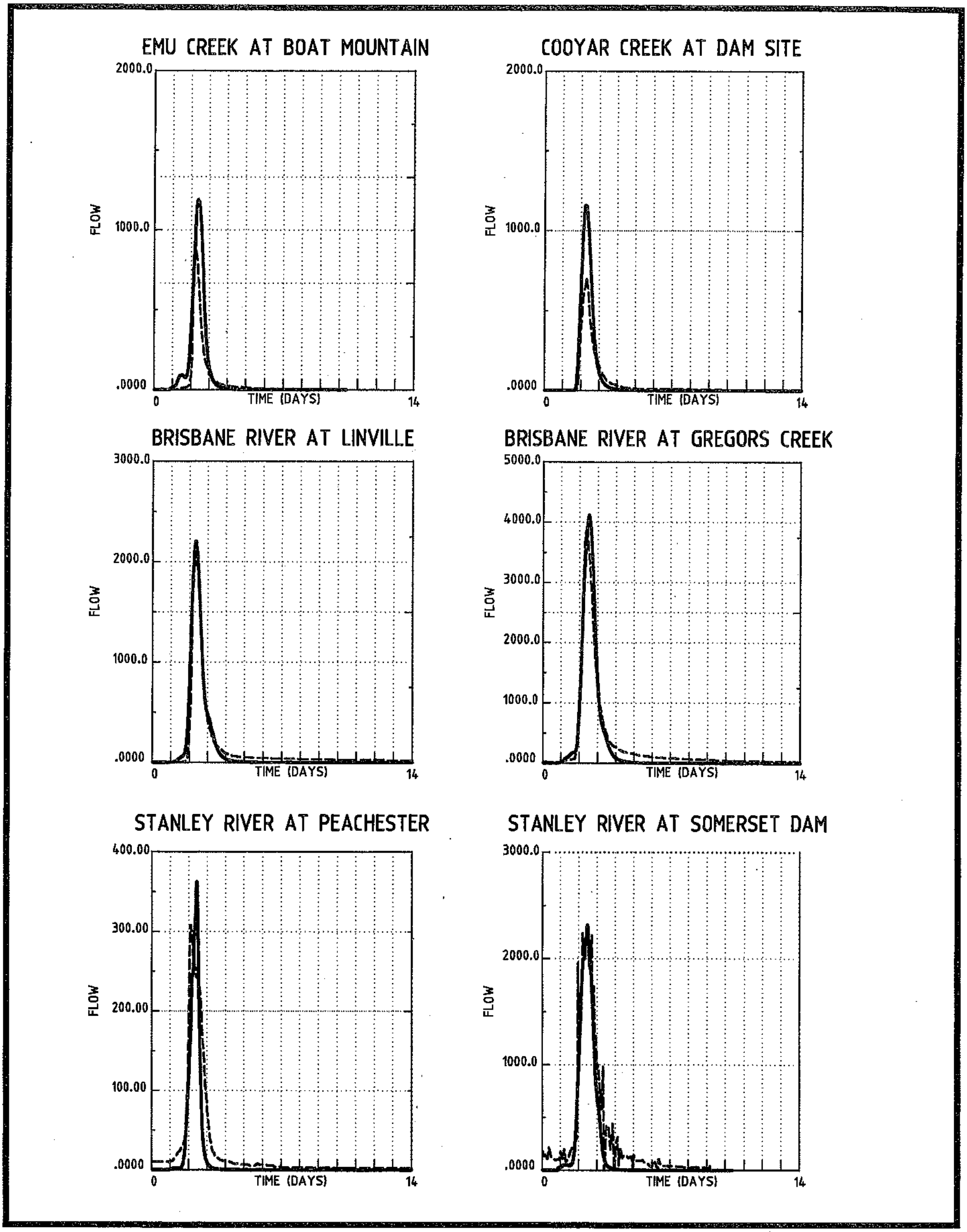
- - - - - - - - RECORDED DISCHARGE

———————— PREDICTED DISCHARGE

FILE NAME: FIG-B1 PLO... LE: 1=

DISK N°: G:\ JOB N°: T004157 DATE 17-2-98

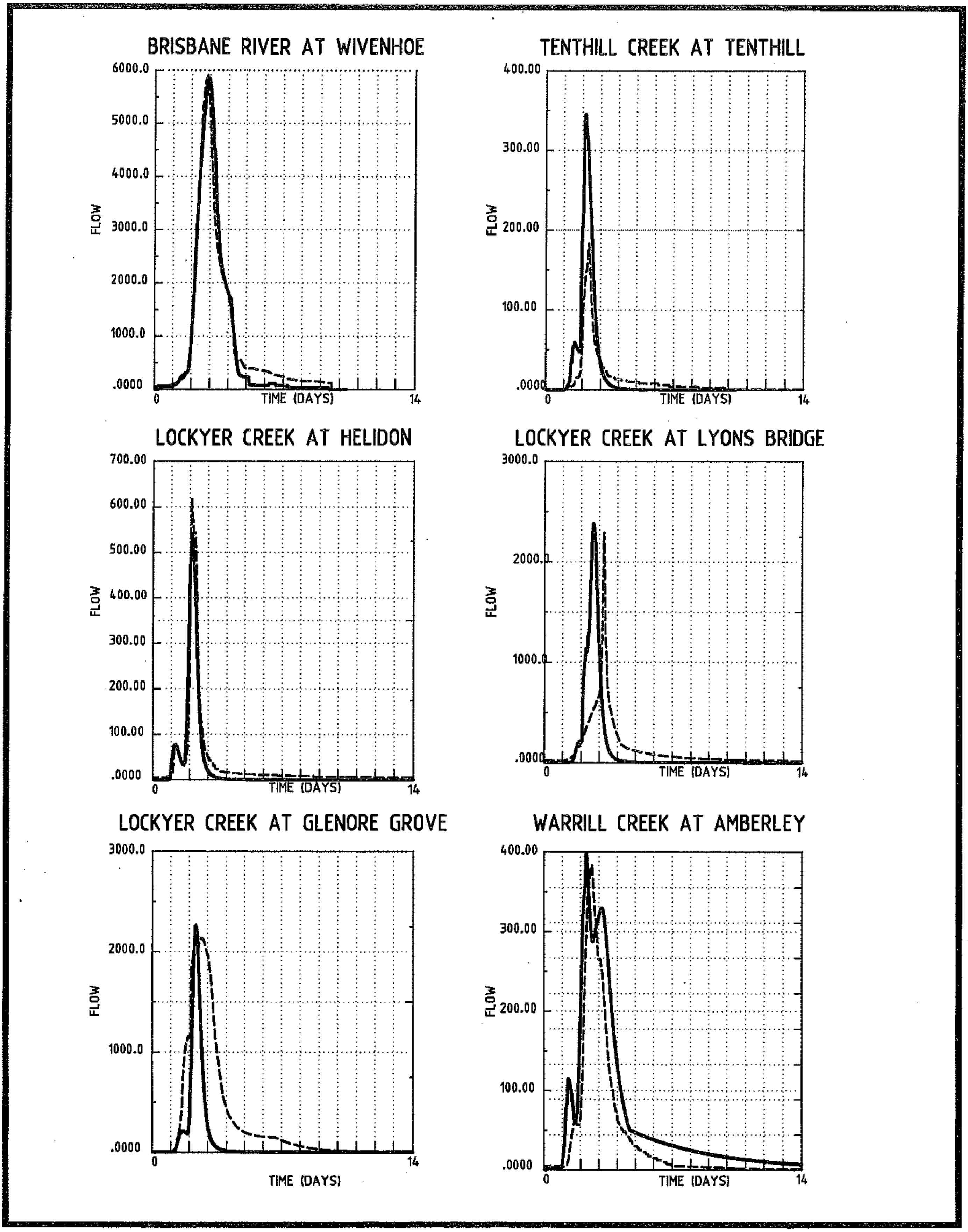
FIGURE B-2a
BRISBANE RIVER FLOOD STUDY
JUNE 1983 FLOOD HYDROGRAPHS



LEGEND
- - - - - - - - RECORDED DISCHARGE
———————— PREDICTED DISCHARGE

FILE NAME: FIG-B2 DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98
PLO. ...LE: 1=.

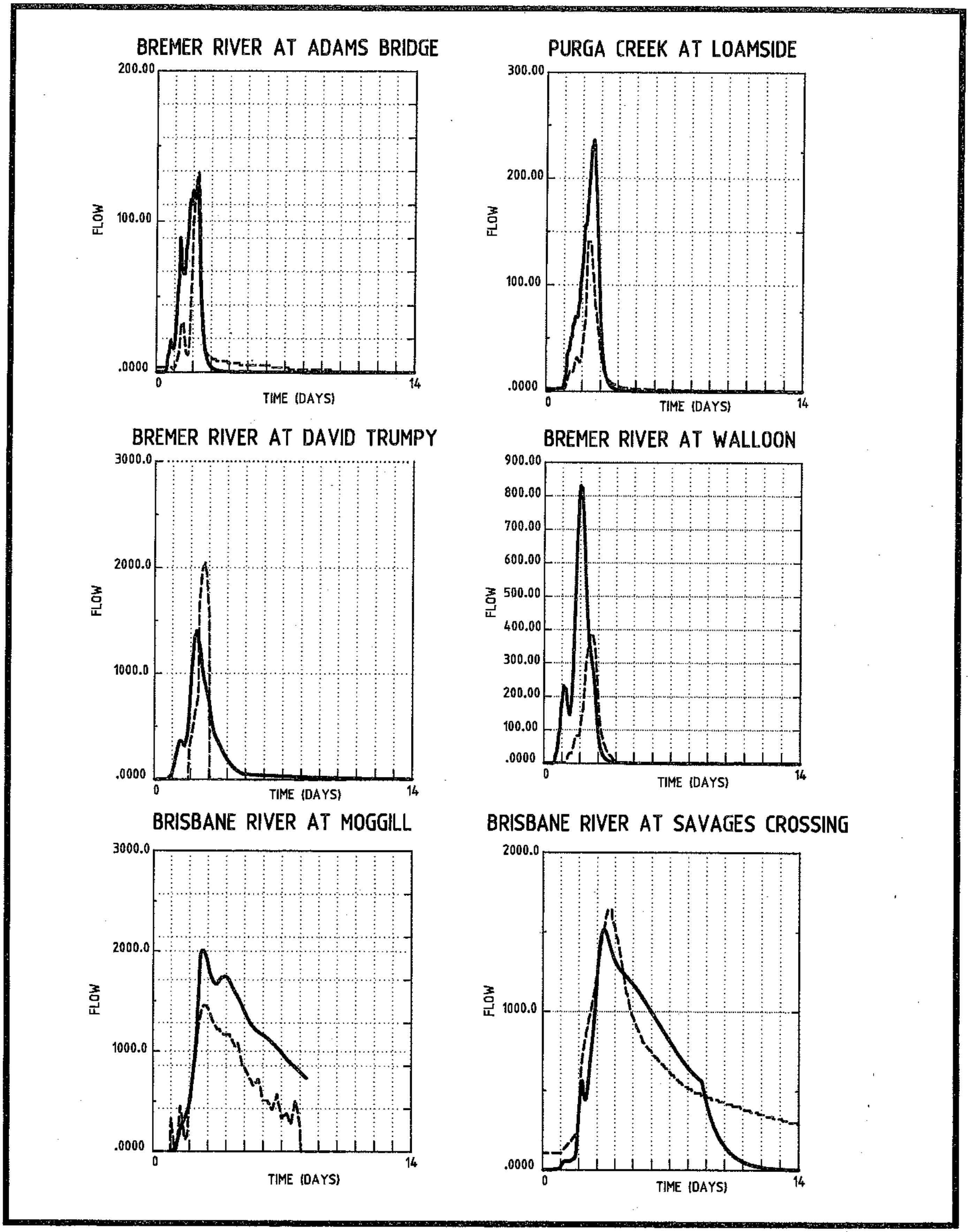
FIGURE B-2b
BRISBANE RIVER FLOOD STUDY
JUNE 1983 FLOOD HYDROGRAPHS



LEGEND
- - - - - - - - RECORDED DISCHARGE
———————— PREDICTED DISCHARGE

FILE NAME: FIG-B2 PLO... LE: 1=..   DISK N°: G:\   JOB N°: T004157   DATE: 17-2-98

FIGURE B-2c
BRISBANE RIVER FLOOD STUDY
JUNE 1983 FLOOD HYDROGRAPHS



LEGEND

- - - - - - - - RECORDED DISCHARGE

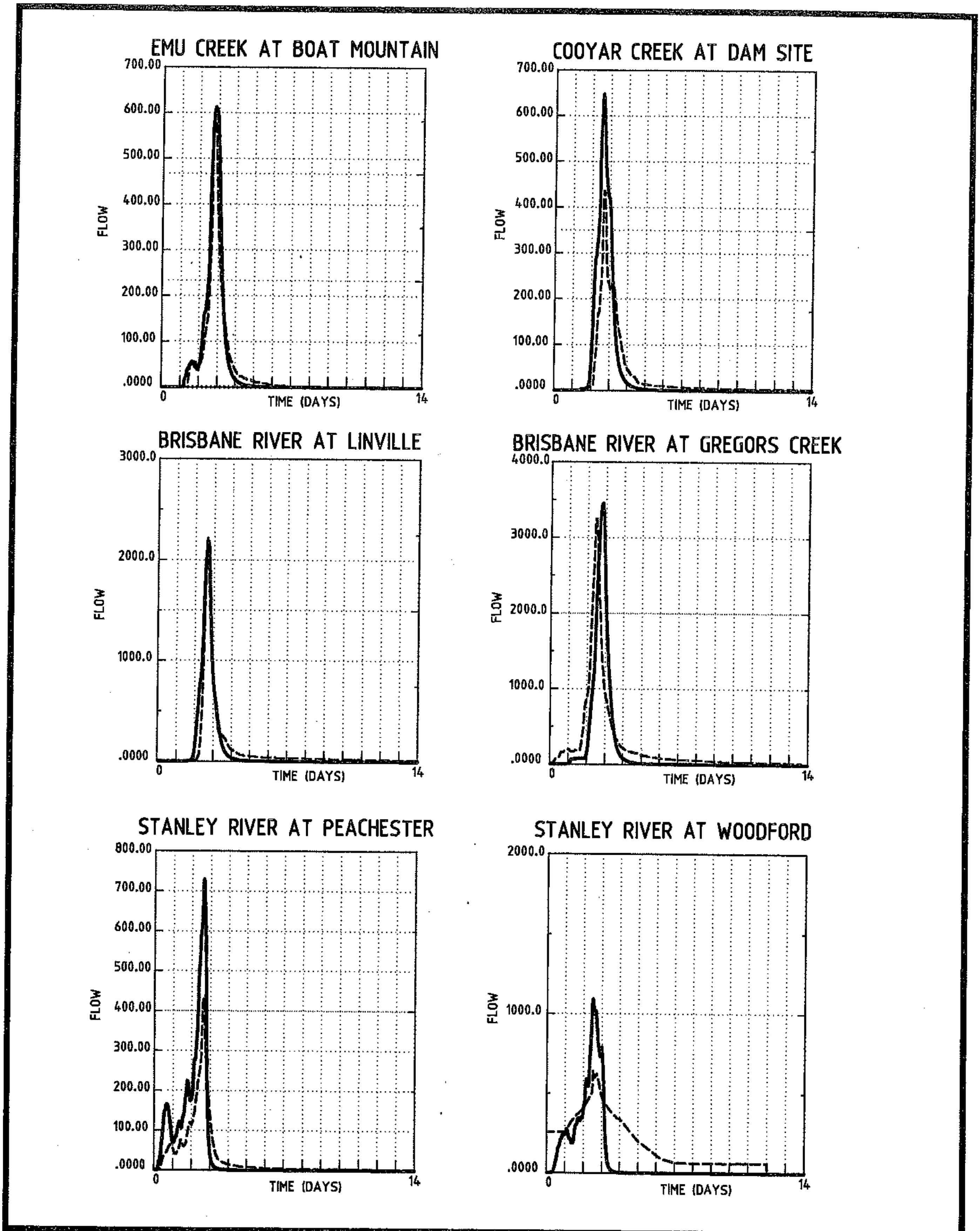
———————— PREDICTED DISCHARGE

FILE NAME: FIG-B2 PLOT SCALE: 1:1 DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98

SINCLAIR KNIGHT MERZ

FIGURE B-3a

BRISBANE RIVER FLOOD STUDY
LATE APRIL 1989 FLOOD HYDROGRAPHS



LEGEND

-------- RECORDED DISCHARGE

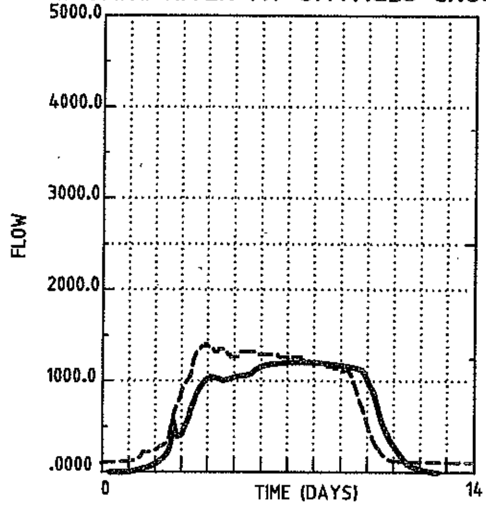
———— PREDICTED DISCHARGE

FILE NAME: FIG-B3 PLC LE 1: DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98

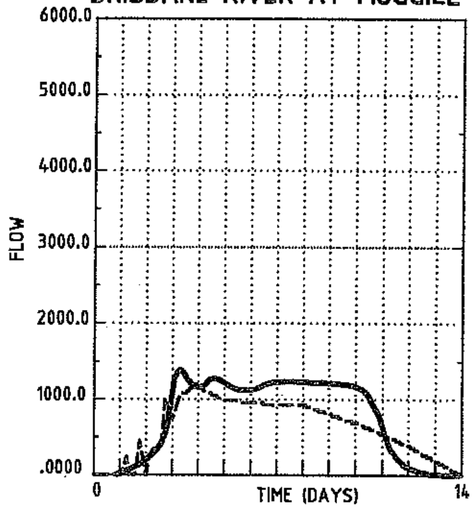
FIGURE B-3b
BRISBANE RIVER FLOOD STUDY
LATE APRIL 1989 FLOOD HYDROGRAPHS

SINCLAIR KNIGHT MERZ

BRISBANE RIVER AT SAVAGES CROSSING

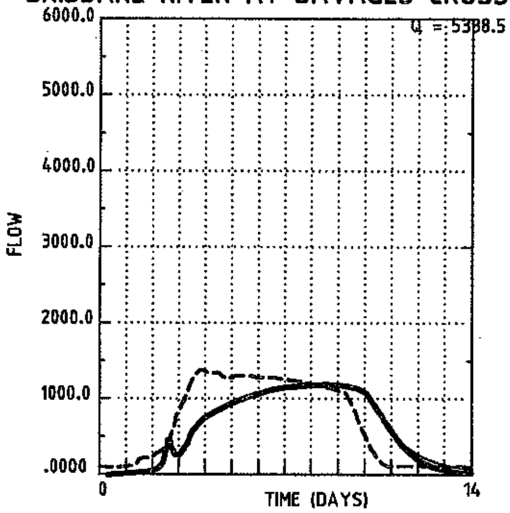


BRISBANE RIVER AT MOGGILL

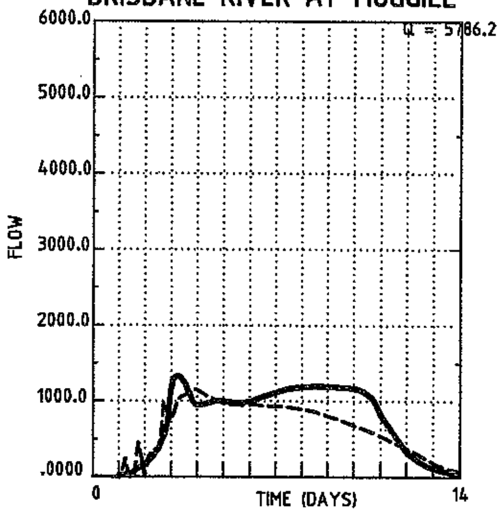


STORAGE CURVE A

BRISBANE RIVER AT SAVAGES CROSSING



BRISBANE RIVER AT MOGGILL

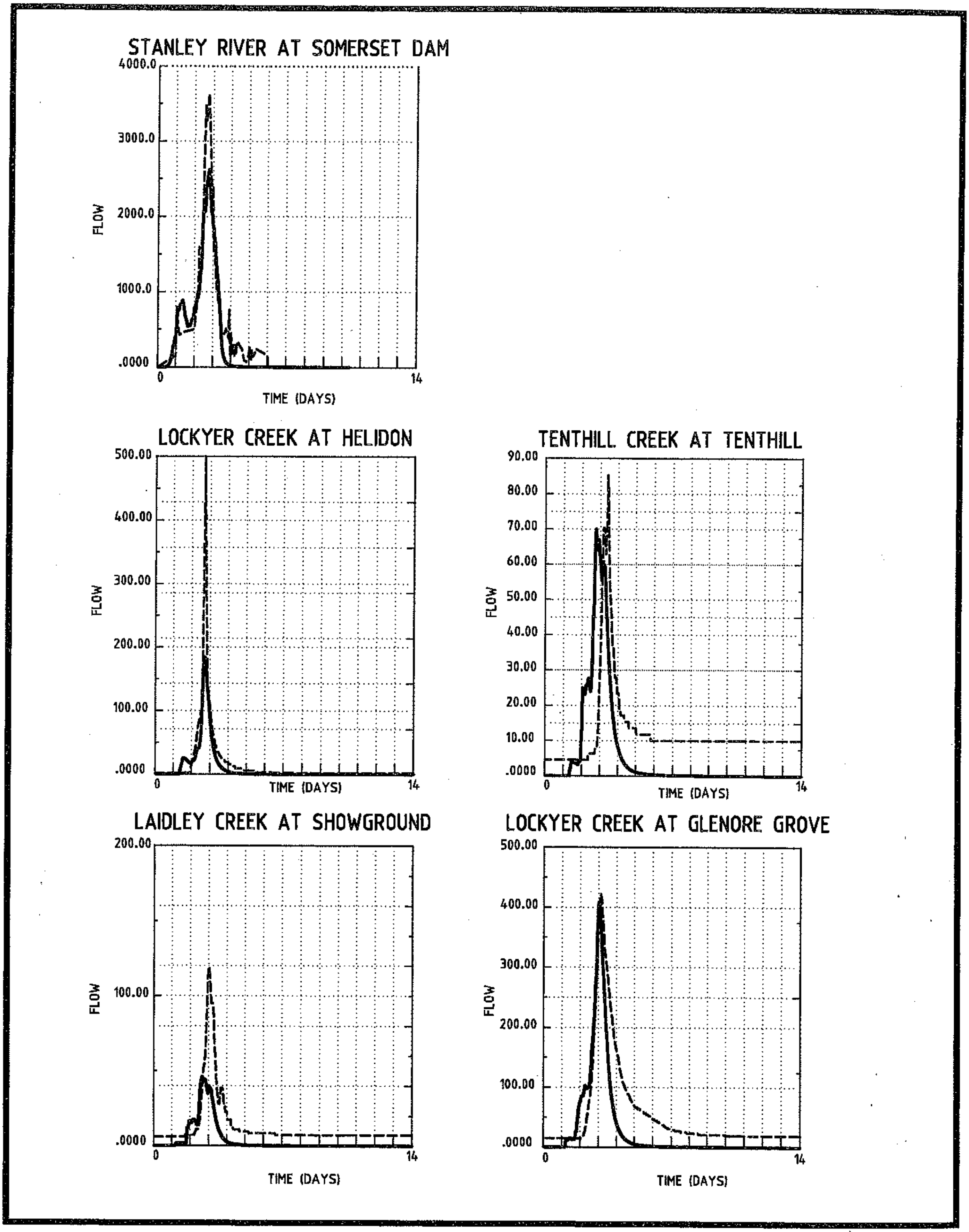


STORAGE CURVE B

LEGEND
-------- RECORDED DISCHARGE
——— PREDICTED DISCHARGE

FILE NAME: 4157-232 DISK N°: G:\ JOB N°: T00457 DATE: 17-2-98
PLOT SCALE: 1=1

FIGURE B-3c
BRISBANE RIVER FLOOD STUDY
LATE APRIL 1989 FLOOD HYDROGRAPHS



LEGEND

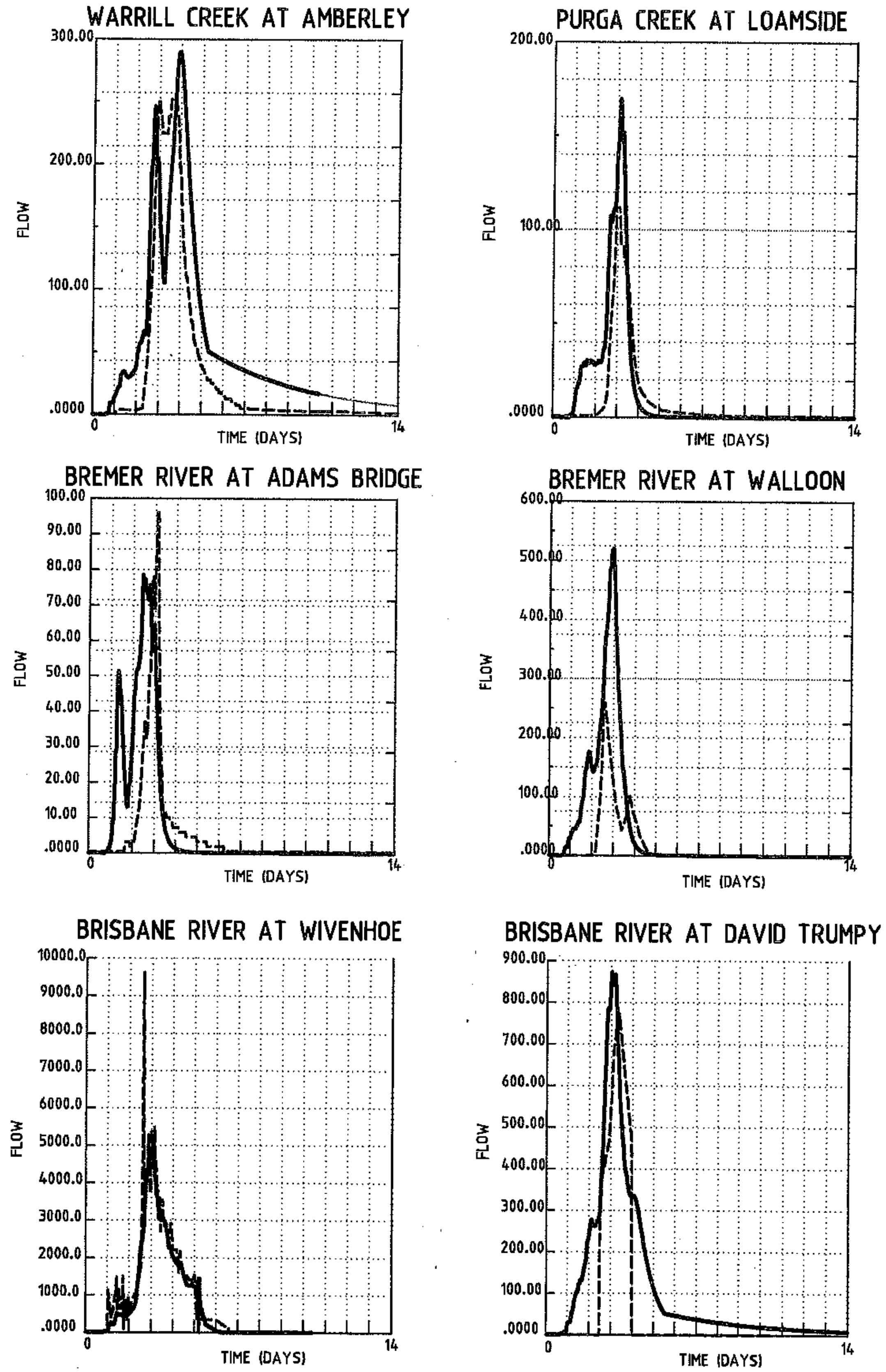
- - - - - - - RECORDED DISCHARGE

———————— PREDICTED DISCHARGE

FILE NAME: FIG-B3 PLOT SCALE: 1=1 DISK No: G:\ JOB No: T00457 DATE 17-2-89

SINCLAIR KNIGHT MERZ

FIGURE B-3d
BRISBANE RIVER FLOOD STUDY
LATE APRIL 1989 FLOOD HYDROGRAPHS



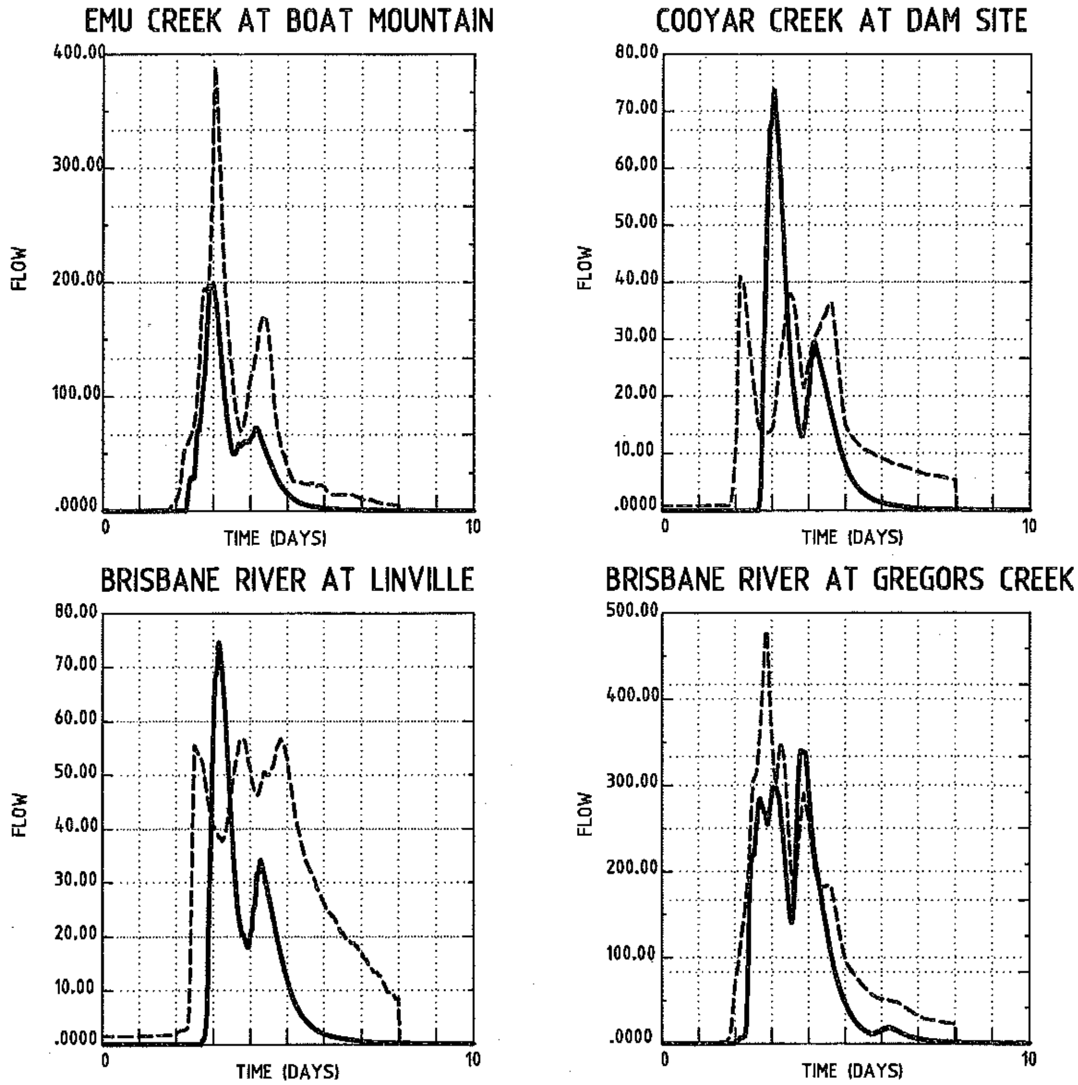
LEGEND
-------- RECORDED DISCHARGE
———— PREDICTED DISCHARGE

FILE NAME: FIG-B3 PLOT SCALE: 1=1 DISK No: G:\ JOB No: T00 DATE: 17-2

FIGURE B-4a

SINCLAIR KNIGHT MERZ

BRISBANE RIVER FLOOD STUDY
MAY 1996 FLOOD HYDROGRAPHS



LEGEND

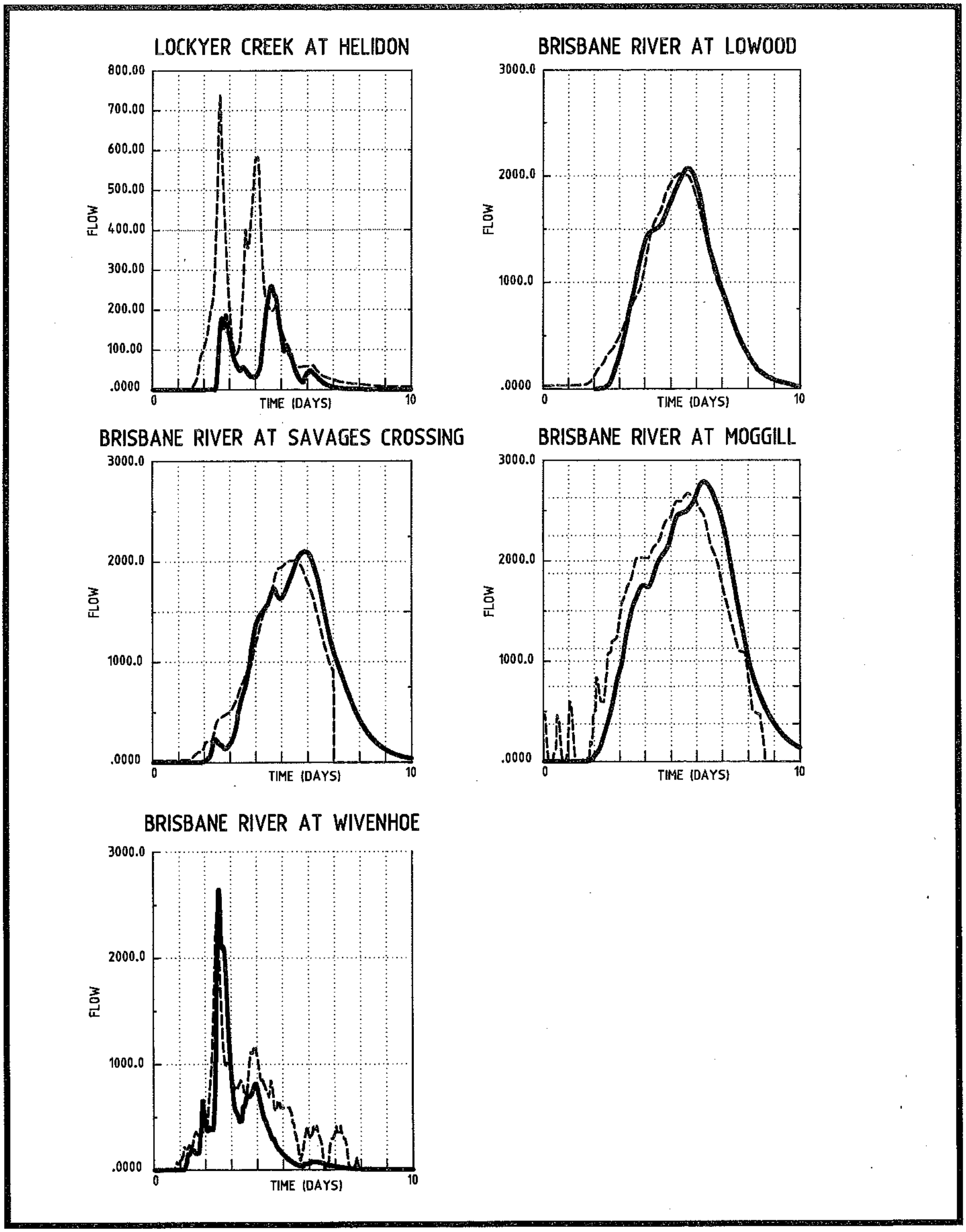
- - - - - - - - RECORDED DISCHARGE

———————— PREDICTED DISCHARGE

FILE NAME: FIG-B4 PLOT SCALE: 1:100 DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98

BCC.121.0158

FIGURE B-4b
BRISBANE RIVER FLOOD STUDY
MAY 1996 FLOOD HYDROGRAPHS

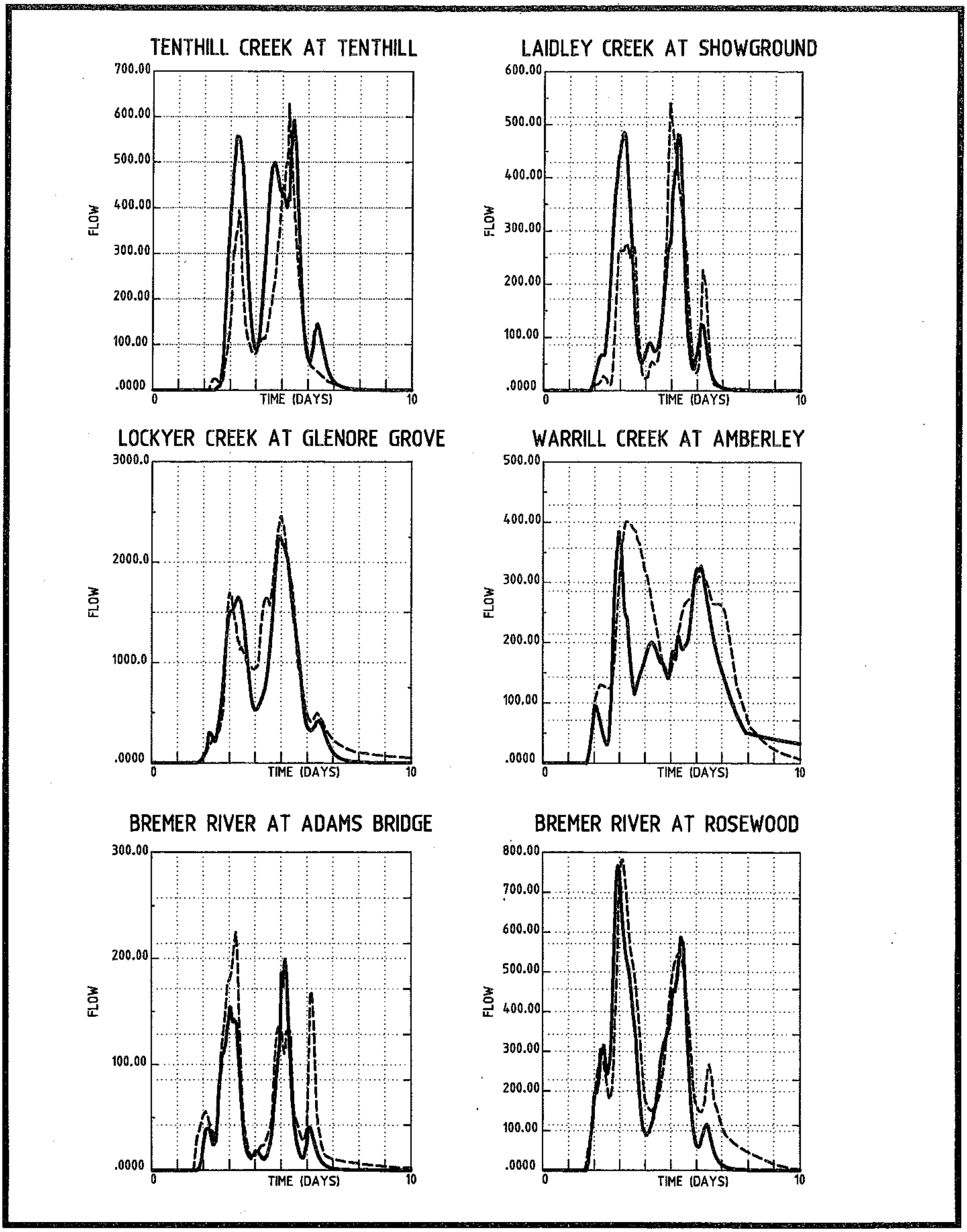


LEGEND

- - - - - - RECORDED DISCHARGE

———— PREDICTED DISCHARGE

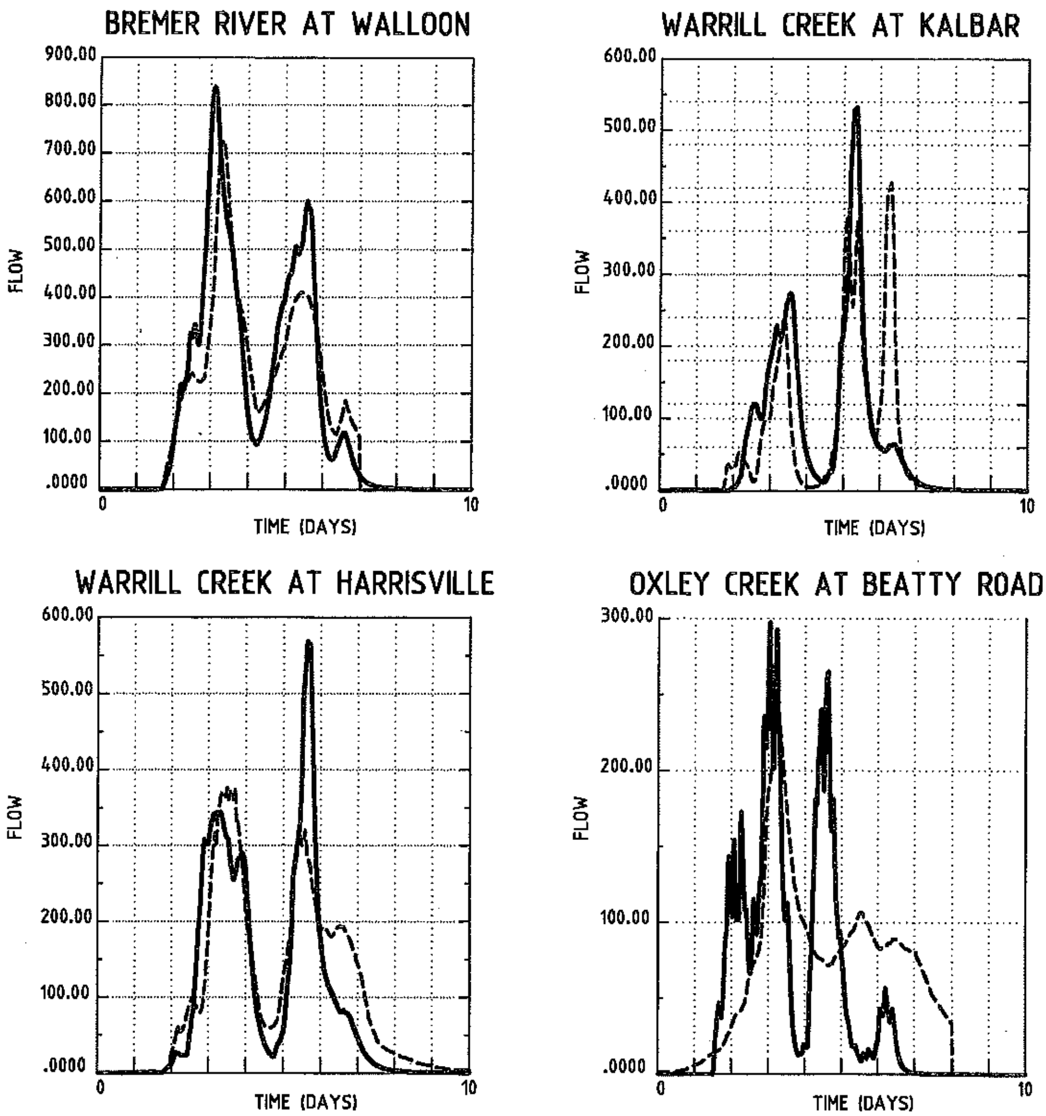
FILE NAME; FIG-B' PLOT SCALE: 1=100 DISK No. G:\ JOB No. T004 DATE. 17-2-98



LEGEND
- - - - - - RECORDED DISCHARGE
——— PREDICTED DISCHARGE

DATE: 17-2-98
JOB N°: T004157
DISK N°: G:\
FILE NAME: FIG-B4
PLO, ..LE: 1=..

FIGURE B-4d
BRISBANE RIVER FLOOD STUDY
MAY 1996 FLOOD HYDROGRAPHS



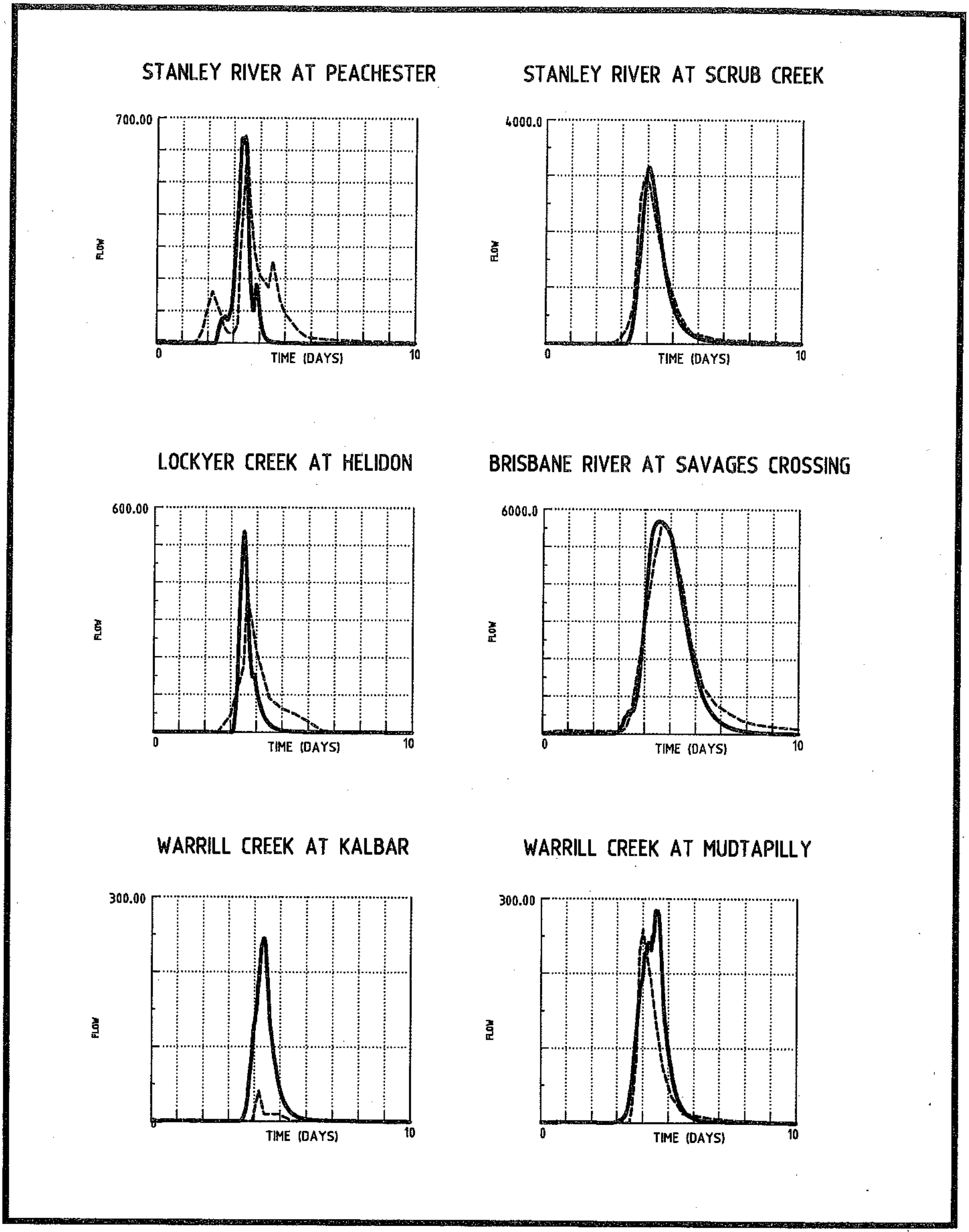
LEGEND
-------- RECORDED DISCHARGE
———— PREDICTED DISCHARGE

FILE NAME: FIG-B4 PLOT SCALE: 1=100 DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98

SINCLAIR KNIGHT MERZ

FIGURE B-5

BRISBANE RIVER FLOOD STUDY
FEBRUARY 1931 FLOOD HYDROGRAPHS



LEGEND

- - - - - - - - - RECORDED DISCHARGE

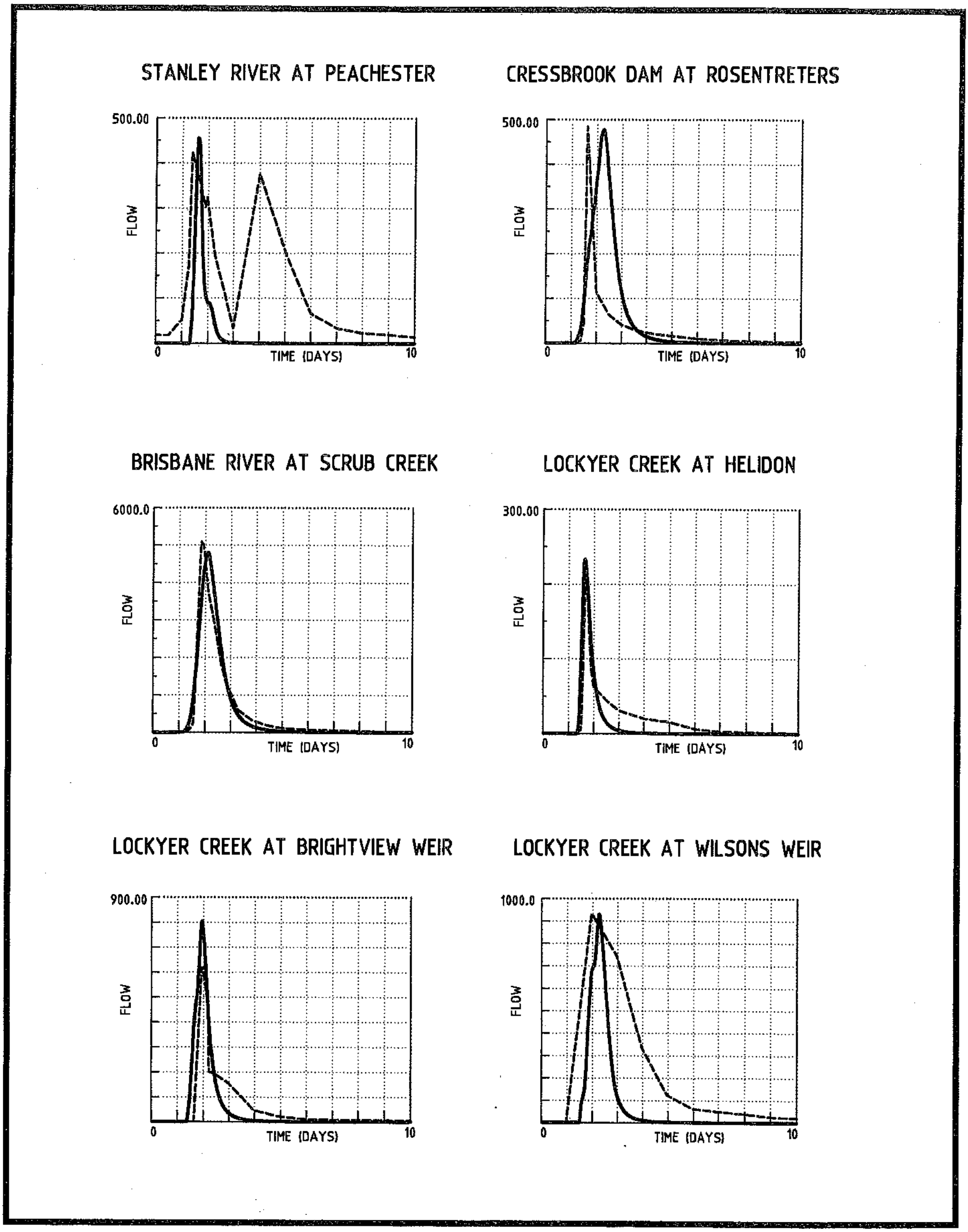
———————— PREDICTED DISCHARGE

FILE NAME: 4157-234 DISK Nº: G:\ JOB Nº: T004157 DATE: 17-2-98
PLO, ..ALE: 1=..

SINCLAIR KNIGHT MERZ

FIGURE B-6a

BRISBANE RIVER FLOOD STUDY
MARCH 1955 FLOOD HYDROGRAPHS



LEGEND

---------- RECORDED DISCHARGE

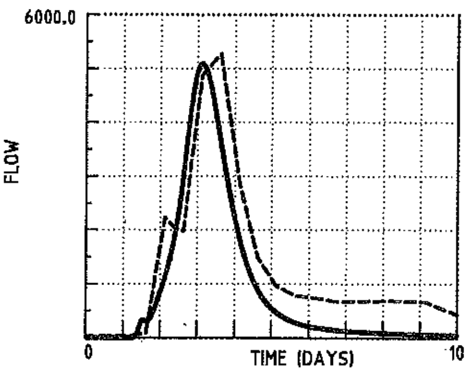
———— PREDICTED DISCHARGE

FILE NAME: 04157-57 PLOT SCALE: 1:100 DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98

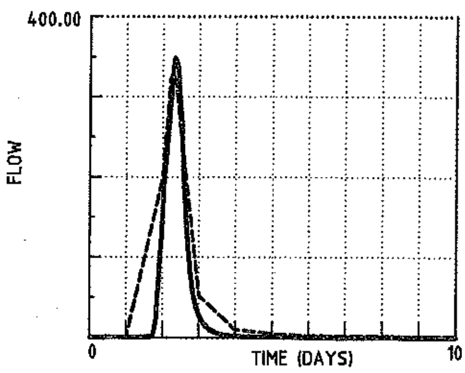
SINCLAIR KNIGHT MERZ

FIGURE B-6b
BRISBANE RIVER FLOOD STUDY
MARCH 1955 FLOOD HYDROGRAPHS

BRISBANE RIVER AT SAVAGES CROSSING



WARRILL CREEK AT KALBAR

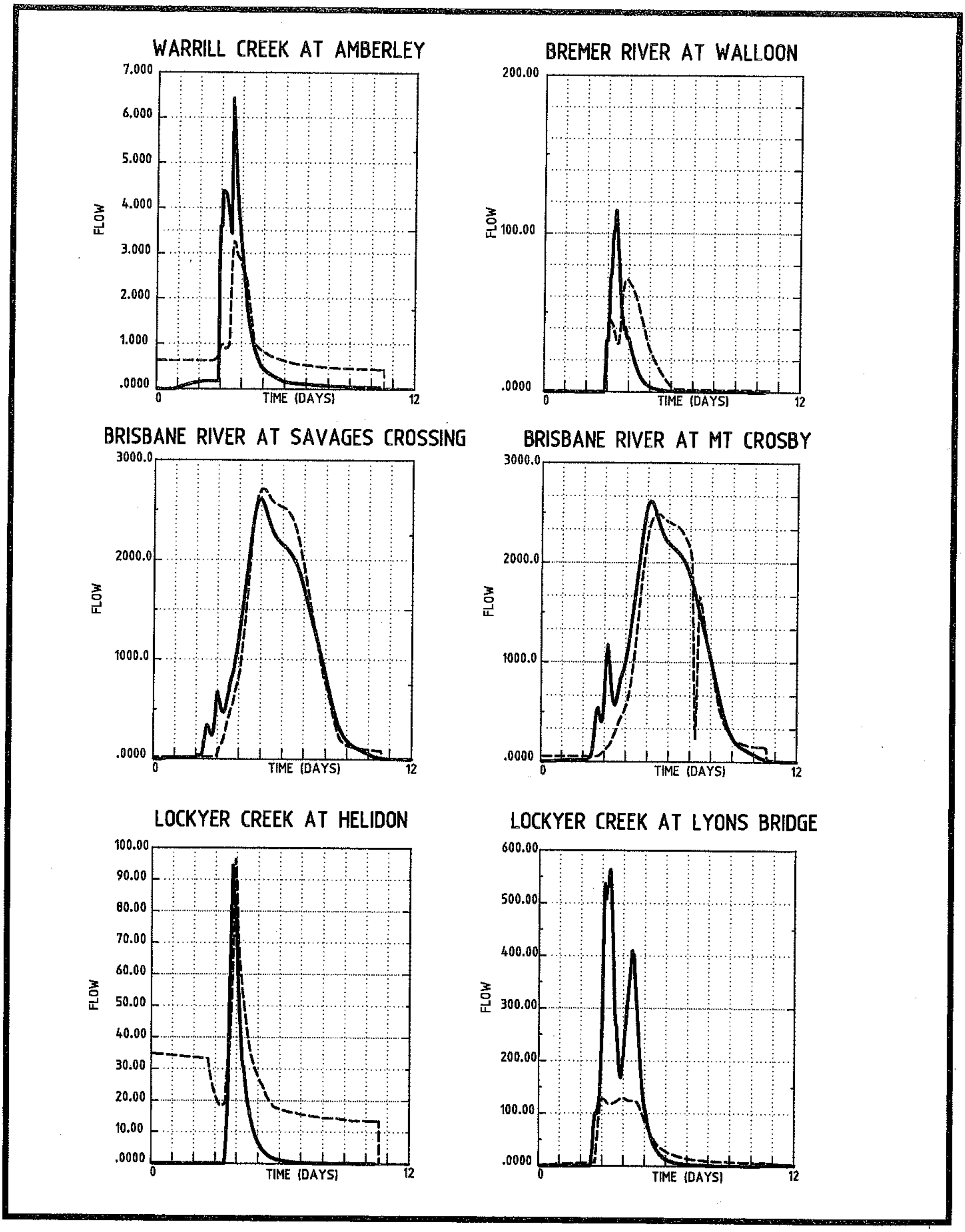


LEGEND
----------- RECORDED DISCHARGE
———————— PREDICTED DISCHARGE

PLOT SCALE: 1=100

FIGURE B-7a

BRISBANE RIVER FLOOD STUDY
JULY 1973 FLOOD HYDROGRAPHS



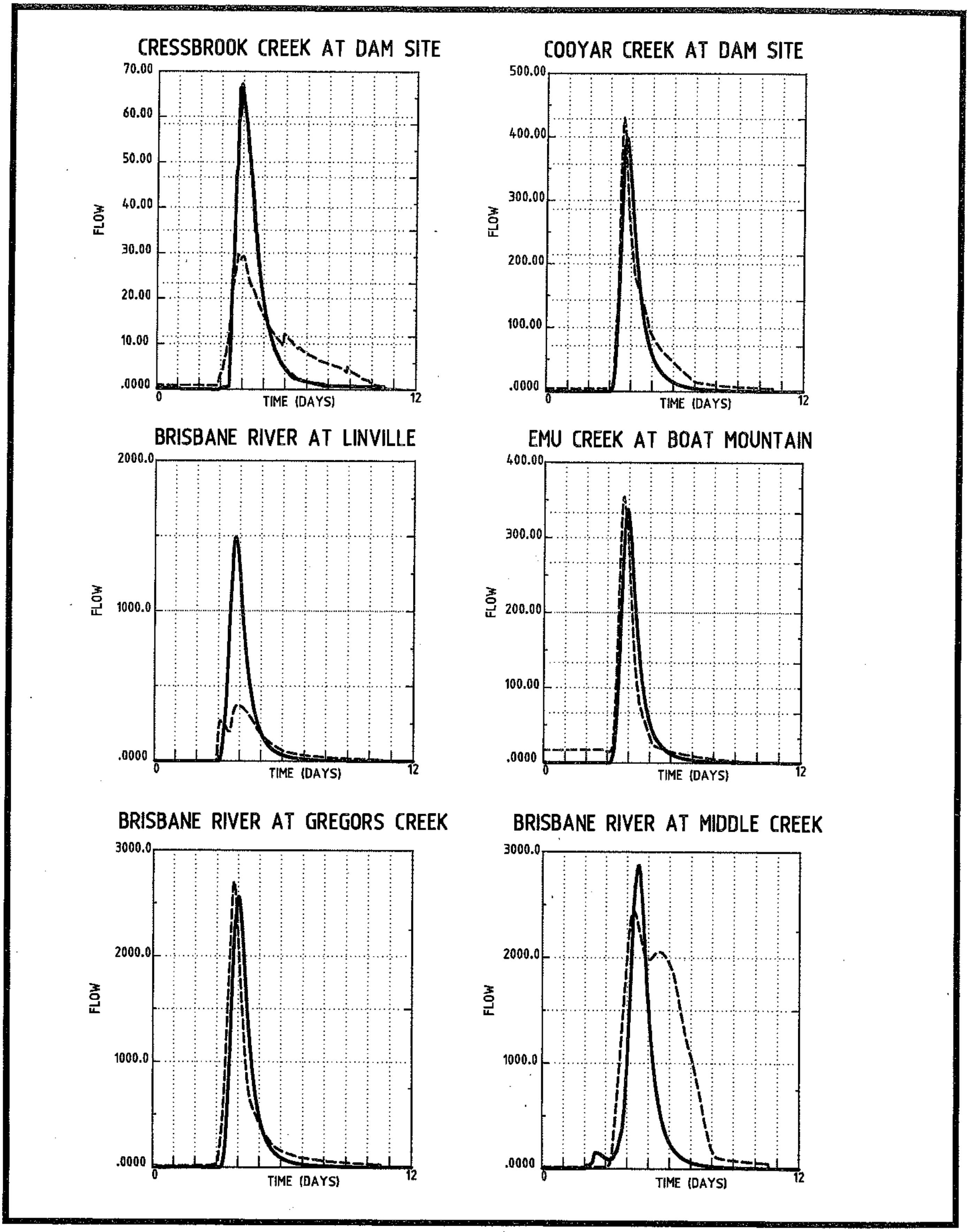
LEGEND

-------- RECORDED DISCHARGE

———— PREDICTED DISCHARGE

FILE NAME: FIG-B7A PLO⁻ ⁻LE: 1= DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98

FIGURE B-7b
BRISBANE RIVER FLOOD STUDY
JULY 1973 FLOOD HYDROGRAPHS



LEGEND

- - - - - - - - RECORDED DISCHARGE

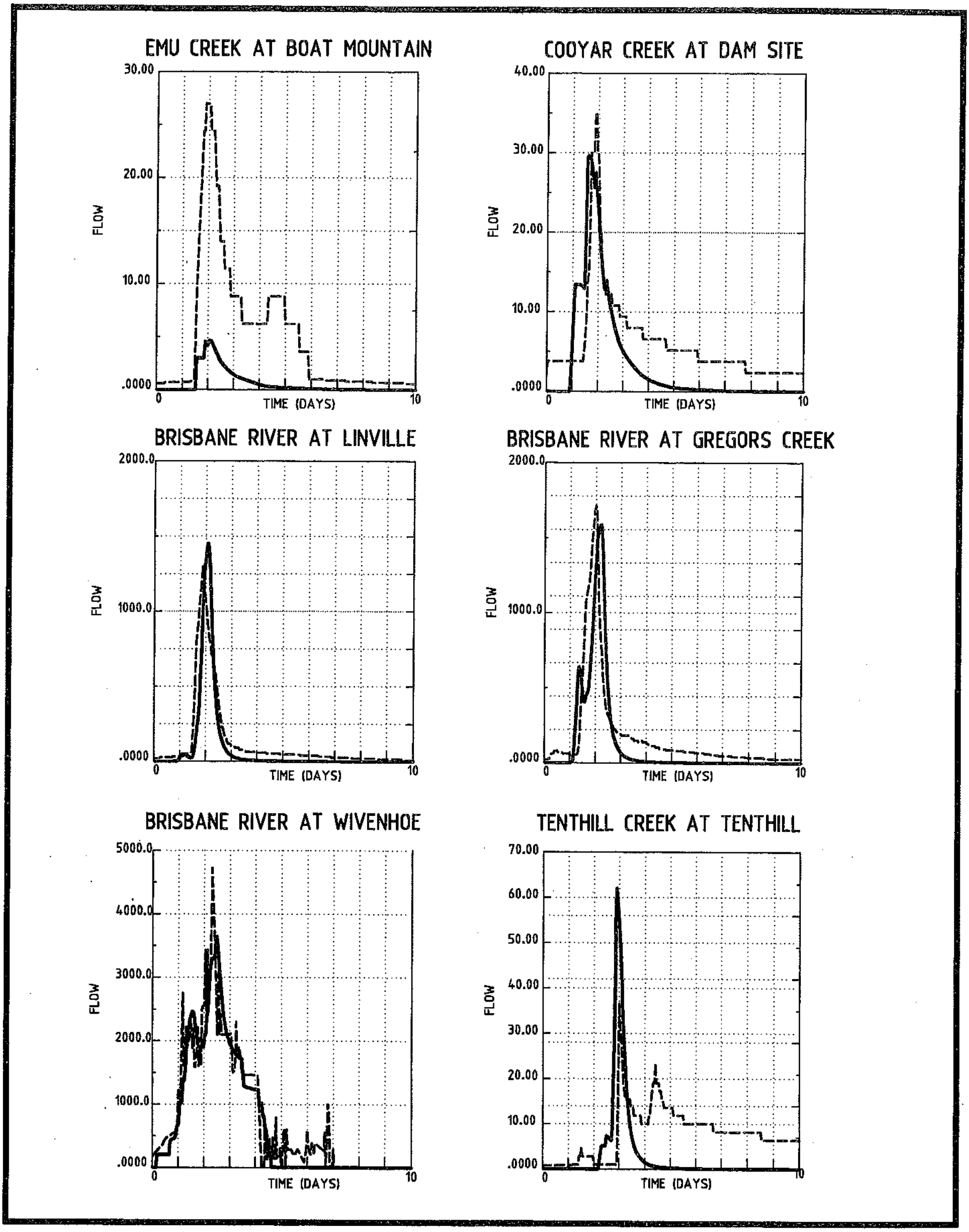
———————— PREDICTED DISCHARGE

FILE NAME: FIG-B7A　DISK N°: G:\　JOB N°: T004157　DATE: 17-2-98

PLO... ...LE: 1=

FIGURE B-8a

BRISBANE RIVER FLOOD STUDY
EARLY APRIL 1989 FLOOD HYDROGRAPHS



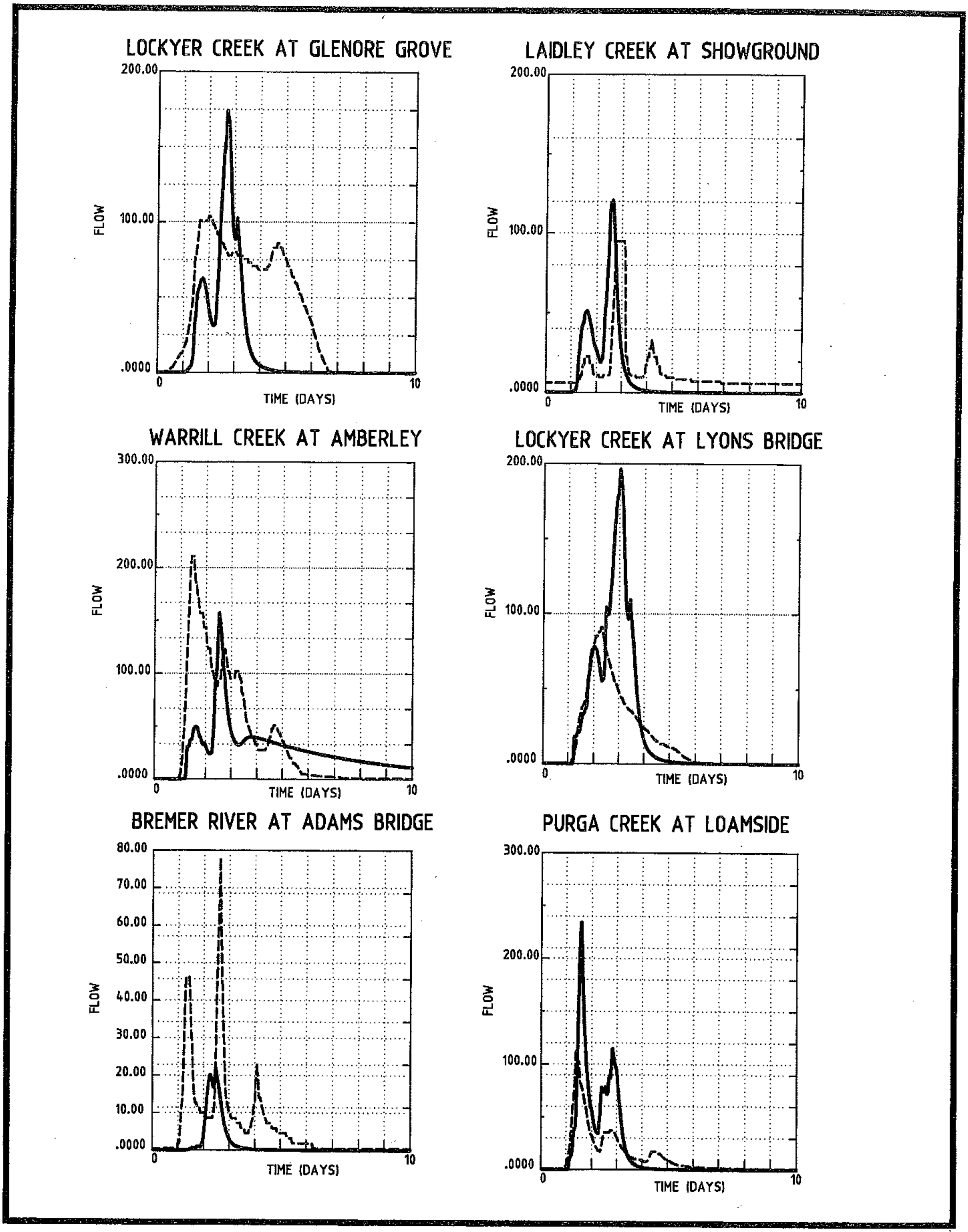
LEGEND

-------- RECORDED DISCHARGE

——— PREDICTED DISCHARGE

FILE NAME: FIG-B7A DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98

FIGURE B-8b
BRISBANE RIVER FLOOD STUDY
EARLY APRIL 1989 FLOOD HYDROGRAPHS



LEGEND

- - - - - - - - RECORDED DISCHARGE

———————— PREDICTED DISCHARGE

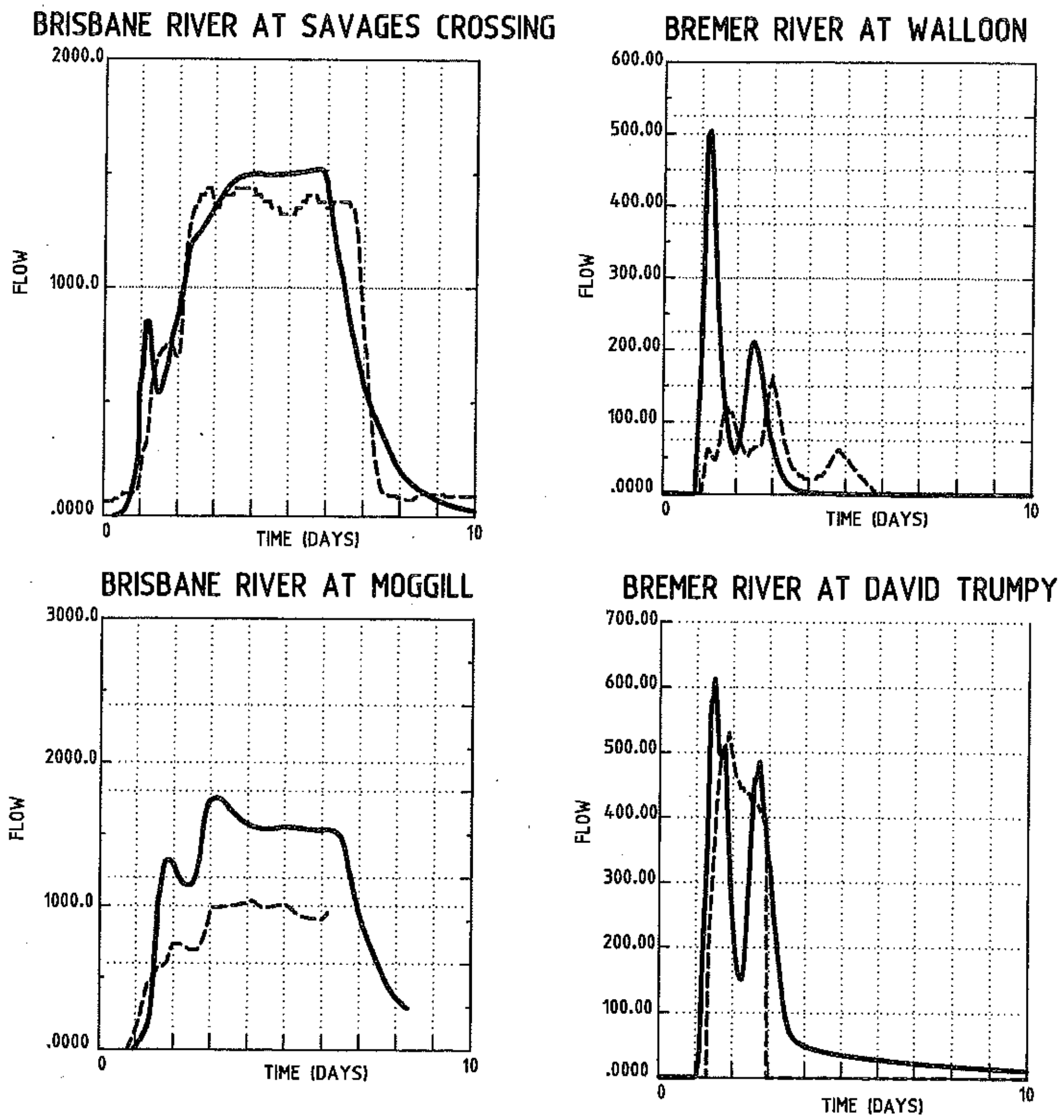
FILE NAME: FIG-B7A DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98
PLO. ...LE: 1:.

SINCLAIR KNIGHT MERZ

FIGURE B-8c

BRISBANE RIVER FLOOD STUDY

EARLY APRIL 1989 FLOOD HYDROGRAPHS



LEGEND

- - - - - - - - RECORDED DISCHARGE

———————— PREDICTED DISCHARGE

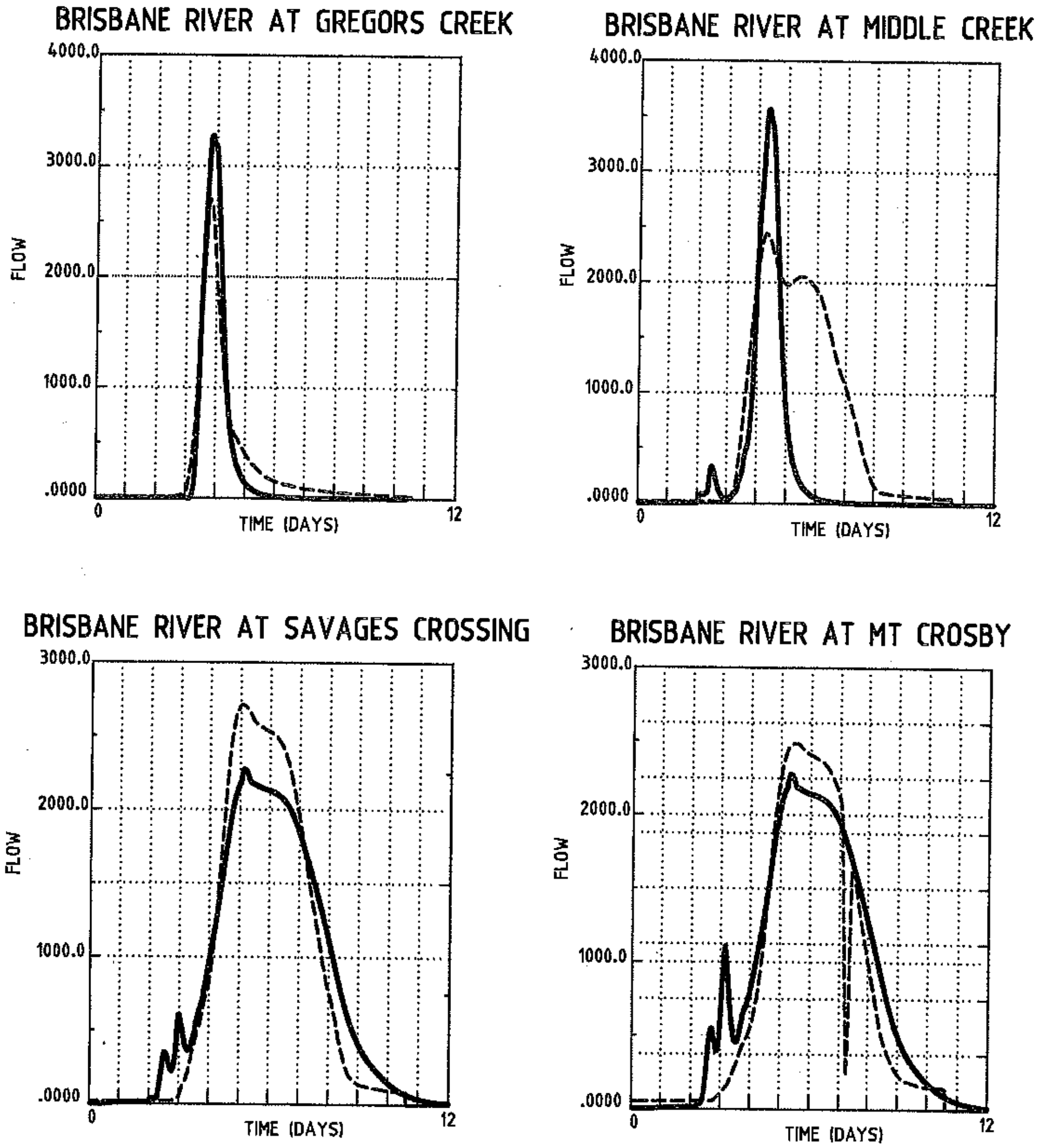
FILE NAME: FIG-R7A DISK N°: G:\ JOB N°: T00/457 DATE: 17-2-98

PLOT SCALE: 1=1

FIGURE B-9

BRISBANE RIVER FLOOD STUDY
JULY 1973 FLOOD SENSITIVITY ANALYSIS
POST WIVENHOE PERN VALUES

SINCLAIR KNIGHT MERZ



NOTE:

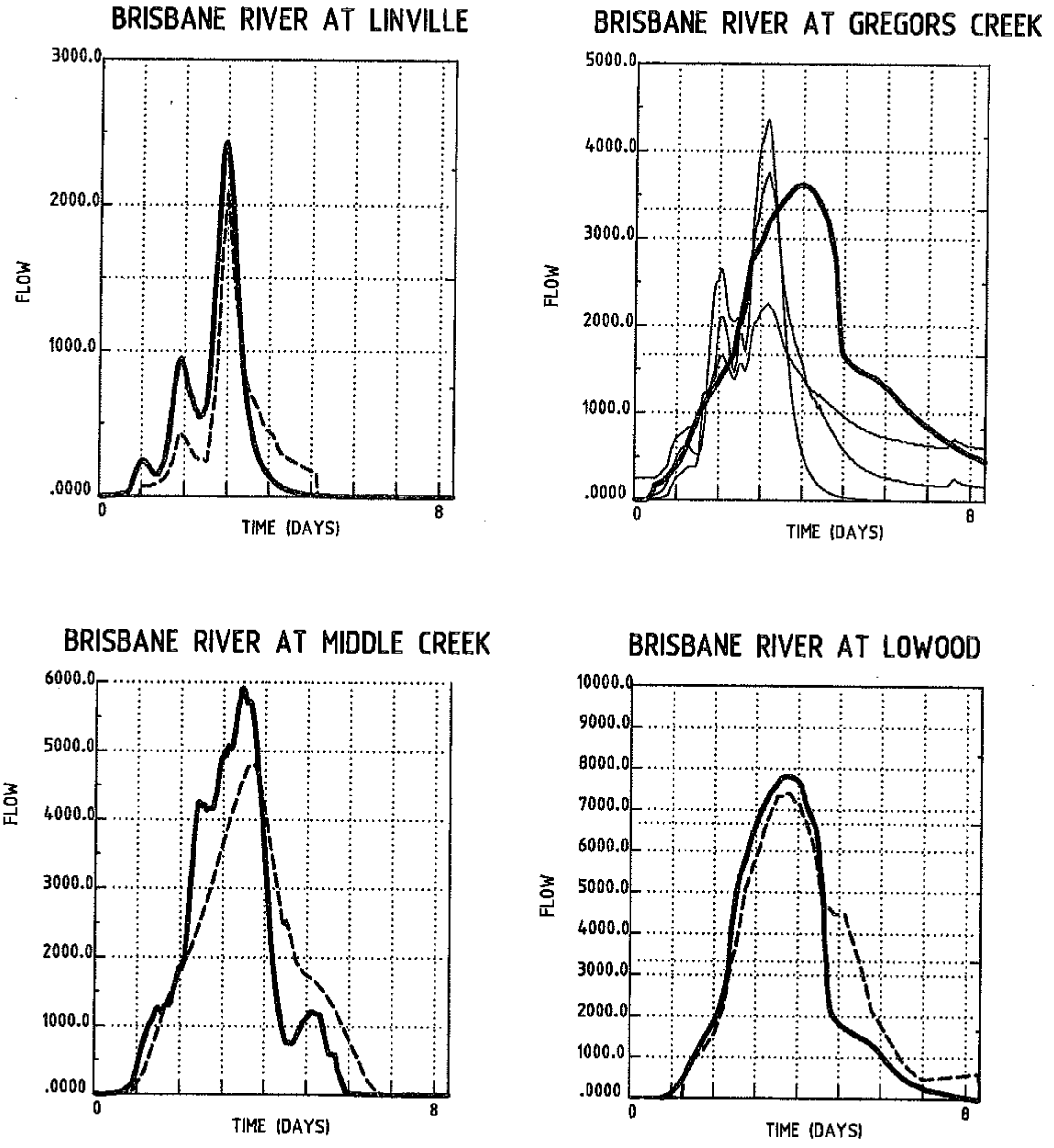
WIVENHOE STORAGE HAS NOT BEEN MODELLED.

FILE NAME: 4157-238 DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98

FIGURE B-10a

BRISBANE RIVER FLOOD STUDY
JANUARY 1974 FLOOD SENSITIVITY ANALYSIS
POST WIVENHOE PERN VALUES

SINCLAIR KNIGHT MERZ



NOTE:
WIVENHOE STORAGE HAS NOT BEEN MODELLED.

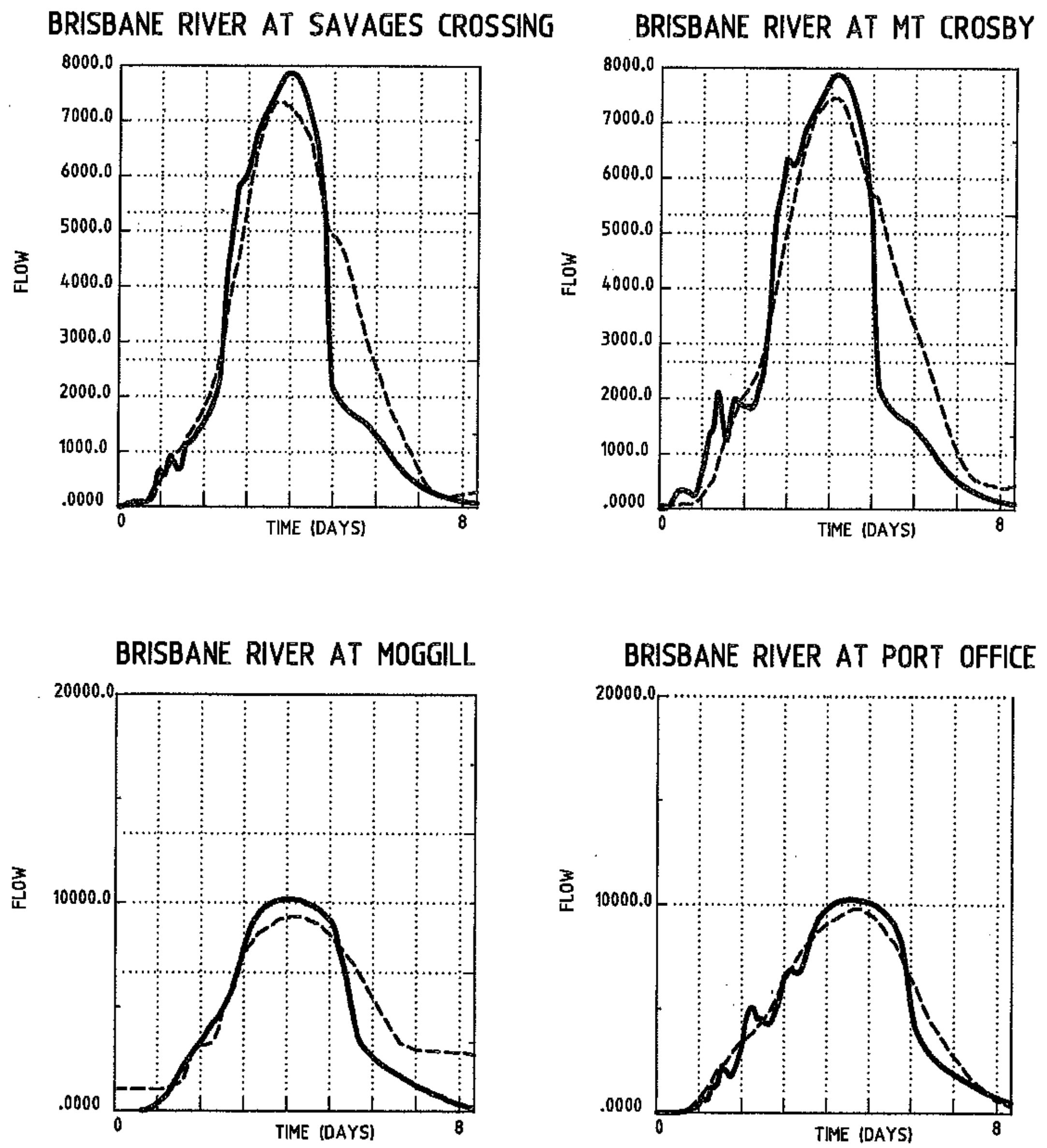
LEGEND
- - - - - - - RECORDED DISCHARGE
———— PREDICTED DISCHARGE

FILE NAME: 4157-239 PLOT SCALE: 1=1 DISK N°: G:\ JOB N°: T00/157 DATE: 17-2-98

FIGURE B-10b

BRISBANE RIVER FLOOD STUDY
JANUARY 1974 FLOOD SENSITIVITY ANALYSIS
POST WIVENHOE PERN VALUES

SINCLAIR KNIGHT MERZ



NOTE:
WIVENHOE STORAGE HAS NOT BEEN MODELLED.

LEGEND

- - - - - - - - RECORDED DISCHARGE

———————— PREDICTED DISCHARGE

Appendix C - Mike 11 Model Results - Calibration/Verification

TABLE C-1 - Predicted & Recorded Flood Levels for Calibration\Verification Events

					CALIBRATION EVENTS													VERIFICATION EVENTS											
LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	1974 PREDICTED WL (m AHD)	1974 RECORDED WL (m AHD)	1974 RECORDED WL (m AHD)	1974 DIFFERENCE (m)	1996 PREDICTED WL (m AHD)	1996 RECORDED WL (m AHD)	1996 DIFFERENCE (m)	1983 PREDICTED WL (m AHD)	1983 RECORDED WL (m AHD)	1983 DIFFERENCE (m)	1989B PREDICTED WL (m AHD)	1989B RECORDED WL (m AHD)	1989B DIFFERENCE (m)	1931 PREDICTED WL (m AHD)	1931 RECORDED WL (m AHD)	1931 DIFFERENCE (m)	1955 PREDICTED WL (m AHD)	1955 RECORDED WL (m AHD)	1955 DIFFERENCE (m)	1973 PREDICTED WL (m AHD)	1973 RECORDED WL (m AHD)	1973 DIFFERENCE (m)	1989A PREDICTED WL (m AHD)	1989A RECORDED WL (m AHD)	1989A DIFFERENCE (m)
BRISBANE	1000	78.66	BN 2020		22.05	22.17		-0.12	9.49			7.02			5.59			17.08			14.91			9.58			6.91		
BRISBANE	1000.285	78.375	BN 2010		21.91	21.92		-0.01	9.4			6.94			5.52			16.91			14.73			9.46			6.82		
BRISBANE	1000.775	77.885	BN 2000		21.70	21.68		0.02	9.23			6.78			5.36			16.67			14.46			9.22			6.64		
BRISBANE	1001.315	77.345	BN 1990		21.63	21.5		0.13	9.09			6.61			5.18			16.55			14.31			9.01			6.45		
BRISBANE	1001.865	76.795	BN 1980		21.25	21.1		0.15	8.84			6.37			4.94			16.11			13.86			8.64			6.18		
BRISBANE	1002.35	76.310	BN 1970		21.12				8.57			6.11			4.70			15.88			13.57			8.23			5.90		
BRISBANE	1002.785	75.875	BN 1960		21.10				8.47			5.98			4.55			15.84			13.51			8.07			5.74		
BRISBANE	1003.275	75.385	BN 1950		20.87				8.25			5.76			4.33			15.53			13.18			7.73			5.54		
BRISBANE	1003.775	74.885	BN 1940		20.68	20.83		-0.15	8.06			5.55			4.15			15.29			12.91			7.43			5.36		
BRISBANE	1004.3	74.360	BN 1930		20.37	20.25		0.12	7.8			5.42			4.00			14.87			12.44			7.04			5.15		
BRISBANE	1004.81	73.850	BN 1920		20.35	20.25	20.25	0.10	7.68			5.37			3.92			14.80			12.34			6.84			5.03		
BRISBANE	1005.325	73.335	BN 1910		20.23				7.53			5.32			3.84			14.63			12.16			6.59			4.86		
BRISBANE	1005.87	72.790	BN 1900		20.02	19.97	19.93	0.05	7.38			5.27			3.78			14.35			11.86			6.35			4.71		
BRISBANE	1006.3	72.360	BN 1890	Moggill Gauge	19.89	20.04	19.93	-0.04	7.37	7.09	0.28	5.27	5.26	0.01	3.77	4.02	-0.25	14.23			11.75			6.34	8.32	0.02	4.70	3.73	0.97
BRISBANE	1006.91	71.750	BN 1880		19.70				7.27			5.18			3.70			14.02			11.56			6.24			4.62		
BRISBANE	1007.41	71.250	BN 1870		19.67	19.33		0.34	7.21			5.11			3.61			13.97			11.50			6.17			4.55		
BRISBANE	1007.92	70.740	BN 1860		19.38	19.33	19.6	0.05	7.04			4.98			3.51			13.74			11.28			6.02			4.43		
BRISBANE	1008.445	70.215	BN 1850		19.20	19.21	19.46	-0.01	6.99			4.93			3.48			13.62			11.18			5.97			4.39		
BRISBANE	1008.925	69.735	BN 1840		19.14				6.93			4.88			3.44			13.57			11.13			5.92			4.35		
BRISBANE	1009.4	69.260	BN 1830		19.05				6.85			4.82			3.40			13.48			11.04			5.84			4.29		
BRISBANE	1009.72	68.940	BN 1820		19.04	18.88		0.16	6.81			4.79			3.38			13.45			11.01			5.81			4.26		
BRISBANE	1010.49	68.170	BN 1810		18.69	18.69		0.00	6.65			4.67			3.31			13.21			10.81			5.66			4.16		
BRISBANE	1010.725	67.935	BN 1800		18.71				6.65			4.66			3.31			13.22			10.81			5.68			4.15		
BRISBANE	1010.98	67.680	BN 1790		18.63				6.6			4.63			3.29			13.16			10.76			5.62			4.12		
BRISBANE	1011.51	67.150	BN 1780		18.62	18.3	18.63	-0.01	6.54			4.58			3.25			13.13			10.72			5.56			4.08		
BRISBANE	1011.98	66.680	BN 1770		18.62	18.8		-0.18	6.47			4.52			3.22			13.08			10.66			5.50			4.03		
BRISBANE	1012.475	66.185	BN 1760		18.52	18.6	18.63	-0.08	6.39			4.46			3.18			12.99			10.58			5.43			3.97		
BRISBANE	1012.935	65.725	BN 1750		18.42	18.6		-0.18	6.32			4.40			3.14			12.90			10.50			5.37			3.93		
BRISBANE	1013.445	65.215	BN 1740		18.33	18.63		-0.30	6.28			4.35			3.11			12.81			10.41			5.30			3.88		
BRISBANE	1013.91	64.750	BN 1730		18.28			18.28	6.19			4.28			3.06			12.75			10.35			5.23			3.82		
BRISBANE	1014.31	64.350	BN 1720		18.25	18.3		-0.05	6.11			4.22			3.02			12.68			10.28			5.16			3.76		
BRISBANE	1014.61	64.050	BN 1710	Goodna Hospital Gauge	18.28	18.43		-0.15	6.06			4.17			2.99			12.64			10.23			5.11	5.11	0.00	3.72		
BRISBANE	1015.09	63.570	BN 1700		18.14	18.3		-0.16	6.05			4.17			2.99			12.58			10.19			5.11			3.72		
BRISBANE	1015.56	63.100	BN 1690		18.00	18.33	17.96	0.04	5.97			4.11			2.96			12.48			10.10			5.04			3.67		
BRISBANE	1016.14	62.520	BN 1680		17.90	17.78	18.15	0.12	5.91			4.07			2.93			12.40			10.03			4.99			3.63		
BRISBANE	1016.64	62.020	BN 1670		17.80	17.63		0.17	5.8			3.97			2.87			12.28			9.91			4.88			3.55		
BRISBANE	1017.13	61.530	BN 1660		17.57	17.54		0.03	5.66			3.84			2.78			12.09			9.73			4.75			3.44		
BRISBANE	1017.61	61.050	BN 1650		17.45	17.66	17.29	0.16	5.56			3.77			2.74			11.90			9.54			4.66			3.38		
BRISBANE	1017.92	60.740	BN 1640		17.29				5.48			3.71			2.71			11.75			9.40			4.59			3.33		
BRISBANE	1018.2	60.460	BN 1630		17.21	17.26		-0.05	5.49			3.71			2.71			11.71			9.36			4.59			3.33		
BRISBANE	1018.725	59.935	BN 1620		16.89				5.42			3.67			2.69			11.48			9.18			4.54			3.30		
BRISBANE	1019.095	59.565	BN 1610		16.75	16.83		-0.08	5.37			3.63			2.66			11.33			9.05			4.49			3.26		
BRISBANE	1019.49	59.170	BN 1600		16.64	16.65		-0.01	5.33			3.60			2.65			11.24			8.96			4.46			3.24		
BRISBANE	1019.865	58.795	BN 1590		16.34	16.47		-0.13	5.28			3.57			2.63			11.04			8.80			4.41			3.21		
BRISBANE	1020.115	58.545	BN 1580		16.44	16.71	16.56	-0.12	5.28			3.55			2.62			11.07			8.80			4.40			3.20		
BRISBANE	1020.525	58.135	BN 1570		16.42				5.27			3.54			2.61			11.03			8.76			4.39			3.19		
BRISBANE	1020.83	57.830	BN 1560		16.27	17.02		-0.75	5.23			3.51			2.60			10.92			8.67			4.36			3.16		
BRISBANE	1021.095	57.565	BN 1550		16.06	16.26		-0.20	5.16			3.47			2.57			10.77			8.55			4.30			3.13		
BRISBANE	1021.539	57.121	BN 1540		15.89	16.04		-0.15	5.1			3.42			2.55			10.62			8.40			4.25			3.09		
BRISBANE	1021.715	56.945	BN 1530		15.92	15.98		-0.06	5.1			3.42			2.54			10.62			8.39			4.24			3.08		
BRISBANE	1021.895	56.765	BN 1520		15.85	16.74		-0.89	5.09			3.41			2.54			10.57			8.35			4.23			3.08		
BRISBANE	1022.105	56.555	BN 1510		15.73	15.86		-0.13	5.09			3.41			2.54			10.52			8.31			4.23			3.08		
BRISBANE	1022.575	56.085	BN 1500		15.65	15.52		0.13	5.02			3.36			2.51			10.42			8.22			4.17			3.04		
BRISBANE	1023.04	55.620	BN 1490		15.41	15.31		0.10	4.92			3.30			2.48			10.24			8.07			4.10			2.99		
BRISBANE	1023.57	55.090	BN 1480		15.32	15.31		0.01	4.88			3.27			2.46			10.20			8.05			4.06			2.97		
BRISBANE	1024.08	54.580	BN 1470		15.27	15.13		0.14	4.81			3.22			2.44			10.13			7.98			4.00			2.93		
BRISBANE	1024.563	54.097	BN 1460		15.21	15.4		-0.19	4.72			3.15			2.40			10.06			7.90			3.92			2.87		
BRISBANE	1025.07	53.590	BN 1450		15.12	15.19		-0.07	4.67			3.11			2.37			9.97			7.82			3.87			2.84		
BRISBANE	1025.36	53.300	BN 1440		14.97				4.6			3.06			2.35			9.86			7.73			3.81			2.80		
BRISBANE	1025.59	53.070	BN 1430		14.81	14.94		-0.13	4.54			3.02			2.33			9.74			7.63			3.76			2.77		
BRISBANE	1026.17	52.490	BN 1420		14.69	14.64		0.05	4.51			3.00			2.32			9.67	10.74	-1.07	7.57			3.73			2.75		
BRISBANE	1026.68	51.980	BN 1410	Mt Ommaney Gauge	14.58	14.58	14.55	0.00	4.43			2.94			2.29			9.55			7.46			3.66			2.70		
BRISBANE	1026.9	51.760	BN 1400		14.46	14.55	14.24	-0.09	4.38			2.91			2.27			9.46			7.39			3.62			2.68		
BRISBANE	1027.16	51.500	BN 1390		14.32	14.46	14.24	0.08	4.35			2.89			2.26			9.38			7.33			3.60			2.66		
BRISBANE	1027.68	50.980	BN 1380		14.38	14.32		0.06	4.32			2.86			2.24			9.38			7.31			3.56			2.64		
BRISBANE	1028.18	50.480	BN 1370		14.40	14.3	14.12	0.10	4.27			2.83			2.22			9.38			7.30			3.52			2.61		
BRISBANE	1028.68	49.980	BN 1360		14.27				4.17			2.76			2.19			9.27			7.22			3.44			2.55		
BRISBANE	1028.72	49.940	BN1350	Centenary Bridge																									
BRISBANE	1028.76	49.900	BN 1340		14.12				4.08			2.70			2.16			9.27			7.22			3.37			2.51		
BRISBANE	1029.2	49.460	BN 1330		14.01	14.09		-0.08	3.98			2.64			2.13			9.17			7.13			3.30			2.46		
BRISBANE	1029.68	48.980	BN 1320		14.03	13.97		0.06	3.95			2.61			2.11			9.17			7.13			3.27			2.44		
BRISBANE	1030.22	48.440	BN 1310		14.03	13.63		0.40	3.89			2.58			2.10			9.18			7.13			3.22			2.41		
BRISBANE	1030.87	47.790	BN 1300		13.96				3.79			2.51			2.06			9.12	9.40	-0.28	7.08	7.17	-0.09	3.15			2.36		
BRISBANE	1031.26	47.400	BN 1290		13.80	13.73	13.51	0.07	3.71			2.46			2.03			9.02			7.00			3.08			2.32		
BRISBANE	1031.7	46.960	BN 1280	Darra Wharf Gauge	13.41	13.79	13.36	0.05	3.59			2.40			2.00			8.78			6.80			3.00	3.15	-0.15	2.27		
BRISBANE	1031.995	46.665	BN 1270		13.52				3.6			2.39			2.00			8.75			6.76			3.00			2.26		
BRISBANE	1032.23	46.430	BN 1260		13.39	13.18		0.21	3.57			2.38			1.99			8.68	8.99	-0.31	6.70	6.70	0.00	2.98			2.25		
BRISBANE	1032.585	46.075	BN 1250		13.15	13.33	12.9	-0.18	3.52			2.35			1.97			8.52			6.57			2.94			2.23		
BRISBANE	1033.08	45.580	BN 1240		13.00	12.99		0.01	3.48			2.33			1.97			8.39			6.46			2.92			2.21		
BRISBANE	1033.37	45.290	BN 1230		12.89	13.02	12.9	-0.13	3.43			2.30			1.95			8.31	8.67	-0.36	6.40	6.41	-0.01	2.88			2.19		
BRISBANE	1033.9	44.760	BN 1220		12.65	12.98	12.57	0.08	3.35			2.26			1.93			8.16			6.27			2.82			2.15		
BRISBANE	1034.37	44.290	BN 1210		12.49	12.26		0.23	3.29			2.23			1.91			8.05	8.13		6.19	6.23	-0.04	2.78			2.13		
BRISBANE	1034.89	43.770	BN 1200	Sherwood Gauge	12.40	12.52		-0.12	3.23			2.20			1.89			7.95			6.10			2.73			2.10		
BRISBANE	1035.414	43.246	BN 1190		12.14	12.14		0.00	3.15			2.15			1.87			7.78			5.95			2.67			2.06		
BRISBANE	1035.9	42.760	BN 1180		11.86	11.87		-0.01	3.06			2.10			1.84			7.55			5.77			2.60			2.02		
BRISBANE	1036.46	42.200	BN 1170		11.55	11.77	11.74	-0.19	2.98			2.07			1.82			7.33			5.59			2.55			1.99		
BRISBANE	1036.77	41.890	BN 1160		11.47	11.59	11.24	-0.12	2.95			2.05			1.81			7.26	7.69	-0.43	5.52	5.47	0.05	2.53			1.97		
BRISBANE	1036.915	41.745	BN 1150		11.31	11.65	11.32	-0.01	2.92			2.04			1.81			7.16			5.45			2.51			1.96		

TABLE C-1 - Predicted & Recorded Flood Levels for Calibration\Verification Events

					CALIBRATION EVENTS														VERIFICATION EVENTS										
LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	1974 PREDICTED WL (m AHD)	1974 RECORDED WL (m AHD)	1974 RECORDED WL (m AHD)	1974 DIFFERENCE (m)	1996 PREDICTED WL (m AHD)	1996 RECORDED WL (m AHD)	1996 DIFFERENCE (m)	1983 PREDICTED WL (m AHD)	1983 RECORDED WL (m AHD)	1983 DIFFERENCE (m)	1989B PREDICTED WL (m AHD)	1989B RECORDED WL (m AHD)	1989B DIFFERENCE (m)	1931 PREDICTED WL (m AHD)	1931 RECORDED WL (m AHD)	1931 DIFFERENCE (m)	1955 PREDICTED WL (m AHD)	1955 RECORDED WL (m AHD)	1955 DIFFERENCE (m)	1973 PREDICTED WL (m AHD)	1973 RECORDED WL (m AHD)	1973 DIFFERENCE (m)	1989A PREDICTED WL (m AHD)	1989A RECORDED WL (m AHD)	1989A DIFFERENCE (m)
BRISBANE	1037.09	41.570	BN 1140		11.26	11.84	11.2	0.06	2.93			2.04			1.81			7.14			5.44			2.51			1.96		
BRISBANE	1037.11	41.550	BN 1130	Indooroopilly Bridge																									
BRISBANE	1037.175	41.485	BN 1120		11.16	11.47	11.13	0.03	2.79			2.03			1.80			7.13			5.40			2.49			1.95		
BRISBANE	1037.285	41.375	BN 1110	Clarence Road Gauge	11.11	11.2		-0.09	2.77			2.01			1.79			7.09	7.46	-0.37	5.36	5.56	-0.20	2.47			1.94		
BRISBANE	1037.625	41.035	BN 1100		11.10	11.1	11.07	0.00	2.73			1.99			1.78			7.05			5.32			2.44			1.92		
BRISBANE	1038.085	40.575	BN 1090		11.12	11.1		0.02	2.72			1.99			1.78			7.02			5.30			2.43			1.92		
BRISBANE	1038.6	40.060	BN 1080		11.10	11.04		0.06	2.63			1.94			1.75			6.99			5.25			2.37			1.88		
BRISBANE	1039.1	39.560	BN 1070		11.10	11.07		0.03	2.54			1.90			1.73			6.95	6.97	-0.02	5.22	5.16	0.06	2.31			1.84		
BRISBANE	1039.565	39.095	BN 1060	Oxley Creek Gauge	11.11	11.01		0.10	2.49			1.87			1.71			6.94			5.21			2.27			1.82		
BRISBANE	1040.09	38.570	BN 1050	King Authur Terrace Gauge	11.03	11.04		-0.01	2.46			1.86			1.71			6.92	6.78	0.14	5.20	5.10	0.10	2.25			1.81		
BRISBANE	1040.49	38.170	BN 1040		10.88	11.01		-0.13	2.4			1.83			1.69			6.83			5.13			2.21			1.79		
BRISBANE	1041.01	37.650	BN 1030		10.92	10.89		0.03	2.38			1.82			1.69			6.84	6.62	0.22	5.14	5.02	0.12	2.20			1.78		
BRISBANE	1041.23	37.430	BN 1020		10.88	10.83		0.05	2.36			1.80			1.68			6.80			5.10			2.19			1.77		
BRISBANE	1041.46	37.200	BN 1010	Tennyson Power House Gauge	10.79	10.83		-0.04	2.32			1.78			1.68			6.75			5.06			2.17	2.17	0.00	1.75		
BRISBANE	1041.7	36.960	BN 1000		10.75	10.83		-0.08	2.32			1.78			1.68			6.73			5.04			2.17			1.76		
BRISBANE	1041.96	36.700	BN 990	Yeronga Street Gauge	10.60	10.83		-0.23	2.27			1.76			1.66			6.62	6.40	0.22	4.96	4.95	0.01	2.13			1.74		
BRISBANE	1042.235	36.425	BN 980		10.43	10.42		0.01	2.21			1.74			1.65			6.62			4.89			2.10			1.72		
BRISBANE	1042.515	36.145	BN 970		10.42	10.43		-0.01	2.2			1.73			1.65			6.50			4.87			2.09			1.71		
BRISBANE	1042.91	35.750	BN 960		10.35	10.25	10.16	0.10	2.12			1.69			1.63			6.41	6.17	0.24	4.78	4.80	-0.02	2.04			1.68		
BRISBANE	1043.725	34.935	BN 950		10.03	9.95		0.08	1.94			1.62			1.59			6.17			4.59			1.93			1.62		
BRISBANE	1044.06	34.600	BN 940	Sandy Creek Gauge	9.86	9.81		0.05	1.91			1.61			1.59			6.10	6.01	0.09	4.64	4.64	-0.10	1.91			1.61		
BRISBANE	1044.34	34.320	BN 930		9.69	9.61		0.08	1.86			1.59			1.58			5.99			4.45			1.88			1.60		
BRISBANE	1044.605	34.055	BN 920		9.64	9.49		0.15	1.84			1.58			1.57			5.94			4.41			1.87			1.59		
BRISBANE	1044.86	33.800	BN 910		9.60	9.55		0.05	1.81			1.57			1.57			5.89	5.80	0.09	4.37	4.49	-0.12	1.86			1.58		
BRISBANE	1045.4	33.260	BN 900		9.41	9.31		0.10	1.73			1.55			1.55			5.74			4.24			1.81			1.55		
BRISBANE	1045.885	32.775	BN 890		9.28	9.46	9.15	-0.18	1.71			1.52			1.54			5.57			4.10			1.77			1.53		
BRISBANE	1046.18	32.480	BN 880		9.19	9.49		-0.30	1.71			1.52			1.53			5.54			4.08			1.77			1.53		
BRISBANE	1046.34	32.320	BN 870	Dutton Park Cemetery Gauge	9.12	9.57		-0.45	1.71			1.52			1.53			5.51	5.48	0.03	4.07	4.12	-0.05	1.76			1.53		
BRISBANE	1046.58	32.080	BN 860		9.07				1.7			1.51			1.53			5.47			4.03			1.75			1.52		
BRISBANE	1046.9	31.760	BN 850		8.88	9.03		-0.15	1.7			1.49			1.52			5.34			3.93			1.72			1.50		
BRISBANE	1047.35	31.310	BN 840		8.49	8.61	8.38	-0.12	1.7			1.47			1.51			5.09			3.75			1.69			1.48		
BRISBANE	1047.915	30.745	BN 830	Highgate Hill Gauge	8.26	8.36		-0.10	1.7			1.46			1.50			4.94	5.10	-0.16	3.63	3.82	-0.19	1.67			1.47		
BRISBANE	1048.375	30.285	BN 820		8.32	8.3	8.36	0.02	1.69			1.45			1.50			4.96			3.64			1.66			1.47		
BRISBANE	1048.89	29.770	BN 810	St Lucia Ferry Gauge	8.08	8.09		-0.01	1.69			1.42			1.48			4.79			3.50			1.61	1.53	0.08	1.44		
BRISBANE	1049.12	29.540	BN 800		8.02	8.24	8.27	-0.22	1.69			1.41			1.48			4.75			3.48	3.55	-0.07	1.60			1.43		
BRISBANE	1049.37	29.290	BN 790		7.83				1.69			1.39			1.47			4.64	4.76	-0.12	3.40	3.51	-0.11	1.57			1.42		
BRISBANE	1049.59	29.070	BN 780		7.82				1.68			1.39			1.47			4.63	4.73	-0.10	3.39	3.50	-0.11	1.57			1.42		
BRISBANE	1049.87	28.790	BN 770		7.70	7.9	7.57	0.13	1.68			1.38			1.46			4.56			3.34			1.55			1.41		
BRISBANE	1050.43	28.230	BN 760		7.69	7.75		-0.06	1.68			1.37			1.46			4.49			3.28			1.54			1.40		
BRISBANE	1050.86	27.800	BN 750		7.55	7.48	7.57	-0.02	1.67			1.35			1.45			4.42	4.41	0.01	3.23	3.19	0.04	1.52			1.39		
BRISBANE	1051.36	27.300	BN 740		7.55				1.67			1.35			1.45			4.42			3.23			1.51			1.39		
BRISBANE	1051.895	26.785	BN 730		7.37	7.29	7.14	0.08	1.67			1.33			1.43			4.28			3.12			1.47			1.37		
BRISBANE	1052.31	26.350	BN 720		7.47	7.17	7.08	0.30	1.66			1.33			1.43						3.16			1.48			1.37		
BRISBANE	1052.37	26.290	BN 710	Merivale Bridge														4.34											
BRISBANE	1052.39	26.270	BN 700		7.36	7.23		0.13	1.66			1.32			1.43			4.28			3.11			1.46			1.36		
BRISBANE	1052.595	26.065	BN 690		7.26				1.66			1.31			1.42			4.23			3.09			1.46			1.36		
BRISBANE	1052.607	26.053	BN 680	William Jolly Bridge																									
BRISBANE	1052.64	26.020	BN 670		6.72	7.05	6.35	-0.33	1.65			1.30			1.42			4.02	4.03	-0.01	3.05	2.81	0.24	1.43			1.35		
BRISBANE	1052.865	25.795	BN 660	Montague Road Gauge	6.58	6.56		0.02	1.65			1.30			1.41			3.96			3.01			1.43			1.35		
BRISBANE	1053.32	25.340	BN 650		6.50	6.44		0.06	1.65			1.29			1.41			3.91			2.97			1.42			1.35		
BRISBANE	1053.356	25.304	BN 640	Victoria Bridge																									
BRISBANE	1053.385	25.275	BN630		6.31	6.44		-0.13	1.65			1.28			1.40			3.84	3.88	-0.04	2.91	2.66	0.25	1.39			1.33		
BRISBANE	1053.9	24.760	BN 620		5.92	6.04		-0.12	1.64			1.26			1.39			3.59			2.72			1.37			1.32		
BRISBANE	1054.64	24.020	BN 610		5.84				1.64			1.26			1.39			3.52			2.68			1.37			1.32		
BRISBANE	1054.66	24.000	BN 600	Captain Cook Bridge																									
BRISBANE	1054.68	23.980	BN 590		5.76	5.77	6.26	-0.01	1.64			1.25			1.38			3.52	3.65	-0.13	2.68	2.43	0.25	1.36			1.31		
BRISBANE	1054.97	23.690	BN 560		5.50	5.59		-0.09	1.64			1.23			1.38			3.40			2.59			1.33			1.30		
BRISBANE	1055.28	23.380	BN 550		5.45				1.64			1.22			1.38			3.37			2.57			1.32			1.30		
BRISBANE	1055.42	23.240	BN 540		5.46	5.44		0.02	1.64			1.22			1.37			3.37			2.57			1.32			1.30		
BRISBANE	1055.96	22.700	BN 530	Port Office Gauge	5.40	5.44	4.95	-0.04	1.63			1.21			1.37			3.33	3.42	-0.09	2.54	2.28	0.26	1.31	1.11	0.20	1.29		
BRISBANE	1056.4	22.260	BN 520		5.14	5.31	5.31	-0.17	1.63			1.19			1.36			3.20			2.46			1.28			1.28		
BRISBANE	1056.695	21.965	BN 510		5.07				1.63			1.19			1.36			3.16			2.43			1.27			1.28		
BRISBANE	1056.865	21.795	BN 500		5.28	5.4	4.76	-0.12	1.63			1.19			1.36			3.26			2.49			1.28			1.28		
BRISBANE	1056.92	21.740	BN 495	Story Bridge																									
BRISBANE	1056.95	21.710	BN 490		5.17	5.47	4.8	-0.30	1.63			1.19			1.35			3.26			2.46	2.15	0.31	1.27			1.28		
BRISBANE	1057.09	21.570	BN 480		5.01	5.28	4.8	-0.27	1.63			1.18			1.35			3.19			2.41			1.26			1.27		
BRISBANE	1057.53	21.130	BN 470		4.87	4.86		0.01	1.63			1.18			1.35			3.13			2.37			1.25			1.26		
BRISBANE	1058.04	20.620	BN 460		4.61	4.4	4.21	0.21	1.62			1.18			1.34			2.99			2.28			1.22			1.25		
BRISBANE	1058.23	20.430	BN 450		4.53				1.62			1.18			1.34			2.95			2.25			1.21			1.25		
BRISBANE	1058.53	20.130	BN 440		4.39	4.79	4.49	-0.10	1.62			1.18			1.33			2.89			2.21			1.21			1.24		
BRISBANE	1058.735	19.925	BN 430		4.43	4.58	4.22	-0.15	1.62			1.18			1.33			2.90			2.22			1.21			1.24		
BRISBANE	1059.035	19.625	BN 420		4.14	4.03	3.85	0.11	1.62			1.18			1.33			2.78	2.74	0.04	2.14	1.98	0.16	1.21			1.23		
BRISBANE	1059.54	19.120	BN 410		4.09	4.09	3.91	0.00	1.61			1.18			1.33			2.75			2.11			1.21			1.22		
BRISBANE	1059.99	18.670	BN 400		3.88	4	3.48	-0.12	1.61			1.19			1.32			2.65			2.04			1.21			1.22		
BRISBANE	1060.345	18.315	BN 390		3.64	3.27		0.37	1.61			1.19			1.32			2.55	2.59	-0.04	1.98	1.98	0.00	1.21			1.21		
BRISBANE	1060.535	18.125	BN 380		3.48	3.33	3.21	0.15	1.61			1.19			1.32			2.48			1.94			1.21			1.21		
BRISBANE	1061.015	17.645	BN 370		3.44	3.18		0.26	1.61			1.19			1.31			2.45			1.92			1.21			1.20		
BRISBANE	1061.53	17.130	BN 360		3.21				1.6			1.19			1.31			2.36			1.86			1.21			1.20		
BRISBANE	1062.02	16.640	BN 350		3.13	3.15	3.06	-0.02	1.6			1.19			1.30			2.33			1.83			1.21			1.19		
BRISBANE	1062.535	16.125	BN 340		3.08	3.15	2.6	-0.07	1.6			1.19			1.30			2.30	2.36	-0.06	1.81	1.82	-0.01	1.21			1.19		
BRISBANE	1062.94	15.720	BN 330		3.08				1.59			1.19			1.30			2.30			1.81			1.22			1.18		
BRISBANE	1063.31	15.350	BN 320	Newstead Park Gauge	2.96	3.3	2.6	-0.34	1.59			1.19			1.29			2.25	2.28	-0.03	1.78	1.75	0.03	1.22	1.28	-0.06	1.18		
BRISBANE	1063.645	15.015	BN 310	Cresent Road Gauge	2.69	2.63	2.63	0.06	1.59			1.19			1.29			2.13			1.70			1.21			1.17		
BRISBANE	1064	14.660	BN 300		2.65	2.78		-0.13	1.59			1.18			1.29			2.12			1.69			1.21			1.17		
BRISBANE	1064.49	14.170	BN 290		2.53	2.42	2.39	0.11	1.58			1.18			1.28			2.06			1.68			1.21			1.16		
BRISBANE	1065.01	13.650	BN 280		2.55	2.48		0.07	1.58			1.18			1.28			2.07			1.66			1.21			1.16		
BRISBANE	1065.503	13.157	BN 270		2.51	2.51		0.00	1.58			1.17			1.28			2.06			1.65			1.21			1.16		
BRISBANE	1065.99	12.670	BN 260	Cairncross Dock Gauge	2.52	2.49		0.03	1.58			1.17			1.27			2.06			1.65			1.21	1.05	0.16	1.16		

TABLE C-1 - Predicted & Recorded Flood Levels for Calibration\Verification Events

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	CALIBRATION EVENTS															VERIFICATION EVENTS											
					1974 PREDICTED WL (m AHD)	1974 RECORDED WL (m AHD)	1974 RECORDED WL (m AHD)	1974 DIFFERENCE (m)	1996 PREDICTED WL (m AHD)	1996 RECORDED WL (m AHD)	1996 DIFFERENCE (m)	1983 PREDICTED WL (m AHD)	1983 RECORDED WL (m AHD)	1983 DIFFERENCE (m)	1989B PREDICTED WL (m AHD)	1989B RECORDED WL (m AHD)	1989D DIFFERENCE (m)	1931 PREDICTED WL (m AHD)	1931 RECORDED WL (m AHD)	1931 DIFFERENCE (m)	1955 PREDICTED WL (m AHD)	1955 RECORDED WL (m AHD)	1955 DIFFERENCE (m)	1973 PREDICTED WL (m AHD)	1973 RECORDED WL (m AHD)	1973 DIFFERENCE (m)	1989A PREDICTED WL (m AHD)	1989A RECORDED WL (m AHD)	1989A DIFFERENCE (m)
BRISBANE	1066.505	12.155	BN 250		2.45	2.51		-0.06	1.57			1.17			1.27			2.03			1.64			1.21			1.15		
BRISBANE	1067.02	11.640	BN 240		2.41	2.36	2.42	0.05	1.57			1.16			1.27			2.02			1.63			1.20			1.15		
BRISBANE	1067.485	11.175	BN 230		2.31	2.36	2.42	-0.05	1.57			1.16			1.26			1.97			1.60			1.20			1.15		
BRISBANE	1067.965	10.695	BN 220		2.19	2.02		0.17	1.57			1.16			1.26			1.92			1.57			1.20			1.14		
BRISBANE	1068.66	10.000	BN 210		2.03	2.02		0.01	1.56			1.16			1.25			1.86			1.52			1.20			1.14		
BRISBANE	1069.045	9.615	BN 200		1.96	1.9		0.06	1.56			1.16			1.25			1.83			1.51			1.20			1.14		
BRISBANE	1069.535	9.125	BN 190	Bulimba Power House Gauge	1.90	1.9		0.00	1.56			1.15			1.25			1.81			1.49			1.20			1.13		
BRISBANE	1070.025	8.635	BN 180		1.84	1.85		-0.01	1.55			1.15			1.24			1.79			1.48			1.20			1.13		
BRISBANE	1070.53	8.130	BN 170		1.75				1.55			1.15			1.24			1.75			1.46			1.20			1.13		
BRISBANE	1071.04	7.620	BN 160		1.67				1.55			1.14			1.23			1.72			1.44			1.20			1.12		
BRISBANE	1071.52	7.140	BN 160		1.70				1.54			1.14			1.23			1.74			1.45			1.20			1.12		
BRISBANE	1072.015	6.645	BN 140		1.61				1.54			1.13			1.23			1.70			1.42			1.19			1.12		
BRISBANE	1072.515	6.145	BN 130		1.60				1.54			1.13			1.22			1.68			1.41			1.19			1.12		
BRISBANE	1072.995	5.665	BN 120		1.60				1.53			1.13			1.22			1.66			1.40			1.19			1.12		
BRISBANE	1073.485	5.175	BN 110		1.59				1.53			1.13			1.22			1.63			1.38			1.19			1.11		
BRISBANE	1074	4.660	BN 100		1.59				1.53			1.13			1.21			1.61			1.37			1.19			1.11		
BRISBANE	1074.46	4.200	BN 90		1.58				1.52			1.13			1.21			1.59			1.35			1.19			1.10		
BRISBANE	1074.985	3.675	BN 80		1.58				1.52			1.12			1.21			1.54			1.33			1.18			1.10		
BRISBANE	1075.48	3.180	BN 70		1.58				1.51			1.12			1.21			1.54			1.33			1.18			1.10		
BRISBANE	1076	2.660	BN 60		1.57				1.51			1.13			1.20			1.54			1.33			1.18			1.10		
BRISBANE	1076.495	2.165	BN 50		1.57				1.51			1.13			1.20			1.51			1.31			1.18			1.10		
BRISBANE	1077.01	1.650	BN 40		1.56				1.51			1.14			1.20			1.51			1.31			1.19			1.10		
BRISBANE	1077.51	1.150	BN 30		1.56				1.51			1.14			1.20			1.52			1.31			1.19			1.10		
BRISBANE	1078.04	0.620	BN 20		1.56				1.51			1.14			1.20			1.51			1.31			1.19			1.10		
BRISBANE	1078.525	0.135	BN 10		1.56				1.51			1.14			1.20			1.50			1.30			1.19			1.10		
BRISBANE	1078.66	0.000	-	Western Inner Bar Gauge	1.55	1.55		0.00	1.51	2.75	0.00	1.14	1.14	0.00	1.20	1.2	0.00	1.50			1.30	1.30	0.00	1.19	1.19	0.00	1.10	1.10	0.00
BREMER	599.4	-	-		19.94				7.37			5.24			3.75			14.25			11.77			6.34			4.70		
BREMER	600	-	-		19.94				7.38			5.27			3.78			14.25			11.77			6.34			4.71		
OXLEY	599.4	-	-		11.07				2.47			1.87			1.71			6.93			5.20			2.26			1.81		
OXLEY	600	-	-		11.07				2.47			1.87			1.71			6.93			5.20			2.26			1.81		
BREAKFAST	599.4	-	-		3.05				1.59			1.19			1.29			2.29			1.80			1.22			1.18		
BREAKFAST	600	-	-		3.05				1.59			1.19			1.29			2.29			1.80			1.22			1.18		
BULIMBA	599.4	-	-		1.61				1.55			1.15			1.23			1.70			1.42			1.20			1.12		
BULIMBA	600	-	-		1.61				1.54			1.13			1.23			1.70			1.42			1.19			1.12		
CENTWEIR	0	-	-		14.27				4.17			2.76			2.19			-			-			3.44			2.55		
CENTWEIR	0.08	-	-		14.12				4.08			2.70			2.16			-			-			3.37			2.51		
INDOORWEIR	0	-	-		11.26				2.93			2.04			1.81			-			5.44			2.51			1.96		
INDOORWEIR	0.085	-	-		11.16				2.79			2.03			1.80			-			5.40			2.49			1.95		
WILLIAMWEIR	0	-	-		7.26				1.66			1.31			1.42			4.23			3.09			1.46			1.36		
WILLIAMWEIR	0.045	-	-		6.72				1.65			1.30			1.42			4.02			3.05			1.43			1.35		
VICTORIAWEIR	0	-	-		6.50				1.65			1.29			1.41			-			-			1.42			1.35		
VICTORIAWEIR	0.065	-	-		6.31				1.65			1.28			1.40			-			-			1.39			1.33		
CAPTAINWEIR	0	-	-		5.84				1.64			1.26			1.39			-			-			1.37			1.32		
CAPTAINWEIR	0.04	-	-		5.76				1.64			1.25			1.38			-			-			1.36			1.31		
STORYWEIR	0	-	-		5.28				1.63			1.19			1.36			-			2.49			1.28			1.28		
STORYWEIR	0.085	-	-		5.17				1.63			1.19			1.35			-			2.46			1.27			1.28		
MERIVALEWEIR	0	-	-		-				1.66			1.33			1.43			-			-			-			1.37		
MERIVALEWEIR	0.08	-	-		-				1.66			1.32			1.43			-			-			-			1.36		
GOODNALINK1	0	-	-		18.38				6.29			4.38			3.13			12.86			10.45			5.34			3.90		
GOODNALINK1	1	-	-		17.71				5.72			3.90			2.82			12.19			9.83			4.80			3.48		
GOODNALINK2	0	-	-		18.31				6.22			4.31			3.08			12.78			10.38			5.26			3.85		
GOODNALINK2	1.07	-	-		17.95				5.95			4.09			2.94			12.44			10.07			5.01			3.65		
STLUCIALINK1	0	-	-		11.10				2.53			1.89			1.73			6.95			5.22			2.30			1.84		
STLUCIALINK1	1.05	-	-		10.27				2.06			1.67			1.62			6.35			4.72			2.00			1.66		
STLUCIALINK2	0	-	-		11.09				2.48			1.87			1.71			6.94			5.21			2.27			1.82		
STLUCIALINK2	1.05	-	-		10.31				2.09			1.68			1.62			6.37			4.75			2.02			1.67		
STLUCIALINK3	0	-	-		10.97				2.44			1.85			1.70			6.89			5.18			2.24			1.80		
STLUCIALINK3	0.85	-	-		10.43				2.2			1.73			1.65			6.50			4.87			2.09			1.71		

TABLE C-2 - Predicted Discharges for Calibration\Verification Events

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CALIBRATION EVENTS 1974 Q (m^3/s)	1996 Q (m^3/s)	1983 Q (m^3/s)	1989B 0 (m^3/s)	VERIFICATION EVENTS 1931 Q (m^3/s)	1955 Q (m^3/s)	1973 Q (m^3/s)	1989A Q (m^3/s)
BRISBANE	1000.14	78.52	7504	2159	1518	1190	5919	5104	2613	1606
BRISBANE	1000.53	78.13	7504	2157	1518	1190	5917	5102	2613	1605
BRISBANE	1001.05	77.62	7505	2156	1517	1190	5913	5098	2612	1603
BRISBANE	1001.59	77.07	7506	2153	1517	1191	5908	5094	2610	1599
BRISBANE	1002.11	76.55	7507	2152	1517	1191	5905	5091	2609	1598
BRISBANE	1002.57	76.09	7508	2151	1517	1191	5901	5087	2608	1597
BRISBANE	1003.03	75.63	7508	2150	1517	1192	5897	5083	2607	1595
BRISBANE	1003.53	75.14	7509	2150	1517	1192	5893	5079	2605	1593
BRISBANE	1004.04	74.62	7510	2150	1516	1192	5889	5075	2603	1591
BRISBANE	1004.56	74.11	7511	2150	1516	1193	5884	5070	2602	1589
BRISBANE	1005.07	73.59	7513	2150	1516	1193	5877	5062	2600	1586
BRISBANE	1005.60	73.06	7514	2151	1516	1194	5869	5054	2596	1582
BRISBANE	1006.04	72.63	7516	2151	1516	1195	5863	5047	2594	1579
BRISBANE	1006.25	72.41	9626	2749	1903	1514	5679	4396	2339	1738
BRISBANE	1006.61	72.06	9625	2748	1902	1513	5678	4394	2339	1737
BRISBANE	1007.16	71.50	9623	2748	1899	1512	5676	4391	2339	1734
BRISBANE	1007.67	71.00	9621	2747	1896	1511	5674	4387	2338	1732
BRISBANE	1008.18	70.48	9618	2746	1893	1509	5672	4384	2337	1730
BRISBANE	1008.69	69.98	9617	2746	1892	1508	5671	4382	2337	1730
BRISBANE	1009.16	69.50	9616	2745	1891	1506	5669	4380	2336	1731
BRISBANE	1009.56	69.10	9615	2745	1890	1505	5668	4378	2336	1731
BRISBANE	1010.11	68.56	9612	2744	1890	1504	5666	4374	2336	1732
BRISBANE	1010.61	68.05	9611	2744	1889	1503	5665	4372	2335	1733
BRISBANE	1010.85	67.81	9610	2744	1889	1503	5664	4371	2335	1733
BRISBANE	1011.25	67.42	9609	2744	1889	1502	5663	4370	2335	1734
BRISBANE	1011.75	66.92	9607	2743	1888	1500	5661	4367	2334	1735
BRISBANE	1012.23	66.43	9605	2742	1888	1499	5659	4363	2333	1736
BRISBANE	1012.71	65.96	9602	2742	1888	1497	5657	4360	2333	1737
BRISBANE	1013.06	65.60	9600	2741	1889	1496	5656	4357	2332	1738
BRISBANE	1013.32	65.34	9546	2741	1889	1495	5654	4356	2332	1738
BRISBANE	1013.56	65.10	9544	2741	1889	1494	5653	4354	2332	1739
BRISBANE	1013.80	64.87	9522	2740	1890	1494	5652	4352	2331	1739
BRISBANE	1014.11	64.55	9520	2739	1891	1491	5650	4349	2330	1741
BRISBANE	1014.46	64.20	9517	2739	1892	1489	5648	4346	2330	1743
BRISBANE	1014.85	63.81	9514	2738	1893	1487	5645	4341	2329	1744
BRISBANE	1015.33	63.34	9512	2737	1894	1486	5644	4340	2328	1745
BRISBANE	1015.71	62.96	9511	2737	1895	1485	5643	4338	2328	1746
BRISBANE	1016.00	62.67	9531	2736	1895	1484	5642	4337	2327	1747
BRISBANE	1016.39	62.27	9530	2736	1896	1483	5641	4336	2327	1748
BRISBANE	1016.77	61.90	9528	2735	1897	1481	5640	4334	2326	1749
BRISBANE	1017.01	61.65	9582	2735	1898	1480	5639	4332	2326	1750
BRISBANE	1017.37	61.29	9580	2734	1899	1479	5637	4330	2325	1751
BRISBANE	1017.77	60.90	9578	2734	1899	1478	5636	4328	2324	1752
BRISBANE	1018.06	60.60	9576	2734	1900	1477	5634	4327	2324	1753
BRISBANE	1018.46	60.20	9575	2733	1901	1475	5633	4325	2324	1754
BRISBANE	1018.91	59.75	9573	2733	1902	1474	5632	4324	2323	1755
BRISBANE	1019.29	59.37	9572	2733	1902	1473	5631	4322	2323	1756
BRISBANE	1019.68	58.98	9571	2732	1904	1471	5630	4321	2322	1757
BRISBANE	1019.99	58.67	9570	2732	1904	1470	5629	4320	2321	1758
BRISBANE	1020.32	58.34	9568	2731	1906	1468	5628	4317	2320	1760
BRISBANE	1020.68	57.98	9567	2730	1907	1465	5626	4315	2319	1762
BRISBANE	1020.96	57.70	9566	2730	1908	1464	5626	4314	2319	1763
BRISBANE	1021.32	57.34	9565	2730	1909	1463	5625	4313	2320	1764
BRISBANE	1021.63	57.03	9564	2730	1910	1461	5624	4312	2320	1765
BRISBANE	1021.81	56.86	9564	2729	1910	1460	5624	4311	2321	1766
BRISBANE	1022.00	56.66	9563	2729	1911	1459	5623	4310	2321	1767
BRISBANE	1022.34	56.32	9562	2729	1912	1458	5622	4309	2322	1768
BRISBANE	1022.81	55.85	9561	2729	1913	1456	5621	4307	2323	1770
BRISBANE	1023.31	55.36	9559	2728	1914	1454	5620	4306	2323	1771
BRISBANE	1023.83	54.84	9558	2728	1915	1453	5619	4305	2324	1773
BRISBANE	1024.32	54.34	9557	2728	1916	1451	5618	4303	2325	1774
BRISBANE	1024.82	53.84	9556	2728	1918	1448	5617	4302	2326	1776
BRISBANE	1025.22	53.45	9554	2727	1919	1446	5616	4300	2327	1778
BRISBANE	1025.48	53.19	9553	2727	1920	1445	5615	4299	2327	1779
BRISBANE	1025.88	52.78	9552	2727	1922	1444	5614	4298	2328	1780
BRISBANE	1026.43	52.24	9551	2727	1923	1442	5613	4297	2329	1782
BRISBANE	1026.79	51.87	9550	2727	1925	1441	5612	4296	2329	1784

TABLE C-2 - Predicted Discharges for Calibration\Verification Events

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CALIBRATION EVENTS				VERIFICATION EVENTS			
			1974 Q (m³/s)	1996 Q (m³/s)	1983 Q (m³/s)	1989B Q (m³/s)	1931 Q (m³/s)	1955 Q (m³/s)	1973 Q (m³/s)	1989A Q (m³/s)
BRISBANE	1027.03	51.63	9549	2727	1926	1440	5612	4295	2330	1785
BRISBANE	1027.42	51.24	9548	2727	1927	1438	5611	4294	2330	1786
BRISBANE	1027.93	50.73	9546	2727	1930	1435	5610	4292	2332	1789
BRISBANE	1028.43	50.23	9544	2726	1933	1432	5608	4290	2333	1793
BRISBANE	1028.72	49.94	9147	2726	1934	1431	5607	4289	2334	1794
BRISBANE	1028.98	49.68	9542	2726	1935	1430	5607	4288	2334	1795
BRISBANE	1029.44	49.22	9539	2726	1937	1428	5605	4286	2335	1798
BRISBANE	1029.95	48.71	9535	2726	1939	1426	5604	4285	2337	1800
BRISBANE	1030.55	48.11	9531	2726	1942	1424	5600	4280	2338	1804
BRISBANE	1031.07	47.59	9528	2725	1945	1421	5599	4279	2339	1807
BRISBANE	1031.48	47.18	9527	2725	1947	1420	5598	4278	2340	1809
BRISBANE	1031.85	46.81	9526	2725	1948	1419	5597	4277	2341	1811
BRISBANE	1032.11	46.55	9525	2725	1950	1418	5596	4276	2342	1813
BRISBANE	1032.41	46.25	9523	2725	1951	1422	5595	4275	2343	1815
BRISBANE	1032.83	45.83	9522	2725	1953	1426	5594	4274	2344	1818
BRISBANE	1033.23	45.44	9521	2725	1955	1430	5593	4272	2345	1820
BRISBANE	1033.64	45.03	9519	2725	1957	1435	5592	4271	2346	1822
BRISBANE	1034.14	44.53	9518	2724	1959	1439	5591	4270	2347	1825
BRISBANE	1034.63	44.03	9517	2724	1961	1445	5590	4269	2348	1828
BRISBANE	1035.15	43.51	9514	2724	1964	1450	5588	4267	2350	1832
BRISBANE	1035.66	43.00	9513	2724	1966	1457	5587	4265	2351	1835
BRISBANE	1036.18	42.48	9511	2724	1969	1462	5586	4264	2352	1839
BRISBANE	1036.62	42.05	9510	2724	1971	1467	5585	4263	2353	1842
BRISBANE	1036.84	41.82	9509	2723	1973	1470	5584	4262	2354	1844
BRISBANE	1037.00	41.66	9509	2723	1973	1472	5584	4261	2355	1845
BRISBANE	1037.11	41.55	9508	2723	1974	1473	5583	4261	2355	1846
BRISBANE	1037.23	41.43	9508	2723	1974	1474	5583	4261	2355	1846
BRISBANE	1037.46	41.21	9508	2723	1976	1477	5583	4260	2356	1848
BRISBANE	1037.86	40.81	9506	2723	1978	1483	5582	4259	2357	1852
BRISBANE	1038.34	40.32	9500	2723	1982	1490	5580	4257	2359	1856
BRISBANE	1038.85	39.81	9495	2722	1986	1498	5575	4253	2362	1862
BRISBANE	1039.15	39.51	9492	2723	1989	1504	5572	4250	2364	1866
BRISBANE	1039.38	39.28	9400	2723	1991	1509	5570	4248	2366	1869
BRISBANE	1039.62	39.04	9398	2723	1994	1513	5568	4246	2367	1873
BRISBANE	1039.75	38.91	9324	2723	1996	1516	5567	4245	2368	1875
BRISBANE	1039.96	38.70	9202	2785	2160	1552	5463	4158	2421	1915
BRISBANE	1040.17	38.49	9202	2785	2162	1556	5462	4157	2423	1918
BRISBANE	1040.37	38.29	9139	2785	2164	1560	5462	4157	2424	1921
BRISBANE	1040.75	37.91	9139	2785	2167	1565	5462	4157	2425	1925
BRISBANE	1041.12	37.54	9138	2785	2170	1571	5461	4156	2427	1930
BRISBANE	1041.35	37.32	9137	2785	2173	1576	5461	4156	2429	1934
BRISBANE	1041.58	37.08	9136	2785	2175	1580	5461	4156	2430	1937
BRISBANE	1041.83	36.83	9136	2785	2177	1584	5461	4156	2431	1940
BRISBANE	1042.10	36.56	9135	2785	2179	1588	5461	4156	2433	1943
BRISBANE	1042.37	36.29	9135	2785	2180	1591	5461	4156	2434	1945
BRISBANE	1042.51	36.15	9196	2785	2181	1593	5461	4156	2434	1947
BRISBANE	1042.71	35.95	9196	2785	2183	1596	5460	4156	2435	1949
BRISBANE	1042.96	35.70	9196	2785	2185	1600	5460	4155	2436	1952
BRISBANE	1043.05	35.61	9274	2785	2186	1601	5460	4155	2437	1954
BRISBANE	1043.10	35.57	9274	2785	2186	1602	5460	4155	2437	1954
BRISBANE	1043.42	35.24	9365	2784	2189	1607	5460	4155	2439	1958
BRISBANE	1043.89	34.77	9364	2784	2193	1615	5460	4155	2441	1965
BRISBANE	1044.20	34.46	9364	2784	2195	1621	5460	4155	2443	1969
BRISBANE	1044.47	34.19	9364	2784	2198	1625	5460	4155	2444	1972
BRISBANE	1044.73	33.93	9363	2784	2200	1629	5460	4155	2445	1976
BRISBANE	1045.13	33.53	9364	2784	2205	1637	5459	4155	2448	1983
BRISBANE	1045.64	33.02	9368	2784	2211	1649	5459	4154	2452	1992
BRISBANE	1046.03	32.63	9371	2784	2216	1657	5459	4154	2455	1999
BRISBANE	1046.26	32.40	9372	2784	2219	1662	5459	4154	2456	2003
BRISBANE	1046.46	32.20	9372	2784	2221	1665	5458	4154	2457	2005
BRISBANE	1046.74	31.92	9374	2784	2224	1671	5458	4154	2459	2010
BRISBANE	1047.13	31.54	9374	2784	2228	1679	5458	4154	2462	2017
BRISBANE	1047.63	31.03	9372	2784	2232	1686	5458	4154	2464	2022
BRISBANE	1048.15	30.52	9373	2784	2236	1692	5458	4154	2467	2028
BRISBANE	1048.63	30.03	9376	2784	2241	1702	5458	4154	2470	2036
BRISBANE	1049.01	29.65	9387	2784	2246	1711	5458	4154	2473	2044
BRISBANE	1049.25	29.42	9394	2784	2249	1716	5458	4154	2475	2048

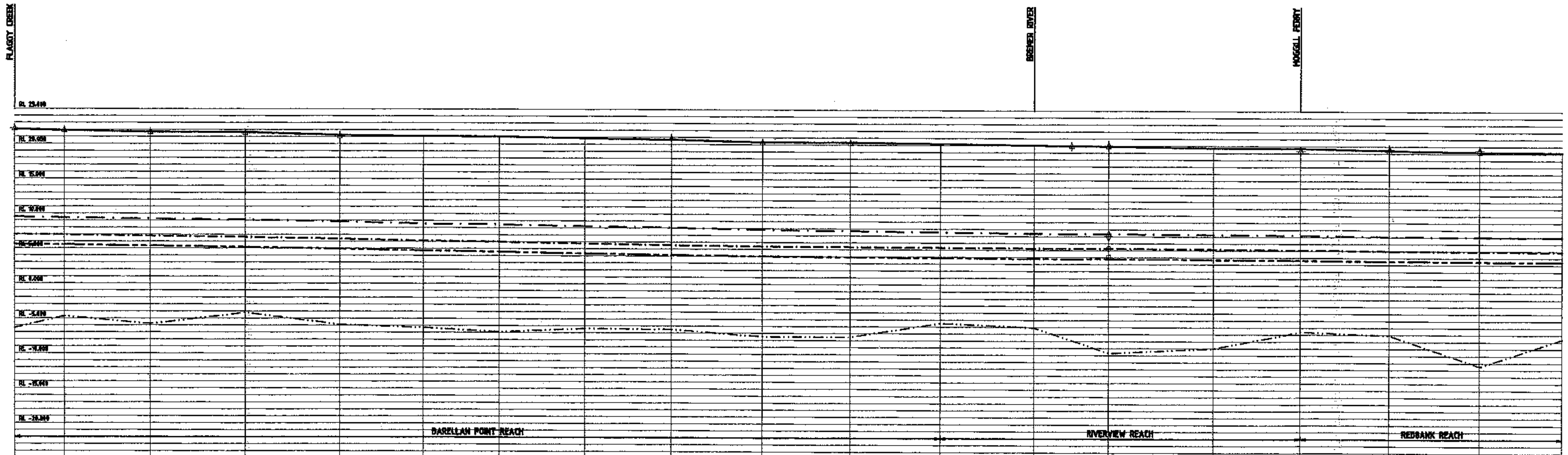
TABLE C-2 - Predicted Discharges for Calibration\Verification Events

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CALIBRATION EVENTS 1974 Q (m^3/s)	1996 Q (m^3/s)	1983 Q (m^3/s)	1989B Q (m^3/s)	VERIFICATION EVENTS 1931 Q (m^3/s)	1955 Q (m^3/s)	1973 Q (m^3/s)	1989A Q (m^3/s)
BRISBANE	1049.48	29.18	9399	2784	2252	1720	5457	4154	2476	2051
BRISBANE	1049.73	28.93	9408	2785	2255	1724	5457	4154	2478	2055
BRISBANE	1050.15	28.51	9418	2785	2260	1731	5457	4153	2481	2061
BRISBANE	1050.65	28.02	9435	2785	2267	1742	5457	4153	2485	2070
BRISBANE	1051.11	27.55	9447	2785	2272	1751	5457	4153	2488	2077
BRISBANE	1051.63	27.03	9471	2786	2278	1760	5457	4153	2492	2085
BRISBANE	1052.10	26.56	9539	2786	2284	1768	5457	4153	2495	2092
BRISBANE	1052.35	26.31	9554	2786	2287	1775	5457	4153	2497	2098
BRISBANE	1052.49	26.17	9566	2786	2289	1777	5457	4153	2498	2100
BRISBANE	1052.63	26.04	9580	2786	2290	1779	5457	4153	2499	2101
BRISBANE	1052.75	25.91	9566	2786	2291	1781	5457	4153	2500	2103
BRISBANE	1053.09	25.57	9559	2787	2294	1786	5457	4153	2502	2107
BRISBANE	1053.36	25.31	9540	2787	2299	1794	5457	4153	2505	2114
BRISBANE	1053.64	25.02	9522	2787	2304	1801	5457	4153	2508	2121
BRISBANE	1054.27	24.39	9474	2788	2315	1815	5457	4153	2515	2133
BRISBANE	1054.66	24.00	9455	2789	2326	1830	5457	4153	2521	2146
BRISBANE	1054.83	23.84	9448	2789	2330	1835	5457	4153	2523	2151
BRISBANE	1055.13	23.54	9442	2789	2335	1842	5457	4153	2526	2157
BRISBANE	1055.35	23.31	9437	2790	2339	1847	5457	4153	2529	2161
BRISBANE	1055.69	22.97	9430	2790	2344	1854	5457	4153	2532	2168
BRISBANE	1056.18	22.48	9427	2791	2354	1868	5457	4153	2538	2180
BRISBANE	1056.55	22.11	9428	2791	2361	1877	5457	4153	2543	2188
BRISBANE	1056.78	21.88	9427	2791	2364	1882	5457	4153	2545	2192
BRISBANE	1056.92	21.74	9424	2791	2370	1889	5457	4153	2549	2199
BRISBANE	1057.02	21.64	9422	2792	2373	1894	5457	4153	2551	2204
BRISBANE	1057.31	21.35	9419	2792	2378	1901	5457	4153	2555	2210
BRISBANE	1057.79	20.87	9413	2793	2386	1912	5457	4153	2560	2220
BRISBANE	1058.14	20.53	9407	2793	2393	1919	5457	4153	2564	2227
BRISBANE	1058.38	20.28	9403	2793	2398	1925	5457	4153	2567	2233
BRISBANE	1058.63	20.03	9399	2793	2403	1930	5457	4153	2570	2237
BRISBANE	1058.89	19.78	9393	2794	2408	1936	5457	4153	2573	2243
BRISBANE	1059.29	19.37	9387	2794	2414	1943	5457	4153	2576	2249
BRISBANE	1059.77	18.89	9372	2795	2427	1957	5457	4153	2583	2262
BRISBANE	1060.17	18.49	9382	2795	2439	1971	5457	4153	2591	2275
BRISBANE	1060.44	18.22	9387	2796	2444	1976	5457	4153	2594	2280
BRISBANE	1060.78	17.88	9393	2796	2449	1983	5457	4153	2598	2287
BRISBANE	1061.27	17.39	9405	2797	2461	1997	5457	4153	2606	2300
BRISBANE	1061.78	16.88	9413	2797	2472	2009	5457	4153	2614	2312
BRISBANE	1062.28	16.38	9422	2798	2484	2025	5457	4153	2623	2328
BRISBANE	1062.74	15.92	9431	2799	2503	2045	5457	4153	2636	2347
BRISBANE	1063.03	15.63	9436	2800	2517	2058	5457	4153	2645	2361
BRISBANE	1063.22	15.44	9453	2858	2561	2081	5457	4153	2661	2385
BRISBANE	1063.48	15.18	9456	2859	2572	2092	5457	4153	2668	2395
BRISBANE	1063.82	14.84	9460	2859	2583	2103	5457	4153	2675	2406
BRISBANE	1064.25	14.42	9467	2859	2596	2116	5457	4153	2684	2419
BRISBANE	1064.75	13.91	9475	2859	2618	2131	5457	4153	2694	2434
BRISBANE	1065.26	13.40	9486	2859	2648	2149	5457	4153	2706	2453
BRISBANE	1065.75	12.91	9498	2859	2680	2170	5457	4154	2719	2474
BRISBANE	1066.25	12.41	9509	2860	2713	2191	5457	4154	2734	2496
BRISBANE	1066.76	11.90	9520	2860	2745	2212	5457	4154	2749	2517
BRISBANE	1067.25	11.41	9534	2860	2781	2235	5457	4154	2765	2540
BRISBANE	1067.73	10.94	9549	2861	2822	2258	5457	4154	2782	2564
BRISBANE	1068.31	10.35	9563	2861	2862	2282	5457	4154	2798	2587
BRISBANE	1068.85	9.81	9574	2861	2903	2305	5457	4154	2815	2612
BRISBANE	1069.29	9.37	9583	2861	2934	2324	5457	4154	2828	2633
BRISBANE	1069.78	8.88	9594	2861	2971	2346	5457	4154	2843	2658
BRISBANE	1070.28	8.38	9605	2862	3009	2368	5457	4154	2859	2684
BRISBANE	1070.79	7.87	9620	2862	3050	2392	5457	4154	2875	2713
BRISBANE	1071.28	7.38	9636	2862	3091	2416	5457	4154	2892	2741
BRISBANE	1071.77	6.89	9650	2862	3132	2441	5457	4154	2911	2771
BRISBANE	1072.02	6.64	9658	2863	3155	2455	5457	4154	2921	2787
BRISBANE	1072.27	6.39	9794	2937	3426	2971	5458	4154	3034	2973
BRISBANE	1072.76	5.90	9810	2938	3472	2998	5458	4154	3052	3003
BRISBANE	1073.24	5.42	9828	2938	3521	3026	5458	4154	3071	3035
BRISBANE	1073.74	4.92	9848	2938	3574	3056	5458	4154	3091	3069
BRISBANE	1074.23	4.43	9868	2938	3627	3084	5458	4154	3111	3103
BRISBANE	1074.72	3.94	9889	2938	3681	3113	5458	4154	3132	3140

TABLE C-2 - Predicted Discharges for Calibration\Verification Events

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CALIBRATION EVENTS 1974 Q (m^3/s)	1996 Q (m^3/s)	1983 Q (m^3/s)	1989B Q (m^3/s)	VERIFICATION EVENTS 1931 Q (m^3/s)	1955 Q (m^3/s)	1973 Q (m^3/s)	1989A Q (m^3/s)
BRISBANE	1075.23	3.43	9911	2938	3735	3141	5458	4154	3152	3176
BRISBANE	1075.74	2.92	9949	2938	3816	3185	5458	4154	3184	3232
BRISBANE	1076.25	2.41	9999	2937	3932	3245	5458	4154	3228	3311
BRISBANE	1076.75	1.91	10042	2938	4026	3293	5458	4154	3264	3374
BRISBANE	1077.26	1.40	10107	2938	4166	3365	5458	4154	3317	3469
BRISBANE	1077.78	0.88	10151	2938	4261	3413	5458	4154	3353	3533
BRISBANE	1078.28	0.38	10192	2953	4353	3460	5458	4154	3388	3596
BRISBANE	1078.59	0.07	10207	2963	4386	3476	5458	4154	3400	3617
BREMER	599.70	-	3743	1326	1212	941	1297	1073	367	584
OXLEY	599.70	-	1077	475	382	288	831	297	246	264
BREAKFAST	599.70	-	131	390	221	407	433	211	426	141
BULIMBA	599.70	-	1433	495	554	758	713	337	785	279
CENTWEIR	0.04	-	439	0	0	0	-	-	0	0
INDOORWEIR	0.04	-	0	0	0	0	-	0	0	0
WILLIAMWEIR	0.02	-	0	0	0	0	0	0	0	0
VICTORIAWEIR	0.03	-	0	0	0	0	-	-	0	0
CAPTAINWEIR	0.02	-	0	0	0	0	-	-	0	0
STORYWEIR	0.04	-	0	0	0	0	-	0	0	0
MERIVALEWEIR	0.04	-	-	0	0	0	-	-	-	0
GOODNALINK1	0.50	-	59	0	0	0	0	0	0	0
GOODNALINK2	0.54	-	23	0	0	0	0	0	0	0
STLUCIALINK1	0.53	-	91	0	0	0	0	0	0	0
STLUCIALINK2	0.53	-	79	0	0	0	0	0	0	0
STLUCIALINK3	0.43	-	62	0	0	0	0	0	0	0

FIGURE C-1a
BRISBANE RIVER FLOOD STUDY
MIKE 11 CALIBRATION PROFILE



DATUM RL. -25.000

1996 PREDICTED FLOOD LEVEL	9.490	9.400	9.230	9.090	8.840	8.570	8.470	8.250	8.060	7.800	7.600	7.530	7.380	7.320	7.270	7.210	7.040	4.990	4.930
1989b PREDICTED FLOOD LEVEL	5.590	5.520	5.360	5.180	4.940	4.700	4.550	4.330	4.150	4.090	3.920	3.840	3.780	3.720	3.700	3.610	3.550	3.460	3.440
1983 PREDICTED FLOOD LEVEL	7.020	6.940	6.780	6.610	6.370	6.110	5.980	5.760	5.550	5.420	5.370	5.320	5.220	5.270	5.180	5.110	4.880	4.930	4.880
1974 PREDICTED FLOOD LEVEL	22.050	21.910	21.760	21.630	21.250	21.120	21.110	20.870	20.680	20.370	20.350	20.230	20.020	19.890	19.700	19.670	19.380	19.200	19.140
BED LEVEL (m AHD)	-4.400	-4.700	-5.000	-4.200	-5.900	-6.300	-6.900	-6.400	-6.500	-7.500	-7.500	-5.500	-4.100	-9.700	-9.000	-6.600	-7.100	-11.500	-7.400
CROSS SECTION NUMBER	BN 2020	BN 2010	BN 2000	BN 1990	BN 1980	BN 1970	BN 1960	BN 1950	BN 1940	BN 1930	BN 1920	BN 1910	BN 1900	BN 1890	BN 1880	BN 1870	BN 1860	BN 1850	BN 1840
MIKE 11 CHAINAGE (km)	1000.000	1000.285	1000.775	1001.315	1001.845	1002.350	1002.785	1003.275	1003.775	1004.300	1004.810	1005.325	1005.870	1006.360	1006.970	1007.410	1007.920	1008.445	1008.925
AMTD CHAINAGE (km)	78.660	78.375	77.865	77.345	76.795	76.310	75.875	75.385	74.885	74.360	73.850	73.335	72.790	72.360	71.750	71.250	70.760	70.215	69.735

BRISBANE RIVER - BN 2020 TO BN 1840

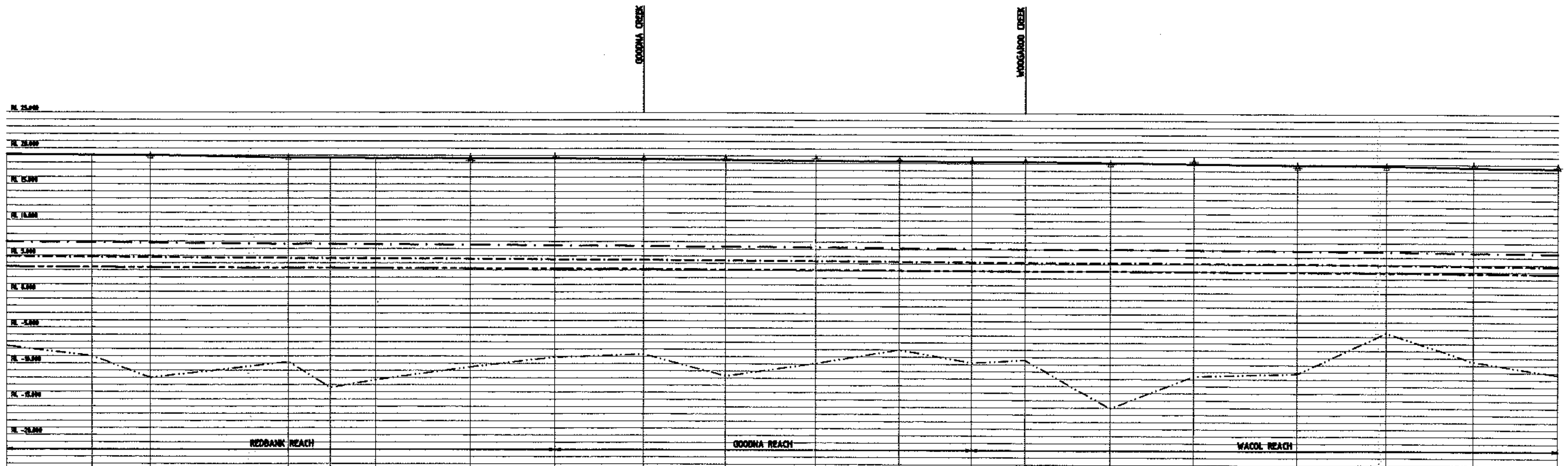
LEGEND

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

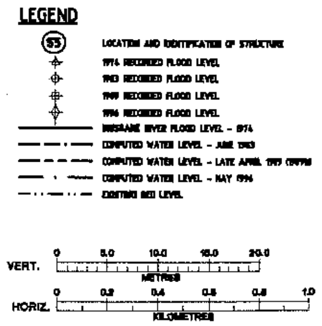
PLOT SCALE: 1=30

FIGURE C-1b
BRISBANE RIVER FLOOD STUDY
MIKE 11 CALIBRATION PROFILE

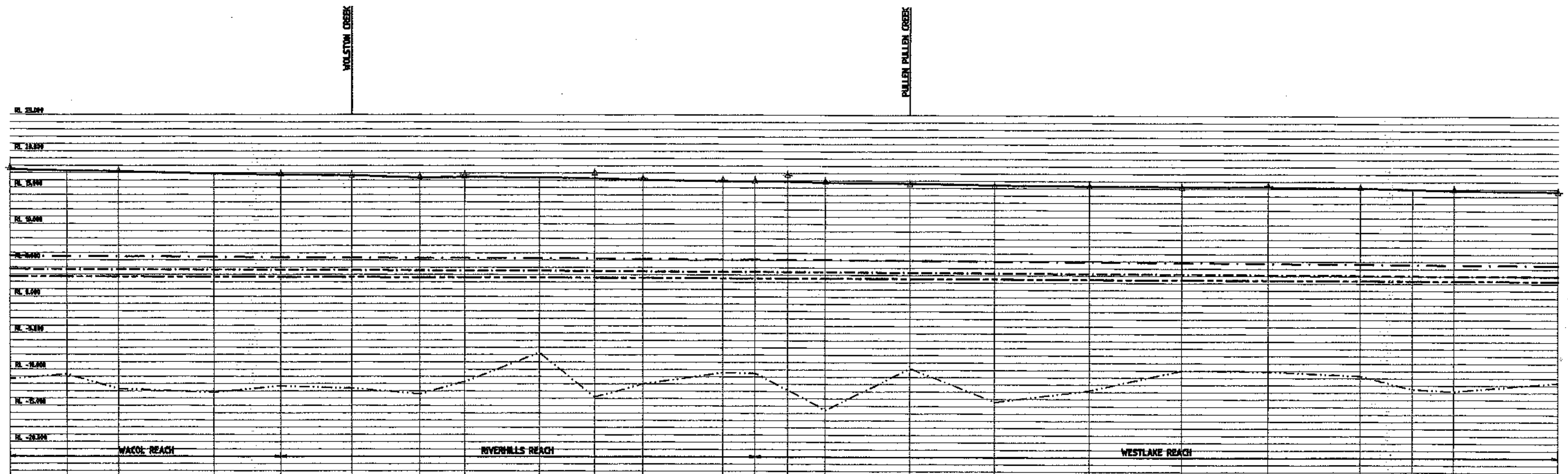


DATUM RL. -25.000

1996 PREDICTED FLOOD LEVEL	4.934	6.650	4.810	6.650	4.650	4.680	4.560	4.470	6.390	6.320	4.240	4.190	6.110	4.040	6.050	5.970	5.910	5.880	5.640	5.560
1989b PREDICTED FLOOD LEVEL	3.440	3.400	3.380	3.310	3.310	3.290	3.250	3.220	3.180	3.140	3.110	3.060	3.020	2.990	2.990	2.960	2.930	2.970	2.780	2.760
1983 PREDICTED FLOOD LEVEL	4.880	4.820	4.790	4.670	4.640	4.630	4.580	4.520	4.460	4.400	4.350	4.280	4.220	4.170	4.170	4.110	4.070	3.970	3.840	3.770
1974 PREDICTED FLOOD LEVEL	19.160	19.050	19.040	18.670	18.710	18.630	18.620	18.620	18.520	18.430	18.330	18.280	18.250	18.280	18.140	18.000	17.900	17.800	17.570	17.450
BED LEVEL (m AHD)	-7.680	-9.610	-12.860	-9.880	-13.440	-12.310	-10.540	-9.100	-8.700	-11.780	-8.900	-8.000	-9.800	-9.400	-14.300	-11.600	-11.200	-5.500	-9.500	-11.300
CROSS SECTION NUMBER	BN 1840	BN 1830	BN 1820	BN 1810	BN 1800	BN 1790	BN 1780	BN 1770	BN 1760	BN 1750	BN 1740	BN 1730	BN 1720	BN 1710	BN 1700	BN 1690	BN 1680	BN 1670	BN 1660	BN 1650
MIKE 11 CHAINAGE (km)	1008.925	1009.400	1009.720	1010.490	1010.725	1010.980	1011.510	1011.980	1012.475	1012.935	1013.445	1013.910	1014.310	1014.610	1015.090	1015.560	1016.140	1016.660	1017.130	1017.610
AMTD CHAINAGE (km)	69.735	69.260	68.940	68.170	67.935	67.680	67.150	66.680	66.185	65.725	65.215	64.750	64.350	64.050	63.570	63.100	62.520	62.000	61.530	61.050



PLOT SCALE: 1=30



CROSS SECTION NUMBER	1996 PREDICTED FLOOD LEVEL	1989b PREDICTED FLOOD LEVEL	1983 PREDICTED FLOOD LEVEL	1974 PREDICTED FLOOD LEVEL	BED LEVEL (m AHD)	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 1650	5.560	2.740	3.770	17.450	-11.300	1017.480	61.050
BN 1640	5.480	2.730	3.710	17.290	-10.300	1017.920	60.740
BN 1630	5.490	2.710	3.710	17.210	-12.700	1018.200	60.444
BN 1620	5.420	2.690	3.670	16.890	-13.300	1018.725	59.935
BN 1610	5.370	2.660	3.630	16.750	-12.300	1018.995	59.565
BN 1600	5.330	2.650	3.600	16.640	-12.600	1019.490	59.170
BN 1590	5.290	2.630	3.570	16.340	-13.400	1019.865	58.795
BN 1580	5.280	2.620	3.550	16.440	-11.700	1020.115	58.545
BN 1570	5.270	2.610	3.560	16.420	-7.700	1020.525	58.135
BN 1560	5.230	2.600	3.510	16.270	-13.800	1020.830	57.830
BN 1550	5.160	2.570	3.470	16.060	-12.800	1021.095	57.565
BN 1540	5.100	2.550	3.420	15.890	-10.600	1021.539	57.121
BN 1530	5.100	2.549	3.420	15.920	-10.500	1021.715	56.945
BN 1520	5.090	2.540	3.410	15.850	-12.800	1021.895	56.765
BN 1510	5.090	2.540	3.450	15.730	-15.400	1022.105	56.155
BN 1500	5.020	2.510	3.340	15.650	-9.800	1022.575	56.085
BN 1490	4.920	2.480	3.300	15.410	-14.400	1022.940	55.720
BN 1480	4.880	2.460	3.270	15.320	-12.000	1023.570	55.090
BN 1470	4.810	2.440	3.220	15.270	-10.000	1024.080	54.580
BN 1460	4.720	2.400	3.150	15.210	-10.100	1024.563	54.097
BN 1450	4.670	2.370	3.110	15.120	-10.700	1025.070	53.590
BN 1440	4.600	2.350	3.060	14.970	-12.500	1025.340	53.303
BN 1430	4.560	2.330	3.020	14.810	-12.800	1025.590	53.070
BN 1420	4.510	2.320	3.000	14.690	-11.600	1026.170	52.490

BRISBANE RIVER - BN 1650 TO BN 1420

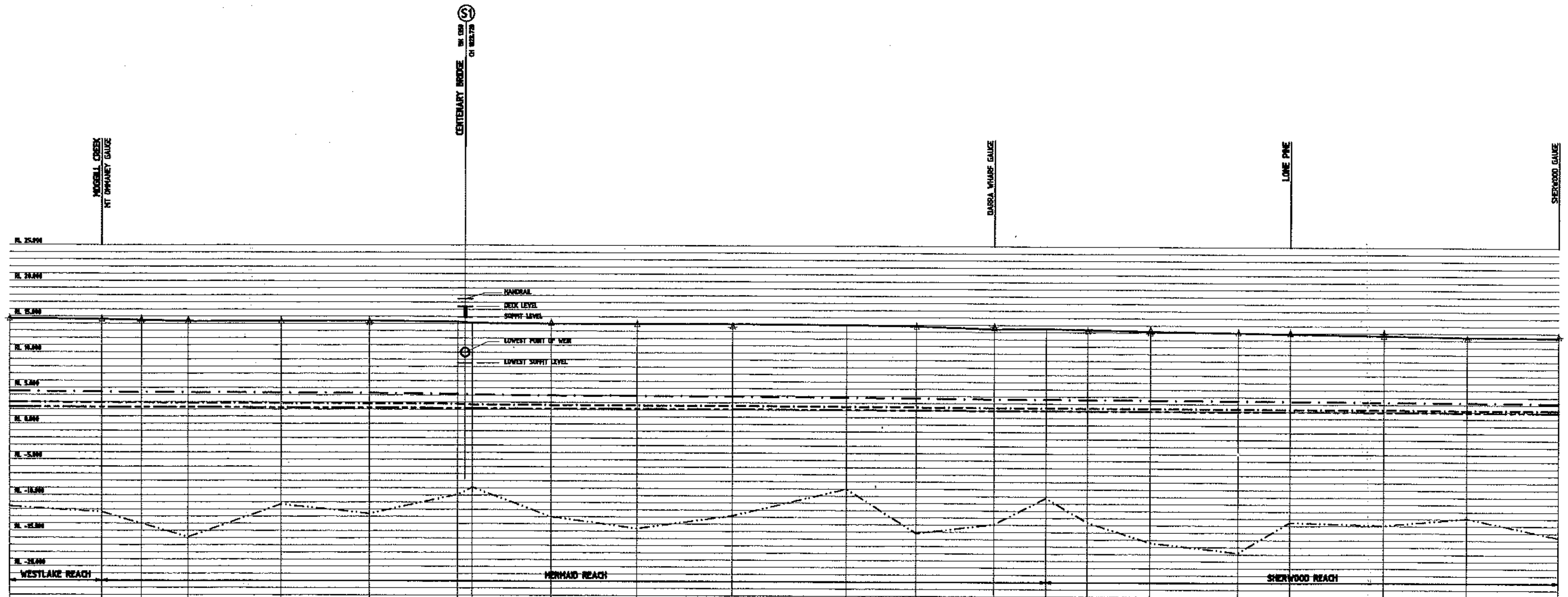
LEGEND

- LOCATION AND IDENTIFICATION OF STRUCTURE
- 1974 RECORDED FLOOD LEVEL
- 1983 RECORDED FLOOD LEVEL
- 1989 RECORDED FLOOD LEVEL
- 1996 RECORDED FLOOD LEVEL
- BRISBANE RIVER FLOOD LEVEL - 1974
- COMPUTED WATER LEVEL - JUNE 1983
- COMPUTED WATER LEVEL - LATE APRIL 1989 (1989b)
- COMPUTED WATER LEVEL - MAY 1996
- EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

FILE ... 415 ... PLOT SCALE: 1=30

FIGURE C-1d
BRISBANE RIVER FLOOD STUDY
MIKE 11 CALIBRATION PROFILE



CROSS SECTION NUMBER	BN 1420	BN 1410	BN 1400	BN 1390	BN 1380	BN 1370	BN 1360	BN 1340	BN 1330	BN 1320	BN 1310
1996 PREDICTED FLOOD LEVEL	4.570	4.430	4.380	4.350	4.320	4.270	4.170	4.080	3.980	3.950	3.850
1989b PREDICTED FLOOD LEVEL	2.320	2.290	2.270	2.240	2.240	2.220	2.190	2.560	2.150	2.110	2.100
1983 PREDICTED FLOOD LEVEL	3.800	2.940	2.910	2.899	2.860	2.830	2.760	2.780	2.640	2.410	2.580
1974 PREDICTED FLOOD LEVEL	14.690	14.590	14.460	14.320	14.380	14.450	14.270	14.120	14.010	14.030	14.030
BED LEVEL (m AHD)	-11.680	-12.450	-14.840	-15.900	-11.300	-12.690	-9.910	-8.980	-13.080	-14.460	-12.800
MIKE 11 CHAINAGE (km)	1026.170	1026.680	1026.900	1027.160	1027.600	1028.100	1028.680	1028.760	1029.200	1029.600	1030.220
AMTD CHAINAGE (km)	52.490	51.980	51.760	51.500	50.980	50.480	49.980	49.900	49.460	48.980	48.440

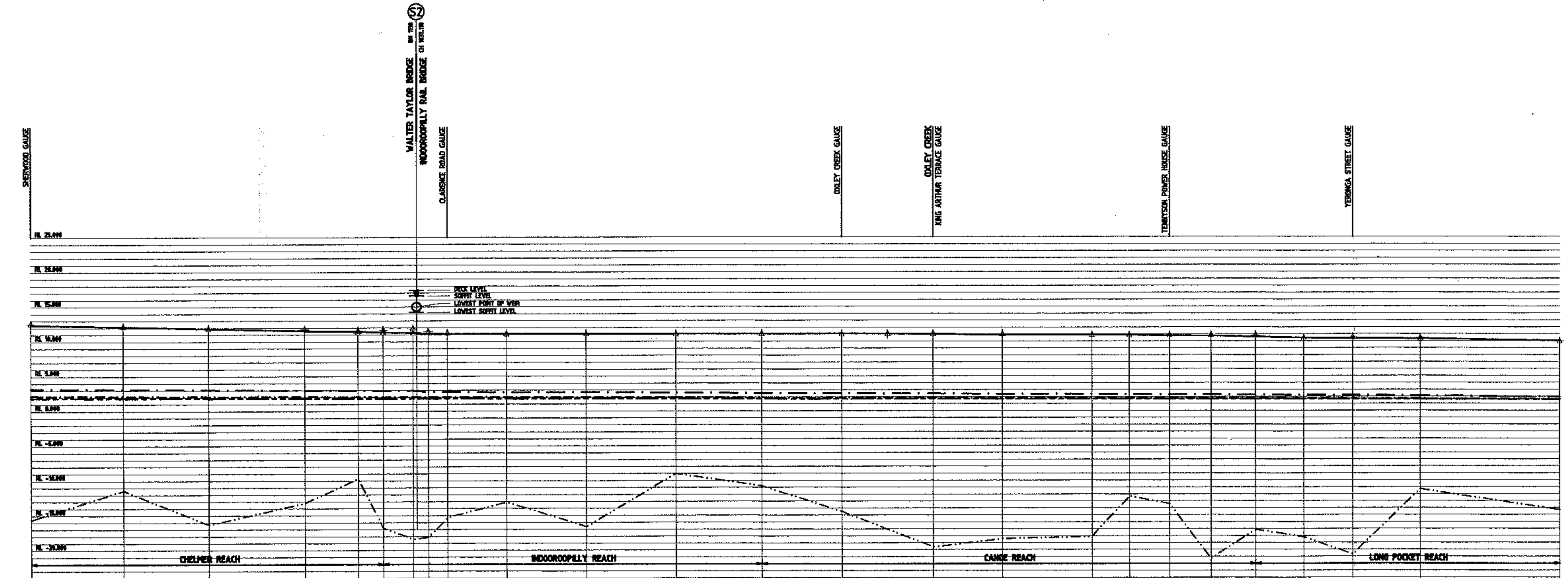
CROSS SECTION NUMBER	BN 1300	BN 1290	BN 1280	BN 1270	BN 1260	BN 1250	BN 1240	BN 1230	BN 1220	BN 1210	BN 1200
1996 PREDICTED FLOOD LEVEL	3.790	3.710	3.590	3.600	3.570	3.520	3.480	3.430	3.350	3.310	3.230
1989b PREDICTED FLOOD LEVEL	2.040	2.030	2.000	2.040	1.990	1.970	1.970	1.950	1.930	1.910	1.890
1983 PREDICTED FLOOD LEVEL	2.510	2.460	2.400	2.310	2.380	2.350	2.330	2.300	2.240	2.230	2.200
1974 PREDICTED FLOOD LEVEL	13.960	13.800	13.610	13.520	13.390	13.150	13.000	12.890	12.650	12.490	12.490
BED LEVEL (m AHD)	-9.080	-15.290	-13.980	-16.290	-13.480	-16.140	-17.800	-13.560	-13.960	-12.980	-15.600
MIKE 11 CHAINAGE (km)	1030.870	1031.260	1031.700	1031.995	1032.230	1032.515	1033.080	1033.370	1033.900	1034.370	1034.890
AMTD CHAINAGE (km)	47.990	47.480	46.960	46.665	46.430	46.145	45.580	45.290	44.760	44.290	43.770

BRISBANE RIVER - BN 1420 TO BN 1200

LEGEND

- (S3) LOCATION AND IDENTIFICATION OF STRUCTURE
- 1974 RECORDED FLOOD LEVEL
- 1983 RECORDED FLOOD LEVEL
- 1989 RECORDED FLOOD LEVEL
- 1996 RECORDED FLOOD LEVEL
- BRISBANE RIVER FLOOD LEVEL - 1974
- COMPUTED WATER LEVEL - JUNE 1983
- COMPUTED WATER LEVEL - LATE APRIL 1989 (1989b)
- COMPUTED WATER LEVEL - MAY 1996
- EXISTING BED LEVEL

FILE NAME: 415...
PLOT SCALE: 1=30

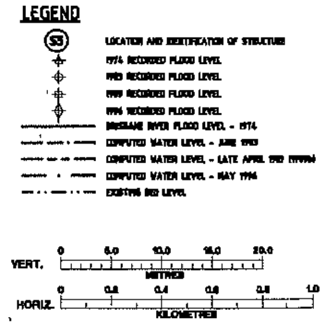


1996 PREDICTED FLOOD LEVEL	3.230	3.150	3.040	2.980	2.950	2.920	2.930	2.790
1989b PREDICTED FLOOD LEVEL	1.890	1.870	1.840	1.820	1.810	1.810	1.810	1.800
1983 PREDICTED FLOOD LEVEL	2.280	2.150	2.100	2.070	2.050	2.040	2.060	2.030
1974 PREDICTED FLOOD LEVEL	12.440	12.140	11.840	11.550	11.470	11.310	11.260	11.140
BED LEVEL (m AHD)	-15.600	-11.400	-16.300	-13.200	-9.700	-16.800	-18.400	-18.100
CROSS SECTION NUMBER	BN 1200	BN 1190	BN 1180	BN 1170	BN 1160	BN 1150	BN 1140	BN 1120
MIKE 11 CHAINAGE (km)	1034.890	1035.414	1035.900	1036.440	1036.770	1036.915	1037.09	1037.175
AMTD CHAINAGE (km)	43.770	43.244	42.760	42.200	41.890	41.745	41.570	41.485

1996 PREDICTED FLOOD LEVEL	2.770	2.730	2.720	2.630	2.540	2.490	2.460	2.400
1989b PREDICTED FLOOD LEVEL	1.790	1.780	1.780	1.750	1.730	1.710	1.710	1.690
1983 PREDICTED FLOOD LEVEL	2.010	1.990	1.990	1.940	1.900	1.870	1.860	1.830
1974 PREDICTED FLOOD LEVEL	11.110	11.100	11.120	11.160	11.100	11.110	11.030	10.880
BED LEVEL (m AHD)	-15.300	-13.100	-16.600	-9.000	-10.800	-14.580	-19.600	-18.480
CROSS SECTION NUMBER	BN 1110	BN 1100	BN 1090	BN 1080	BN 1070	BN 1060	BN 1050	BN 1040
MIKE 11 CHAINAGE (km)	1037.285	1037.625	1038.085	1038.6	1039.100	1039.565	1040.090	1040.490
AMTD CHAINAGE (km)	41.375	41.035	40.575	40.06	39.560	39.050	38.570	38.170

1996 PREDICTED FLOOD LEVEL	2.380	2.360	2.320	2.320	2.270	2.210	2.200	2.120	1.960
1989b PREDICTED FLOOD LEVEL	1.690	1.680	1.680	1.480	1.660	1.650	1.650	1.630	1.590
1983 PREDICTED FLOOD LEVEL	1.820	1.800	1.780	1.780	1.760	1.740	1.730	1.690	1.620
1974 PREDICTED FLOOD LEVEL	10.920	10.880	10.790	10.750	10.680	10.430	10.420	10.350	10.030
BED LEVEL (m AHD)	-16.100	-12.300	-13.600	-21.300	-17.100	-18.200	-20.700	-11.300	-14.300
CROSS SECTION NUMBER	BN 1030	BN 1020	BN 1010	BN 1000	BN 990	BN 980	BN 970	BN 960	BN 950
MIKE 11 CHAINAGE (km)	1041.01	1041.23	1041.46	1041.7	1041.96	1042.235	1042.505	1042.91	1043.725
AMTD CHAINAGE (km)	37.560	37.430	37.200	36.960	36.700	36.425	36.165	35.750	34.935

BRISBANE RIVER - BN 1200 TO BN 950



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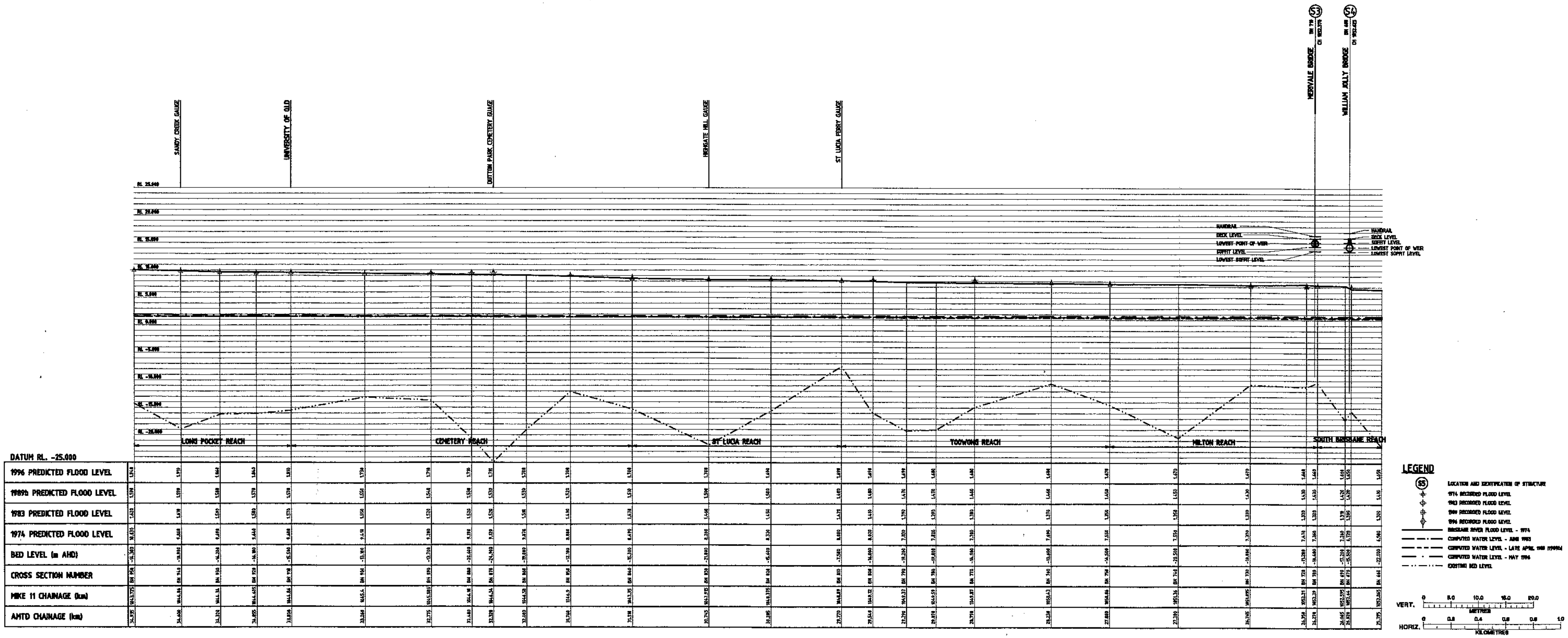
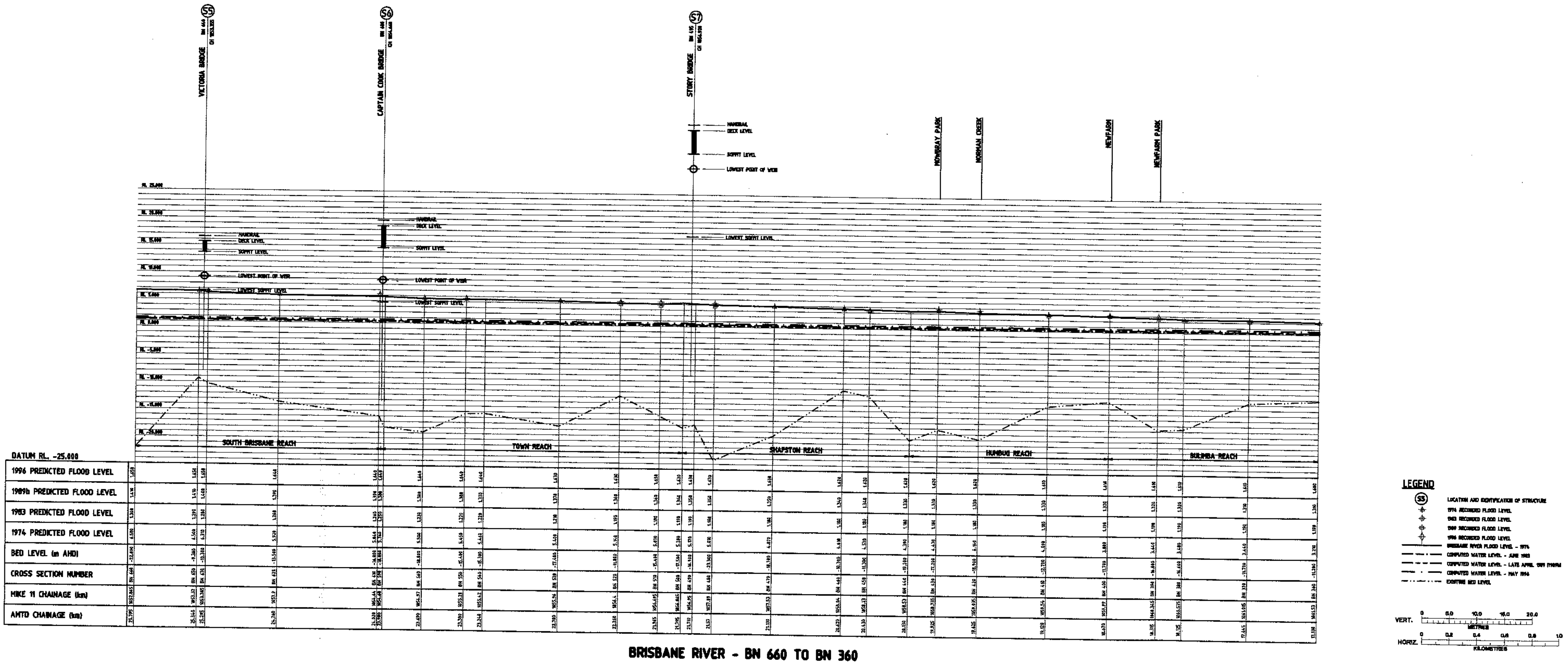
PLOT SCALE: 1=30



BRISBANE RIVER - BN 950 TO BN 660

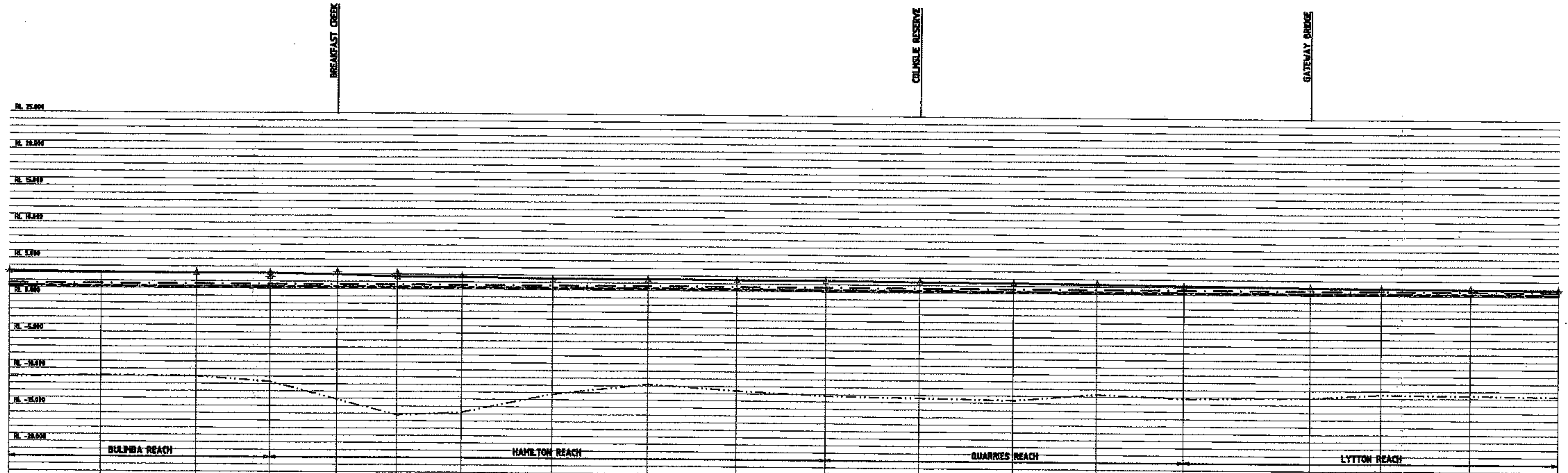
PLOT SCALE: 1=30

FIGURE C-1g
BRISBANE RIVER FLOOD STUDY
MIKE 11 CALIBRATION PROFILE



BRISBANE RIVER - BN 660 TO BN 360

PLOT SCALE: 1=30



1996 PREDICTED FLOOD LEVEL	1.600	1.600	1.600	1.590	1.590	1.590	1.590	1.580	1.580	1.580	1.580	1.570	1.570	1.570	1.570	1.560	1.560	1.560	1.550
1989b PREDICTED FLOOD LEVEL	1.310	1.300	1.300	1.300	1.290	1.290	1.290	1.280	1.280	1.280	1.270	1.270	1.270	1.260	1.260	1.250	1.250	1.250	1.240
1983 PREDICTED FLOOD LEVEL	1.190	1.190	1.190	1.190	1.190	1.190	1.180	1.180	1.180	1.170	1.170	1.170	1.160	1.160	1.160	1.160	1.160	1.150	1.150
1974 PREDICTED FLOOD LEVEL	3.210	3.130	3.060	3.080	2.960	2.490	2.650	2.530	2.550	2.550	2.520	2.450	2.410	2.310	2.190	2.030	1.960	1.900	1.840
BED LEVEL (m AHD)	-11.200	-10.900	-11.000	-11.700	-14.100	-16.200	-15.800	-13.200	-11.800	-12.400	-13.200	-13.400	-13.600	-12.700	-13.250	-13.000	-12.500	-12.600	-12.700
CROSS SECTION NUMBER	BN 360	BN 350	BN 340	BN 330	BN 320	BN 310	BN 300	BN 290	BN 280	BN 270	BN 260	BN 250	BN 240	BN 230	BN 220	BN 210	BN 200	BN 190	BN 180
MIKE 11 CHAINAGE (km)	1061.53	1062.02	1062.535	1062.94	1063.31	1063.445	1064	1064.49	1065.01	1065.505	1065.99	1066.505	1067.02	1067.485	1067.965	1068.66	1069.045	1069.535	1070.025
AMTD CHAINAGE (km)	17.130	16.644	16.125	15.720	15.350	15.015	14.460	14.170	13.650	13.157	12.670	12.155	11.640	11.175	10.695	10.000	9.615	9.125	8.635

BRISBANE RIVER - BN 360 TO BN 180

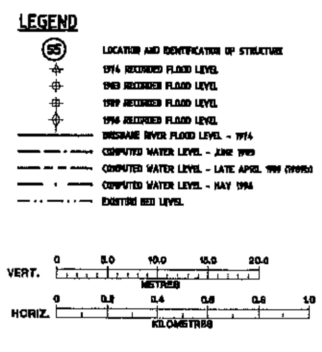
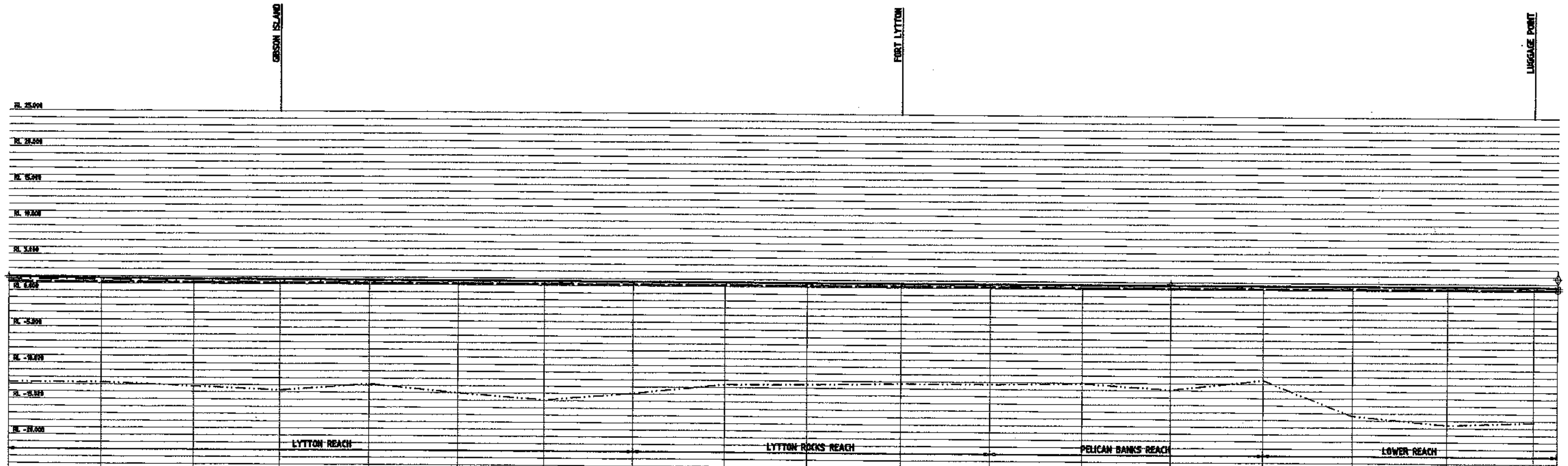


FIGURE C-1l

BRISBANE RIVER FLOOD STUDY
MIKE 11 CALIBRATION PROFILE



DATUM RL. -25.000

1996 PREDICTED FLOOD LEVEL	1.550	1.550	1.550	1.540	1.540	1.540	1.530	1.530	1.530	1.520	1.520	1.510	1.510	1.510	1.510	1.510	1.510	1.510	1.510
1989b PREDICTED FLOOD LEVEL	1.240	1.240	1.230	1.230	1.230	1.220	1.220	1.220	1.210	1.210	1.210	1.210	1.200	1.200	1.200	1.200	1.200	1.200	1.200
1983 PREDICTED FLOOD LEVEL	1.150	1.150	1.140	1.140	1.130	1.130	1.130	1.130	1.130	1.130	1.120	1.120	1.130	1.130	1.140	1.140	1.140	1.160	1.160
1974 PREDICTED FLOOD LEVEL	1.840	1.750	1.670	1.700	1.610	1.600	1.600	1.590	1.590	1.580	1.580	1.580	1.570	1.570	1.560	1.560	1.560	1.560	1.550
BED LEVEL (m AHD)	-12.700	-12.500	-13.200	-13.700	-12.800	-14.400	-14.900	-13.900	-12.400	-12.500	-12.300	-12.300	-12.100	-12.900	-11.500	-16.400	-17.400	-17.200	
CROSS SECTION NUMBER	BN 180	BN 170	BN 160	BN 150	BN 140	BN 130	BN 120	BN 110	BN 100	BN 90	BN 80	BN 70	BN 60	BN 50	BN 40	BN 30	BN 20	BN 10	
MIKE 11 CHAINAGE (km)	1070.025	1070.53	1071.04	1071.52	1072.015	1072.515	1072.995	1073.485	1074.000	1074.440	1074.985	1075.48	1076.000	1076.495	1077.01	1077.51	1078.04	1078.525	1078.66
AMTD CHAINAGE (km)	8.635	8.130	7.620	7.140	6.645	6.145	5.665	5.175	4.66	4.2	3.675	3.180	2.660	2.165	1.650	1.150	0.620	0.135	0

BRISBANE RIVER - BN 180 TO BN 10

LEGEND

- (SS) LOCATION AND IDENTIFICATION OF STRUCTURE
- 1974 RECORDED FLOOD LEVEL
- 1983 RECORDED FLOOD LEVEL
- 1989 RECORDED FLOOD LEVEL
- 1996 RECORDED FLOOD LEVEL
- BRISBANE RIVER FLOOD LEVEL - 1974
- COMPUTED WATER LEVEL - JUNE 1983
- COMPUTED WATER LEVEL - LATE APRIL 1989
- COMPUTED WATER LEVEL - MAY 1996
- EXISTING BED LEVEL

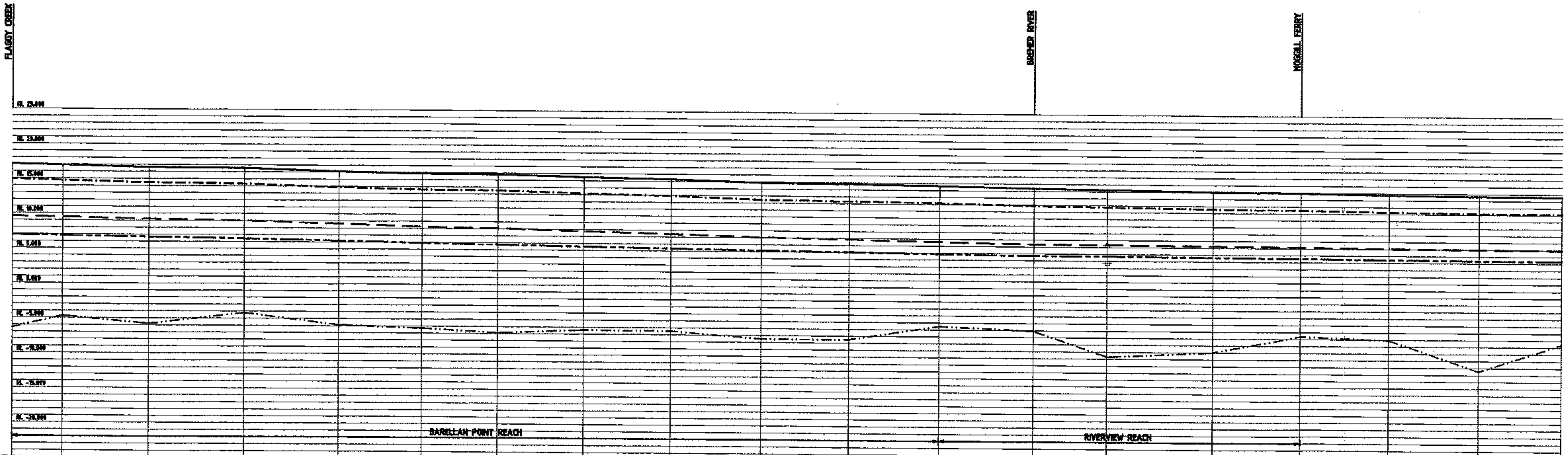
VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

PLOT SCALE: 1=30

SINCLAIR KNIGHT MERZ

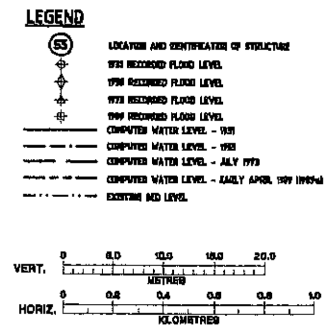
FIGURE C-2a
BRISBANE RIVER FLOOD STUDY
MIKE 11 VERIFICATION PROFILE



	BN 2020	BN 2010	BN 2000	BN 1990	BN 1980	BN 1970	BN 1960	BN 1950	BN 1940	BN 1930
1989a PREDICTED FLOOD LEVEL	6.914	6.820	6.640	6.450	6.180	5.900	5.740	5.540	5.360	5.150
1973 PREDICTED FLOOD LEVEL	9.508	9.460	9.220	9.010	8.440	8.230	8.070	7.730	7.630	7.040
1955 PREDICTED FLOOD LEVEL	14.970	14.730	14.440	14.310	13.840	13.570	13.510	13.080	12.910	12.640
1931 PREDICTED FLOOD LEVEL	17.080	16.910	16.670	16.550	16.110	15.880	15.840	15.530	15.290	14.970
BED LEVEL (m AHD)	-6.440	-4.780	-5.800	-4.200	-5.900	-6.300	-6.900	-6.440	-6.500	-7.500
CROSS SECTION NUMBER	BN 2020	BN 2010	BN 2000	BN 1990	BN 1980	BN 1970	BN 1960	BN 1950	BN 1940	BN 1930
MIKE 11 CHAINAGE (km)	1000.000	1000.285	1000.775	1001.315	1001.865	1002.358	1002.785	1003.275	1003.775	1004.300
AMTD CHAINAGE (km)	78.660	78.375	77.885	77.345	76.795	76.310	75.875	75.385	74.885	74.360

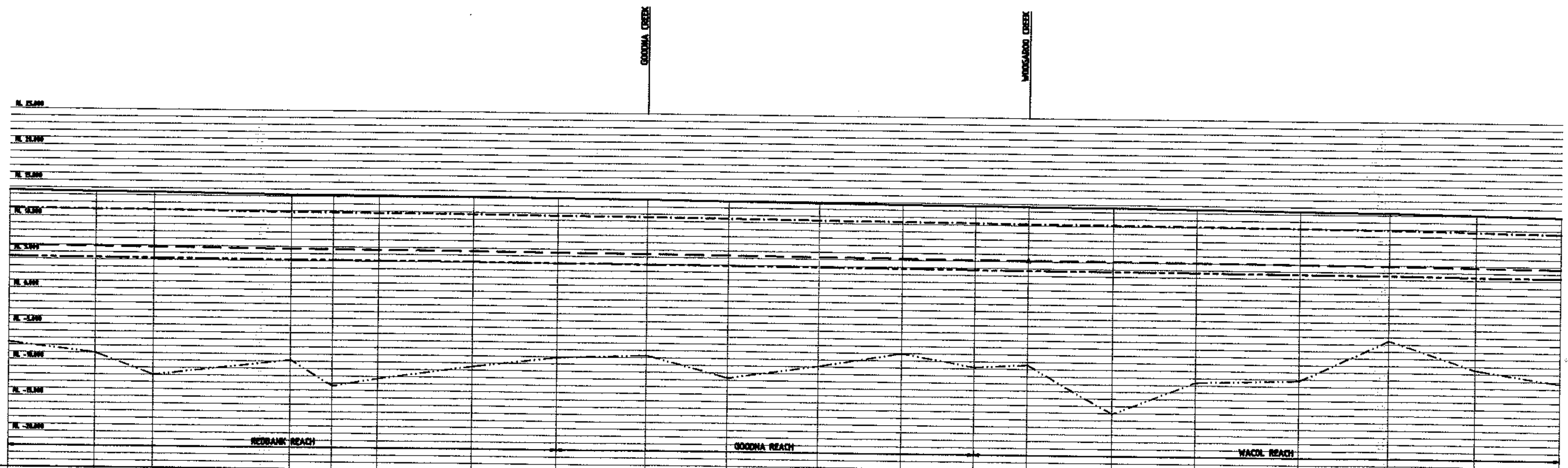
	BN 1920	BN 1910	BN 1900	BN 1890	BN 1880	BN 1870	BN 1860	BN 1850	BN 1840
1989a PREDICTED FLOOD LEVEL	5.030	4.860	4.710	4.700	4.620	4.550	4.430	4.390	4.350
1973 PREDICTED FLOOD LEVEL	6.840	6.590	6.350	6.340	6.240	6.170	6.020	5.970	5.920
1955 PREDICTED FLOOD LEVEL	12.340	12.160	11.860	11.750	11.560	11.500	11.280	11.180	11.130
1931 PREDICTED FLOOD LEVEL	14.800	14.630	14.350	14.230	14.020	13.970	13.740	13.620	13.570
BED LEVEL (m AHD)	-7.500	-5.590	-6.300	-9.700	-9.000	-6.600	-7.100	-11.500	-7.600
CROSS SECTION NUMBER	BN 1920	BN 1910	BN 1900	BN 1890	BN 1880	BN 1870	BN 1860	BN 1850	BN 1840
MIKE 11 CHAINAGE (km)	1004.810	1005.325	1005.870	1006.300	1006.910	1007.410	1007.920	1008.445	1008.925
AMTD CHAINAGE (km)	73.850	73.335	72.790	72.360	71.750	71.250	70.740	70.215	69.735

BRISBANE RIVER - BN 2020 TO BN 1840



PLOT SCALE: 1=30

FIGURE C-2b
BRISBANE RIVER FLOOD STUDY
MIKE 11 VERIFICATION PROFILE



DATUM RL. -25.000

1989a PREDICTED FLOOD LEVEL	4.350	4.290	4.260	4.160	4.150	4.120	4.080	4.030	3.970	3.930	3.880	3.820	3.760	3.720	3.720	3.670	3.630	3.550	3.440	3.380
1973 PREDICTED FLOOD LEVEL	5.920	5.840	5.810	5.660	5.640	5.620	5.560	5.500	5.430	5.370	5.300	5.230	5.160	5.110	5.110	5.040	4.990	4.880	4.750	4.660
1955 PREDICTED FLOOD LEVEL	11.130	11.040	11.030	10.810	10.810	10.740	10.720	10.640	10.580	10.500	10.410	10.350	10.280	10.230	10.190	10.100	10.030	9.910	9.730	9.540
1931 PREDICTED FLOOD LEVEL	13.570	13.480	13.450	13.310	13.220	13.160	13.110	13.080	12.910	12.940	12.810	12.750	12.640	12.640	12.580	12.480	12.440	12.200	12.090	11.900
BED LEVEL (m AHD)	-7.560	-9.480	-12.080	-9.880	-13.480	-12.340	-10.500	-9.300	-8.760	-11.700	-9.980	-8.080	-9.880	-9.480	-16.980	-11.480	-11.200	-5.500	-9.500	-11.380
CROSS SECTION NUMBER	BN 1840	BN 1830	BN 1820	BN 1810	BN 1800	BN 1790	BN 1780	BN 1770	BN 1760	BN 1750	BN 1740	BN 1730	BN 1720	BN 1710	BN 1700	BN 1690	BN 1680	BN 1670	BN 1660	BN 1650
MIKE 11 CHAINAGE (km)	1008.975	1009.480	1009.720	1010.410	1010.725	1010.980	1011.510	1011.980	1012.475	1012.935	1013.445	1013.910	1014.330	1014.610	1015.080	1015.540	1016.140	1016.640	1017.130	1017.610
AMTD CHAINAGE (km)	69.735	69.240	68.840	68.170	67.995	67.480	67.150	66.680	66.185	65.725	65.215	64.740	64.550	64.050	63.570	63.100	62.520	62.020	61.530	61.050

BRISBANE RIVER - BN 1840 TO BN 1650

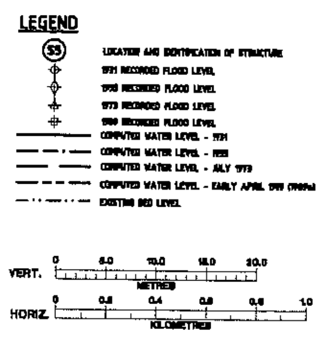
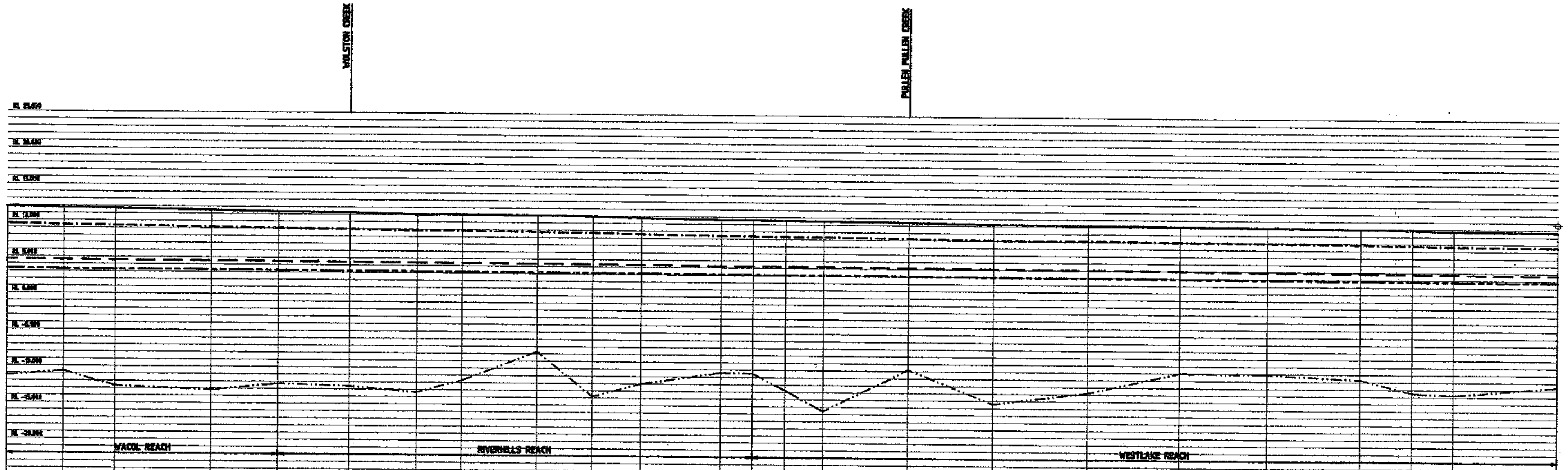


FIGURE C-2c
BRISBANE RIVER FLOOD STUDY
MIKE 11 VERIFICATION PROFILE



DATUM RL. -25.000

1989a PREDICTED FLOOD LEVEL	3.380	3.330	3.330	3.300	3.260	3.240	3.210	3.200
1973 PREDICTED FLOOD LEVEL	4.660	4.590	4.590	4.540	4.490	4.440	4.430	4.400
1955 PREDICTED FLOOD LEVEL	9.540	9.400	9.540	9.160	9.650	8.960	8.880	8.880
1931 PREDICTED FLOOD LEVEL	11.980	11.750	11.710	11.480	11.330	11.240	11.040	11.070
BED LEVEL (m AHD)	-11.300	-10.700	-12.700	-13.200	-12.300	-12.460	-13.480	-11.780
CROSS SECTION NUMBER	BN 1650	BN 1640	BN 1630	BN 1620	BN 1610	BN 1600	BN 1590	BN 1580
MIKE 11 CHAINAGE (km)	1017.610	1017.920	1018.200	1018.725	1019.095	1019.490	1019.865	1020.115
AMTD CHAINAGE (km)	61.050	60.760	60.460	59.935	59.565	59.170	58.795	58.545

1989a PREDICTED FLOOD LEVEL	3.190	3.160	3.130	3.080	3.080	3.060	3.060	3.040
1973 PREDICTED FLOOD LEVEL	4.390	4.360	4.380	4.250	4.240	4.230	4.220	4.170
1955 PREDICTED FLOOD LEVEL	8.760	8.670	8.550	8.400	8.390	8.350	8.310	8.210
1931 PREDICTED FLOOD LEVEL	11.030	10.920	10.770	10.620	10.620	10.570	10.520	10.420
BED LEVEL (m AHD)	-7.700	-13.800	-12.000	-10.610	-10.500	-12.800	-15.400	-9.800
CROSS SECTION NUMBER	BN 1570	BN 1560	BN 1550	BN 1540	BN 1530	BN 1520	BN 1510	BN 1500
MIKE 11 CHAINAGE (km)	1020.525	1020.830	1021.095	1021.539	1021.715	1021.895	1022.105	1022.575
AMTD CHAINAGE (km)	58.135	57.830	57.565	57.121	56.945	56.765	56.555	56.085

1989a PREDICTED FLOOD LEVEL	2.990	2.970	2.930	2.870	2.840	2.800	2.770	2.750
1973 PREDICTED FLOOD LEVEL	4.100	4.060	4.000	3.920	3.870	3.810	3.740	3.730
1955 PREDICTED FLOOD LEVEL	8.070	8.050	7.980	7.900	7.820	7.730	7.630	7.570
1931 PREDICTED FLOOD LEVEL	10.210	10.100	10.130	10.060	9.970	9.860	9.740	9.670
BED LEVEL (m AHD)	-16.400	-12.800	-10.080	-10.100	-10.700	-17.500	-17.800	-11.600
CROSS SECTION NUMBER	BN 1490	BN 1480	BN 1470	BN 1460	BN 1450	BN 1440	BN 1430	BN 1420
MIKE 11 CHAINAGE (km)	1023.040	1023.570	1024.080	1024.563	1025.070	1025.360	1025.590	1026.170
AMTD CHAINAGE (km)	55.620	55.090	54.580	54.097	53.590	53.300	53.070	52.490

BRISBANE RIVER - BN 1650 TO BN 1420

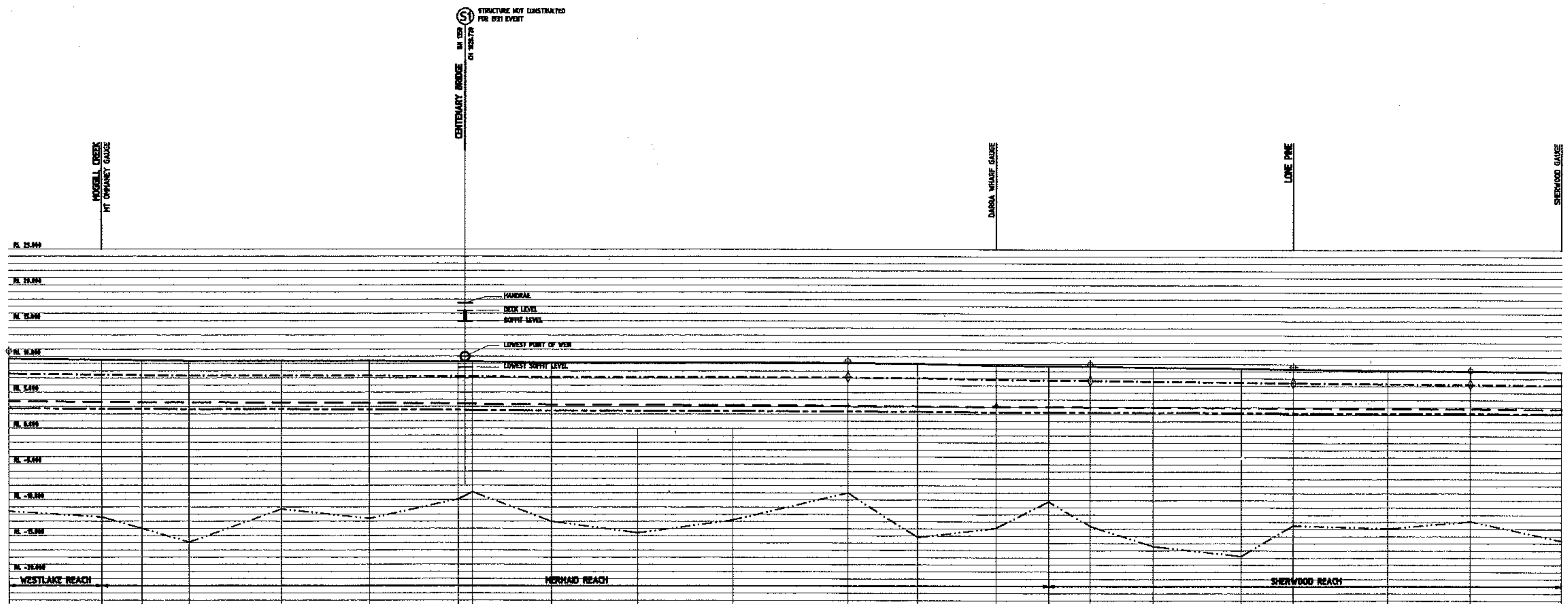
LEGEND

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

FIL E: 41 … PLOT SCALE: 1=30

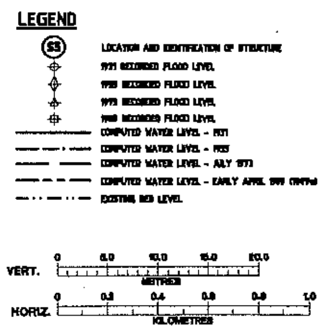
FIGURE C-2d
BRISBANE RIVER FLOOD STUDY
MIKE 11 VERIFICATION PROFILE



DATUM RL. -25.000

1989a PREDICTED FLOOD LEVEL	2.754	2.708	2.684	2.460	2.440	2.410	2.558	2.538	2.480	2.440	2.410	2.344	2.320	2.270	2.260	2.250	2.238	2.210	2.190	2.150	2.130	2.180
1973 PREDICTED FLOOD LEVEL	3.738	3.460	3.420	3.400	3.540	3.520	3.444	3.378	3.308	3.270	3.220	3.150	3.080	3.008	3.008	2.980	2.944	2.920	2.880	2.820	2.780	2.730
1955 PREDICTED FLOOD LEVEL	7.570	7.440	7.398	7.330	7.310	7.300	7.228	7.228	7.138	7.138	7.138	7.080	7.060	6.800	6.760	6.700	6.570	6.440	6.480	6.270	6.190	6.180
1931 PREDICTED FLOOD LEVEL	9.670	9.550	9.444	9.380	9.380	9.380	9.276	9.276	9.178	9.178	9.180	9.120	9.020	8.710	8.750	8.680	8.520	8.390	8.310	8.160	8.050	7.950
BED LEVEL (m AHD)	-11.600	-12.400	-14.080	-15.900	-11.380	-12.600	-9.980	-8.980	-13.800	-14.400	-12.880	-5.880	-15.240	-13.980	-10.280	-13.600	-16.480	-17.880	-13.500	-13.940	-12.980	-15.680
CROSS SECTION NUMBER	BN 1420	BN 1410	BN 1400	BN 1390	BN 1380	BN 1370	BN 1360	BN 1350	BN 1330	BN 1320	BN 1310	BN 1300	BN 1290	BN 1280	BN 1270	BN 1260	BN 1250	BN 1240	BN 1230	BN 1220	BN 1210	BN 1200
MIKE 11 CHAINAGE (km)	1026.170	1026.680	1026.908	1027.160	1027.400	1028.180	1028.480	1028.740	1029.200	1029.680	1030.220	1030.870	1031.240	1031.780	1031.995	1032.230	1032.585	1033.080	1033.370	1033.980	1034.370	1034.890
AMTD CHAINAGE (km)	52.690	51.900	51.760	51.500	50.980	50.480	49.980	49.900	49.440	48.980	48.440	47.790	47.480	46.960	46.665	46.630	46.075	45.580	45.290	44.760	44.290	43.770

BRISBANE RIVER - BN 1420 TO BN 1200

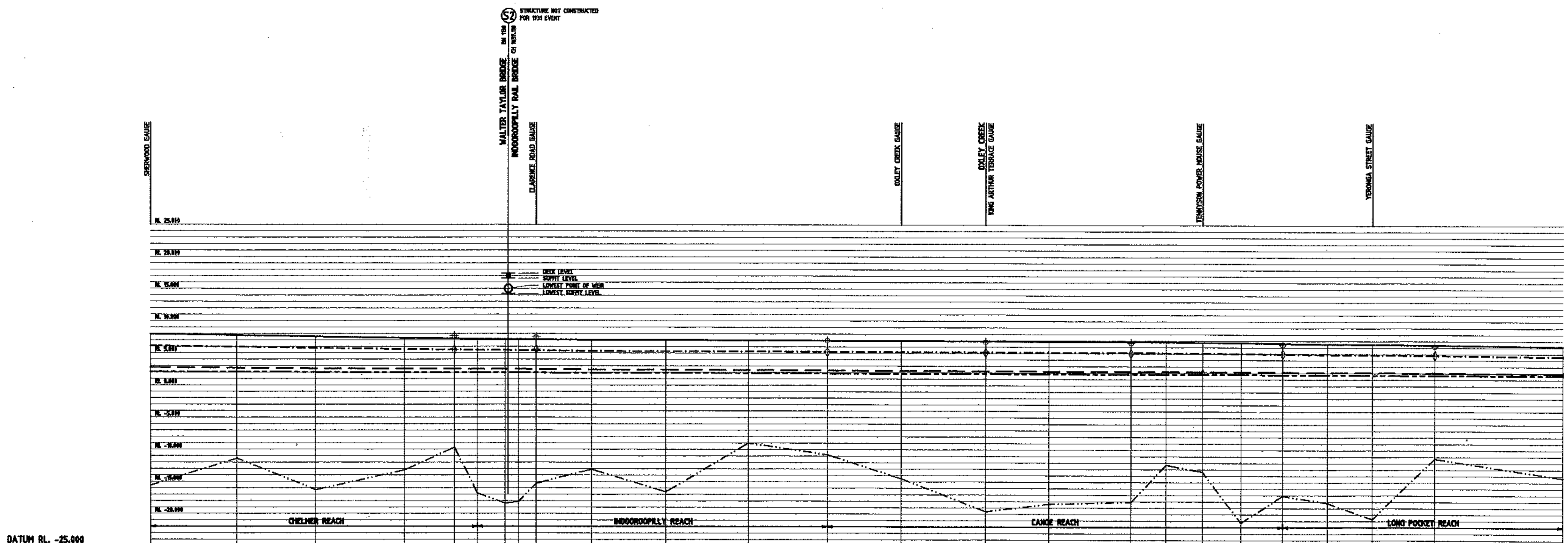


SINCLAIR KNIGHT MERZ

FIGURE C-2e

BRISBANE RIVER FLOOD STUDY

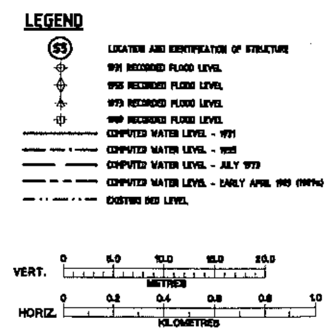
MIKE 11 VERIFICATION PROFILE



DATUM RL. -25.000													
1989a PREDICTED FLOOD LEVEL	2.900	2.860	2.820	1.990	1.970	1.960	1.960	1.950	1.940	1.920	1.920	1.880	1.840
1973 PREDICTED FLOOD LEVEL	2.730	2.670	2.600	2.550	2.530	2.510	2.510	2.490	2.470	2.440	2.430	2.370	2.310
1955 PREDICTED FLOOD LEVEL	6.180	5.950	5.770	5.590	5.520	5.450	5.440	5.440	5.350	5.320	5.300	5.250	5.220
1931 PREDICTED FLOOD LEVEL	7.950	7.780	7.550	7.330	7.260	7.160	7.140	7.130	7.090	7.050	7.020	6.990	6.950
BED LEVEL (m AHD)	-15.600	-11.600	-16.300	-13.200	-9.700	-16.800	-18.400	-18.100	-15.300	-13.100	-16.400	-9.600	-10.800
CROSS SECTION NUMBER	BN 1200	BN 1190	BN 1180	BN 1170	BN 1160	BN 1150	BN 1140	BN 1120	BN 1110	BN 1100	BN 1090	BN 1080	BN 1070
MIKE 11 CHAINAGE (km)	1034.898	1035.416	1035.908	1036.440	1036.770	1036.975	1037.090	1037.175	1037.285	1037.625	1038.085	1038.600	1039.100
AMTD CHAINAGE (km)	43.770	43.264	42.760	42.200	41.890	41.745	41.570	41.485	41.375	41.035	40.575	40.060	39.560

1989a PREDICTED FLOOD LEVEL	1.820	1.810	1.790	1.780	1.770	1.750	1.740	1.740	1.720	1.710	1.680	1.670
1973 PREDICTED FLOOD LEVEL	2.270	2.250	2.240	2.200	2.190	2.170	2.170	2.130	2.100	2.090	2.040	1.930
1955 PREDICTED FLOOD LEVEL	5.210	5.200	5.130	5.160	5.100	5.060	5.040	4.960	4.890	4.870	4.780	4.510
1931 PREDICTED FLOOD LEVEL	6.910	6.920	6.830	6.840	6.800	6.750	6.730	6.620	6.520	6.500	6.410	6.170
BED LEVEL (m AHD)	-14.500	-19.610	-18.640	-18.100	-17.300	-13.400	-21.300	-17.100	-18.200	-20.700	-11.300	-14.300
CROSS SECTION NUMBER	BN 1060	BN 1050	BN 1040	BN 1030	BN 1020	BN 1010	BN 1000	BN 990	BN 980	BN 970	BN 960	BN 950
MIKE 11 CHAINAGE (km)	1039.565	1040.090	1040.490	1041.010	1041.230	1041.460	1041.700	1041.960	1042.235	1042.515	1042.910	1043.725
AMTD CHAINAGE (km)	39.050	38.570	38.170	37.560	37.430	37.200	36.960	36.700	36.425	36.145	35.750	34.935

BRISBANE RIVER - BN 1200 TO BN 950

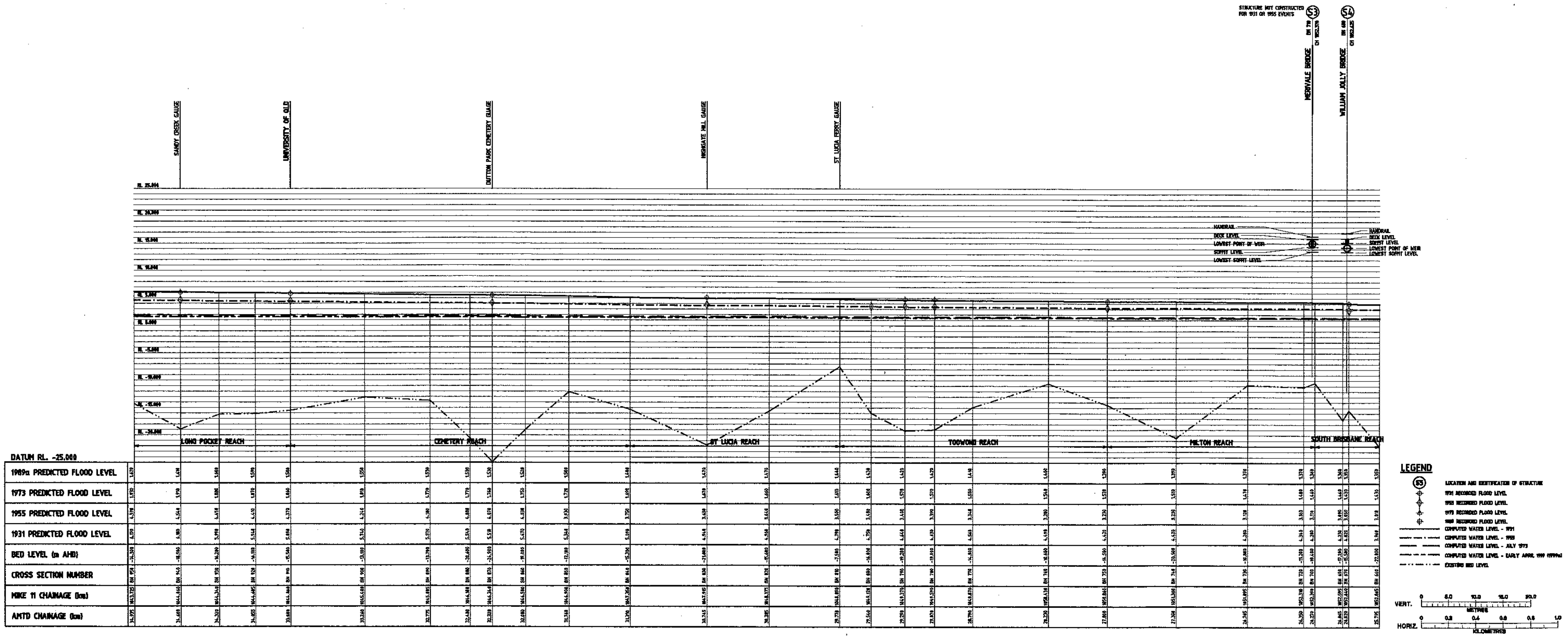


FILE NAME: 4157-340 PLOT SCALE: 1=30 DISK N°: C:\DWG JOB N°: T00457 DATE: 23/3/97

BCC.121.0194

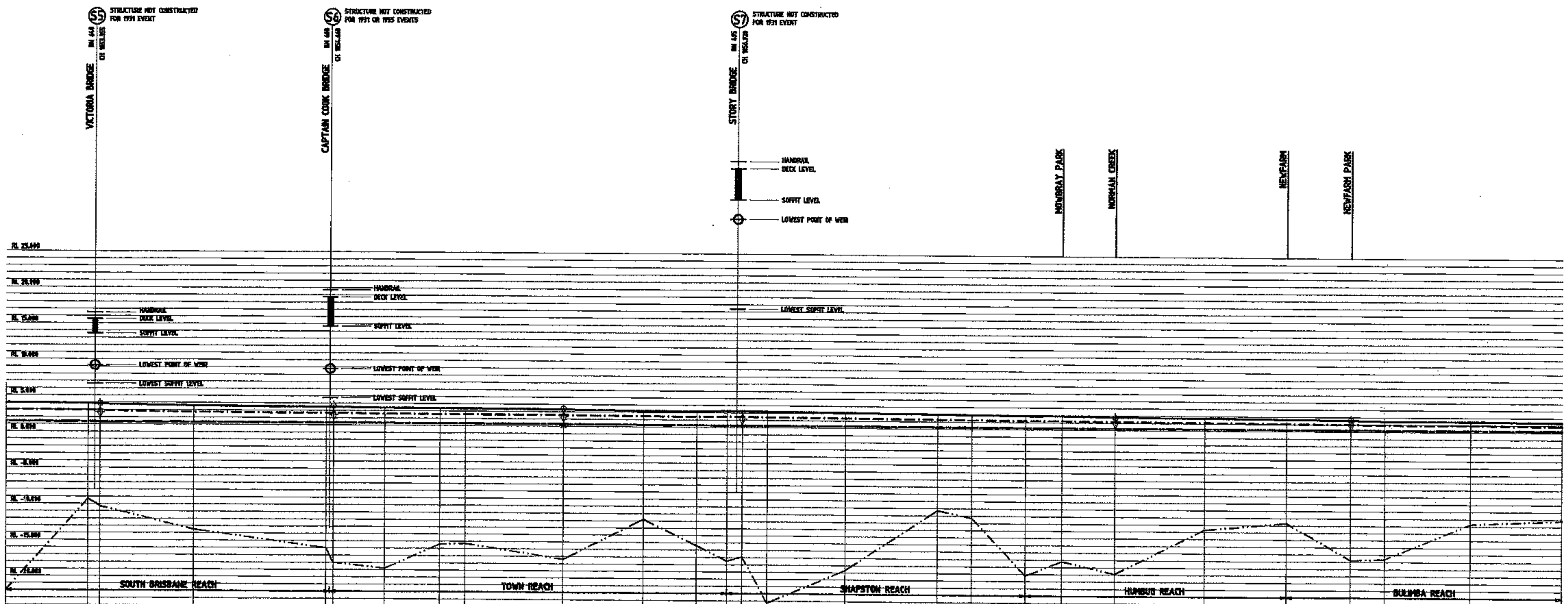
FIGURE C-2f

BRISBANE RIVER FLOOD STUDY
MIKE 11 VERIFICATION PROFILE



BRISBANE RIVER - BN 950 TO BN 660

FIGURE C-2g
BRISBANE RIVER FLOOD STUDY
MIKE 11 VERIFICATION PROFILE



DATUM RL. -25.000

1989a PREDICTED FLOOD LEVEL	1.350	1.350	1.330	1.320	1.320	1.310	1.300	1.300	1.300
1973 PREDICTED FLOOD LEVEL	1.438	1.428	1.390	1.370	1.370	1.340	1.330	1.320	1.320
1955 PREDICTED FLOOD LEVEL	3.030	2.970	2.940	2.720	2.640	2.640	2.590	2.570	2.570
1931 PREDICTED FLOOD LEVEL	3.960	3.910	3.840	3.590	3.520	3.520	3.400	3.370	3.320
BED LEVEL (m AHD)	-22.000	-9.360	-10.300	-13.510	-16.000	-18.000	-18.880	-15.450	-15.300
CROSS SECTION NUMBER	BN 660	BN 650	BN 630	BN 620	BN 610	BN 590	BN 560	BN 550	BN 540
MIKE 11 CHAINAGE (km)	1052.865	1053.320	1053.365	1053.900	1054.640	1054.680	1054.970	1055.280	1055.420
AMTD CHAINAGE (km)	25.795	25.340	25.295	24.760	24.020	23.980	23.690	23.380	23.240

1989a PREDICTED FLOOD LEVEL	1.290	1.280	1.280	1.280	1.280	1.270	1.260	1.250	1.250
1973 PREDICTED FLOOD LEVEL	1.310	1.280	1.270	1.280	1.270	1.260	1.250	1.220	1.210
1955 PREDICTED FLOOD LEVEL	2.540	2.460	2.430	2.190	2.440	2.410	2.370	2.280	2.250
1931 PREDICTED FLOOD LEVEL	3.330	3.200	3.160	3.260	3.260	3.190	3.130	2.990	2.950
BED LEVEL (m AHD)	-17.400	-11.800	-15.400	-17.500	-16.900	-23.300	-18.700	-10.300	-11.380
CROSS SECTION NUMBER	BN 530	BN 520	BN 510	BN 500	BN 490	BN 480	BN 470	BN 460	BN 450
MIKE 11 CHAINAGE (km)	1055.960	1056.400	1056.695	1056.865	1056.950	1057.090	1057.530	1058.040	1058.230
AMTD CHAINAGE (km)	22.700	22.260	21.965	21.795	21.710	21.570	21.130	20.620	20.430

1989a PREDICTED FLOOD LEVEL	1.240	1.240	1.230	1.220	1.220	1.210	1.210	1.200	1.200
1973 PREDICTED FLOOD LEVEL	1.210	1.210	1.210	1.210	1.210	1.200	1.210	1.210	1.210
1955 PREDICTED FLOOD LEVEL	2.210	2.220	2.160	2.110	2.040	1.980	1.940	1.920	1.860
1931 PREDICTED FLOOD LEVEL	2.890	2.980	2.780	2.750	2.650	2.550	2.480	2.450	2.340
BED LEVEL (m AHD)	-19.200	-17.200	-18.900	-12.700	-11.700	-16.800	-14.600	-11.700	-11.200
CROSS SECTION NUMBER	BN 440	BN 430	BN 420	BN 410	BN 400	BN 390	BN 380	BN 370	BN 360
MIKE 11 CHAINAGE (km)	1058.530	1058.735	1059.035	1059.540	1059.990	1060.345	1060.535	1061.015	1061.530
AMTD CHAINAGE (km)	20.130	19.925	19.625	19.120	18.670	18.315	18.125	17.645	17.130

BRISBANE RIVER - BN 660 TO BN 360

LEGEND
- (S5) LOCATION AND IDENTIFICATION OF STRUCTURE
- 1931 RECORDED FLOOD LEVEL
- 1955 RECORDED FLOOD LEVEL
- 1973 RECORDED FLOOD LEVEL
- 1989 RECORDED FLOOD LEVEL
- COMPUTED WATER LEVEL - 1931
- COMPUTED WATER LEVEL - 1955
- COMPUTED WATER LEVEL - JULY 1973
- COMPUTED WATER LEVEL - EARLY APRIL 1989 (1989a)
- EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

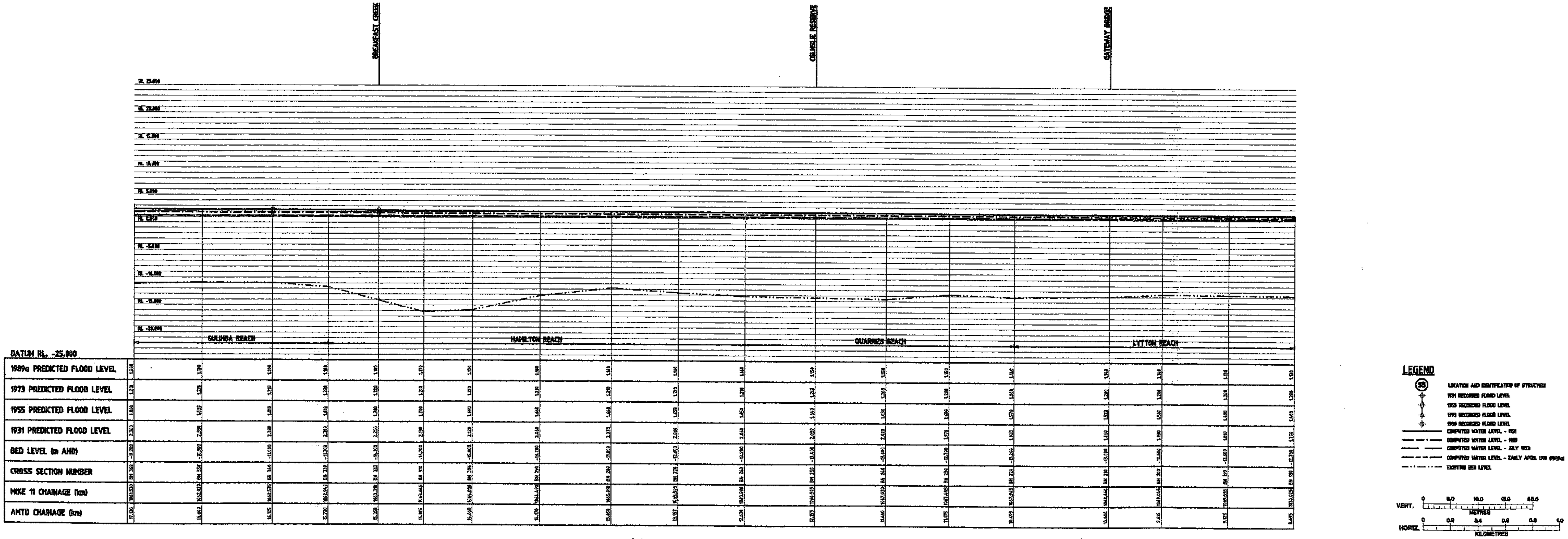
PLOT SCALE: 1=30

SINCLAIR KNIGHT MERZ

FIGURE C-2h

BRISBANE RIVER FLOOD STUDY

MIKE 11 VERIFICATION PROFILE

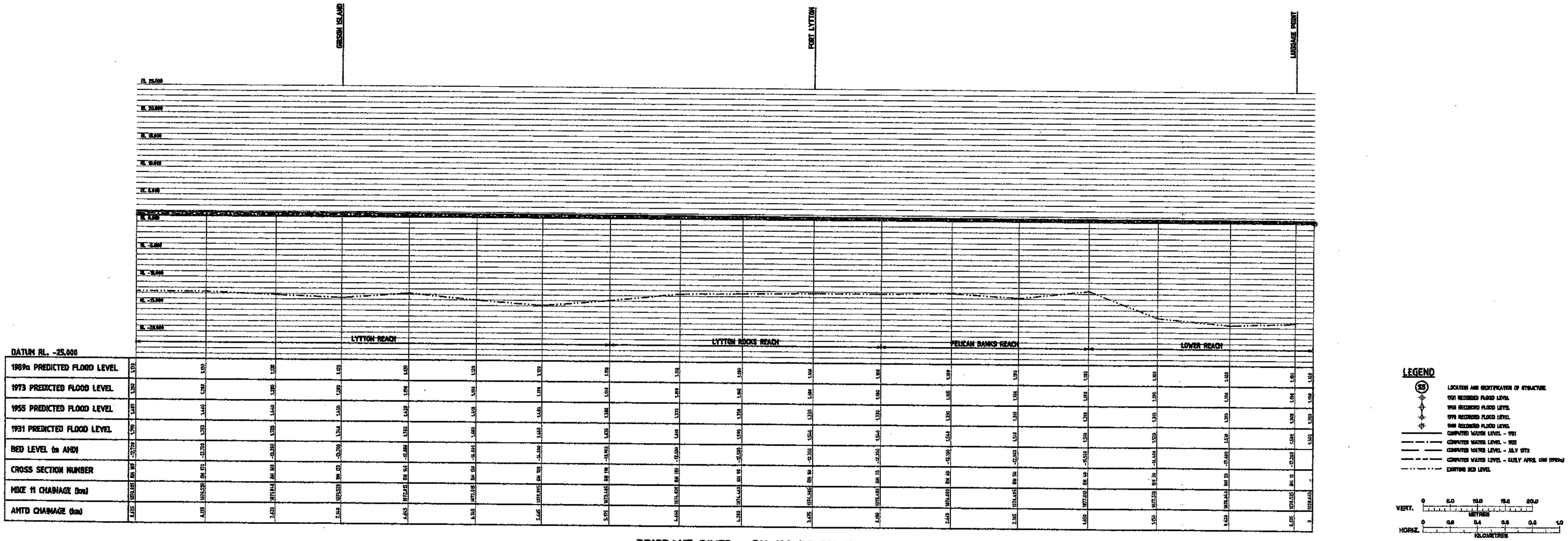


BRISBANE RIVER - BN 360 TO BN 180

FILE NAME: 415/-11/ PLOT SCALE: 1=30 DISK N: C:\DWG JOB N: T00415/ DATE: 23/3/97

FIGURE C-2i

BRISBANE RIVER FLOOD STUDY
MIKE 11 VERIFICATION PROFILE



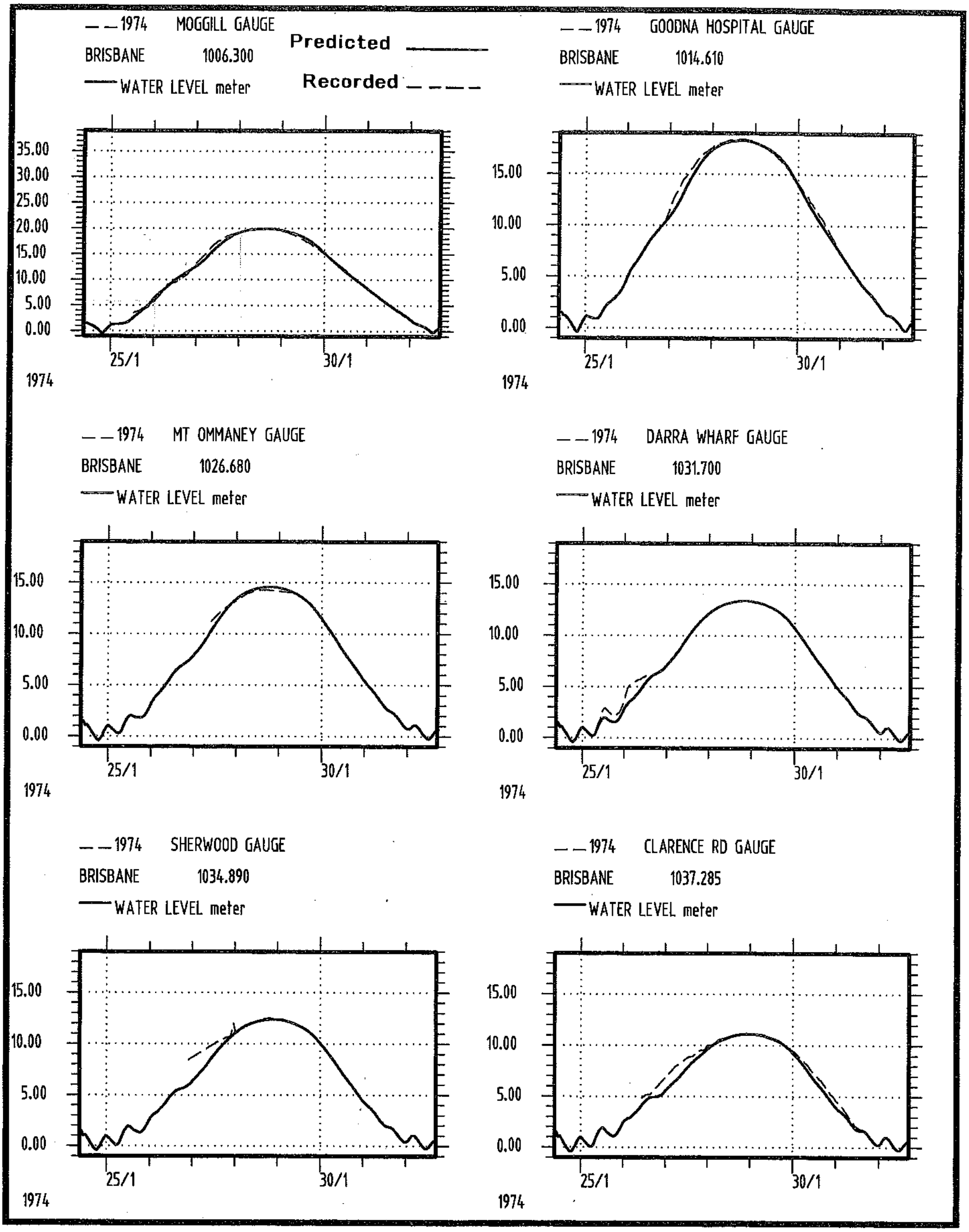
BRISBANE RIVER - BN 180 TO BN 10

PLOT SCALE: 1=30

FIGURE C-3a

BRISBANE RIVER FLOOD STUDY
PREDICTED AND RECORDED HYDROGRAPH
COMPARISON - JANUARY 1974

SINCLAIR KNIGHT MERZ

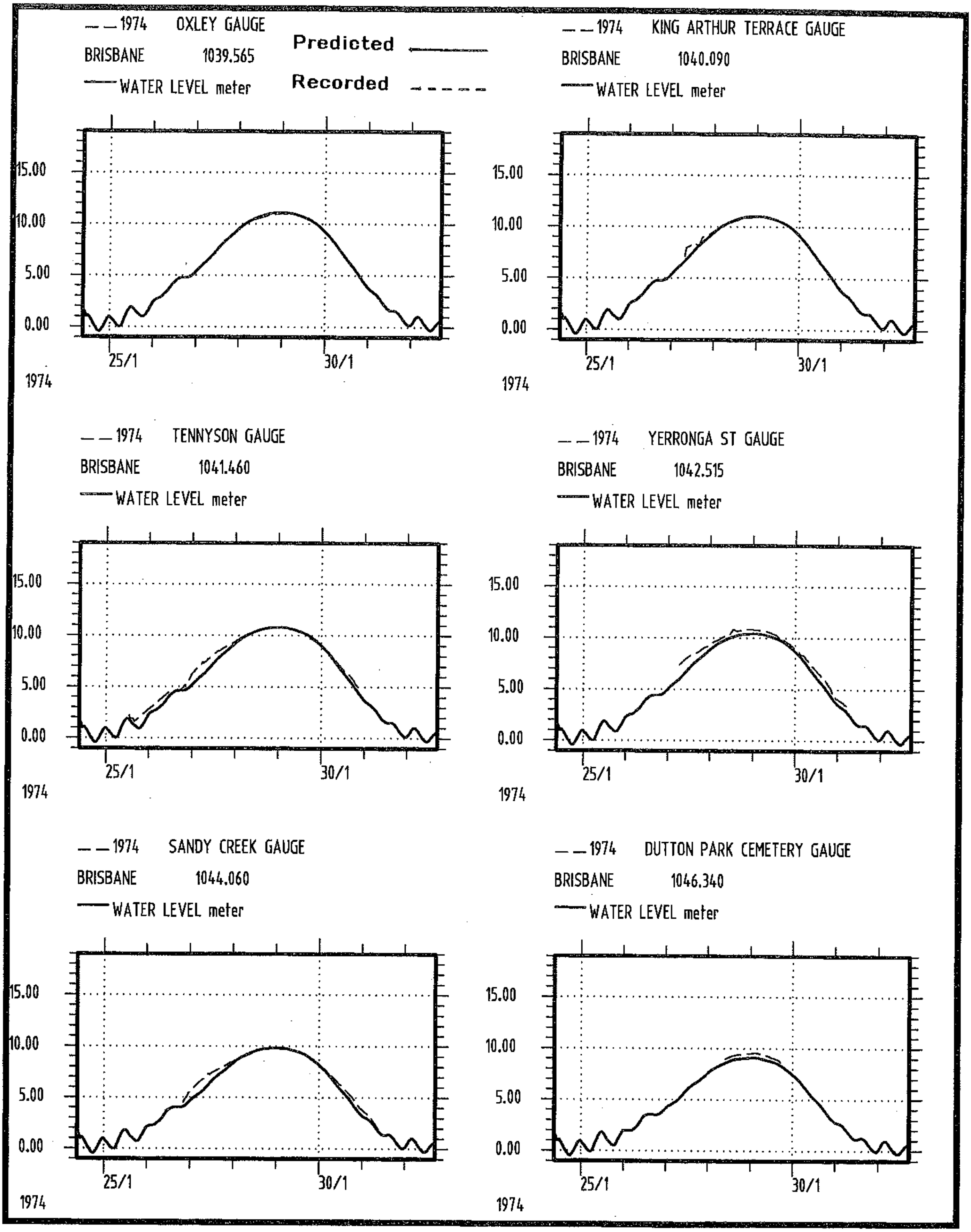


FILE NAME: 4157-240 DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98

SINCLAIR KNIGHT MERZ

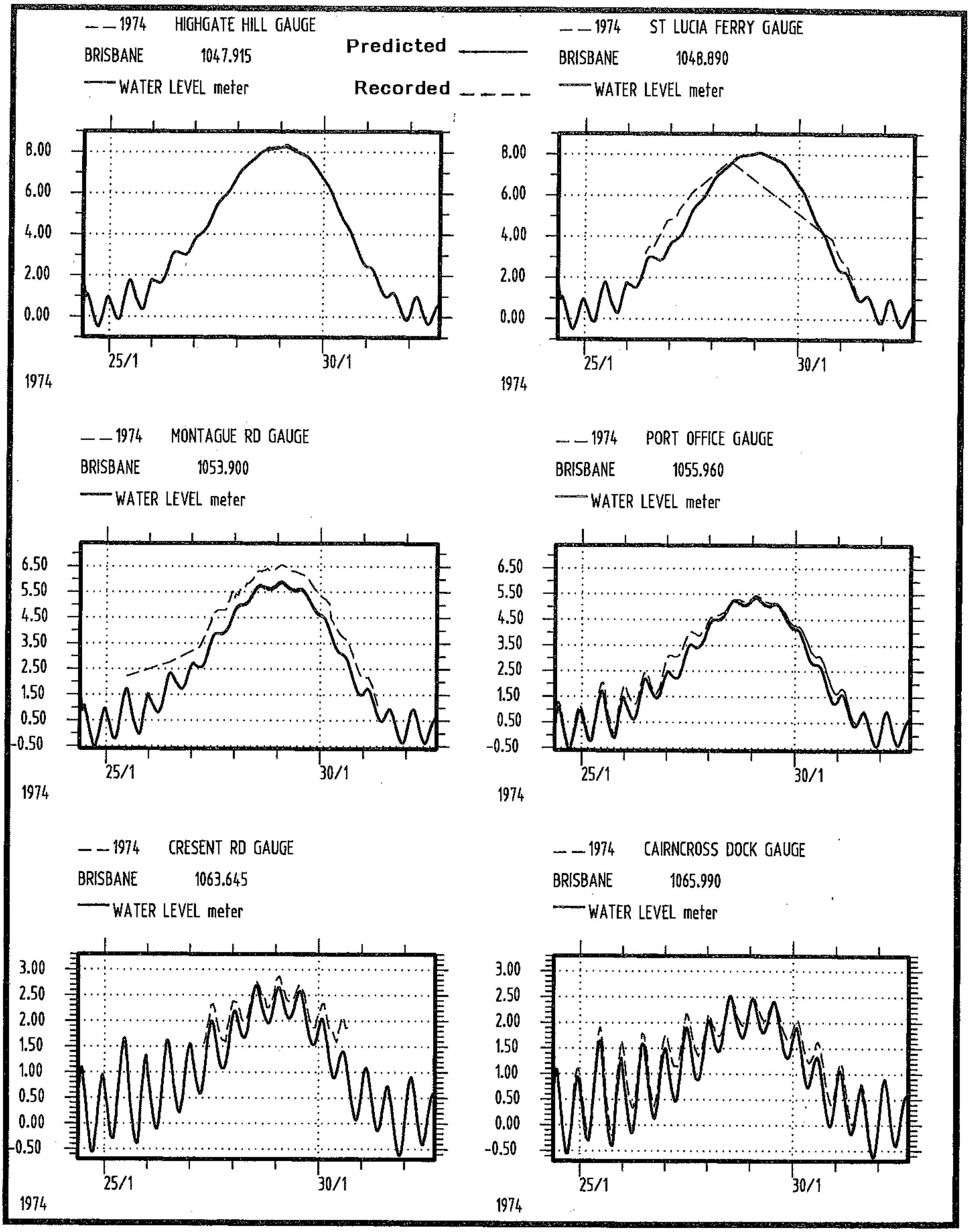
FIGURE C-3b

BRISBANE RIVER FLOOD STUDY
PREDICTED AND RECORDED HYDROGRAPH
COMPARISON - JANUARY 1974



FILE NAME: 4157-241 DISK Nº: G:\ JOB Nº: T004157 DATE: 17-2-98
PL... SCALE: 1...

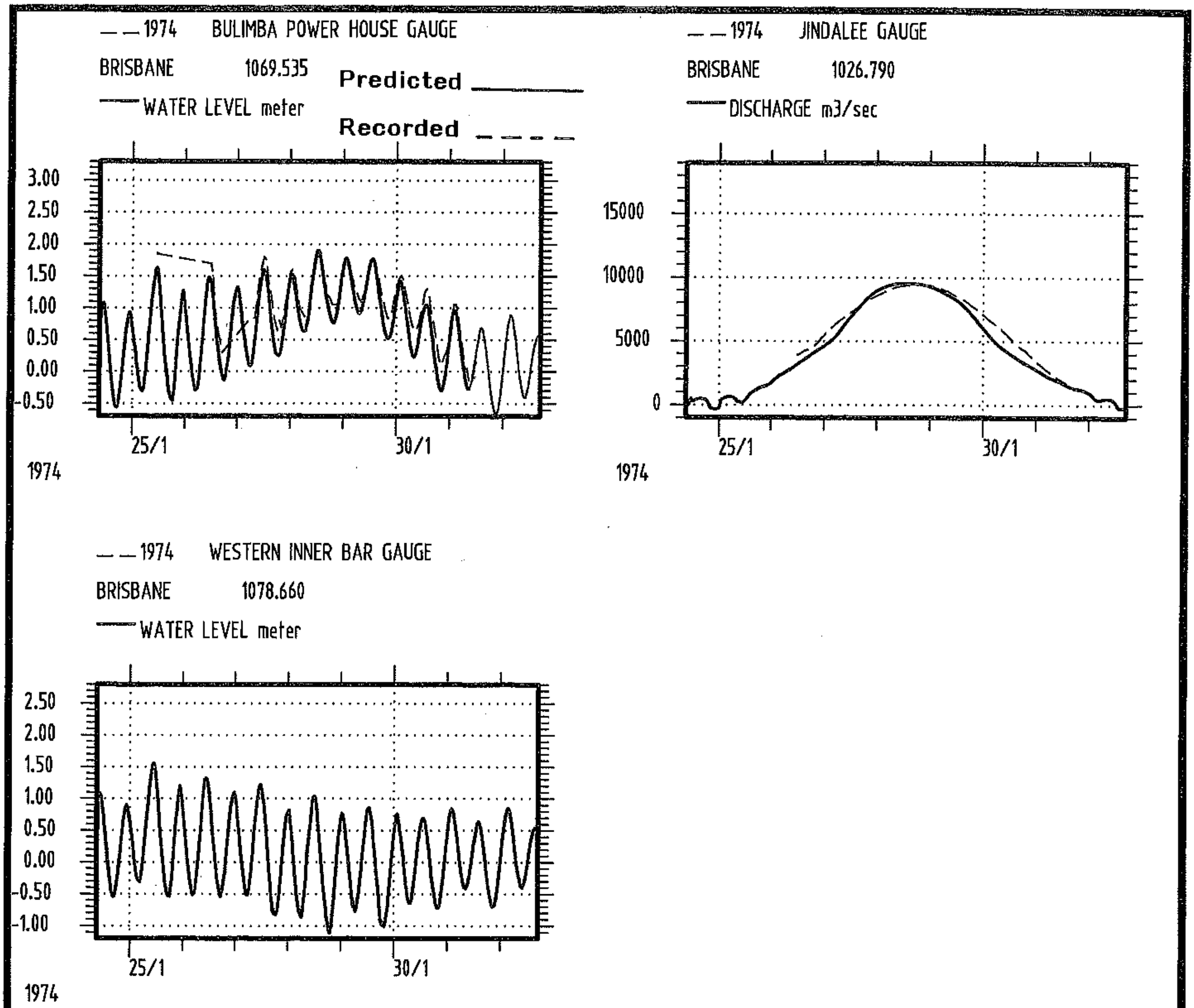
FIGURE C-3c
BRISBANE RIVER FLOOD STUDY PREDICTED AND RECORDED HYDROGRAPH COMPARISON - JANUARY 1974



FILE NAME: 4157-242 DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98
PLOT SCALE: 1...

FIGURE C-3d

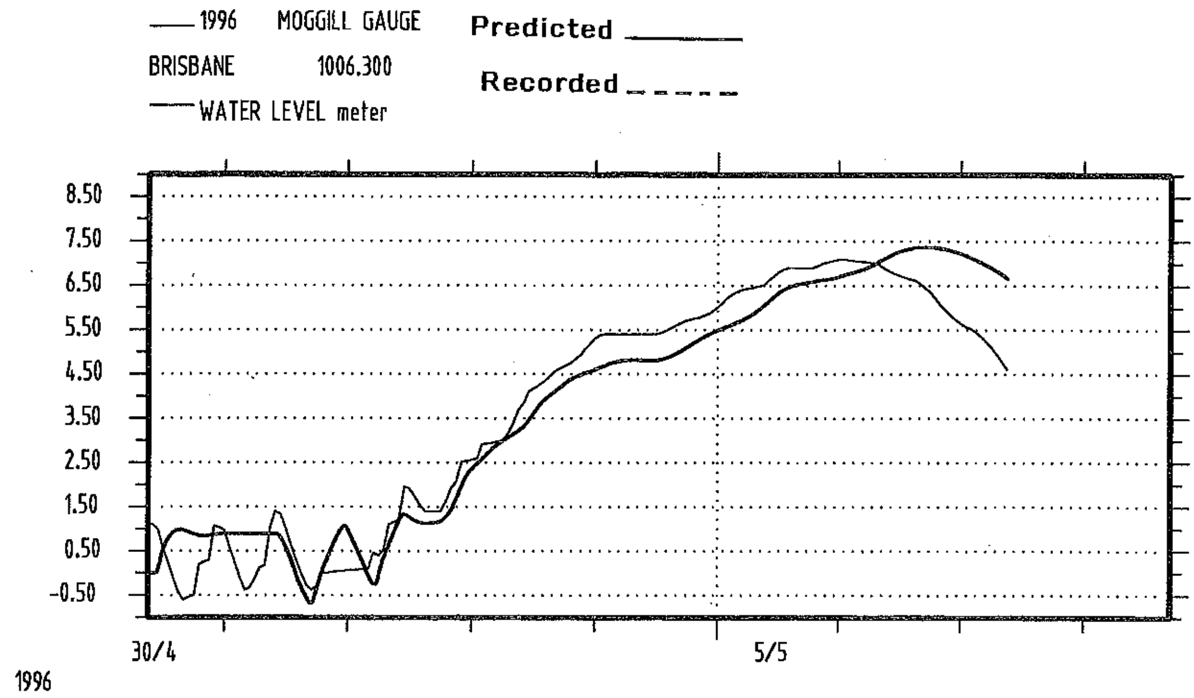
BRISBANE RIVER FLOOD STUDY PREDICTED AND RECORDED HYDROGRAPH COMPARISON - JANUARY 1974

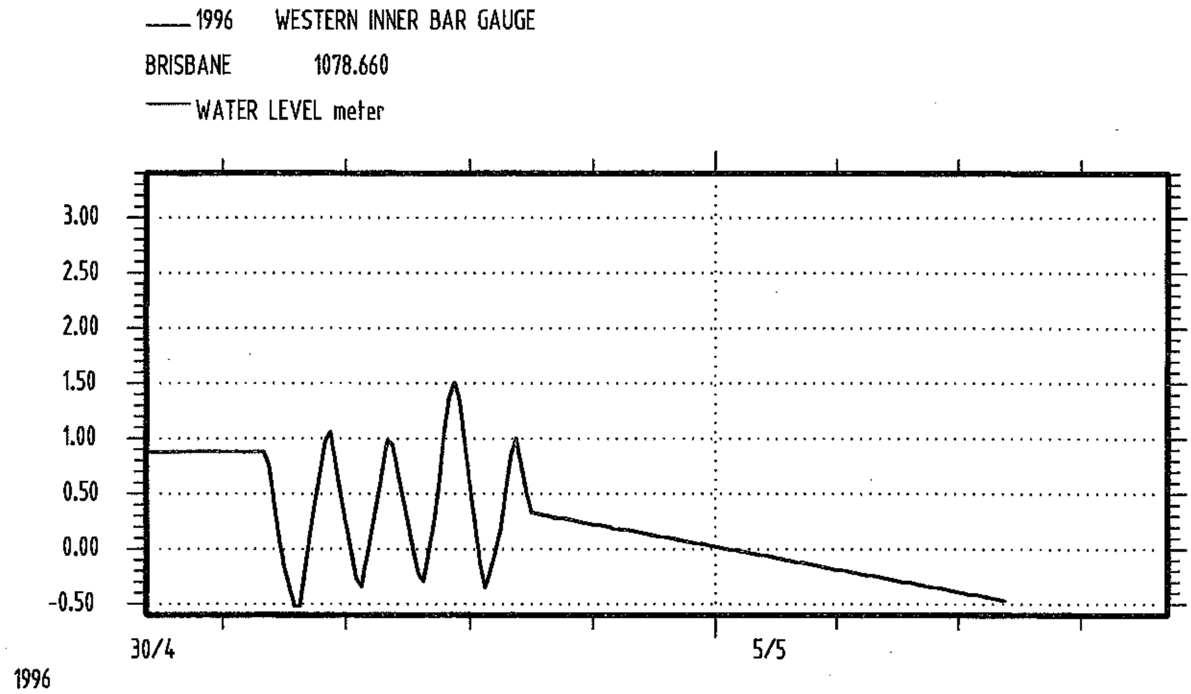


FILE NAME: 4157-243 DISK N°: G:\ JOB N°: T00457 DATE: 17-2-98
PLOT SCALE: 1-1

FIGURE C-4

BRISBANE RIVER FLOOD STUDY
PREDICTED AND RECORDED HYDROGRAPH
COMPARISON - MAY 1996

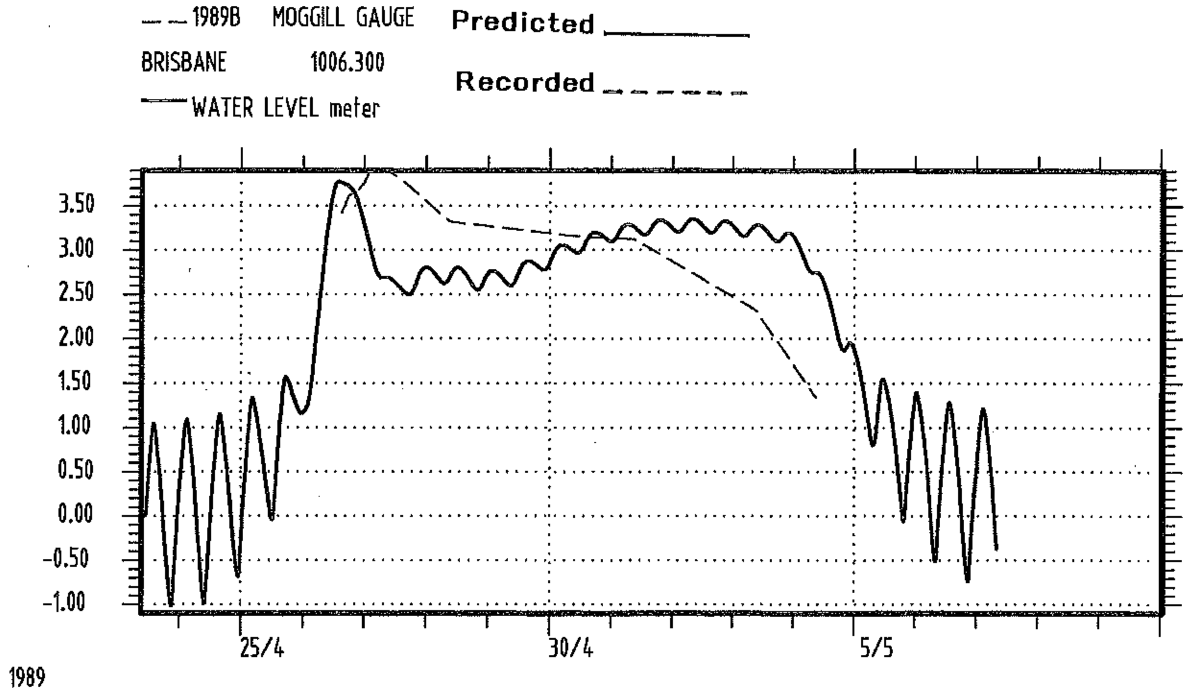




FILE NAME: 415? ... PLOT SCALE: 1=1

SINCLAIR KNIGHT MERZ

FIGURE C-5
BRISBANE RIVER FLOOD STUDY
PREDICTED AND RECORDED HYDROGRAPH
COMPARISON - LATE APRIL 1989



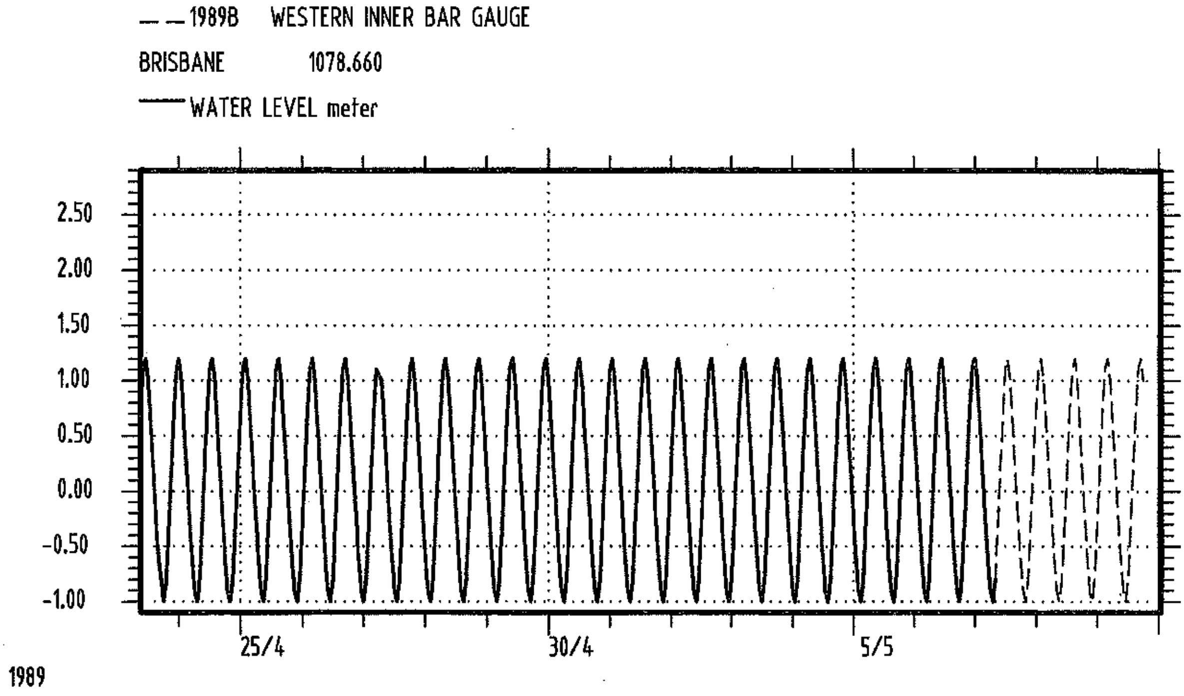
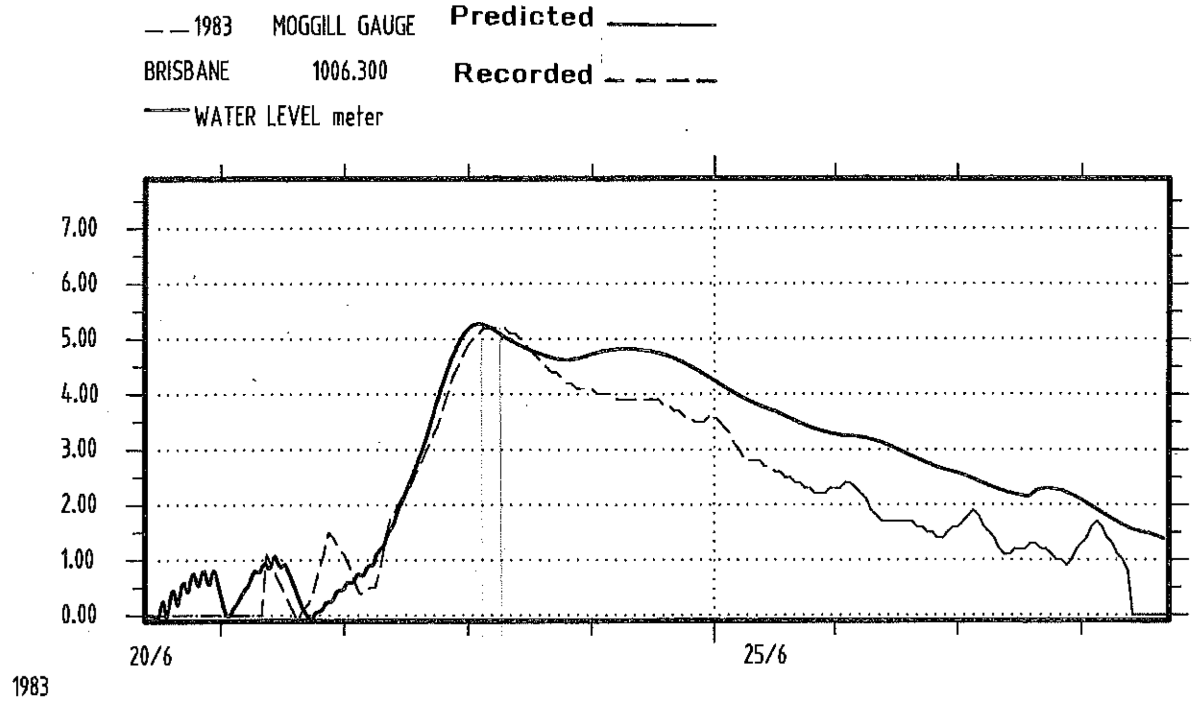
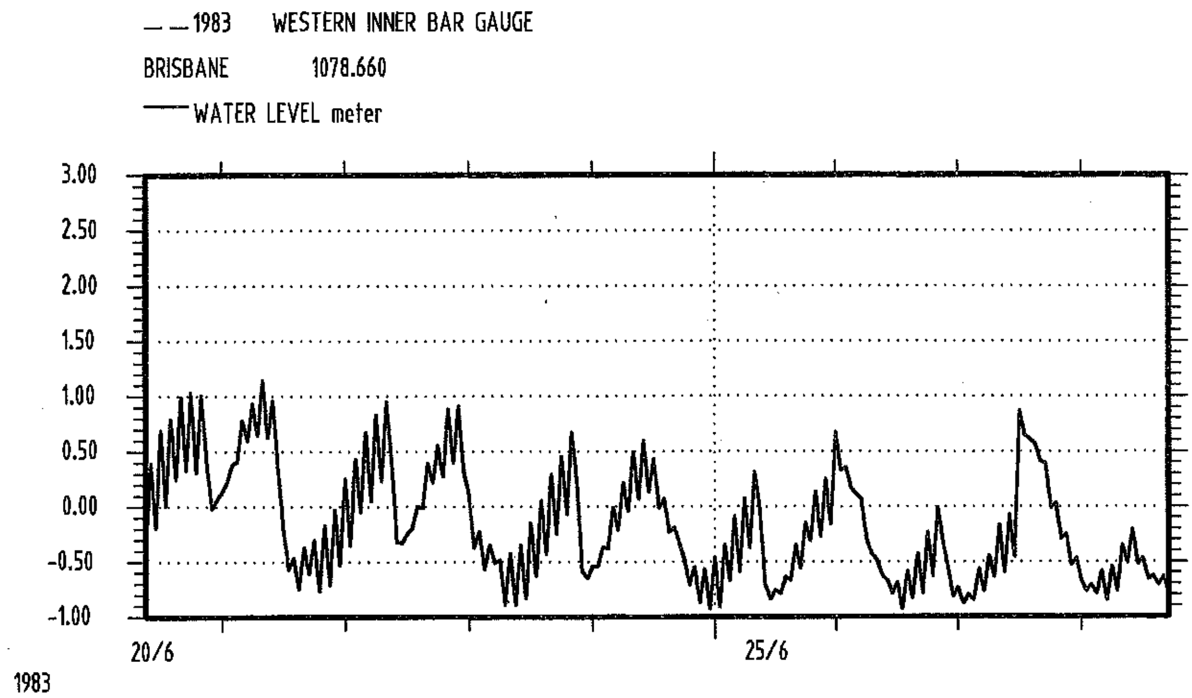


FIGURE C-6
BRISBANE RIVER FLOOD STUDY
PREDICTED AND RECORDED HYDROGRAPH
COMPARISON - JUNE 1983

SINCLAIR KNIGHT MERZ



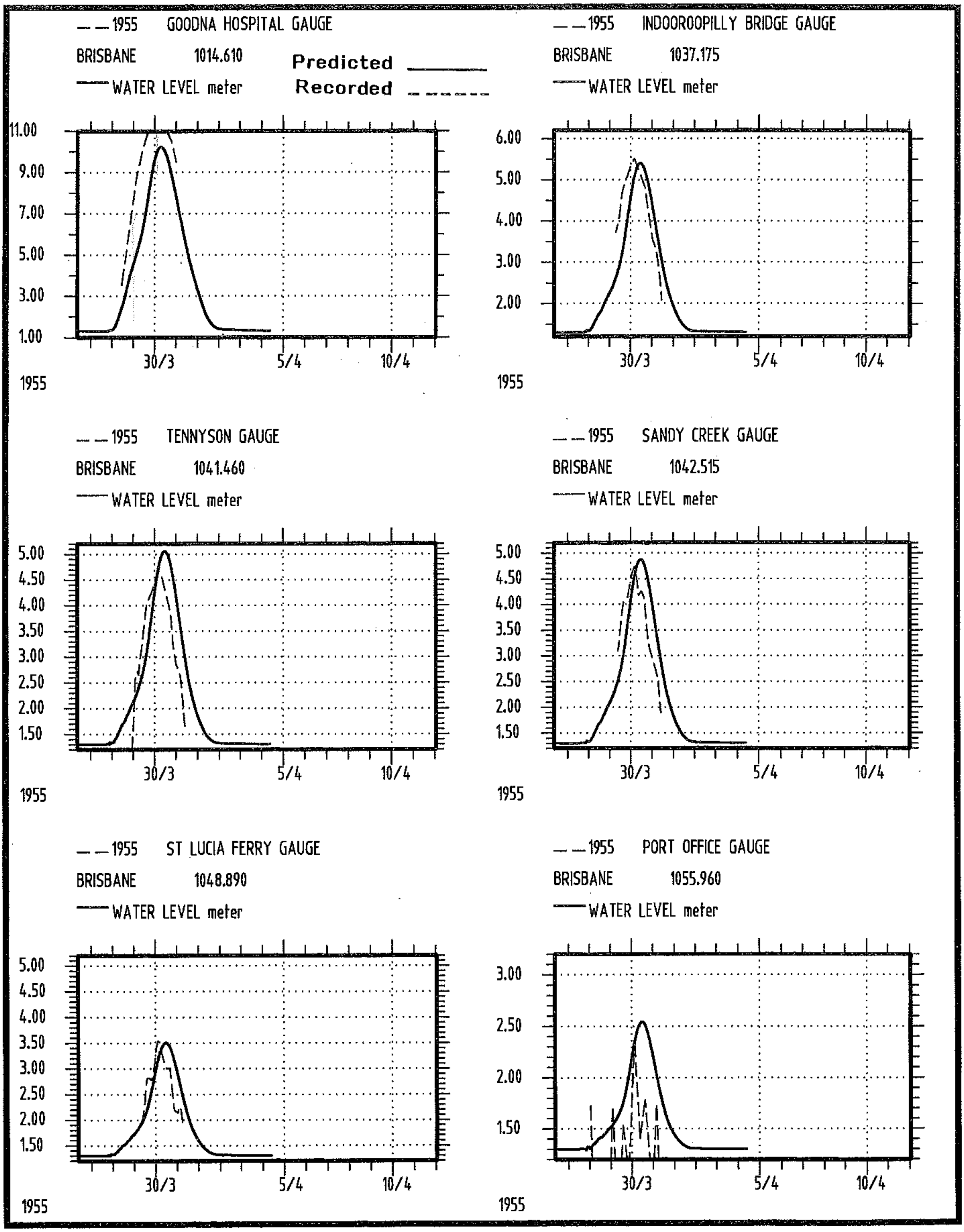


FILE NAME: 4157-216 PLOT SCALE: 1=1 DISK No: G:\ JOB No: T00457 DATE 17-2-98

SINCLAIR KNIGHT MERZ

FIGURE C-7

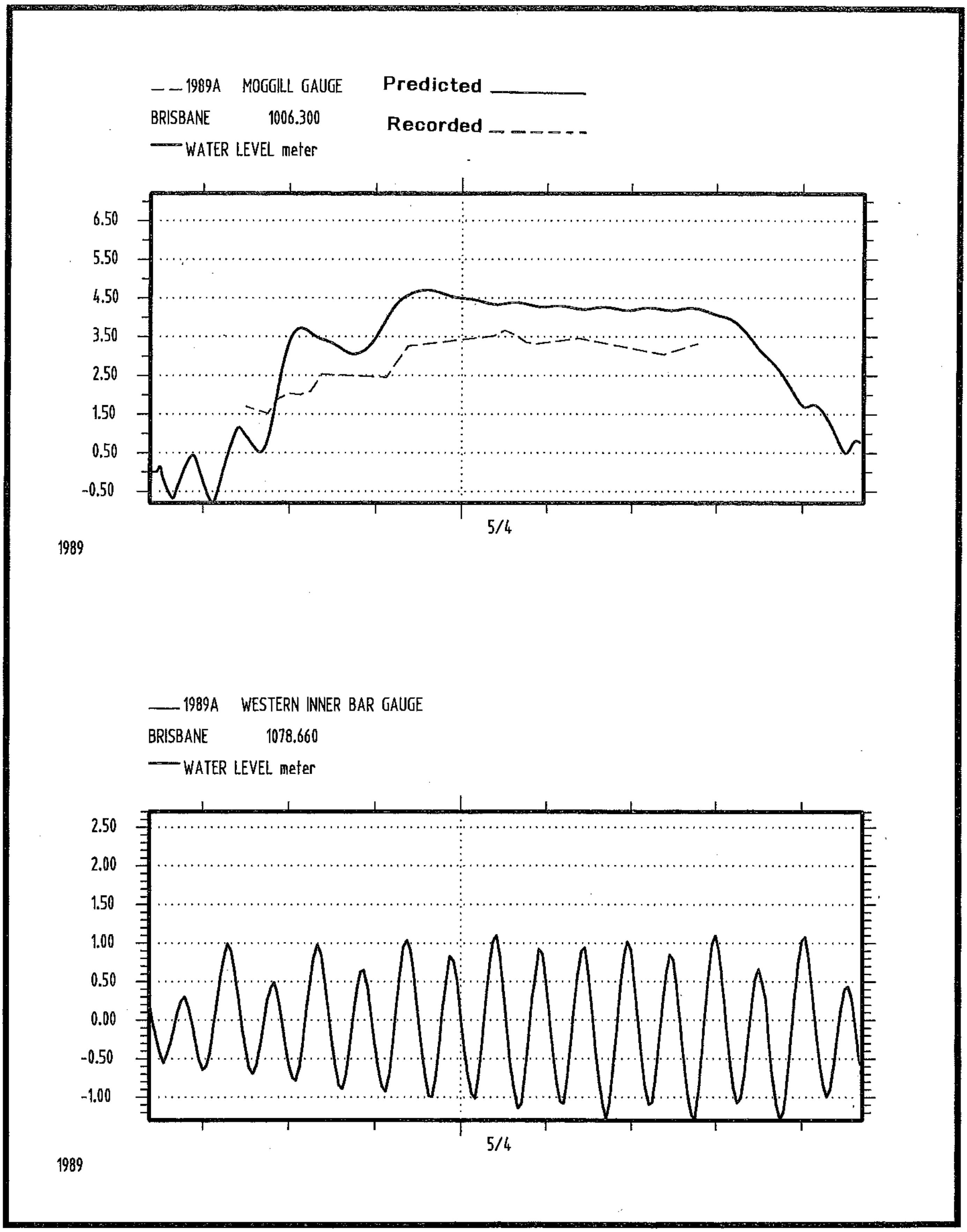
BRISBANE RIVER FLOOD STUDY
PREDICTED AND RECORDED HYDROGRAPH
COMPARISON - MARCH 1955



FILE NAME: 4157-2/7 PLOT SCALE: 1=1 DISK Nº: G:\ JOB Nº: T00/157 DATE: 17-2-98

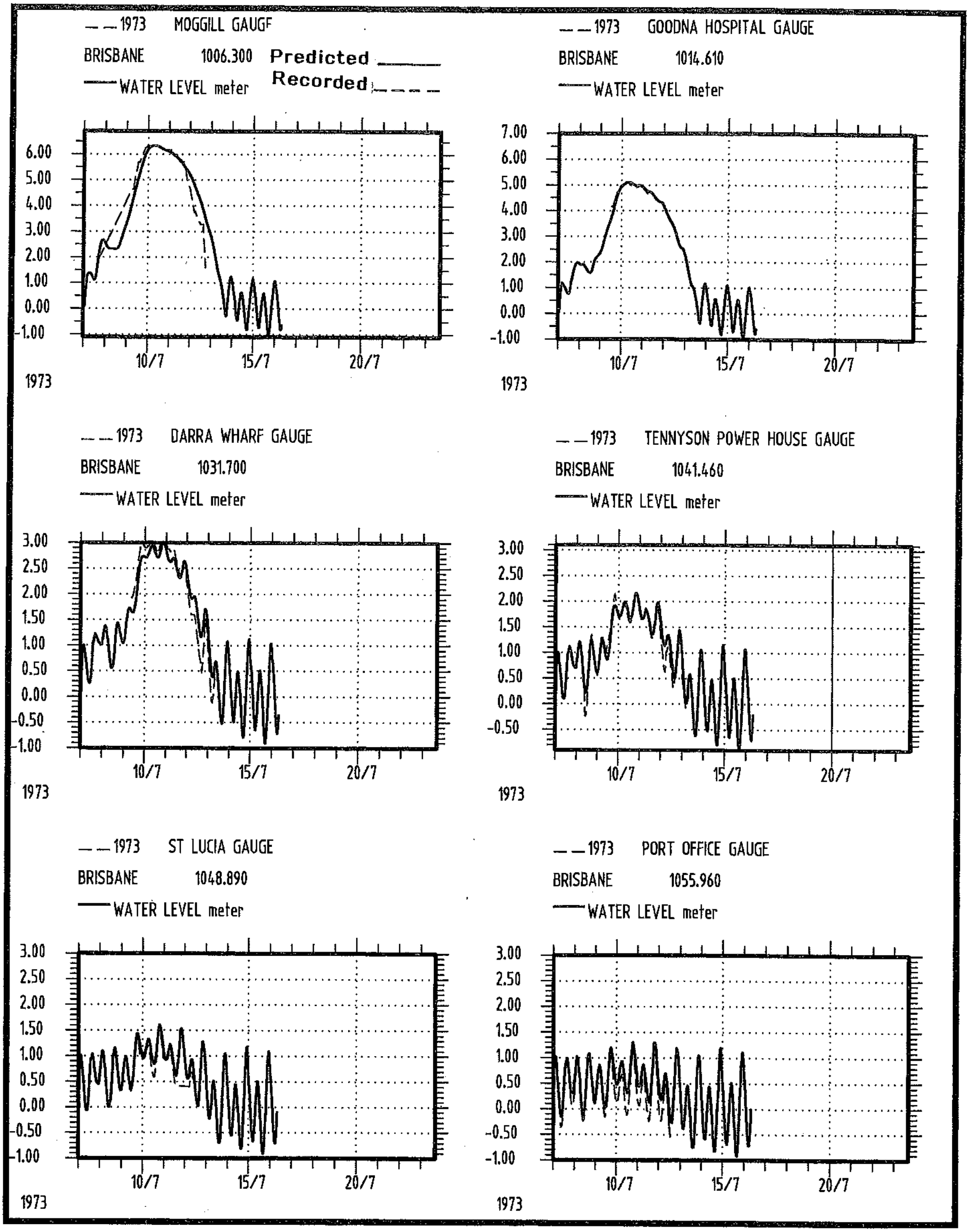
SINCLAIR KNIGHT MERZ

FIGURE C-8
BRISBANE RIVER FLOOD STUDY
PREDICTED AND RECORDED HYDROGRAPH
COMPARISON - EARLY APRIL 1989



SINCLAIR KNIGHT MERZ

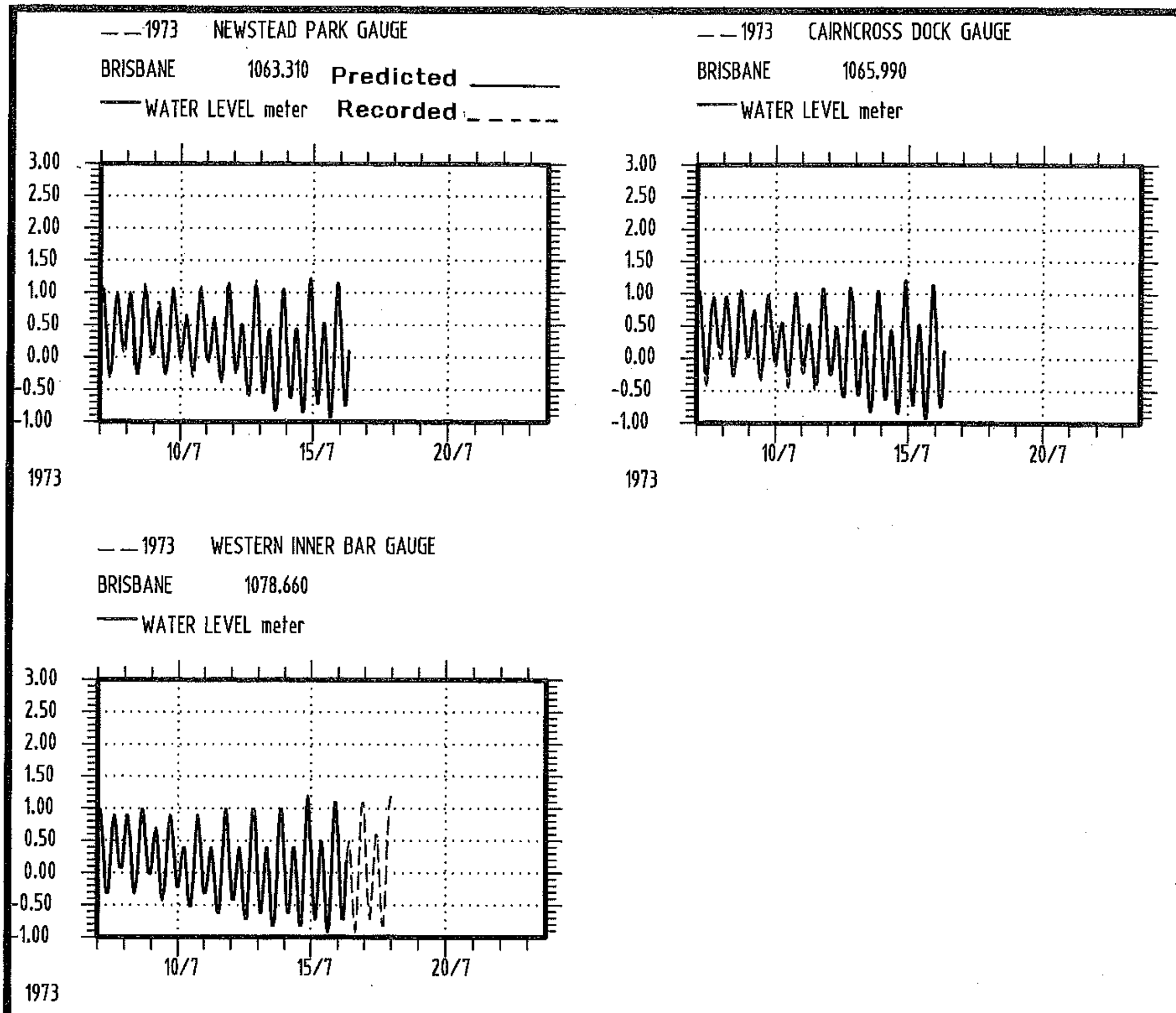
FIGURE C-9a
BRISBANE RIVER FLOOD STUDY
PREDICTED AND RECORDED HYDROGRAPH COMPARISON - JULY 1973



FILE NAME: 4157-249 DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98
PLC. SCALE: 1:

FIGURE C-9b

BRISBANE RIVER FLOOD STUDY
PREDICTED AND RECORDED HYDROGRAPH
COMPARISON - JULY 1973



FILE NAME: 4157-250 DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98
PL... ...LE: 1

Appendix D - Generalised Tropical Storm Method

INSTRUCTIONS FOR THE USE OF THE GTSM PMP SPATIAL DISTRIBUTION DIAGRAMS

1. Select the appropriate distribution diagram according to whether the area of the catchment is above or below 2000 km^2.

2. Expand or contract the scale of the isohyetal pattern until the outermost isohyet just touches the catchment. Adjust the positioning of the pattern to get an (estimated) highest PMP depth over the catchment. This depends on the shape of the catchment as well as the position of the pattern.

3. Calculate the area of the catchment within the central isohyet, and then between each adjacent pair of isohyets until all these areas have been calculated. A planimeter or other means are suitable methods of doing this.

4. Multiply the percentage assigned to the label on each isohyet by the mean PMP depth for that duration. This gives isohyet labels in millimeters.

5. Multiply these areas by an estimate of the mean rainfall value over that part of the catchment contained in the annulus between each successive pair of isohyets. This will generally not be the arithmetic mean because of the usually irregular shape of the catchment boundary. For the central isohyet a mean value has to be estimated. This will not be critical.

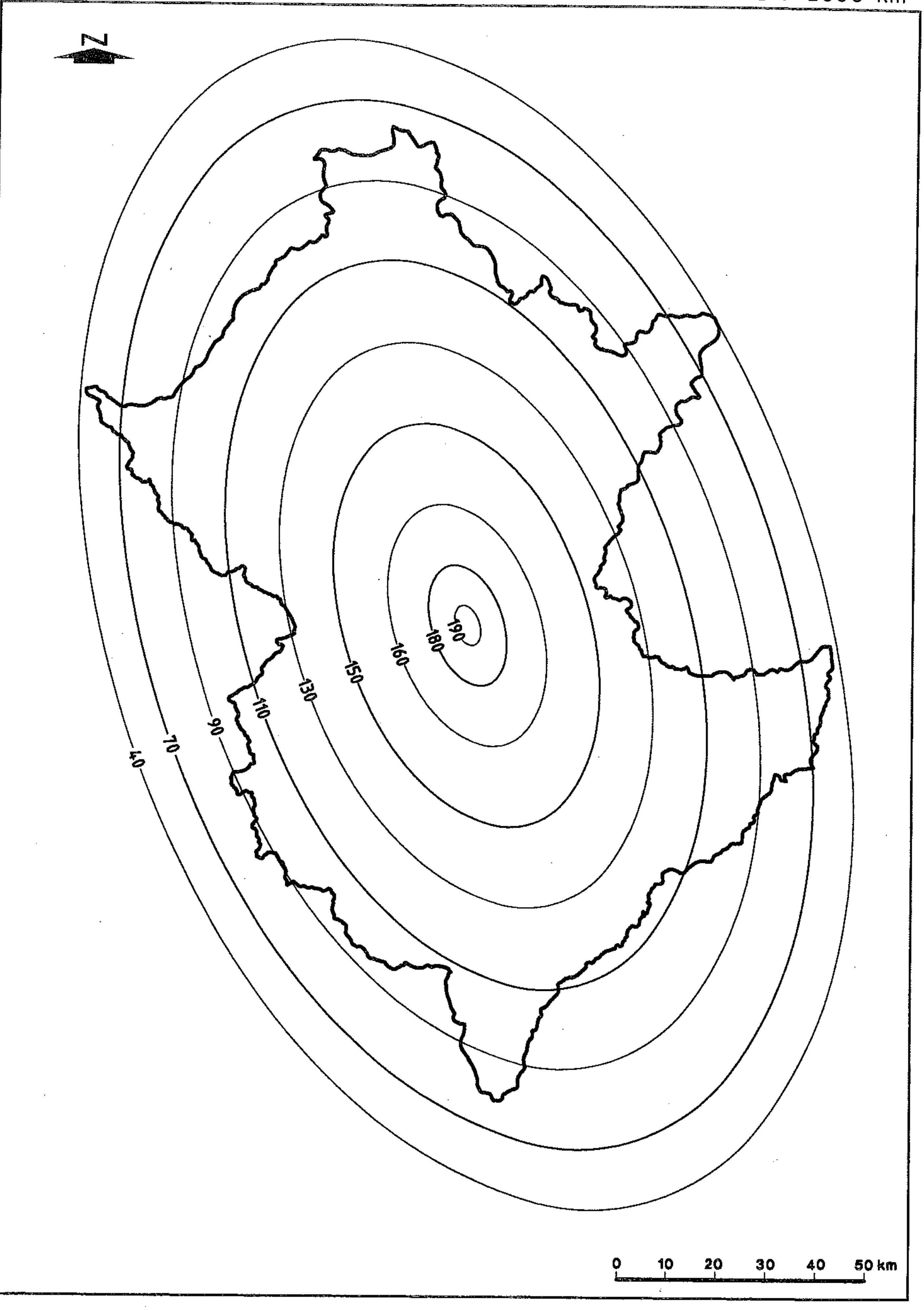
6. The sum of all the above products is divided by the total catchment area to obtain the calculated mean catchment PMP depth. This will usually not be equal to the true PMP depth. The ratio of the actual PMP to the calculated PMP values is then calculated.

7. The values of the isohyetal labels are all multiplied by this ratio (ie a constant scaling factor) to ensure that the isohyetal pattern gives the correct mean PMP depth.

FIGURE D-1

BRISBANE RIVER FLOOD STUDY
GENERALISED TROPICAL STORM METHOD (GTSM)
DESIGN ISOHYETAL PATTERN FOR THE
DISTRIBUTION OF PMP FOR AREAS > 2000 km²

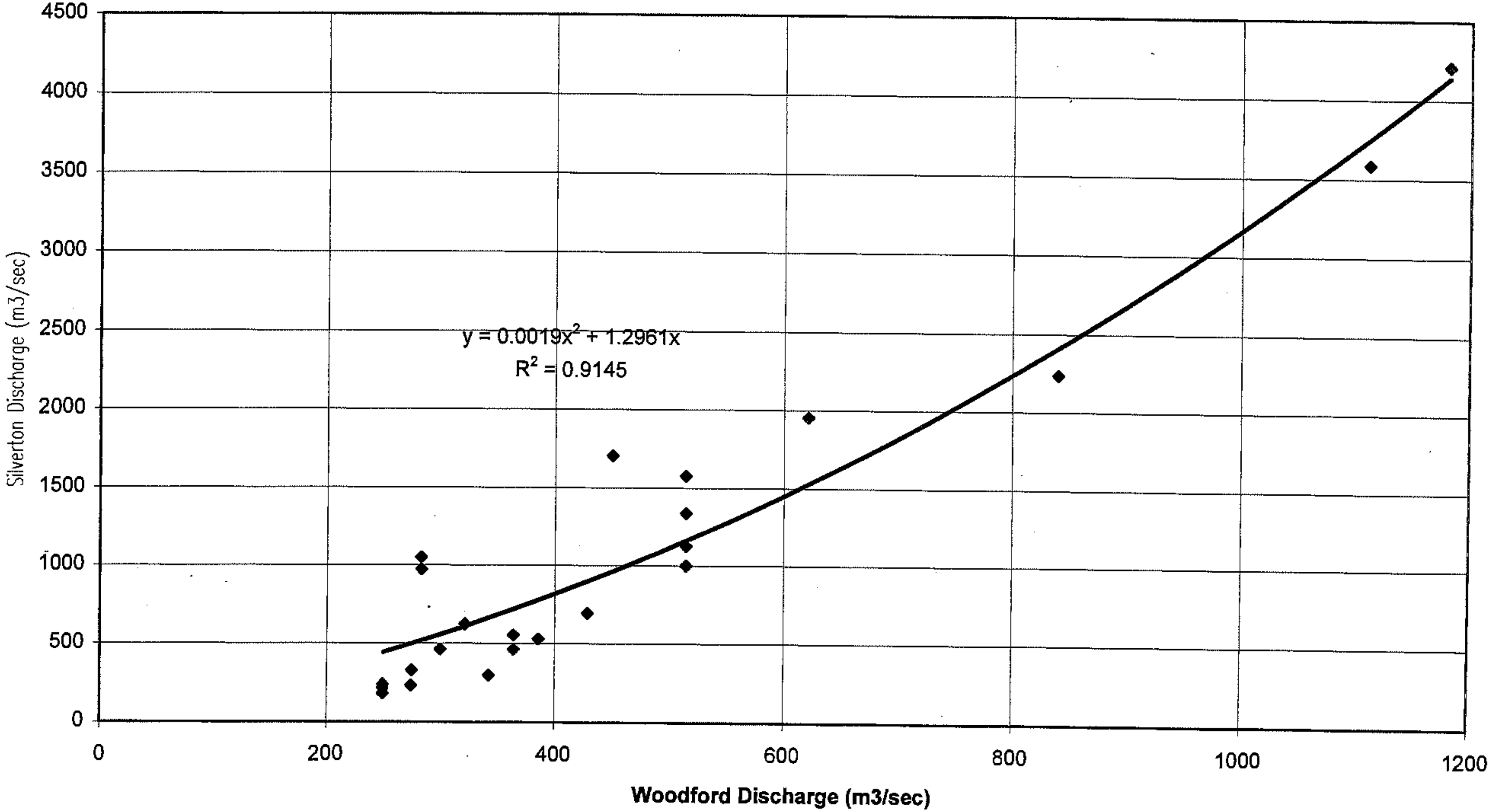
SINCLAIR KNIGHT MERZ



FILE NAME: 04157-A1 DISK No: C:\DWG JOB No: T0... DATE
PLOT SCALE: 1=1000

Appendix E - Adjustment of Historical Streamflows to Account for the Effects of Somerset Dam

Figure E-1 - Relationship Between Discharges at Woodford and Silverton



BCC.121.0214

Table E-1 - Calculation of Adjustment Factor for Post Somerset Dam Flows

Date	Recorded Discharge at Woodford (Cumecs)	Calculated Discharge at Somerset Dam (Cumecs)	Recorded Discharge at Somerset Dam (Peak Monthly) (Cumecs)	Adjustment Factor (Calculated - Actual Discharge) (Cumecs)
31/01/44	300	560	241	319
25/03/46	664	1699	1374	325
13/02/47	471	1033	317	716
1/03/47	514	1169	671	498
11/12/47				
1/05/48	429	904	716	188
19/01/50	166	267	115	152
15/02/50	233	405		
18/02/50	233	405		
28/02/50	643	1618	1139	479
1/03/50				
24/06/50				
29/07/50	250	442	352	90
31/01/51	750	2041	1347	694
1/02/51				
21/02/53	879	2605	1506	1099
24/03/53				
13/02/54				
14/07/54	557	1312	46	1266
28/03/55	1041	3407	3078	329
10/02/56				
13/01/56				
15/01/67				
11/02/56				
12/02/56				
11/03/56	536	1240	1397	0
13/03/56				
10/06/58	199	334	84	250
20/12/61	250	442		
2/01/63	258	461		
10/01/63	300	443	215	228
17/03/63	793	2885	1300	1585
8/05/63				
28/03/64	429	904		
23/04/64	124	189		
21/07/65		1243	0	1243
30/01/67	283			
18/03/67	283	1082	1050	32
8/05/67	191	316		
10/06/67	514	1443	1088	355
24/06/67	224	387		
27/06/67	321	613		
12/01/68	450	1894	1491	403
8/12/70	557	1271	0	1271
27/01/71	275	380	285	95
5/02/71				
20/02/71	283	1594	1763	0
24/02/71				
29/12/71	191	316		
12/02/72	1463	444	291	153

Table E-1 - Calculation of Adjustment Factor for Post Somerset Dam Flows

Date	Recorded Discharge at Woodford (Cumecs)	Calculated Discharge at Somerset Dam (Cumecs)	Recorded Discharge at Somerset Dam (Peak Monthly) (Cumecs)	Adjustment Factor (Calculated - Actual Discharge) (Cumecs)
9/03/72	149	3621	1781	1840
3/04/72	664	2270	1175	1095
30/10/72				
8/07/73	879	2605	2070	535
14/01/74	191	4109		
25/01/74	1111	3495	1081	2414
17/02/74	250	442		
12/03/74	579	132	194	0
9/01/75	132	204	0	204
24/12/75	149	235	3	0
20/01/76	514	1200	1098	102
23/02/76	258	461	8	0
3/03/76	224	387	176	0
14/03/76	266	480		
26/03/78	72	103	0	103
2/04/78	60	85	0	85
25/01/79	111	167		
10/02/79	54	76	0	76
8/05/80	195	325	4	0
9/05/80	233	405		
9/02/81			0	0
16/02/81	360	713	0	713
17/02/81	250	442	0	442
8/04/81	54	76	0	76
23/05/81	60	85	6	0
21/01/82	707	1867	0	1867
21/01/82	660	1683	0	1683
4/03/82	90	132	0	132
16/03/82	54	76	0	76
3/05/83	72	103	0	103
24/05/83	224	387	0	387
24/05/83	216	369	0	369
29/05/83				
19/06/83	237	414	0	414
20/06/83	300	560	7	0
22/06/83	729	1953		1953
22/06/83	840	2236	1475	761
7/07/83	36	49	0	49
22/11/83	72	103		103
30/11/83	216	369		369
2/12/83	42	58	0	58
9/04/84	72	103		103
28/07/84	195	325		325
8/11/84	42	58		58
11/03/85	300	560		560
9/07/85	300	560		560

Note: - Calculated discharge at Somerset is based on the flows at Woodford, as illustrated in Figure E-1 - Relationship Between Discharges at Woodford and Silverton

Table E-2 - Historical Data at Woodford and Silverton (1920-1985)

Date	Time	Level (m)	Discharge at Woodford (m^3/s)	Corresponding Discharge at Silverton (DNR) (m^3/s)
8/01/20	1700	4.88	249.60	236.60
7/04/21	600	5.79	364.29	553.70
30/12/21	1600	5.49	300.00	459.70
20/06/25	800	5.94	385.71	528.70
17/12/26	900	5.72	342.86	294.10
24/01/27	1600	6.48	514.29	1127.00
18/02/28	800	6.50	514.29	1000.00
19/04/28	1200	7.01	621.43	1955.00
21/01/29	1000	5.26	283.20	974.70
10/05/30	1930	5.79	364.29	459.70
5/02/31	1500	8.94	1322.22	2022.00
5/04/33	800	5.18	274.80	231.70
16/03/37	2000	5.18	274.80	324.70
20/01/38	730	5.64	321.43	623.20
26/05/38	900	6.10	428.57	694.30
16/03/39	900	4.88	249.60	216.20
19/03/40	900	4.88	249.60	214.90
1/06/41	800	4.88	249.60	181.20
9/02/42	1515	5.79	364.29	
31/01/44	1500	5.46	300.00	
25/03/46	1200	7.16	664.29	
13/02/47	1130	6.25	471.43	
1/03/47	1900	6.48	514.29	
1/05/48		6.10	428.57	
19/01/50		3.91	165.60	
15/02/50	1600	4.72	232.80	
18/02/50		4.72	232.80	
28/02/50	900	7.09	642.86	
29/07/50	900	4.88	249.60	
31/01/51	1230	7.62	750.00	
21/02/53	800	8.23	878.57	
14/07/54	700	6.71	557.14	
28/03/55	330	8.53	1040.74	
11/03/56	1800	6.55	535.71	
10/06/58	900	4.27	199.20	
20/12/61	900	4.88	249.60	
2/01/63	800	5.03	258.00	
10/01/63	1800	5.49	300.00	
17/03/63	900	7.77	792.86	
28/03/64	630	6.10	428.57	
23/04/64	1500	3.35	123.60	
30/01/67	2100	5.33	283.20	
18/03/67	1500	5.33	283.20	1051.00
8/05/67	500	4.22	190.80	
10/06/67	1800	6.50	514.29	1578.00
24/06/67	0	4.57	224.40	
27/06/67	800	5.64	321.43	
12/01/68	1900	6.20	450.00	1708.00
8/12/70	300	6.71	557.14	

Table E-2 - Historical Data at Woodford and Silverton (1920-1985)

Date	Time	Level (m)	Discharge at Woodford (m^3/s)	Corresponding Discharge at Silverton (DNR) (m^3/s)
8/01/20	1700	4.88	249.60	236.60
27/01/71	1500	5.18	274.80	
20/02/71	900	5.33	283.20	
29/12/71	900	4.17	190.80	3587.00
12/02/72	900	9.14	1462.96	
9/03/72	1200	3.68	148.80	
3/04/72	300	7.16	664.29	
8/07/73	300	8.23	878.57	
14/01/74	900	4.20	190.80	
25/01/74	1200	8.60	1111.11	
17/02/74	1500	4.90	249.60	
12/03/74	2100	6.80	578.57	
9/01/75	900	3.50	132.00	
24/12/75	1500	3.70	148.80	
20/01/76	1500	6.50	514.29	
23/02/76	1500	5.00	258.00	
3/03/76	1500	4.60	224.40	
14/03/76	1500	5.10	266.40	
26/03/78	2225	4.68	72.00	
2/04/78	1205	4.50	60.00	
25/01/79	820	5.06	111.00	
10/02/79	1340	4.44	54.00	
8/05/80	2300	5.52	195.00	
9/05/80	900	4.65	232.80	
16/02/81	2115	6.09	360.00	
17/02/81	900	4.90	249.60	
8/04/81	1610	4.36	54.00	
23/05/81	430	4.54	60.00	
21/01/82	1600	7.35	707.14	
21/01/82	1445	6.58	660.00	
4/03/82	955	4.98	90.00	
16/03/82	335	4.40	54.00	
3/05/83	1615	4.73	72.00	
24/05/83	800	4.60	224.40	
24/05/83	0	5.56	216.00	
19/06/83	2100	5.73	237.00	2236.00
20/06/83	1100	5.50	300.00	
22/06/83		7.50	728.57	
22/06/83	1700	6.89	840.00	
7/07/83	300	4.07	36.00	
22/11/83	1245	4.68	72.00	
30/11/83	1355	5.61	216.00	
2/12/83	2005	4.21	42.00	
9/04/84	1415	4.70	72.00	
28/07/84	1055	5.45	195.00	
8/11/84	2245	4.23	42.00	
11/03/85	530	6.03	300.00	
9/07/85	1515	5.97	300.00	

Table E-3 - Historical and Adjusted Data at Moggill (1965-1983)

Date	Time	Level m AHD	Discharge Cumecs	Adjusted Discharge Cumecs
21/07/65	600	5.76	2175.33	3418.33
20/03/67		4.66	1787.00	
12/06/67	1800	7.98	3054.62	3409.60
14/01/68	1100	10.72	4356.11	4759.00
11/12/70	1000	3.82	1485.57	2756.60
4/02/71	1600	6.39	2389.43	
11/02/71	900	3.29	1317.00	
20/02/71	1500	7.50	2846.00	2846.00
24/02/71	1400	3.34	1317.00	
14/02/72	2100	5.14	1919.00	
5/04/72	900	4.84	1820.00	2915.00
10/07/73	730	6.32	2355.57	2891.00
28/01/74	1430	19.93	9745.00	12159.00
9/02/81	1545	2.05	905.52	905.52
22/01/82	1115	3.43	1350.71	3034.00
29/05/83	120	2.24	948.64	
23/06/83	500	5.26	1985.00	2746.00
5/04/89	100	3.73	1451.86	
27/04/89	1200	4.02	1553.00	
18/05/89	0	2.70	1137.75	
13/12/91	300	5.22	1952.00	
17/03/92	1230	2.44	1034.88	
6/05/96	300	7.10	2681.40	

Table E-4 - Historical and Adjusted Data at Port Office (1841-1974)

Date	Level (m)	Discharge AHD-0.15m Cumecs	Adjusted AHD -0.15m Cumecs	Discharge HAT+0.15m Cumecs	Adjusted HAT+0.15m Cumecs
14/01/1841	8.43	14655.2	14655.2	14583.3	14583.3
09/06/1843	2.76	4800.0	5428.6	3500.0	3500.0
10/01/1844	7.03	12241.4	12241.4	11666.7	11666.7
16/04/1852	2.91	4800.0	5571.4	3750.0	3750.0
19/05/1857	3.27	6166.7	6166.7	4750.0	4750.0
16/02/1863	3.32	6166.7	6166.7	4750.0	4750.0
20/03/1864	3.78	7000.0	7000.0	5800.0	5800.0
02/04/1867	2.46	4800.0	5000.0	2666.7	2666.7
10/03/1870	2.89	4800.0	5571.4	3750.0	3750.0
18/06/1873	2.69	4800.0	5285.7	3250.0	3250.0
01/03/1875	2.61	4800.0	5142.9	3000.0	3000.0
16/08/1879	2.46	4800.0	5000.0	2666.7	2666.7
23/01/1887	3.78	7000.0	7000.0	5800.0	5800.0
20/05/1889	3.75	7000.0	7000.0	5800.0	5800.0
13/03/1890	5.33	9200.0	9200.0	8500.0	8500.0
05/02/1893	8.35	14655.2	14655.2	14583.3	14583.3
12/02/1893	2.15	4400.0	4400.0	1000.0	1000.0
19/02/1893	8.09	14137.9	14137.9	13958.3	13958.3
12/06/1893	3.63	6666.7	6666.7	5400.0	5400.0
15/02/1896	2	4000.0	4000.0	0.0	0.0
22/02/1896	0.86	2166.7	2166.7	0.0	0.0
29/02/1896	1.85	3833.3	3833.3	0.0	0.0
13/01/1898	5.02	8714.3	8714.3	6833.3	8000.0
09/03/1898	3.27	6166.7	6166.7	4750.0	4750.0
15/03/08	3.35	6333.3	6333.3	5000.0	5000.0
28/01/27	1.7	3500.0	3500.0	0.0	0.0
22/02/28	1.67	3500.0	3500.0	0.0	0.0
21/04/28	2.15	4400.0	4400.0	1000.0	1000.0
24/01/29	1.85	3833.3	3833.3	0.0	0.0
7/02/31	3.32	6166.7	6166.7	4750.0	4750.0
30/03/55	2.36	4800.0	5129.0	2333.3	2662.3
13/01/56	1.75	3666.7	3666.7	0.0	0.0
15/01/56	1.75	3666.7	3666.7	0.0	0.0
11/02/56	1.39	3000.0	3000.0	0.0	0.0
12/02/56	1.31	2833.3	2833.3	0.0	0.0
12/03/56	1.42	3000.0	3000.0	0.0	0.0
13/03/56	1.34	2833.3	2833.3	0.0	0.0
14/03/56	1.29	2833.3	2833.3	0.0	0.0
12/06/67	1.87	3833.3	4188.3	0.0	355.0
15/01/68	1.97	4000.0	4403.0	0.0	403.0
6/02/71	1.47	3166.7	3166.7	0.0	0.0
29/01/74	5.45	8750.0	11164.0	8833.3	11247.3

Table E-5 - Historical and Adjusted Discharge at Lowood

Date	Lowood Discharge Cumecs	Adjusted Lowood Discharge Cumecs
Jan-10	706.3	
Jan-11	1316	
Mar-12	460.7	
Jun-13	416.4	
Feb-14	234.4	
Feb-15	1035	
Dec-16	375.2	
Dec-17	522.2	
Feb-18	379.4	
Dec-21	1280	
Jan-22	1154	
Feb-24	173.2	
Mar-25	673.9	
Jun-25	778.4	
Dec-26	259.5	
Jan-27	2715	
Apr-28	4225	
Jan-29	2064	
Jun-30	749.2	
Feb-31	5574	
Dec-33	446.4	
Feb-34	614.2	
Feb-35	119.9	
Mar-36	138.6	
Mar-37	1102	
May-38	1052	
Mar-39	459.8	
Mar-40	697.3	
Jan-41	425.2	
Feb-42	1360	
Dec-43	1207	
31/01/44	1043	1362
25/03/46	1052	1377
13/02/47	421	1137
1/03/47	803	1302
11/12/47	613	613
1/05/48	544	732
19/01/50	295	448
28/02/50	2451	2930
1/03/50	2298	2298
24/06/50	1043	1043
29/07/50	784	874
31/01/51	2534	3228
1/02/51	2704	2704
21/02/53	764	1863
24/03/53	743	743
13/02/54	2111	2111
14/07/54	1922	3188
28/03/55	5363	5692
10/02/56	1365	1365
11/03/56	2141	2141

Table E-5 - Historical and Adjusted Discharge at Lowood

Date	Lowood Discharge Cumecs	Adjusted Lowood Discharge Cumecs
10/06/58	1520	1770
20/12/61	152	152
10/01/63	230	458
17/03/63	115	1700
8/05/63	502	502
28/03/64	258	258
23/04/64	12	12
21/07/65	1238	2481
30/01/67	254	254
18/03/67	1272	1304
8/05/67	215	215
10/06/67	2351	2706
12/01/68	3363	3766
8/12/70	582	1853
27/01/71	482	577
5/02/71	1071	1071
20/02/71	2779	2779
29/12/71	578	578
12/02/72	1842	1995
9/03/72	266	2106
3/04/72	1665	2760
30/10/72	531	531
8/07/73	2709	3244
25/01/74	7393	9807
17/02/74	835	835
12/03/74	874	874
9/01/75	203	407
24/12/75	520	520
20/01/76	1610	1712
23/02/76	1047	1047
14/03/76	1059	1059
26/03/78	59	162
2/04/78	351	436
25/01/79	298	298
10/02/79	35	110
9/05/80	44	44
16/02/81	765	1478
8/04/81	49	124
23/05/81	10	10
21/01/82	1006	2873
4/03/82	422	554
24/05/83	525	911
22/06/83	1659	2420
7/07/83	409	458
30/11/83	13	381
2/12/83		58
9/04/84	134	237
28/07/84		325
8/11/84	108	166
11/03/85	22	582
9/07/85	63	623

Appendix F - Dam Operations

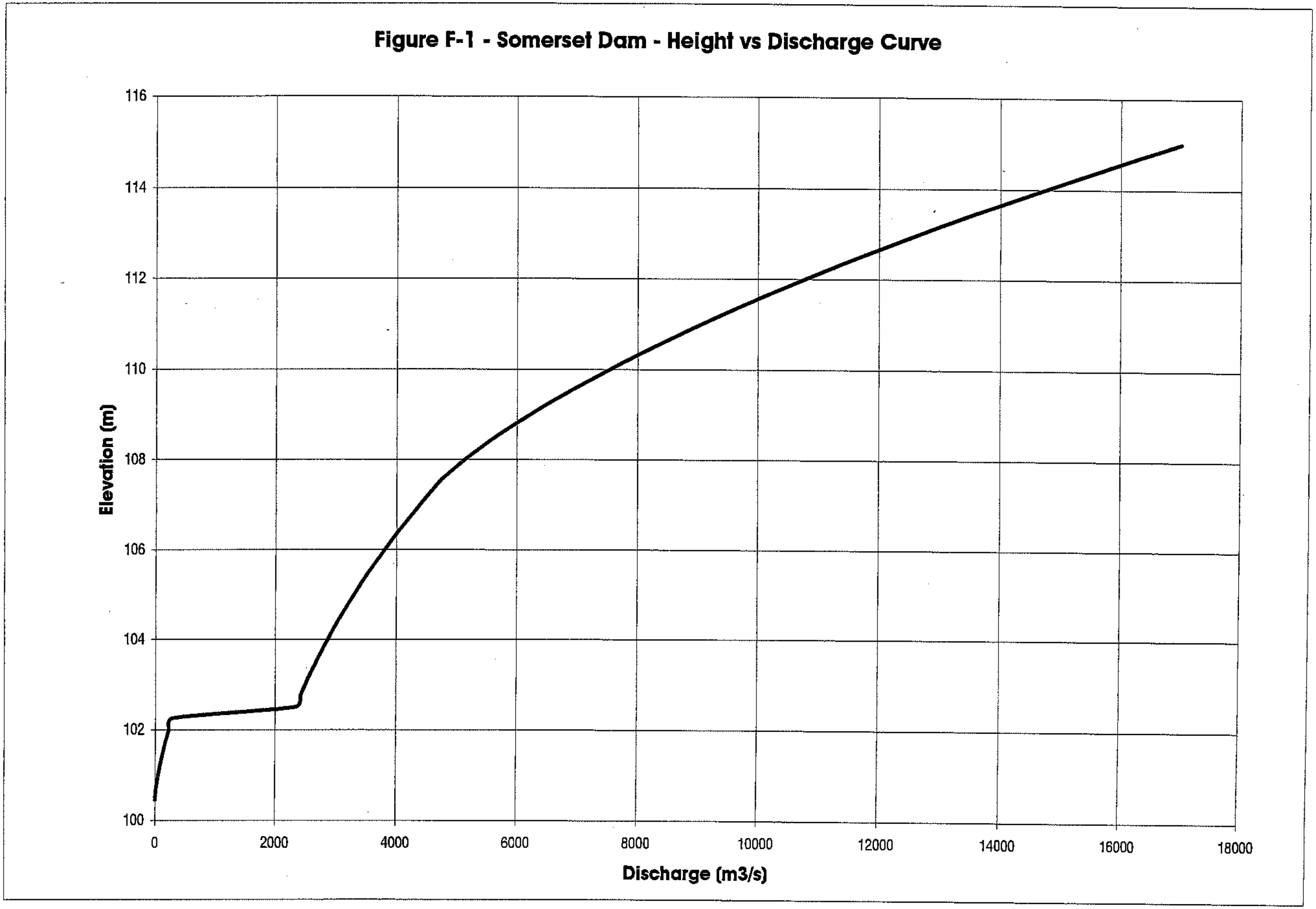


Figure F-1 - Somerset Dam - Height vs Discharge Curve
Elevation (m)
116
114
112
110
108
106
104
102
100
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
Discharge (m3/s)

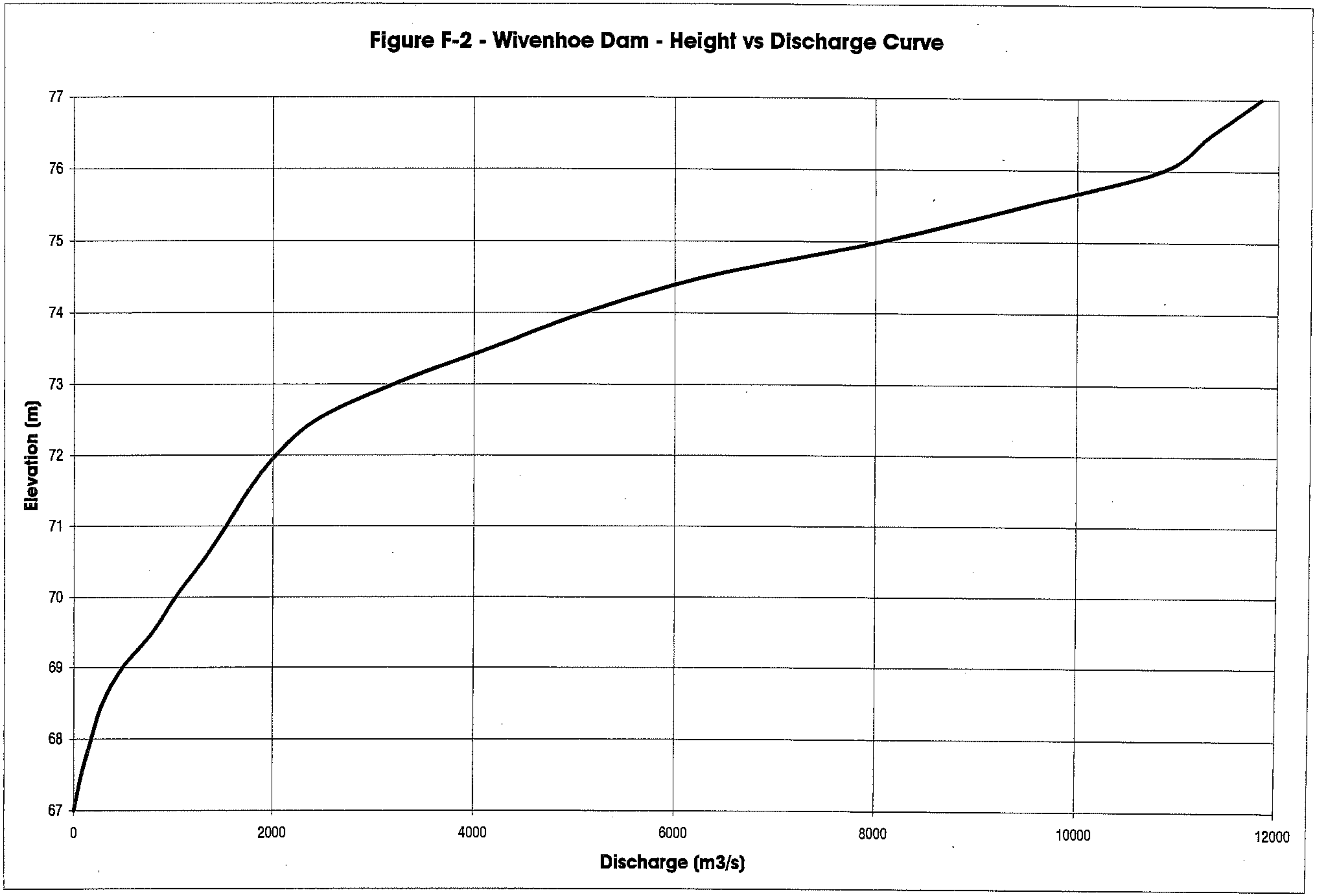
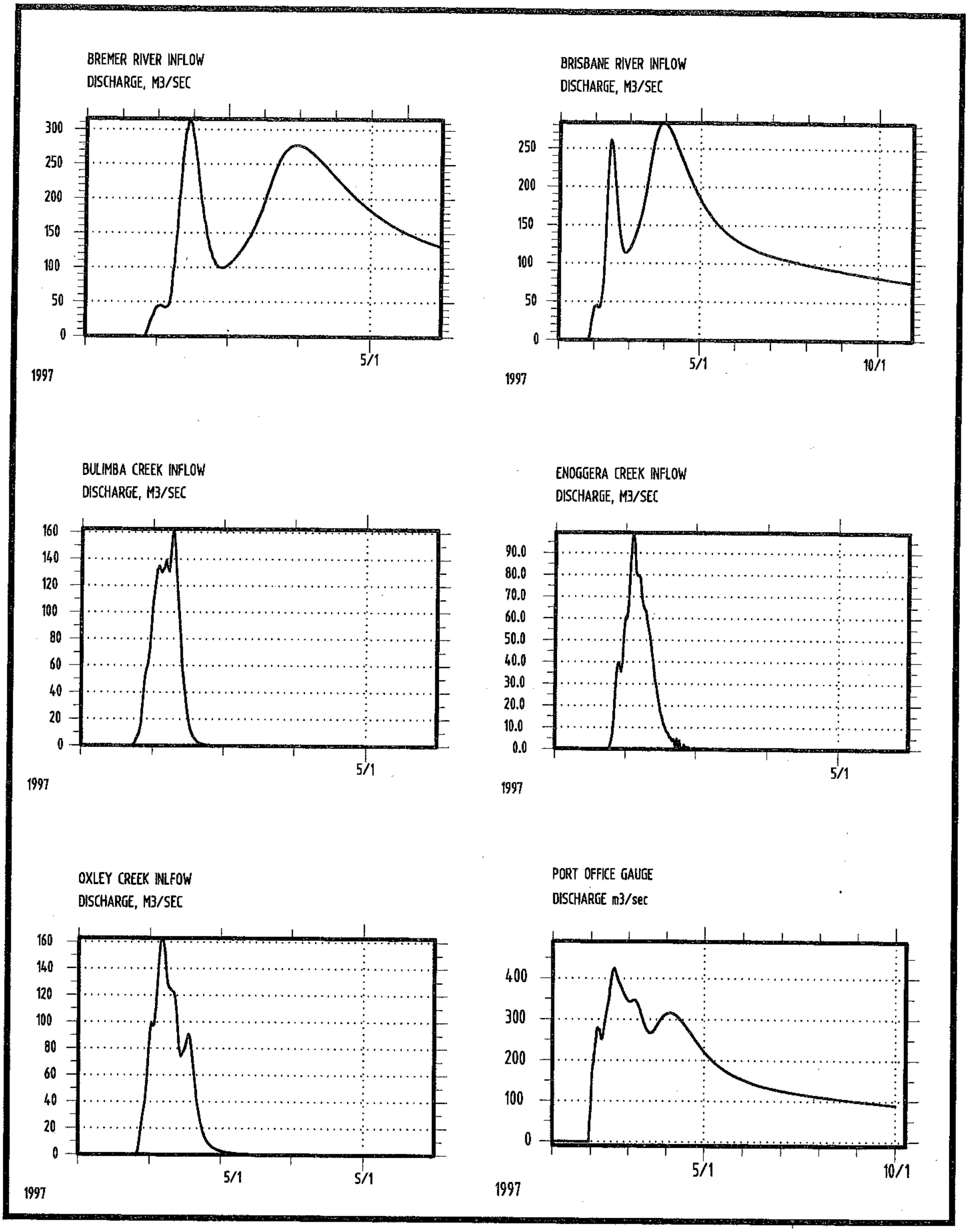


Figure F-2 - Wivenhoe Dam - Height vs Discharge Curve
Elevation (m)
77
76
75
74
73
72
71
70
69
68
67
0
2000
4000
6000
8000
10000
12000
Discharge (m3/s)

Appendix G - Design Discharge Hydrographs

SINCLAIR KNIGHT MERZ

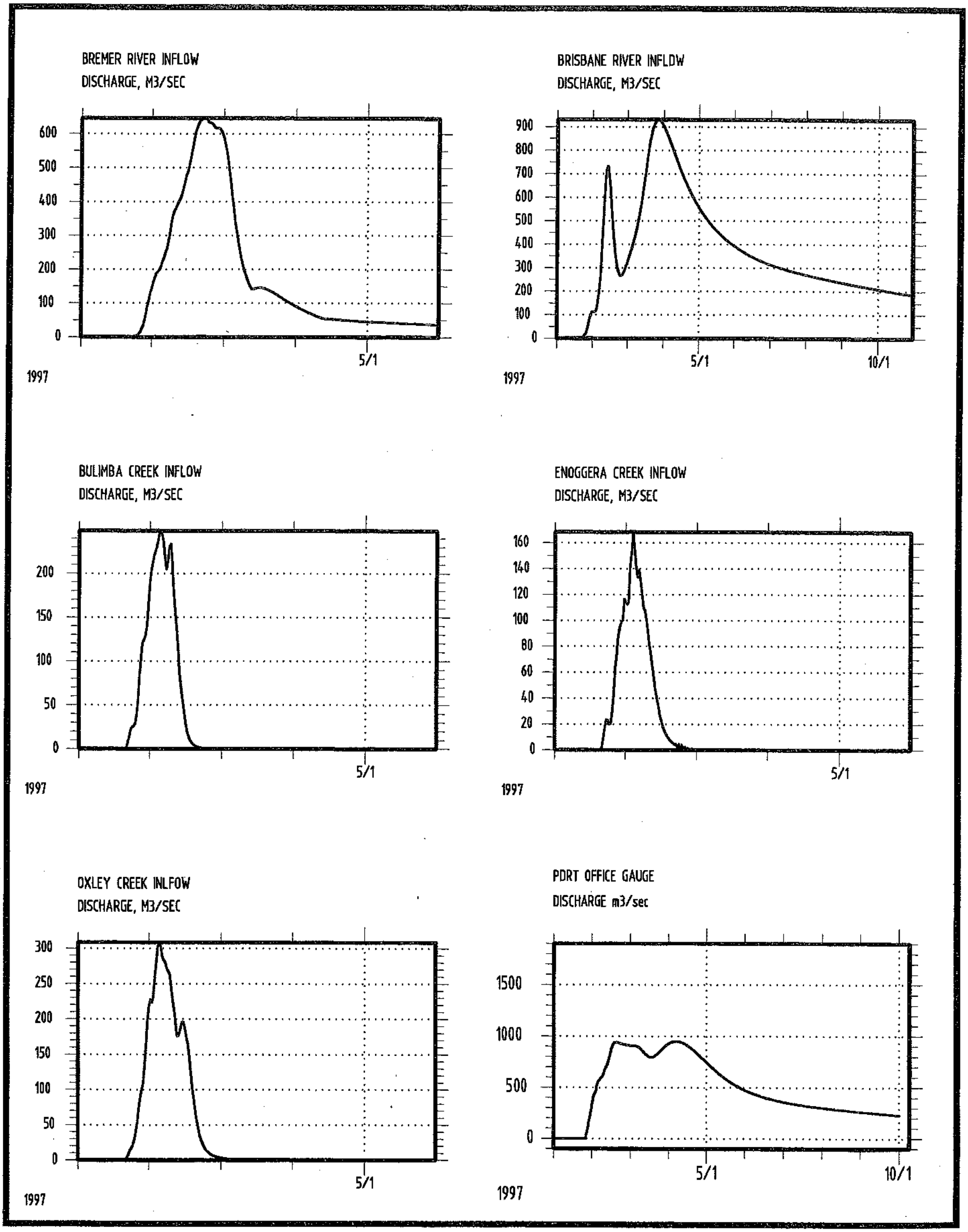
FIGURE G-1
BRISBANE RIVER FLOOD STUDY
HYDROGRAPHS FOR THE 2 YEAR ARI
FLOOD EVENT



FILE NAME: 4157-251 DISK Nº: G:\ JOB Nº: TO0457 DATE: 17-2-
PLOT SCALE: 1=1

SINCLAIR KNIGHT MERZ

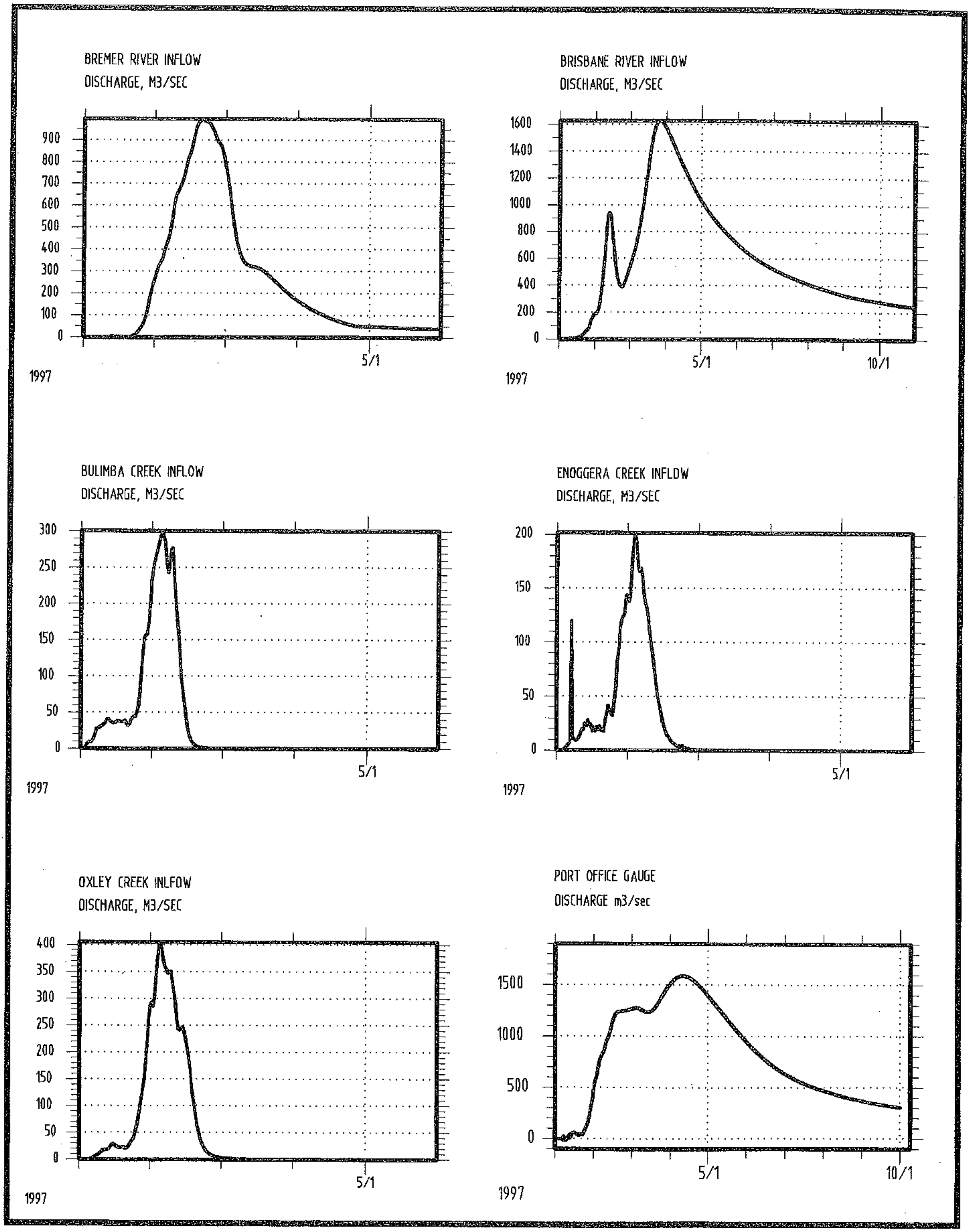
FIGURE G-2
BRISBANE RIVER FLOOD STUDY
HYDROGRAPHS FOR THE 5 YEAR ARI FLOOD EVENT



FILE NAME: 4157-252 PLOT SCALE: 1=1 DISK No: G:\ JOB No: T004157 DATE: 17-2-98

SINCLAIR KNIGHT MERZ

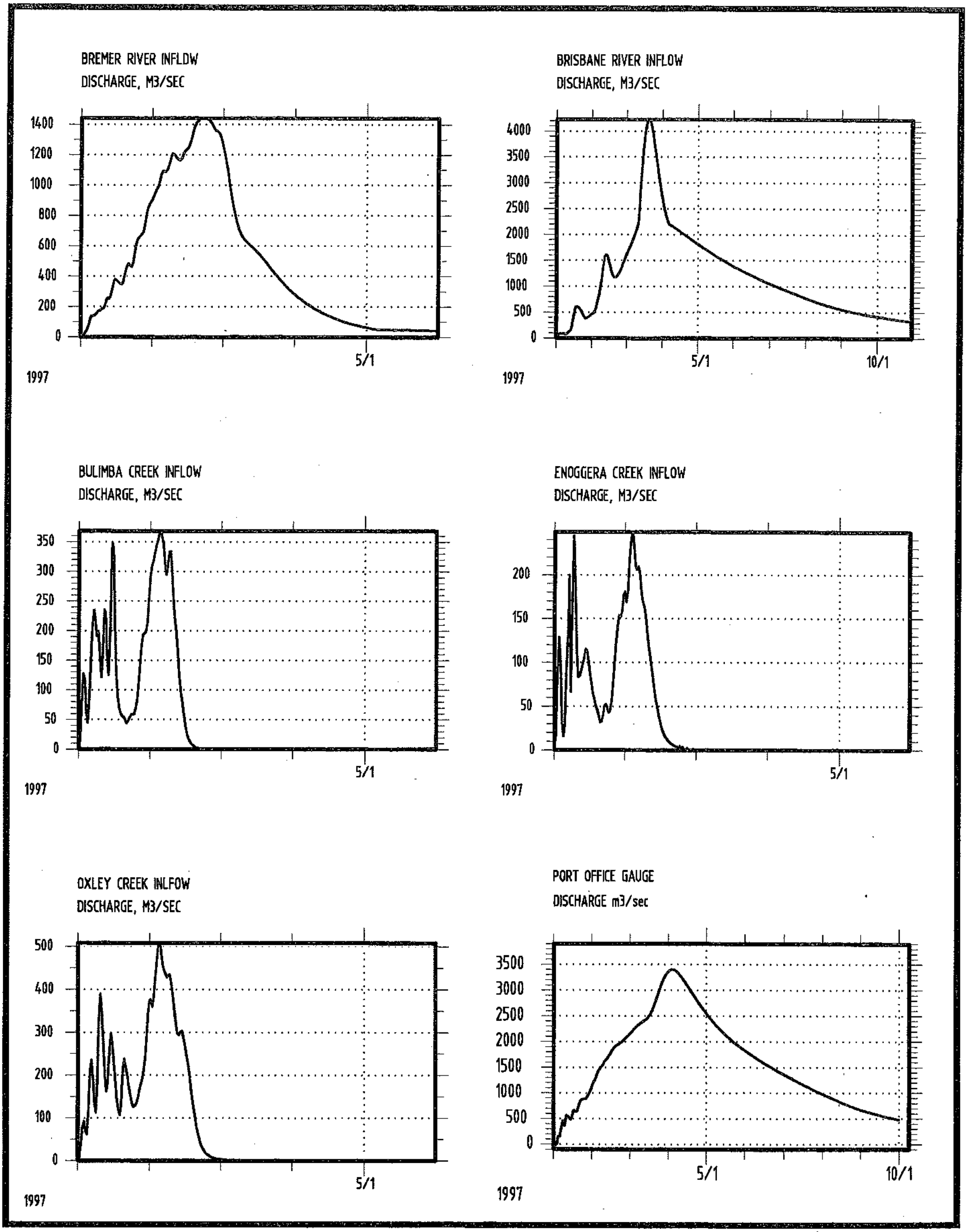
FIGURE G-3
BRISBANE RIVER FLOOD STUDY
HYDROGRAPHS FOR THE 10 YEAR ARI FLOOD EVENT



SINCLAIR KNIGHT MERZ

FIGURE G-4

BRISBANE RIVER FLOOD STUDY
HYDROGRAPHS FOR THE 20 YEAR ARI
FLOOD EVENT

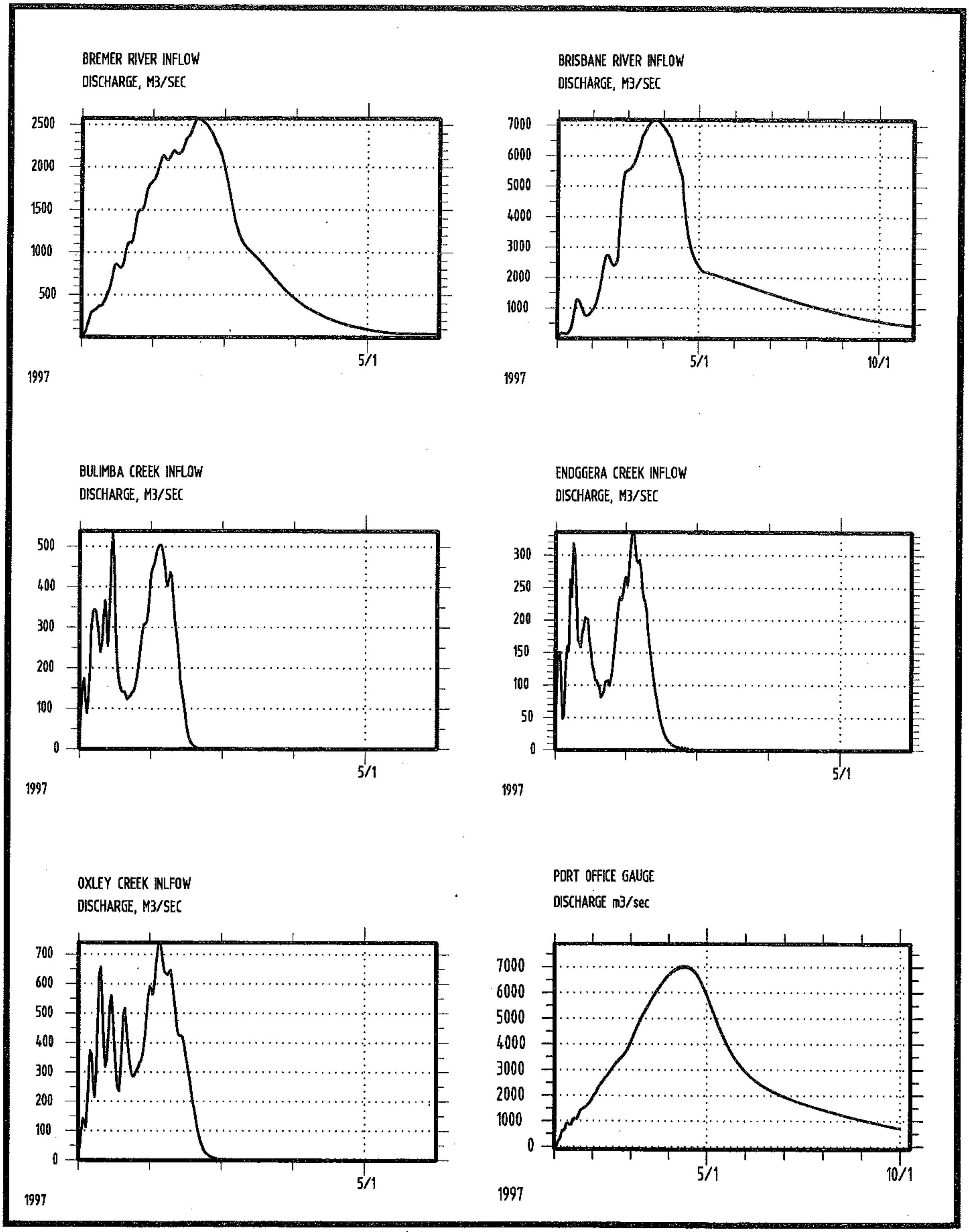


FILE NAME: 4157 ... PLOT SCALE: 1=1 DISK No: G:\ JOB No: T00... DATE: 17-2-...

SINCLAIR KNIGHT MERZ

FIGURE G-5

BRISBANE RIVER FLOOD STUDY HYDROGRAPHS FOR THE 50 YEAR ARI FLOOD EVENT

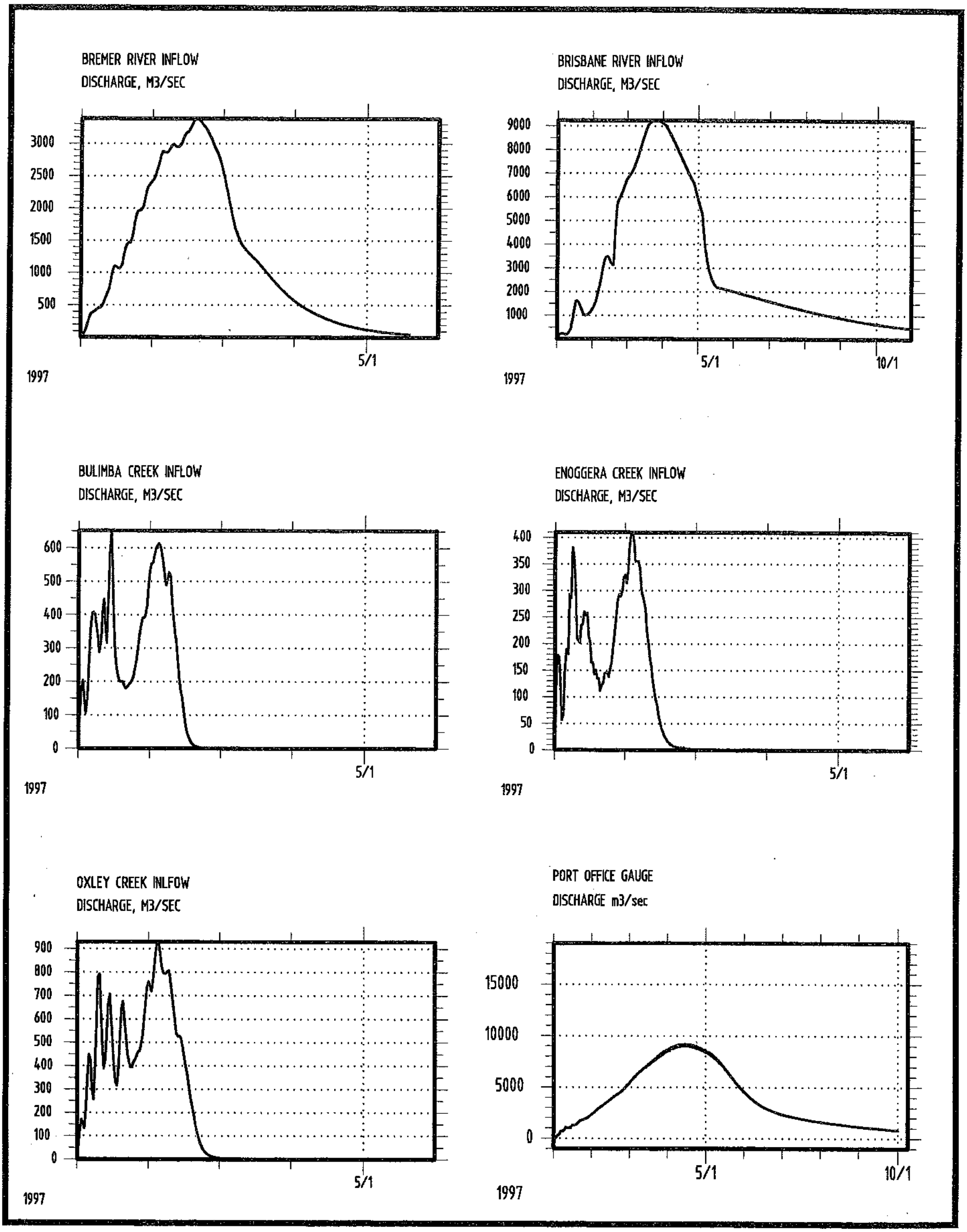


FILE NAME: 4157 PLOT SCALE: 1=1 DISK No: G:\ JOB No: T00/457 DATE: 17-2-98

SINCLAIR KNIGHT MERZ

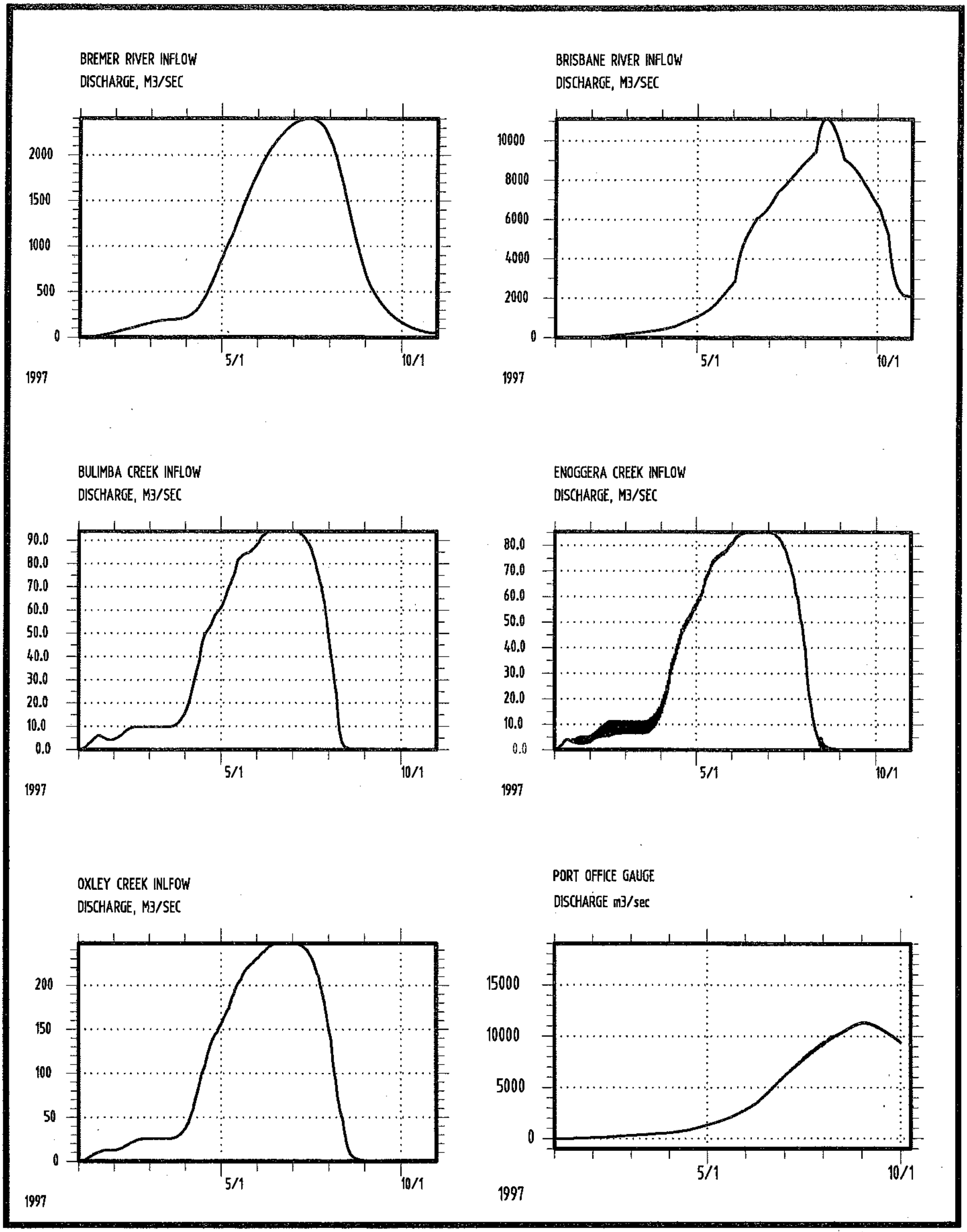
FIGURE G-6

BRISBANE RIVER FLOOD STUDY
HYDROGRAPHS FOR THE 100 YEAR ARI
FLOOD EVENT



FILE NAME: 4157-256 PL[illegible] [illegible]LE: 1: DISK N°: G:\ JOB N°: T004157 DATE: 17-2-98

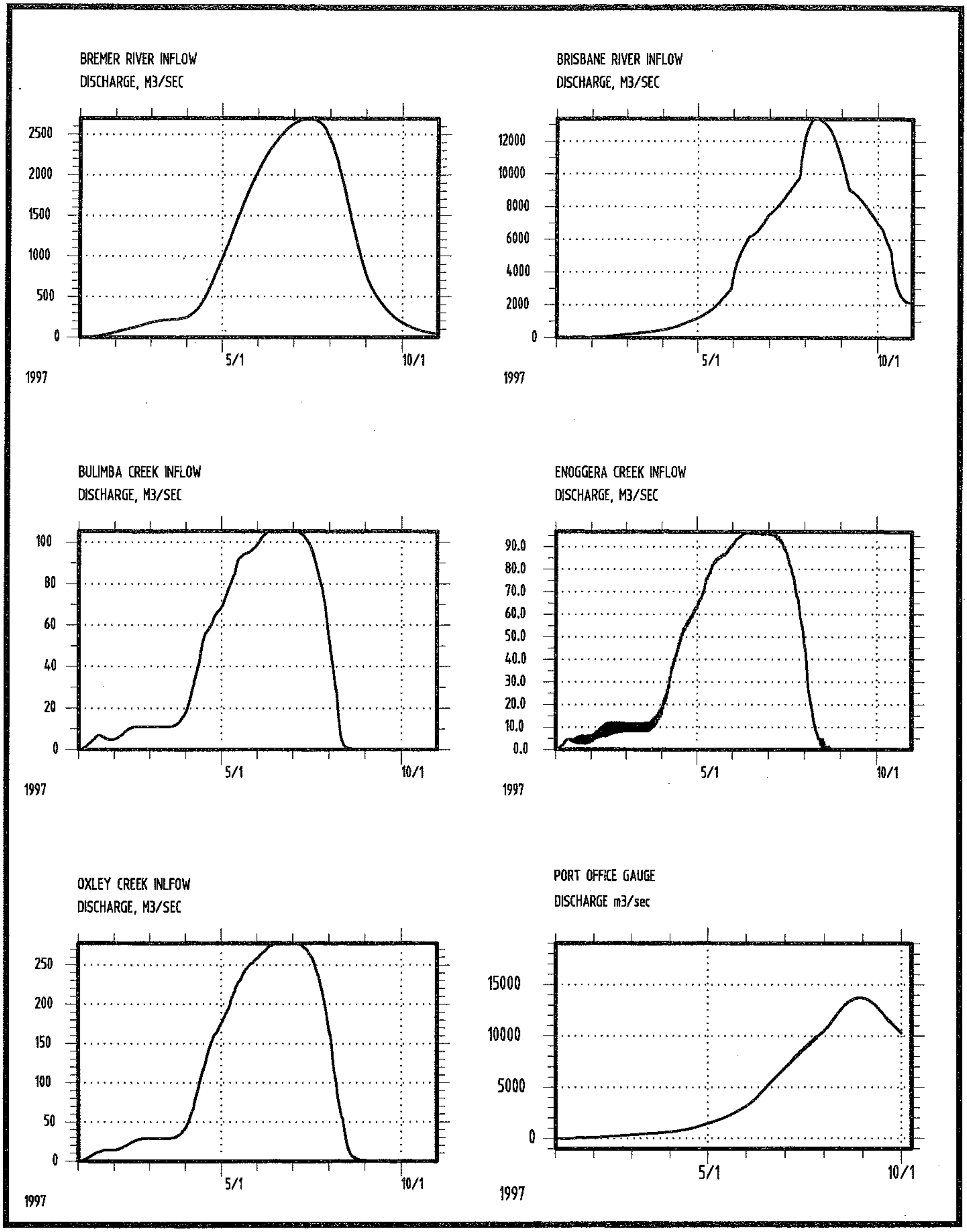
FIGURE G-7
BRISBANE RIVER FLOOD STUDY HYDROGRAPHS FOR THE 200 YEAR ARI FLOOD EVENT



FILE NAME: 4157-257 PLOT SCALE: 1=1 DISK No: G:\ JOB No: T004157 DATE: 17-2-98

FIGURE G-8
BRISBANE RIVER FLOOD STUDY
HYDROGRAPHS FOR THE 500 YEAR ARI
FLOOD EVENT

SINCLAIR KNIGHT MERZ

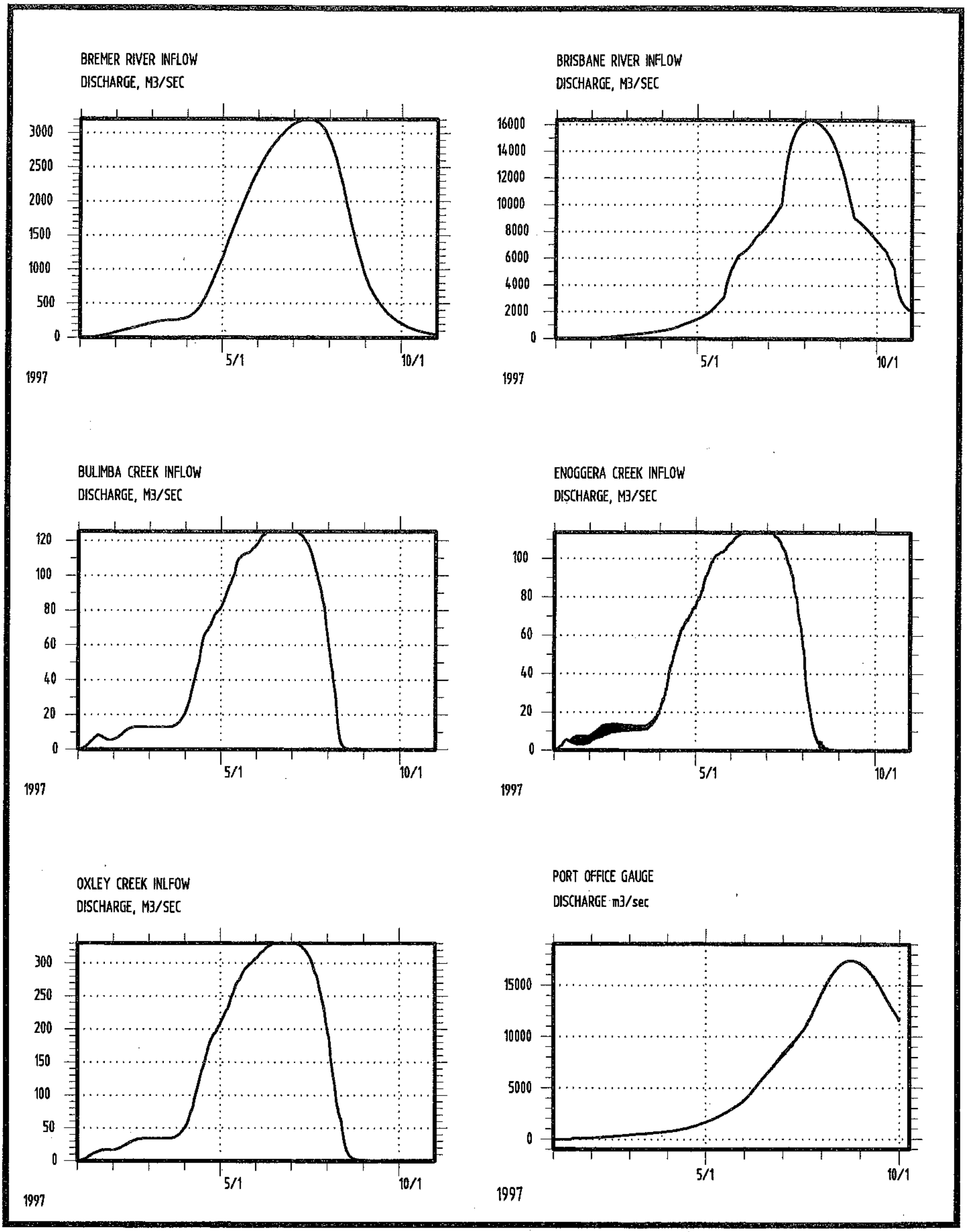


FILE NAME: 4157-258
PLOT SCALE: 1=1
DISK No: G:\
JOB No: T00/457
DATE: 17-2-98

SINCLAIR KNIGHT MERZ

FIGURE G-9

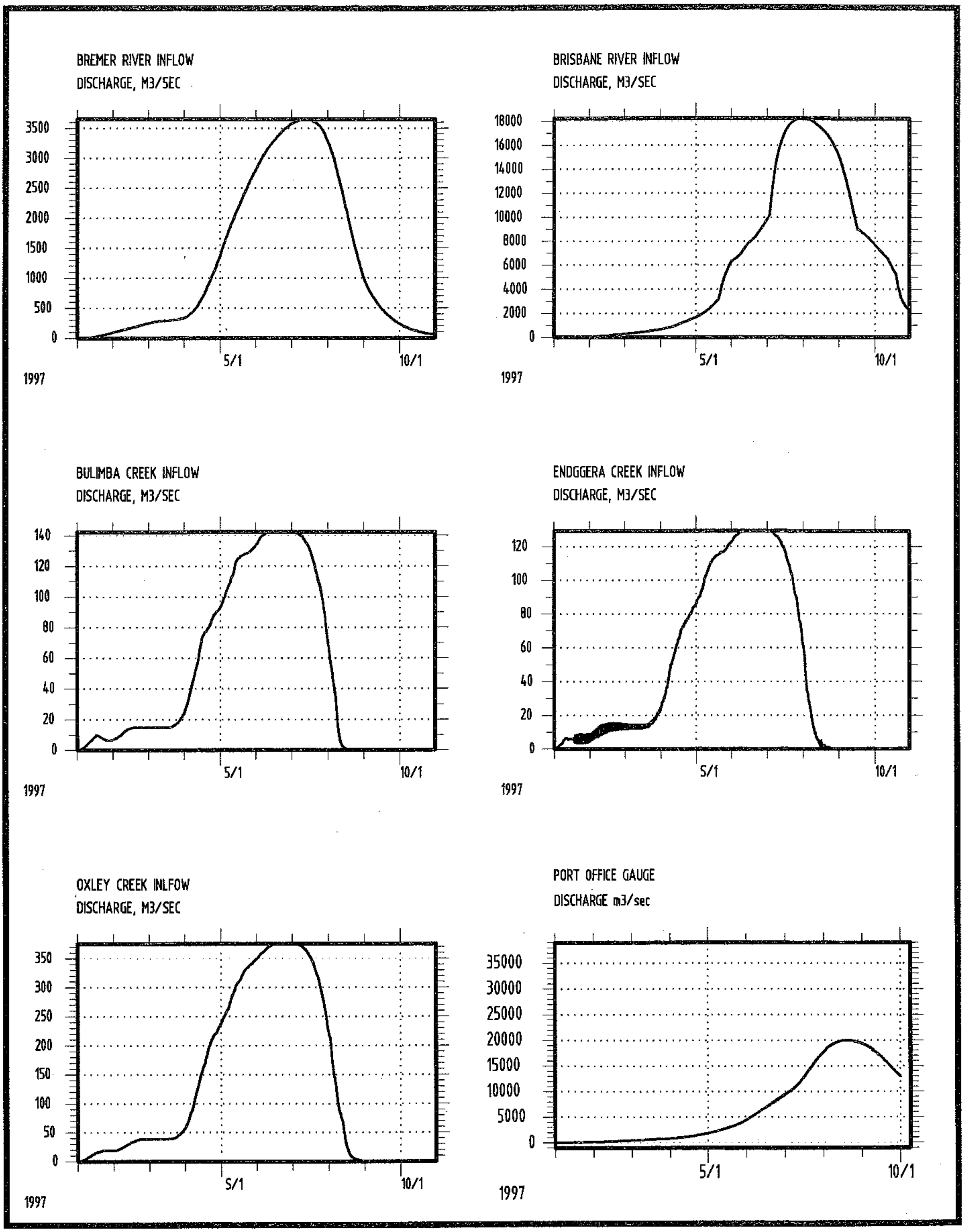
BRISBANE RIVER FLOOD STUDY
HYDROGRAPHS FOR THE 1000 YEAR ARI
FLOOD EVENT



FILE NAME: 4157.258 DISK No: G:\ JOB No: T00/457 DATE: 17-2-98
PLOT SCALE: 1=1

FIGURE G-10

BRISBANE RIVER FLOOD STUDY HYDROGRAPHS FOR THE 2000 YEAR ARI FLOOD EVENT

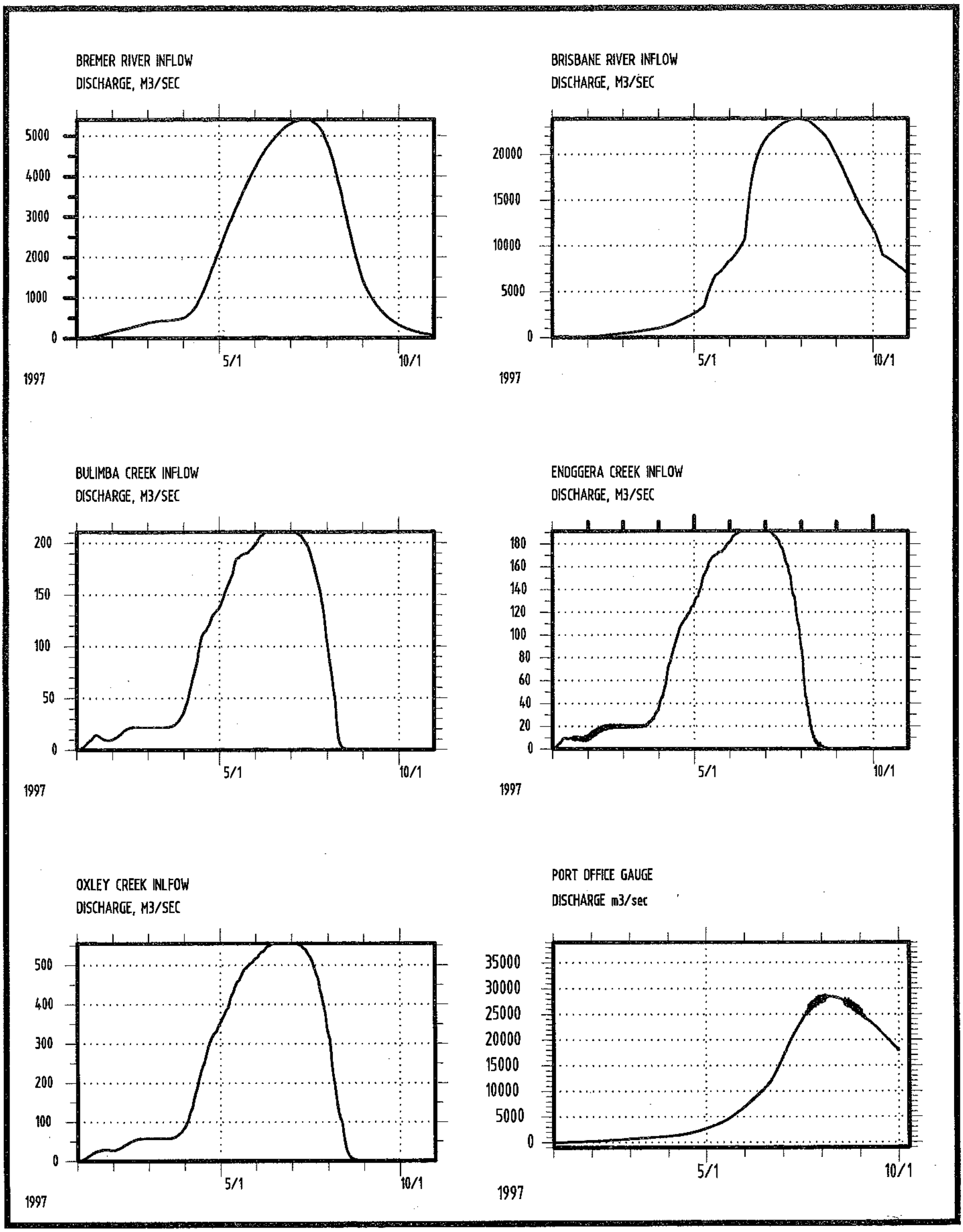


FILE NAME: 4157-260 PLOT SCALE: 1=1 DISK No: G:\ JOB No: T004157 DATE: 17-2-98

SINCLAIR KNIGHT MERZ

FIGURE G-11

BRISBANE RIVER FLOOD STUDY
HYDROGRAPHS FOR THE 10 000 YEAR ARI FLOOD EVENT

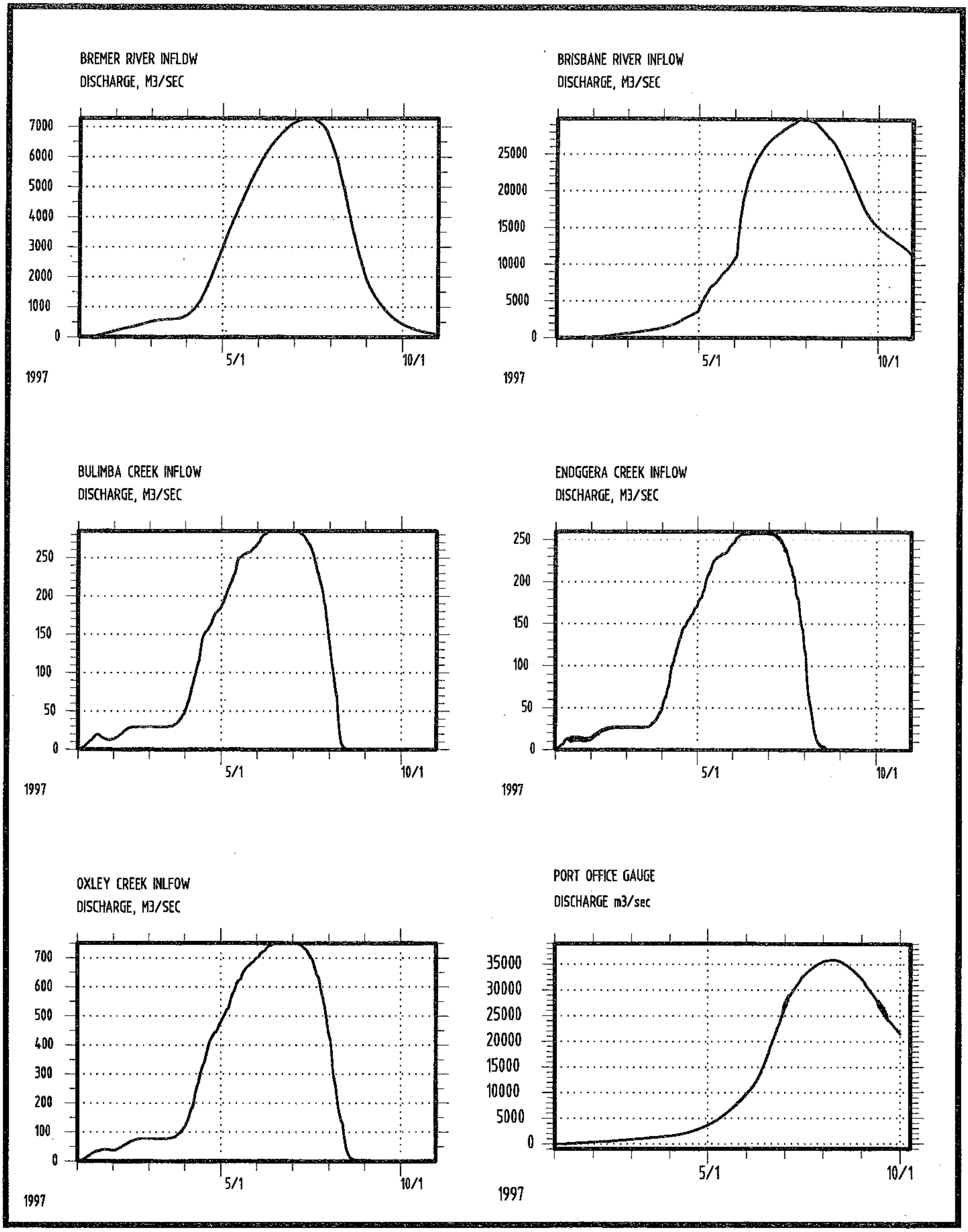


FILE : 415 PLOT SCALE: 1=1

D : G:\ J TOO 17-2

SINCLAIR KNIGHT MERZ

FIGURE G-12
BRISBANE RIVER FLOOD STUDY HYDROGRAPHS FOR THE PMF (100 000 YEAR ARI) FLOOD EVENT



Appendix H - Design Hydraulic Modelling Results - Existing Conditions

TABLE H-1 - Combined Tailwater and River Flooding Conditions - Moreton Bay Storm Surge

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	Design Events - Existing Case		
					100 Year ARI Flood 100 Year Moreton Bay Storm Surge (m AHD)	100 Year ARI Flood 20 Year Moreton Bay Storm Surge (m AHD)	20 Year ARI Flood 100 Year Moreton Bay Storm Surge (m AHD)
BRISBANE	1000	78.66	BN 2020		22.80	22.79	13.39
BRISBANE	1000.285	78.375	BN 2010		22.61	22.59	13.23
BRISBANE	1000.775	77.885	BN 2000		22.33	22.32	12.98
BRISBANE	1001.315	77.345	BN 1990		22.24	22.23	12.82
BRISBANE	1001.865	76.795	BN 1980		21.72	21.71	12.42
BRISBANE	1002.35	76.310	BN 1970		21.53	21.51	12.12
BRISBANE	1002.785	75.875	BN 1960		21.51	21.49	12.07
BRISBANE	1003.275	75.385	BN 1950		21.18	21.17	11.76
BRISBANE	1003.775	74.885	BN 1940		20.91	20.90	11.50
BRISBANE	1004.3	74.360	BN 1930		20.46	20.44	11.09
BRISBANE	1004.81	73.850	BN 1920		20.43	20.41	10.98
BRISBANE	1005.325	73.335	BN 1910		20.25	20.24	10.81
BRISBANE	1005.87	72.790	BN 1900		19.95	19.93	10.56
BRISBANE	1006.3	72.360	BN 1890	Moggill Gauge	19.77	19.76	10.48
BRISBANE	1006.91	71.750	BN 1880		19.57	19.56	10.30
BRISBANE	1007.41	71.250	BN 1870		19.54	19.53	10.24
BRISBANE	1007.92	70.740	BN 1860		19.26	19.24	10.05
BRISBANE	1008.445	70.215	BN 1850		19.08	19.06	9.96
BRISBANE	1008.925	69.735	BN 1840		19.02	19.00	9.92
BRISBANE	1009.4	69.260	BN 1830		18.93	18.91	9.84
BRISBANE	1009.72	68.940	BN 1820		18.92	18.90	9.81
BRISBANE	1010.49	68.170	BN 1810		18.56	18.54	9.64
BRISBANE	1010.725	67.935	BN 1800		18.58	18.56	9.65
BRISBANE	1010.98	67.680	BN 1790		18.51	18.49	9.60
BRISBANE	1011.51	67.150	BN 1780		18.50	18.48	9.56
BRISBANE	1011.98	66.680	BN 1770		18.50	18.48	9.51
BRISBANE	1012.475	66.185	BN 1760		18.40	18.38	9.43
BRISBANE	1012.935	65.725	BN 1750		18.29	18.27	9.36
BRISBANE	1013.445	65.215	BN 1740		18.21	18.19	9.29
BRISBANE	1013.91	64.750	BN 1730		18.15	18.13	9.23
BRISBANE	1014.31	64.350	BN 1720		18.12	18.10	9.17
BRISBANE	1014.61	64.050	BN 1710	Goodna Hospital Gauge	18.16	18.14	9.12
BRISBANE	1015.09	63.570	BN 1700		18.02	18.00	9.09
BRISBANE	1015.56	63.100	BN 1690		17.89	17.87	9.01
BRISBANE	1016.14	62.520	BN 1680		17.79	17.77	8.95
BRISBANE	1016.64	62.020	BN 1670		17.70	17.68	8.85
BRISBANE	1017.13	61.530	BN 1660		17.47	17.45	8.69
BRISBANE	1017.61	61.050	BN 1650		17.35	17.32	8.52
BRISBANE	1017.92	60.740	BN 1640		17.19	17.16	8.40
BRISBANE	1018.2	60.460	BN 1630		17.11	17.09	8.37
BRISBANE	1018.725	59.935	BN 1620		16.79	16.76	8.23
BRISBANE	1019.095	59.565	BN 1610		16.65	16.62	8.12
BRISBANE	1019.49	59.170	BN 1600		16.54	16.52	8.04
BRISBANE	1019.865	58.795	BN 1590		16.25	16.22	7.92
BRISBANE	1020.115	58.545	BN 1580		16.35	16.32	7.91
BRISBANE	1020.525	58.135	BN 1570		16.32	16.29	7.87
BRISBANE	1020.83	57.830	BN 1560		16.17	16.14	7.80
BRISBANE	1021.095	57.565	BN 1550		15.96	15.93	7.70
BRISBANE	1021.539	57.121	BN 1540		15.80	15.76	7.58
BRISBANE	1021.715	56.945	BN 1530		15.82	15.79	7.57
BRISBANE	1021.895	56.765	BN 1520		15.76	15.73	7.54
BRISBANE	1022.105	56.555	BN 1510		15.63	15.60	7.51
BRISBANE	1022.575	56.085	BN 1500		15.56	15.53	7.44
BRISBANE	1023.04	55.620	BN 1490		15.32	15.29	7.33
BRISBANE	1023.57	55.090	BN 1480		15.23	15.19	7.31
BRISBANE	1024.08	54.580	BN 1470		15.18	15.14	7.25
BRISBANE	1024.563	54.097	BN 1460		15.12	15.08	7.18
BRISBANE	1025.07	53.590	BN 1450		15.03	14.99	7.12
BRISBANE	1025.36	53.300	BN 1440		14.88	14.85	7.05
BRISBANE	1025.59	53.070	BN 1430		14.72	14.69	6.97
BRISBANE	1026.17	52.490	BN 1420		14.60	14.57	6.93
BRISBANE	1026.68	51.980	BN 1410	Mt Ommaney Gauge	14.50	14.46	6.84
BRISBANE	1026.9	51.760	BN 1400		14.37	14.34	6.78
BRISBANE	1027.16	51.500	BN 1390		14.23	14.20	6.74
BRISBANE	1027.68	50.980	BN 1380		14.29	14.26	6.72
BRISBANE	1028.18	50.480	BN 1370		14.32	14.28	6.72
BRISBANE	1028.68	49.980	BN 1360		14.19	14.15	6.65
BRISBANE	1028.72	49.940	BN1350	Centenary Bridge			
BRISBANE	1028.76	49.900	BN 1340		14.04	14.00	6.59
BRISBANE	1029.2	49.460	BN 1330		13.93	13.89	6.52
BRISBANE	1029.68	48.980	BN 1320		13.95	13.91	6.52
BRISBANE	1030.22	48.440	BN 1310		13.95	13.91	6.51
BRISBANE	1030.87	47.790	BN 1300		13.88	13.84	6.47
BRISBANE	1031.26	47.400	BN 1290		13.72	13.68	6.41
BRISBANE	1031.7	46.960	BN 1280	Darra Wharf Gauge	13.34	13.30	6.27
BRISBANE	1031.995	46.665	BN 1270		13.45	13.41	6.23
BRISBANE	1032.23	46.430	BN 1260		13.32	13.28	6.18
BRISBANE	1032.585	46.075	BN 1250		13.09	13.04	6.09
BRISBANE	1033.08	45.580	BN 1240		12.94	12.89	6.01
BRISBANE	1033.37	45.290	BN 1230		12.83	12.78	5.96
BRISBANE	1033.9	44.760	BN 1220		12.60	12.56	5.86

TABLE H-1 - Combined Tailwater and River Flooding Conditions - Moreton Bay Storm Surge

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	Design Events - Existing Case: 100 Year ARI Flood 100 Year Moreton Bay Storm Surge (m AHD)	100 Year ARI Flood 20 Year Moreton Bay Storm Surge (m AHD)	20 Year ARI Flood 100 Year Moreton Bay Storm Surge (m AHD)
BRISBANE	1034.37	44.290	BN 1210		12.45	12.40	5.81
BRISBANE	1034.89	43.770	BN 1200	Sherwood Gauge	12.35	12.30	5.74
BRISBANE	1035.414	43.246	BN 1190		12.11	12.06	5.63
BRISBANE	1035.9	42.760	BN 1180		11.83	11.78	5.50
BRISBANE	1036.46	42.200	BN 1170		11.53	11.48	5.37
BRISBANE	1036.77	41.890	BN 1160		11.46	11.40	5.32
BRISBANE	1036.915	41.745	BN 1150		11.30	11.25	5.27
BRISBANE	1037.09	41.570	BN 1140		11.26	11.20	5.26
BRISBANE	1037.11	41.550	BN 1130	Indooroopilly Bridge			
BRISBANE	1037.175	41.485	BN 1120		11.17	11.11	5.12
BRISBANE	1037.285	41.375	BN 1110	Clarence Road Gauge	11.12	11.06	5.09
BRISBANE	1037.625	41.035	BN 1100		11.10	11.05	5.06
BRISBANE	1038.085	40.575	BN 1090		11.13	11.07	5.05
BRISBANE	1038.6	40.060	BN 1080		11.11	11.05	5.01
BRISBANE	1039.1	39.560	BN 1070		11.10	11.04	4.99
BRISBANE	1039.565	39.095	BN 1060	Oxley Creek Gauge	11.12	11.06	4.98
BRISBANE	1040.09	38.570	BN 1050	King Authur Terrace Gauge	11.04	10.98	4.98
BRISBANE	1040.49	38.170	BN 1040		10.91	10.85	4.93
BRISBANE	1041.01	37.650	BN 1030		10.95	10.89	4.93
BRISBANE	1041.23	37.430	BN 1020		10.92	10.85	4.90
BRISBANE	1041.46	37.200	BN 1010	Tennyson Power House Gauge	10.83	10.77	4.87
BRISBANE	1041.7	36.960	BN 1000		10.80	10.74	4.87
BRISBANE	1041.96	36.700	BN 990	Yeronga Street Gauge	10.67	10.60	4.81
BRISBANE	1042.235	36.425	BN 980		10.52	10.45	4.76
BRISBANE	1042.515	36.145	BN 970		10.52	10.45	4.74
BRISBANE	1042.91	35.750	BN 960		10.46	10.39	4.68
BRISBANE	1043.725	34.935	BN 950		10.15	10.08	4.55
BRISBANE	1044.06	34.600	BN 940	Sandy Creek Gauge	10.00	9.92	4.51
BRISBANE	1044.34	34.320	BN 930		9.84	9.76	4.46
BRISBANE	1044.605	34.055	BN 920		9.79	9.71	4.42
BRISBANE	1044.86	33.800	BN 910		9.75	9.67	4.40
BRISBANE	1045.4	33.260	BN 900		9.58	9.49	4.31
BRISBANE	1045.885	32.775	BN 890		9.46	9.37	4.22
BRISBANE	1046.18	32.480	BN 880		9.38	9.29	4.21
BRISBANE	1046.34	32.320	BN 870	Dutton Park Cemetery Gauge	9.31	9.22	4.19
BRISBANE	1046.58	32.080	BN 860		9.26	9.17	4.17
BRISBANE	1046.9	31.760	BN 850		9.08	8.99	4.10
BRISBANE	1047.35	31.310	BN 840		8.72	8.62	3.98
BRISBANE	1047.915	30.745	BN 830	Highgate Hill Gauge	8.50	8.40	3.91
BRISBANE	1048.375	30.285	BN 820		8.56	8.46	3.91
BRISBANE	1048.89	29.770	BN 810	St Lucia Ferry Gauge	8.34	8.23	3.83
BRISBANE	1049.12	29.540	BN 800		8.29	8.18	3.81
BRISBANE	1049.37	29.290	BN 790		8.12	8.00	3.76
BRISBANE	1049.59	29.070	BN 780		8.12	8.00	3.76
BRISBANE	1049.87	28.790	BN 770		7.99	7.88	3.72
BRISBANE	1050.43	28.230	BN 760		7.99	7.87	3.69
BRISBANE	1050.86	27.800	BN 750		7.85	7.72	3.66
BRISBANE	1051.36	27.300	BN 740		7.85	7.72	3.66
BRISBANE	1051.895	26.765	BN 730		7.69	7.56	3.59
BRISBANE	1052.31	26.350	BN 720		7.79	7.67	3.62
BRISBANE	1052.37	26.290	BN 710	Merivale Bridge			
BRISBANE	1052.39	26.270	BN 700		7.64	7.50	3.58
BRISBANE	1052.595	26.065	BN 690		7.54	7.41	3.56
BRISBANE	1052.607	26.053	BN 680	William Jolly Bridge			
BRISBANE	1052.64	26.020	BN 670		7.05	6.93	3.49
BRISBANE	1052.865	25.795	BN 660	Montague Road Gauge	6.93	6.80	3.47
BRISBANE	1053.32	25.340	BN 650		6.86	6.73	3.44
BRISBANE	1053.356	25.304	BN 640	Victoria Bridge			
BRISBANE	1053.385	25.275	BN630		6.70	6.57	3.39
BRISBANE	1053.9	24.760	BN 620		6.35	6.21	3.28
BRISBANE	1054.64	24.020	BN 610		6.29	6.14	3.26
BRISBANE	1054.66	24.000	BN 600	Captain Cook Bridge			
BRISBANE	1054.68	23.980	BN 590		6.22	6.07	3.24
BRISBANE	1054.97	23.690	BN 560		5.99	5.84	3.19
BRISBANE	1055.28	23.380	BN 550		5.94	5.79	3.18
BRISBANE	1055.42	23.240	BN 540		5.95	5.79	3.18
BRISBANE	1055.96	22.700	BN 530	Port Office Gauge	5.90	5.74	3.16
BRISBANE	1056.4	22.260	BN 520		5.67	5.51	3.11
BRISBANE	1056.695	21.965	BN 510		5.62	5.45	3.09
BRISBANE	1056.865	21.795	BN 500		5.80	5.64	3.13
BRISBANE	1056.92	21.740	BN 495	Story Bridge			
BRISBANE	1056.95	21.710	BN 490		5.71	5.54	3.11
BRISBANE	1057.09	21.570	BN 480		5.57	5.40	3.08
BRISBANE	1057.53	21.130	BN 470		5.45	5.27	3.06
BRISBANE	1058.04	20.620	BN 460		5.23	5.04	3.00
BRISBANE	1058.23	20.430	BN 450		5.16	4.97	2.99
BRISBANE	1058.53	20.130	BN 440		5.04	4.85	2.97
BRISBANE	1058.735	19.925	BN 430		5.08	4.89	2.97
BRISBANE	1059.035	19.625	BN 420		4.82	4.63	2.92
BRISBANE	1059.54	19.120	BN 410		4.80	4.60	2.91
BRISBANE	1059.99	18.670	BN 400		4.64	4.43	2.87

TABLE H-1 - Combined Tailwater and River Flooding Conditions - Moreton Bay Storm Surge

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	Design Events - Existing Case		
					100 Year ARI Flood 100 Year Moreton Bay Storm Surge (m AHD)	100 Year ARI Flood 20 Year Moreton Bay Storm Surge (m AHD)	20 Year ARI Flood 100 Year Moreton Bay Storm Surge (m AHD)
BRISBANE	1060.345	18.315	BN 390		4.42	4.20	2.84
BRISBANE	1060.535	18.125	BN 380		4.29	4.06	2.81
BRISBANE	1061.015	17.645	BN 370		4.27	4.04	2.80
BRISBANE	1061.53	17.130	BN 360		4.09	3.85	2.77
BRISBANE	1062.02	16.640	BN 350		4.04	3.80	2.76
BRISBANE	1062.535	16.125	BN 340		4.02	3.77	2.75
BRISBANE	1062.94	15.720	BN 330		4.02	3.77	2.75
BRISBANE	1063.31	15.350	BN 320	Newstead Park Gauge	3.92	3.67	2.73
BRISBANE	1063.645	15.015	BN 310	Cresent Road Gauge	3.70	3.43	2.69
BRISBANE	1064	14.660	BN 300		3.67	3.40	2.69
BRISBANE	1064.49	14.170	BN 290		3.57	3.29	2.67
BRISBANE	1065.01	13.650	BN 280		3.61	3.33	2.68
BRISBANE	1065.503	13.157	BN 270		3.57	3.29	2.67
BRISBANE	1065.99	12.670	BN 260	Cairncross Dock Gauge	3.58	3.30	2.67
BRISBANE	1066.505	12.155	BN 250		3.53	3.24	2.66
BRISBANE	1067.02	11.640	BN 240		3.50	3.21	2.66
BRISBANE	1067.485	11.175	BN 230		3.43	3.13	2.65
BRISBANE	1067.965	10.695	BN 220		3.33	3.03	2.65
BRISBANE	1068.66	10.000	BN 210		3.20	2.88	2.64
BRISBANE	1069.045	9.615	BN 200		3.15	2.83	2.64
BRISBANE	1069.535	9.125	BN 190	Bulimba Power House Gauge	3.11	2.79	2.63
BRISBANE	1070.025	8.635	BN 180		3.06	2.73	2.62
BRISBANE	1070.53	8.130	BN 170		3.00	2.66	2.62
BRISBANE	1071.04	7.620	BN 160		2.95	2.60	2.62
BRISBANE	1071.52	7.140	BN 150		2.97	2.63	2.62
BRISBANE	1072.015	6.645	BN 140		2.89	2.54	2.61
BRISBANE	1072.515	6.145	BN 130		2.85	2.49	2.61
BRISBANE	1072.995	5.665	BN 120		2.82	2.46	2.61
BRISBANE	1073.485	5.175	BN 110		2.75	2.39	2.61
BRISBANE	1074	4.660	BN 100		2.70	2.34	2.62
BRISBANE	1074.46	4.200	BN 90		2.67	2.29	2.62
BRISBANE	1074.985	3.675	BN 80		2.60	2.20	2.59
BRISBANE	1075.48	3.180	BN 70		2.60	2.19	2.60
BRISBANE	1076	2.660	BN 60		2.63	2.20	2.63
BRISBANE	1076.495	2.165	BN 50		2.64	2.19	2.64
BRISBANE	1077.01	1.650	BN 40		2.69	2.21	2.69
BRISBANE	1077.51	1.150	BN 30		2.67	2.20	2.67
BRISBANE	1078.04	0.620	BN 20		2.61	2.16	2.61
BRISBANE	1078.525	0.135	BN 10		2.50	2.10	2.50
BRISBANE	1078.66	0.000	-	Western Inner Bar Gauge	2.50	2.10	2.50
BREMER	599.4	-	-		19.82	19.80	10.50
BREMER	600	-	-		19.82	19.80	10.50
OXLEY	599.4	-	-		11.08	11.02	4.98
OXLEY	600	-	-		11.08	11.02	4.98
BREAKFAST	599.4	-	-		4.00	3.75	2.75
BREAKFAST	600	-	-		4.00	3.74	2.75
BULIMBA	599.4	-	-		2.89	2.54	2.61
BULIMBA	600	-	-		2.89	2.54	2.61
CENTWEIR	0	-	-		14.19	14.15	6.65
CENTWEIR	0.08	-	-		14.04	14.00	6.59
INDOORWEIR	0	-	-		11.26	11.20	5.26
INDOORWEIR	0.085	-	-		11.17	11.11	5.12
WILLIAMWEIR	0	-	-		7.54	7.41	3.56
WILLIAMWEIR	0.045	-	-		7.05	6.93	3.49
VICTORIAWEIR	0	-	-		6.86	6.73	3.44
VICTORIAWEIR	0.065	-	-		6.70	6.57	3.39
CAPTAINWEIR	0	-	-		6.29	6.14	3.26
CAPTAINWEIR	0.04	-	-		6.22	6.07	3.24
STORYWEIR	0	-	-		5.80	5.64	3.13
STORYWEIR	0.085	-	-		5.71	5.54	3.11
MERIVALEWE	0	-	-		7.79	7.67	3.62
MERIVALEWE	0.08	-	-		7.64	7.50	3.58
GOODNALINK1	0	-	-		18.25	18.23	9.32
GOODNALINK1	1	-	-		17.61	17.58	8.77
GOODNALINK2	0	-	-		18.18	18.16	9.26
GOODNALINK2	1.07	-	-		17.85	17.82	8.98
STLUCIALINK1	0	-	-		11.11	11.05	4.99
STLUCIALINK1	1.05	-	-		10.39	10.31	4.64
STLUCIALINK2	0	-	-		11.10	11.04	4.98
STLUCIALINK2	1.05	-	-		10.42	10.35	4.66
STLUCIALINK3	0	-	-		10.99	10.93	4.96
STLUCIALINK3	0.85	-	-		10.52	10.45	4.74

TABLE H -2 - Predicted Flood Levels for Design Events

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	DESIGN EVENTS PMF WL (m AHD)	10000 YEAR ARI WL (m AHD)	2000 YEAR ARI WL (m AHD)	1000 YEAR ARI WL (m AHD)	500 YEAR ARI WL (m AHD)	200 YEAR ARI WL (m AHD)	100 YEAR ARI WL (m AHD)	50 YEAR ARI WL (m AHD)	20 YEAR ARI WL (m AHD)	10 YEAR ARI WL (m AHD)	5 YEAR ARI WL (m AHD)	2 YEAR ARI WL (m AHD)
BRISBANE	1000	78.66	BN 2020		40.26	36.04	31.82	30.29	27.56	25.25	22.76	19.70	13.24	7.25	4.72	1.77
BRISBANE	1000.285	78.375	BN 2010		40.31	36.03	31.73	30.17	27.36	25.04	22.57	19.53	13.07	7.16	4.66	1.75
BRISBANE	1000.775	77.885	BN 2000		39.47	35.32	31.19	29.68	26.99	24.73	22.29	19.28	12.81	7.00	4.54	1.71
BRISBANE	1001.315	77.345	BN 1990		39.73	35.49	31.26	29.72	26.98	24.68	22.20	19.17	12.65	6.86	4.40	1.65
BRISBANE	1001.865	76.795	BN 1980		39.00	34.79	30.62	29.10	26.40	24.14	21.68	18.70	12.23	6.64	4.24	1.59
BRISBANE	1002.35	76.310	BN 1970		38.81	34.60	30.44	28.92	26.23	23.95	21.48	18.48	11.92	6.42	4.09	1.56
BRISBANE	1002.785	75.875	BN 1960		39.08	34.76	30.53	28.98	26.24	23.93	21.46	18.46	11.86	6.34	4.01	1.53
BRISBANE	1003.275	75.385	BN 1950		38.72	34.42	30.17	28.61	25.89	23.60	21.13	18.15	11.54	6.16	3.88	1.50
BRISBANE	1003.775	74.885	BN 1940		38.28	34.03	29.85	28.31	25.62	23.34	20.86	17.91	11.26	5.97	3.73	1.48
BRISBANE	1004.3	74.360	BN 1930		38.19	33.79	29.42	27.79	25.13	22.86	20.41	17.49	10.83	5.75	3.59	1.46
BRISBANE	1004.81	73.850	BN 1920		38.06	33.71	29.41	27.82	25.14	22.85	20.37	17.44	10.70	5.63	3.49	1.45
BRISBANE	1005.325	73.335	BN 1910		37.97	33.58	29.23	27.62	24.93	22.67	20.20	17.28	10.53	5.47	3.36	1.44
BRISBANE	1005.87	72.790	BN 1900		37.61	33.21	28.85	27.21	24.59	22.35	19.89	16.98	10.26	5.25	3.18	1.42
BRISBANE	1006.3	72.360	BN 1890	Moggill Gauge	37.63	33.17	28.74	27.07	24.41	22.18	19.72	16.85	10.18	5.18	3.14	1.42
BRISBANE	1006.91	71.750	BN 1880		37.43	32.94	28.49	26.79	24.17	21.96	19.51	16.64	9.99	5.06	3.06	1.40
BRISBANE	1007.41	71.250	BN 1870		37.41	32.84	28.43	26.76	24.14	21.94	19.48	16.60	9.92	4.97	3.00	1.38
BRISBANE	1007.92	70.740	BN 1860		37.23	32.69	28.24	26.54	23.88	21.62	19.19	16.34	9.73	4.85	2.92	1.36
BRISBANE	1008.445	70.215	BN 1850		37.01	32.42	27.92	26.17	23.60	21.41	19.02	16.20	9.63	4.78	2.87	1.34
BRISBANE	1008.925	69.735	BN 1840		37.16	32.54	27.95	26.14	23.48	21.33	18.96	16.15	9.59	4.74	2.84	1.34
BRISBANE	1009.4	69.260	BN 1830		36.87	32.31	27.84	26.11	23.48	21.27	18.86	16.05	9.50	4.70	2.81	1.33
BRISBANE	1009.72	68.940	BN 1820		37.04	32.44	27.91	26.15	23.48	21.25	18.85	16.03	9.47	4.67	2.80	1.33
BRISBANE	1010.49	68.170	BN 1810		36.41	31.84	27.40	25.65	23.03	20.82	18.50	15.74	9.30	4.59	2.75	1.31
BRISBANE	1010.725	67.935	BN 1800		36.08	31.62	27.28	25.58	23.02	20.86	18.52	15.75	9.30	4.58	2.75	1.31
BRISBANE	1010.98	67.680	BN 1790		35.65	31.27	27.04	25.37	22.88	20.75	18.44	15.69	9.26	4.56	2.73	1.31
BRISBANE	1011.51	67.150	BN 1780		36.34	31.78	27.36	25.62	23.02	20.81	18.43	15.67	9.21	4.52	2.71	1.30
BRISBANE	1011.98	66.680	BN 1770		36.43	31.85	27.40	25.66	23.04	20.83	18.43	15.62	9.15	4.48	2.68	1.30
BRISBANE	1012.475	66.185	BN 1760		36.47	31.85	27.34	25.57	22.90	20.71	18.33	15.53	9.07	4.42	2.65	1.29
BRISBANE	1012.935	65.725	BN 1750		36.46	31.84	27.33	25.57	22.90	20.65	18.22	15.44	8.99	4.38	2.62	1.28
BRISBANE	1013.445	65.215	BN 1740		36.39	31.73	27.16	25.40	22.75	20.54	18.14	15.34	8.92	4.33	2.59	1.28
BRISBANE	1013.91	64.750	BN 1730		36.42	31.78	27.24	25.45	22.76	20.53	18.08	15.29	8.85	4.27	2.55	1.26
BRISBANE	1014.31	64.350	BN 1720		36.41	31.77	27.23	25.44	22.75	20.52	18.05	15.22	8.79	4.22	2.51	1.25
BRISBANE	1014.61	64.050	BN 1710	Goodna Hospital Gauge	36.42	31.77	27.23	25.45	22.76	20.53	18.08	15.25	8.73	4.18	2.49	1.25
BRISBANE	1015.09	63.570	BN 1700		36.34	31.69	27.13	25.34	22.64	20.41	17.94	15.13	8.71	4.17	2.48	1.25
BRISBANE	1015.56	63.100	BN 1690		36.09	31.50	27.01	25.22	22.53	20.29	17.81	15.02	8.62	4.13	2.46	1.24
BRISBANE	1016.14	62.520	BN 1680		36.30	31.66	27.10	25.28	22.54	20.25	17.71	14.93	8.56	4.09	2.44	1.24
BRISBANE	1016.64	62.020	BN 1670		36.38	31.71	27.10	25.27	22.50	20.17	17.62	14.82	8.45	4.01	2.38	1.22
BRISBANE	1017.13	61.530	BN 1660		36.37	31.66	27.01	25.14	22.27	19.94	17.39	14.61	8.27	3.87	2.29	1.20
BRISBANE	1017.61	61.050	BN 1650		36.23	31.40	26.82	24.97	22.17	19.84	17.26	14.44	8.09	3.77	2.23	1.19
BRISBANE	1017.92	60.740	BN 1640		36.11	31.25	26.58	24.75	21.98	19.67	17.10	14.28	7.96	3.69	2.19	1.18
BRISBANE	1018.2	60.460	BN 1630		36.16	31.35	26.68	24.81	21.95	19.59	17.02	14.22	7.93	3.67	2.18	1.18
BRISBANE	1018.725	59.935	BN 1620		35.93	31.09	26.37	24.44	21.53	19.21	16.69	13.94	7.78	3.60	2.14	1.17
BRISBANE	1019.095	59.565	BN 1610		35.87	31.03	26.31	24.37	21.42	19.07	16.56	13.80	7.66	3.54	2.11	1.16
BRISBANE	1019.49	59.170	BN 1600		35.69	30.85	26.16	24.24	21.31	18.95	16.45	13.70	7.58	3.48	2.08	1.16
BRISBANE	1019.865	58.795	BN 1590		35.32	30.47	25.79	23.84	20.88	18.60	16.15	13.46	7.45	3.43	2.05	1.15
BRISBANE	1020.115	58.545	BN 1580		35.65	30.77	26.04	24.09	21.12	18.75	16.25	13.51	7.43	3.40	2.03	1.15
BRISBANE	1020.525	58.135	BN 1570		35.63	30.75	26.00	24.04	21.08	18.73	16.22	13.48	7.39	3.36	2.01	1.14
BRISBANE	1020.83	57.830	BN 1560		35.32	30.45	25.75	23.79	20.86	18.54	16.07	13.36	7.32	3.32	1.99	1.14
BRISBANE	1021.095	57.565	BN 1550		34.89	30.05	25.42	23.47	20.58	18.30	15.86	13.19	7.21	3.27	1.96	1.13
BRISBANE	1021.539	57.121	BN 1540		34.79	29.93	25.28	23.32	20.40	18.12	15.69	13.03	7.08	3.19	1.92	1.13
BRISBANE	1021.715	56.945	BN 1530		34.98	30.08	25.38	23.40	20.46	18.16	15.72	13.03	7.06	3.17	1.91	1.12
BRISBANE	1021.895	56.765	BN 1520		34.82	29.88	25.23	23.27	20.36	18.08	15.65	12.98	7.03	3.15	1.90	1.12
BRISBANE	1022.105	56.555	BN 1510		34.39	29.53	24.96	23.03	20.17	17.92	15.53	12.90	7.00	3.15	1.89	1.12
BRISBANE	1022.575	56.085	BN 1500		34.65	29.69	24.97	23.02	20.14	17.87	15.45	12.80	6.92	3.10	1.87	1.12
BRISBANE	1023.04	55.620	BN 1490		34.60	29.62	24.86	22.82	19.84	17.59	15.21	12.59	6.81	3.07	1.86	1.12
BRISBANE	1023.57	55.090	BN 1480		33.87	29.00	24.46	22.51	19.68	17.48	15.12	12.52	6.78	3.05	1.85	1.11
BRISBANE	1024.08	54.580	BN 1470		34.19	29.08	24.48	22.51	19.65	17.43	15.07	12.46	6.72	3.02	1.83	1.11
BRISBANE	1024.563	54.097	BN 1460		34.15	29.12	24.43	22.42	19.58	17.37	15.01	12.40	6.64	2.97	1.80	1.11
BRISBANE	1025.07	53.590	BN 1450		34.39	29.32	24.54	22.49	19.53	17.29	14.91	12.30	6.58	2.93	1.78	1.10
BRISBANE	1025.36	53.300	BN 1440		33.96	28.85	24.19	22.18	19.31	17.12	14.77	12.19	6.49	2.89	1.76	1.10
BRISBANE	1025.59	53.070	BN 1430		33.59	28.61	24.00	21.99	19.14	16.95	14.61	12.04	6.41	2.85	1.75	1.10
BRISBANE	1026.17	52.490	BN 1420		33.61	28.41	23.77	21.75	18.92	16.78	14.48	11.96	6.36	2.83	1.73	1.09

TABLE H -2 - Predicted Flood Levels for Design Events

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	DESIGN EVENTS PMF WL (m AHD)	10000 YEAR ARI WL (m AHD)	2000 YEAR ARI WL (m AHD)	1000 YEAR ARI WL (m AHD)	500 YEAR ARI WL (m AHD)	200 YEAR ARI WL (m AHD)	100 YEAR ARI WL (m AHD)	50 YEAR ARI WL (m AHD)	20 YEAR ARI WL (m AHD)	10 YEAR ARI WL (m AHD)	5 YEAR ARI WL (m AHD)	2 YEAR ARI WL (m AHD)
BRISBANE	1026.68	51.980	BN 1410	Mt Ommaney Gauge	33.69	28.56	23.87	21.82	18.92	16.70	14.38	11.84	6.26	2.78	1.71	1.09
BRISBANE	1026.9	51.760	BN 1400		33.62	28.47	23.77	21.70	18.78	16.54	14.25	11.73	6.20	2.75	1.70	1.09
BRISBANE	1027.16	51.500	BN 1390		33.40	28.23	23.53	21.45	18.53	16.38	14.11	11.62	6.15	2.73	1.69	1.09
BRISBANE	1027.68	50.980	BN 1380		33.33	28.22	23.58	21.54	18.66	16.47	14.17	11.64	6.13	2.71	1.68	1.08
BRISBANE	1028.18	50.480	BN 1370		33.51	28.37	23.68	21.62	18.71	16.51	14.19	11.65	6.12	2.70	1.67	1.08
BRISBANE	1028.68	49.980	BN 1360		33.23	28.11	23.48	21.43	18.55	16.36	14.06	11.54	6.05	2.67	1.66	1.08
BRISBANE	1028.72	49.940	BN1350	Centenary Bridge												
BRISBANE	1028.76	49.900	BN 1340		32.66	27.50	22.92	21.18	18.32	16.14	13.91	11.45	5.97	2.63	1.64	1.07
BRISBANE	1029.2	49.460	BN 1330		32.32	27.22	22.76	21.04	18.18	16.00	13.80	11.35	5.90	2.60	1.62	1.07
BRISBANE	1029.68	48.980	BN 1320		32.60	27.44	22.90	21.16	18.26	16.05	13.82	11.34	5.90	2.60	1.62	1.07
BRISBANE	1030.22	48.440	BN 1310		32.70	27.38	22.84	21.11	18.23	16.04	13.82	11.36	5.89	2.58	1.62	1.07
BRISBANE	1030.87	47.790	BN 1300		32.37	27.19	22.72	21.01	18.14	15.96	13.75	11.29	5.84	2.56	1.60	1.07
BRISBANE	1031.26	47.400	BN 1290		31.83	26.75	22.41	20.72	17.92	15.77	13.59	11.17	5.78	2.54	1.59	1.07
BRISBANE	1031.7	46.960	BN 1280	Darra Wharf Gauge	30.69	25.72	21.65	20.04	17.36	15.30	13.21	10.87	5.62	2.47	1.56	1.06
BRISBANE	1031.995	46.665	BN 1270		31.74	26.57	22.20	20.50	17.67	15.51	13.31	10.87	5.57	2.44	1.55	1.06
BRISBANE	1032.23	46.430	BN 1260		31.26	26.12	21.89	20.23	17.46	15.34	13.18	10.79	5.51	2.41	1.53	1.06
BRISBANE	1032.585	46.075	BN 1250		30.52	25.48	21.43	19.81	17.11	15.05	12.94	10.59	5.41	2.37	1.52	1.05
BRISBANE	1033.08	45.580	BN 1240		30.88	25.32	21.27	19.65	16.95	14.89	12.79	10.45	5.32	2.34	1.50	1.05
BRISBANE	1033.37	45.290	BN 1230		30.91	25.52	21.26	19.54	16.81	14.76	12.68	10.36	5.27	2.31	1.49	1.05
BRISBANE	1033.9	44.760	BN 1220		30.67	25.23	20.97	19.22	16.48	14.47	12.45	10.17	5.16	2.28	1.48	1.05
BRISBANE	1034.37	44.290	BN 1210		30.78	25.21	20.66	18.95	16.27	14.29	12.29	10.03	5.10	2.25	1.46	1.05
BRISBANE	1034.89	43.770	BN 1200	Sherwood Gauge	30.85	25.32	20.87	19.06	16.19	14.20	12.19	9.93	5.02	2.22	1.45	1.04
BRISBANE	1035.414	43.246	BN 1190		30.01	24.53	20.30	18.58	15.85	13.90	11.94	9.72	4.90	2.16	1.43	1.04
BRISBANE	1035.9	42.760	BN 1180		29.50	23.98	19.90	18.20	15.50	13.58	11.65	9.47	4.74	2.10	1.40	1.04
BRISBANE	1036.46	42.200	BN 1170		29.54	23.82	19.61	17.84	15.11	13.22	11.35	9.21	4.60	2.05	1.38	1.03
BRISBANE	1036.77	41.890	BN 1160		29.29	23.60	19.50	17.77	15.06	13.16	11.28	9.13	4.54	2.02	1.36	1.03
BRISBANE	1036.915	41.745	BN 1150		28.74	23.04	19.15	17.46	14.81	12.97	11.12	9.01	4.48	2.00	1.36	1.03
BRISBANE	1037.09	41.570	BN 1140		28.88	23.12	19.10	17.35	14.73	12.92	11.07	8.98	4.47	2.00	1.35	1.03
BRISBANE	1037.11	41.550	BN 1130	Indooroopilly Bridge												
BRISBANE	1037.175	41.485	BN 1120		26.33	22.93	18.72	17.10	14.54	12.77	10.98	8.90	4.32	1.94	1.33	1.02
BRISBANE	1037.285	41.375	BN 1110	Clarence Road Gauge	25.67	22.51	18.58	17.01	14.47	12.71	10.93	8.86	4.29	1.93	1.32	1.02
BRISBANE	1037.625	41.035	BN 1100		25.99	22.72	18.66	17.06	14.48	12.71	10.91	8.83	4.25	1.91	1.31	1.02
BRISBANE	1038.085	40.575	BN 1090		26.56	23.13	18.86	17.22	14.60	12.78	10.93	8.81	4.23	1.90	1.31	1.02
BRISBANE	1038.6	40.060	BN 1080		26.51	23.09	18.83	17.19	14.57	12.75	10.91	8.79	4.18	1.88	1.30	1.02
BRISBANE	1039.1	39.560	BN 1070		26.73	23.26	18.94	17.29	14.64	12.79	10.90	8.76	4.15	1.86	1.29	1.02
BRISBANE	1039.565	39.095	BN 1060	Oxley Creek Gauge	26.72	23.25	18.93	17.28	14.63	12.79	10.92	8.75	4.14	1.85	1.29	1.02
BRISBANE	1040.09	38.570	BN 1050	King Authur Terrace Gauge	26.67	23.20	18.88	17.22	14.56	12.72	10.84	8.72	4.14	1.86	1.29	1.02
BRISBANE	1040.49	38.170	BN 1040		26.63	23.16	18.81	17.13	14.43	12.57	10.71	8.60	4.08	1.84	1.29	1.02
BRISBANE	1041.01	37.650	BN 1030		26.66	23.19	18.86	17.19	14.50	12.62	10.74	8.62	4.09	1.84	1.29	1.02
BRISBANE	1041.23	37.430	BN 1020		26.66	23.19	18.86	17.19	14.50	12.62	10.71	8.58	4.05	1.83	1.28	1.01
BRISBANE	1041.46	37.200	BN 1010	Tennyson Power House Gauge	26.63	23.16	18.82	17.15	14.44	12.53	10.62	8.51	4.01	1.81	1.27	1.01
BRISBANE	1041.7	36.960	BN 1000		26.62	23.15	18.81	17.13	14.41	12.50	10.59	8.48	4.01	1.81	1.27	1.01
BRISBANE	1041.96	36.700	BN 990	Yeronga Street Gauge	26.58	23.09	18.74	17.05	14.30	12.37	10.45	8.36	3.94	1.79	1.27	1.01
BRISBANE	1042.235	36.425	BN 980		26.52	23.04	18.68	16.98	14.21	12.24	10.30	8.23	3.89	1.77	1.26	1.01
BRISBANE	1042.515	36.145	BN 970		26.59	23.11	18.72	16.99	14.20	12.24	10.29	8.21	3.87	1.77	1.26	1.01
BRISBANE	1042.91	35.750	BN 960		26.58	23.10	18.74	17.03	14.21	12.21	10.22	8.13	3.79	1.74	1.24	1.01
BRISBANE	1043.725	34.935	BN 950		26.14	22.71	18.41	16.69	13.85	11.86	9.91	7.85	3.63	1.67	1.22	1.00
BRISBANE	1044.06	34.600	BN 940	Sandy Creek Gauge	25.47	22.18	18.04	16.37	13.59	11.64	9.75	7.75	3.59	1.66	1.21	1.00
BRISBANE	1044.34	34.320	BN 930		25.08	21.85	17.77	16.12	13.37	11.45	9.58	7.61	3.52	1.64	1.21	1.00
BRISBANE	1044.605	34.055	BN 920		25.43	22.01	17.77	16.11	13.34	11.41	9.53	7.55	3.49	1.63	1.20	1.00
BRISBANE	1044.86	33.800	BN 910		25.52	22.00	17.78	16.10	13.31	11.38	9.49	7.51	3.45	1.61	1.20	1.00
BRISBANE	1045.4	33.260	BN 900		25.51	22.01	17.72	16.01	13.12	11.18	9.31	7.34	3.34	1.58	1.18	0.99
BRISBANE	1045.885	32.775	BN 890		25.50	22.00	17.70	15.98	13.09	11.10	9.17	7.15	3.23	1.54	1.17	0.99
BRISBANE	1046.18	32.480	BN 880		25.42	21.93	17.64	15.91	13.01	11.02	9.09	7.10	3.22	1.54	1.16	0.99
BRISBANE	1046.34	32.320	BN 870	Dutton Park Cemetery Gauge	24.93	21.55	17.36	15.68	12.84	10.90	9.02	7.06	3.20	1.53	1.16	0.99
BRISBANE	1046.58	32.080	BN 860		24.88	21.50	17.33	15.64	12.80	10.85	8.97	7.02	3.18	1.53	1.16	0.99
BRISBANE	1046.9	31.760	BN 850		24.58	21.22	17.07	15.40	12.57	10.64	8.78	6.85	3.09	1.50	1.15	0.99
BRISBANE	1047.35	31.310	BN 840		23.77	20.50	16.48	14.85	12.07	10.20	8.41	6.54	2.95	1.46	1.13	0.98
BRISBANE	1047.915	30.745	BN 830	Highgate Hill Gauge	23.48	20.28	16.26	14.61	11.81	9.94	8.17	6.35	2.87	1.43	1.13	0.98
BRISBANE	1048.375	30.285	BN 820		23.77	20.50	16.41	14.75	11.92	10.03	8.23	6.38	2.87	1.43	1.12	0.98
BRISBANE	1048.89	29.770	BN 810	St Lucia Ferry Gauge	23.43	20.19	16.12	14.46	11.64	9.77	8.00	6.18	2.76	1.40	1.11	0.98

TABLE H - 2 - Predicted Flood Levels for Design Events

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	DESIGN EVENTS											
					PMF WL (m AHD)	10000 YEAR ARI WL (m AHD)	2000 YEAR ARI WL (m AHD)	1000 YEAR ARI WL (m AHD)	500 YEAR ARI WL (m AHD)	200 YEAR ARI WL (m AHD)	100 YEAR ARI WL (m AHD)	50 YEAR ARI WL (m AHD)	20 YEAR ARI WL (m AHD)	10 YEAR ARI WL (m AHD)	5 YEAR ARI WL (m AHD)	2 YEAR ARI WL (m AHD)
BRISBANE	1049.12	29.540	BN 800		23.39	20.07	15.98	14.35	11.55	9.70	7.94	6.14	2.74	1.39	1.11	0.98
BRISBANE	1049.37	29.290	BN 790		23.23	20.01	15.94	14.28	11.44	9.54	7.75	5.99	2.68	1.37	1.10	0.98
BRISBANE	1049.59	29.070	BN 780		23.39	20.13	16.02	14.35	11.48	9.56	7.74	5.97	2.67	1.37	1.10	0.98
BRISBANE	1049.87	28.790	BN 770		23.03	19.79	15.65	14.00	11.21	9.37	7.63	5.88	2.63	1.36	1.10	0.98
BRISBANE	1050.43	28.230	BN 760		23.29	20.02	15.89	14.22	11.34	9.42	7.61	5.82	2.59	1.35	1.09	0.97
BRISBANE	1050.86	27.800	BN 750		22.68	19.55	15.55	13.91	11.09	9.22	7.46	5.73	2.54	1.34	1.09	0.97
BRISBANE	1051.36	27.300	BN 740		22.80	19.53	15.53	13.89	11.08	9.21	7.46	5.72	2.55	1.34	1.09	0.97
BRISBANE	1051.895	26.765	BN 730		22.88	19.53	15.30	13.68	10.87	9.02	7.30	5.57	2.46	1.31	1.08	0.97
BRISBANE	1052.31	26.350	BN 720		22.98	19.72	15.59	13.92	11.06	9.16	7.40	5.65	2.49	1.32	1.08	0.97
BRISBANE	1052.37	26.290	BN 710	Merivale Bridge												
BRISBANE	1052.39	26.270	BN 700		21.93	19.09	15.18	13.60	10.82	8.96	7.23	5.51	2.44	1.30	1.07	0.97
BRISBANE	1052.595	26.065	BN 690		21.33	18.63	14.81	13.29	10.59	8.79	7.14	5.45	2.42	1.30	1.07	0.97
BRISBANE	1052.607	26.053	BN 680	William Jolly Bridge												
BRISBANE	1052.64	26.020	BN 670		20.14	16.83	12.85	11.69	9.61	8.14	6.63	5.08	2.34	1.28	1.06	0.96
BRISBANE	1052.865	25.795	BN 660	Montague Road Gauge	20.03	16.44	12.55	11.44	9.41	7.96	6.49	4.98	2.32	1.28	1.06	0.96
BRISBANE	1053.32	25.340	BN 650		20.07	16.61	12.55	11.42	9.36	7.88	6.42	4.92	2.28	1.26	1.06	0.96
BRISBANE	1053.356	25.304	BN 640	Victoria Bridge												
BRISBANE	1053.385	25.275	BN630		18.15	15.50	12.25	11.04	9.09	7.67	6.24	4.77	2.20	1.24	1.05	0.95
BRISBANE	1053.9	24.760	BN 620		18.08	15.31	11.76	10.55	8.63	7.22	5.85	4.43	2.05	1.20	1.03	0.95
BRISBANE	1054.64	24.020	BN 610		17.86	15.15	11.69	10.48	8.54	7.14	5.78	4.36	2.01	1.19	1.03	0.95
BRISBANE	1054.66	24.000	BN 600	Captain Cook Bridge												
BRISBANE	1054.68	23.980	BN 590		17.36	14.89	11.54	10.35	8.44	7.05	5.70	4.30	1.98	1.18	1.02	0.95
BRISBANE	1054.97	23.690	BN 560		16.41	14.14	11.01	9.89	8.07	6.74	5.45	4.11	1.92	1.16	1.01	0.95
BRISBANE	1055.28	23.380	BN 550		16.23	14.00	10.91	9.80	8.00	6.68	5.40	4.08	1.90	1.16	1.01	0.95
BRISBANE	1055.42	23.240	BN 540		16.35	14.08	10.95	9.83	8.02	6.69	5.40	4.08	1.90	1.16	1.01	0.95
BRISBANE	1055.96	22.700	BN 530	Port Office Gauge	16.51	14.16	10.96	9.82	7.98	6.64	5.34	4.02	1.88	1.15	1.01	0.95
BRISBANE	1056.4	22.260	BN 520		16.23	13.86	10.64	9.49	7.64	6.35	5.09	3.84	1.81	1.13	1.00	0.95
BRISBANE	1056.695	21.965	BN 510		15.70	13.49	10.43	9.33	7.56	6.27	5.03	3.79	1.79	1.13	1.00	0.95
BRISBANE	1056.865	21.795	BN 500		16.59	14.19	10.90	9.74	7.88	6.53	5.22	3.93	1.84	1.14	1.00	0.95
BRISBANE	1056.92	21.740	BN 495	Story Bridge												
BRISBANE	1056.95	21.710	BN 490		16.32	13.95	10.72	9.57	7.73	6.41	5.12	3.85	1.81	1.13	1.00	0.94
BRISBANE	1057.09	21.570	BN 480		15.55	13.35	10.32	9.23	7.47	6.21	4.97	3.75	1.78	1.12	1.00	0.94
BRISBANE	1057.53	21.130	BN 470		15.13	13.00	10.05	8.99	7.28	6.04	4.83	3.65	1.75	1.12	0.99	0.94
BRISBANE	1058.04	20.620	BN 460		14.53	12.49	9.64	8.61	6.94	5.74	4.58	3.45	1.68	1.10	0.99	0.94
BRISBANE	1058.23	20.430	BN 450		14.49	12.40	9.53	8.51	6.85	5.65	4.50	3.39	1.66	1.09	0.98	0.94
BRISBANE	1058.53	20.130	BN 440		13.73	11.77	9.15	8.19	6.61	5.47	4.37	3.30	1.63	1.09	0.98	0.94
BRISBANE	1058.735	19.925	BN 430		14.03	12.01	9.28	8.30	6.69	5.53	4.41	3.32	1.63	1.09	0.98	0.94
BRISBANE	1059.035	19.625	BN 420		12.87	11.00	8.60	7.71	6.23	5.16	4.13	3.12	1.57	1.07	0.98	0.94
BRISBANE	1059.54	19.120	BN 410		13.50	11.43	8.68	7.76	6.23	5.13	4.09	3.08	1.55	1.07	0.97	0.94
BRISBANE	1059.99	18.670	BN 400		12.91	10.97	8.38	7.47	5.97	4.90	3.88	2.92	1.49	1.05	0.97	0.94
BRISBANE	1060.345	18.315	BN 390		11.54	9.91	7.68	6.88	5.53	4.57	3.65	2.76	1.45	1.04	0.97	0.94
BRISBANE	1060.535	18.125	BN 380		10.97	9.46	7.36	6.60	5.30	4.37	3.50	2.66	1.42	1.03	0.96	0.94
BRISBANE	1061.015	17.645	BN 370		11.40	9.72	7.43	6.61	5.29	4.34	3.45	2.62	1.40	1.03	0.96	0.94
BRISBANE	1061.53	17.130	BN 360		10.43	8.95	6.91	6.18	4.94	4.06	3.24	2.47	1.35	1.02	0.96	0.94
BRISBANE	1062.02	16.640	BN 350		10.51	8.97	6.87	6.12	4.87	3.99	3.16	2.41	1.33	1.01	0.96	0.94
BRISBANE	1062.535	16.125	BN 340		10.68	9.06	6.90	6.13	4.85	3.95	3.12	2.37	1.31	1.01	0.95	0.94
BRISBANE	1062.94	15.720	BN 330		10.86	9.12	6.92	6.14	4.85	3.95	3.11	2.36	1.31	1.01	0.95	0.94
BRISBANE	1063.31	15.350	BN 320	Newstead Park Gauge	10.24	8.70	6.63	5.89	4.65	3.79	2.99	2.28	1.28	1.00	0.95	0.94
BRISBANE	1063.645	15.015	BN 310	Cresent Road Gauge	9.08	7.77	5.98	5.32	4.21	3.43	2.72	2.09	1.23	0.99	0.95	0.94
BRISBANE	1064	14.660	BN 300		9.17	7.79	5.95	5.29	4.16	3.38	2.68	2.06	1.22	0.99	0.95	0.94
BRISBANE	1064.49	14.170	BN 290		8.59	7.33	5.63	5.01	3.94	3.21	2.55	1.97	1.19	0.98	0.94	0.94
BRISBANE	1065.01	13.650	BN 280		9.01	7.65	5.81	5.15	4.03	3.26	2.57	1.98	1.20	0.98	0.94	0.94
BRISBANE	1065.503	13.157	BN 270		9.22	7.73	5.76	5.05	3.94	3.19	2.53	1.95	1.19	0.98	0.94	0.94
BRISBANE	1065.99	12.670	BN 260	Cairncross Dock Gauge	8.90	7.54	5.72	5.05	3.95	3.21	2.54	1.96	1.19	0.98	0.94	0.94
BRISBANE	1066.505	12.155	BN 250		9.13	7.64	5.64	4.94	3.85	3.11	2.46	1.91	1.18	0.98	0.94	0.94
BRISBANE	1067.02	11.640	BN 240		8.78	7.39	5.53	4.86	3.79	3.07	2.43	1.88	1.17	0.98	0.94	0.94
BRISBANE	1067.485	11.175	BN 230		8.49	7.14	5.33	4.68	3.63	2.93	2.32	1.81	1.15	0.97	0.94	0.94
BRISBANE	1067.965	10.695	BN 220		7.95	6.69	5.01	4.40	3.41	2.76	2.20	1.73	1.12	0.97	0.94	0.94
BRISBANE	1068.66	10.000	BN 210		7.06	6.00	4.54	4.00	3.10	2.52	2.02	1.61	1.09	0.96	0.93	0.94
BRISBANE	1069.045	9.615	BN 200		7.48	6.21	4.50	3.86	2.97	2.42	1.95	1.56	1.08	0.96	0.93	0.93
BRISBANE	1069.535	9.125	BN 190	Bulimba Power House Gauge	7.21	5.93	4.28	3.72	2.88	2.34	1.89	1.52	1.07	0.95	0.93	0.93

TABLE H-2 - Predicted Flood Levels for Design Events

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	DESIGN EVENTS PMF WL (m AHD)	10000 YEAR ARI WL (m AHD)	2000 YEAR ARI WL (m AHD)	1000 YEAR ARI WL (m AHD)	500 YEAR ARI WL (m AHD)	200 YEAR ARI WL (m AHD)	100 YEAR ARI WL (m AHD)	50 YEAR ARI WL (m AHD)	20 YEAR ARI WL (m AHD)	10 YEAR ARI WL (m AHD)	5 YEAR ARI WL (m AHD)	2 YEAR ARI WL (m AHD)
BRISBANE	1070.025	8.635	BN 180		7.02	5.76	4.07	3.54	2.75	2.25	1.82	1.48	1.06	0.95	0.93	0.93
BRISBANE	1070.53	8.130	BN 170		7.06	5.76	3.99	3.38	2.57	2.11	1.72	1.41	1.04	0.95	0.93	0.93
BRISBANE	1071.04	7.620	BN 160		6.92	5.55	3.72	3.17	2.43	1.99	1.64	1.36	1.03	0.94	0.93	0.93
BRISBANE	1071.52	7.140	BN 150		6.67	5.41	3.74	3.21	2.48	2.04	1.67	1.38	1.03	0.94	0.93	0.93
BRISBANE	1072.015	6.645	BN 140		6.36	5.11	3.44	2.94	2.27	1.88	1.56	1.31	1.01	0.94	0.93	0.93
BRISBANE	1072.515	6.145	BN 130		6.07	4.80	3.24	2.77	2.15	1.79	1.50	1.28	1.01	0.94	0.93	0.93
BRISBANE	1072.995	5.665	BN 120		5.66	4.55	3.09	2.66	2.07	1.73	1.46	1.25	1.00	0.94	0.93	0.93
BRISBANE	1073.485	5.175	BN 110		5.06	4.07	2.77	2.38	1.88	1.59	1.36	1.19	0.98	0.93	0.93	0.93
BRISBANE	1074	4.660	BN 100		4.54	3.68	2.51	2.17	1.73	1.48	1.29	1.14	0.97	0.93	0.93	0.93
BRISBANE	1074.46	4.200	BN 90		4.30	3.33	2.26	1.97	1.59	1.38	1.22	1.10	0.96	0.93	0.93	0.93
BRISBANE	1074.985	3.675	BN 80		3.25	2.50	1.73	1.54	1.31	1.18	1.09	1.02	0.94	0.93	0.92	0.93
BRISBANE	1075.48	3.180	BN 70		2.94	2.29	1.62	1.45	1.25	1.14	1.06	1.00	0.94	0.92	0.92	0.92
BRISBANE	1076	2.660	BN 60		2.84	2.24	1.62	1.46	1.26	1.15	1.07	1.01	0.94	0.92	0.92	0.92
BRISBANE	1076.495	2.165	BN 50		1.89	1.48	1.15	1.08	1.01	0.98	0.96	0.94	0.92	0.92	0.92	0.92
BRISBANE	1077.01	1.650	BN 40		1.65	1.38	1.14	1.08	1.02	0.99	0.96	0.95	0.93	0.92	0.92	0.92
BRISBANE	1077.51	1.150	BN 30		1.57	1.36	1.15	1.10	1.03	1.00	0.97	0.95	0.93	0.92	0.92	0.92
BRISBANE	1078.04	0.620	BN 20		1.31	1.20	1.07	1.04	0.99	0.97	0.95	0.94	0.92	0.92	0.92	0.92
BRISBANE	1078.525	0.135	BN 10		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
BRISBANE	1078.66	0.000	-	Western Inner Bar Gauge	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
BREMER	599.4	-	-		37.65	33.20	28.77	27.11	24.46	22.23	19.76	16.88	10.20	5.20	3.14	1.42
BREMER	600	-	-		37.63	33.18	28.77	27.11	24.46	22.23	19.76	16.87	10.20	5.20	3.14	1.42
OXLEY	599.4	-	-		26.70	23.23	18.91	17.25	14.59	12.76	10.87	8.73	4.14	1.86	1.29	1.01
OXLEY	600	-	-		26.70	23.23	18.91	17.25	14.60	12.76	10.87	8.73	4.14	1.86	1.29	1.02
BREAKFAST	599.4	-	-		10.72	9.05	6.84	6.06	4.79	3.90	3.09	2.34	1.30	1.01	0.95	0.94
BREAKFAST	600	-	-		10.72	9.05	6.84	6.06	4.79	3.90	3.08	2.34	1.30	1.01	0.95	0.94
BULIMBA	599.4	-	-		6.36	5.11	3.43	2.93	2.27	1.88	1.56	1.31	1.01	0.94	0.93	0.93
BULIMBA	600	-	-		6.36	5.11	3.43	2.93	2.27	1.88	1.56	1.31	1.01	0.94	0.93	0.93
CENTWEIR	0	-	-		33.23	28.11	23.48	21.43	18.55	16.36	14.06	11.54	6.05	2.67	1.66	1.08
CENTWEIR	0.08	-	-		32.66	27.50	22.92	21.18	18.32	16.14	13.91	11.45	5.97	2.63	1.64	1.07
INDOORWEIR	0	-	-		28.88	23.12	19.10	17.35	14.73	12.92	11.07	8.98	4.47	2.00	1.35	1.03
INDOORWEIR	0.085	-	-		26.33	22.93	18.72	17.10	14.54	12.77	10.98	8.90	4.32	1.94	1.33	1.02
WILLIAMWEIR	0	-	-		21.33	18.63	14.81	13.29	10.59	8.79	7.14	5.45	2.42	1.30	1.07	0.97
WILLIAMWEIR	0.045	-	-		20.14	16.83	12.85	11.69	9.61	8.14	6.63	5.08	2.34	1.28	1.06	0.96
VICTORIAWEIR	0	-	-		20.07	16.61	12.55	11.42	9.36	7.88	6.42	4.92	2.28	1.26	1.06	0.96
VICTORIAWEIR	0.065	-	-		18.15	15.50	12.25	11.04	9.09	7.67	6.24	4.77	2.20	1.24	1.05	0.95
CAPTAINWEIR	0	-	-		17.86	15.15	11.69	10.48	8.54	7.14	5.78	4.36	2.01	1.19	1.03	0.95
CAPTAINWEIR	0.04	-	-		17.36	14.89	11.54	10.35	8.44	7.05	5.70	4.30	1.98	1.18	1.02	0.95
STORYWEIR	0	-	-		16.59	14.19	10.90	9.74	7.88	6.53	5.22	3.93	1.84	1.14	1.00	0.95
STORYWEIR	0.085	-	-		16.32	13.95	10.72	9.57	7.73	6.41	5.12	3.85	1.81	1.13	1.00	0.94
MERIVALEWEIR	0	-	-		22.98	19.72	15.59	13.92	11.06	9.16	7.40	5.65	2.49	1.32	1.08	0.97
MERIVALEWEIR	0.08	-	-		21.93	19.09	15.18	13.60	10.82	8.96	7.23	5.51	2.44	1.30	1.07	0.97
GOODNALINK1	0	-	-		36.43	31.79	27.26	25.47	22.78	20.57	18.18	15.40	8.95	4.35	2.61	1.28
GOODNALINK1	1	-	-		36.38	31.70	27.08	25.23	22.43	20.07	17.53	14.72	8.36	3.94	2.34	1.21
GOODNALINK2	0	-	-		36.42	31.77	27.22	25.43	22.72	20.52	18.11	15.32	8.88	4.30	2.57	1.27
GOODNALINK2	1.07	-	-		36.18	31.51	26.98	25.19	22.50	20.25	17.77	14.98	8.59	4.11	2.45	1.24
STLUCIALINK1	0	-	-		26.73	23.26	18.94	17.28	14.63	12.79	10.91	8.76	4.15	1.86	1.29	1.02
STLUCIALINK1	1.05	-	-		26.56	23.08	18.71	16.99	14.16	12.14	10.15	8.05	3.74	1.72	1.24	1.00
STLUCIALINK2	0	-	-		26.71	23.24	18.92	17.26	14.62	12.78	10.90	8.73	4.14	1.86	1.29	1.02
STLUCIALINK2	1.05	-	-		26.57	23.09	18.73	17.02	14.19	12.18	10.18	8.09	3.76	1.73	1.24	1.01
STLUCIALINK3	0	-	-		26.65	23.18	18.85	17.18	14.51	12.65	10.79	8.67	4.12	1.85	1.29	1.02
STLUCIALINK3	0.85	-	-		26.58	23.10	18.70	16.98	14.20	12.24	10.29	8.22	3.87	1.77	1.26	1.01

TABLE H-3 - Predicted Discharges for Design Events

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	DESIGN EVENTS										
			PMF Q (m^3/s)	10000 YEAR ARI Q (m^3/s)	2000 YEAR ARI Q (m^3/s)	1000 YEAR ARI Q (m^3/s)	500 YEAR ARI Q (m^3/s)	200 YEAR ARI Q (m^3/s)	100 YEAR ARI Q (m^3/s)	50 YEAR ARI Q (m^3/s)	20 YEAR ARI Q (m^3/s)	10 YEAR ARI Q (m^3/s)	5 YEAR ARI Q (m^3/s)	2 YEAR ARI Q (m^3/s)
BRISBANE	1000.14	78.52	29818	23872	18246	16373	13372	11115	9235	7185	4225	1627	930	284
BRISBANE	1000.53	78.13	29816	23870	18242	16371	13367	11113	9233	7183	4222	1627	930	284
BRISBANE	1001.05	77.62	29814	23869	18240	16369	13364	11111	9231	7181	4219	1626	929	283
BRISBANE	1001.59	77.07	29812	23867	18237	16367	13360	11108	9229	7179	4214	1624	928	283
BRISBANE	1002.11	76.55	29809	23865	18232	16364	13355	11105	9226	7177	4211	1623	928	283
BRISBANE	1002.57	76.09	29807	23863	18229	16362	13351	11102	9224	7174	4207	1623	927	283
BRISBANE	1003.03	75.63	29801	23859	18223	16358	13345	11099	9222	7172	4202	1622	927	283
BRISBANE	1003.53	75.14	29798	23857	18219	16355	13339	11095	9219	7169	4198	1621	926	283
BRISBANE	1004.04	74.62	29796	23856	18216	16353	13335	11092	9217	7167	4193	1620	926	283
BRISBANE	1004.56	74.11	29793	23853	18210	16350	13329	11089	9214	7164	4189	1619	925	283
BRISBANE	1005.07	73.59	29791	23851	18206	16347	13324	11085	9211	7161	4181	1617	925	283
BRISBANE	1005.60	73.06	29787	23848	18200	16343	13316	11081	9206	7156	4172	1615	923	283
BRISBANE	1006.04	72.63	29785	23846	18196	16341	13311	11077	9203	7153	4165	1614	923	283
BRISBANE	1006.25	72.41	36224	28595	20940	18475	14589	11882	9542	7339	3646	1602	955	367
BRISBANE	1006.61	72.06	36221	28594	20938	18473	14587	11880	9541	7338	3644	1602	955	367
BRISBANE	1007.16	71.50	36217	28590	20933	18469	14584	11877	9538	7335	3640	1601	955	367
BRISBANE	1007.67	71.00	36210	28586	20928	18465	14579	11873	9535	7332	3634	1601	955	367
BRISBANE	1008.18	70.48	36206	28583	20924	18461	14575	11870	9532	7330	3630	1600	954	367
BRISBANE	1008.69	69.98	36202	28579	20920	18456	14571	11866	9531	7329	3628	1600	954	367
BRISBANE	1009.16	69.50	36196	28575	20914	18450	14567	11864	9529	7327	3625	1600	954	368
BRISBANE	1009.56	69.10	36194	28573	20912	18448	14564	11862	9528	7325	3623	1599	954	368
BRISBANE	1010.11	68.56	36189	28569	20906	18443	14559	11858	9525	7322	3618	1599	953	368
BRISBANE	1010.61	68.05	36187	28567	20904	18440	14557	11856	9523	7321	3616	1598	953	368
BRISBANE	1010.85	67.81	36185	28566	20902	18438	14555	11855	9522	7320	3615	1598	953	368
BRISBANE	1011.25	67.42	36183	28564	20900	18437	14554	11853	9521	7319	3613	1598	953	368
BRISBANE	1011.75	66.92	36179	28562	20896	18434	14551	11850	9519	7317	3609	1598	953	368
BRISBANE	1012.23	66.43	36176	28559	20893	18430	14547	11847	9516	7314	3604	1597	953	368
BRISBANE	1012.71	65.96	36170	28555	20887	18424	14542	11843	9513	7311	3599	1597	952	368
BRISBANE	1013.06	65.60	36166	28552	20885	18420	14537	11839	9510	7309	3596	1597	952	368
BRISBANE	1013.32	65.34	31487	24031	17094	15169	12405	10744	9325	7307	3594	1596	952	368
BRISBANE	1013.56	65.10	31484	24028	17090	15165	12401	10740	9322	7305	3593	1596	952	368
BRISBANE	1013.80	64.87	20721	16276	12695	11899	10741	10051	9254	7304	3590	1596	952	368
BRISBANE	1014.11	64.55	20717	16273	12676	11889	10730	10042	9250	7301	3586	1595	952	368
BRISBANE	1014.46	64.20	20712	16269	12658	11880	10718	10033	9245	7298	3582	1595	952	368
BRISBANE	1014.85	63.81	20708	16265	12648	11869	10705	10023	9240	7295	3577	1595	951	368
BRISBANE	1015.33	63.34	20704	16261	12639	11861	10699	10018	9237	7293	3575	1594	951	368
BRISBANE	1015.71	62.96	20702	16260	12636	11858	10696	10015	9236	7292	3573	1594	951	369
BRISBANE	1016.00	62.67	31463	24011	17072	15138	12373	10713	9302	7292	3572	1594	951	369
BRISBANE	1016.39	62.27	31461	24009	17071	15136	12370	10711	9300	7291	3570	1594	951	369
BRISBANE	1016.77	61.90	31458	24007	17069	15132	12366	10706	9297	7289	3568	1593	951	369
BRISBANE	1017.01	61.65	36125	28522	20863	18382	14502	11810	9486	7288	3566	1593	951	369
BRISBANE	1017.37	61.29	36121	28519	20861	18378	14498	11807	9484	7286	3563	1593	951	369
BRISBANE	1017.77	60.90	36114	28515	20857	18372	14493	11803	9480	7284	3561	1593	951	369
BRISBANE	1018.06	60.60	36111	28512	20854	18368	14490	11800	9478	7282	3559	1593	951	369
BRISBANE	1018.46	60.20	36107	28509	20851	18363	14485	11797	9476	7280	3557	1593	951	369
BRISBANE	1018.91	59.75	36103	28506	20848	18359	14481	11795	9474	7279	3556	1592	950	369
BRISBANE	1019.29	59.37	36099	28504	20845	18356	14478	11793	9472	7277	3554	1592	950	369
BRISBANE	1019.68	58.98	36097	28502	20843	18353	14475	11791	9471	7276	3552	1592	950	369
BRISBANE	1019.99	58.67	36095	28501	20843	18352	14473	11790	9470	7275	3551	1592	950	369
BRISBANE	1020.32	58.34	36092	28498	20841	18348	14469	11787	9468	7274	3548	1592	950	369
BRISBANE	1020.68	57.98	36088	28495	20838	18343	14465	11784	9465	7272	3545	1591	950	369
BRISBANE	1020.96	57.70	36086	28494	20837	18342	14463	11783	9464	7271	3544	1591	950	369
BRISBANE	1021.32	57.34	36085	28493	20837	18340	14462	11782	9463	7271	3543	1591	950	369
BRISBANE	1021.63	57.03	36084	28492	20836	18339	14460	11781	9462	7270	3541	1591	950	370
BRISBANE	1021.81	56.86	36082	28491	20835	18338	14459	11781	9461	7269	3540	1591	950	370
BRISBANE	1022.00	56.66	36079	28490	20835	18336	14458	11780	9461	7269	3539	1591	950	370
BRISBANE	1022.34	56.32	36076	28488	20834	18334	14456	11779	9460	7268	3538	1591	950	370
BRISBANE	1022.81	55.85	36073	28486	20832	18331	14453	11777	9458	7267	3536	1590	950	370
BRISBANE	1023.31	55.36	36069	28483	20829	18326	14449	11775	9456	7265	3535	1590	950	370
BRISBANE	1023.83	54.84	36066	28482	20828	18324	14446	11773	9455	7266	3533	1590	950	370

TABLE H-3 - Predicted Discharges for Design Events

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	DESIGN EVENTS PMF Q (m³/s)	10000 YEAR ARI Q (m³/s)	2000 YEAR ARI Q (m³/s)	1000 YEAR ARI Q (m³/s)	500 YEAR ARI Q (m³/s)	200 YEAR ARI Q (m³/s)	100 YEAR ARI Q (m³/s)	50 YEAR ARI Q (m³/s)	20 YEAR ARI Q (m³/s)	10 YEAR ARI Q (m³/s)	5 YEAR ARI Q (m³/s)	2 YEAR ARI Q (m³/s)
BRISBANE	1024.32	54.34	36062	28479	20825	18320	14443	11771	9453	7267	3532	1590	950	370
BRISBANE	1024.82	53.84	36059	28477	20823	18318	14441	11770	9451	7268	3530	1590	950	370
BRISBANE	1025.22	53.45	36054	28474	20822	18316	14436	11767	9449	7269	3528	1590	950	370
BRISBANE	1025.48	53.19	36053	28473	20822	18315	14434	11766	9448	7270	3527	1590	950	370
BRISBANE	1025.88	52.78	36050	28471	20822	18313	14432	11764	9447	7272	3526	1590	950	370
BRISBANE	1026.43	52.24	36045	28468	20822	18310	14429	11763	9446	7274	3525	1590	949	370
BRISBANE	1026.79	51.87	36043	28466	20822	18308	14426	11761	9444	7276	3523	1589	949	370
BRISBANE	1027.03	51.63	36042	28465	20822	18307	14424	11760	9443	7278	3522	1589	949	370
BRISBANE	1027.42	51.24	36040	28463	20822	18304	14422	11758	9442	7280	3521	1589	949	370
BRISBANE	1027.93	50.73	36036	28461	20821	18301	14418	11756	9440	7285	3519	1589	949	370
BRISBANE	1028.43	50.23	36031	28457	20821	18299	14414	11753	9437	7293	3517	1589	949	371
BRISBANE	1028.72	49.94	14317	14090	13424	12881	11483	10400	9085	7294	3516	1589	949	371
BRISBANE	1028.98	49.68	36027	28454	20820	18294	14409	11750	9434	7293	3515	1589	949	371
BRISBANE	1029.44	49.22	36023	28451	20818	18287	14405	11747	9431	7287	3513	1589	949	371
BRISBANE	1029.95	48.71	36014	28445	20814	18278	14395	11741	9426	7279	3511	1589	949	371
BRISBANE	1030.55	48.11	36003	28438	20807	18263	14386	11736	9421	7266	3507	1588	949	371
BRISBANE	1031.07	47.59	35999	28435	20801	18257	14386	11732	9417	7257	3505	1588	949	371
BRISBANE	1031.48	47.18	35996	28433	20801	18253	14386	11731	9416	7254	3504	1588	949	371
BRISBANE	1031.85	46.81	35995	28432	20802	18251	14386	11730	9415	7252	3503	1588	949	371
BRISBANE	1032.11	46.55	35993	28431	20802	18259	14385	11728	9413	7250	3502	1588	949	371
BRISBANE	1032.41	46.25	35991	28430	20803	18267	14384	11727	9412	7248	3501	1588	949	371
BRISBANE	1032.83	45.83	35989	28428	20805	18272	14383	11725	9410	7246	3500	1588	949	371
BRISBANE	1033.23	45.44	35985	28425	20807	18289	14388	11723	9408	7242	3498	1588	949	371
BRISBANE	1033.64	45.03	35982	28422	20809	18303	14392	11721	9406	7240	3497	1588	949	371
BRISBANE	1034.14	44.53	35979	28420	20814	18314	14397	11720	9405	7237	3496	1588	949	371
BRISBANE	1034.63	44.03	35973	28415	20824	18333	14402	11718	9403	7235	3494	1588	949	371
BRISBANE	1035.15	43.51	35967	28410	20826	18379	14414	11715	9400	7233	3493	1588	949	371
BRISBANE	1035.66	43.00	35964	28407	20831	18387	14423	11713	9398	7232	3491	1588	949	372
BRISBANE	1036.18	42.48	35960	28404	20835	18395	14435	11710	9396	7230	3490	1588	949	372
BRISBANE	1036.62	42.05	35957	28402	20840	18390	14448	11708	9394	7229	3488	1587	949	372
BRISBANE	1036.84	41.82	35955	28401	20847	18401	14455	11707	9393	7228	3487	1587	949	372
BRISBANE	1037.00	41.66	35954	28400	20849	18396	14459	11706	9392	7227	3487	1587	949	372
BRISBANE	1037.11	41.55	29071	26236	20782	18392	14461	11706	9392	7227	3487	1587	949	372
BRISBANE	1037.23	41.43	35953	28400	20856	18375	14464	11705	9391	7226	3486	1587	949	372
BRISBANE	1037.46	41.21	35952	28399	20868	18379	14467	11705	9390	7226	3486	1587	949	372
BRISBANE	1037.86	40.81	35950	28398	20885	18414	14469	11703	9389	7224	3484	1587	949	372
BRISBANE	1038.34	40.32	35940	28391	20843	18427	14446	11694	9379	7218	3482	1587	949	372
BRISBANE	1038.85	39.81	35930	28384	20846	18435	14431	11686	9372	7211	3479	1587	949	372
BRISBANE	1039.15	39.51	35925	28380	20835	18416	14423	11681	9366	7206	3476	1587	949	372
BRISBANE	1039.38	39.28	21512	18356	15682	14411	12305	10725	9205	7153	3474	1587	949	372
BRISBANE	1039.62	39.04	21506	18333	15673	14409	12296	10721	9201	7149	3473	1587	949	372
BRISBANE	1039.75	38.91	17895	16464	14175	13113	11444	10161	9013	7122	3472	1587	949	372
BRISBANE	1039.96	38.70	17424	15016	12345	11489	10377	9658	8673	6928	3402	1586	949	419
BRISBANE	1040.17	38.49	17422	15015	12342	11486	10376	9657	8673	6927	3401	1586	949	419
BRISBANE	1040.37	38.29	11296	10011	9620	9555	9433	9211	8549	6927	3401	1586	949	419
BRISBANE	1040.75	37.91	11293	10011	9605	9543	9425	9208	8549	6926	3401	1586	949	419
BRISBANE	1041.12	37.54	11288	10010	9571	9515	9408	9202	8547	6925	3401	1586	949	420
BRISBANE	1041.35	37.32	11285	10009	9553	9499	9399	9199	8546	6925	3400	1586	949	420
BRISBANE	1041.58	37.08	11284	10008	9542	9490	9393	9197	8546	6924	3400	1586	949	420
BRISBANE	1041.83	36.83	11282	10008	9531	9480	9387	9195	8545	6924	3400	1586	949	420
BRISBANE	1042.10	36.56	11280	10008	9519	9470	9381	9193	8545	6923	3400	1586	949	420
BRISBANE	1042.37	36.29	11278	10007	9508	9462	9375	9191	8544	6923	3400	1586	949	420
BRISBANE	1042.51	36.15	17407	15007	12340	11448	10334	9645	8667	6923	3400	1586	949	420
BRISBANE	1042.71	35.95	17407	15006	12343	11446	10336	9644	8667	6922	3400	1586	949	420
BRISBANE	1042.96	35.70	17407	15005	12345	11445	10340	9643	8667	6922	3400	1586	949	420
BRISBANE	1043.05	35.61	21327	18031	14262	13031	11341	10258	8905	6951	3400	1586	949	420
BRISBANE	1043.10	35.57	21327	18030	14263	13031	11341	10258	8905	6951	3399	1586	949	420
BRISBANE	1043.42	35.24	35879	28548	20038	17464	13776	11332	9099	7009	3399	1586	949	420
BRISBANE	1043.89	34.77	35878	28546	20035	17461	13772	11332	9099	7010	3399	1586	949	421
BRISBANE	1044.20	34.46	35878	28543	20034	17461	13771	11331	9099	7010	3399	1586	949	421

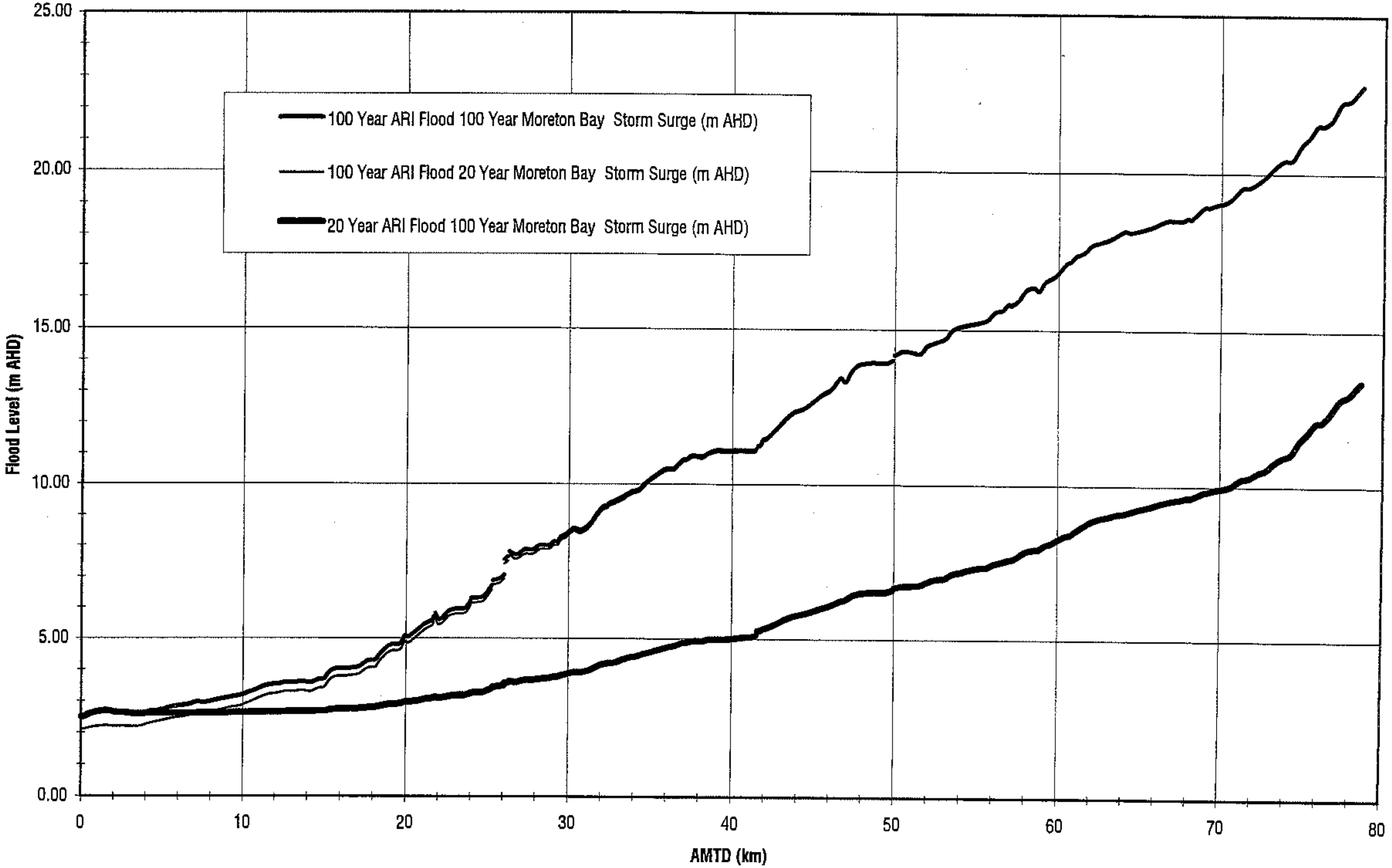
TABLE H-3 - Predicted Discharges for Design Events

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	DESIGN EVENTS PMF Q (m³/s)	10000 YEAR ARI Q (m³/s)	2000 YEAR ARI Q (m³/s)	1000 YEAR ARI Q (m³/s)	500 YEAR ARI Q (m³/s)	200 YEAR ARI Q (m³/s)	100 YEAR ARI Q (m³/s)	50 YEAR ARI Q (m³/s)	20 YEAR ARI Q (m³/s)	10 YEAR ARI Q (m³/s)	5 YEAR ARI Q (m³/s)	2 YEAR ARI Q (m³/s)
BRISBANE	1044.47	34.19	35877	28540	20034	17460	13770	11331	9098	7010	3399	1586	949	421
BRISBANE	1044.73	33.93	35877	28536	20032	17459	13768	11330	9099	7010	3399	1586	949	421
BRISBANE	1045.13	33.53	35876	28524	20026	17455	13766	11332	9100	7011	3399	1586	949	421
BRISBANE	1045.64	33.02	35874	28509	20024	17449	13761	11333	9103	7012	3398	1586	949	421
BRISBANE	1046.03	32.63	35873	28495	20021	17443	13758	11337	9106	7012	3398	1586	949	421
BRISBANE	1046.26	32.40	35873	28491	20020	17440	13756	11339	9107	7013	3398	1586	949	421
BRISBANE	1046.46	32.20	35872	28494	20019	17439	13756	11339	9108	7013	3398	1586	949	421
BRISBANE	1046.74	31.92	35872	28497	20018	17437	13756	11342	9109	7013	3398	1586	949	421
BRISBANE	1047.13	31.54	35871	28503	20016	17435	13755	11343	9112	7013	3398	1586	949	421
BRISBANE	1047.63	31.03	35870	28513	20014	17433	13754	11340	9115	7013	3398	1586	949	422
BRISBANE	1048.15	30.52	35868	28509	20011	17432	13753	11334	9122	7013	3398	1586	949	422
BRISBANE	1048.63	30.03	35867	28559	20005	17430	13757	11358	9129	7016	3398	1586	949	422
BRISBANE	1049.01	29.65	35866	28619	20004	17429	13756	11357	9131	7019	3398	1586	949	422
BRISBANE	1049.25	29.42	35865	28640	20004	17429	13755	11359	9132	7020	3398	1586	949	422
BRISBANE	1049.48	29.18	35865	28652	20004	17428	13754	11355	9132	7021	3398	1586	949	422
BRISBANE	1049.73	28.93	35865	28667	20004	17428	13755	11359	9132	7022	3398	1586	949	422
BRISBANE	1050.15	28.51	35865	28687	20004	17427	13750	11351	9131	7023	3397	1586	949	422
BRISBANE	1050.65	28.02	35864	28711	20003	17425	13753	11374	9125	7022	3397	1586	949	423
BRISBANE	1051.11	27.55	35864	28720	20002	17423	13745	11369	9121	7032	3397	1586	949	423
BRISBANE	1051.63	27.03	35863	28748	20000	17420	13755	11387	9136	7051	3397	1586	949	423
BRISBANE	1052.10	26.56	35863	28849	19998	17417	13763	11361	9217	7069	3397	1586	949	423
BRISBANE	1052.35	26.31	32954	27406	19989	17416	13779	11386	9250	7079	3397	1586	949	423
BRISBANE	1052.49	26.17	35863	28889	19996	17416	13786	11394	9263	7083	3397	1586	949	423
BRISBANE	1052.63	26.04	32073	28231	19996	17416	13791	11395	9274	7087	3397	1586	949	423
BRISBANE	1052.75	25.91	35863	28908	19996	17416	13773	11368	9269	7081	3397	1586	949	423
BRISBANE	1053.09	25.57	35862	28880	19996	17415	13785	11343	9248	7074	3397	1586	949	423
BRISBANE	1053.36	25.31	32348	27920	19900	17389	13786	11363	9223	7066	3397	1586	949	423
BRISBANE	1053.64	25.02	35862	28820	19995	17415	13789	11389	9240	7058	3397	1586	949	423
BRISBANE	1054.27	24.39	35862	28702	19993	17414	13761	11388	9253	7039	3397	1586	949	424
BRISBANE	1054.66	24.00	33049	27618	19869	17399	13739	11360	9229	7033	3397	1586	949	424
BRISBANE	1054.83	23.84	35862	28704	19992	17414	13740	11350	9221	7031	3397	1586	949	424
BRISBANE	1055.13	23.54	35862	28702	19992	17414	13740	11347	9213	7029	3397	1586	949	424
BRISBANE	1055.35	23.31	35862	28699	19992	17414	13741	11345	9207	7029	3397	1586	949	424
BRISBANE	1055.69	22.97	35862	28695	19992	17413	13742	11342	9198	7031	3397	1586	949	424
BRISBANE	1056.18	22.48	35862	28681	19992	17413	13741	11335	9167	7032	3397	1586	949	424
BRISBANE	1056.55	22.11	35862	28671	19992	17413	13739	11335	9157	7031	3397	1586	949	424
BRISBANE	1056.78	21.88	35862	28665	19991	17413	13738	11333	9151	7030	3397	1586	950	424
BRISBANE	1056.92	21.74	35862	28658	19991	17413	13737	11330	9143	7028	3397	1586	950	424
BRISBANE	1057.02	21.64	35862	28653	19991	17413	13736	11327	9137	7027	3397	1586	950	424
BRISBANE	1057.31	21.35	35862	28644	19991	17412	13734	11325	9128	7025	3397	1586	950	425
BRISBANE	1057.79	20.87	35861	28627	19991	17412	13733	11324	9123	7024	3397	1586	950	425
BRISBANE	1058.14	20.53	35861	28615	19990	17412	13732	11323	9126	7023	3397	1586	950	425
BRISBANE	1058.38	20.28	35861	28603	19990	17412	13732	11321	9128	7023	3397	1586	950	425
BRISBANE	1058.63	20.03	35861	28597	19990	17412	13732	11320	9128	7022	3397	1586	950	425
BRISBANE	1058.89	19.78	35861	28588	19990	17411	13732	11319	9128	7022	3397	1586	950	425
BRISBANE	1059.29	19.37	35861	28580	19989	17411	13732	11319	9128	7021	3397	1586	950	425
BRISBANE	1059.77	18.89	35861	28554	19989	17411	13731	11317	9124	7019	3397	1586	950	425
BRISBANE	1060.17	18.49	35861	28555	19988	17410	13731	11315	9119	7017	3397	1586	950	425
BRISBANE	1060.44	18.22	35861	28559	19988	17410	13731	11314	9117	7018	3397	1586	950	425
BRISBANE	1060.78	17.88	35861	28564	19988	17410	13731	11314	9115	7018	3397	1586	950	425
BRISBANE	1061.27	17.39	35861	28571	19987	17410	13731	11313	9110	7019	3397	1586	950	425
BRISBANE	1061.78	16.88	35861	28575	19987	17410	13731	11312	9107	7020	3397	1586	950	426
BRISBANE	1062.28	16.38	35861	28574	19987	17410	13731	11312	9103	7021	3397	1586	950	426
BRISBANE	1062.74	15.92	35861	28569	19987	17410	13730	11311	9106	7021	3398	1586	950	426
BRISBANE	1063.03	15.63	35861	28570	19986	17409	13730	11311	9107	7020	3398	1586	950	426
BRISBANE	1063.22	15.44	35892	28465	19980	17404	13725	11309	9097	7011	3398	1586	951	434
BRISBANE	1063.48	15.18	35892	28465	19980	17404	13725	11309	9096	7010	3398	1586	951	434
BRISBANE	1063.82	14.84	35892	28464	19980	17403	13725	11309	9095	7010	3398	1586	951	434
BRISBANE	1064.25	14.42	35891	28464	19980	17403	13725	11309	9095	7010	3398	1586	951	434
BRISBANE	1064.75	13.91	35891	28463	19979	17403	13725	11309	9095	7009	3398	1586	951	434

TABLE H-3 - Predicted Discharges for Design Events

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	DESIGN EVENTS PMF Q (m³/s)	10000 YEAR ARI Q (m³/s)	2000 YEAR ARI Q (m³/s)	1000 YEAR ARI Q (m³/s)	500 YEAR ARI Q (m³/s)	200 YEAR ARI Q (m³/s)	100 YEAR ARI Q (m³/s)	50 YEAR ARI Q (m³/s)	20 YEAR ARI Q (m³/s)	10 YEAR ARI Q (m³/s)	5 YEAR ARI Q (m³/s)	2 YEAR ARI Q (m³/s)
BRISBANE	1065.26	13.40	35891	28462	19979	17403	13724	11308	9095	7009	3398	1586	951	434
BRISBANE	1065.75	12.91	35891	28462	19978	17402	13724	11308	9094	7009	3398	1586	952	434
BRISBANE	1066.25	12.41	35891	28461	19978	17402	13724	11308	9094	7009	3398	1586	952	434
BRISBANE	1066.76	11.90	35891	28460	19977	17401	13723	11308	9093	7009	3398	1586	952	434
BRISBANE	1067.25	11.41	35891	28460	19977	17401	13723	11308	9093	7009	3398	1587	952	435
BRISBANE	1067.73	10.94	35891	28459	19977	17401	13723	11308	9093	7009	3398	1587	952	435
BRISBANE	1068.31	10.35	35891	28459	19976	17400	13723	11308	9093	7009	3398	1587	952	435
BRISBANE	1068.85	9.81	35890	28459	19976	17400	13723	11308	9094	7008	3398	1587	952	435
BRISBANE	1069.29	9.37	35890	28459	19976	17400	13722	11308	9094	7008	3398	1587	952	435
BRISBANE	1069.78	8.88	35890	28458	19976	17400	13722	11308	9094	7008	3398	1587	952	435
BRISBANE	1070.28	8.38	35891	28458	19975	17399	13722	11308	9094	7008	3398	1587	952	435
BRISBANE	1070.79	7.87	35891	28457	19975	17399	13722	11308	9095	7008	3398	1587	953	435
BRISBANE	1071.28	7.38	35891	28456	19974	17398	13722	11307	9095	7008	3398	1587	953	435
BRISBANE	1071.77	6.89	35891	28455	19974	17398	13722	11307	9095	7008	3398	1587	953	436
BRISBANE	1072.02	6.64	35891	28455	19974	17398	13722	11307	9095	7008	3398	1587	953	436
BRISBANE	1072.27	6.39	35933	28467	19967	17393	13720	11307	9088	7003	3398	1587	959	503
BRISBANE	1072.76	5.90	35933	28467	19967	17393	13720	11307	9088	7004	3398	1587	959	503
BRISBANE	1073.24	5.42	35933	28467	19967	17393	13720	11307	9088	7004	3398	1587	959	503
BRISBANE	1073.74	4.92	35933	28467	19967	17393	13720	11307	9088	7004	3398	1587	960	504
BRISBANE	1074.23	4.43	35933	28467	19967	17393	13720	11307	9088	7004	3399	1587	960	504
BRISBANE	1074.72	3.94	35933	28467	19967	17393	13720	11307	9088	7004	3399	1587	960	504
BRISBANE	1075.23	3.43	35933	28467	19967	17393	13720	11307	9088	7004	3399	1587	960	504
BRISBANE	1075.74	2.92	35933	28467	19967	17393	13720	11307	9088	7004	3399	1587	960	504
BRISBANE	1076.25	2.41	35933	28467	19967	17393	13720	11307	9088	7005	3399	1587	960	504
BRISBANE	1076.75	1.91	35933	28467	19967	17393	13720	11307	9088	7005	3399	1587	961	505
BRISBANE	1077.26	1.40	35933	28467	19967	17393	13720	11307	9088	7005	3399	1587	961	505
BRISBANE	1077.78	0.88	35933	28467	19967	17393	13720	11307	9088	7005	3399	1587	961	505
BRISBANE	1078.28	0.38	35933	28467	19967	17393	13720	11307	9088	7005	3399	1587	961	505
BRISBANE	1078.59	0.07	35933	28467	19967	17393	13720	11307	9088	7005	3399	1587	961	505
BREMER	599.70	-	6461	4753	2982	2632	2104	1622	2191	1869	960	874	636	230
OXLEY	599.70	-	2263	2440	2476	2080	1279	729	1167	828	474	400	307	164
BREAKFAST	599.70	-	656	570	167	137	103	92	408	335	249	201	168	100
BULIMBA	599.70	-	603	426	222	158	99	90	651	538	368	301	248	162
CENTWEIR	0.04	-	26640	18626	10963	5690	3054	1380	377	9	0	0	0	0
INDOORWEIR	0.04	-	7478	2211	725	10	0	0	0	0	0	0	0	0
WILLIAMWEIR	0.02	-	3790	1057	0	0	0	0	0	0	0	0	0	0
VICTORIAWEIR	0.03	-	3523	961	95	60	0	0	0	0	0	0	0	0
CAPTAINWEIR	0.02	-	2921	1085	124	15	0	0	0	0	0	0	0	0
STORYWEIR	0.04	-	0	0	0	0	0	0	0	0	0	0	0	0
MERIVALEWEIR	0.04	-	2909	1555	8	0	0	0	0	0	0	0	0	0
GOODNALINK1	0.50	-	4922	4522	3795	3255	2151	1122	204	0	0	0	0	0
GOODNALINK2	0.54	-	10763	7755	4493	3333	1732	750	77	0	0	0	0	0
STLUCIALINK1	0.53	-	14552	10519	5869	4462	2459	1077	195	59	0	0	0	0
STLUCIALINK2	0.53	-	3921	3026	1923	1588	1017	618	241	29	0	0	0	0
STLUCIALINK3	0.43	-	6139	5039	3401	2584	1175	474	123	0	0	0	0	0

Figure H-1 - Combined Tailwater & River Flooding Conditions - Moreton Bay Storm Surge

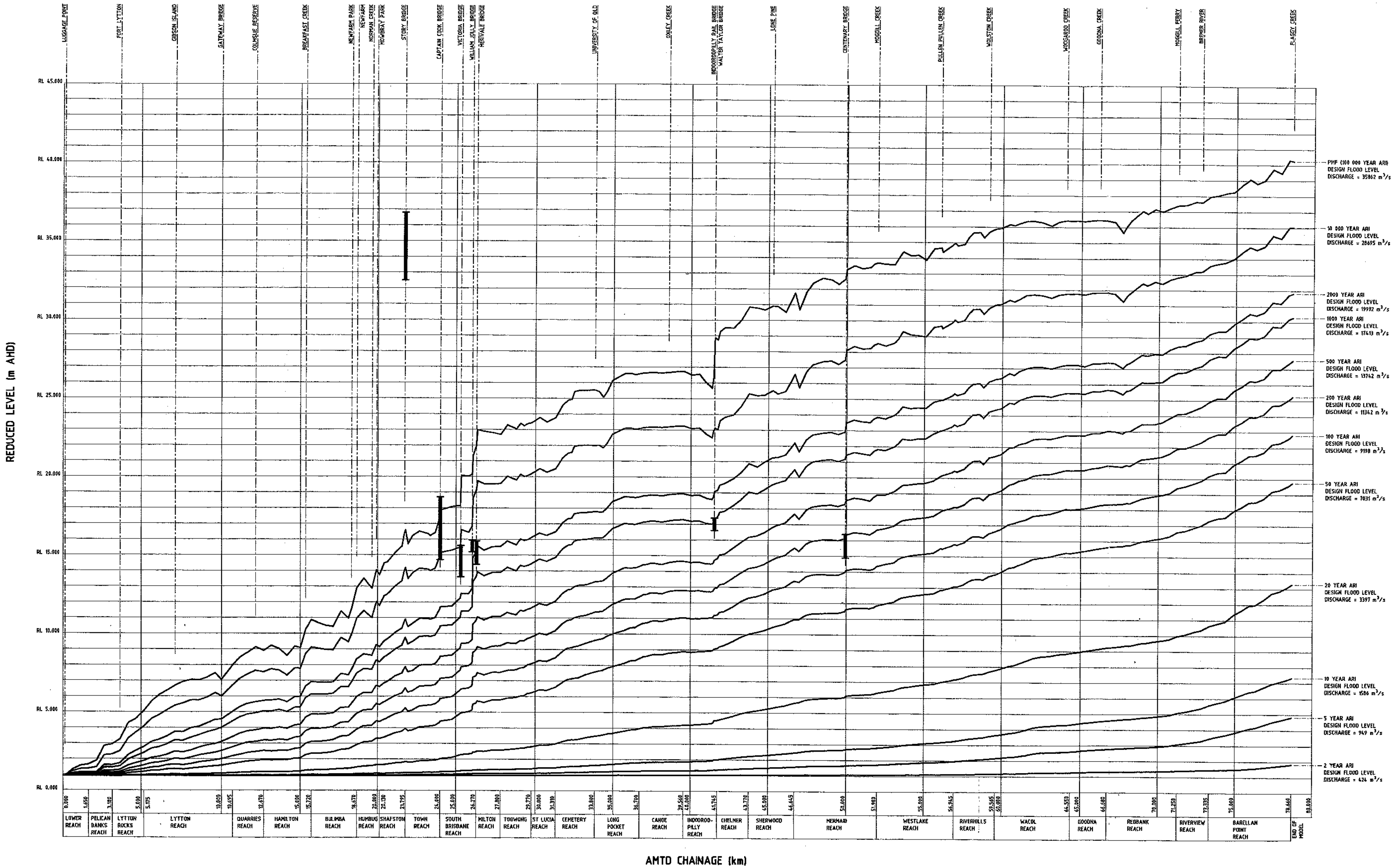


BCC.121.0251

SINCLAIR KNIGHT MERZ

FIGURE H-2

BRISBANE RIVER FLOOD STUDY
DESIGN PROFILES FOR THE BRISBANE RIVER - COMBINED



NOTE:
DISCHARGES GIVEN
AT PORT OFFICE

VERTICAL 0 2.0 4.0 6.0 8.0 10.0 METRES
HORIZONTAL 0 2.0 4.0 6.0 8.0 10.0 KILOMETRES

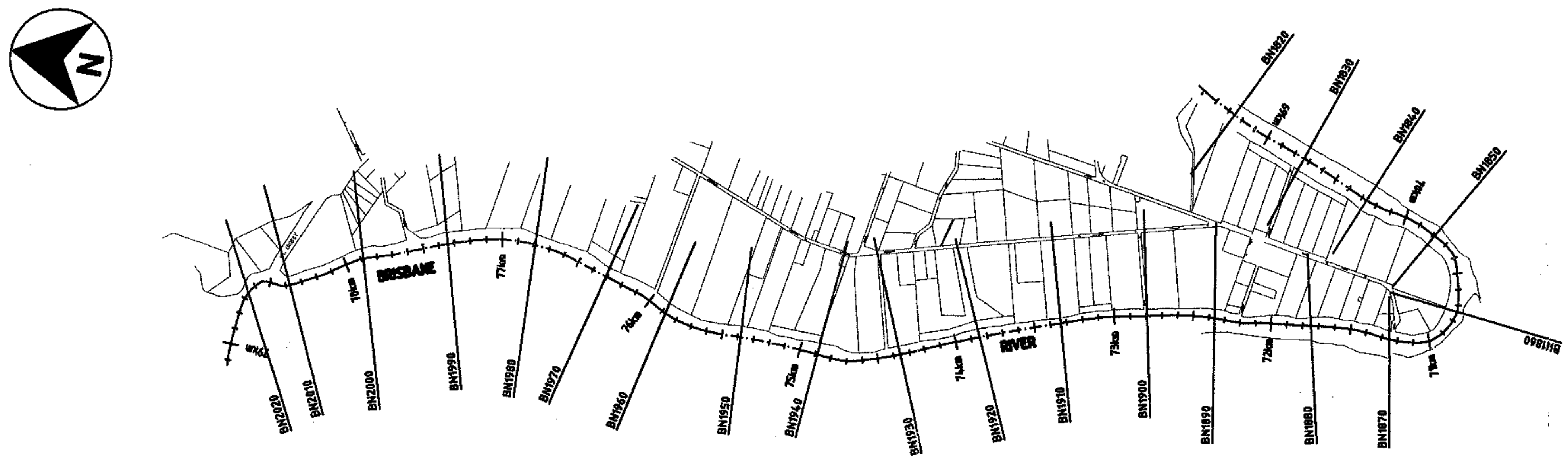
FILE NAME: 4157-263
PLOT SCALE: 1=250
DISK N°: G:\
JOB N°: T004157
DATE: 14-2-98

SINCLAIR KNIGHT MERZ

FIGURE H-3a

BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 5, 20, AND 100 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



LEGEND

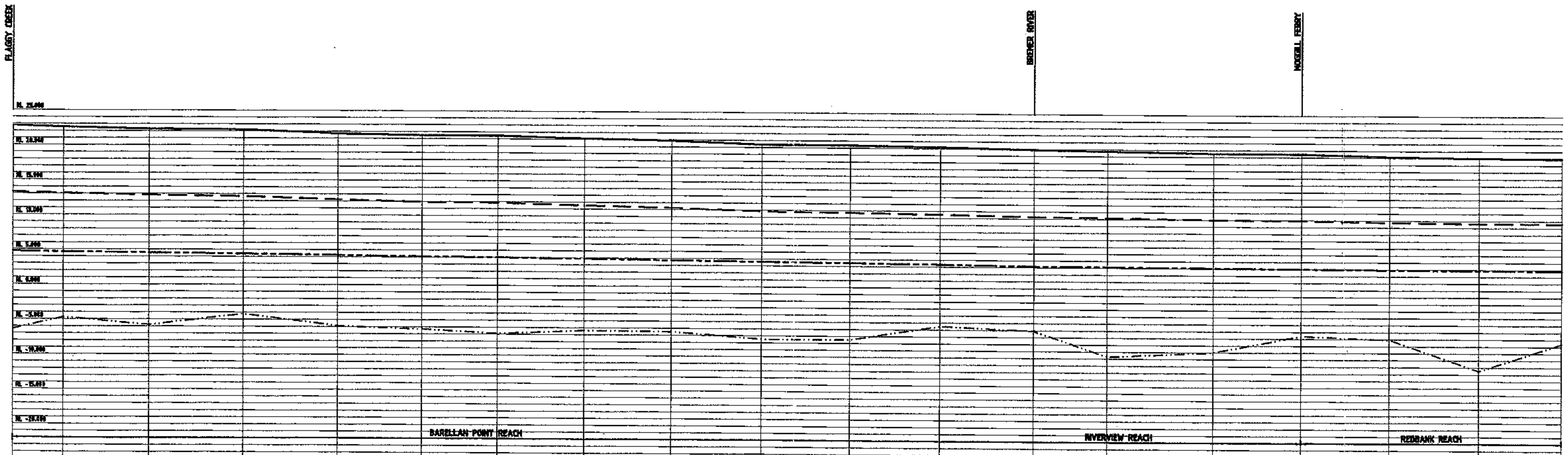
3000 — AMTD LINE

BN 1250 — SURVEYED CROSS SECTION

(516) — LOCATION AND IDENTIFICATION OF STRUCTURE

PLAN VIEW

KILOMETRES



DATUM RL. -25.000

	BN 2020	BN 2010	BN 2000	BN 1990	BN 1980	BN 1970	BN 1960	BN 1950	BN 1940	BN 1930
5 YEAR ARI DESIGN FLOOD LEVEL	4.720	4.660	4.560	4.400	4.240	4.090	4.010	3.880	3.730	3.590
20 YEAR ARI DESIGN FLOOD LEVEL	13.240	13.070	12.870	12.650	12.230	11.920	11.860	11.540	11.260	10.830
100 YEAR ARI DESIGN FLOOD LEVEL	22.760	22.570	22.290	22.200	21.600	21.480	21.440	21.130	20.860	20.410
BED LEVEL (m AHD)	-4.480	-4.730	-5.440	-4.200	-5.900	-4.300	-6.900	-6.400	-6.500	-7.500
CROSS SECTION NUMBER	BN 2020	BN 2010	BN 2000	BN 1990	BN 1980	BN 1970	BN 1960	BN 1950	BN 1940	BN 1930
MIKE 11 CHAINAGE (km)	1000.000	1000.385	1000.775	1001.315	1001.865	1002.350	1002.785	1003.275	1003.775	1004.300
AMTD CHAINAGE (km)	78.660	78.375	77.885	77.345	76.795	76.310	75.875	75.385	74.885	74.360

	BN 1920	BN 1910	BN 1900	BN 1890	BN 1880	BN 1870	BN 1860	BN 1850	BN 1840
5 YEAR ARI DESIGN FLOOD LEVEL	3.490	3.360	3.180	3.160	3.060	3.000	2.920	2.870	2.840
20 YEAR ARI DESIGN FLOOD LEVEL	10.700	10.530	10.260	10.180	9.990	9.920	9.730	9.430	9.590
100 YEAR ARI DESIGN FLOOD LEVEL	20.370	20.280	19.890	19.720	19.570	19.440	19.190	19.020	18.960
BED LEVEL (m AHD)	-7.500	-5.500	-6.190	-9.700	-9.000	-4.600	-7.100	-11.500	-7.690
CROSS SECTION NUMBER	BN 1920	BN 1910	BN 1900	BN 1890	BN 1880	BN 1870	BN 1860	BN 1850	BN 1840
MIKE 11 CHAINAGE (km)	1004.690	1005.325	1005.870	1006.300	1006.910	1007.410	1007.920	1008.445	1008.925
AMTD CHAINAGE (km)	73.950	73.335	72.790	72.360	71.750	71.250	70.740	70.215	69.735

LEGEND

(516) — LOCATION AND IDENTIFICATION OF STRUCTURE

5 YEAR ARI DESIGN FLOOD

20 YEAR ARI DESIGN FLOOD

100 YEAR ARI DESIGN FLOOD

EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

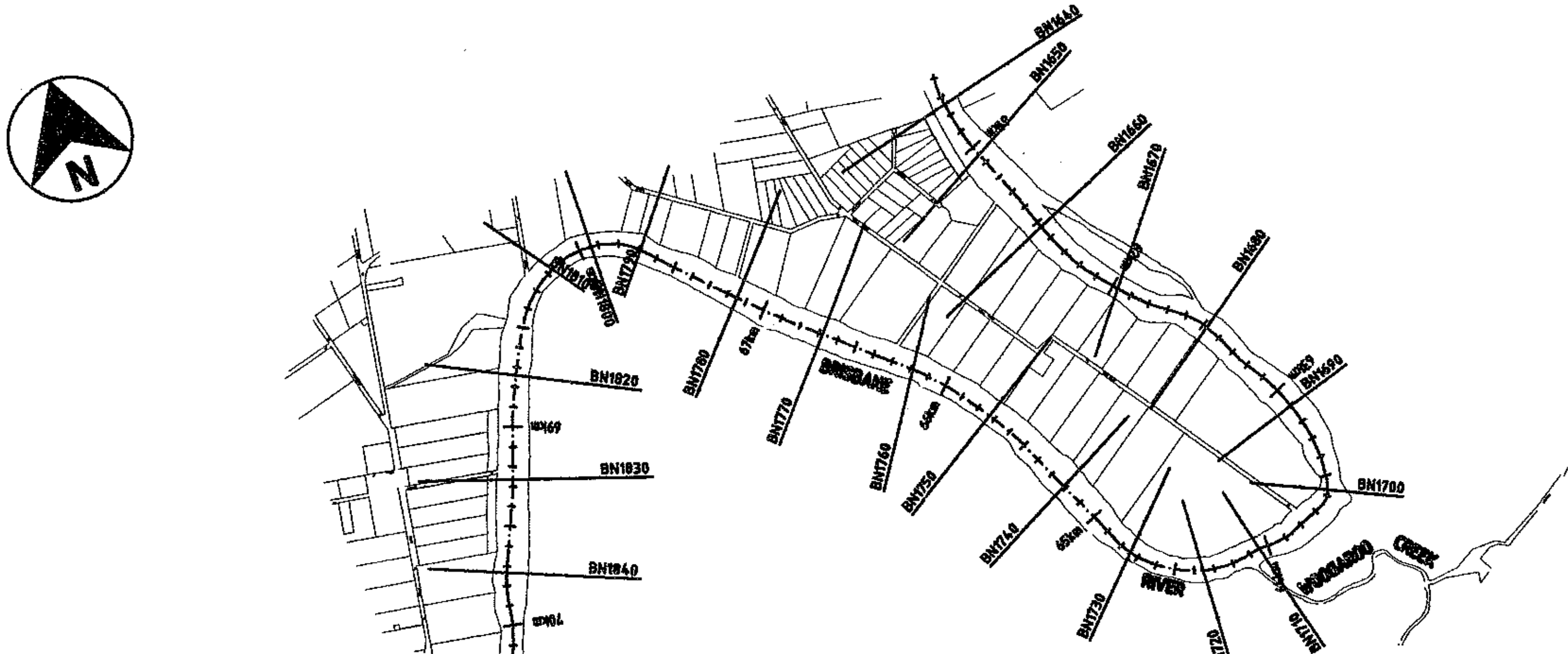
BRISBANE RIVER - BN 2020 TO BN 1840

FILE NAME: 415/-119 PLOT SCALE: 1=30 DISK N°: CADWG JOB N°: T004157 DATE: 23/5/97

FIGURE H-3b

SINCLAIR KNIGHT MERZ

BRISBANE RIVER FLOOD STUDY
MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 5, 20, AND 100 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



PLAN VIEW

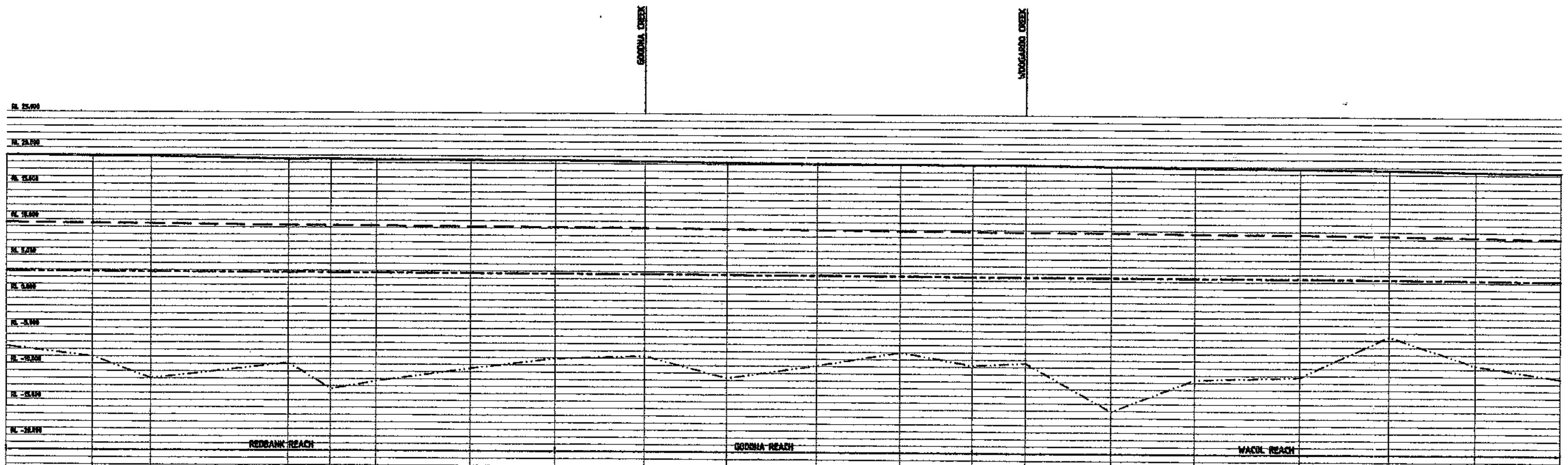
0 0.25 0.5 0.75 1.0 1.25 KILOMETRES

LEGEND

AMTD LINE

BN 1750 SURVEYED CROSS SECTION

(516) LOCATION AND IDENTIFICATION OF STRUCTURE



DATUM RL. -25.000

5 YEAR ARI DESIGN FLOOD LEVEL	2.840	2.819	2.808	2.758	2.750	2.738	2.716	2.688	2.650	2.620
20 YEAR ARI DESIGN FLOOD LEVEL	9.590	9.560	9.470	9.300	9.380	9.260	9.210	9.150	9.070	8.994
100 YEAR ARI DESIGN FLOOD LEVEL	18.910	18.844	18.850	18.580	18.520	18.440	18.430	18.430	18.330	18.224
BED LEVEL (m AHD)	-7.600	-9.000	-12.090	-9.600	-13.600	-12.300	-10.580	-9.100	-8.700	-11.700
CROSS SECTION NUMBER	BN 1840	BN 1830	BN 1820	BN 1810	BN 1800	BN 1790	BN 1780	BN 1770	BN 1760	BN 1750
MIKE 11 CHAINAGE (km)	1008.925	1009.440	1009.720	1010.490	1010.735	1010.980	1011.534	1011.980	1012.475	1012.935
AMTD CHAINAGE (km)	69.735	69.360	68.860	68.170	67.935	67.680	67.150	66.680	66.185	65.725

5 YEAR ARI DESIGN FLOOD LEVEL	2.594	2.550	2.518	2.498	2.480	2.460	2.440	2.380	2.290	2.230
20 YEAR ARI DESIGN FLOOD LEVEL	8.920	8.858	8.778	8.730	8.710	8.620	8.560	8.450	8.270	8.090
100 YEAR ARI DESIGN FLOOD LEVEL	18.140	18.080	18.050	18.050	17.940	17.810	17.770	17.620	17.390	17.240
BED LEVEL (m AHD)	-9.900	-8.000	-9.800	-9.400	-16.100	-11.600	-11.200	-5.500	-9.540	-11.300
CROSS SECTION NUMBER	BN 1740	BN 1730	BN 1720	BN 1710	BN 1700	BN 1690	BN 1680	BN 1670	BN 1660	BN 1650
MIKE 11 CHAINAGE (km)	1013.445	1013.910	1014.310	1014.410	1015.090	1015.560	1016.140	1016.660	1017.130	1017.610
AMTD CHAINAGE (km)	65.215	64.740	64.550	64.050	63.570	63.100	62.520	62.020	61.530	61.050

LEGEND

(516) LOCATION AND IDENTIFICATION OF STRUCTURE

5 YEAR ARI DESIGN FLOOD

20 YEAR ARI DESIGN FLOOD

100 YEAR ARI DESIGN FLOOD

EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 1840 TO BN 1650

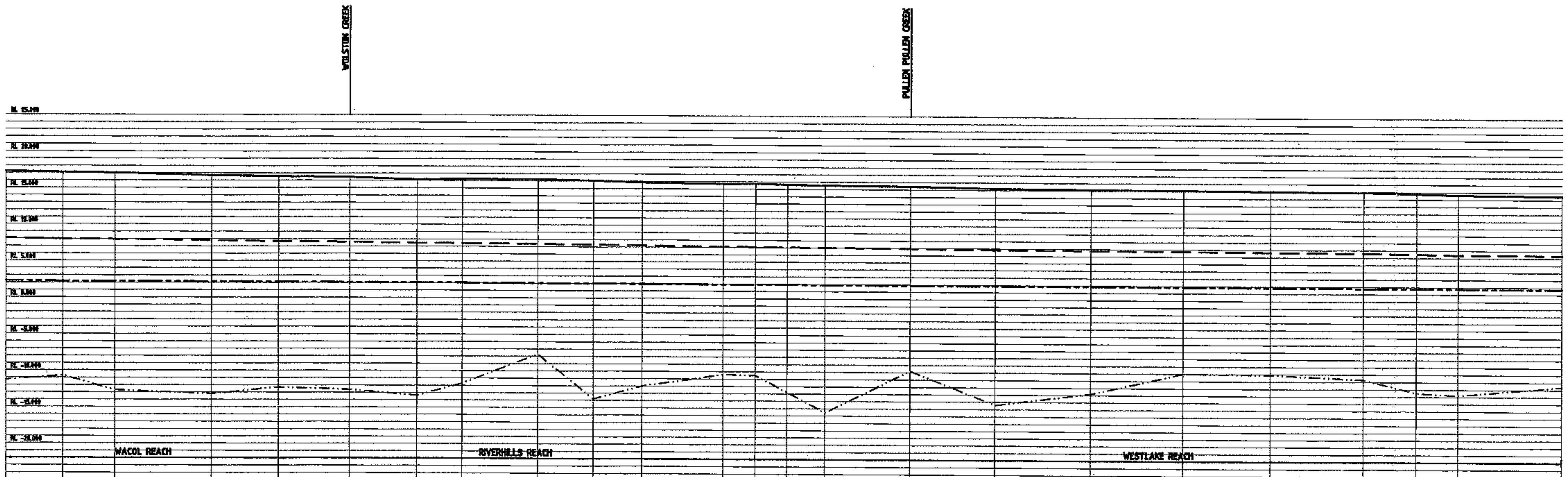
FILE NAME: 4157-120 PLOT SCALE: 1=30 DISK N°: C:\DWG JOB N°: T004157 DATE: 23/3/97

FIGURE H-3c

BRISBANE RIVER FLOOD STUDY
MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 5, 20, AND 100 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS

PLAN VIEW

KILOMETRES



DATUM RL. -25.000

5 YEAR ARI DESIGN FLOOD LEVEL	2.230	2.190	2.180	2.140	2.110	2.080	2.050	2.030	2.010	1.990	1.960	1.920
20 YEAR ARI DESIGN FLOOD LEVEL	8.090	7.960	7.930	7.780	7.440	7.580	7.450	7.430	7.390	7.320	7.210	7.080
100 YEAR ARI DESIGN FLOOD LEVEL	17.260	17.180	17.020	16.690	16.560	16.450	16.150	16.250	16.220	16.070	15.860	15.490
BED LEVEL (m AHD)	-13.300	-10.700	-12.700	-13.200	-12.300	-12.600	-15.400	-11.700	-7.700	-13.800	-12.000	-10.400
CROSS SECTION NUMBER	BN 1650	BN 1640	BN 1630	BN 1620	BN 1610	BN 1600	BN 1590	BN 1580	BN 1570	BN 1560	BN 1550	BN 1540
MIKE 11 CHAINAGE (km)	1017.610	1017.920	1018.260	1018.725	1019.095	1019.490	1019.865	1020.115	1020.525	1020.830	1021.095	1021.539
AMTD CHAINAGE (km)	61.050	60.740	60.440	59.935	59.565	59.170	58.795	58.545	58.135	57.830	57.565	57.121

5 YEAR ARI DESIGN FLOOD LEVEL	1.910	1.900	2.090	1.870	1.860	1.850	1.830	1.800	1.780	1.760	1.750	1.730
20 YEAR ARI DESIGN FLOOD LEVEL	7.060	7.030	7.400	6.920	6.810	6.780	6.720	6.660	6.580	6.490	6.410	6.310
100 YEAR ARI DESIGN FLOOD LEVEL	15.720	15.650	15.530	15.450	15.210	15.120	15.070	15.010	14.910	14.770	14.610	14.490
BED LEVEL (m AHD)	-10.500	-12.100	-15.690	-9.800	-14.400	-12.800	-10.000	-10.100	-10.700	-12.500	-12.800	-11.600
CROSS SECTION NUMBER	BN 1530	BN 1520	BN 1510	BN 1500	BN 1490	BN 1480	BN 1470	BN 1460	BN 1450	BN 1440	BN 1430	BN 1420
MIKE 11 CHAINAGE (km)	1021.715	1021.895	1022.105	1022.575	1023.040	1023.570	1024.080	1024.563	1025.070	1025.360	1025.590	1026.170
AMTD CHAINAGE (km)	56.945	56.745	56.555	56.085	55.620	55.090	54.580	54.097	53.590	53.300	53.070	52.490

LEGEND

LOCATION AND IDENTIFICATION OF STRUCTURE
5 YEAR ARI DESIGN FLOOD
20 YEAR ARI DESIGN FLOOD
100 YEAR ARI DESIGN FLOOD
EXISTING BED LEVEL

VERT. METRES
HORIZ. KILOMETRES

BRISBANE RIVER - BN 1650 TO BN 1420

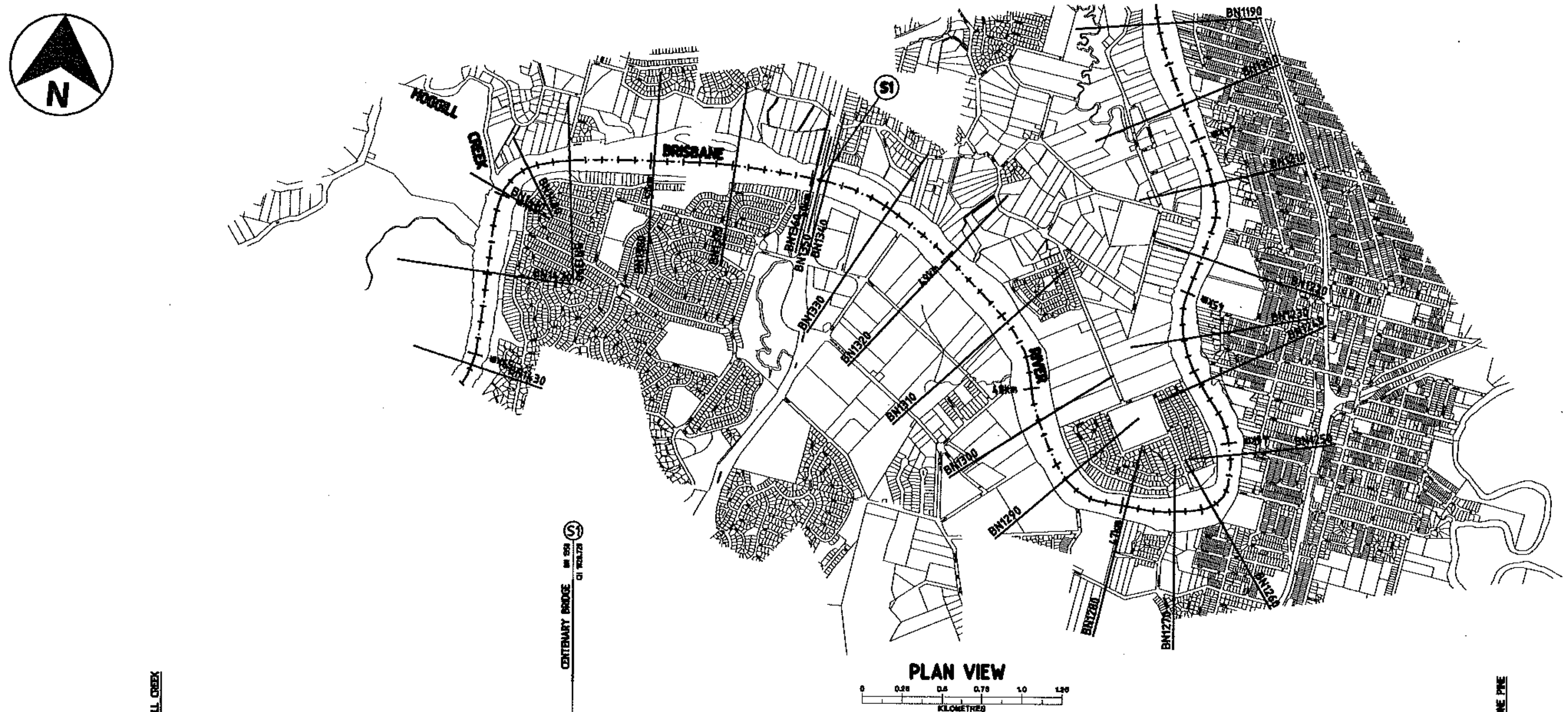
FILE NAME: 4157-121 PLOT SCALE: 1=30 DISK N°: C:\DWG JOB N°: T004157 DATE: 23/3/97

SINCLAIR KNIGHT MERZ

FIGURE H-3d

BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 5, 20, AND 100 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



PLAN VIEW

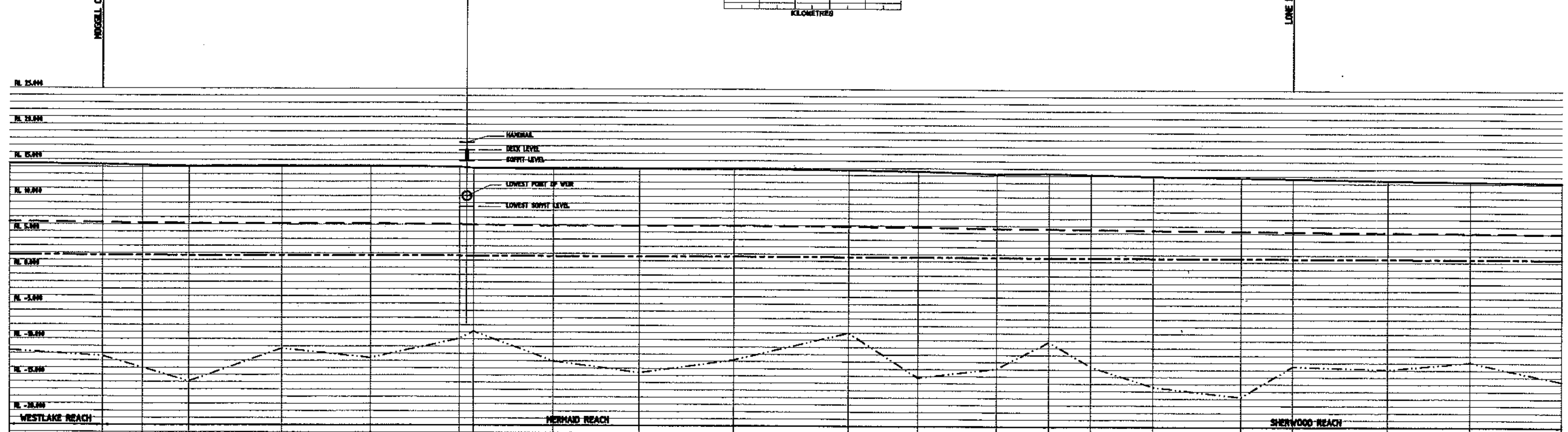
0 0.25 0.5 0.75 1.0 1.25 KILOMETRES

LEGEND

ARTD LINE

BN 1250 SURVEYED CROSS SECTION

S1 LOCATION AND IDENTIFICATION OF STRUCTURE



DATUM RL. -25.000

5 YEAR ARI DESIGN FLOOD LEVEL	1.730	1.710	1.700	1.690	1.680	1.670	1.660	1.640	1.620	1.620	1.620	1.600	1.590	1.560	1.550	1.530	1.520	1.500	1.490	1.480	1.460	1.450
20 YEAR ARI DESIGN FLOOD LEVEL	6.340	6.260	6.200	6.150	6.130	6.120	6.050	5.970	5.980	5.900	5.890	5.860	5.780	5.620	5.570	5.510	5.440	5.320	5.270	5.160	5.100	5.020
100 YEAR ARI DESIGN FLOOD LEVEL	14.400	14.380	14.250	14.100	14.170	14.190	14.040	13.910	13.800	13.820	13.820	13.750	13.590	13.210	13.310	13.180	12.940	12.790	12.680	12.450	12.250	12.190
BED LEVEL (m AHD)	-11.600	-12.600	-14.800	-15.900	-11.300	-12.600	-9.300	-8.900	-13.040	-14.400	-12.880	-9.600	-15.260	-13.910	-10.280	-13.680	-16.400	-17.880	-13.500	-13.940	-12.900	-15.600
CROSS SECTION NUMBER	BN 1420	BN 1410	BN 1400	BN 1390	BN 1380	BN 1370	BN 1360	BN 1340	BN 1330	BN 1320	BN 1310	BN 1300	BN 1290	BN 1280	BN 1270	BN 1260	BN 1250	BN 1240	BN 1230	BN 1220	BN 1210	BN 1200
MIKE 11 CHAINAGE (km)	1026.170	1026.680	1026.900	1027.160	1027.480	1028.180	1028.680	1028.760	1029.200	1029.440	1030.220	1030.870	1031.260	1031.780	1031.995	1032.230	1032.565	1033.080	1033.370	1033.900	1034.370	1034.390
AMTD CHAINAGE (km)	52.490	51.980	51.760	51.500	50.980	50.480	49.980	49.900	49.444	48.988	48.449	47.790	47.400	46.960	46.665	46.430	46.015	45.500	45.290	44.760	44.290	43.770

LEGEND

S1 LOCATION AND IDENTIFICATION OF STRUCTURE

5 YEAR ARI DESIGN FLOOD

20 YEAR ARI DESIGN FLOOD

100 YEAR ARI DESIGN FLOOD

EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

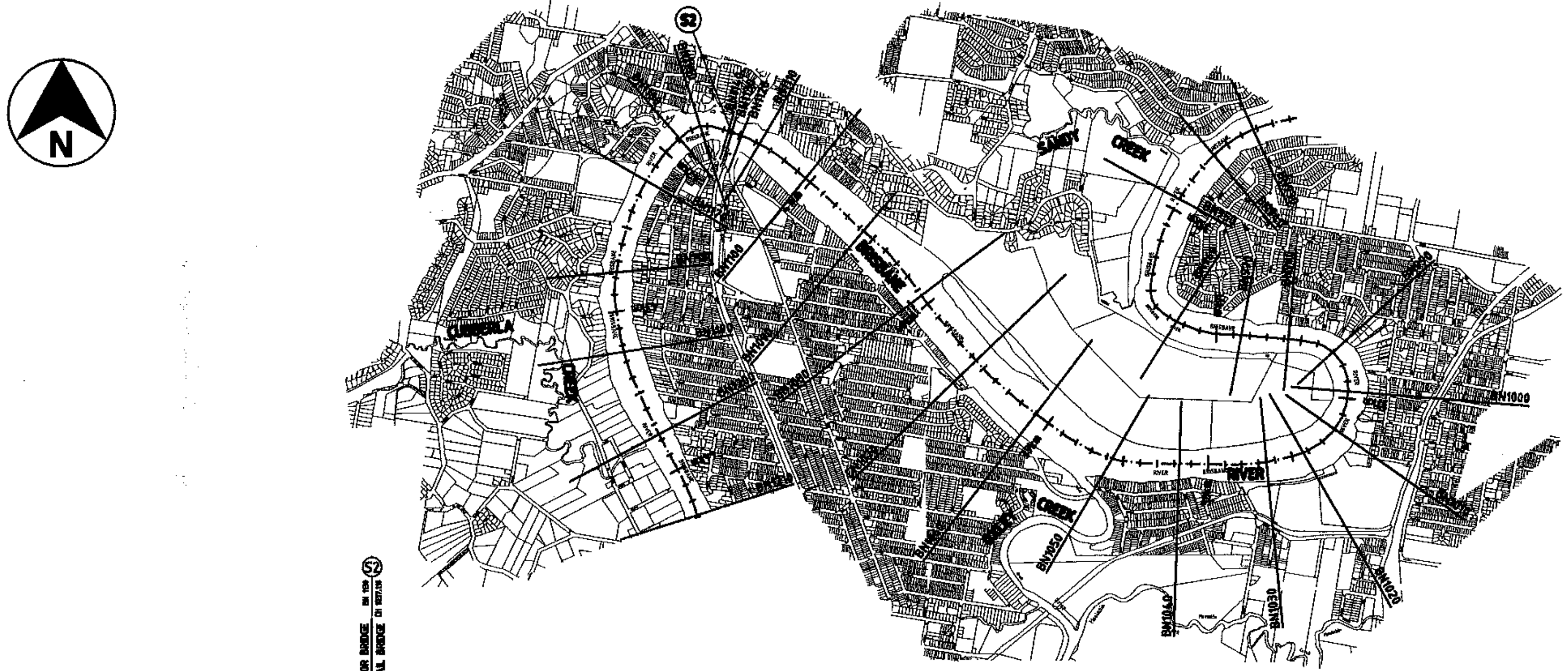
BRISBANE RIVER - BN 1420 TO BN 1200

PLOT SCALE: 1=30

SINCLAIR KNIGHT MERZ

FIGURE H-3e

BRISBANE RIVER FLOOD STUDY
MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 5, 20, AND 100 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS

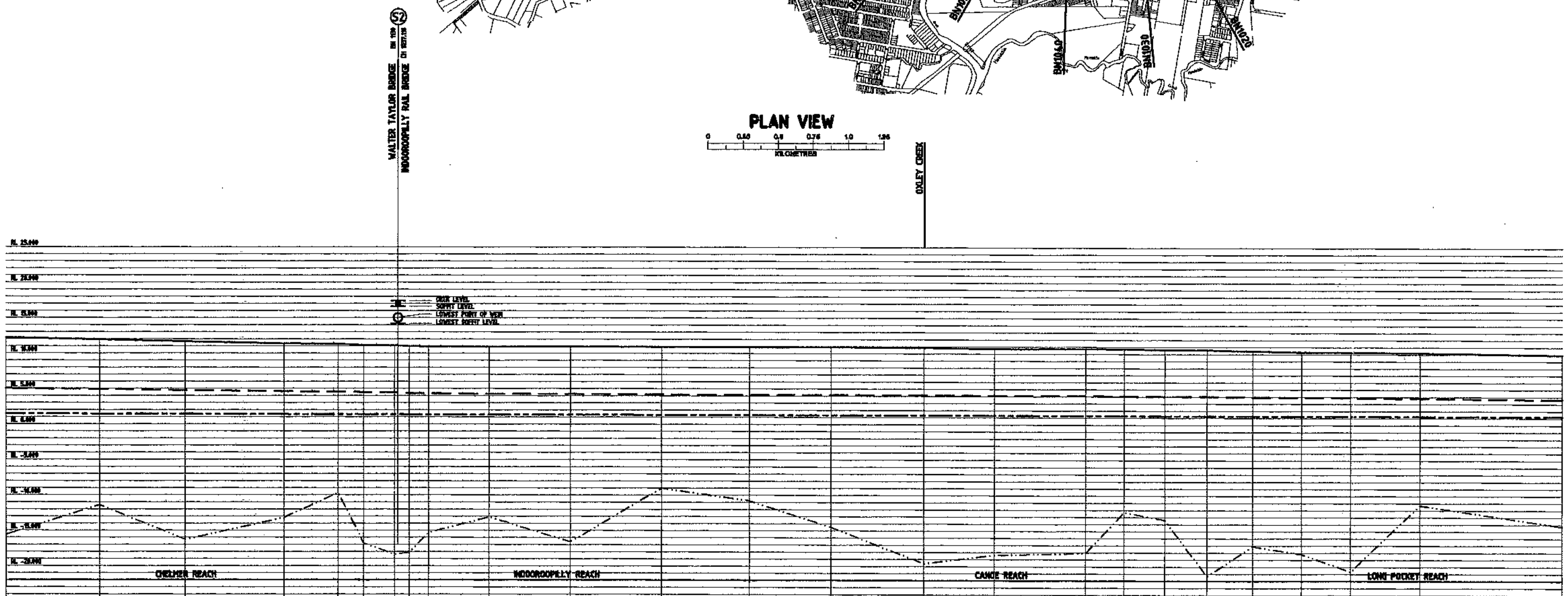


LEGEND

- AMTD LINE
- BN 1250 — SURVEYED CROSS SECTION
- (S16) LOCATION AND IDENTIFICATION OF STRUCTURE

PLAN VIEW

0 0.25 0.5 0.75 1.0 1.25 KILOMETRES



DATUM RL. -25.000

5 YEAR ARI DESIGN FLOOD LEVEL	1.450	1.430	1.400	1.380	1.360	1.340	1.350	1.330	1.320	1.310	1.310	1.300	1.290	1.290	1.290	1.290	1.280	1.280	1.270	1.270	1.270	1.260	1.240	1.240	1.220
20 YEAR ARI DESIGN FLOOD LEVEL	5.020	4.930	4.740	4.680	4.540	4.480	4.470	4.320	4.290	4.250	4.230	4.180	4.150	4.140	4.140	4.080	4.090	4.050	4.010	4.010	3.940	3.890	3.870	3.790	3.630
100 YEAR ARI DESIGN FLOOD LEVEL	12.090	11.940	11.650	11.350	11.280	11.120	11.070	10.980	10.930	10.910	10.930	10.910	10.900	10.870	10.840	10.790	10.760	10.730	10.420	10.590	10.450	10.300	10.290	10.220	9.910
BED LEVEL (m AHD)	-15.600	-11.400	-16.300	-13.200	-9.780	-16.000	-18.400	-18.900	-15.300	-13.100	-16.600	-9.000	-10.000	-14.500	-19.400	-18.400	-18.100	-12.300	-13.400	-21.300	-17.100	-18.200	-20.700	-11.300	-16.300
CROSS SECTION NUMBER	BN 1200	BN 1190	BN 1180	BN 1170	BN 1160	BN 1150	BN 1140	BN 1120	BN 1110	BN 1100	BN 1090	BN 1080	BN 1070	BN 1060	BN 1050	BN 1040	BN 1030	BN 1020	BN 1010	BN 1000	BN 990	BN 980	BN 970	BN 960	BN 950
MIKE 11 CHAINAGE (km)	1034.890	1035.414	1035.900	1036.460	1036.770	1036.915	1037.090	1037.115	1037.285	1037.425	1038.085	1038.600	1039.100	1039.565	1040.090	1040.490	1041.010	1041.230	1041.460	1041.700	1041.940	1042.235	1042.515	1042.910	1043.725
AMTD CHAINAGE (km)	43.770	43.266	42.760	42.208	42.090	41.745	41.570	41.485	41.315	41.035	40.575	40.060	39.560	39.050	38.570	38.170	37.560	37.430	37.200	36.940	36.700	36.425	36.145	35.750	34.935

LEGEND

- (S16) LOCATION AND IDENTIFICATION OF STRUCTURE
- 5 YEAR ARI DESIGN FLOOD
- 20 YEAR ARI DESIGN FLOOD
- 100 YEAR ARI DESIGN FLOOD
- EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 1200 TO BN 950

FILE NAME: 4157-123 PLOT SCALE: 1=30 DISK Nº: C:\DWG JOB Nº: T00415? DATE: 23/5/97

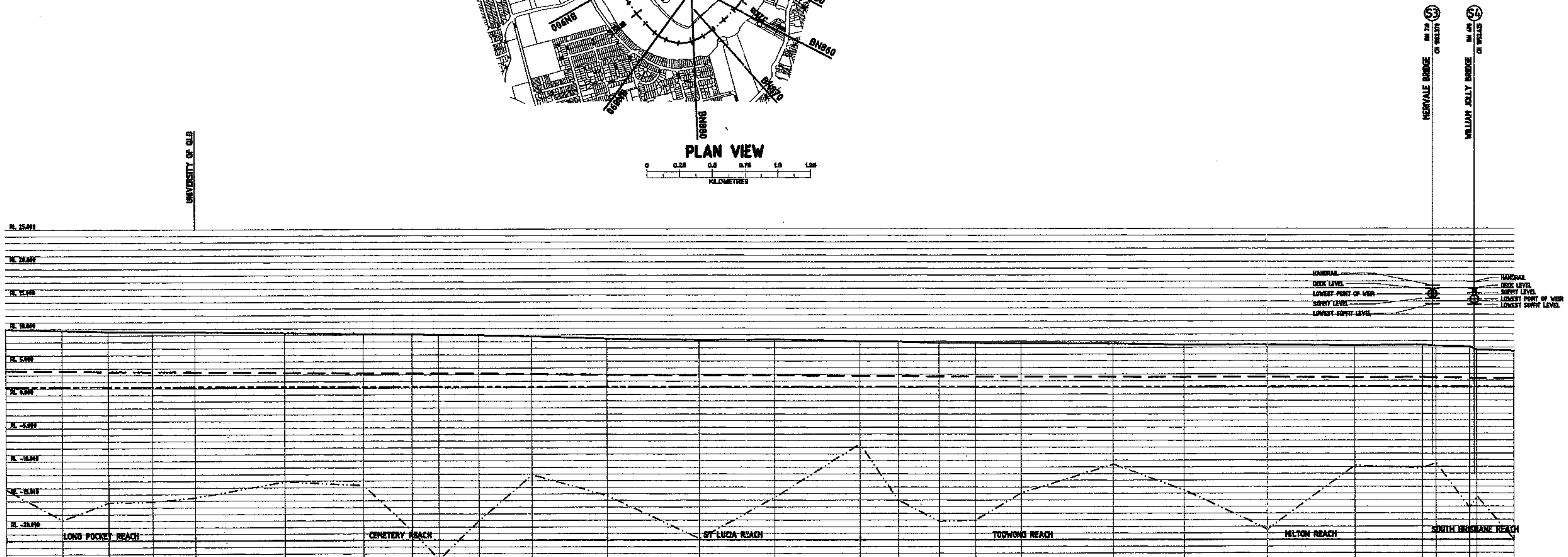
FIGURE H-3f

BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 5, 20, AND 100 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS

PLAN VIEW

LEGEND
AMTD LINE
BN 1250 SURVEYED CROSS SECTION
S16 LOCATION AND IDENTIFICATION OF STRUCTURE



DATUM RL. -25.000

CROSS SECTION NUMBER	5 YEAR ARI DESIGN FLOOD LEVEL	20 YEAR ARI DESIGN FLOOD LEVEL	100 YEAR ARI DESIGN FLOOD LEVEL	BED LEVEL (m AHD)	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 950	1.220	3.630	9.910	-14.300	1043.725	34.935
BN 940	1.210	3.590	9.750	-18.900	1044.060	34.600
BN 930	1.210	3.520	9.580	-16.200	1044.340	34.320
BN 920	1.200	3.490	9.530	-16.800	1044.605	34.055
BN 910	1.200	3.450	9.490	-15.500	1044.860	33.800
BN 900	1.180	3.340	9.310	-13.900	1045.400	33.260
BN 890	1.170	3.230	9.170	-13.700	1045.885	32.775
BN 880	1.150	3.220	9.000	-20.600	1046.180	32.480
BN 870	1.147	3.200	9.020	-24.900	1046.340	32.320
BN 860	1.140	3.180	8.970	-19.080	1046.580	32.080
BN 850	1.150	3.090	8.730	-12.100	1046.900	31.760
BN 840	1.130	2.950	8.410	-15.300	1047.350	31.310
BN 830	1.130	2.870	8.170	-21.800	1047.915	30.745
BN 820	1.120	2.870	8.230	-15.600	1048.375	30.285
BN 810	1.110	2.760	8.080	-7.500	1048.890	29.770
BN 800	1.110	2.740	7.940	-16.000	1049.120	29.540
BN 790	1.100	2.680	7.750	-19.200	1049.370	29.290
BN 780	1.100	2.670	7.740	-19.000	1049.530	29.070
BN 770	1.100	2.650	7.630	-16.900	1049.870	28.790
BN 760	1.090	2.590	7.610	-10.500	1050.430	28.230
BN 750	1.090	2.540	7.460	-14.500	1050.840	27.800
BN 740	1.090	2.550	7.440	-20.500	1051.360	27.300
BN 730	1.080	2.460	7.300	-10.800	1051.895	26.765
BN 720	1.080	2.490	7.400	-11.100	1052.310	26.350
BN 700	1.070	2.440	7.230	-10.400	1052.390	26.270
BN 690	1.070	2.420	7.140	-17.200	1052.595	26.065
BN 670	1.040	2.340	6.630	-15.900	1052.640	26.020
BN 660	1.060	2.320	6.490	-22.000	1052.865	25.795

LEGEND
S16 LOCATION AND IDENTIFICATION OF STRUCTURE
5 YEAR ARI DESIGN FLOOD
20 YEAR ARI DESIGN FLOOD
100 YEAR ARI DESIGN FLOOD
EXISTING BED LEVEL

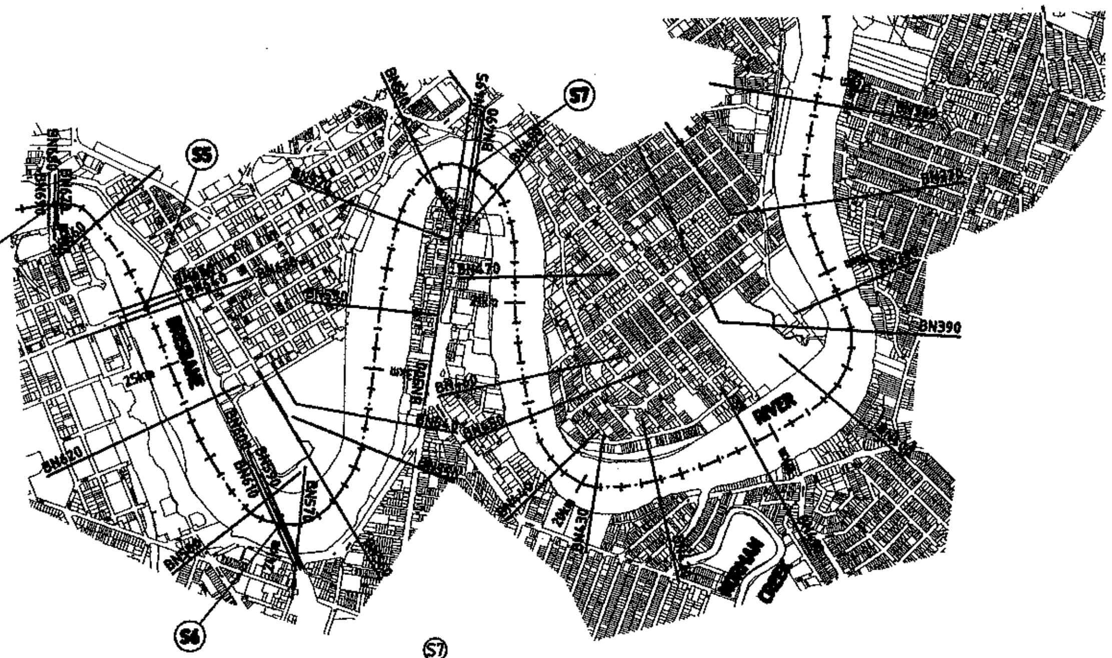
VERT. (METRES)
HORIZ. (KILOMETRES)

BRISBANE RIVER - BN 950 TO BN 660

SINCLAIR KNIGHT MERZ

FIGURE H-3g

BRISBANE RIVER FLOOD STUDY
MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 5, 20, AND 100 YEAR ARI
FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS

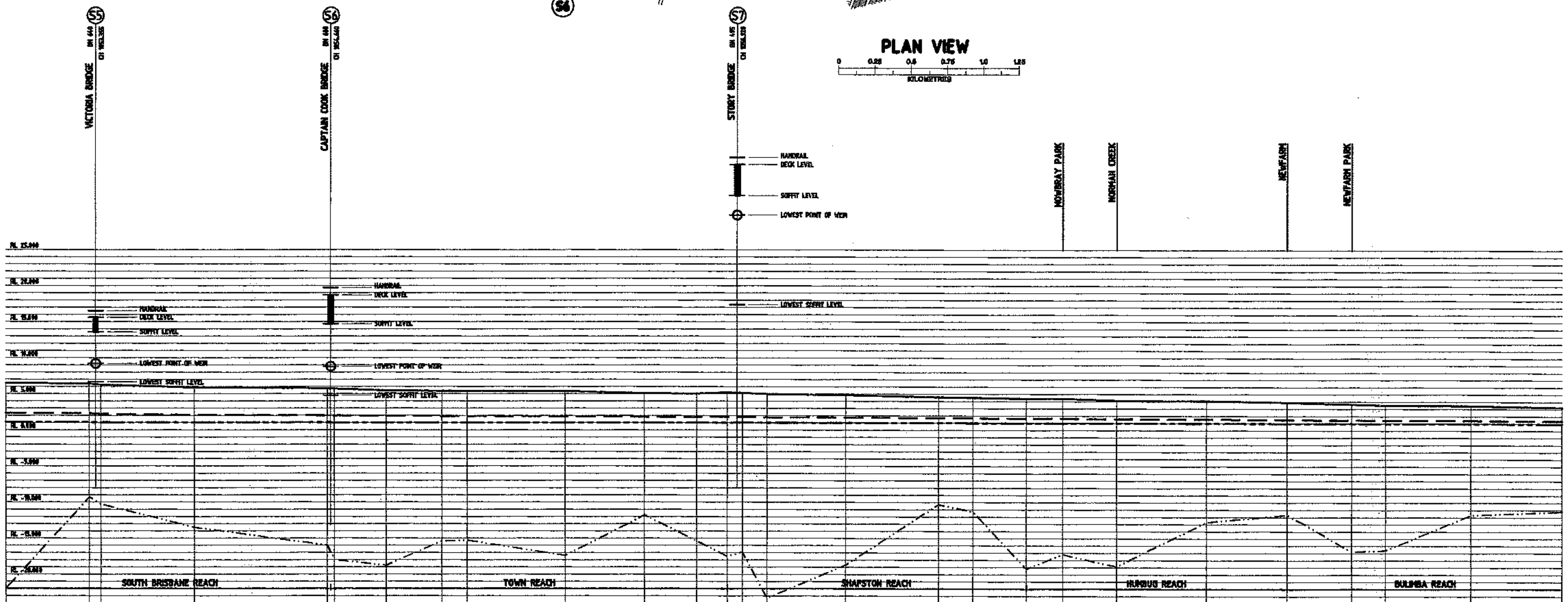


PLAN VIEW

0 0.25 0.5 0.75 1.0 1.25
KILOMETRES

LEGEND

AMTD LINE
BN 1250 SURVEYED CROSS SECTION
S16 LOCATION AND IDENTIFICATION OF STRUCTURE



DATUM RL. -25.000

	5 YEAR ARI DESIGN FLOOD LEVEL	20 YEAR ARI DESIGN FLOOD LEVEL	100 YEAR ARI DESIGN FLOOD LEVEL	BED LEVEL (m AHD)	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 660	1.040	2.320	6.690	-22.000	1052.845	25.795
BN 650	1.060	2.280	6.420	-9.300	1053.320	25.360
BN 630	1.050	2.280	6.340	-10.300	1053.385	25.295
BN 620	1.030	2.050	5.950	-13.500	1053.900	24.764
BN 610	1.030	2.010	5.760	-16.000	1054.440	24.020
BN 590	1.020	1.980	5.704	-18.000	1054.480	23.980
BN 560	1.010	1.920	5.450	-18.800	1054.970	23.490
BN 550	1.010	1.890	5.400	-15.400	1055.280	23.380
BN 540	1.018	1.900	5.400	-15.390	1055.420	23.240
BN 530	1.010	1.880	5.344	-17.400	1055.960	22.700
BN 520	1.000	1.810	5.490	-11.600	1056.480	22.260
BN 510	1.000	1.790	5.030	-15.400	1056.695	21.965
BN 500	1.000	1.840	5.220	-17.300	1056.865	21.795
BN 490	1.000	1.810	5.120	-16.900	1056.950	21.710
BN 480	1.000	1.780	4.970	-23.300	1057.090	21.570
BN 470	0.998	1.750	4.850	-10.730	1057.590	21.180
BN 460	0.990	1.680	4.500	-10.300	1058.040	20.620
BN 450	0.980	1.660	4.500	-11.300	1058.230	20.430
BN 440	0.980	1.630	4.370	-17.200	1058.530	20.130
BN 430	0.980	1.650	4.410	-17.200	1058.735	19.925
BN 420	0.980	1.570	4.130	-18.900	1059.035	19.625
BN 410	0.976	1.550	4.090	-12.700	1059.540	19.120
BN 400	0.976	1.490	3.880	-11.700	1059.990	18.670
BN 390	0.978	1.450	3.650	-16.880	1060.365	18.295
BN 380	0.980	1.420	3.580	-16.650	1060.535	18.125
BN 370	0.960	1.400	3.450	-11.700	1061.015	17.645
BN 360	0.960	1.350	3.240	-11.200	1061.530	17.130

(Row "CROSS SECTION NUMBER" shown as first column.)

LEGEND

S16 LOCATION AND IDENTIFICATION OF STRUCTURE
5 YEAR ARI DESIGN FLOOD
20 YEAR ARI DESIGN FLOOD
100 YEAR ARI DESIGN FLOOD
EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

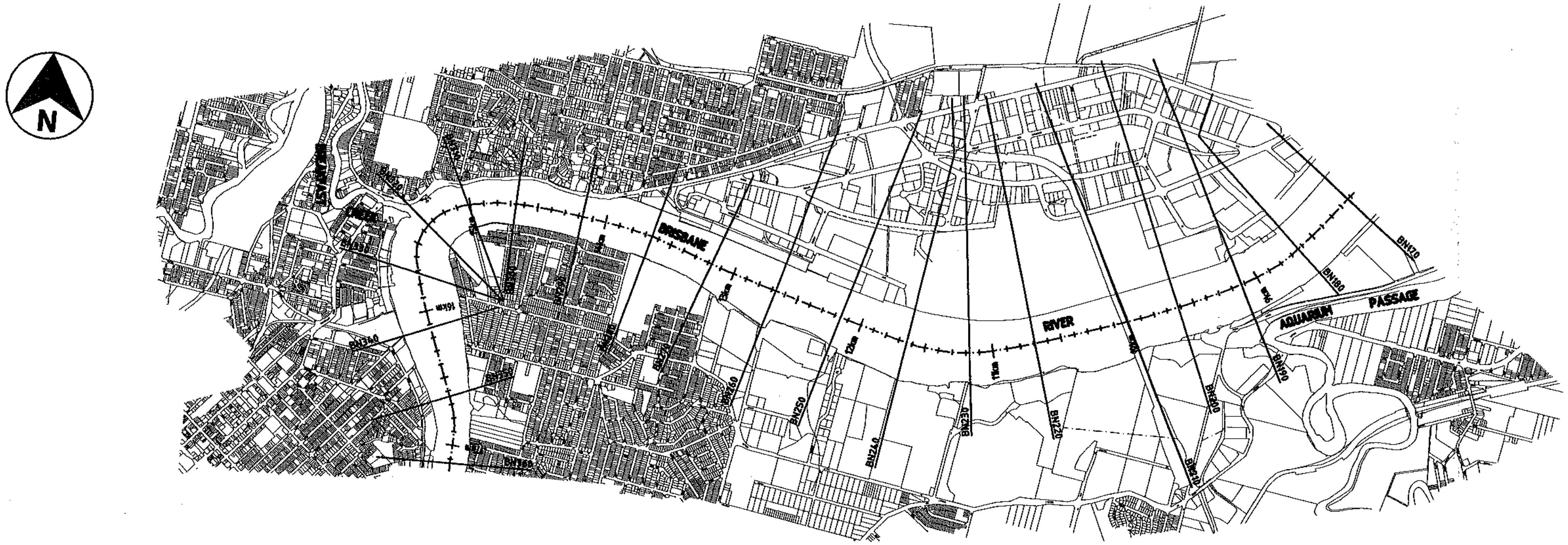
BRISBANE RIVER - BN 660 TO BN 360

FILE NAME: 41...
PLOT SCALE: 1=30

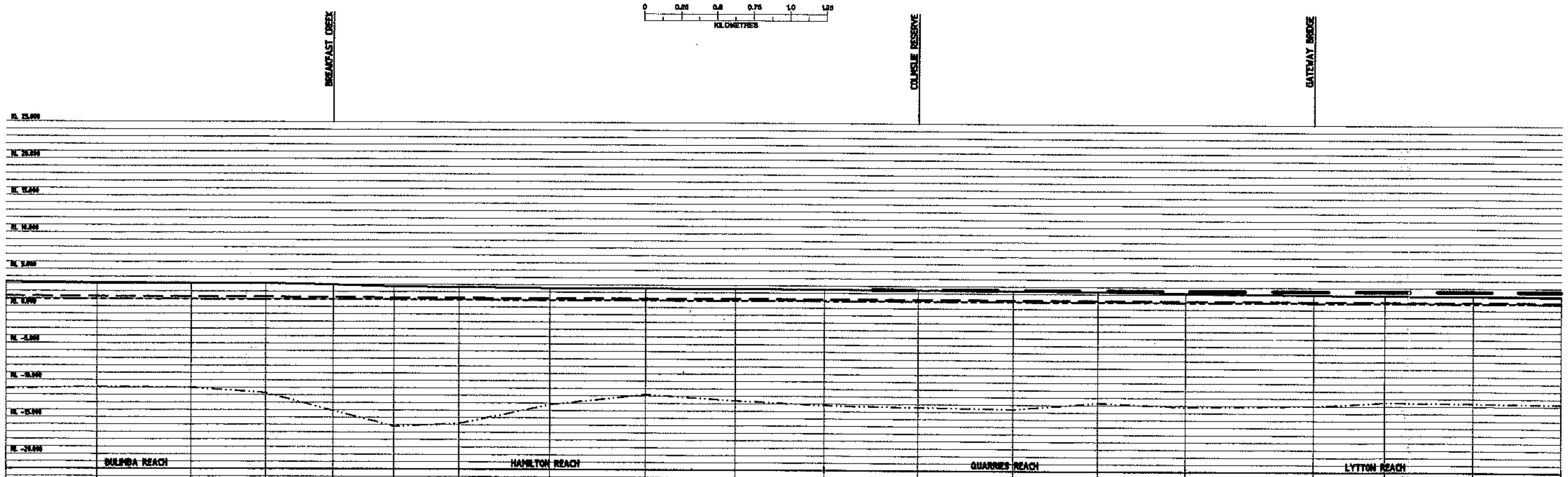
SINCLAIR KNIGHT MERZ

FIGURE H-3h

BRISBANE RIVER FLOOD STUDY
MIKE 11 EXISITNG DESIGN FLOOD PROFILES FOR THE 5, 20, AND 100 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



PLAN VIEW



DATUM RL. -25.000

	BN 360	BN 350	BN 340	BN 330	BN 320	BN 310	BN 300	BN 290	BN 280	BN 270
5 YEAR ARI DESIGN FLOOD LEVEL	0.960	0.960	0.950	0.950	0.950	0.950	0.950	0.944	0.940	0.940
20 YEAR ARI DESIGN FLOOD LEVEL	1.350	1.330	1.310	1.310	1.280	1.230	1.220	1.190	1.200	1.190
100 YEAR ARI DESIGN FLOOD LEVEL	3.244	3.160	3.120	3.110	2.990	2.720	2.680	2.590	2.570	2.530
BED LEVEL (m AHD)	-11.280	-10.980	-11.080	-11.700	-14.140	-14.280	-15.800	-13.200	-11.800	-12.690
CROSS SECTION NUMBER	BN 360	BN 350	BN 340	BN 330	BN 320	BN 310	BN 300	BN 290	BN 280	BN 270
MIKE 11 CHAINAGE (km)	1061.530	1062.020	1062.535	1062.940	1063.310	1063.645	1064.000	1064.890	1065.410	1065.583
AMTD CHAINAGE (km)	17.130	16.640	16.125	15.720	15.350	15.015	14.660	14.170	13.450	13.157

	BN 260	BN 250	BN 240	BN 230	BN 220	BN 210	BN 200	BN 190	BN 180
5 YEAR ARI DESIGN FLOOD LEVEL	0.940	0.944	0.940	0.940	0.940	0.930	0.930	0.930	0.930
20 YEAR ARI DESIGN FLOOD LEVEL	1.190	1.180	1.170	1.150	1.120	1.050	1.080	1.070	1.060
100 YEAR ARI DESIGN FLOOD LEVEL	2.540	2.440	2.530	2.320	2.200	2.020	1.950	1.890	1.820
BED LEVEL (m AHD)	-13.200	-13.400	-13.480	-12.780	-13.380	-13.080	-12.580	-12.440	-12.780
CROSS SECTION NUMBER	BN 260	BN 250	BN 240	BN 230	BN 220	BN 210	BN 200	BN 190	BN 180
MIKE 11 CHAINAGE (km)	1065.990	1066.505	1067.020	1067.485	1067.965	1068.660	1069.045	1069.535	1070.025
AMTD CHAINAGE (km)	12.670	12.155	11.640	11.175	10.695	10.000	9.615	9.125	8.635

LEGEND

- LOCATION AND IDENTIFICATION OF STRUCTURE
- 5 YEAR ARI DESIGN FLOOD
- 20 YEAR ARI DESIGN FLOOD
- 100 YEAR ARI DESIGN FLOOD
- 100 YEAR ARI MORETON BAY STORM SURGE LEVEL, RL 2.5m AHD, INCLUDING 300mm ALLOWANCE FOR GREENHOUSE EFFECT.
- EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

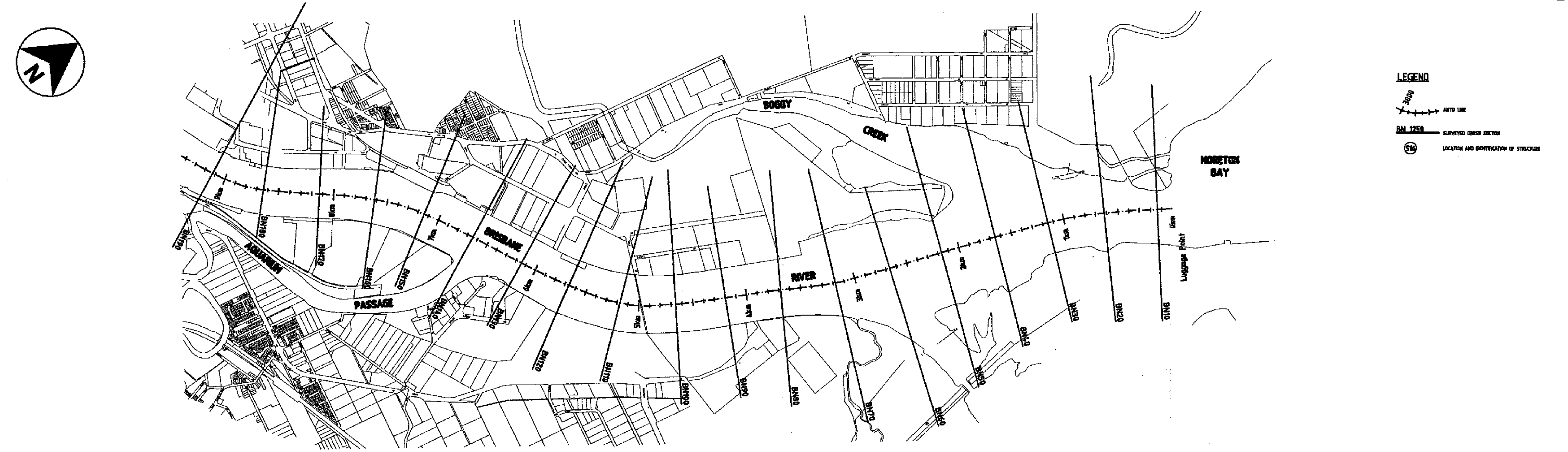
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 360 TO BN 180

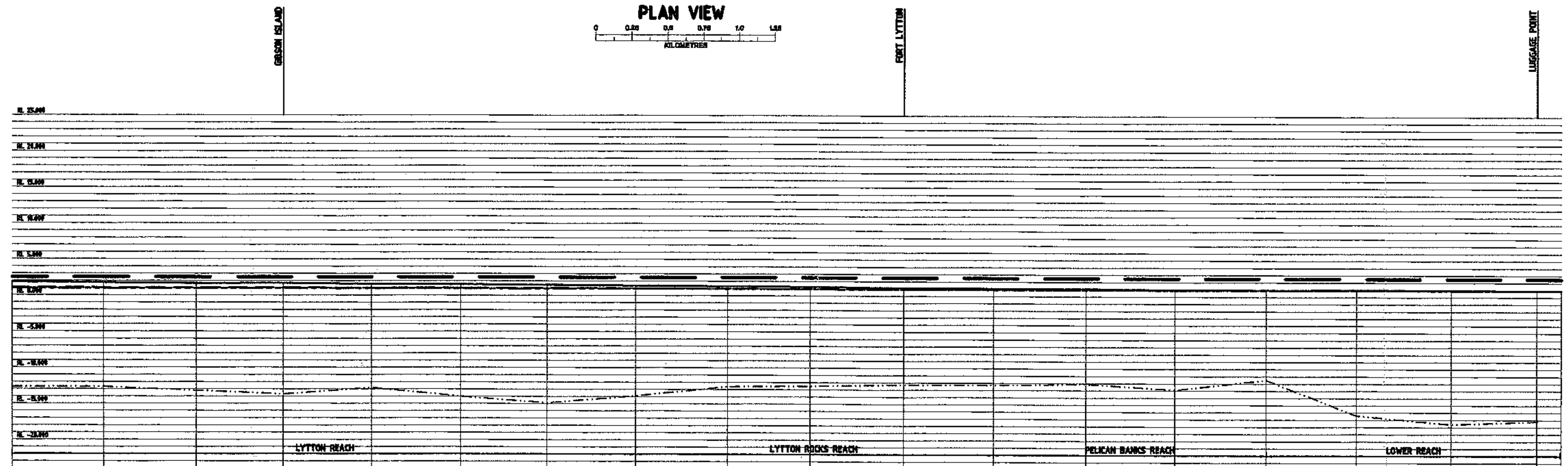
FILE NAME: 415-27 PLOT SCALE: 1=30 DISK N: C:\DWG JOB N: T00415 DATE: 23/5/97

FIGURE H-3i

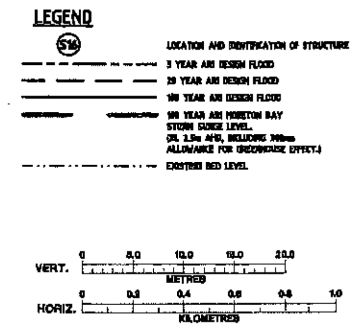
BRISBANE RIVER FLOOD STUDY
MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 5, 20, AND 100 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



PLAN VIEW



5 YEAR ARI DESIGN FLOOD LEVEL	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
20 YEAR ARI DESIGN FLOOD LEVEL	1.060	1.040	1.030	1.030	1.010	1.010	1.000	0.980	0.970	0.960	0.940	0.940	0.940	0.920	0.930	0.930	0.920	0.920	0.920
100 YEAR ARI DESIGN FLOOD LEVEL	1.820	1.720	1.640	1.670	1.560	1.540	1.450	1.360	1.290	1.220	1.090	1.060	1.070	0.960	0.960	0.970	0.950	0.920	0.920
BED LEVEL (m AHD)	-12.700	-12.700	-13.200	-13.700	-13.800	-14.600	-14.900	-13.900	-12.600	-12.500	-12.300	-12.300	-12.100	-12.900	-11.500	-16.400	-17.600	-17.200	
CROSS SECTION NUMBER	BN 180	BN 170	BN 160	BN 150	BN 140	BN 130	BN 120	BN 110	BN 100	BN 90	BN 80	BN 70	BN 60	BN 50	BN 40	BN 30	BN 20	BN 10	
MIKE 11 CHAINAGE (km)	1070.025	1070.530	1071.040	1071.520	1072.015	1072.515	1072.995	1073.485	1074.000	1074.440	1074.945	1075.440	1076.000	1076.495	1077.010	1077.510	1078.040	1078.535	1078.660
AMTD CHAINAGE (km)	8.635	8.130	7.620	7.160	6.645	6.165	5.665	5.175	4.660	4.200	3.675	3.180	2.660	2.165	1.650	1.150	0.620	0.135	0



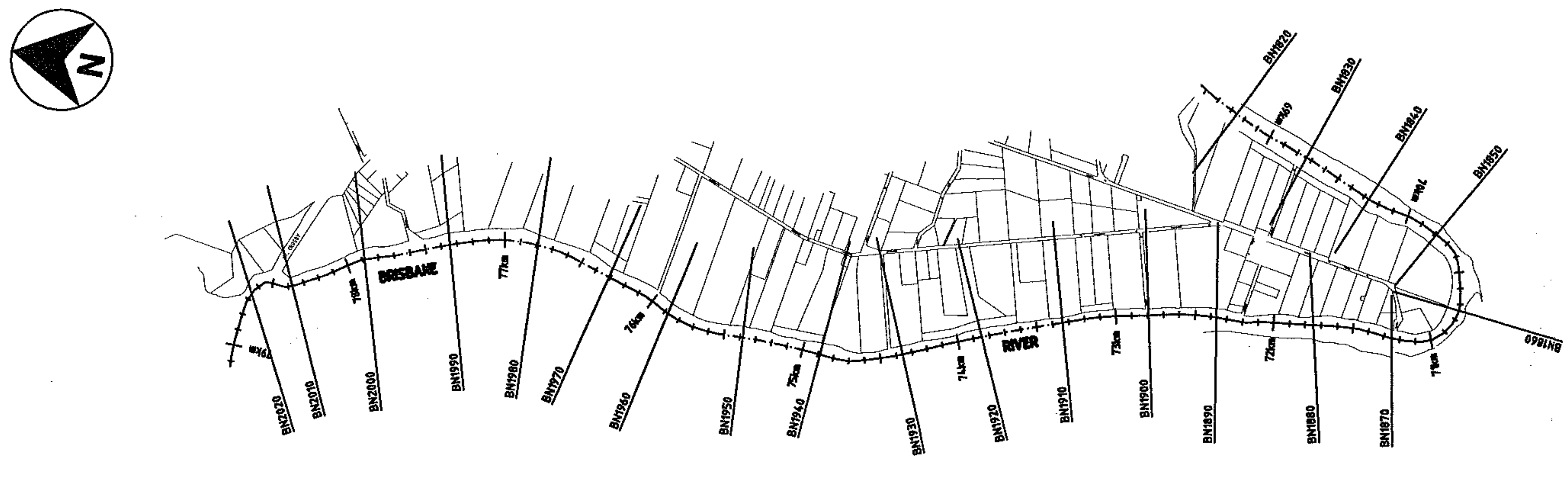
BRISBANE RIVER - BN 180 TO BN 10

FILE NAME: 4157-127
PLOT SCALE: 1=30
DISK N: C:\DWG
JOB N: T004157
DATE: 23/7/97

SINCLAIR KNIGHT MERZ

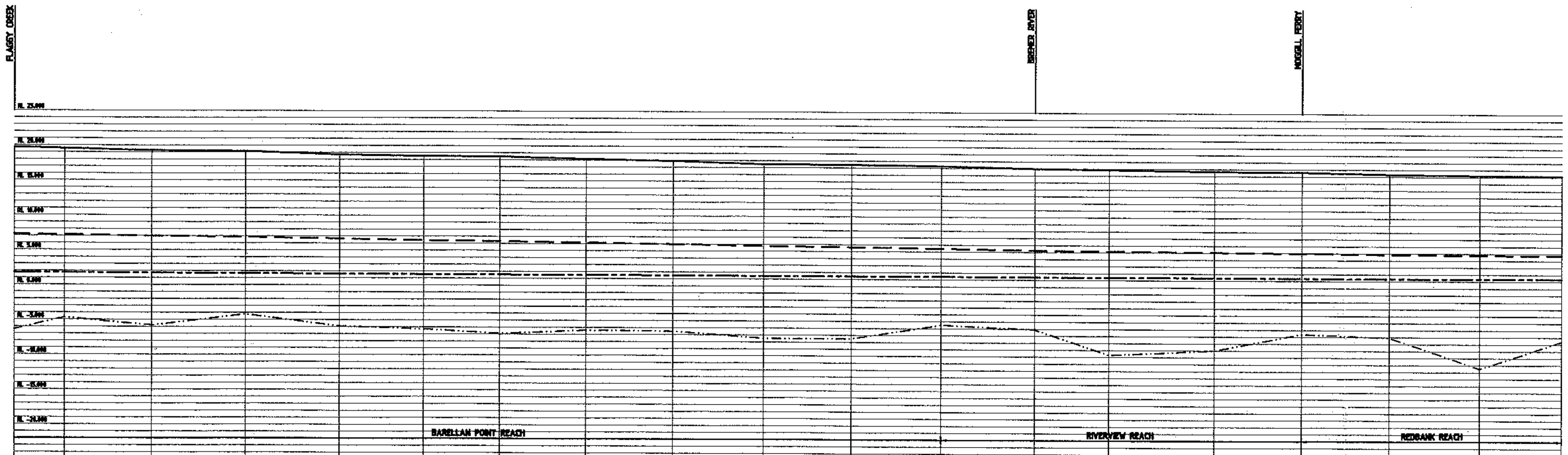
FIGURE H-4a

BRISBANE RIVER FLOOD STUDY
MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2, 10, AND 50 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



PLAN VIEW

KILOMETRES



DATUM RL. -25.000

2 YEAR ARI DESIGN FLOOD LEVEL	1.770	1.750	1.710	1.650	1.590	1.560	1.530	1.500	1.480	1.460	1.450	1.440	1.420	1.420	1.400	1.380	1.360	1.344	1.340
10 YEAR ARI DESIGN FLOOD LEVEL	7.250	7.160	7.000	6.660	6.440	6.420	6.340	6.160	5.970	5.750	5.430	5.470	5.250	5.180	5.060	4.970	4.850	4.790	4.740
50 YEAR ARI DESIGN FLOOD LEVEL	19.700	19.530	19.280	19.170	18.700	18.480	18.460	18.150	17.970	17.650	17.440	17.200	16.900	16.850	16.640	16.400	16.340	16.200	16.150
BED LEVEL (m AHD)	-4.440	-4.700	-5.040	-4.200	-5.940	-6.380	-4.990	-4.400	-6.500	-7.500	-7.500	-5.500	-4.300	-9.700	-9.800	-6.650	-7.700	-11.500	-7.640
CROSS SECTION NUMBER	BN 2020	BN 2010	BN 2000	BN 1990	BN 1980	BN 1970	BN 1960	BN 1950	BN 1940	BN 1930	BN 1920	BN 1910	BN 1900	BN 1890	BN 1880	BN 1870	BN 1860	BN 1850	BN 1840
MIKE 11 CHAINAGE (km)	1080.000	1080.285	1080.775	1081.315	1081.845	1082.350	1082.785	1083.275	1083.775	1084.300	1084.810	1085.325	1085.870	1086.360	1086.910	1087.410	1087.920	1088.445	1088.925
AMTD CHAINAGE (km)	78.440	78.375	77.885	77.345	76.795	76.310	75.875	75.345	74.885	74.340	73.850	73.335	72.790	72.300	71.750	71.250	70.740	70.215	69.735

LEGEND

- LOCATION AND IDENTIFICATION OF STRUCTURE
- 2 YEAR ARI DESIGN FLOOD
- 10 YEAR ARI DESIGN FLOOD
- 50 YEAR ARI DESIGN FLOOD
- EXISTING BED LEVEL

VERT. 0 4.0 12.0 16.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 2020 TO BN 1840

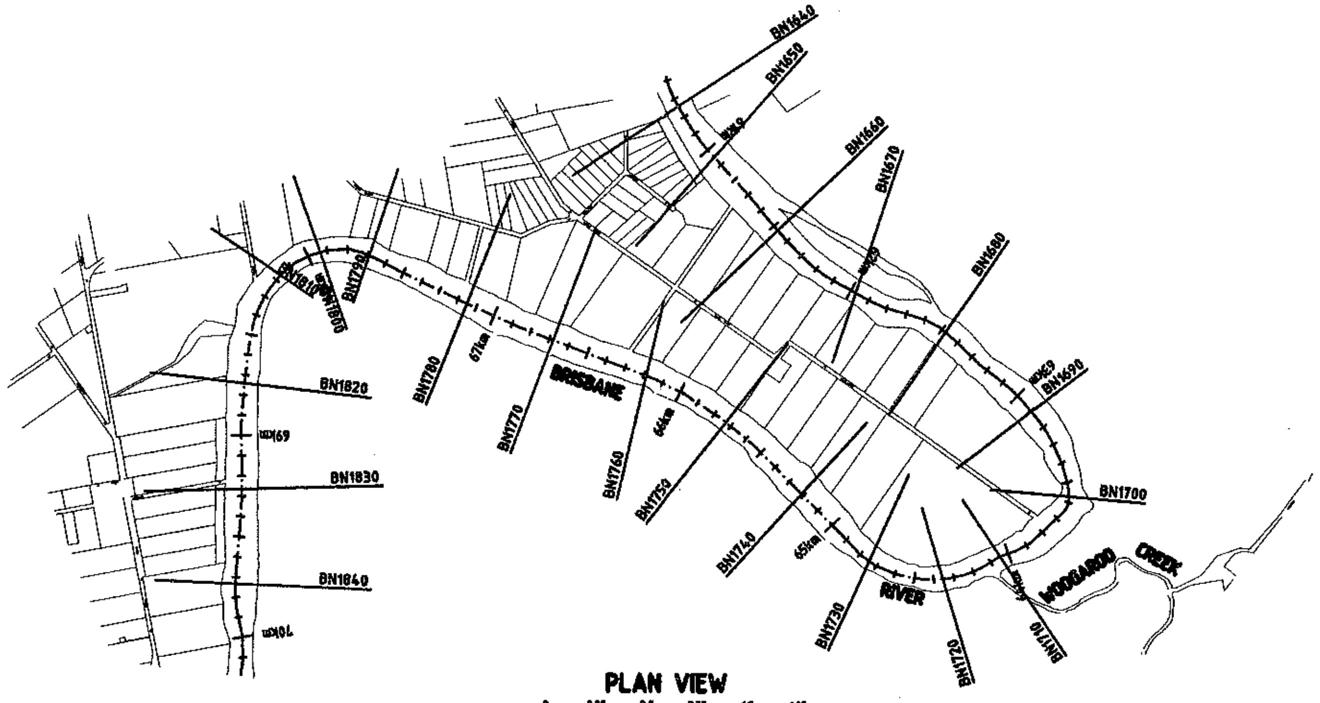
FILE ... 415 ... PLOT SCALE: 1=30

SINCLAIR KNIGHT MERZ

FIGURE H-4b

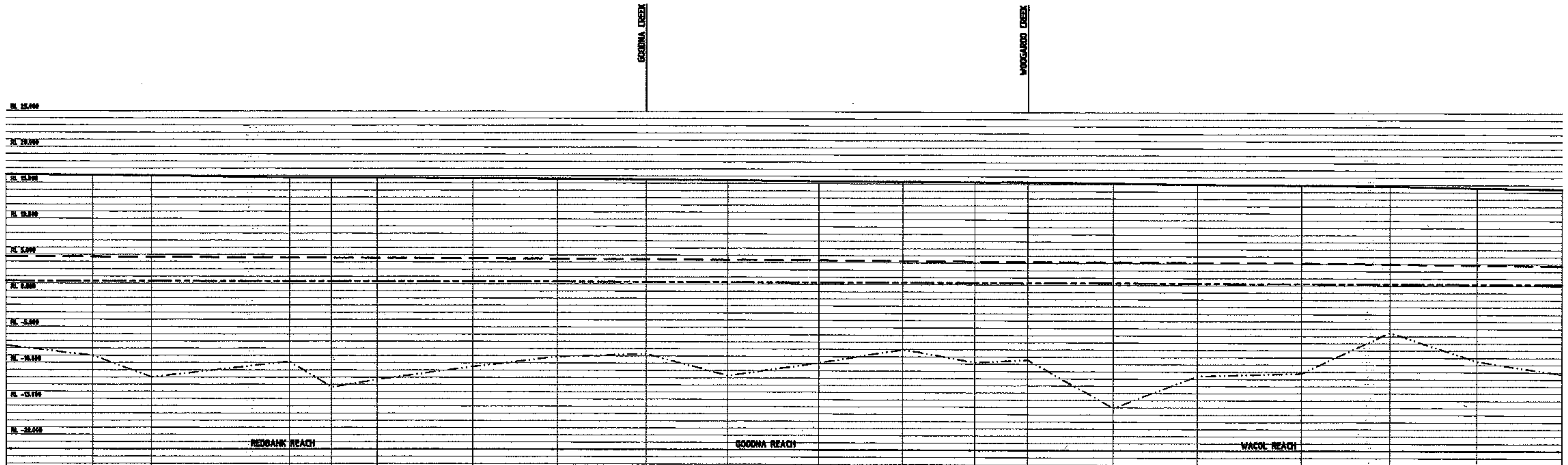
BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2, 10, AND 50 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



PLAN VIEW

LEGEND



DATUM RL. -25.000

2 YEAR ARI DESIGN FLOOD LEVEL	1.340	1.330	1.330	1.310	1.310	1.310	1.300	1.300	1.290	1.280	1.280	1.260	1.250	1.250	1.250	1.240	1.240	1.220	1.200	1.190
10 YEAR ARI DESIGN FLOOD LEVEL	4.740	4.700	4.670	4.590	4.580	4.560	4.520	4.480	4.420	4.380	4.330	4.270	4.220	4.180	4.170	4.130	4.090	4.010	3.870	3.770
50 YEAR ARI DESIGN FLOOD LEVEL	16.150	16.050	16.030	15.740	15.750	15.690	15.670	15.620	15.530	15.440	15.340	15.290	15.220	15.250	15.130	15.020	14.930	14.820	14.610	14.440
BED LEVEL (m AHD)	-7.600	-9.000	-12.000	-9.800	-13.400	-12.300	-10.500	-9.100	-8.700	-11.700	-9.900	-8.000	-9.800	-9.400	-16.100	-11.600	-11.200	-5.500	-9.500	-11.300
CROSS SECTION NUMBER	BN 1840	BN 1830	BN 1820	BN 1810	BN 1800	BN 1790	BN 1780	BN 1770	BN 1760	BN 1750	BN 1740	BN 1730	BN 1720	BN 1710	BN 1700	BN 1690	BN 1680	BN 1670	BN 1660	BN 1650
MIKE 11 CHAINAGE (km)	1008.925	1009.400	1009.720	1010.490	1010.725	1010.880	1011.518	1011.980	1012.475	1012.935	1013.445	1013.910	1014.310	1014.610	1015.090	1015.560	1016.140	1016.640	1017.150	1017.610
AMTD CHAINAGE (km)	69.735	69.260	68.840	68.170	67.935	67.480	67.150	66.680	66.185	65.725	65.215	64.740	64.550	64.050	63.570	63.100	62.520	62.020	61.530	61.050

LEGEND

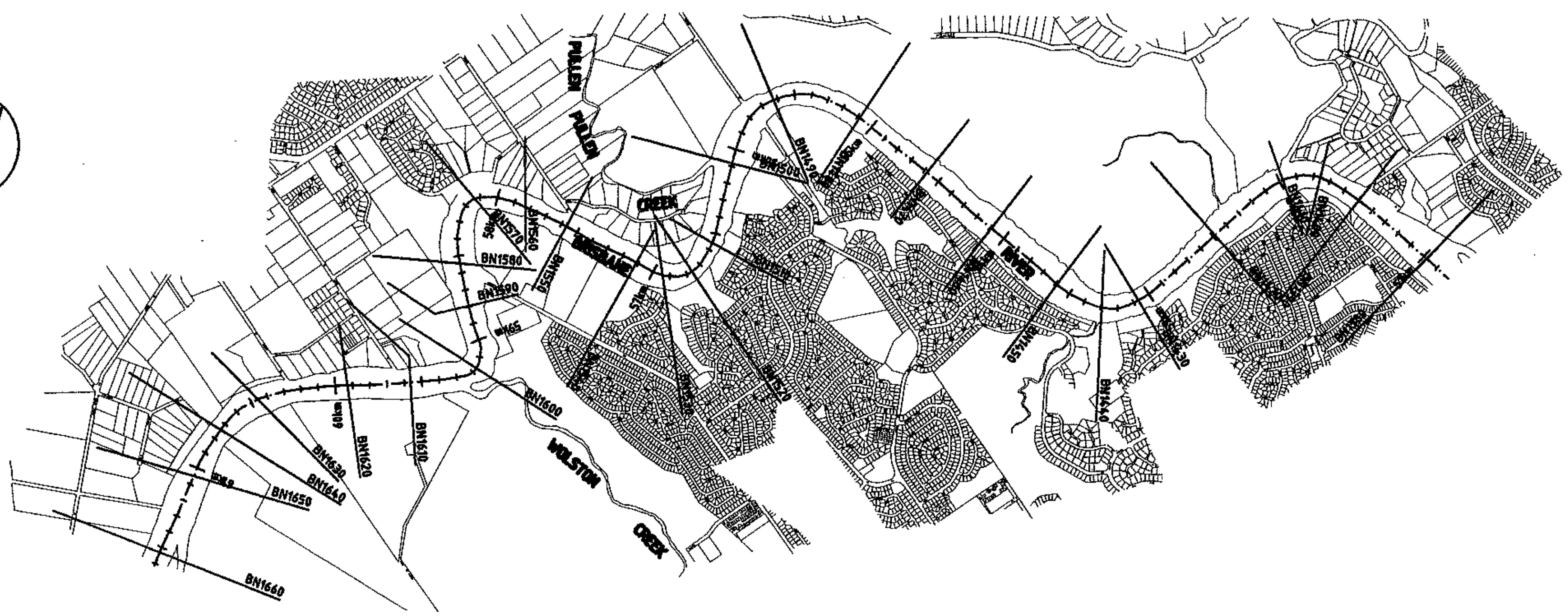
BRISBANE RIVER - BN 1840 TO BN 1650

DISK N°: C:\DWG JOB N°: T00457 DATE: 23/3/97

FILE NAME: 4157-129
PLOT SCALE: 1=30

FIGURE H-4c

BRISBANE RIVER FLOOD STUDY
MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2, 10, AND 50 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



PLAN VIEW

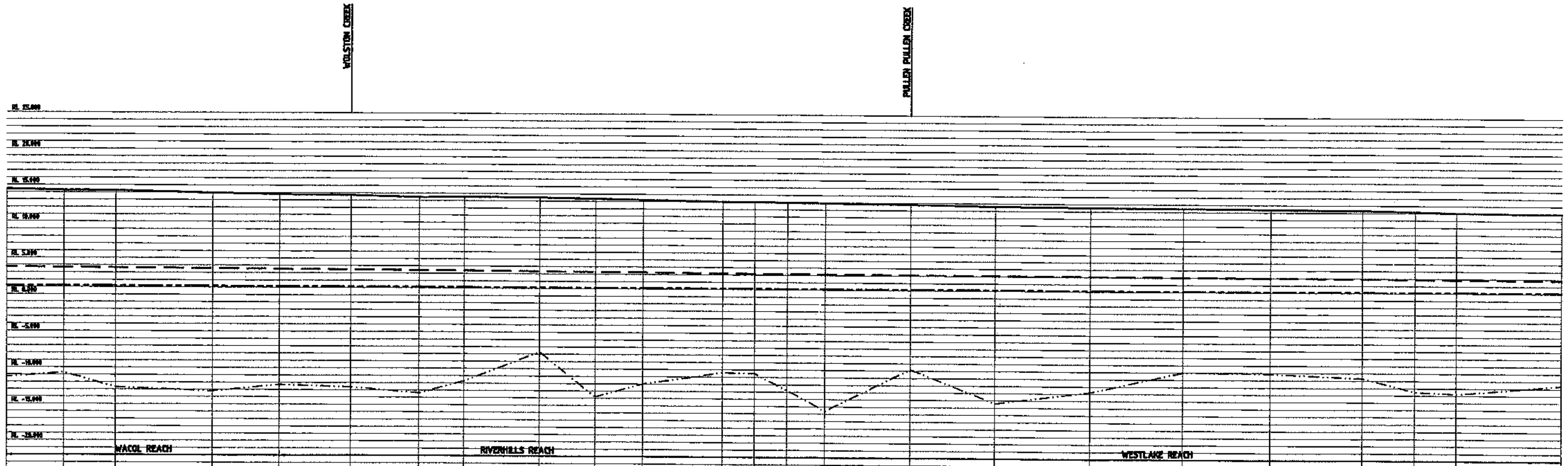
0 0.25 0.5 0.75 1.0 1.25 KILOMETRES

LEGEND

AMTD LINE

BN 1250 SURVEYED CROSS SECTION

LOCATION AND IDENTIFICATION OF STRUCTURE



DATUM RL. -25.000

DESIGN FLOOD LEVEL	1.190	1.180	1.180	1.170	1.160	1.160	1.150	1.150
DESIGN FLOOD LEVEL	3.770	3.490	3.470	3.400	3.540	3.480	3.430	3.400
DESIGN FLOOD LEVEL	14.440	14.280	14.220	13.940	13.800	13.700	13.460	13.510
BED LEVEL (m AHD)	-11.300	-10.700	-12.700	-13.200	-12.380	-12.400	-13.400	-11.700
CROSS SECTION NUMBER	BN 1650	BN 1640	BN 1630	BN 1620	BN 1610	BN 1600	BN 1590	BN 1580
MIKE 11 CHAINAGE (km)	1017.610	1017.920	1018.200	1018.725	1019.095	1019.490	1019.865	1020.115
AMTD CHAINAGE (km)	61.050	60.740	60.460	59.935	59.565	59.170	58.795	58.545

DESIGN FLOOD LEVEL	1.140	1.140	1.130	1.130	1.120	1.120	1.120	1.120
DESIGN FLOOD LEVEL	3.360	3.320	3.270	3.190	3.170	3.150	3.150	3.100
DESIGN FLOOD LEVEL	13.444	13.344	13.190	13.030	13.030	12.980	12.900	12.800
BED LEVEL (m AHD)	-7.700	-13.800	-12.000	-10.400	-10.500	-12.800	-15.680	-9.800
CROSS SECTION NUMBER	BN 1570	BN 1560	BN 1550	BN 1540	BN 1530	BN 1520	BN 1510	BN 1500
MIKE 11 CHAINAGE (km)	1020.525	1020.830	1021.095	1021.539	1021.715	1021.895	1022.105	1022.575
AMTD CHAINAGE (km)	58.135	57.830	57.565	57.121	56.945	56.765	56.555	56.085

DESIGN FLOOD LEVEL	1.120	1.110	1.110	1.100	1.100	1.100	1.100	1.090
DESIGN FLOOD LEVEL	3.070	3.050	3.020	2.970	2.950	2.890	2.850	2.830
DESIGN FLOOD LEVEL	12.598	12.520	12.460	12.400	12.300	12.190	12.040	11.960
BED LEVEL (m AHD)	-14.400	-12.800	-10.800	-10.100	-10.700	-12.500	-12.800	-11.600
CROSS SECTION NUMBER	BN 1490	BN 1480	BN 1470	BN 1460	BN 1450	BN 1440	BN 1430	BN 1420
MIKE 11 CHAINAGE (km)	1023.040	1023.570	1024.080	1024.563	1025.070	1025.360	1025.590	1026.170
AMTD CHAINAGE (km)	55.620	55.090	54.580	54.097	53.590	53.300	53.070	52.490

LEGEND

LOCATION AND IDENTIFICATION OF STRUCTURE

2 YEAR ARI DESIGN FLOOD

10 YEAR ARI DESIGN FLOOD

50 YEAR ARI DESIGN FLOOD

EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 1650 TO BN 1420

FILE NAME: 4157-130 DISK N°: C:\DWG JOB N°: T00415? DATE: 23/3/97
PLOT SCALE: 1=30

SINCLAIR KNIGHT MERZ

FIGURE H-4d

BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2, 10, AND 50 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS

PLAN VIEW

0 0.25 0.5 0.75 1.0 1.25

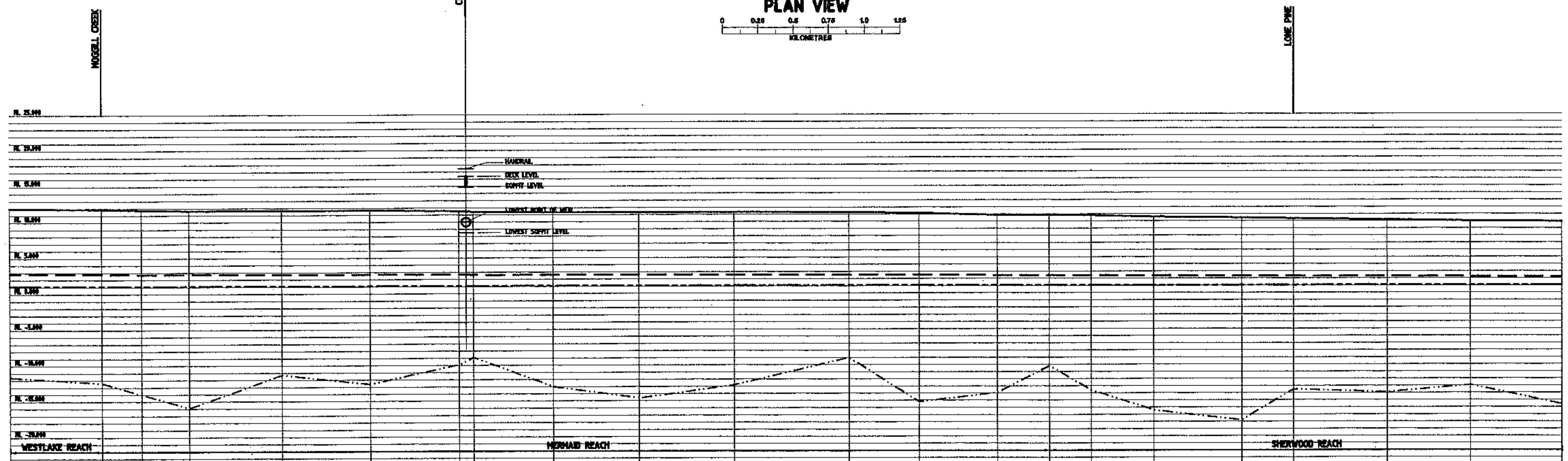
KILOMETRES

LEGEND

AMTD LINE

BN 1250 SURVEYED CROSS SECTION

LOCATION AND IDENTIFICATION OF STRUCTURE



DATUM RL. -25.000

2 YEAR ARI DESIGN FLOOD LEVEL	1.090	1.090	1.090	1.090	1.080	1.080	1.080
10 YEAR ARI DESIGN FLOOD LEVEL	2.830	2.780	2.750	2.730	2.710	2.700	2.670
50 YEAR ARI DESIGN FLOOD LEVEL	11.960	11.840	11.730	11.620	11.640	11.450	11.540
BED LEVEL (m AHD)	-11.600	-12.600	-14.000	-15.900	-11.300	-12.600	-9.900
CROSS SECTION NUMBER	BN 1420	BN 1410	BN 1400	BN 1390	BN 1380	BN 1370	BN 1360
MIKE 11 CHAINAGE (km)	1026.170	1026.600	1026.900	1027.160	1027.680	1028.180	1028.600
AMTD CHAINAGE (km)	52.690	51.900	51.760	51.500	50.900	50.480	49.980

2 YEAR ARI DESIGN FLOOD LEVEL	1.070	1.070	1.070	1.070	1.070	1.070	1.060
10 YEAR ARI DESIGN FLOOD LEVEL	2.630	2.600	2.600	2.580	2.560	2.540	2.470
50 YEAR ARI DESIGN FLOOD LEVEL	11.450	11.350	11.340	11.360	11.290	11.170	10.870
BED LEVEL (m AHD)	-8.900	-13.000	-14.600	-12.800	-9.800	-15.200	-13.900
CROSS SECTION NUMBER	BN 1340	BN 1330	BN 1320	BN 1310	BN 1300	BN 1290	BN 1280
MIKE 11 CHAINAGE (km)	1028.760	1029.280	1029.600	1030.220	1030.870	1031.260	1031.760
AMTD CHAINAGE (km)	49.900	49.440	48.980	48.440	47.790	47.400	46.960

2 YEAR ARI DESIGN FLOOD LEVEL	1.060	1.060	1.050	1.050	1.050	1.050	1.050	1.040
10 YEAR ARI DESIGN FLOOD LEVEL	2.440	2.410	2.370	2.340	2.310	2.280	2.250	2.220
50 YEAR ARI DESIGN FLOOD LEVEL	10.870	10.790	10.590	10.450	10.360	10.170	10.030	9.930
BED LEVEL (m AHD)	-10.200	-13.600	-16.600	-17.800	-13.500	-13.900	-12.900	-15.600
CROSS SECTION NUMBER	BN 1270	BN 1260	BN 1250	BN 1240	BN 1230	BN 1220	BN 1210	BN 1200
MIKE 11 CHAINAGE (km)	1031.995	1032.230	1032.585	1033.080	1033.370	1033.900	1034.370	1034.890
AMTD CHAINAGE (km)	46.665	46.430	46.075	45.580	45.290	44.740	44.290	43.770

LEGEND

LOCATION AND IDENTIFICATION OF STRUCTURE

2 YEAR ARI DESIGN FLOOD

10 YEAR ARI DESIGN FLOOD

50 YEAR ARI DESIGN FLOOD

EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 1420 TO BN 1200

FILE NAME: 415 DISK No: C:\DWG JOB No: T004 DATE: 23/

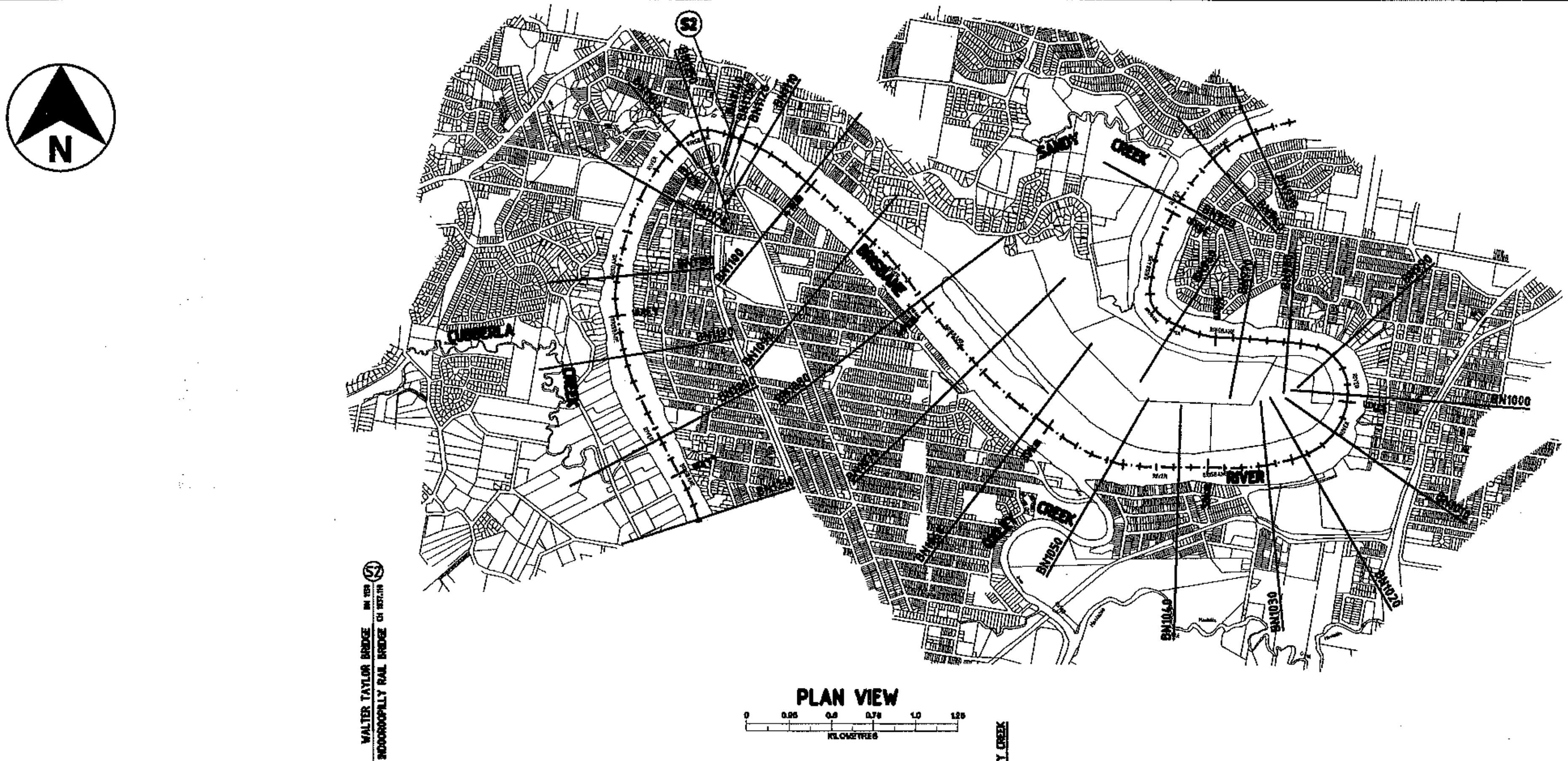
PLOT SCALE: 1=30

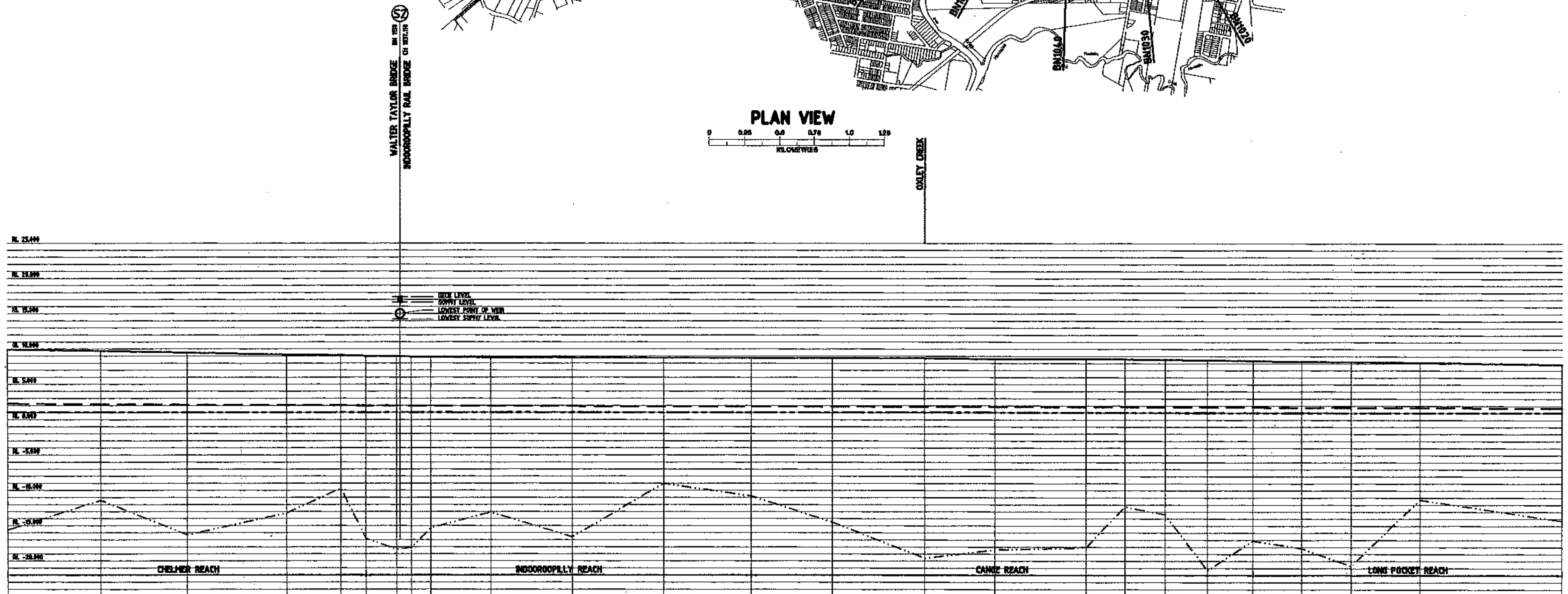
SINCLAIR KNIGHT MERZ

FIGURE H-4e

BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2, 10, AND 50 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS





DATUM RL. -25.000

	BN 1200	BN 1190	BN 1180	BN 1170	BN 1160	BN 1150	BN 1140	BN 1120	BN 1110	BN 1100	BN 1090	BN 1080	BN 1070
2 YEAR ARI DESIGN FLOOD LEVEL	1.040	1.040	1.040	1.030	1.030	1.030	1.030	1.020	1.020	1.020	1.020	1.020	1.020
10 YEAR ARI DESIGN FLOOD LEVEL	2.220	2.160	2.100	2.050	2.020	2.000	2.000	1.940	1.930	1.910	1.900	1.880	1.860
50 YEAR ARI DESIGN FLOOD LEVEL	9.930	9.720	9.470	9.210	9.130	9.010	8.980	8.900	8.860	8.830	8.810	8.790	8.740
BED LEVEL (m AHD)	-15.600	-11.600	-16.300	-13.200	-9.700	-14.800	-18.400	-18.100	-15.300	-13.190	-16.600	-9.090	-10.800
CROSS SECTION NUMBER	BN 1200	BN 1190	BN 1180	BN 1170	BN 1160	BN 1150	BN 1140	BN 1120	BN 1110	BN 1100	BN 1090	BN 1080	BN 1070
MIKE 11 CHAINAGE (km)	1034.890	1035.616	1035.900	1036.440	1036.770	1036.915	1037.890	1037.175	1037.285	1037.625	1038.085	1038.600	1039.100
AMTD CHAINAGE (km)	43.770	43.246	42.760	42.200	41.890	41.765	41.570	41.445	41.375	41.035	40.575	40.060	39.560

	BN 1060	BN 1050	BN 1040	BN 1030	BN 1020	BN 1010	BN 1000	BN 990	BN 980	BN 970	BN 960	BN 950
2 YEAR ARI DESIGN FLOOD LEVEL	1.020	1.020	1.020	1.020	1.010	1.010	1.000	1.010	1.010	1.010	1.010	1.000
10 YEAR ARI DESIGN FLOOD LEVEL	1.850	1.860	1.840	1.840	1.830	1.810	1.810	1.790	1.770	1.770	1.740	1.670
50 YEAR ARI DESIGN FLOOD LEVEL	8.750	8.720	8.600	8.620	8.580	8.510	8.440	8.360	8.330	8.310	8.130	7.850
BED LEVEL (m AHD)	-16.500	-19.600	-18.400	-10.180	-12.360	-13.440	-21.350	-17.160	-18.200	-20.780	-11.300	-14.300
CROSS SECTION NUMBER	BN 1060	BN 1050	BN 1040	BN 1030	BN 1020	BN 1010	BN 1000	BN 990	BN 980	BN 970	BN 960	BN 950
MIKE 11 CHAINAGE (km)	1039.565	1040.090	1040.450	1041.010	1041.230	1041.460	1041.780	1041.940	1042.335	1042.515	1042.910	1043.725
AMTD CHAINAGE (km)	39.050	38.570	38.170	37.540	37.430	37.200	36.940	36.700	36.425	36.145	35.750	34.935

BRISBANE RIVER - BN 1200 TO BN 950

LEGEND

- LOCATION AND IDENTIFICATION OF STRUCTURE
- 2 YEAR ARI DESIGN FLOOD
- 10 YEAR ARI DESIGN FLOOD
- 50 YEAR ARI DESIGN FLOOD
- EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

FILE NAME: 4157-152 PLOT SCALE: 1=30 DISK N°: C:\DWG JOB N°: T004157 DATE: 23/3/97

BCC.121.0266

SINCLAIR KNIGHT MERZ

FIGURE H-4f

BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2, 10, AND 50 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS

LEGEND

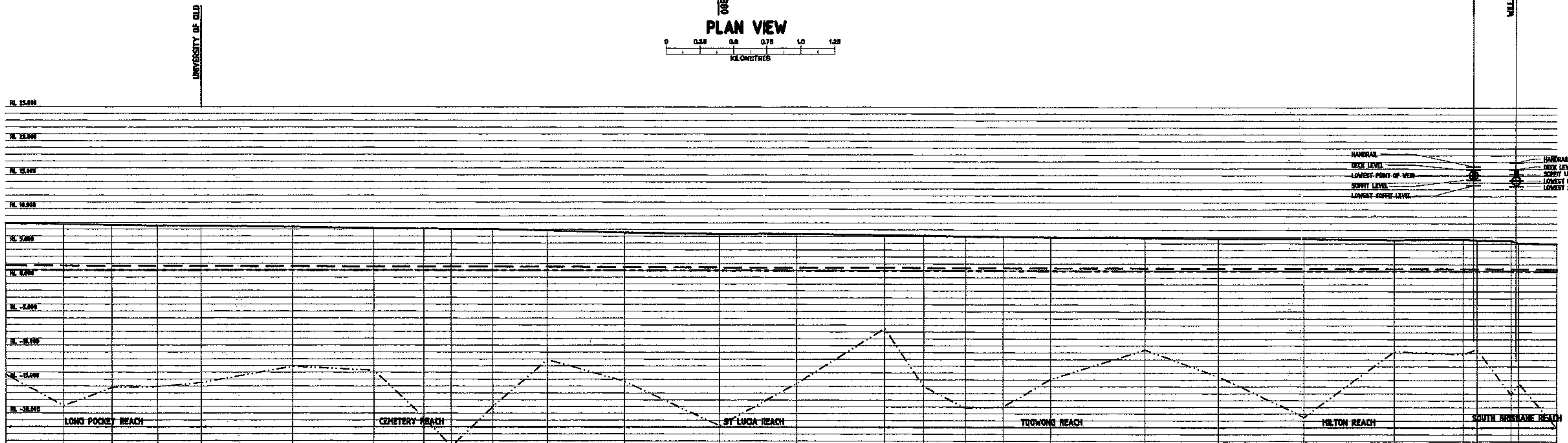
AMTD LINE

BN 1250 SURVEYED CROSS SECTION

S16 LOCATION AND IDENTIFICATION OF STRUCTURE

PLAN VIEW

0 0.25 0.5 0.75 1.0 1.25 KILOMETRES



DATUM RL. -25.000

2 YEAR ARI DESIGN FLOOD LEVEL	1.000	1.000	1.000	1.000	1.000	0.990	0.990	0.990	0.990	0.990	0.990	0.980	0.980	0.980
10 YEAR ARI DESIGN FLOOD LEVEL	1.670	1.660	1.660	1.630	1.610	1.580	1.540	1.540	1.530	1.550	1.500	1.440	1.430	1.430
50 YEAR ARI DESIGN FLOOD LEVEL	7.850	7.750	7.610	7.550	7.510	7.340	7.150	7.180	7.060	7.020	6.850	6.510	6.350	6.300
BED LEVEL (m AHD)	-14.300	-18.900	-16.200	-16.100	-15.500	-13.100	-13.700	-20.440	-24.900	-19.080	-12.100	-15.300	-21.800	-15.600
CROSS SECTION NUMBER	BN 950	BN 940	BN 930	BN 920	BN 910	BN 900	BN 890	BN 880	BN 870	BN 860	BN 850	BN 840	BN 830	BN 820
MIKE 11 CHAINAGE (km)	1043.725	1044.060	1044.340	1044.605	1044.860	1045.400	1045.885	1046.110	1046.340	1046.580	1046.900	1047.350	1047.915	1048.375
AMTD CHAINAGE (km)	34.935	34.480	34.320	34.055	33.800	33.260	32.775	32.480	32.320	32.080	31.760	31.310	30.745	30.285

2 YEAR ARI DESIGN FLOOD LEVEL	0.980	0.980	0.980	0.980	0.980	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.960	0.960
10 YEAR ARI DESIGN FLOOD LEVEL	1.400	1.390	1.370	1.370	1.340	1.350	1.340	1.360	1.310	1.320	1.300	1.300	1.280	1.280
50 YEAR ARI DESIGN FLOOD LEVEL	6.180	6.140	5.990	5.970	5.880	5.830	5.730	5.770	5.570	5.450	5.510	5.450	5.080	4.980
BED LEVEL (m AHD)	-7.500	-16.000	-19.280	-19.000	-14.940	-10.600	-14.500	-20.500	-10.800	-11.200	-10.400	-17.290	-15.580	-22.800
CROSS SECTION NUMBER	BN 810	BN 800	BN 790	BN 780	BN 770	BN 760	BN 750	BN 740	BN 730	BN 720	BN 700	BN 690	BN 670	BN 660
MIKE 11 CHAINAGE (km)	1048.890	1049.120	1049.370	1049.590	1049.870	1050.430	1050.860	1051.360	1051.895	1052.310	1052.390	1052.595	1052.640	1052.865
AMTD CHAINAGE (km)	29.770	29.540	29.290	29.070	28.790	28.230	27.800	27.300	26.765	26.350	26.270	26.065	26.020	25.795

LEGEND

S16 LOCATION AND IDENTIFICATION OF STRUCTURE

2 YEAR ARI DESIGN FLOOD

10 YEAR ARI DESIGN FLOOD

50 YEAR ARI DESIGN FLOOD

EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 950 TO BN 660

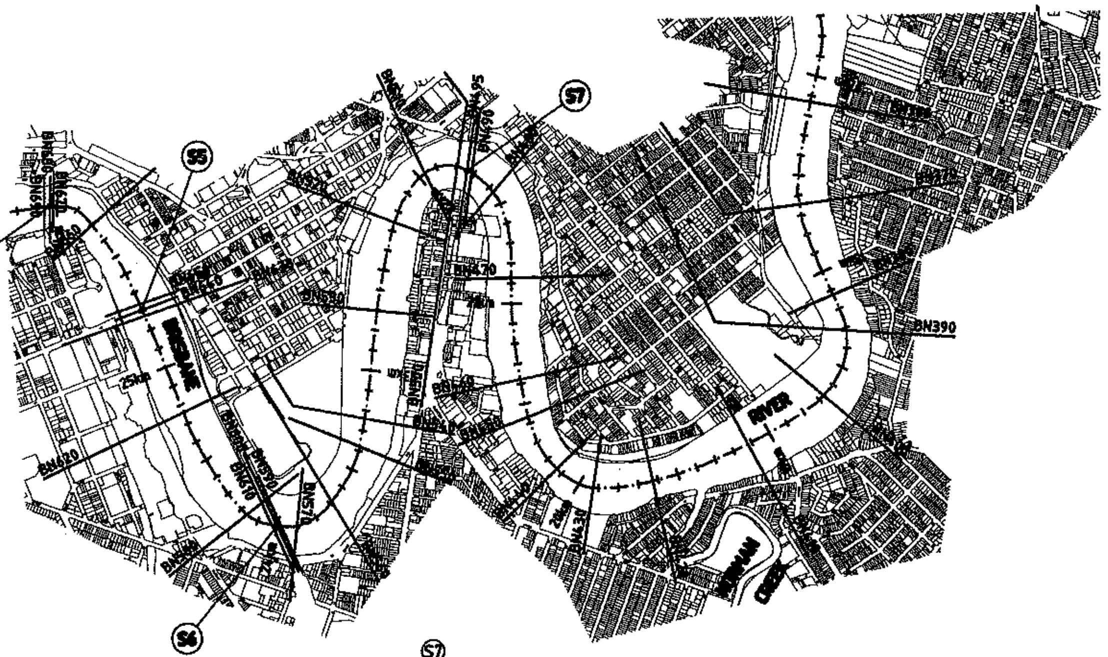
FILE NAME: 4157-133 PLOT SCALE: 1=30 DISK N: C:\DWG JOB N: T00415? DATE: 23/3/97

BCC.121.0267

FIGURE H-4g

BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2, 10, AND 50 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



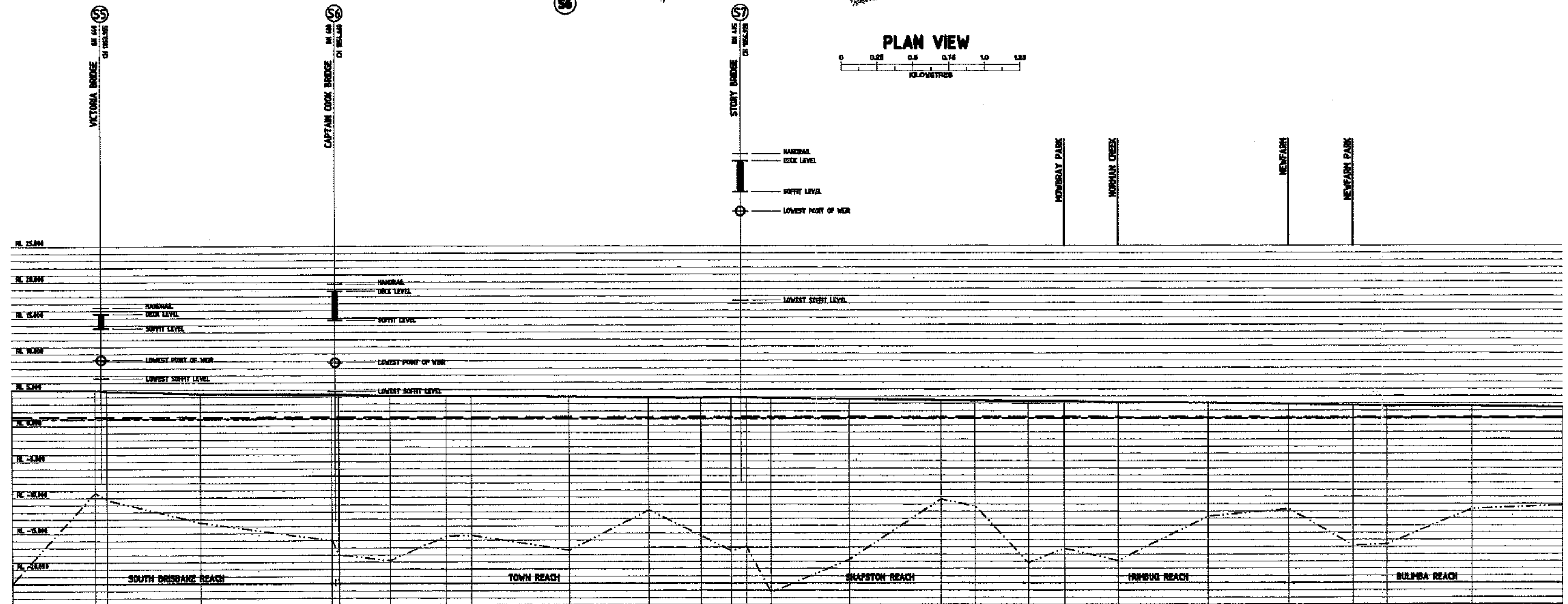
PLAN VIEW

LEGEND

AMTD LINE

BN 1250 SURVEYED CROSS SECTION

S16 LOCATION AND IDENTIFICATION OF STRUCTURE



DATUM RL. -25.000

CROSS SECTION NUMBER	2 YEAR ARI DESIGN FLOOD LEVEL	10 YEAR ARI DESIGN FLOOD LEVEL	50 YEAR ARI DESIGN FLOOD LEVEL	BED LEVEL (m AHD)	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 660	0.960	1.280	4.980	-22.900	1052.865	25.795
BN 650	0.960	1.260	4.920	-9.360	1053.320	25.350
BN 640	0.950	1.240	4.770	-10.300	1053.365	25.285
BN 630	0.950	1.200	4.430	-13.500	1053.900	24.760
BN 610	0.950	1.190	4.360	-16.000	1054.440	24.920
BN 600	0.950	1.180	4.380	-18.000	1054.480	23.980
BN 560	0.950	1.140	4.110	-18.840	1054.970	23.690
BN 550	0.950	1.160	4.080	-15.440	1055.280	23.380
BN 540	0.950	1.160	4.080	-15.380	1055.420	23.240
BN 530	0.950	1.150	4.020	-17.400	1055.960	22.700
BN 520	0.950	1.130	3.840	-11.800	1056.400	22.260
BN 510	0.950	1.130	3.790	-15.400	1056.495	21.965
BN 500	0.950	1.140	3.930	-17.500	1056.865	21.795
BN 490	0.940	1.130	3.850	-16.980	1056.950	21.710
BN 480	0.940	1.120	3.750	-23.360	1057.090	21.570
BN 470	0.940	1.120	3.650	-18.700	1057.530	21.130
BN 460	0.940	1.100	3.450	-10.300	1058.040	20.620
BN 450	0.940	1.090	3.390	-11.300	1058.230	20.430
BN 440	0.940	1.090	3.300	-19.200	1058.530	20.130
BN 430	0.940	1.090	3.370	-17.200	1058.735	19.925
BN 420	0.940	1.070	3.120	-18.900	1059.035	19.625
BN 410	0.940	1.070	3.080	-12.700	1059.540	19.120
BN 400	0.940	1.050	2.920	-11.700	1059.990	18.670
BN 380	0.940	1.040	2.740	-16.800	1060.345	18.315
BN 375	0.940	1.030	2.340	-16.400	1060.535	18.125
BN 370	0.940	1.030	2.620	-11.700	1061.015	17.645
BN 360	0.940	1.020	2.470	-14.200	1061.530	17.130

LEGEND

S16 LOCATION AND IDENTIFICATION OF STRUCTURE

2 YEAR ARI DESIGN FLOOD

10 YEAR ARI DESIGN FLOOD

50 YEAR ARI DESIGN FLOOD

EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

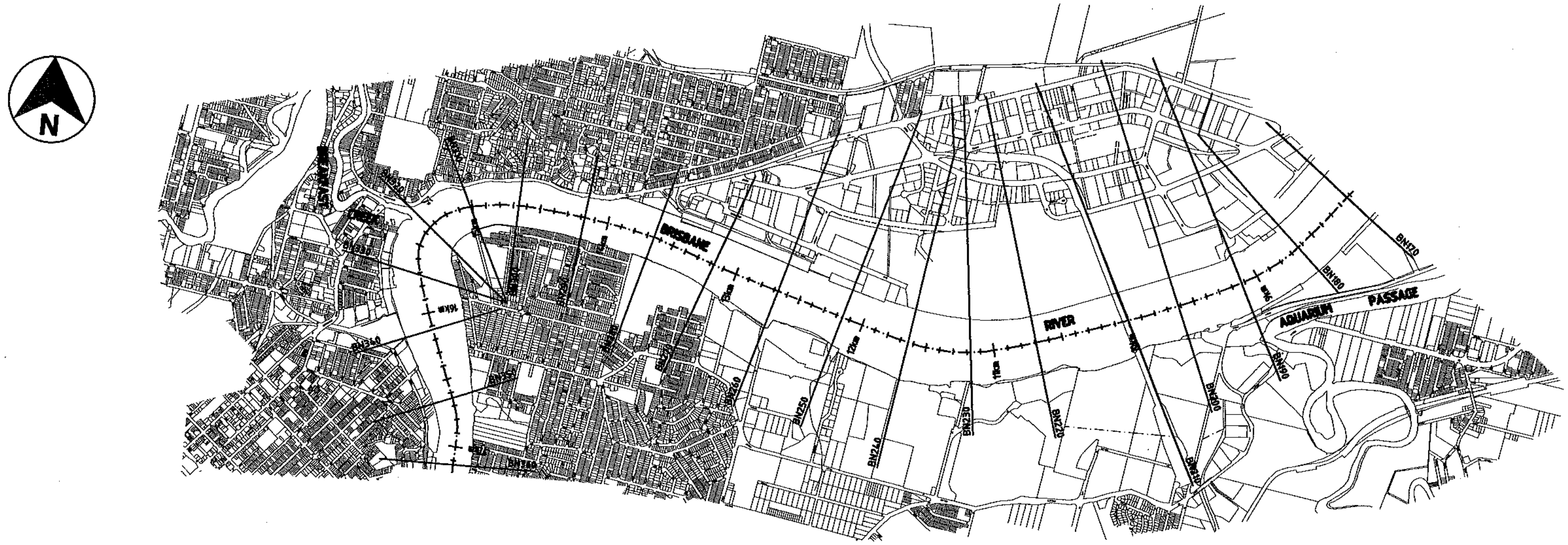
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 660 TO BN 360

PLOT SCALE: 1=30

BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2, 10 AND 50 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS

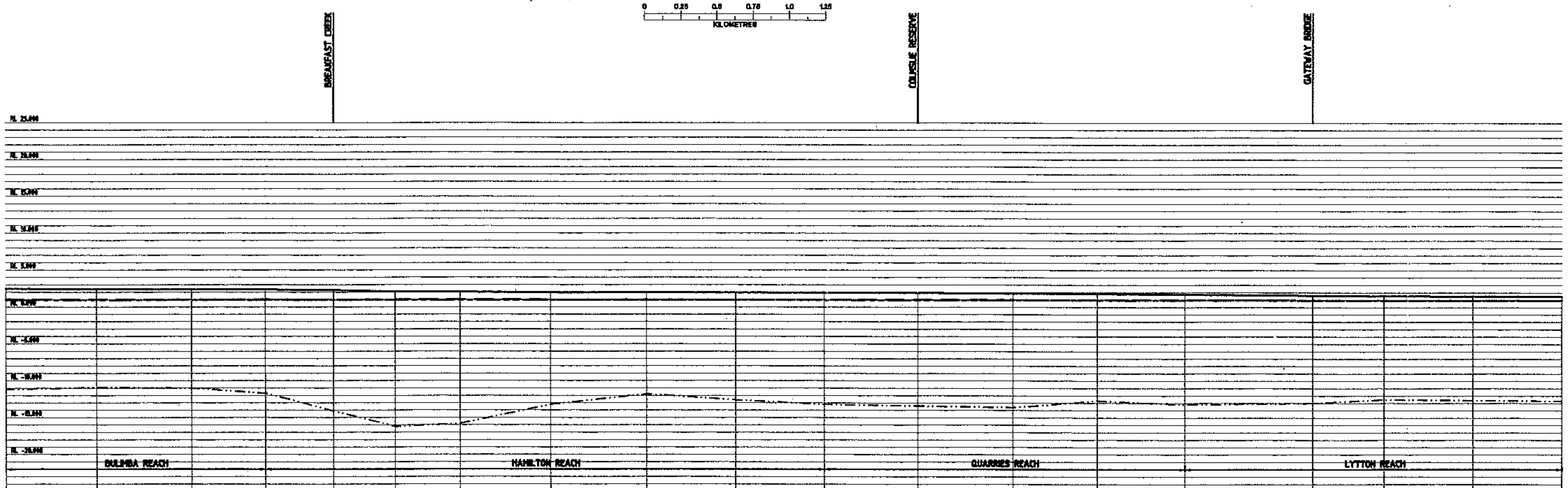


LEGEND

- AMTD LINE
- BN 1250 SURVEYED CROSS SECTION
- (S16) LOCATION AND IDENTIFICATION OF STRUCTURE

PLAN VIEW

0 0.25 0.5 0.75 1.0 1.25 KILOMETRES



DATUM RL. -25.000

2 YEAR ARI DESIGN FLOOD LEVEL	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.938	0.936	0.938
10 YEAR ARI DESIGN FLOOD LEVEL	1.020	1.010	1.010	1.010	1.000	0.990	0.990	0.980	0.980	0.980	0.980	0.980	0.980	0.970	0.970	0.964	0.960	0.950	0.950
50 YEAR ARI DESIGN FLOOD LEVEL	2.470	2.450	2.370	2.344	2.284	2.090	2.040	1.970	1.980	1.950	1.966	1.914	1.880	1.810	1.738	1.616	1.560	1.520	1.444
BED LEVEL (m AHD)	-11.390	-10.906	-11.810	-11.708	-14.308	-16.280	-15.848	-13.280	-11.800	-12.680	-13.280	-13.410	-13.680	-12.716	-13.260	-13.880	-12.580	-12.680	-12.700
CROSS SECTION NUMBER	BN 360	BN 350	BN 340	BN 330	BN 320	BN 310	BN 300	BN 290	BN 280	BN 270	BN 260	BN 250	BN 240	BN 230	BN 220	BN 210	BN 200	BN 190	BN 180
MIKE 11 CHAINAGE (km)	1061.530	1062.020	1062.575	1062.940	1063.318	1063.645	1064.080	1064.690	1065.018	1065.583	1065.990	1066.505	1067.020	1067.485	1067.965	1068.448	1069.045	1069.535	1070.025
AMTD CHAINAGE (km)	17.130	16.640	16.125	15.720	15.350	15.015	14.660	14.170	13.650	13.157	12.670	12.155	11.640	11.175	10.695	10.000	9.615	9.125	8.635

LEGEND

- (S16) LOCATION AND IDENTIFICATION OF STRUCTURE
- 2 YEAR ARI DESIGN FLOOD
- 10 YEAR ARI DESIGN FLOOD
- 50 YEAR ARI DESIGN FLOOD
- EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 360 TO BN 180

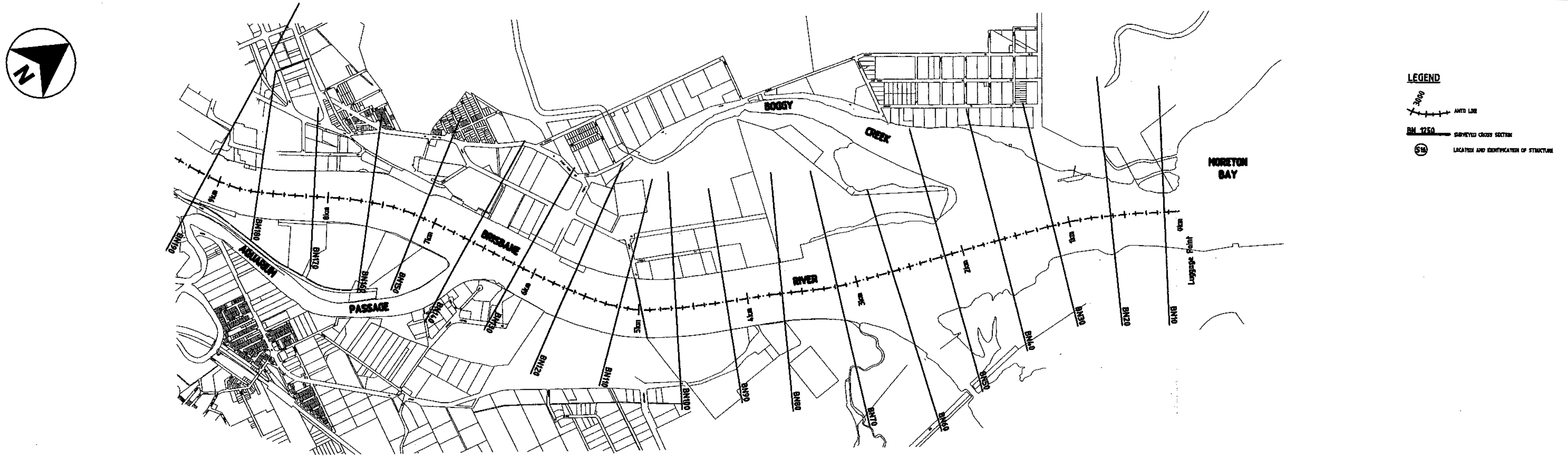
FILE NAME: 415...
PLOT SCALE: 1=30

SINCLAIR KNIGHT MERZ

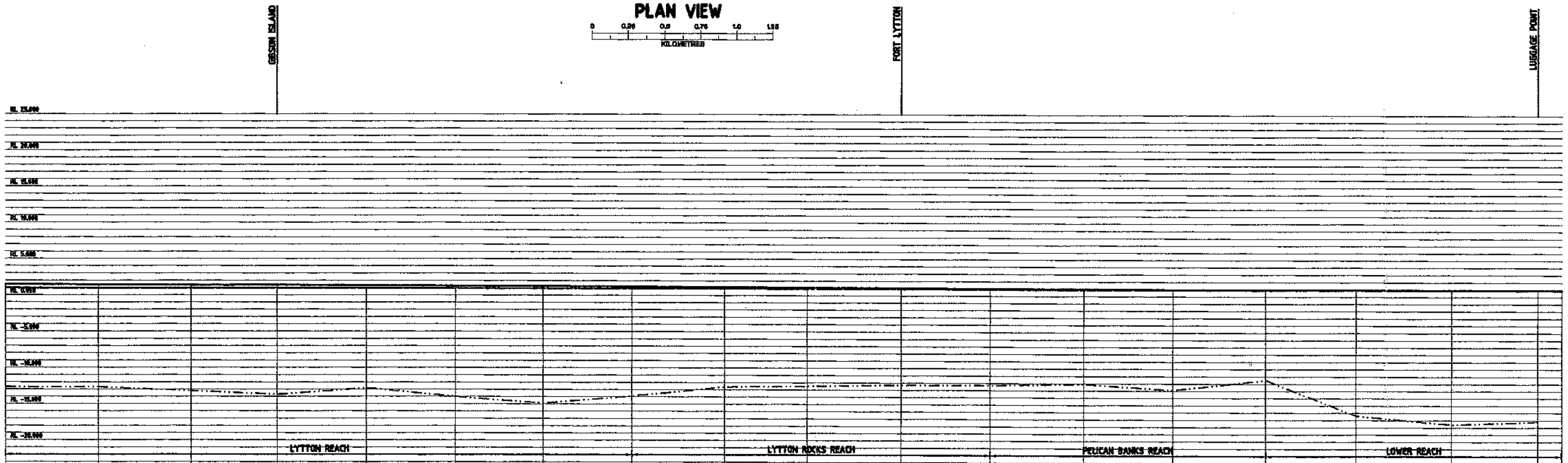
FIGURE H-4i

BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2, 10, AND 50 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



PLAN VIEW



DATUM RL. -25.000

2 YEAR ARI DESIGN FLOOD LEVEL	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
10 YEAR ARI DESIGN FLOOD LEVEL	0.950	0.950	0.940	0.940	0.940	0.940	0.940	0.930	0.930	0.930	0.930	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
50 YEAR ARI DESIGN FLOOD LEVEL	1.440	1.410	1.360	1.300	1.310	1.280	1.250	1.190	1.140	1.100	1.020	1.080	1.010	0.940	0.950	0.950	0.940	0.920	0.920
BED LEVEL (m AHD)	-12.700	-12.740	-13.200	-13.700	-12.800	-16.090	-14.500	-13.900	-12.600	-12.500	-12.300	-12.300	-12.100	-12.900	-11.500	-16.400	-17.600	-17.200	
CROSS SECTION NUMBER	BN 180	BN 170	BN 160	BN 150	BN 140	BN 130	BN 120	BN 110	BN 100	BN 90	BN 80	BN 70	BN 60	BN 50	BN 40	BN 30	BN 20	BN 10	
MIKE 11 CHAINAGE (km)	1070.025	1070.530	1071.040	1071.520	1072.015	1072.515	1072.995	1073.485	1074.000	1074.460	1074.985	1075.480	1076.000	1076.495	1077.010	1077.510	1078.040	1078.525	1078.660
AMTD CHAINAGE (km)	8.635	8.130	7.620	7.140	6.645	6.145	5.665	5.175	4.660	4.200	3.675	3.180	2.660	2.165	1.650	1.150	0.620	0.135	0

LEGEND

- LOCATION AND IDENTIFICATION OF STRUCTURE
- 2 YEAR ARI DESIGN FLOOD
- 10 YEAR ARI DESIGN FLOOD
- 50 YEAR ARI DESIGN FLOOD
- EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

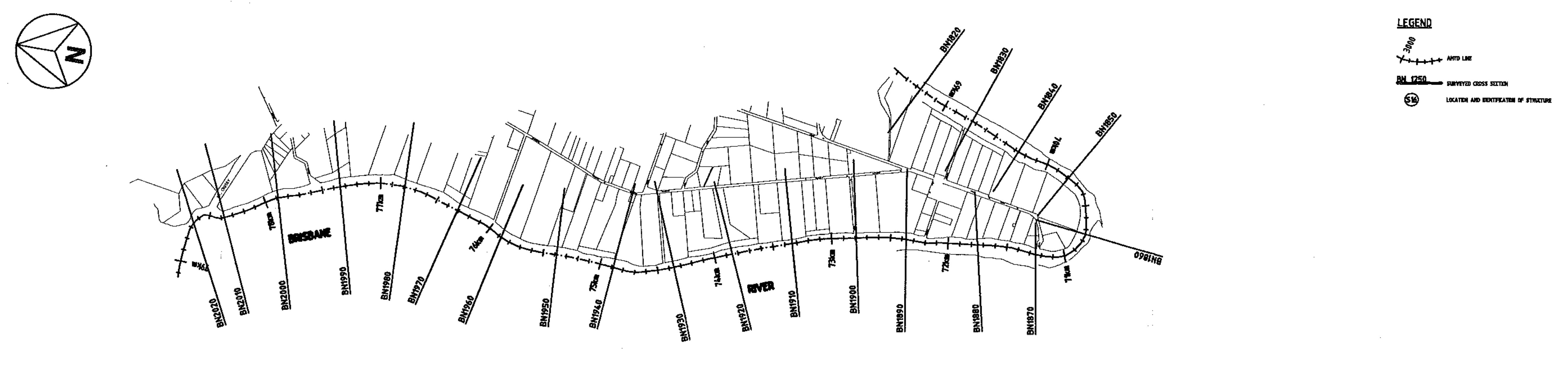
BRISBANE RIVER - BN 180 TO BN 10

FILE NAME: 4... PLOT SCALE: 1:30

FIGURE H-5a

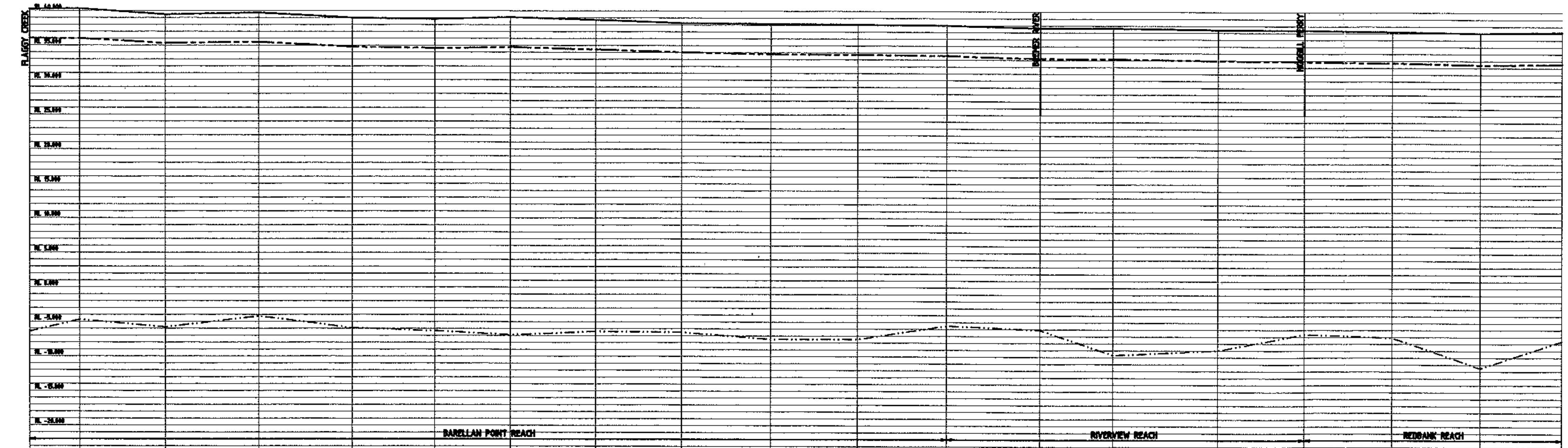
SINCLAIR KNIGHT MERZ

BRISBANE RIVER FLOOD STUDY
MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE PMF AND 10 000 YEAR ARI
FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



PLAN VIEW

KILOMETRES



DATUM RL. -25.000

10 000 YEAR ARI DESIGN FLOOD LEVEL	36.840	36.030	35.320	35.490	34.790	34.600	34.740	34.420	34.030	33.790	33.710	33.580	33.210	33.170	32.940	32.840	32.690	32.420	32.540
PMF DESIGN FLOOD LEVEL	40.260	40.310	39.470	39.730	39.800	38.810	39.480	38.720	38.280	38.190	38.860	37.970	37.610	37.450	37.430	37.410	37.230	37.010	37.160
BED LEVEL (m AHD)	-6.480	-4.700	-5.800	-4.200	-5.900	-4.380	-4.900	-6.600	-4.500	-7.500	-7.500	-5.500	-6.900	-9.700	-9.000	-6.400	-7.300	-11.500	-7.400
CROSS SECTION NUMBER	BN 2020	BN 2010	BN 2000	BN 1990	BN 1980	BN 1970	BN 1960	BN 1950	BN 1940	BN 1930	BN 1920	BN 1910	BN 1900	BN 1890	BN 1880	BN 1870	BN 1860	BN 1850	BN 1840
MIKE 11 CHAINAGE (km)	1880.000	1880.295	1880.775	1881.315	1881.845	1882.350	1882.785	1883.275	1883.775	1884.300	1884.810	1885.325	1885.870	1886.300	1886.970	1887.410	1887.920	1888.445	1888.925
AMTD CHAINAGE (km)	78.664	78.375	77.885	77.345	76.795	76.310	75.875	75.385	74.885	74.366	73.850	73.335	72.790	72.340	71.750	71.350	70.740	70.215	69.735

LEGEND

- LOCATION AND IDENTIFICATION OF STRUCTURE
- PMF DESIGN FLOOD
- 10 000 YEAR ARI DESIGN FLOOD
- EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 2020 TO BN 1840

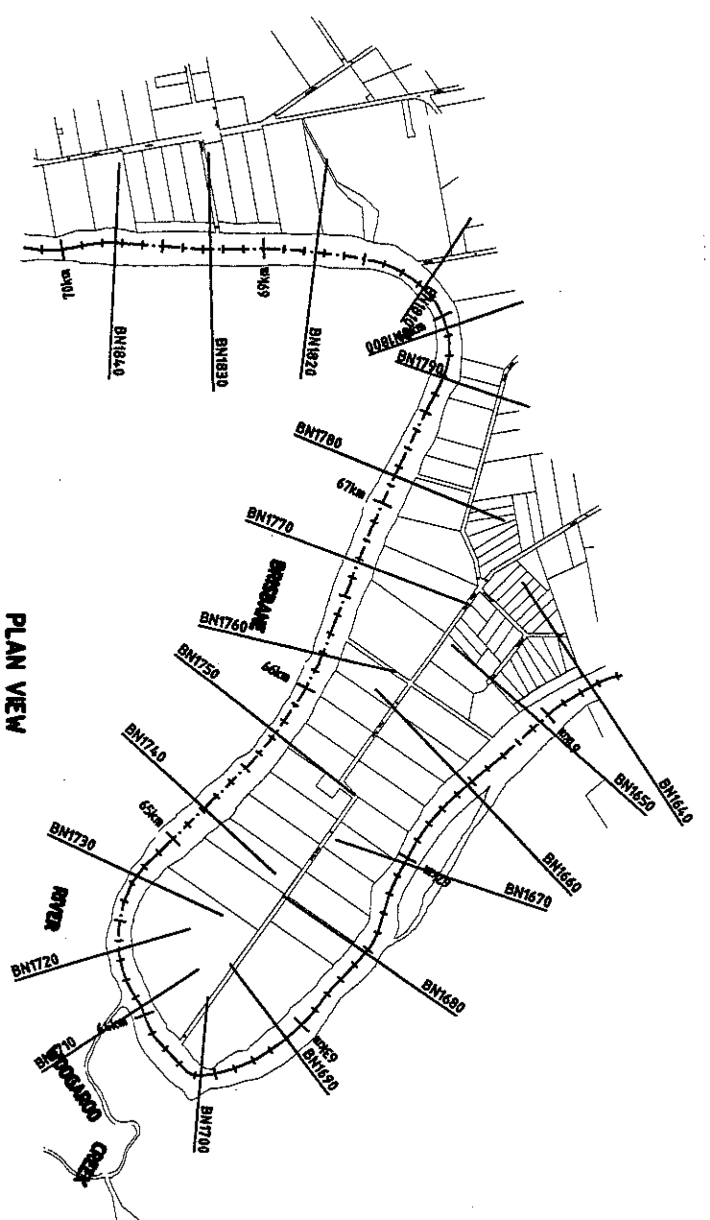
JOB N: T00437 DATE: 23/3/?? DISK N: C:\DWG FILE NAME: 4137-202 PLOT SCALE: 1=30

SINCLAIR KNIGHT MERZ

FIGURE H-5b

BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE PMF AND 10 000 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



PLAN VIEW

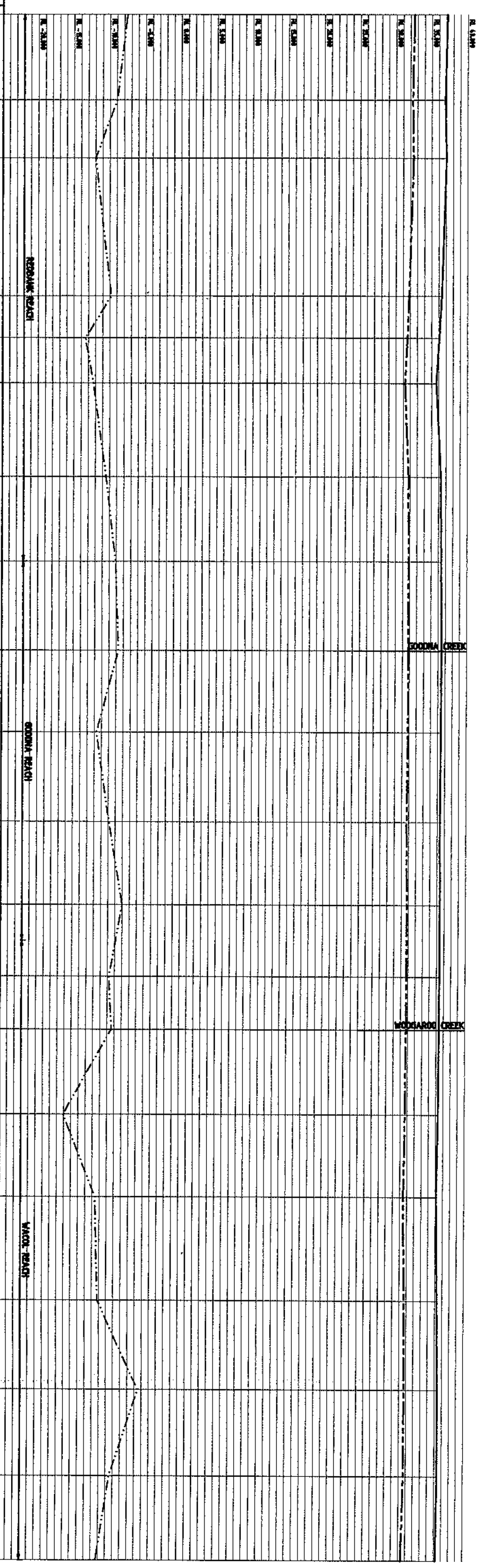
0 0.25 0.5 0.75 1.0 1.25 KILOMETRES

LEGEND

AMTD LINE

BN 1250 SURVEYED CROSS SECTION

LOCATION AND IDENTIFICATION OF STRUCTURE



DATUM RL. -25.000

CROSS SECTION NUMBER	10 000 YEAR ARI DESIGN FLOOD LEVEL	PMF DESIGN FLOOD LEVEL	BED LEVEL (m AHD)	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 1840	32.540	37.160	-7.600	1008.925	69.735
BN 1834	32.310	36.870	-9.000	1009.600	69.260
BN 1828	32.440	37.040	-12.000	1009.720	68.848
BN 1818	31.840	36.410	-9.800	1010.490	68.170
BN 1804	31.620	36.880	-13.400	1010.725	67.935
BN 1798	31.270	35.650	-12.300	1010.980	67.680
BN 1780	31.780	36.340	-10.500	1011.510	67.150
BN 1770	31.850	36.630	-9.100	1011.980	66.680
BN 1760	31.850	36.470	-8.700	1012.475	66.185
BN 1750	31.840	36.460	-11.700	1012.935	65.725
BN 1740	31.730	36.390	-9.900	1013.445	65.215
BN 1730	31.780	36.420	-8.800	1013.930	64.740
BN 1720	31.770	36.410	-9.800	1014.310	64.550
BN 1710	31.770	36.420	-9.400	1014.610	64.050
BN 1700	31.690	36.340	-16.100	1015.090	63.570
BN 1694	31.500	36.090	-11.600	1015.560	63.100
BN 1680	31.660	36.300	-11.200	1016.140	62.520
BN 1674	31.710	36.300	-5.500	1016.640	62.020
BN 1660	31.660	36.370	-9.500	1017.130	61.530
BN 1650	31.480	36.230	-11.300	1017.610	61.050

BRISBANE RIVER - BN 1840 TO BN 1650

LEGEND

LOCATION AND IDENTIFICATION OF STRUCTURE

PMF DESIGN FLOOD

10 000 YEAR ARI DESIGN FLOOD

EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

FILE NAME: 415... PLOT SCALE: 1=30

SINCLAIR KNIGHT MERZ

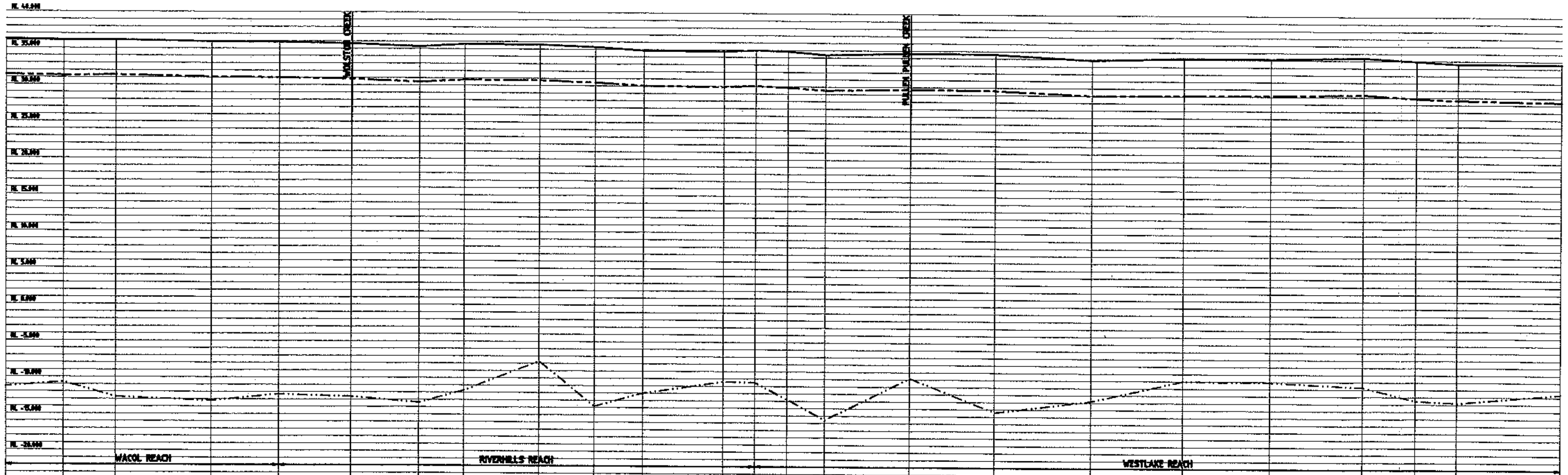
FIGURE H-5c

BRISBANE RIVER FLOOD STUDY
MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE PMF AND 10 000 YEAR ARI
FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS

LEGEND
- 3000 — AMTD LINE
- BN 1250 — SURVEYED CROSS SECTION
- (516) — LOCATION AND IDENTIFICATION OF STRUCTURE

PLAN VIEW

0 0.25 0.5 0.75 1.0 1.25
KILOMETRES



DATUM RL. -25.000

10 000 YEAR ARI DESIGN FLOOD LEVEL	31.400	31.250	31.350	31.080	31.030	30.850	30.470	30.770	30.150	30.650	30.050	29.930
PMF DESIGN FLOOD LEVEL	36.230	36.190	34.160	35.930	35.870	35.490	35.320	35.650	35.630	35.320	34.890	34.790
BED LEVEL (m AHD)	-11.300	-10.780	-12.700	-13.280	-12.380	-12.600	-13.400	-11.700	-7.700	-13.800	-12.000	-10.400
CROSS SECTION NUMBER	BN 1650	BN 1640	BN 1630	BN 1620	BN 1610	BN 1600	BN 1590	BN 1580	BN 1570	BN 1560	BN 1550	BN 1540
MIKE 11 CHAINAGE (km)	1017.510	1017.920	1018.200	1018.725	1019.095	1019.490	1019.865	1020.115	1020.525	1020.830	1021.095	1021.530
AMTD CHAINAGE (km)	61.650	60.760	60.440	59.935	59.565	59.170	58.795	58.545	58.135	57.830	57.565	57.121

10 000 YEAR ARI DESIGN FLOOD LEVEL	30.080	29.880	29.530	29.690	29.420	29.000	29.080	29.120	29.320	28.850	28.410	28.410
PMF DESIGN FLOOD LEVEL	34.980	34.820	34.590	34.650	34.400	33.870	34.110	34.150	34.390	33.760	33.590	33.410
BED LEVEL (m AHD)	-10.580	-12.040	-15.400	-9.890	-14.400	-12.880	-10.800	-10.100	-10.700	-12.500	-12.800	-11.400
CROSS SECTION NUMBER	BN 1530	BN 1520	BN 1510	BN 1500	BN 1490	BN 1480	BN 1470	BN 1460	BN 1450	BN 1440	BN 1430	BN 1420
MIKE 11 CHAINAGE (km)	1021.715	1021.875	1022.505	1022.715	1023.040	1023.570	1024.080	1024.563	1025.070	1025.340	1025.590	1026.170
AMTD CHAINAGE (km)	56.945	56.745	56.555	56.885	55.620	55.090	54.580	54.097	53.590	53.300	53.070	52.490

LEGEND
- (516) — LOCATION AND IDENTIFICATION OF STRUCTURE
- ——— PMF DESIGN FLOOD
- – – – 10 000 YEAR ARI DESIGN FLOOD
- –··–··– EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

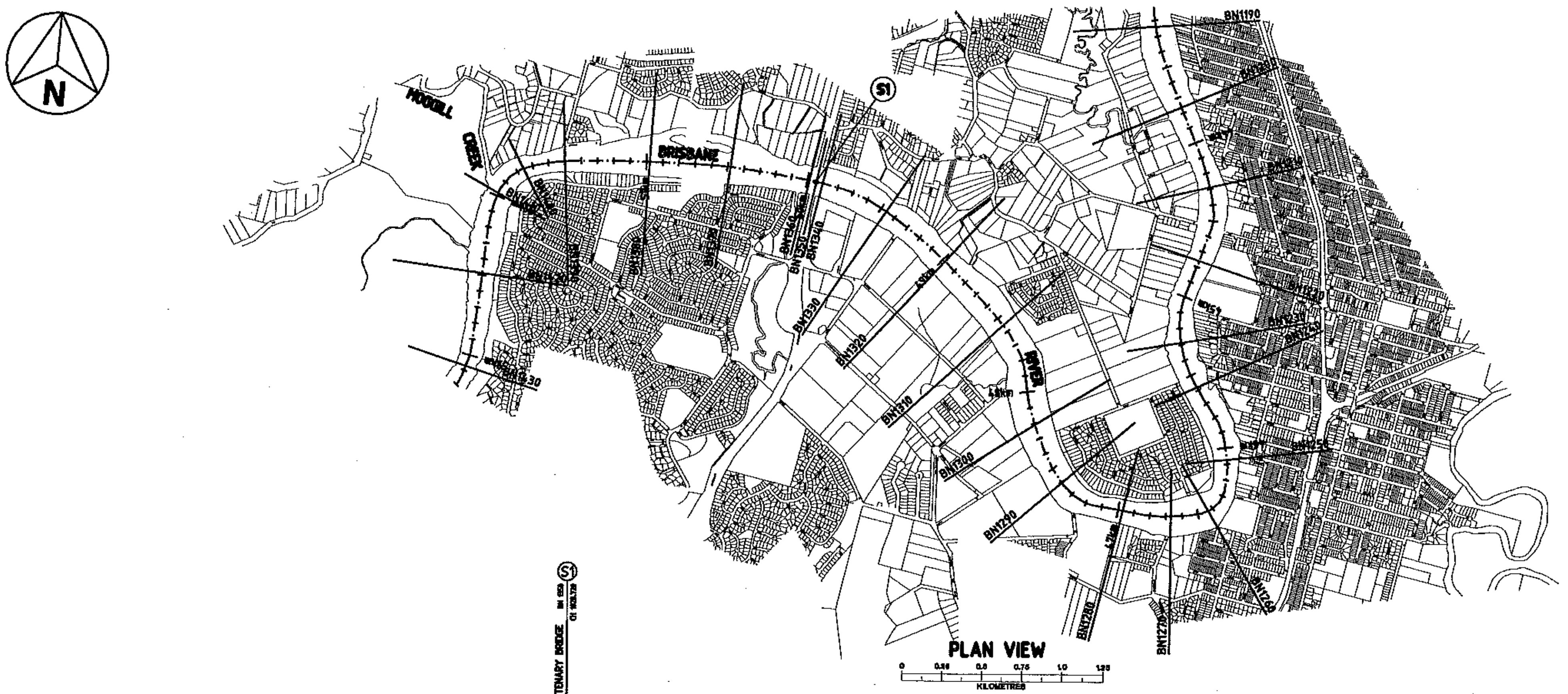
BRISBANE RIVER - BN 1650 TO BN 1420

PLOT SCALE: 1=30

SINCLAIR KNIGHT MERZ

FIGURE H-5d

BRISBANE RIVER FLOOD STUDY
MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE PMF AND 10 000 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS

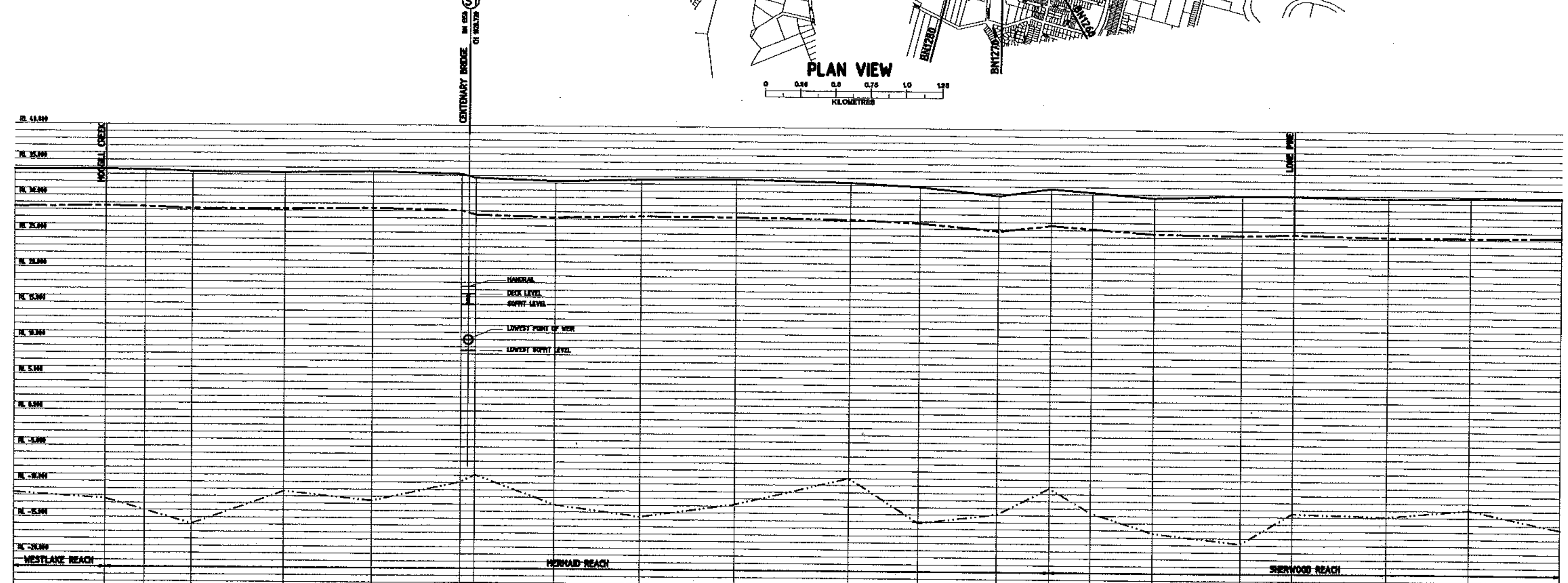


LEGEND

AMTD LINE

BN 1250 SURVEYED CROSS SECTION

S1 LOCATION AND IDENTIFICATION OF STRUCTURE



CROSS SECTION NUMBER	10 000 YEAR ARI DESIGN FLOOD LEVEL	PMF DESIGN FLOOD LEVEL	BED LEVEL (m AHD)	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 1420	28.430	33.690	-11.604	1026.170	52.694
BN 1410	28.560	33.690	-12.400	1026.440	51.980
BN 1400	28.470	33.620	-16.000	1026.900	51.760
BN 1390	28.230	33.480	-15.940	1027.164	51.500
BN 1380	28.220	33.330	-11.300	1027.680	50.980
BN 1370	28.370	33.510	-12.480	1028.190	50.480
BN 1360	28.110	33.230	-9.904	1028.484	49.980
BN 1348	27.508	32.640	-8.900	1028.760	49.904
BN 1330	27.220	32.320	-13.300	1029.280	49.440
BN 1320	27.440	32.480	-16.400	1029.480	48.900
BN 1310	27.380	32.780	-12.840	1030.220	48.440
BN 1300	27.190	32.370	-9.060	1030.670	47.790
BN 1290	26.750	31.830	-15.740	1031.260	47.440
BN 1280	25.720	30.690	-13.980	1031.700	46.960
BN 1270	26.570	31.740	-10.280	1031.995	46.665
BN 1260	26.120	31.260	-13.680	1032.234	46.438
BN 1250	25.480	30.520	-16.450	1032.505	46.075
BN 1240	25.320	30.880	-17.800	1033.080	45.580
BN 1230	25.520	30.910	-13.580	1033.370	45.290
BN 1220	25.320	30.470	-13.950	1033.950	44.760
BN 1210	25.310	30.780	-12.900	1034.370	44.290
BN 1200	25.320	30.450	-15.480	1034.890	43.770

LEGEND

S1 LOCATION AND IDENTIFICATION OF STRUCTURE

——— PMF DESIGN FLOOD

— — — 10 000 YEAR ARI DESIGN FLOOD

— · · — EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

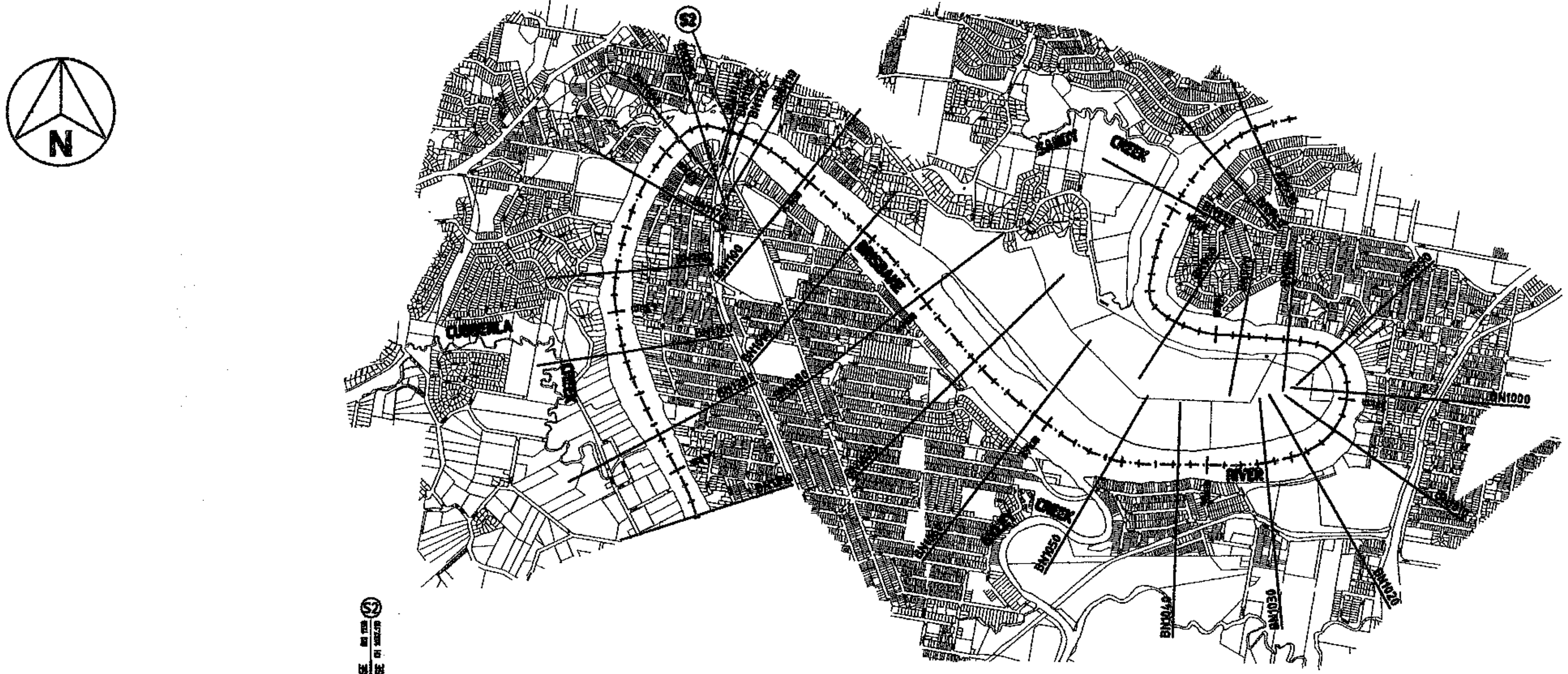
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 1420 TO BN 1200

FILE: 41 PLOT SCALE: 1=30

FIGURE H-5e

BRISBANE RIVER FLOOD STUDY
MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE PMF AND 10 000 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS

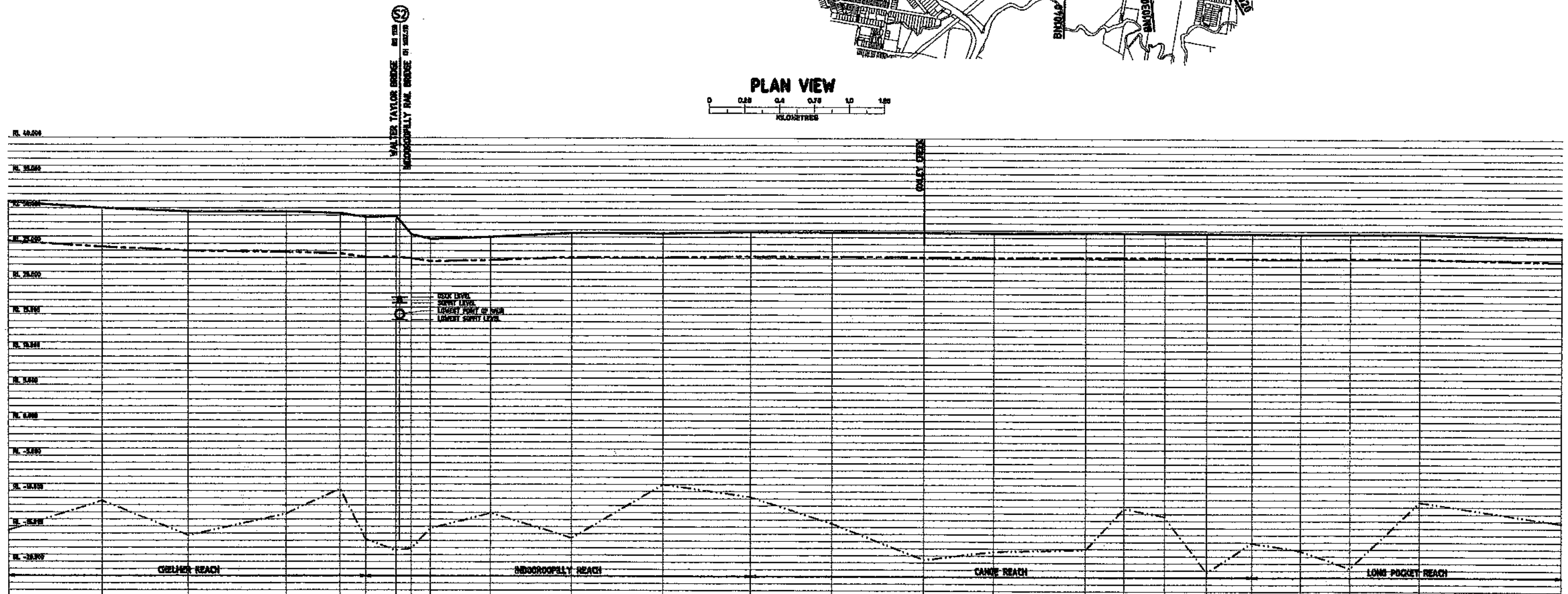


PLAN VIEW

0 0.25 0.5 0.75 1.0 1.25
KILOMETRES

LEGEND

- AMTD LINE
- BN 125a — SURVEYED CROSS SECTION
- (S10) LOCATION AND IDENTIFICATION OF STRUCTURE



DATUM RL. -25.000

CROSS SECTION NUMBER	10 000 YEAR ARI DESIGN FLOOD LEVEL	PMF DESIGN FLOOD LEVEL	BED LEVEL (m AHD)	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 1200	25.320	30.858	-15.600	1034.890	43.779
BN 1190	24.530	30.010	-11.448	1035.616	43.244
BN 1180	23.988	29.580	-16.510	1035.900	42.780
BN 1170	23.920	29.540	-13.260	1036.460	42.200
BN 1160	23.680	29.294	-3.700	1036.770	41.880
BN 1150	23.040	28.740	-16.880	1036.915	41.745
BN 1140	23.120	28.884	-30.600	1037.095	41.570
BN 1120	22.958	26.334	-18.188	1037.175	41.495
BN 1110	22.519	25.478	-15.300	1037.285	41.375
BN 1100	22.720	25.998	-13.100	1037.425	41.035
BN 1090	23.130	26.540	-16.600	1038.605	40.575
BN 1080	23.490	26.510	-9.300	1038.400	40.064
BN 1070	23.264	26.730	-10.800	1039.030	39.560
BN 1060	23.250	26.720	-14.500	1039.565	39.050
BN 1050	23.200	26.670	-19.690	1040.090	38.520
BN 1040	23.460	26.630	-18.440	1040.490	38.170
BN 1030	23.490	26.660	-18.100	1041.040	37.564
BN 1020	23.570	26.640	-12.800	1041.230	37.430
BN 1010	23.568	26.630	-13.400	1041.640	37.200
BN 1000	23.354	26.420	-21.340	1041.780	36.960
BN 990	23.898	26.590	-17.500	1041.960	36.780
BN 980	23.840	26.570	-18.200	1042.250	36.475
BN 970	23.770	26.590	-20.700	1042.515	36.145
BN 960	23.780	26.560	-11.300	1042.910	35.750
BN 950	22.770	26.560	-16.300	1043.735	34.935

LEGEND

- (S10) LOCATION AND IDENTIFICATION OF STRUCTURE
- PMF DESIGN FLOOD
- 10 000 YEAR ARI DESIGN FLOOD
- EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

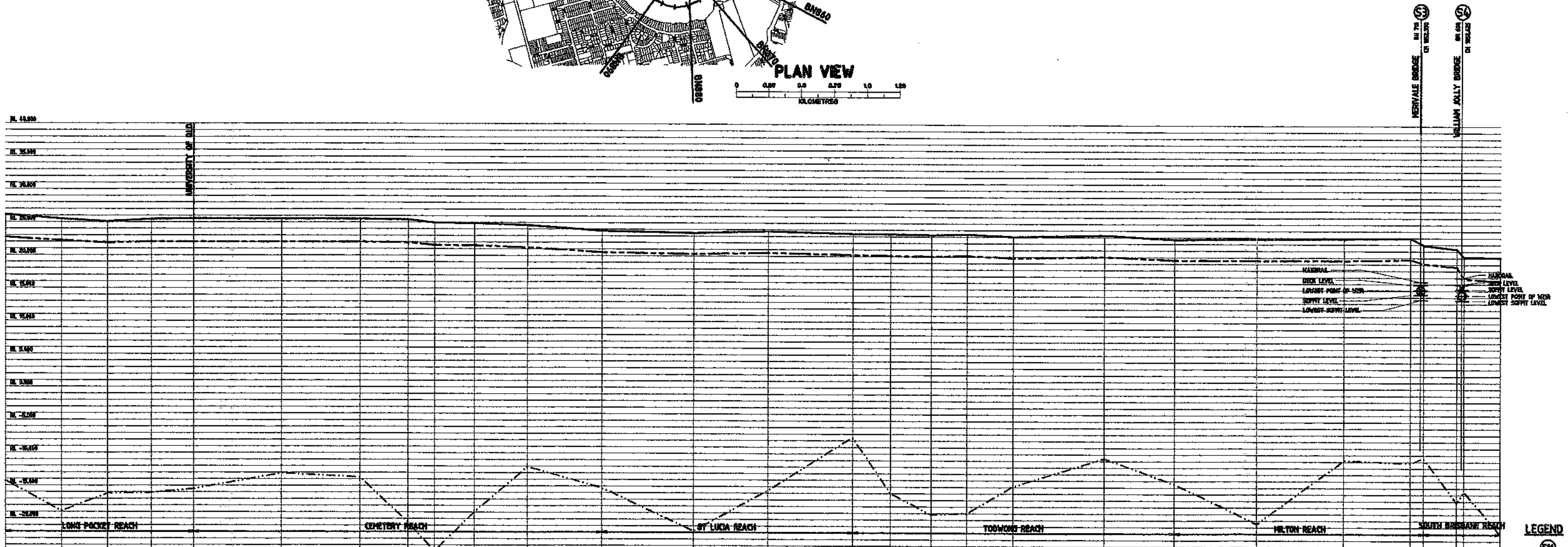
BRISBANE RIVER - BN 1200 TO BN 950

FILE NAME: 415/-141 PLOT SCALE: 1=30 DISK N°: C:\DWG JOB N°: T004157 DATE: 23/3/97

FIGURE H-5f

BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE PMF AND 10 000 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



10 000 YEAR ARI DESIGN FLOOD LEVEL	22.310	22.180	21.850	22.010	22.090	22.010
PMF DESIGN FLOOD LEVEL	26.140	25.470	25.880	25.430	25.520	25.510
BED LEVEL (m AHD)	-14.380	-18.900	-16.280	-14.900	-15.500	-13.900
CROSS SECTION NUMBER	BN 950	BN 940	BN 930	BN 920	BN 910	BN 900
MIKE 11 CHAINAGE (km)	1043.325	1044.040	1044.340	1044.685	1044.840	1045.400
AMTD CHAINAGE (km)	34.935	34.606	34.320	34.055	33.880	33.260

10 000 YEAR ARI DESIGN FLOOD LEVEL	22.000	21.930	21.580	21.580	21.220	20.500	20.280
PMF DESIGN FLOOD LEVEL	25.500	25.420	24.930	24.880	24.580	23.770	23.480
BED LEVEL (m AHD)	-13.700	-20.480	-26.500	-19.800	-12.100	-15.300	-21.800
CROSS SECTION NUMBER	BN 890	BN 880	BN 870	BN 860	BN 850	BN 840	BN 830
MIKE 11 CHAINAGE (km)	1045.805	1046.100	1046.340	1046.580	1046.930	1047.350	1047.975
AMTD CHAINAGE (km)	33.775	32.480	32.320	32.080	31.760	31.310	30.385

10 000 YEAR ARI DESIGN FLOOD LEVEL	20.500	20.150	20.070	20.010	20.100	19.790	20.020
PMF DESIGN FLOOD LEVEL	23.770	23.430	23.360	23.330	23.390	23.030	23.290
BED LEVEL (m AHD)	-15.600	-7.500	-16.000	-19.200	-19.800	-14.900	-10.400
CROSS SECTION NUMBER	BN 820	BN 810	BN 800	BN 790	BN 780	BN 770	BN 760
MIKE 11 CHAINAGE (km)	1048.375	1048.880	1049.120	1049.370	1049.580	1049.870	1050.430
AMTD CHAINAGE (km)	30.285	29.770	29.540	29.320	29.070	28.790	28.230

10 000 YEAR ARI DESIGN FLOOD LEVEL	19.550	19.530	19.530	19.720	19.090	18.630	16.830	16.440
PMF DESIGN FLOOD LEVEL	22.480	22.400	22.880	22.980	21.930	21.530	20.140	20.030
BED LEVEL (m AHD)	-14.500	-20.500	-10.800	-11.200	-10.400	-17.200	-15.500	-22.800
CROSS SECTION NUMBER	BN 750	BN 740	BN 730	BN 720	BN 710	BN 690	BN 670	BN 660
MIKE 11 CHAINAGE (km)	1050.940	1051.360	1051.895	1052.310	1052.380	1052.595	1052.640	1052.865
AMTD CHAINAGE (km)	27.810	27.380	26.765	26.350	26.370	26.065	26.020	25.795

LEGEND

VERT. METRES

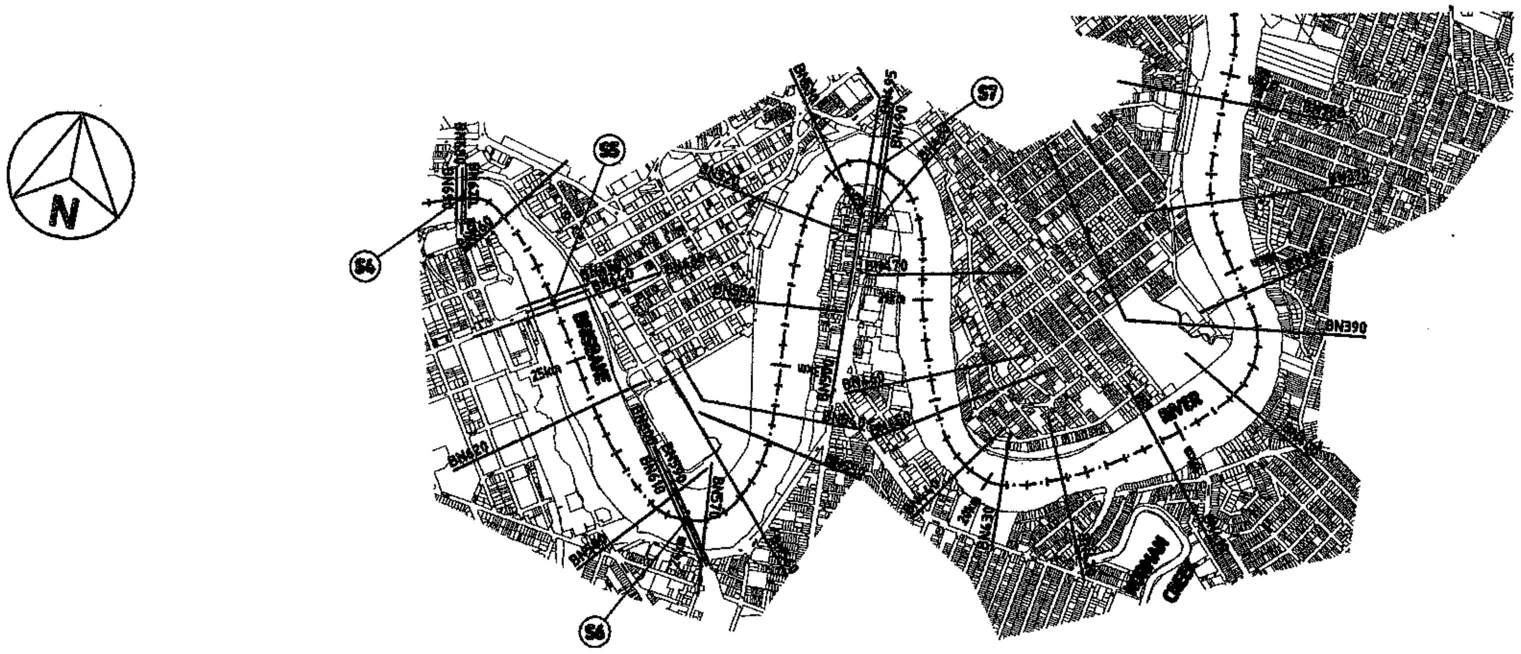
HORIZ. KILOMETRES

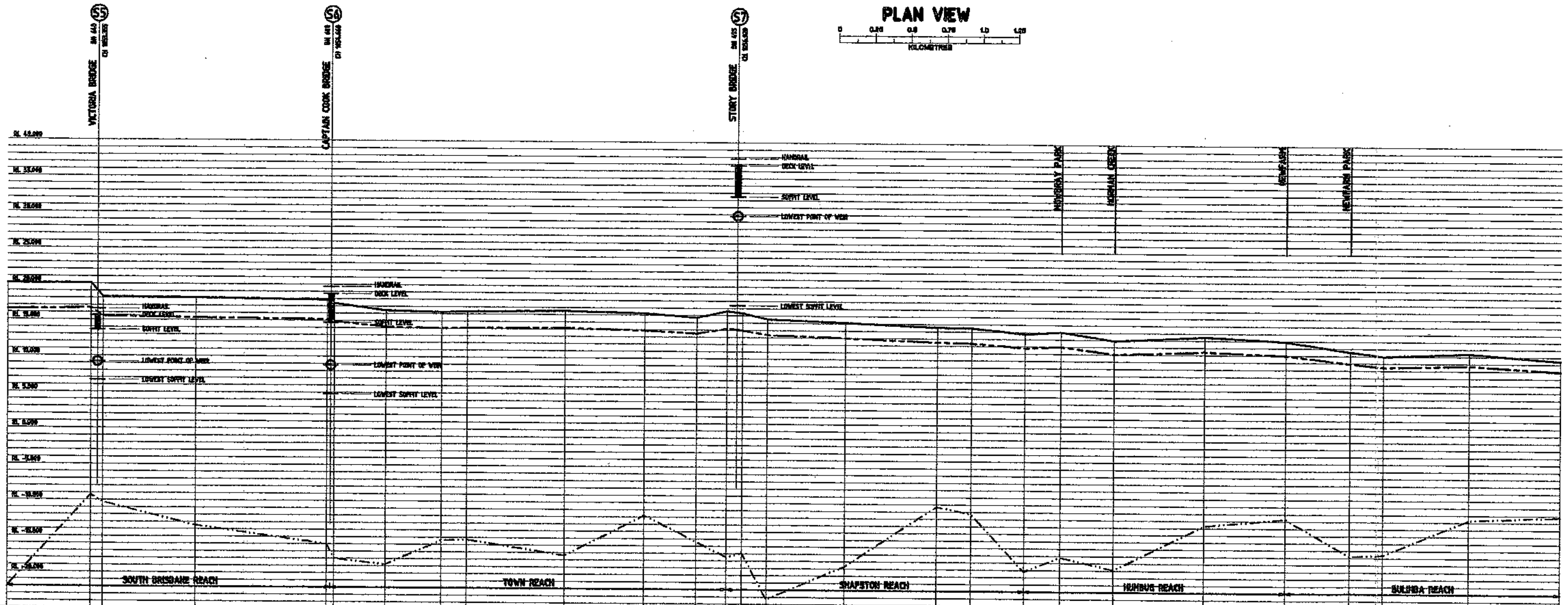
BRISBANE RIVER - BN 950 TO BN 660

FIGURE H-5g

BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE PMF AND 10 000 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS





CROSS SECTION NUMBER	10 000 YEAR ARI DESIGN FLOOD LEVEL	PMF DESIGN FLOOD LEVEL	BED LEVEL (m AHD)	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 660	16.440	20.838	-22.000	1052.865	25.795
BN 650	16.410	20.470	-9.300	1053.320	25.340
BN 638	15.500	18.150	-10.300	1053.385	25.295
BN 620	15.310	18.080	-13.500	1053.960	24.760
BN 610	15.150	17.840	-14.600	1054.660	24.020
BN 598	14.890	17.360	-18.000	1054.680	23.950
BN 584	14.140	16.410	-18.980	1054.970	23.690
BN 550	14.800	16.230	-15.460	1055.280	23.380
BN 540	14.080	16.350	-15.310	1055.430	23.240
BN 530	14.150	16.530	-17.404	1055.960	22.700
BN 520	13.840	16.230	-16.800	1056.400	22.260
BN 510	13.490	15.700	-15.400	1056.895	21.965
BN 500	14.190	16.590	-17.510	1056.865	21.795
BN 490	13.950	16.320	-16.900	1056.950	21.710
BN 480	13.350	15.550	-23.340	1057.090	21.570
BN 470	13.000	15.130	-18.700	1057.530	21.130
BN 460	12.490	14.530	-14.380	1058.040	20.620
BN 450	12.400	14.490	-14.300	1058.230	20.430
BN 440	11.770	13.730	-19.200	1058.530	20.130
BN 430	12.810	14.830	-17.200	1058.735	19.925
BN 420	11.800	12.870	-18.900	1059.035	19.625
BN 410	11.430	13.500	-12.740	1059.540	19.120
BN 400	10.970	12.910	-15.700	1059.990	18.670
BN 390	9.910	11.560	-16.800	1060.345	18.345
BN 383	9.440	10.670	-14.600	1060.575	18.115
BN 370	9.720	11.440	-11.700	1061.015	17.665
BN 360	8.950	10.830	-11.204	1061.530	17.130

LEGEND
- LOCATION AND IDENTIFICATION OF STRUCTURE
- PMF DESIGN FLOOD
- 10 000 YEAR ARI DESIGN FLOOD
- EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

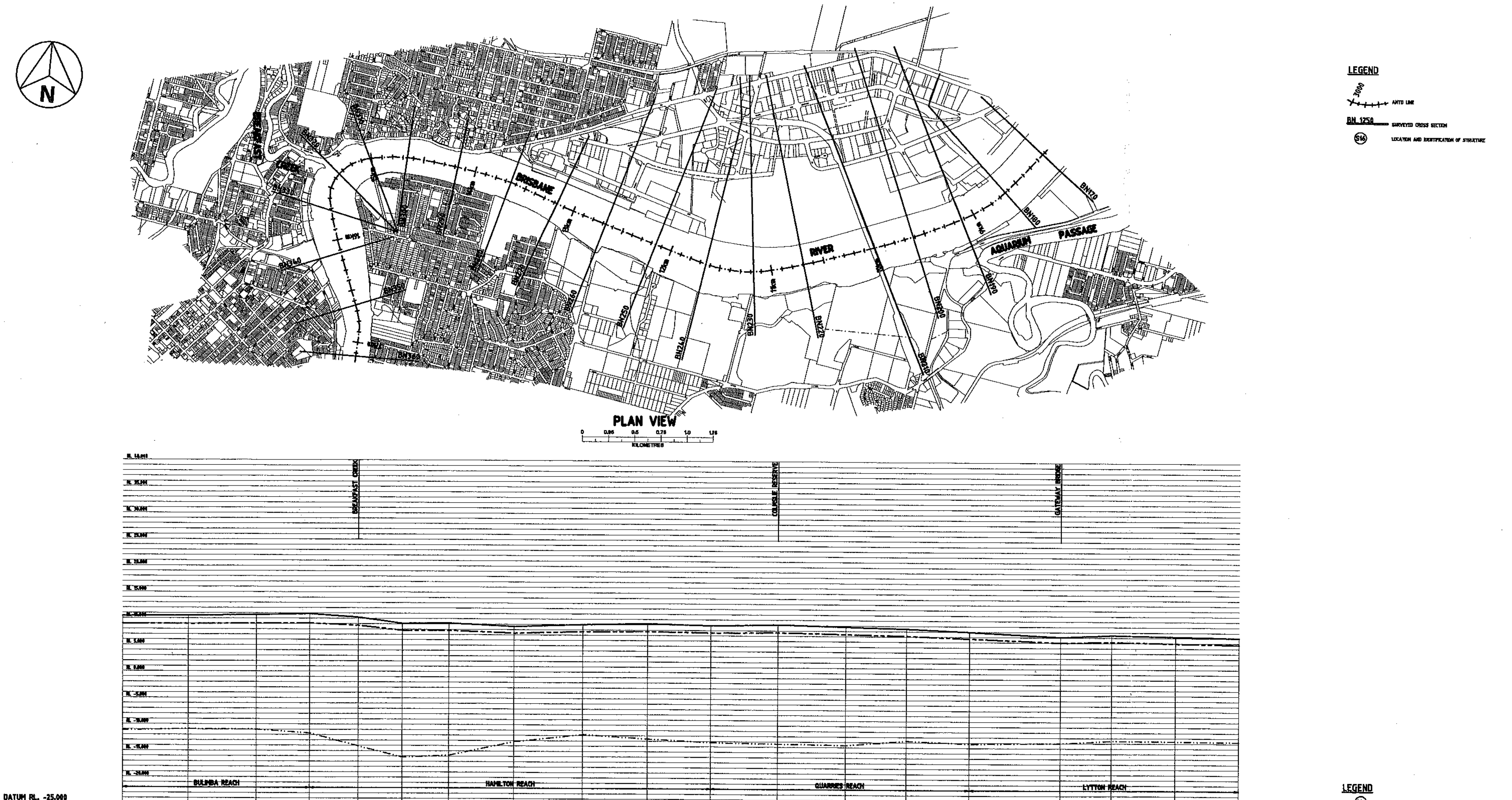
BRISBANE RIVER - BN 660 TO BN 360

FILE NAME: 4157-143 PLOT SCALE: 1=30 DISK No: C:\DWG JOB No: T004157 DATE: 23/3/97

SINCLAIR KNIGHT MERZ

FIGURE H-5h

BRISBANE RIVER FLOOD STUDY
MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE PMF AND 10 000 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



10 000 YEAR ARI DESIGN FLOOD LEVEL	8.950	8.970	9.040	9.120	8.700	7.770	7.790	7.330	7.650	7.730	7.540	7.440	7.390	7.140	6.970	6.800	6.270	5.930	5.740
PMF DESIGN FLOOD LEVEL	10.430	10.510	10.680	10.840	10.240	9.080	9.170	8.590	9.610	9.220	8.900	9.130	8.780	8.490	7.950	7.860	7.480	7.210	7.020
BED LEVEL (m AHD)	-11.200	-10.900	-11.080	-11.780	-14.180	-16.200	-15.800	-13.200	-11.800	-12.440	-13.260	-13.440	-13.480	-12.780	-13.200	-13.080	-12.500	-12.610	-12.700
CROSS SECTION NUMBER	BN 360	BN 350	BN 340	BN 330	BN 320	BN 310	BN 300	BN 290	BN 280	BN 270	BN 260	BN 250	BN 240	BN 230	BN 220	BN 210	BN 200	BN 190	BN 180
MIKE 11 CHAINAGE (km)	1861.530	1862.028	1862.535	1862.940	1863.310	1863.645	1864.880	1864.490	1865.010	1865.503	1865.990	1866.505	1867.020	1867.485	1867.965	1868.660	1869.045	1869.535	1870.025
AMTD CHAINAGE (km)	17.130	16.640	16.125	15.720	15.350	15.015	14.448	14.170	13.650	13.157	12.670	12.155	11.640	11.175	10.695	10.000	9.615	9.125	8.635

BRISBANE RIVER - BN 360 TO BN 180

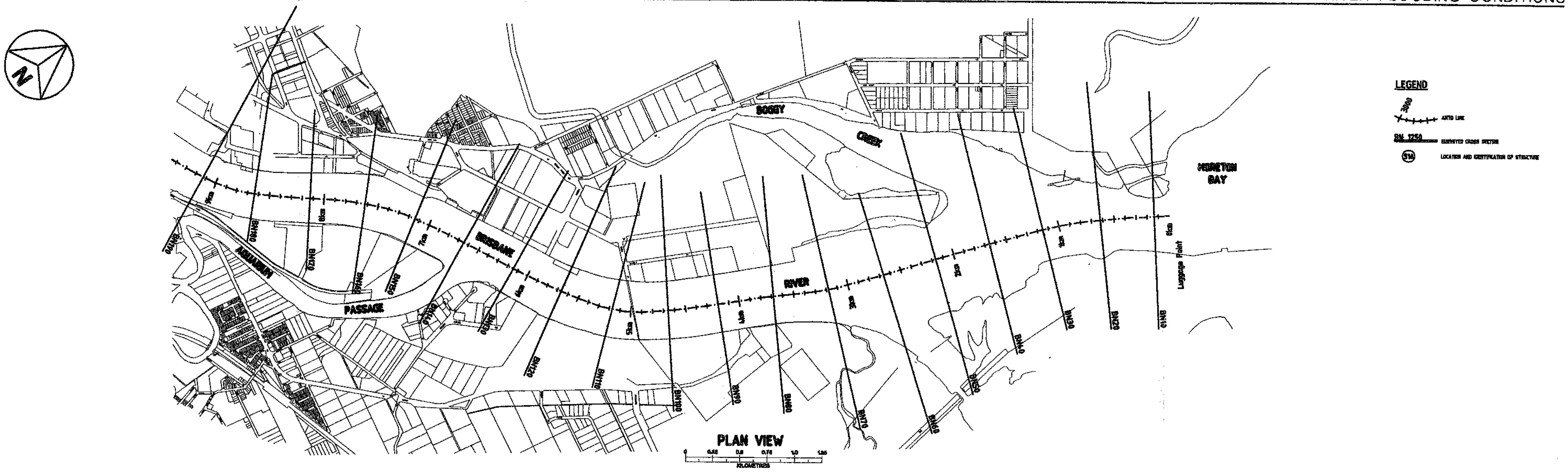
FILE NAME: 415-20? PLOT SCALE: 1=30

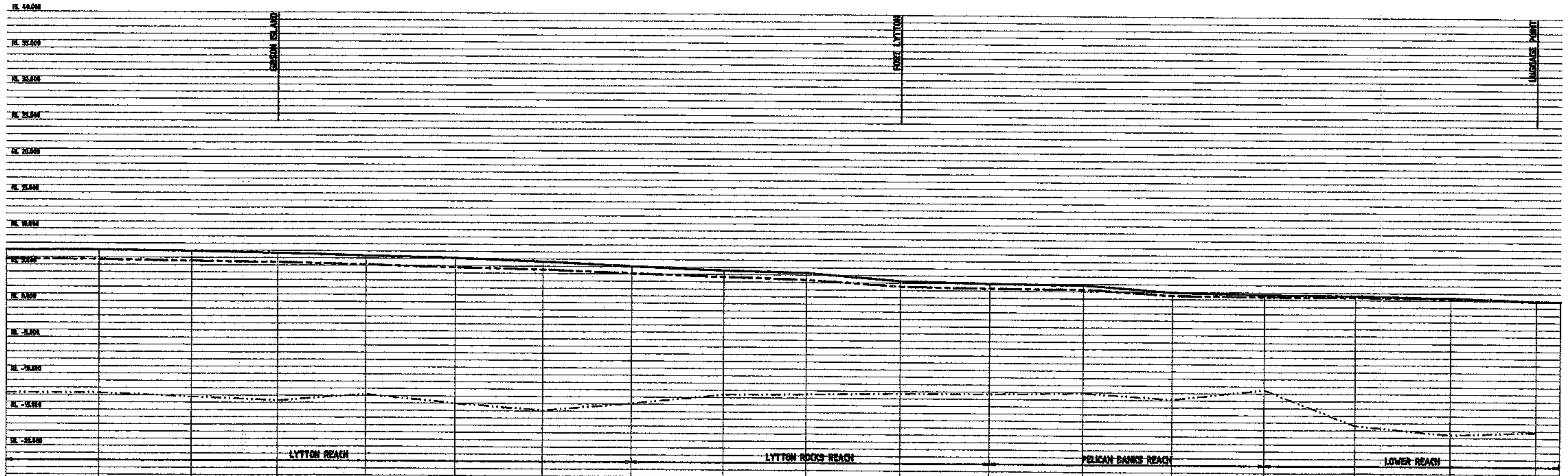
SINCLAIR KNIGHT MERZ

FIGURE H-5i

BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE PMF AND 10 000 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS





DATUM RL. -25.000

10 000 YEAR ARI DESIGN FLOOD LEVEL	5.740	5.740	5.550	5.410	5.110	4.800	4.550	4.270	3.680	3.330	2.500	2.270	2.240	1.680	1.340	1.340	1.280	0.920	0.920
PMF DESIGN FLOOD LEVEL	7.020	7.060	6.920	6.670	6.360	6.070	5.660	5.060	4.540	4.300	3.250	2.940	2.840	1.890	1.650	1.570	1.310	0.920	0.920
BED LEVEL (m AHD)	-12.700	-12.700	-13.300	-13.700	-12.800	-14.000	-14.900	-13.900	-12.600	-12.500	-12.300	-12.300	-12.100	-12.900	-11.500	-16.400	-17.400	-17.200	
CROSS SECTION NUMBER	BN 180	BN 170	BN 160	BN 150	BN 140	BN 130	BN 120	BN 110	BN 100	BN 90	BN 80	BN 70	BN 60	BN 50	BN 40	BN 30	BN 20	BN 10	-
MIKE 11 CHAINAGE (km)	1070.025	1070.530	1071.040	1071.520	1072.015	1072.515	1072.995	1073.445	1074.000	1074.460	1074.905	1075.480	1076.020	1076.495	1077.050	1077.510	1078.046	1078.525	1078.640
AMTD CHAINAGE (km)	8.635	8.130	7.620	7.140	6.645	6.145	5.645	5.175	4.560	4.200	3.675	3.180	2.640	2.165	1.650	1.150	0.620	0.135	-

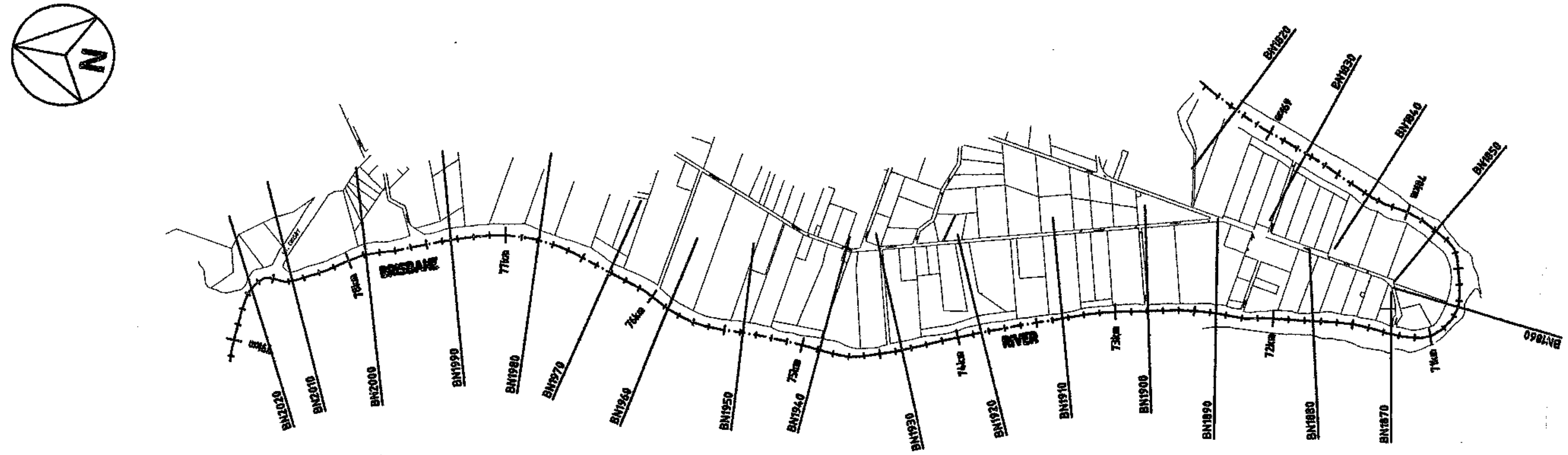
BRISBANE RIVER - BN 180 TO BN 10

FILE NAME: 415/-145 PLOT SCALE: 1=30 DISK N°: CNDWG JOB N°: T00415? DATE: 23/3/97

SINCLAIR KNIGHT MERZ

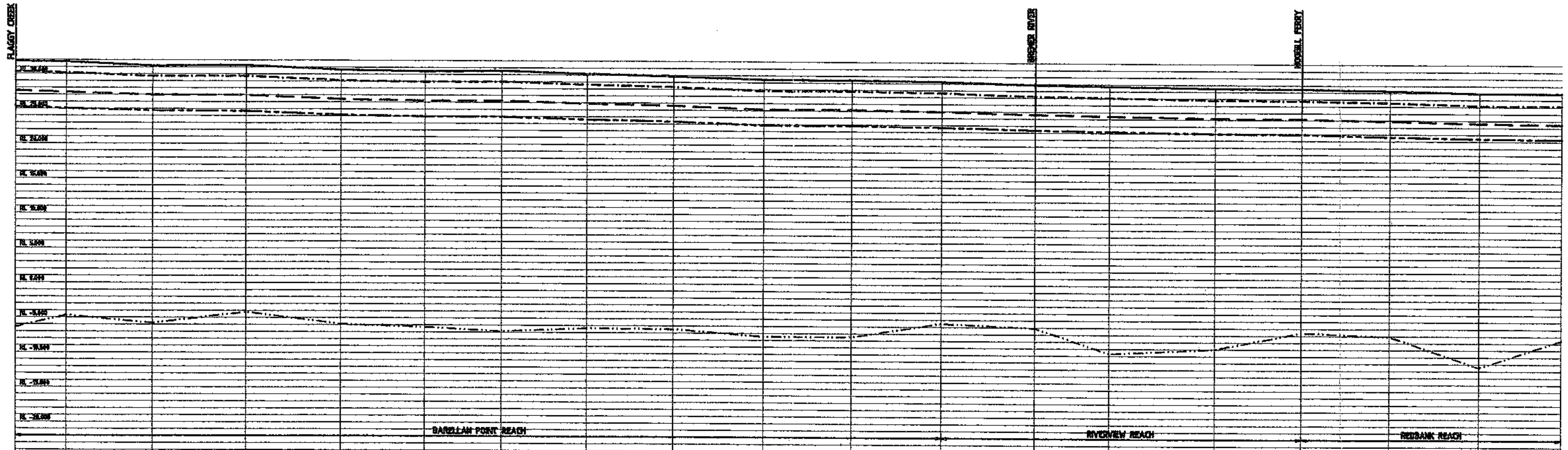
FIGURE H-6a

BRISBANE RIVER FLOOD STUDY
MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2000, 1000, 500, AND 200 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



LEGEND
AMTD LINE
BN 1250 SURVEYED CROSS SECTION
LOCATION AND IDENTIFICATION OF STRUCTURE

PLAN VIEW
0 0.25 0.5 0.75 1.0 1.25 KILOMETRES



DATUM RL. -25.000

200 YEAR ARI DESIGN FLOOD LEVEL	25.250	25.646	24.730	24.480	24.148	23.956	23.934	23.600	23.340	22.860
500 YEAR ARI DESIGN FLOOD LEVEL	27.560	27.340	26.990	26.980	26.400	26.230	26.240	25.890	25.620	25.130
1000 YEAR ARI DESIGN FLOOD LEVEL	28.250	30.570	29.480	29.220	29.100	28.920	28.980	28.610	28.310	27.790
2000 YEAR ARI DESIGN FLOOD LEVEL	31.820	31.730	31.190	31.260	30.620	30.440	30.530	30.170	29.850	29.420
BED LEVEL (m AHD)	-6.600	-4.700	-5.600	-6.200	-5.900	-6.300	-6.900	-6.400	-6.500	-7.500
CROSS SECTION NUMBER	BN 2020	BN 2010	BN 2000	BN 1990	BN 1980	BN 1970	BN 1960	BN 1950	BN 1940	BN 1930
MIKE 11 CHAINAGE (km)	1000.000	1000.285	1000.775	1001.315	1001.865	1002.350	1002.785	1003.275	1003.775	1004.300
AMTD CHAINAGE (km)	78.660	78.375	77.885	77.345	76.795	76.310	75.875	75.385	74.885	74.360

200 YEAR ARI DESIGN FLOOD LEVEL	22.850	22.678	22.350	22.180	21.960	21.948	21.620	21.630	21.330
500 YEAR ARI DESIGN FLOOD LEVEL	25.144	24.930	24.590	24.418	24.170	24.140	23.868	23.680	23.480
1000 YEAR ARI DESIGN FLOOD LEVEL	27.820	27.420	27.210	27.070	26.790	26.760	24.560	26.170	26.140
2000 YEAR ARI DESIGN FLOOD LEVEL	29.410	29.230	28.850	28.740	28.490	28.430	28.240	27.920	27.950
BED LEVEL (m AHD)	-7.500	-5.500	-6.100	-9.700	-9.800	-6.400	-7.100	-11.500	-7.600
CROSS SECTION NUMBER	BN 1920	BN 1910	BN 1900	BN 1890	BN 1880	BN 1870	BN 1860	BN 1850	BN 1840
MIKE 11 CHAINAGE (km)	1004.810	1005.335	1005.870	1006.300	1006.910	1007.410	1007.920	1008.445	1008.925
AMTD CHAINAGE (km)	73.850	73.335	72.790	72.360	71.750	71.250	70.740	70.215	69.735

BRISBANE RIVER - BN 2020 TO BN 1840

LEGEND
LOCATION AND IDENTIFICATION OF STRUCTURE
2000 YEAR ARI DESIGN FLOOD LEVEL
1000 YEAR ARI DESIGN FLOOD LEVEL
500 YEAR ARI DESIGN FLOOD LEVEL
200 YEAR ARI DESIGN FLOOD LEVEL
EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

FILE NAME: 4157-146 DISK N°: C:\DWG JOB N°: T004157 DATE: 23/3/97
PLOT SCALE: 1=30

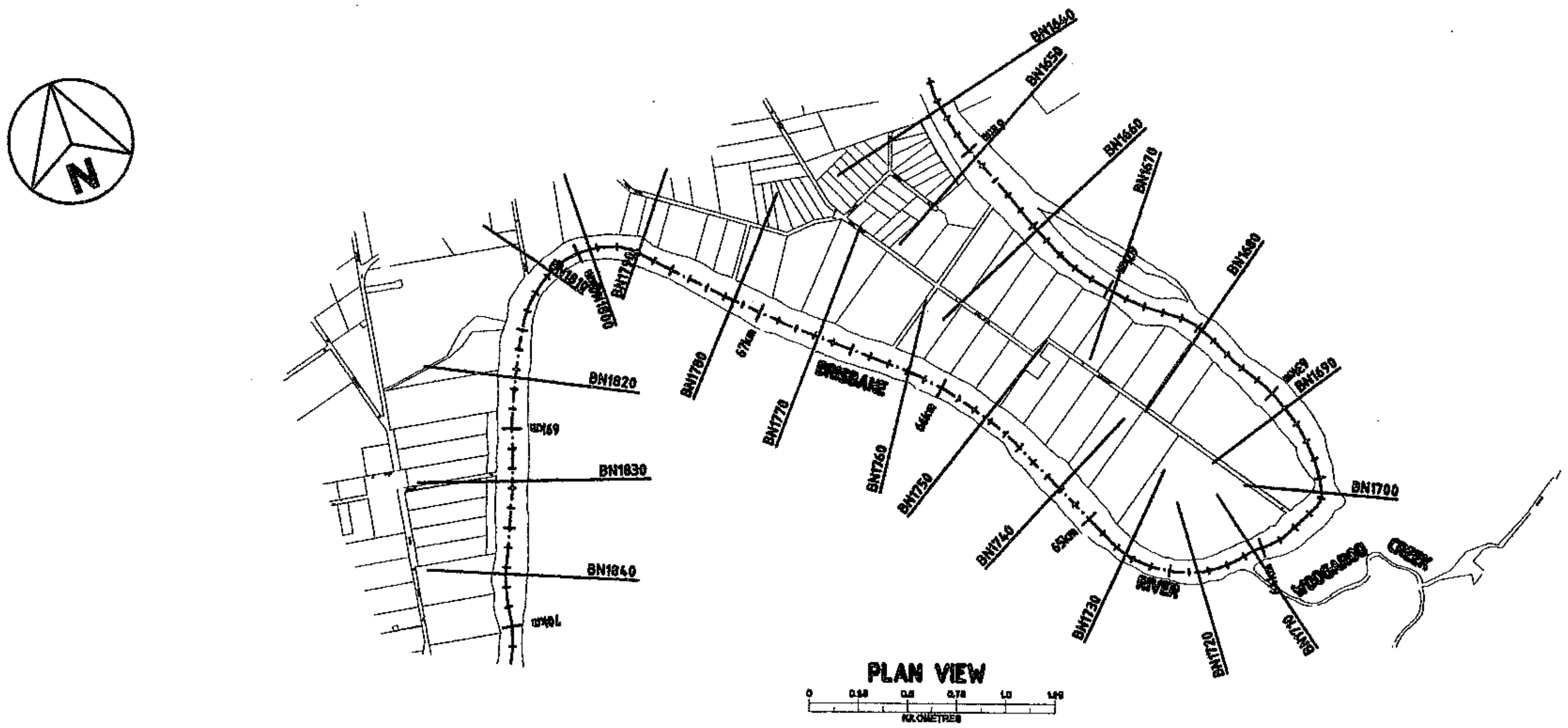
BCC.121.0280

SINCLAIR KNIGHT MERZ

FIGURE H-6b

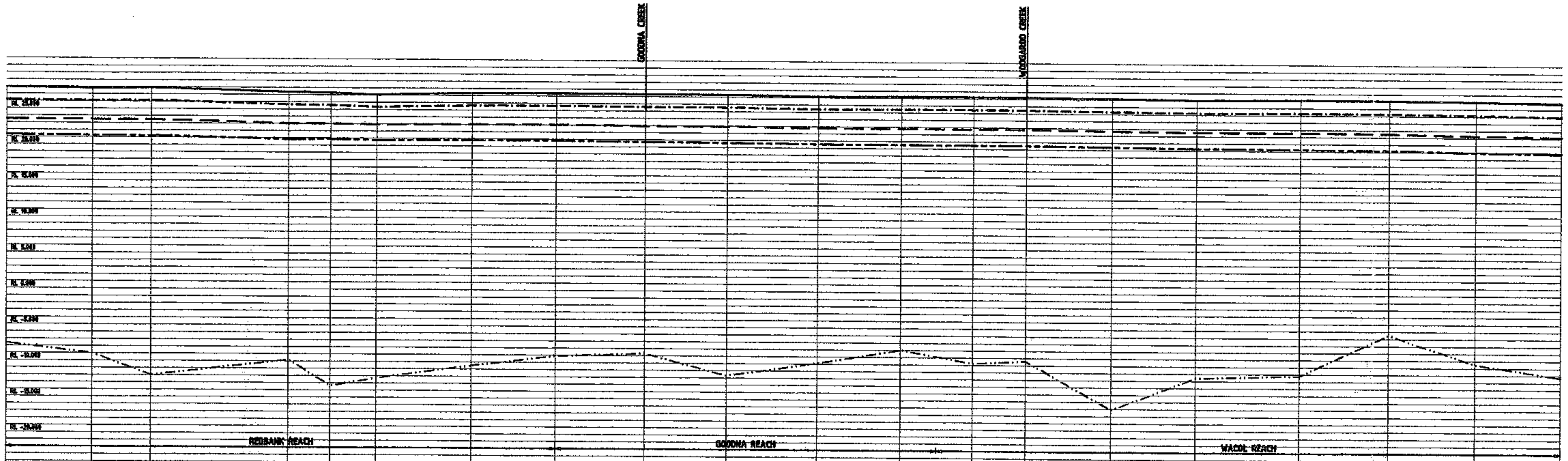
BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2000, 1000, 500, AND 200 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITONS



LEGEND

- ARTS LINE
- BN 1250 SURVEYED CROSS SECTION
- LOCATION AND IDENTIFICATION OF STRUCTURE



DATUM RL. -25.000

200 YEAR ARI DESIGN FLOOD LEVEL	21.530	21.270	21.250	20.830	20.866	20.750	20.898	20.939	20.738	20.650	20.548	20.530	20.570	20.534	20.410	20.290	20.250	20.110	19.940	19.840
500 YEAR ARI DESIGN FLOOD LEVEL	23.406	23.489	23.430	23.036	23.030	22.880	23.020	23.010	22.980	22.960	22.750	22.760	22.750	22.760	22.640	22.530	22.540	22.500	22.270	22.170
1000 YEAR ARI DESIGN FLOOD LEVEL	26.144	26.110	26.150	25.450	25.580	25.370	25.620	25.440	25.570	25.570	25.484	25.458	25.440	25.457	25.340	25.220	25.280	25.270	25.140	24.910
2000 YEAR ARI DESIGN FLOOD LEVEL	27.958	27.849	27.970	27.440	27.280	27.040	27.360	27.400	27.340	27.336	27.160	27.240	27.230	27.230	27.190	27.010	27.100	27.080	27.030	26.820
BED LEVEL (m AHD)	-7.400	-9.000	-12.600	-9.800	-13.400	-12.300	-16.500	-9.300	-6.700	-11.700	-9.940	-4.000	-9.800	-9.400	-16.100	-11.600	-11.300	-5.500	-9.500	-11.300
CROSS SECTION NUMBER	BN 1840	BN 1830	BN 1820	BN 1810	BN 1800	BN 1790	BN 1780	BN 1770	BN 1760	BN 1750	BN 1740	BN 1730	BN 1720	BN 1710	BN 1700	BN 1690	BN 1680	BN 1670	BN 1660	BN 1650
MIKE 11 CHAINAGE (km)	1008.925	1009.400	1009.728	1010.490	1010.725	1010.980	1011.510	1012.940	1012.475	1012.935	1013.445	1013.910	1014.390	1014.610	1015.090	1015.560	1016.160	1016.640	1017.130	1017.610
AMTD CHAINAGE (km)	69.735	69.260	68.640	68.170	67.935	67.680	67.150	66.680	66.185	65.725	65.235	64.740	64.550	64.950	63.570	63.180	62.520	62.020	61.530	61.050

BRISBANE RIVER - BN 1840 TO BN 1650

LEGEND

- LOCATION AND IDENTIFICATION OF STRUCTURE
- 2000 YEAR ARI DESIGN FLOOD LEVEL
- 1000 YEAR ARI DESIGN FLOOD LEVEL
- 500 YEAR ARI DESIGN FLOOD LEVEL
- 200 YEAR ARI DESIGN FLOOD LEVEL
- EXISTING BED LEVEL

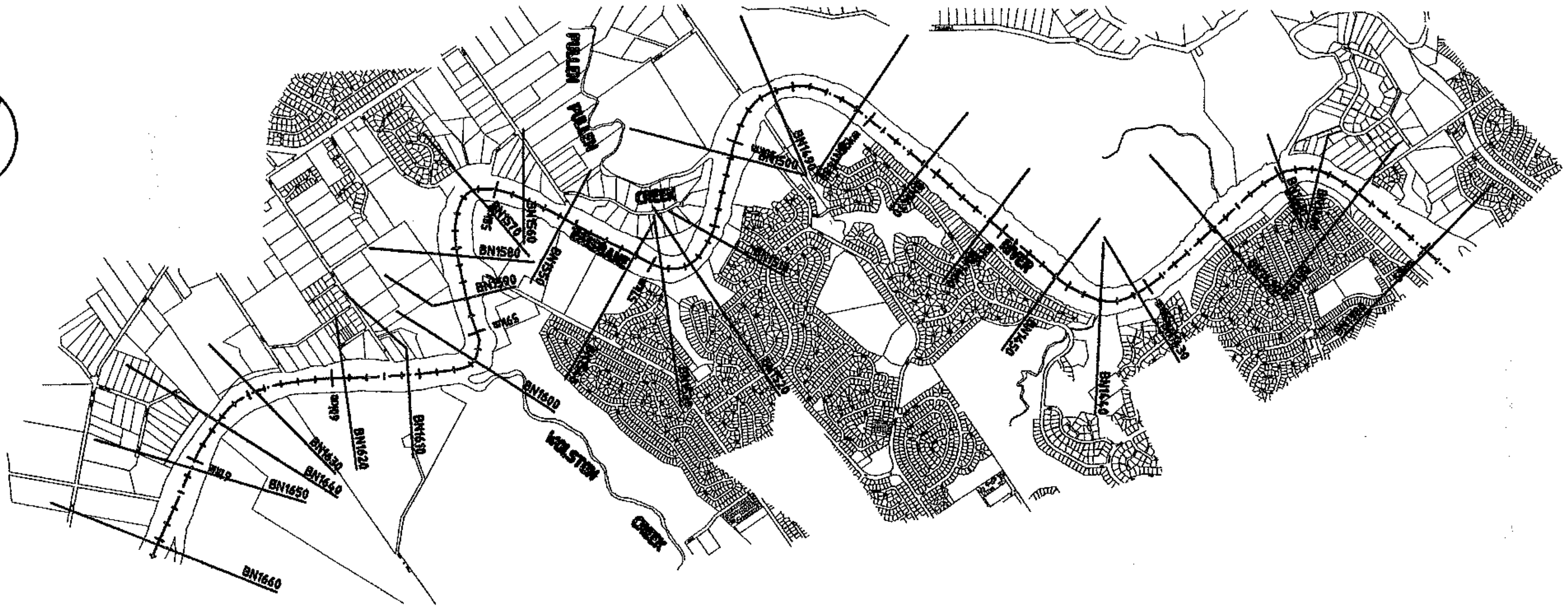
VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

PLOT SCALE: 1=30

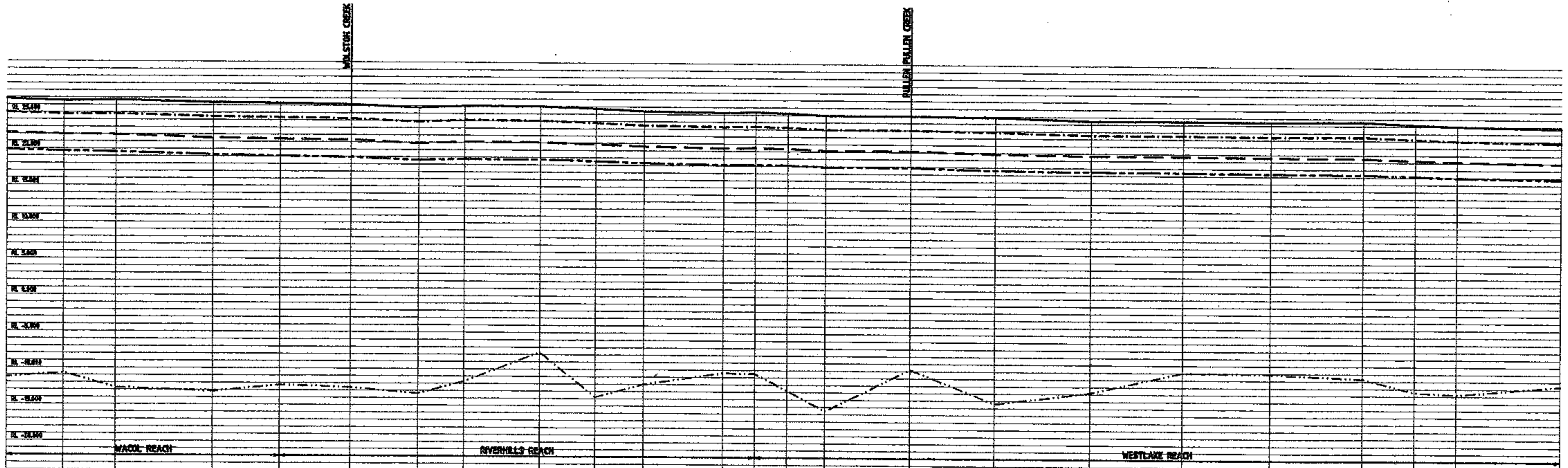
FIGURE H-6c

BRISBANE RIVER FLOOD STUDY
MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2000, 1000, 500, AND 200 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



PLAN VIEW

KILOMETRES



DATUM RL. -25.000

200 YEAR ARI DESIGN FLOOD LEVEL	19.840	19.670	19.570	19.210	19.070	18.950	18.600	18.750	18.730	18.540	18.300
500 YEAR ARI DESIGN FLOOD LEVEL	22.170	21.980	21.950	21.536	21.420	21.310	20.810	21.120	21.004	20.810	20.580
1000 YEAR ARI DESIGN FLOOD LEVEL	24.970	24.750	24.810	24.440	24.370	24.240	23.840	24.090	24.040	23.790	23.470
2000 YEAR ARI DESIGN FLOOD LEVEL	26.820	26.580	26.680	26.370	26.310	26.140	25.790	26.040	26.080	25.750	25.430
BED LEVEL (m AHD)	-11.300	-10.700	-12.700	-13.280	-12.300	-12.400	-13.400	-11.700	-7.700	-13.800	-12.000
CROSS SECTION NUMBER	BN 1650	BN 1640	BN 1630	BN 1620	BN 1610	BN 1600	BN 1590	BN 1580	BN 1570	BN 1560	BN 1550
MIKE 11 CHAINAGE (km)	1017.410	1017.920	1018.200	1018.725	1019.095	1019.490	1019.865	1020.115	1020.525	1020.830	1021.095
AMTD CHAINAGE (km)	61.050	60.740	60.460	59.935	59.565	59.170	58.795	58.545	58.135	57.830	57.565

200 YEAR ARI DESIGN FLOOD LEVEL	18.120	18.160	18.010	17.820	17.870	17.590	17.480	17.430	17.370	17.290	17.120	16.950	16.780
500 YEAR ARI DESIGN FLOOD LEVEL	20.404	20.460	20.360	20.170	20.140	19.840	19.480	19.650	19.500	19.530	19.310	19.140	18.970
1000 YEAR ARI DESIGN FLOOD LEVEL	23.320	23.460	23.270	23.030	23.020	22.820	22.510	22.510	22.420	22.450	22.080	21.990	21.750
2000 YEAR ARI DESIGN FLOOD LEVEL	25.280	25.380	25.230	24.940	24.970	24.840	24.440	24.480	24.430	24.540	24.190	24.000	23.770
BED LEVEL (m AHD)	-10.460	-10.500	-12.800	-15.600	-9.800	-14.460	-12.800	-10.040	-10.100	-10.700	-12.550	-12.800	-11.600
CROSS SECTION NUMBER	BN 1540	BN 1530	BN 1520	BN 1510	BN 1500	BN 1490	BN 1480	BN 1470	BN 1460	BN 1450	BN 1440	BN 1430	BN 1420
MIKE 11 CHAINAGE (km)	1021.539	1021.715	1021.895	1022.105	1022.575	1023.040	1023.570	1024.080	1024.563	1025.070	1025.360	1025.590	1026.170
AMTD CHAINAGE (km)	57.121	56.945	56.765	56.555	56.085	55.620	55.090	54.580	54.097	53.590	53.300	53.070	52.490

BRISBANE RIVER - BN 1650 TO BN 1420

LEGEND

- LOCATION AND IDENTIFICATION OF STRUCTURE
- 2000 YEAR ARI DESIGN FLOOD LEVEL
- 1000 YEAR ARI DESIGN FLOOD LEVEL
- 500 YEAR ARI DESIGN FLOOD LEVEL
- 200 YEAR ARI DESIGN FLOOD LEVEL
- EXISTING BED LEVEL

VERT. METRES
HORIZ. KILOMETRES

PLOT SCALE: 1:30

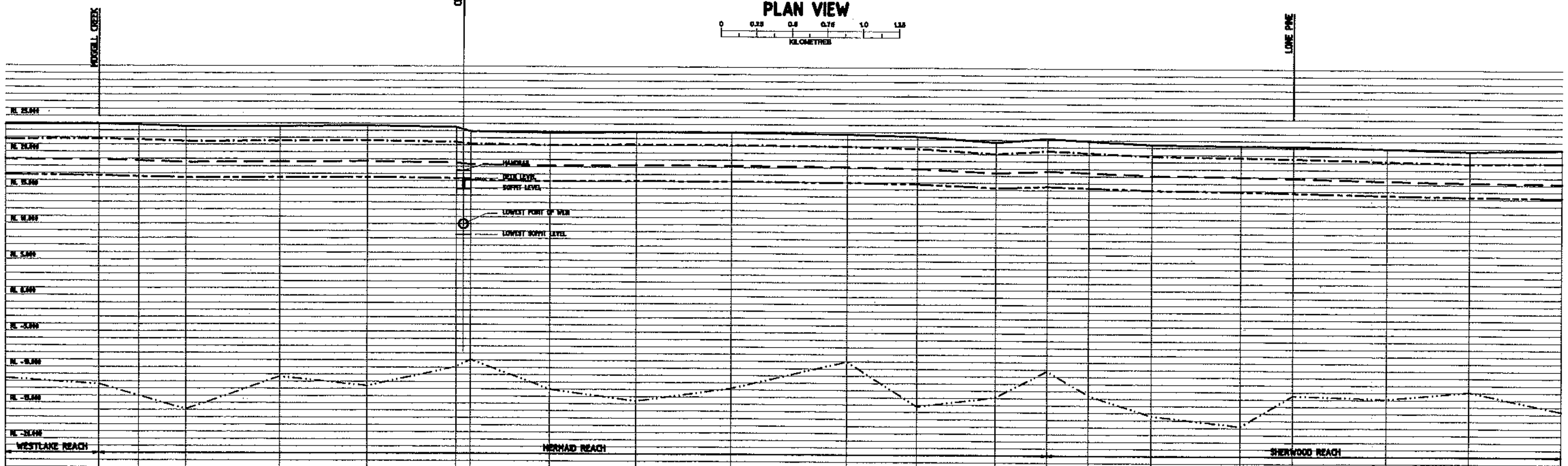
SINCLAIR KNIGHT MERZ

FIGURE H-6d

BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2000, 1000, 500, AND 200 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS

PLAN VIEW



DATUM RL. -25.000

200 YEAR ARI DESIGN FLOOD LEVEL	16.780	16.700	16.540	16.380	16.470	16.510	16.360	16.140	16.000	16.050	16.040
500 YEAR ARI DESIGN FLOOD LEVEL	18.920	18.920	18.780	18.530	18.660	18.710	18.550	18.320	18.180	18.260	18.230
1000 YEAR ARI DESIGN FLOOD LEVEL	21.750	21.820	21.700	21.450	21.540	21.620	21.430	21.180	21.041	21.160	21.110
2000 YEAR ARI DESIGN FLOOD LEVEL	23.770	23.870	23.770	23.530	23.580	23.600	23.440	22.920	22.760	22.900	22.840
BED LEVEL (m AHD)	-11.600	-12.400	-16.800	-15.900	-11.300	-12.400	-9.900	-8.900	-13.000	-14.600	-12.800
CROSS SECTION NUMBER	BN 1420	BN 1410	BN 1400	BN 1390	BN 1380	BN 1370	BN 1360	BN 1340	BN 1330	BN 1320	BN 1310
MIKE 11 CHAINAGE (km)	1026.170	1026.600	1026.900	1027.160	1027.680	1028.180	1028.680	1028.740	1029.200	1029.680	1030.220
AMTD CHAINAGE (km)	52.490	51.900	51.760	51.500	50.980	50.480	49.980	49.908	49.448	48.988	48.440

200 YEAR ARI DESIGN FLOOD LEVEL	15.960	15.770	15.300	15.510	15.344	15.050	14.890	14.760	14.470	14.290	14.200
500 YEAR ARI DESIGN FLOOD LEVEL	18.140	17.920	17.360	17.610	17.460	17.110	16.950	16.810	16.680	16.270	16.190
1000 YEAR ARI DESIGN FLOOD LEVEL	21.010	20.720	20.040	20.500	20.230	19.890	19.650	19.540	19.220	18.950	19.060
2000 YEAR ARI DESIGN FLOOD LEVEL	22.720	22.430	21.650	22.200	21.890	21.430	21.270	21.260	20.970	20.660	20.870
BED LEVEL (m AHD)	-9.800	-15.260	-13.980	-18.200	-13.600	-16.600	-17.800	-13.500	-13.900	-12.900	-15.600
CROSS SECTION NUMBER	BN 1300	BN 1290	BN 1280	BN 1270	BN 1260	BN 1250	BN 1240	BN 1230	BN 1220	BN 1210	BN 1200
MIKE 11 CHAINAGE (km)	1030.870	1031.260	1031.700	1031.995	1032.230	1032.585	1033.080	1033.370	1033.900	1034.370	1034.890
AMTD CHAINAGE (km)	47.798	47.400	46.960	46.665	46.430	46.075	45.580	45.290	44.760	44.290	43.770

BRISBANE RIVER - BN 1420 TO BN 1200

LEGEND

- (S5) LOCATION AND IDENTIFICATION OF STRUCTURE
- 200 YEAR ARI DESIGN FLOOD LEVEL
- 1000 YEAR ARI DESIGN FLOOD LEVEL
- 500 YEAR ARI DESIGN FLOOD LEVEL
- 200 YEAR ARI DESIGN FLOOD LEVEL
- EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

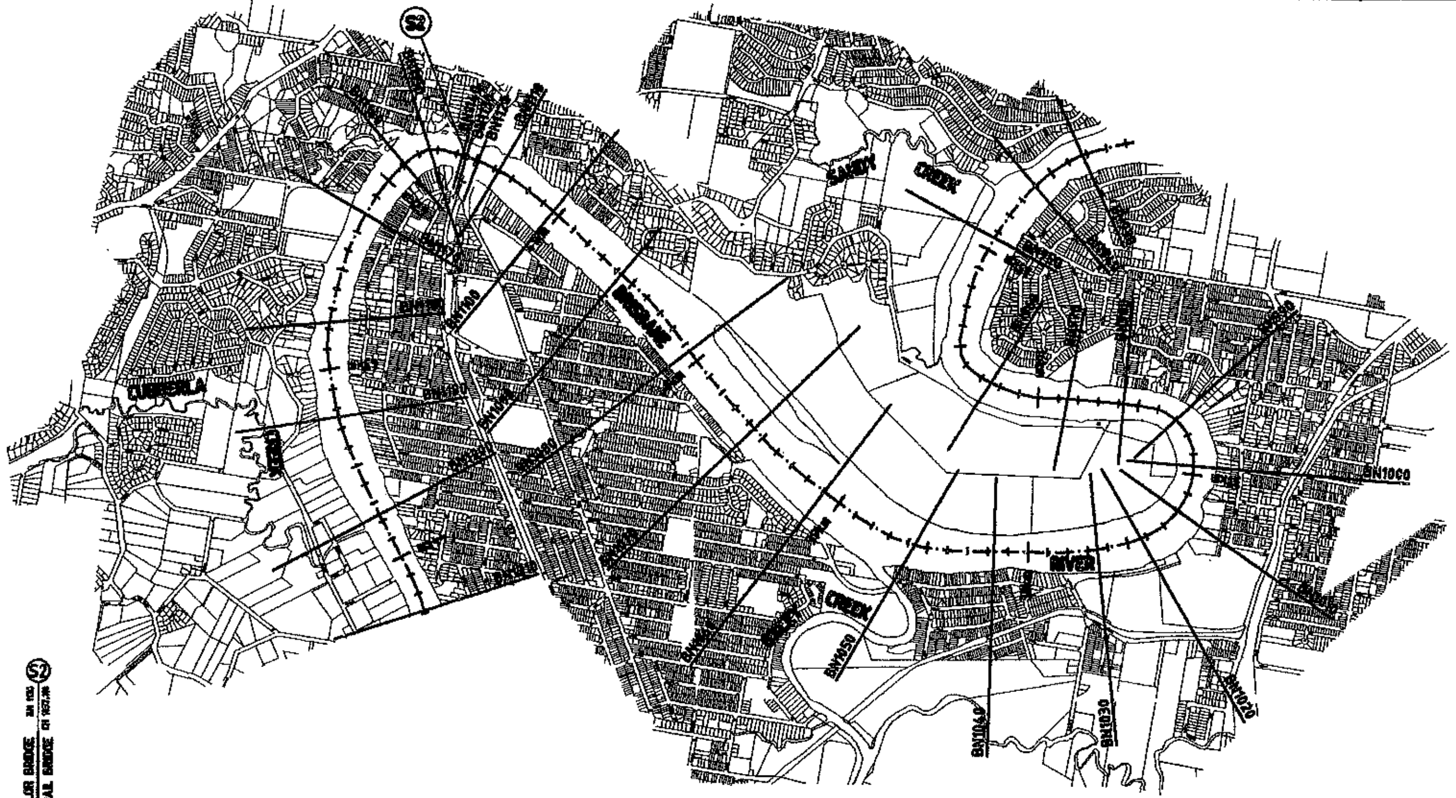
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

FILE NAME: 415.../294 DISK N°: C:\DWG JOB N°: T004157 DATE: 23/.../..
PLOT SCALE: 1=30

FIGURE H-6e

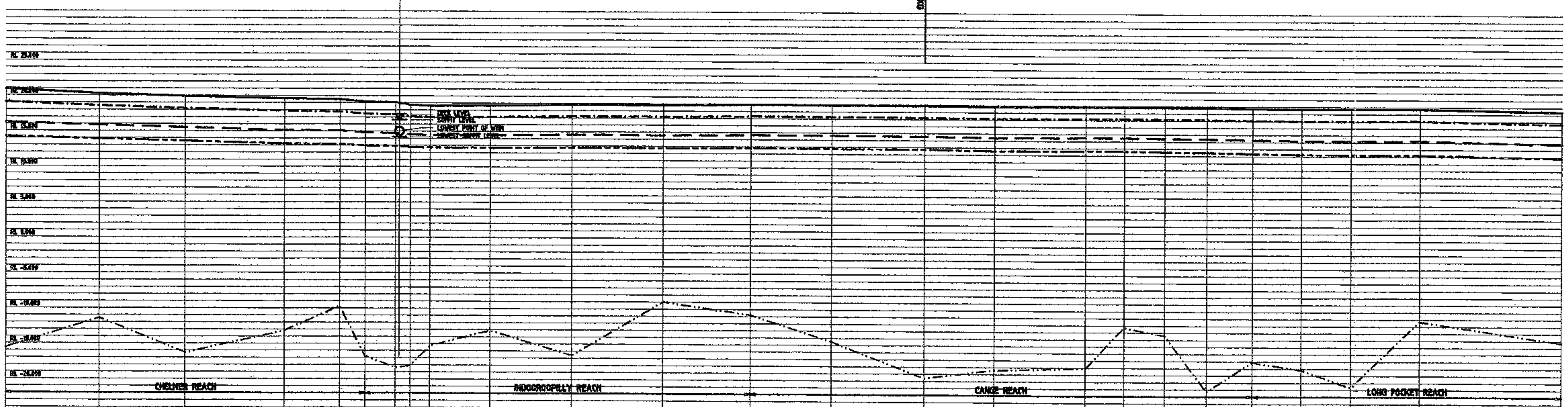
BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2000, 1000, 500, AND 200 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



PLAN VIEW

LEGEND
AMTD LINE
BN 1250 SURVEYED CROSS SECTION
LOCATION AND IDENTIFICATION OF STRUCTURE



DATUM RL. -25.000

200 YEAR ARI DESIGN FLOOD LEVEL	14.320	13.904	13.580	13.270	13.160	12.970	12.920	12.770	12.710
500 YEAR ARI DESIGN FLOOD LEVEL	14.990	15.850	15.500	15.110	15.060	14.810	15.130	14.560	14.470
1000 YEAR ARI DESIGN FLOOD LEVEL	19.860	18.590	18.280	17.640	17.770	17.440	17.350	17.100	17.010
2000 YEAR ARI DESIGN FLOOD LEVEL	20.670	20.350	19.900	19.610	19.500	19.150	19.100	18.720	18.580
BED LEVEL (m AHD)	-15.600	-11.650	-16.300	-17.200	-9.700	-14.800	-18.650	-16.900	-15.300
CROSS SECTION NUMBER	BN 1200	BN 1190	BN 1180	BN 1170	BN 1160	BN 1150	BN 1140	BN 1130	BN 1110
MIKE 11 CHAINAGE (km)	1034.090	1035.414	1035.908	1036.440	1036.770	1036.995	1037.899	1037.115	1037.285
AMTD CHAINAGE (km)	43.770	43.344	42.760	42.240	41.880	41.745	41.570	41.485	41.375

200 YEAR ARI DESIGN FLOOD LEVEL	12.710	12.780	12.750	12.790	12.790	12.720	12.570	12.630
500 YEAR ARI DESIGN FLOOD LEVEL	14.440	15.480	14.570	14.640	14.630	14.560	14.430	14.580
1000 YEAR ARI DESIGN FLOOD LEVEL	17.060	17.220	17.190	17.290	17.260	17.220	17.130	17.190
2000 YEAR ARI DESIGN FLOOD LEVEL	18.660	18.860	18.830	18.940	18.930	18.880	18.810	18.860
BED LEVEL (m AHD)	-13.400	-16.650	-9.300	-10.800	-11.500	-19.600	-18.640	-18.100
CROSS SECTION NUMBER	BN 1100	BN 1090	BN 1080	BN 1070	BN 1060	BN 1050	BN 1040	BN 1030
MIKE 11 CHAINAGE (km)	1037.625	1038.085	1038.440	1039.180	1039.565	1040.010	1040.490	1041.010
AMTD CHAINAGE (km)	41.035	40.575	40.060	39.560	39.450	38.570	38.170	37.560

200 YEAR ARI DESIGN FLOOD LEVEL	12.620	12.530	12.500	12.370	12.260	12.240	12.230	11.860
500 YEAR ARI DESIGN FLOOD LEVEL	14.580	14.440	14.410	14.380	14.210	14.200	14.210	13.850
1000 YEAR ARI DESIGN FLOOD LEVEL	17.190	17.150	17.120	17.050	16.930	16.950	17.030	16.650
2000 YEAR ARI DESIGN FLOOD LEVEL	18.860	18.820	18.810	18.740	18.600	18.720	18.740	18.410
BED LEVEL (m AHD)	-12.500	-13.400	-21.300	-17.100	-18.280	-20.700	-11.300	-14.300
CROSS SECTION NUMBER	BN 1020	BN 1010	BN 1000	BN 990	BN 980	BN 970	BN 960	BN 950
MIKE 11 CHAINAGE (km)	1041.230	1041.440	1041.700	1041.960	1042.235	1042.515	1042.910	1043.725
AMTD CHAINAGE (km)	37.430	37.200	36.960	36.780	36.435	36.165	35.750	34.935

BRISBANE RIVER - BN 1200 TO BN 950

LEGEND
S3 LOCATION AND IDENTIFICATION OF STRUCTURE
2000 YEAR ARI DESIGN FLOOD LEVEL
1000 YEAR ARI DESIGN FLOOD LEVEL
500 YEAR ARI DESIGN FLOOD LEVEL
200 YEAR ARI DESIGN FLOOD LEVEL
EXISTING BED LEVEL

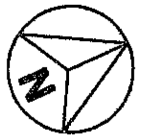
VERT. METRES
HORIZ. KILOMETRES

PLOT SCALE: 1=30

SINCLAIR KNIGHT MERZ

FIGURE H-6f

BRISBANE RIVER FLOOD STUDY
MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2000, 1000, 500, AND 200 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS

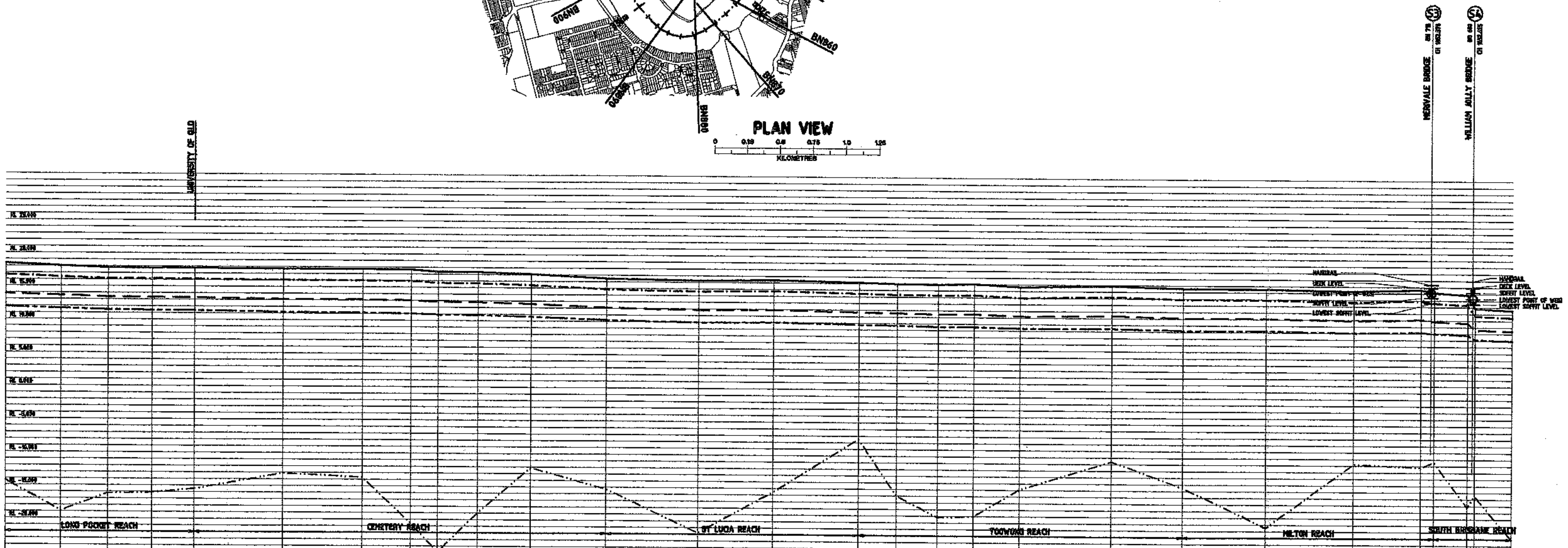


LEGEND

- AMTD LINE
- BN 1250 — SURVEYED CROSS SECTION
- (S3) — LOCATION AND IDENTIFICATION OF STRUCTURE

PLAN VIEW

0 0.25 0.5 0.75 1.0 1.25 KILOMETRES



DATUM RL. -25.000

200 YEAR ARI DESIGN FLOOD LEVEL	11.660	11.650	11.650	11.610	11.380	11.180	11.100	11.020
500 YEAR ARI DESIGN FLOOD LEVEL	13.650	13.590	13.570	13.340	13.510	13.120	13.090	13.010
1000 YEAR ARI DESIGN FLOOD LEVEL	16.490	16.370	16.320	16.100	16.180	16.070	15.980	15.910
2000 YEAR ARI DESIGN FLOOD LEVEL	18.440	18.040	17.770	17.770	17.740	17.720	17.700	17.440
BED LEVEL (m AHD)	-16.380	-18.900	-16.200	-16.100	-15.590	-13.100	-13.780	-20.400
CROSS SECTION NUMBER	BN 950	BN 940	BN 930	BN 920	BN 910	BN 900	BN 890	BN 880
MIKE 11 CHAINAGE (km)	1043.725	1044.060	1044.340	1044.645	1044.960	1045.490	1045.885	1046.180
AMTD CHAINAGE (km)	34.935	34.608	34.330	34.055	33.690	33.260	32.775	32.480

200 YEAR ARI DESIGN FLOOD LEVEL	10.990	10.850	10.640	10.200	9.940	10.030	9.770	9.780
500 YEAR ARI DESIGN FLOOD LEVEL	12.840	12.800	12.570	12.070	11.810	11.920	11.640	11.550
1000 YEAR ARI DESIGN FLOOD LEVEL	15.680	15.640	15.480	14.850	14.610	14.750	14.440	14.350
2000 YEAR ARI DESIGN FLOOD LEVEL	17.360	17.330	17.070	16.480	16.260	16.610	16.120	15.980
BED LEVEL (m AHD)	-24.900	-19.400	-12.100	-15.300	-21.800	-15.400	-7.500	-16.000
CROSS SECTION NUMBER	BN 870	BN 860	BN 850	BN 840	BN 830	BN 820	BN 810	BN 800
MIKE 11 CHAINAGE (km)	1046.340	1046.580	1046.900	1047.350	1047.915	1048.325	1048.890	1049.120
AMTD CHAINAGE (km)	32.320	32.080	31.760	31.310	30.745	30.335	29.770	29.540

200 YEAR ARI DESIGN FLOOD LEVEL	9.540	9.540	9.510	9.420	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
500 YEAR ARI DESIGN FLOOD LEVEL	11.440	11.480	11.210	11.340	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1000 YEAR ARI DESIGN FLOOD LEVEL	14.280	14.350	14.080	14.220	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2000 YEAR ARI DESIGN FLOOD LEVEL	15.940	16.020	15.650	15.890	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
BED LEVEL (m AHD)	-19.200	-19.000	-14.900	-10.600	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CROSS SECTION NUMBER	BN 790	BN 780	BN 770	BN 760	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MIKE 11 CHAINAGE (km)	1049.370	1049.570	1049.970	1050.490	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
AMTD CHAINAGE (km)	29.290	29.090	28.790	28.230	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

LEGEND

- (S3) LOCATION AND IDENTIFICATION OF STRUCTURE
- 2000 YEAR ARI DESIGN FLOOD LEVEL
- 1000 YEAR ARI DESIGN FLOOD LEVEL
- 500 YEAR ARI DESIGN FLOOD LEVEL
- 200 YEAR ARI DESIGN FLOOD LEVEL
- EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

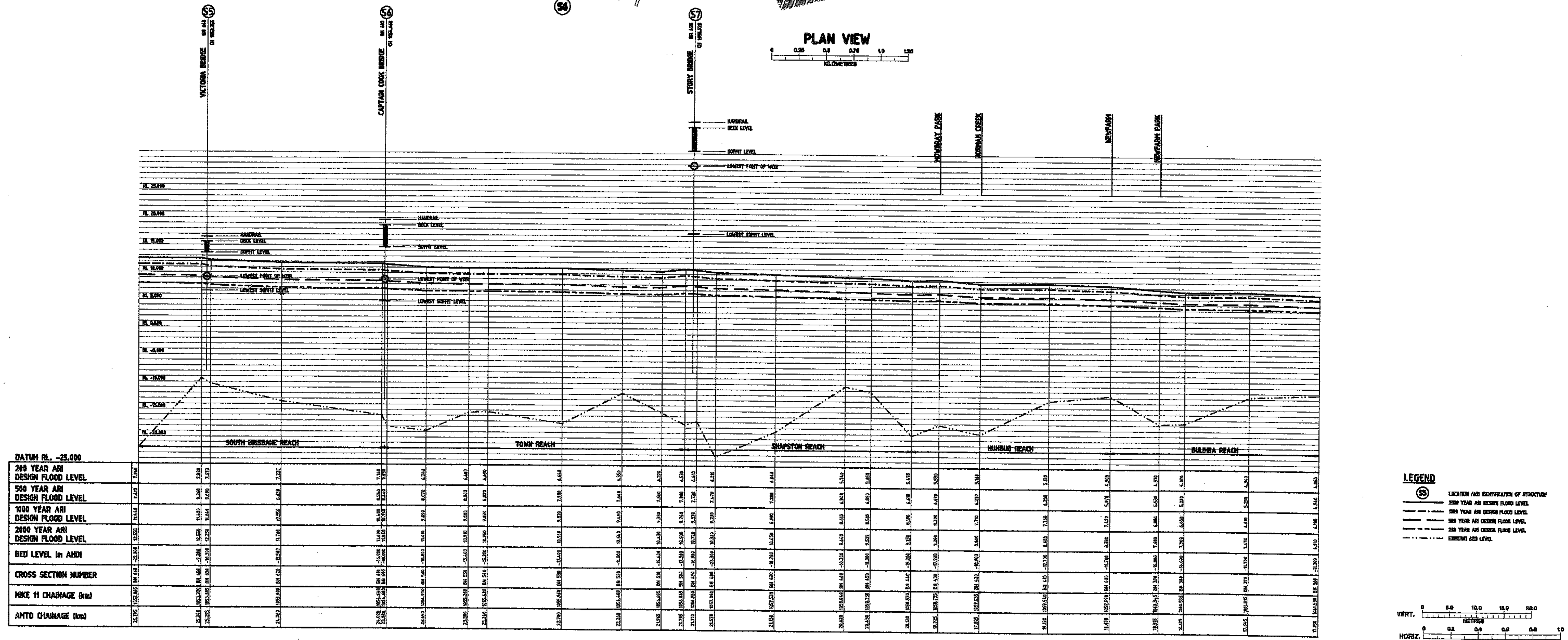
BRISBANE RIVER - BN 950 TO BN 660

FILE NAME: 41... PLOT SCALE: 1=30

BCC.121.0285

FIGURE H-6g

BRISBANE RIVER FLOOD STUDY
MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2000, 1000, 500, AND 200 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS

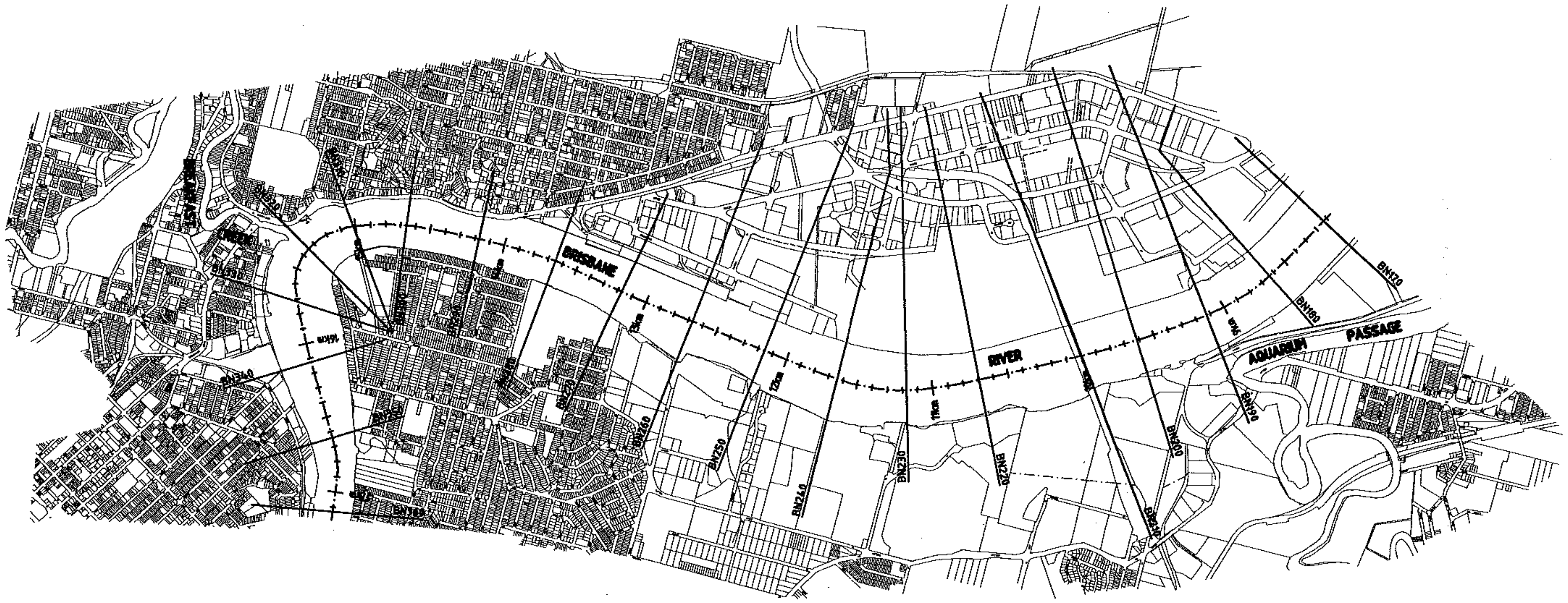


BRISBANE RIVER - BN 660 TO BN 360

FIGURE H-6h

BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2000, 1000, 500, AND 200 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



LEGEND

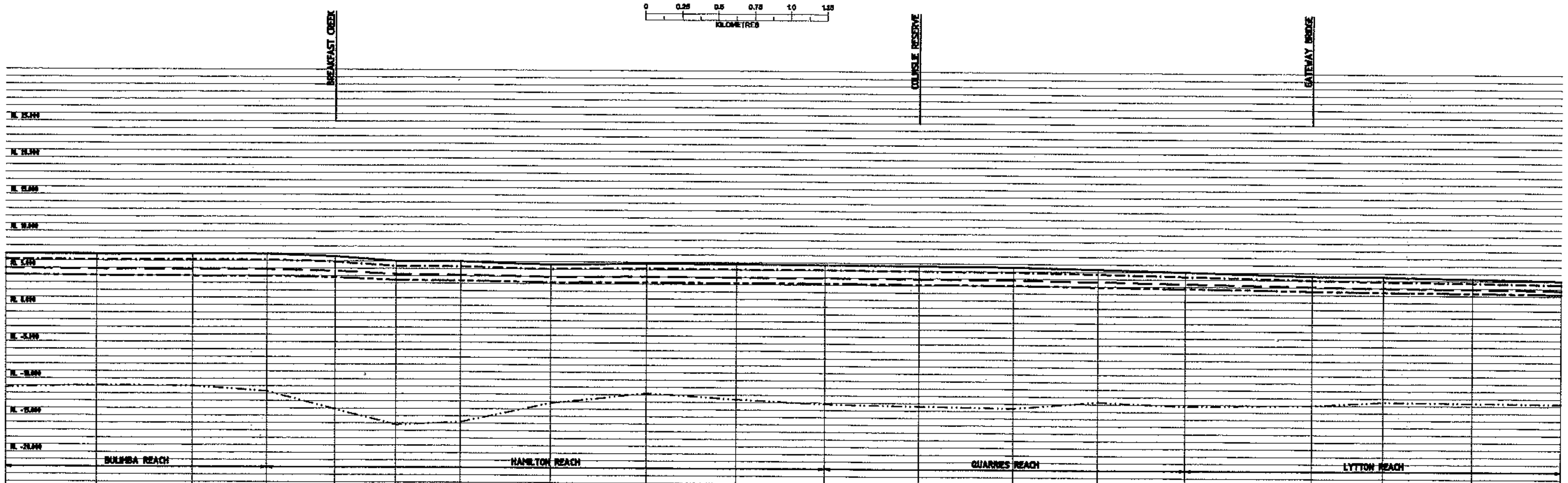
3000 — AMTD LINE

BN 1250 — SURVEYED CROSS SECTION

(S1) LOCATION AND IDENTIFICATION OF STRUCTURE

PLAN VIEW

0 0.25 0.5 0.75 1.0 1.25 KILOMETRES



DATUM RL. -25.000

200 YEAR ARI DESIGN FLOOD LEVEL	4.040	3.990	3.950	3.950	3.790	3.630	3.380	3.270	3.260	3.110	3.210	3.110	3.070	2.930	2.780	2.520	2.420	2.340	2.250
500 YEAR ARI DESIGN FLOOD LEVEL	4.940	4.870	4.850	4.850	4.650	4.290	4.460	3.940	4.030	3.940	3.950	3.850	3.790	3.630	3.410	3.180	2.970	2.880	2.750
1000 YEAR ARI DESIGN FLOOD LEVEL	6.180	6.120	6.130	6.140	5.890	5.320	5.290	5.410	5.150	5.050	5.050	4.960	4.860	4.660	4.440	4.000	3.860	3.720	3.540
2000 YEAR ARI DESIGN FLOOD LEVEL	6.910	6.870	6.900	6.920	6.630	5.980	5.950	5.630	5.810	5.760	5.720	5.640	5.530	5.350	5.410	4.540	4.580	4.280	4.170
BED LEVEL (m AHD)	-11.280	-10.900	-11.400	-11.700	-14.300	-16.280	-15.400	-13.280	-11.800	-12.400	-13.280	-13.400	-13.600	-12.700	-13.280	-13.000	-12.590	-12.640	-12.780
CROSS SECTION NUMBER	BN 360	BN 350	BN 340	BN 330	BN 320	BN 310	BN 300	BN 290	BN 280	BN 270	BN 260	BN 250	BN 240	BN 230	BN 220	BN 210	BN 200	BN 190	BN 180
MIKE 11 CHAINAGE (km)	1061.530	1062.020	1062.535	1062.940	1063.310	1063.445	1064.000	1064.470	1065.030	1065.503	1065.990	1066.505	1067.020	1067.485	1067.985	1068.440	1069.045	1069.535	1070.025
AMTD CHAINAGE (km)	17.130	16.640	16.125	15.720	15.350	15.075	14.440	14.170	13.650	13.157	12.670	12.155	11.640	11.175	10.675	10.400	9.615	9.125	8.635

BRISBANE RIVER - BN 360 TO BN 180

LEGEND

(S5) LOCATION AND IDENTIFICATION OF STRUCTURE

2000 YEAR ARI DESIGN FLOOD LEVEL

1000 YEAR ARI DESIGN FLOOD LEVEL

500 YEAR ARI DESIGN FLOOD LEVEL

200 YEAR ARI DESIGN FLOOD LEVEL

EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

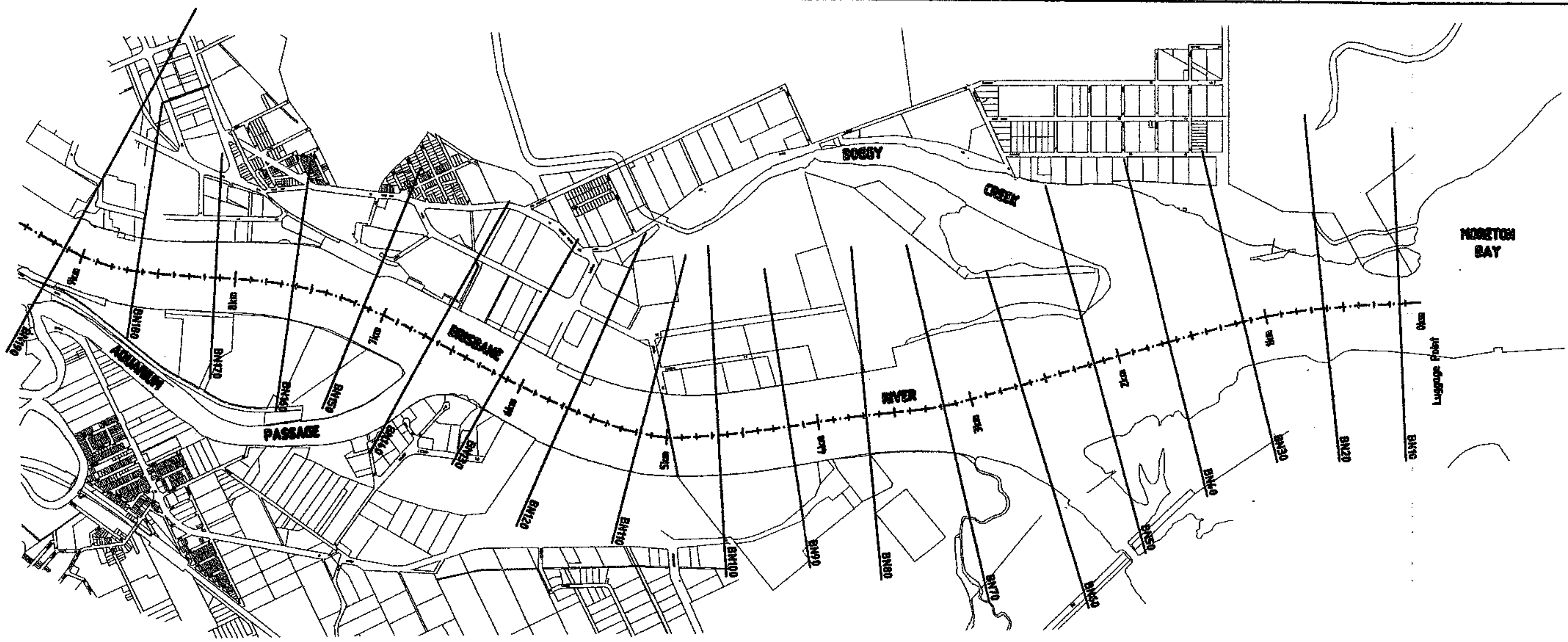
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

PLOT SCALE: 1=30

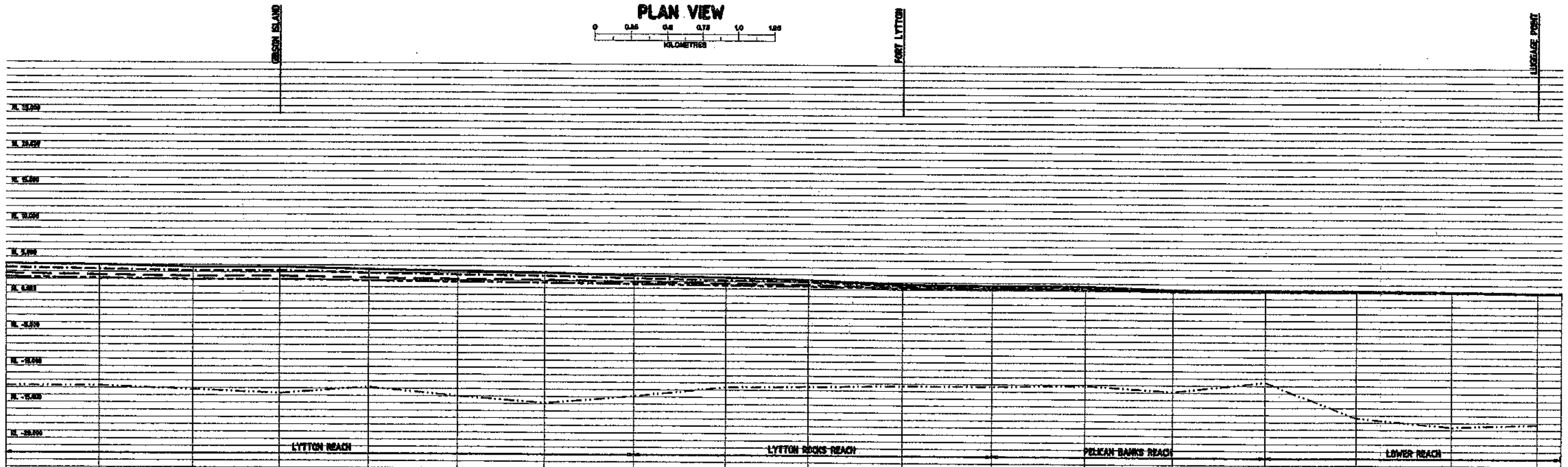
FIGURE H-6i

BRISBANE RIVER FLOOD STUDY

MIKE 11 EXISTING DESIGN FLOOD PROFILES FOR THE 2000, 1000, 500, AND 200 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS



PLAN VIEW



DATUM RL. -25.000																			
200 YEAR ARI DESIGN FLOOD LEVEL	2.258	2.130	1.990	2.040	1.880	1.790	1.730	1.590	1.480	1.310	1.180	1.140	1.050	0.980	0.990	1.000	0.970	0.920	0.920
500 YEAR ARI DESIGN FLOOD LEVEL	2.759	2.570	2.430	2.440	2.270	2.150	2.070	1.880	1.730	1.590	1.310	1.250	1.240	1.010	1.020	1.030	0.990	0.920	0.920
1000 YEAR ARI DESIGN FLOOD LEVEL	3.540	3.350	3.170	3.210	2.960	2.770	2.440	2.350	2.170	1.910	1.540	1.450	1.440	1.180	1.080	1.100	1.040	0.920	0.920
2000 YEAR ARI DESIGN FLOOD LEVEL	4.070	3.990	3.720	3.760	3.440	3.250	3.050	2.770	2.530	2.260	1.750	1.620	1.630	1.150	1.140	1.150	1.070	0.920	0.920
BED LEVEL (m AHD)	-12.700	-12.700	-13.300	-13.700	-12.400	-14.800	-14.900	-13.900	-12.400	-12.500	-12.300	-12.500	-12.100	-12.900	-11.580	-16.470	-17.400	-17.200	
CROSS SECTION NUMBER	BN 180	BN 170	BN 160	BN 150	BN 140	BN 130	BN 120	BN 110	BN 100	BN 90	BN 80	BN 70	BN 60	BN 50	BN 40	BN 30	BN 20	BN 10	-
MIKE 11 CHAINAGE (km)	1970.075	1970.530	1971.040	1971.520	1972.035	1972.515	1972.995	1973.445	1974.000	1974.460	1974.985	1975.480	1976.040	1976.495	1977.010	1977.510	1978.040	1978.525	1978.640
AMTD CHAINAGE (km)	8.635	8.130	7.620	7.144	6.645	6.165	5.665	5.175	4.660	4.200	3.675	3.180	2.640	2.165	1.650	1.150	0.620	0.135	0

BRISBANE RIVER - BN 180 TO BN 10

LEGEND

- LOCATION AND IDENTIFICATION OF STRUCTURE
- 2000 YEAR ARI DESIGN FLOOD LEVEL
- 1000 YEAR ARI DESIGN FLOOD LEVEL
- 500 YEAR ARI DESIGN FLOOD LEVEL
- 200 YEAR ARI DESIGN FLOOD LEVEL
- EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

Appendix I - HEC-RAS Hydraulic Model Results

Table I-1 - HEC-RAS Model Calibration

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	MIKE 11 100 YEAR ARI WL (m AHD)	HEC-RAS 100 YEAR ARI WL (m AHD)	100 YEAR ARI DIFFERENCE (m)	MIKE 11 10 YEAR ARI WL (m AHD)	HEC-RAS 10 YEAR ARI WL (m AHD)	10 YEAR ARI DIFFERENCE (m)
BRISBANE	1000	78.66	BN 2020		22.76	22.58	-0.18	7.25	7.14	-0.11
BRISBANE	1000.285	78.375	BN 2010		22.57	22.38	-0.19	7.16	7.04	-0.12
BRISBANE	1000.775	77.885	BN 2000		22.29	22.13	-0.16	7.00	6.91	-0.09
BRISBANE	1001.315	77.345	BN 1990		22.20	22.07	-0.13	6.86	6.77	-0.09
BRISBANE	1001.865	76.795	BN 1980		21.68	21.39	-0.29	6.64	6.51	-0.13
BRISBANE	1002.35	76.310	BN 1970		21.48	21.28	-0.20	6.42	6.33	-0.09
BRISBANE	1002.785	75.875	BN 1960		21.46	21.25	-0.21	6.34	6.25	-0.09
BRISBANE	1003.275	75.385	BN 1950		21.13	20.93	-0.20	6.16	6.08	-0.08
BRISBANE	1003.775	74.885	BN 1940		20.86	20.67	-0.19	5.97	5.89	-0.08
BRISBANE	1004.3	74.360	BN 1930		20.41	20.19	-0.22	5.75	5.65	-0.10
BRISBANE	1004.81	73.850	BN 1920		20.37	20.21	-0.16	5.63	5.53	-0.10
BRISBANE	1005.325	73.335	BN 1910		20.20	20.04	-0.16	5.47	5.35	-0.12
BRISBANE	1005.87	72.790	BN 1900		19.89	19.67	-0.22	5.25	5.09	-0.16
BRISBANE	1006.3	72.360	BN 1890	Moggill Gauge	19.72	19.55	-0.17	5.18	5.01	-0.17
BRISBANE	1006.91	71.750	BN 1880		19.51	19.38	-0.13	5.06	4.90	-0.16
BRISBANE	1007.41	71.250	BN 1870		19.48	19.34	-0.14	4.97	4.82	-0.15
BRISBANE	1007.92	70.740	BN 1860		19.19	18.99	-0.20	4.85	4.70	-0.15
BRISBANE	1008.445	70.215	BN 1850		19.02	18.89	-0.13	4.78	4.66	-0.12
BRISBANE	1008.925	69.735	BN 1840		18.96	18.85	-0.11	4.74	4.62	-0.12
BRISBANE	1009.4	69.260	BN 1830		18.86	18.74	-0.12	4.70	4.59	-0.11
BRISBANE	1009.72	68.940	BN 1820		18.85	18.72	-0.13	4.67	4.55	-0.12
BRISBANE	1010.49	68.170	BN 1810		18.50	18.39	-0.11	4.59	4.48	-0.11
BRISBANE	1010.725	67.935	BN 1800		18.52	18.37	-0.15	4.58	4.48	-0.10
BRISBANE	1010.98	67.680	BN 1790		18.44	18.34	-0.10	4.56	4.46	-0.10
BRISBANE	1011.51	67.150	BN 1780		18.43	18.33	-0.10	4.52	4.42	-0.10
BRISBANE	1011.98	66.680	BN 1770		18.43	18.30	-0.13	4.48	4.39	-0.09
BRISBANE	1012.475	66.185	BN 1760		18.33	18.21	-0.12	4.42	4.34	-0.08
BRISBANE	1012.935	65.725	BN 1750		18.22	18.15	-0.07	4.38	4.30	-0.08
BRISBANE	1013.445	65.215	BN 1740		18.14	18.07	-0.07	4.33	4.26	-0.07
BRISBANE	1013.91	64.750	BN 1730		18.08	18.06	-0.02	4.27	4.20	-0.07
BRISBANE	1014.31	64.350	BN 1720		18.05	17.99	-0.06	4.22	4.16	-0.06
BRISBANE	1014.61	64.050	BN 1710	Goodna Hospital Gauge	18.08	18.02	-0.06	4.18	4.13	-0.05
BRISBANE	1015.09	63.570	BN 1700		17.94	17.82	-0.12	4.17	4.12	-0.05
BRISBANE	1015.56	63.100	BN 1690		17.81	17.66	-0.15	4.13	4.08	-0.05
BRISBANE	1016.14	62.520	BN 1680		17.71	17.59	-0.12	4.09	4.04	-0.05
BRISBANE	1016.64	62.020	BN 1670		17.62	17.60	-0.02	4.01	3.97	-0.04
BRISBANE	1017.13	61.530	BN 1660		17.39	17.31	-0.08	3.87	3.81	-0.06
BRISBANE	1017.61	61.050	BN 1650		17.26	17.17	-0.09	3.77	3.72	-0.05
BRISBANE	1017.92	60.740	BN 1640		17.10	17.02	-0.08	3.69	3.66	-0.03
BRISBANE	1018.2	60.460	BN 1630		17.02	16.98	-0.04	3.67	3.63	-0.04
BRISBANE	1018.725	59.935	BN 1620		16.69	16.61	-0.08	3.60	3.55	-0.05
BRISBANE	1019.095	59.565	BN 1610		16.56	16.53	-0.03	3.54	3.50	-0.04
BRISBANE	1019.49	59.170	BN 1600		16.45	16.46	0.01	3.48	3.45	-0.03
BRISBANE	1019.865	58.795	BN 1590		16.15	16.14	-0.01	3.43	3.38	-0.05
BRISBANE	1020.115	58.545	BN 1580		16.25	16.21	-0.04	3.40	3.35	-0.05
BRISBANE	1020.525	58.135	BN 1570		16.22	16.20	-0.02	3.36	3.32	-0.04
BRISBANE	1020.83	57.830	BN 1560		16.07	16.03	-0.04	3.32	3.29	-0.03
BRISBANE	1021.095	57.565	BN 1550		15.86	15.79	-0.07	3.27	3.23	-0.04
BRISBANE	1021.539	57.121	BN 1540		15.69	15.66	-0.03	3.19	3.17	-0.02
BRISBANE	1021.715	56.945	BN 1530		15.72	15.66	-0.06	3.17	3.14	-0.03
BRISBANE	1021.895	56.765	BN 1520		15.65	15.61	-0.04	3.15	3.12	-0.03
BRISBANE	1022.105	56.555	BN 1510		15.53	15.49	-0.04	3.15	3.11	-0.04
BRISBANE	1022.575	56.085	BN 1500		15.45	15.43	-0.02	3.10	3.06	-0.04
BRISBANE	1023.04	55.620	BN 1490		15.21	15.12	-0.09	3.07	3.01	-0.06
BRISBANE	1023.57	55.090	BN 1480		15.12	15.05	-0.07	3.05	2.98	-0.07
BRISBANE	1024.08	54.580	BN 1470		15.07	14.98	-0.09	3.02	2.94	-0.08
BRISBANE	1024.563	54.097	BN 1460		15.01	14.95	-0.06	2.97	2.90	-0.07
BRISBANE	1025.07	53.590	BN 1450		14.91	14.87	-0.04	2.93	2.86	-0.07
BRISBANE	1025.36	53.300	BN 1440		14.77	14.70	-0.07	2.89	2.82	-0.07
BRISBANE	1025.59	53.070	BN 1430		14.61	14.53	-0.08	2.85	2.78	-0.07
BRISBANE	1026.17	52.490	BN 1420		14.48	14.43	-0.05	2.83	2.74	-0.09
BRISBANE	1026.68	51.980	BN 1410	Mt Ommaney Gauge	14.38	14.32	-0.06	2.78	2.69	-0.09
BRISBANE	1026.9	51.760	BN 1400		14.25	14.20	-0.05	2.75	2.67	-0.08
BRISBANE	1027.16	51.500	BN 1390		14.11	14.08	-0.03	2.73	2.65	-0.08
BRISBANE	1027.68	50.980	BN 1380		14.17	14.15	-0.02	2.71	2.63	-0.08
BRISBANE	1028.18	50.480	BN 1370		14.19	14.15	-0.04	2.70	2.62	-0.08
BRISBANE	1028.68	49.980	BN 1360		14.06	14.01	-0.05	2.67	2.60	-0.07
BRISBANE	1028.72	49.940	BN1350	Centenary Bridge						
BRISBANE	1028.76	49.900	BN 1340		13.91	13.96	0.05	2.63	2.58	-0.05
BRISBANE	1029.2	49.460	BN 1330		13.80	13.82	0.02	2.60	2.56	-0.04
BRISBANE	1029.68	48.980	BN 1320		13.82	13.81	-0.01	2.60	2.55	-0.05
BRISBANE	1030.22	48.440	BN 1310		13.82	13.85	0.03	2.58	2.54	-0.04
BRISBANE	1030.87	47.790	BN 1300		13.75	13.80	0.05	2.56	2.52	-0.04
BRISBANE	1031.26	47.400	BN 1290		13.59	13.64	0.05	2.54	2.50	-0.04
BRISBANE	1031.7	46.960	BN 1280	Darra Wharf Gauge	13.21	13.27	0.06	2.47	2.44	-0.03
BRISBANE	1031.995	46.665	BN 1270		13.31	13.28	-0.03	2.44	2.40	-0.04

Table I-1 - HEC-RAS Model Calibration

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	MIKE 11 100 YEAR ARI WL (m AHD)	HEC-RAS 100 YEAR ARI WL (m AHD)	100 YEAR ARI DIFFERENCE (m)	MIKE 11 10 YEAR ARI WL (m AHD)	HEC-RAS 10 YEAR ARI WL (m AHD)	10 YEAR ARI DIFFERENCE (m)
BRISBANE	1032.23	46.430	BN 1260		13.18	13.21	0.03	2.41	2.38	-0.03
BRISBANE	1032.585	46.075	BN 1250		12.94	12.97	0.03	2.37	2.34	-0.03
BRISBANE	1033.08	45.580	BN 1240		12.79	12.84	0.05	2.34	2.31	-0.03
BRISBANE	1033.37	45.290	BN 1230		12.68	12.76	0.08	2.31	2.28	-0.03
BRISBANE	1033.9	44.760	BN 1220		12.45	12.55	0.10	2.28	2.24	-0.04
BRISBANE	1034.37	44.290	BN 1210		12.29	12.42	0.13	2.25	2.22	-0.03
BRISBANE	1034.89	43.770	BN 1200	Sherwood Gauge	12.19	12.31	0.12	2.22	2.19	-0.03
BRISBANE	1035.414	43.246	BN 1190		11.94	12.11	0.17	2.16	2.14	-0.02
BRISBANE	1035.9	42.760	BN 1180		11.65	11.80	0.15	2.10	2.08	-0.02
BRISBANE	1036.46	42.200	BN 1170		11.35	11.58	0.23	2.05	2.03	-0.02
BRISBANE	1036.77	41.890	BN 1160		11.28	11.52	0.24	2.02	1.99	-0.03
BRISBANE	1036.915	41.745	BN 1150		11.12	11.37	0.25	2.00	1.98	-0.02
BRISBANE	1037.09	41.570	BN 1140		11.07	11.18	0.11	2.00	1.96	-0.04
BRISBANE	1037.11	41.550	BN 1130	Indooroopilly Bridge						
BRISBANE	1037.175	41.485	BN 1120		10.98	11.08	0.10	1.94	1.95	0.01
BRISBANE	1037.285	41.375	BN 1110	Clarence Road Gauge	10.93	11.10	0.17	1.93	1.95	0.02
BRISBANE	1037.625	41.035	BN 1100		10.91	11.07	0.16	1.91	1.93	0.02
BRISBANE	1038.085	40.575	BN 1090		10.93	11.08	0.15	1.90	1.93	0.03
BRISBANE	1038.6	40.060	BN 1080		10.91	11.07	0.16	1.88	1.90	0.02
BRISBANE	1039.1	39.560	BN 1070		10.90	11.05	0.15	1.86	1.89	0.03
BRISBANE	1039.565	39.095	BN 1060	Oxley Creek Gauge	10.92	11.04	0.12	1.85	1.88	0.03
BRISBANE	1040.09	38.570	BN 1050	King Authur Terrace Gauge	10.84	10.99	0.15	1.86	1.88	0.02
BRISBANE	1040.49	38.170	BN 1040		10.71	10.81	0.10	1.84	1.86	0.02
BRISBANE	1041.01	37.650	BN 1030		10.74	10.84	0.10	1.84	1.86	0.02
BRISBANE	1041.23	37.430	BN 1020		10.71	10.80	0.09	1.83	1.85	0.02
BRISBANE	1041.46	37.200	BN 1010	Tennyson Power House Gaug	10.62	10.71	0.09	1.81	1.84	0.03
BRISBANE	1041.7	36.960	BN 1000		10.59	10.68	0.09	1.81	1.83	0.02
BRISBANE	1041.96	36.700	BN 990	Yeronga Street Gauge	10.45	10.49	0.04	1.79	1.81	0.02
BRISBANE	1042.235	36.425	BN 980		10.30	10.26	-0.04	1.77	1.79	0.02
BRISBANE	1042.515	36.145	BN 970		10.29	10.20	-0.09	1.77	1.78	0.01
BRISBANE	1042.91	35.750	BN 960		10.22	10.03	-0.19	1.74	1.75	0.01
BRISBANE	1043.725	34.935	BN 950		9.91	9.80	-0.11	1.67	1.70	0.03
BRISBANE	1044.06	34.600	BN 940	Sandy Creek Gauge	9.75	9.70	-0.05	1.66	1.69	0.03
BRISBANE	1044.34	34.320	BN 930		9.58	9.52	-0.06	1.64	1.66	0.02
BRISBANE	1044.605	34.055	BN 920		9.53	9.44	-0.09	1.63	1.65	0.02
BRISBANE	1044.86	33.800	BN 910		9.49	9.37	-0.12	1.61	1.64	0.03
BRISBANE	1045.4	33.260	BN 900		9.31	9.22	-0.09	1.58	1.60	0.02
BRISBANE	1045.885	32.775	BN 890		9.17	9.05	-0.12	1.54	1.56	0.02
BRISBANE	1046.18	32.480	BN 880		9.09	8.99	-0.10	1.54	1.56	0.02
BRISBANE	1046.34	32.320	BN 870	Dutton Park Cemetery Gauge	9.02	8.92	-0.10	1.53	1.55	0.02
BRISBANE	1046.58	32.080	BN 860		8.97	8.88	-0.09	1.53	1.55	0.02
BRISBANE	1046.9	31.760	BN 850		8.78	8.69	-0.09	1.50	1.52	0.02
BRISBANE	1047.35	31.310	BN 840		8.41	8.34	-0.07	1.46	1.48	0.02
BRISBANE	1047.915	30.745	BN 830	Highgate Hill Gauge	8.17	8.17	0.00	1.43	1.46	0.03
BRISBANE	1048.375	30.285	BN 820		8.23	8.22	-0.01	1.43	1.46	0.03
BRISBANE	1048.89	29.770	BN 810	St Lucia Ferry Gauge	8.00	8.00	0.00	1.40	1.42	0.02
BRISBANE	1049.12	29.540	BN 800		7.94	7.96	0.02	1.39	1.42	0.03
BRISBANE	1049.37	29.290	BN 790		7.75	7.77	0.02	1.37	1.40	0.03
BRISBANE	1049.59	29.070	BN 780		7.74	7.75	0.01	1.37	1.40	0.03
BRISBANE	1049.87	28.790	BN 770		7.63	7.66	0.03	1.36	1.39	0.03
BRISBANE	1050.43	28.230	BN 760		7.61	7.62	0.01	1.35	1.37	0.02
BRISBANE	1050.86	27.800	BN 750		7.46	7.50	0.04	1.34	1.36	0.02
BRISBANE	1051.36	27.300	BN 740		7.46	7.49	0.03	1.34	1.36	0.02
BRISBANE	1051.895	26.765	BN 730		7.30	7.29	-0.01	1.31	1.34	0.03
BRISBANE	1052.31	26.350	BN 720		7.40	7.27	-0.13	1.32	1.33	0.01
BRISBANE	1052.37	26.290	BN 710	Merivale Bridge						
BRISBANE	1052.39	26.270	BN 700		7.23	7.11	-0.12	1.30	1.32	0.02
BRISBANE	1052.595	26.065	BN 690		7.14	7.04	-0.10	1.30	1.31	0.01
BRISBANE	1052.607	26.053	BN 680	William Jolly Bridge						
BRISBANE	1052.64	26.020	BN 670		6.63	6.49	-0.14	1.28	1.28	0.00
BRISBANE	1052.865	25.795	BN 660	Montague Road Gauge	6.49	6.38	-0.11	1.28	1.27	-0.01
BRISBANE	1053.32	25.340	BN 650		6.42	6.21	-0.21	1.26	1.25	-0.01
BRISBANE	1053.356	25.304	BN 640	Victoria Bridge						
BRISBANE	1053.385	25.275	BN630		6.24	6.13	-0.11	1.24	1.23	-0.01
BRISBANE	1053.9	24.760	BN 620		5.85	5.79	-0.06	1.20	1.19	-0.01
BRISBANE	1054.64	24.020	BN 610		5.78	5.70	-0.08	1.19	1.18	-0.01
BRISBANE	1054.66	24.000	BN 600	Captain Cook Bridge						
BRISBANE	1054.68	23.980	BN 590		5.70	5.61	-0.09	1.18	1.17	-0.01
BRISBANE	1054.97	23.690	BN 560		5.45	5.29	-0.16	1.16	1.15	-0.01
BRISBANE	1055.28	23.380	BN 550		5.40	5.28	-0.12	1.16	1.15	-0.01
BRISBANE	1055.42	23.240	BN 540		5.40	5.27	-0.13	1.16	1.15	-0.01
BRISBANE	1055.96	22.700	BN 530	Port Office Gauge	5.34	5.27	-0.07	1.15	1.15	0.00
BRISBANE	1056.4	22.260	BN 520		5.09	5.06	-0.03	1.13	1.13	0.00
BRISBANE	1056.695	21.965	BN 510		5.03	5.05	0.02	1.13	1.13	0.00
BRISBANE	1056.865	21.795	BN 500		5.22	4.99	-0.23	1.14	1.13	-0.01
BRISBANE	1056.92	21.740	BN 495	Story Bridge						

Table I-1 - HEC-RAS Model Calibration

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	MIKE 11 100 YEAR ARI WL (m AHD)	HEC-RAS 100 YEAR ARI WL (m AHD)	100 YEAR ARI DIFFERENCE (m)	MIKE 11 10 YEAR ARI WL (m AHD)	HEC-RAS 10 YEAR ARI WL (m AHD)	10 YEAR ARI DIFFERENCE (m)
BRISBANE	1056.95	21.710	BN 490		5.12	4.96	-0.16	1.13	1.13	0.00
BRISBANE	1057.09	21.570	BN 480		4.97	4.90	-0.07	1.12	1.12	0.00
BRISBANE	1057.53	21.130	BN 470		4.83	4.77	-0.06	1.12	1.11	-0.01
BRISBANE	1058.04	20.620	BN 460		4.58	4.52	-0.06	1.10	1.10	0.00
BRISBANE	1058.23	20.430	BN 450		4.50	4.45	-0.05	1.09	1.09	0.00
BRISBANE	1058.53	20.130	BN 440		4.37	4.33	-0.04	1.09	1.08	-0.01
BRISBANE	1058.735	19.925	BN 430		4.41	4.32	-0.09	1.09	1.08	-0.01
BRISBANE	1059.035	19.625	BN 420		4.13	4.07	-0.06	1.07	1.07	0.00
BRISBANE	1059.54	19.120	BN 410		4.09	4.02	-0.07	1.07	1.06	-0.01
BRISBANE	1059.99	18.670	BN 400		3.88	3.86	-0.02	1.05	1.05	0.00
BRISBANE	1060.345	18.315	BN 390		3.65	3.63	-0.02	1.04	1.04	0.00
BRISBANE	1060.535	18.125	BN 380		3.50	3.49	-0.01	1.03	1.03	0.00
BRISBANE	1061.015	17.645	BN 370		3.45	3.45	0.00	1.03	1.03	0.00
BRISBANE	1061.53	17.130	BN 360		3.24	3.25	0.01	1.02	1.02	0.00
BRISBANE	1062.02	16.640	BN 350		3.16	3.19	0.03	1.01	1.01	0.00
BRISBANE	1062.535	16.125	BN 340		3.12	3.15	0.03	1.01	1.01	0.00
BRISBANE	1062.94	15.720	BN 330		3.11	3.15	0.04	1.01	1.01	0.00
BRISBANE	1063.31	15.350	BN 320	Newstead Park Gauge	2.99	3.04	0.05	1.00	1.00	0.00
BRISBANE	1063.645	15.015	BN 310	Cresent Road Gauge	2.72	2.70	-0.02	0.99	0.99	0.00
BRISBANE	1064	14.660	BN 300		2.68	2.68	0.00	0.99	0.99	0.00
BRISBANE	1064.49	14.170	BN 290		2.55	2.56	0.01	0.98	0.98	0.00
BRISBANE	1065.01	13.650	BN 280		2.57	2.58	0.01	0.98	0.98	0.00
BRISBANE	1065.503	13.157	BN 270		2.53	2.56	0.03	0.98	0.98	0.00
BRISBANE	1065.99	12.670	BN 260	Cairncross Dock Gauge	2.54	2.56	0.02	0.98	0.98	0.00
BRISBANE	1066.505	12.155	BN 250		2.46	2.48	0.02	0.98	0.98	0.00
BRISBANE	1067.02	11.640	BN 240		2.43	2.45	0.02	0.98	0.98	0.00
BRISBANE	1067.485	11.175	BN 230		2.32	2.34	0.02	0.97	0.97	0.00
BRISBANE	1067.965	10.695	BN 220		2.20	2.23	0.03	0.97	0.97	0.00
BRISBANE	1068.66	10.000	BN 210		2.02	2.05	0.03	0.96	0.96	0.00
BRISBANE	1069.045	9.615	BN 200		1.95	1.98	0.03	0.96	0.96	0.00
BRISBANE	1069.535	9.125	BN 190	Bulimba Power House Gauge	1.89	1.92	0.03	0.95	0.95	0.00
BRISBANE	1070.025	8.635	BN 180		1.82	1.87	0.05	0.95	0.95	0.00
BRISBANE	1070.53	8.130	BN 170		1.72	1.78	0.06	0.95	0.95	0.00
BRISBANE	1071.04	7.620	BN 160		1.64	1.71	0.07	0.94	0.94	0.00
BRISBANE	1071.52	7.140	BN 150		1.67	1.73	0.06	0.94	0.95	0.01
BRISBANE	1072.015	6.645	BN 140		1.56	1.62	0.06	0.94	0.94	0.00
BRISBANE	1072.515	6.145	BN 130		1.50	1.57	0.07	0.94	0.94	0.00
BRISBANE	1072.995	5.665	BN 120		1.46	1.53	0.07	0.94	0.94	0.00
BRISBANE	1073.485	5.175	BN 110		1.36	1.44	0.08	0.93	0.93	0.00
BRISBANE	1074	4.660	BN 100		1.29	1.38	0.09	0.93	0.93	0.00
BRISBANE	1074.46	4.200	BN 90		1.22	1.32	0.10	0.93	0.93	0.00
BRISBANE	1074.985	3.675	BN 80		1.09	1.19	0.10	0.93	0.93	0.00
BRISBANE	1075.48	3.180	BN 70		1.06	1.14	0.08	0.92	0.92	0.00
BRISBANE	1076	2.660	BN 60		1.07	1.15	0.08	0.92	0.92	0.00
BRISBANE	1076.495	2.165	BN 50		0.96	1.04	0.08	0.92	0.92	0.00
BRISBANE	1077.01	1.650	BN 40		0.96	1.02	0.06	0.92	0.92	0.00
BRISBANE	1077.51	1.150	BN 30		0.97	1.03	0.06	0.92	0.92	0.00
BRISBANE	1078.04	0.620	BN 20		0.95	1.01	0.06	0.92	0.92	0.00
BRISBANE	1078.525	0.135	BN 10		0.92	0.92	0.00	0.92	0.92	0.00
BRISBANE	1078.66	0.000	-	Western Inner Bar Gauge	0.92	0.92	0.00	0.92	0.92	0.00

Table I-2 - Comparison of MIKE 11 & HEC-RAS Mannings n Roughness

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	MIKE 11 MANNINGS COEFFICIENT CHANNEL	HEC-RAS MANNINGS COEFFICIENT CHANNEL	RATIO CHANNEL	MIKE 11 MANNINGS COEFFICIENT BANKS	HEC-RAS MANNINGS COEFFICIENT BANKS	RATIO BANKS
BRISBANE	1000	78.66	BN 2020		0.075	0.0637	0.85	0.180	0.153	0.85
BRISBANE	1000.285	78.375	BN 2010		0.075	0.0637	0.85	0.158	0.134	0.85
BRISBANE	1000.775	77.885	BN 2000		0.070	0.0595	0.85	0.147	0.125	0.85
BRISBANE	1001.315	77.345	BN 1990		0.070	0.0595	0.85	0.147	0.125	0.85
BRISBANE	1001.865	76.795	BN 1980		0.070	0.0595	0.85	0.175	0.149	0.85
BRISBANE	1002.35	76.310	BN 1970		0.065	0.0552	0.85	0.104	0.088	0.85
BRISBANE	1002.785	75.875	BN 1960		0.065	0.0552	0.85	0.104	0.088	0.85
BRISBANE	1003.275	75.385	BN 1950		0.075	0.0637	0.85	0.120	0.102	0.85
BRISBANE	1003.775	74.885	BN 1940		0.075	0.0637	0.85	0.150	0.128	0.85
BRISBANE	1004.3	74.360	BN 1930		0.075	0.0637	0.85	0.150	0.128	0.85
BRISBANE	1004.81	73.850	BN 1920		0.075	0.0637	0.85	0.150	0.128	0.85
BRISBANE	1005.325	73.335	BN 1910		0.070	0.0595	0.85	0.168	0.143	0.85
BRISBANE	1005.87	72.790	BN 1900		0.075	0.0637	0.85	0.180	0.153	0.85
BRISBANE	1006.3	72.360	BN 1890	Moggill Gauge	0.075	0.0637	0.85	0.180	0.153	0.85
BRISBANE	1006.91	71.750	BN 1880		0.075	0.0637	0.85	0.180	0.153	0.85
BRISBANE	1007.41	71.250	BN 1870		0.050	0.0425	0.85	0.120	0.102	0.85
BRISBANE	1007.92	70.740	BN 1860		0.070	0.0595	0.85	0.210	0.179	0.85
BRISBANE	1008.445	70.215	BN 1850		0.050	0.0425	0.85	0.165	0.140	0.85
BRISBANE	1008.925	69.735	BN 1840		0.050	0.0425	0.85	0.170	0.145	0.85
BRISBANE	1009.4	69.260	BN 1830		0.050	0.0425	0.85	0.170	0.145	0.85
BRISBANE	1009.72	68.940	BN 1820		0.050	0.0425	0.85	0.170	0.145	0.85
BRISBANE	1010.49	68.170	BN 1810		0.050	0.0425	0.85	0.170	0.145	0.85
BRISBANE	1010.725	67.935	BN 1800		0.050	0.0425	0.85	0.170	0.145	0.85
BRISBANE	1010.98	67.680	BN 1790		0.050	0.0425	0.85	0.170	0.145	0.85
BRISBANE	1011.51	67.150	BN 1780		0.050	0.0425	0.85	0.170	0.145	0.85
BRISBANE	1011.98	66.680	BN 1770		0.055	0.0467	0.85	0.187	0.159	0.85
BRISBANE	1012.475	66.185	BN 1760		0.055	0.0467	0.85	0.187	0.159	0.85
BRISBANE	1012.935	65.725	BN 1750		0.055	0.0467	0.85	0.187	0.159	0.85
BRISBANE	1013.445	65.215	BN 1740		0.055	0.0467	0.85	0.187	0.159	0.85
BRISBANE	1013.91	64.750	BN 1730		0.055	0.0467	0.85	0.187	0.159	0.85
BRISBANE	1014.31	64.350	BN 1720		0.055	0.0467	0.85	0.187	0.159	0.85
BRISBANE	1014.61	64.050	BN 1710	Goodna Hospital Gauge	0.055	0.0467	0.85	0.187	0.159	0.85
BRISBANE	1015.09	63.570	BN 1700		0.055	0.0467	0.85	0.165	0.140	0.85
BRISBANE	1015.56	63.100	BN 1690		0.055	0.0467	0.85	0.143	0.122	0.85
BRISBANE	1016.14	62.520	BN 1680		0.055	0.0467	0.85	0.176	0.150	0.85
BRISBANE	1016.64	62.020	BN 1670		0.055	0.0467	0.85	0.187	0.159	0.85
BRISBANE	1017.13	61.530	BN 1660		0.070	0.0595	0.85	0.238	0.202	0.85
BRISBANE	1017.61	61.050	BN 1650		0.070	0.0595	0.85	0.238	0.202	0.85
BRISBANE	1017.92	60.740	BN 1640		0.070	0.0595	0.85	0.238	0.202	0.85
BRISBANE	1018.2	60.460	BN 1630		0.075	0.0637	0.85	0.255	0.217	0.85
BRISBANE	1018.725	59.935	BN 1620		0.075	0.0637	0.85	0.255	0.217	0.85
BRISBANE	1019.095	59.565	BN 1610		0.075	0.0637	0.85	0.255	0.217	0.85
BRISBANE	1019.49	59.170	BN 1600		0.075	0.0637	0.85	0.255	0.217	0.85
BRISBANE	1019.865	58.795	BN 1590		0.075	0.0637	0.85	0.255	0.217	0.85
BRISBANE	1020.115	58.545	BN 1580		0.075	0.0637	0.85	0.255	0.217	0.85
BRISBANE	1020.525	58.135	BN 1570		0.075	0.0637	0.85	0.203	0.173	0.85
BRISBANE	1020.83	57.830	BN 1560		0.075	0.0637	0.85	0.195	0.166	0.85
BRISBANE	1021.095	57.565	BN 1550		0.075	0.0637	0.85	0.195	0.166	0.85
BRISBANE	1021.539	57.121	BN 1540		0.070	0.0595	0.85	0.182	0.155	0.85
BRISBANE	1021.715	56.945	BN 1530		0.070	0.0595	0.85	0.182	0.155	0.85
BRISBANE	1021.895	56.765	BN 1520		0.070	0.0595	0.85	0.182	0.155	0.85
BRISBANE	1022.105	56.555	BN 1510		0.070	0.0595	0.85	0.182	0.155	0.85
BRISBANE	1022.575	56.085	BN 1500		0.045	0.0382	0.85	0.090	0.077	0.85
BRISBANE	1023.04	55.620	BN 1490		0.045	0.0382	0.85	0.099	0.084	0.85
BRISBANE	1023.57	55.090	BN 1480		0.045	0.0382	0.85	0.117	0.100	0.85
BRISBANE	1024.08	54.580	BN 1470		0.045	0.0382	0.85	0.117	0.100	0.85
BRISBANE	1024.563	54.097	BN 1460		0.055	0.0467	0.85	0.143	0.122	0.85
BRISBANE	1025.07	53.590	BN 1450		0.055	0.0467	0.85	0.143	0.122	0.85
BRISBANE	1025.36	53.300	BN 1440		0.055	0.0467	0.85	0.143	0.122	0.85
BRISBANE	1025.59	53.070	BN 1430		0.055	0.0467	0.85	0.110	0.094	0.85
BRISBANE	1026.17	52.490	BN 1420		0.055	0.0467	0.85	0.143	0.122	0.85
BRISBANE	1026.68	51.980	BN 1410	Mt Ommaney Gauge	0.055	0.0467	0.85	0.143	0.122	0.85
BRISBANE	1026.9	51.760	BN 1400		0.055	0.0467	0.85	0.143	0.122	0.85
BRISBANE	1027.16	51.500	BN 1390		0.055	0.0467	0.85	0.143	0.122	0.85
BRISBANE	1027.68	50.980	BN 1380		0.030	0.0255	0.85	0.078	0.066	0.85
BRISBANE	1028.18	50.480	BN 1370		0.030	0.0255	0.85	0.078	0.066	0.85
BRISBANE	1028.68	49.980	BN 1360		0.030	0.0255	0.85	0.078	0.066	0.85
BRISBANE	1028.72	49.940	BN1350	Centenary Bridge						
BRISBANE	1028.76	49.900	BN 1340		0.035	0.0297	0.85	0.091	0.077	0.85
BRISBANE	1029.2	49.460	BN 1330		0.035	0.0297	0.85	0.098	0.083	0.85
BRISBANE	1029.68	48.980	BN 1320		0.030	0.0255	0.85	0.090	0.077	0.85
BRISBANE	1030.22	48.440	BN 1310		0.030	0.0255	0.85	0.114	0.097	0.85
BRISBANE	1030.87	47.790	BN 1300		0.030	0.0255	0.85	0.117	0.100	0.85
BRISBANE	1031.26	47.400	BN 1290		0.050	0.0425	0.85	0.200	0.170	0.85
BRISBANE	1031.7	46.960	BN 1280	Darra Wharf Gauge	0.075	0.0637	0.85	0.315	0.268	0.85
BRISBANE	1031.995	46.665	BN 1270		0.075	0.0637	0.85	0.330	0.281	0.85
BRISBANE	1032.23	46.430	BN 1260		0.065	0.0552	0.85	0.286	0.243	0.85
BRISBANE	1032.585	46.075	BN 1250		0.075	0.0637	0.85	0.330	0.281	0.85

Table I-2 - Comparison of MIKE 11 & HEC-RAS Mannings n Roughness

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	MIKE 11 MANNINGS COEFFICIENT CHANNEL	HEC-RAS MANNINGS COEFFICIENT CHANNEL	RATIO CHANNEL	MIKE 11 MANNINGS COEFFICIENT BANKS	HEC-RAS MANNINGS COEFFICIENT BANKS	RATIO BANKS
BRISBANE	1033.08	45.580	BN 1240		0.055	0.0467	0.85	0.242	0.206	0.85
BRISBANE	1033.37	45.290	BN 1230		0.055	0.0467	0.85	0.242	0.206	0.85
BRISBANE	1033.9	44.760	BN 1220		0.050	0.0425	0.85	0.220	0.187	0.85
BRISBANE	1034.37	44.290	BN 1210		0.050	0.0425	0.85	0.210	0.179	0.85
BRISBANE	1034.89	43.770	BN 1200	Sherwood Gauge	0.065	0.0552	0.85	0.267	0.227	0.85
BRISBANE	1035.414	43.246	BN 1190		0.060	0.051	0.85	0.234	0.199	0.85
BRISBANE	1035.9	42.760	BN 1180		0.065	0.0552	0.85	0.260	0.221	0.85
BRISBANE	1036.46	42.200	BN 1170		0.065	0.0552	0.85	0.273	0.232	0.85
BRISBANE	1036.77	41.890	BN 1160		0.065	0.0552	0.85	0.260	0.221	0.85
BRISBANE	1036.915	41.745	BN 1150		0.065	0.0552	0.85	0.254	0.216	0.85
BRISBANE	1037.09	41.570	BN 1140		0.065	0.0552	0.85	0.247	0.210	0.85
BRISBANE	1037.11	41.550	BN 1130	Indooroopilly Bridge						
BRISBANE	1037.175	41.485	BN 1120		0.055	0.0467	0.85	0.209	0.178	0.85
BRISBANE	1037.285	41.375	BN 1110	Clarence Road Gauge	0.055	0.0467	0.85	0.187	0.159	0.85
BRISBANE	1037.625	41.035	BN 1100		0.055	0.0467	0.85	0.187	0.159	0.85
BRISBANE	1038.085	40.575	BN 1090		0.030	0.0255	0.85	0.102	0.087	0.85
BRISBANE	1038.6	40.060	BN 1080		0.030	0.0255	0.85	0.102	0.087	0.85
BRISBANE	1039.1	39.560	BN 1070		0.030	0.0255	0.85	0.102	0.087	0.85
BRISBANE	1039.565	39.095	BN 1060	Oxley Creek Gauge	0.030	0.0255	0.85	0.102	0.087	0.85
BRISBANE	1040.09	38.570	BN 1050	King Authur Terrace Gauge	0.030	0.0255	0.85	0.120	0.102	0.85
BRISBANE	1040.49	38.170	BN 1040		0.030	0.0255	0.85	0.126	0.107	0.85
BRISBANE	1041.01	37.650	BN 1030		0.060	0.051	0.85	0.252	0.214	0.85
BRISBANE	1041.23	37.430	BN 1020		0.060	0.051	0.85	0.252	0.214	0.85
BRISBANE	1041.46	37.200	BN 1010	Tennyson Power House Gauge	0.060	0.051	0.85	0.252	0.214	0.85
BRISBANE	1041.7	36.960	BN 1000		0.060	0.051	0.85	0.252	0.214	0.85
BRISBANE	1041.96	36.700	BN 990	Yeronga Street Gauge	0.060	0.051	0.85	0.252	0.214	0.85
BRISBANE	1042.235	36.425	BN 980		0.060	0.051	0.85	0.252	0.214	0.85
BRISBANE	1042.515	36.145	BN 970		0.060	0.051	0.85	0.252	0.214	0.85
BRISBANE	1042.91	35.750	BN 960		0.060	0.051	0.85	0.252	0.214	0.85
BRISBANE	1043.725	34.935	BN 950		0.060	0.051	0.85	0.252	0.214	0.85
BRISBANE	1044.06	34.600	BN 940	Sandy Creek Gauge	0.070	0.0595	0.85	0.294	0.250	0.85
BRISBANE	1044.34	34.320	BN 930		0.070	0.0595	0.85	0.294	0.250	0.85
BRISBANE	1044.605	34.055	BN 920		0.070	0.0595	0.85	0.294	0.250	0.85
BRISBANE	1044.86	33.800	BN 910		0.070	0.0595	0.85	0.294	0.250	0.85
BRISBANE	1045.4	33.260	BN 900		0.070	0.0595	0.85	0.294	0.250	0.85
BRISBANE	1045.885	32.775	BN 890		0.070	0.0595	0.85	0.294	0.250	0.85
BRISBANE	1046.18	32.480	BN 880		0.070	0.0595	0.85	0.294	0.250	0.85
BRISBANE	1046.34	32.320	BN 870	Dutton Park Cemetery Gauge	0.070	0.0595	0.85	0.294	0.250	0.85
BRISBANE	1046.58	32.080	BN 860		0.070	0.0595	0.85	0.294	0.250	0.85
BRISBANE	1046.9	31.760	BN 850		0.070	0.0595	0.85	0.294	0.250	0.85
BRISBANE	1047.35	31.310	BN 840		0.070	0.0595	0.85	0.315	0.268	0.85
BRISBANE	1047.915	30.745	BN 830	Highgate Hill Gauge	0.050	0.0425	0.85	0.260	0.221	0.85
BRISBANE	1048.375	30.285	BN 820		0.050	0.0425	0.85	0.260	0.221	0.85
BRISBANE	1048.89	29.770	BN 810	St Lucia Ferry Gauge	0.050	0.0425	0.85	0.260	0.221	0.85
BRISBANE	1049.12	29.540	BN 800		0.050	0.0425	0.85	0.260	0.221	0.85
BRISBANE	1049.37	29.290	BN 790		0.050	0.0425	0.85	0.260	0.221	0.85
BRISBANE	1049.59	29.070	BN 780		0.045	0.0382	0.85	0.234	0.199	0.85
BRISBANE	1049.87	28.790	BN 770		0.045	0.0382	0.85	0.225	0.191	0.85
BRISBANE	1050.43	28.230	BN 760		0.030	0.0255	0.85	0.132	0.112	0.85
BRISBANE	1050.86	27.800	BN 750		0.030	0.0255	0.85	0.126	0.107	0.85
BRISBANE	1051.36	27.300	BN 740		0.030	0.0255	0.85	0.150	0.128	0.85
BRISBANE	1051.895	26.765	BN 730		0.030	0.0255	0.85	0.156	0.133	0.85
BRISBANE	1052.31	26.350	BN 720		0.030	0.0255	0.85	0.156	0.133	0.85
BRISBANE	1052.37	26.290	BN 710	Merivale Bridge						
BRISBANE	1052.39	26.270	BN 700		0.030	0.0255	0.85	0.156	0.133	0.85
BRISBANE	1052.595	26.065	BN 690		0.030	0.0255	0.85	0.156	0.133	0.85
BRISBANE	1052.607	26.053	BN 680	William Jolly Bridge						
BRISBANE	1052.64	26.020	BN 670		0.045	0.0382	0.85	0.234	0.199	0.85
BRISBANE	1052.865	25.795	BN 660	Montague Road Gauge	0.050	0.0425	0.85	0.360	0.306	0.85
BRISBANE	1053.32	25.340	BN 650		0.060	0.051	0.85	0.312	0.265	0.85
BRISBANE	1053.356	25.304	BN 640	Victoria Bridge						
BRISBANE	1053.385	25.275	BN630		0.060	0.051	0.85	0.312	0.265	0.85
BRISBANE	1053.9	24.760	BN 620		0.060	0.051	0.85	0.288	0.245	0.85
BRISBANE	1054.64	24.020	BN 610		0.060	0.051	0.85	0.276	0.235	0.85
BRISBANE	1054.66	24.000	BN 600	Captain Cook Bridge						
BRISBANE	1054.68	23.980	BN 590		0.060	0.051	0.85	0.270	0.230	0.85
BRISBANE	1054.97	23.690	BN 560		0.025	0.0212	0.85	0.113	0.096	0.85
BRISBANE	1055.28	23.380	BN 550		0.025	0.0212	0.85	0.105	0.089	0.85
BRISBANE	1055.42	23.240	BN 540		0.025	0.0212	0.85	0.105	0.089	0.85
BRISBANE	1055.96	22.700	BN 530	Port Office Gauge	0.025	0.0212	0.85	0.108	0.092	0.85
BRISBANE	1056.4	22.260	BN 520		0.025	0.0212	0.85	0.118	0.100	0.85
BRISBANE	1056.695	21.965	BN 510		0.025	0.0212	0.85	0.130	0.111	0.85
BRISBANE	1056.865	21.795	BN 500		0.040	0.034	0.85	0.208	0.177	0.85
BRISBANE	1056.92	21.740	BN 495	Story Bridge						
BRISBANE	1056.95	21.710	BN 490		0.040	0.034	0.85	0.208	0.177	0.85
BRISBANE	1057.09	21.570	BN 480		0.040	0.034	0.85	0.208	0.177	0.85
BRISBANE	1057.53	21.130	BN 470		0.040	0.034	0.85	0.208	0.177	0.85
BRISBANE	1058.04	20.620	BN 460		0.040	0.034	0.85	0.180	0.153	0.85

Table I-2 - Comparison of MIKE 11 & HEC-RAS Mannings n Roughness

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	MIKE 11 MANNINGS COEFFICIENT CHANNEL	HEC-RAS MANNINGS COEFFICIENT CHANNEL	RATIO CHANNEL	MIKE 11 MANNINGS COEFFICIENT BANKS	HEC-RAS MANNINGS COEFFICIENT BANKS	RATIO BANKS
BRISBANE	1058.23	20.430	BN 450		0.040	0.034	0.85	0.180	0.153	0.85
BRISBANE	1058.53	20.130	BN 440		0.040	0.034	0.85	0.176	0.150	0.85
BRISBANE	1058.735	19.925	BN 430		0.050	0.0425	0.85	0.225	0.191	0.85
BRISBANE	1059.035	19.625	BN 420		0.050	0.0425	0.85	0.250	0.213	0.85
BRISBANE	1059.54	19.120	BN 410		0.050	0.0425	0.85	0.220	0.187	0.85
BRISBANE	1059.99	18.670	BN 400		0.050	0.0425	0.85	0.215	0.183	0.85
BRISBANE	1060.345	18.315	BN 390		0.045	0.0382	0.85	0.203	0.173	0.85
BRISBANE	1060.535	18.125	BN 380		0.035	0.0297	0.85	0.175	0.149	0.85
BRISBANE	1061.015	17.645	BN 370		0.035	0.0297	0.85	0.182	0.155	0.85
BRISBANE	1061.53	17.130	BN 360		0.035	0.0297	0.85	0.182	0.155	0.85
BRISBANE	1062.02	16.640	BN 350		0.035	0.0297	0.85	0.182	0.155	0.85
BRISBANE	1062.535	16.125	BN 340		0.035	0.0297	0.85	0.182	0.155	0.85
BRISBANE	1062.94	15.720	BN 330		0.035	0.0297	0.85	0.182	0.155	0.85
BRISBANE	1063.31	15.350	BN 320	Newstead Park Gauge	0.050	0.0425	0.85	0.260	0.221	0.85
BRISBANE	1063.645	15.015	BN 310	Cresent Road Gauge	0.031	0.0264	0.85	0.161	0.137	0.85
BRISBANE	1064	14.660	BN 300		0.031	0.0264	0.85	0.161	0.137	0.85
BRISBANE	1064.49	14.170	BN 290		0.031	0.0264	0.85	0.161	0.137	0.85
BRISBANE	1065.01	13.650	BN 280		0.031	0.0264	0.85	0.143	0.122	0.85
BRISBANE	1065.503	13.157	BN 270		0.031	0.0264	0.85	0.105	0.089	0.85
BRISBANE	1065.99	12.670	BN 260	Cairncross Dock Gauge	0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1066.505	12.155	BN 250		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1067.02	11.640	BN 240		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1067.485	11.175	BN 230		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1067.965	10.695	BN 220		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1068.66	10.000	BN 210		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1069.045	9.615	BN 200		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1069.535	9.125	BN 190	Bulimba Power House Gauge	0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1070.025	8.635	BN 180		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1070.53	8.130	BN 170		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1071.04	7.620	BN 160		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1071.52	7.140	BN 150		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1072.015	6.645	BN 140		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1072.515	6.145	BN 130		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1072.995	5.665	BN 120		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1073.485	5.175	BN 110		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1074	4.660	BN 100		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1074.46	4.200	BN 90		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1074.985	3.675	BN 80		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1075.48	3.180	BN 70		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1076	2.660	BN 60		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1076.495	2.165	BN 50		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1077.01	1.650	BN 40		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1077.51	1.150	BN 30		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1078.04	0.620	BN 20		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1078.525	0.135	BN 10		0.031	0.0264	0.85	0.104	0.088	0.85
BRISBANE	1078.66	0.000	-	Western Inner Bar Gauge	0.031	0.026	0.85	0.104	0.088	0.85

Table I-3 - HEC-RAS Predicted Velocities

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	100 YEAR ARI FLOOD				BANK FULL				
					AVERAGE VELOCITY m/s	CHANNEL VELOCITY m/s	LEFT BANK VELOCITY m/s	RIGHT BANK VELOCITY m/s	BANK FULL FLOW m^3/s	AVERAGE VELOCITY m/s	CHANNEL VELOCITY m/s	LEFT BANK VELOCITY m/s	RIGHT BANK VELOCITY m/s
BRISBANE	1000	78.66	BN 2020		1.65	2.27	0.44	0.54	6000	1.47	1.87	0.41	0.42
BRISBANE	1000.285	78.375	BN 2010		1.96	2.79	0.71	0.76	6000	1.80	2.38	0.58	0.57
BRISBANE	1000.775	77.885	BN 2000		2.18	2.93	0.78	0.75	750	0.83	0.87	0.21	0.19
BRISBANE	1001.315	77.345	BN 1990		1.59	2.40	0.88	0.53	3500	1.22	1.69	0.55	0.35
BRISBANE	1001.865	76.795	BN 1980		2.58	3.76	0.73	0.68	6000	2.38	3.13	0.65	0.63
BRISBANE	1002.35	76.310	BN 1970		2.36	3.20	0.96	1.10	2000	1.62	1.77	0.63	0.51
BRISBANE	1002.785	75.875	BN 1960		1.85	2.52	0.87	0.86	750	0.81	0.84	0.26	0.08
BRISBANE	1003.275	75.385	BN 1950		2.32	2.98	0.84	0.84	3000	1.74	1.89	0.35	0.63
BRISBANE	1003.775	74.885	BN 1940		2.13	3.11	1.02	0.78	1500	1.15	1.38	0.35	0.42
BRISBANE	1004.3	74.360	BN 1930		2.41	3.64	0.90	0.94	750	0.96	1.03	0.25	0.16
BRISBANE	1004.81	73.850	BN 1920		1.70	2.17	0.58	0.60	3500	1.40	1.54	0.39	0.25
BRISBANE	1005.325	73.335	BN 1910		1.47	2.44	0.72	0.59	2000	1.15	1.47	0.39	0.17
BRISBANE	1005.87	72.790	BN 1900		1.88	3.01	0.75	0.66	750	0.93	1.02	0.18	0.18
BRISBANE	1006.3	72.360	BN 1890	Moggill Gauge	1.95	2.49	0.60	0.54	750	0.63	0.65	0.08	0.09
BRISBANE	1006.91	71.750	BN 1880		1.55	2.38	0.49	0.56	2500	1.19	1.34	0.19	0.31
BRISBANE	1007.41	71.250	BN 1870		1.22	2.09	0.55	0.38	1000	0.81	0.85	0.15	0.16
BRISBANE	1007.92	70.740	BN 1860		1.83	2.95	0.50	0.42	2000	1.42	1.51	0.19	0.21
BRISBANE	1008.445	70.215	BN 1850		1.99	2.69	0.41	0.38	2500	1.18	1.32	0.19	0.18
BRISBANE	1008.925	69.735	BN 1840		1.92	2.49	0.39	0.37	5000	1.59	1.84	0.29	0.29
BRISBANE	1009.4	69.260	BN 1830		1.71	2.63	0.36	0.35	5000	1.57	1.94	0.29	0.29
BRISBANE	1009.72	68.940	BN 1820		1.43	2.32	0.27	0.32	3000	1.27	1.38	0.18	0.17
BRISBANE	1010.49	68.170	BN 1810		2.34	3.06	0.41	0.44	2000	1.27	1.35	0.14	0.18
BRISBANE	1010.725	67.935	BN 1800		2.17	2.89	0.30	0.36	5000	1.74	2.03	0.29	0.27
BRISBANE	1010.98	67.680	BN 1790		2.12	2.84	0.36	0.45	3000	1.35	1.53	0.22	0.23
BRISBANE	1011.51	67.150	BN 1780		1.53	2.44	0.36	0.46	1000	0.68	0.73	0.08	0.08
BRISBANE	1011.98	66.680	BN 1770		1.27	2.24	0.38	0.27	5000	1.19	1.76	0.21	0.21
BRISBANE	1012.475	66.185	BN 1760		1.16	2.27	0.30	0.28	3000	1.07	1.39	0.17	0.20
BRISBANE	1012.935	65.725	BN 1750		1.30	2.22	0.38	0.21	1000	0.71	0.72	0.06	0.04
BRISBANE	1013.445	65.215	BN 1740		1.24	2.14	0.25	0.21	1500	0.87	0.88	0.08	0.07
BRISBANE	1013.91	64.750	BN 1730		0.87	2.05	0.16	0.47	7000	0.87	1.86	0.12	0.41
BRISBANE	1014.31	64.350	BN 1720		0.85	2.12	0.26	0.45	7000	0.85	1.94	0.18	0.40
BRISBANE	1014.61	64.050	BN 1710	Goodna Hospital Gauge	0.76	1.38	0.26	0.38	1000	0.60	0.80	0.11	0.09
BRISBANE	1015.09	63.570	BN 1700		1.61	2.05	0.36	0.25	1500	0.64	0.66	0.08	0.05
BRISBANE	1015.56	63.100	BN 1690		1.99	2.48	0.41	0.51	5000	1.58	1.81	0.27	0.29
BRISBANE	1016.14	62.520	BN 1680		1.74	2.29	0.40	0.23	3000	1.15	1.26	0.18	0.18
BRISBANE	1016.64	62.020	BN 1670		1.37	1.69	0.25	0.16	3500	1.19	1.24	0.16	0.24
BRISBANE	1017.13	61.530	BN 1660		1.42	2.74	0.43	0.40	4000	1.34	1.98	0.32	0.28
BRISBANE	1017.61	61.050	BN 1650		1.17	2.46	0.31	0.22	3500	1.43	1.66	0.18	0.18
BRISBANE	1017.92	60.740	BN 1640		1.30	2.66	0.34	0.33	750	0.63	0.64	0.04	0.04
BRISBANE	1018.2	60.460	BN 1630		1.44	2.23	0.24	0.33	2000	0.99	1.02	0.08	0.10
BRISBANE	1018.725	59.935	BN 1620		2.08	2.89	0.25	0.47	3000	1.38	1.54	0.19	0.17
BRISBANE	1019.095	59.565	BN 1610		1.69	2.51	0.27	0.27	5000	1.66	1.86	0.21	0.23
BRISBANE	1019.49	59.170	BN 1600		1.40	2.19	0.40	0.28	1500	0.76	0.85	0.10	0.04
BRISBANE	1019.865	58.795	BN 1590		2.17	2.81	0.43	0.40	1000	0.67	0.70	0.07	0.07
BRISBANE	1020.115	58.545	BN 1580		1.09	1.97	0.36	0.28	1000	0.55	0.63	0.07	0.08
BRISBANE	1020.525	58.135	BN 1570		1.01	1.32	0.32	0.19	1000	0.43	0.46	0.08	0.07
BRISBANE	1020.83	57.830	BN 1560		1.52	2.01	0.39	0.38	2000	0.76	0.83	0.15	0.12
BRISBANE	1021.095	57.565	BN 1550		2.14	2.65	0.53	0.48	1500	0.91	0.94	0.14	0.09
BRISBANE	1021.539	57.121	BN 1540		1.87	2.45	0.60	0.45	5000	1.52	1.81	0.41	0.38
BRISBANE	1021.715	56.945	BN 1530		1.62	2.07	0.46	0.31	5000	1.36	1.57	0.36	0.24
BRISBANE	1021.895	56.765	BN 1520		1.64	2.12	0.42	0.46	750	0.45	0.46	0.05	0.06
BRISBANE	1022.105	56.555	BN 1510		2.01	2.35	0.41	0.43	4000	1.38	1.47	0.21	0.22
BRISBANE	1022.575	56.085	BN 1500		1.81	2.21	0.42	0.61	5000	1.49	1.66	0.37	0.50
BRISBANE	1023.04	55.620	BN 1490		2.23	3.11	0.56	0.68	5000	1.99	2.27	0.33	0.48
BRISBANE	1023.57	55.090	BN 1480		2.44	2.84	0.46	0.47	3500	1.60	1.69	0.28	0.23
BRISBANE	1024.08	54.580	BN 1470		2.16	2.78	0.47	0.47	7000	2.00	2.38	0.49	0.40
BRISBANE	1024.563	54.097	BN 1460		1.97	2.35	0.44	0.38	4000	1.51	1.61	0.30	0.28
BRISBANE	1025.07	53.590	BN 1450		1.76	2.20	0.27	0.42	5000	1.49	1.64	0.32	0.29
BRISBANE	1025.36	53.300	BN 1440		2.00	2.66	0.49	0.41	3500	1.49	1.61	0.26	0.25
BRISBANE	1025.59	53.070	BN 1430		2.43	3.01	0.74	0.50	4000	1.83	1.96	0.39	0.35
BRISBANE	1026.17	52.490	BN 1420		2.27	2.65	0.52	0.47	5000	1.77	1.92	0.36	0.30
BRISBANE	1026.68	51.980	BN 1410	Mt Ommaney Gauge	1.93	2.59	0.40	0.37	750	0.50	0.51	0.05	0.06

Table I-3 - HEC-RAS Predicted Velocities

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	100 YEAR ARI FLOOD				BANK FULL				
					AVERAGE VELOCITY m/s	CHANNEL VELOCITY m/s	LEFT BANK VELOCITY m/s	RIGHT BANK VELOCITY m/s	BANK FULL FLOW m^3/s	AVERAGE VELOCITY m/s	CHANNEL VELOCITY m/s	LEFT BANK VELOCITY m/s	RIGHT BANK VELOCITY m/s
BRISBANE	1026.9	51.760	BN 1400		2.07	2.85	0.42	0.56	1500	0.89	0.94	0.08	0.13
BRISBANE	1027.16	51.500	BN 1390		2.45	2.93	0.43	0.38	7000	2.19	2.47	0.44	0.30
BRISBANE	1027.68	50.980	BN 1380		1.77	2.25	0.40	0.50	4000	1.32	1.51	0.32	0.31
BRISBANE	1028.18	50.480	BN 1370		1.54	2.11	0.30	0.53	1000	0.58	0.61	0.08	0.08
BRISBANE	1028.68	49.980	BN 1360		1.97	2.49	0.36	0.36	2500	1.29	1.31	0.14	0.14
BRISBANE	1028.72	49.940	BN1350	Centenary Bridge	Bridge				2500				
BRISBANE	1028.76	49.900	BN 1340		1.94	2.52	0.35	0.56	2000	1.14	1.18	0.17	0.16
BRISBANE	1029.2	49.460	BN 1330		1.90	2.88	0.46	0.42	3500	1.60	1.79	0.28	0.23
BRISBANE	1029.68	48.980	BN 1320		1.61	2.72	0.31	0.34	5000	1.63	1.99	0.30	0.25
BRISBANE	1030.22	48.440	BN 1310		1.17	2.30	0.28	0.28	1000	0.62	0.63	0.04	0.05
BRISBANE	1030.87	47.790	BN 1300		1.58	2.24	0.20	0.28	2000	1.04	1.07	0.11	0.09
BRISBANE	1031.26	47.400	BN 1290		2.09	2.67	0.29	0.24	2500	1.29	1.32	0.09	0.10
BRISBANE	1031.7	46.960	BN 1280	Darra Wharf Gauge	2.70	3.30	0.37	0.27	1000	0.71	0.72	0.05	0.04
BRISBANE	1031.995	46.665	BN 1270		1.81	2.46	0.28	0.20	1000	0.58	0.60	0.05	0.04
BRISBANE	1032.23	46.430	BN 1260		1.73	2.37	0.31	0.20	1500	0.75	0.80	0.06	0.06
BRISBANE	1032.585	46.075	BN 1250		2.28	2.73	0.22	0.17	1000	0.56	0.56	0.02	0.03
BRISBANE	1033.08	45.580	BN 1240		1.86	2.58	0.22	0.21	5000	1.68	1.81	0.14	0.16
BRISBANE	1033.37	45.290	BN 1230		2.10	2.63	0.23	0.22	1000	0.59	0.60	0.02	0.04
BRISBANE	1033.9	44.760	BN 1220		2.34	2.87	0.28	0.30	3500	1.54	1.62	0.12	0.14
BRISBANE	1034.37	44.290	BN 1210		2.44	2.89	0.34	0.26	5000	1.85	2.01	0.22	0.20
BRISBANE	1034.89	43.770	BN 1200	Sherwood Gauge	1.88	2.69	0.30	0.24	5000	1.66	1.89	0.17	0.17
BRISBANE	1035.414	43.246	BN 1190		2.31	2.72	0.31	0.29	6000	1.92	2.13	0.27	0.21
BRISBANE	1035.9	42.760	BN 1180		2.41	3.08	0.29	0.38	5000	1.93	2.14	0.21	0.24
BRISBANE	1036.46	42.200	BN 1170		2.41	2.85	0.23	0.34	3000	1.41	1.45	0.10	0.14
BRISBANE	1036.77	41.890	BN 1160		1.97	2.49	0.26	0.30	8000	1.84	2.25	0.28	0.28
BRISBANE	1036.915	41.745	BN 1150		2.40	2.78	0.23	0.29	2500	1.16	1.18	0.06	0.08
BRISBANE	1037.09	41.570	BN 1140		2.70	3.12	0.36	0.29	1000	0.58	0.59	0.03	0.03
BRISBANE	1037.11	41.550	BN 1130	Indooroopilly Bridge	Bridge				1000				
BRISBANE	1037.175	41.485	BN 1120		2.71	3.04	0.40	0.30	2500	1.23	1.27	0.10	0.08
BRISBANE	1037.285	41.375	BN 1110	Clarence Road Gauge	2.54	2.77	0.37	0.33	1500	0.78	0.79	0.07	0.05
BRISBANE	1037.625	41.035	BN 1100		2.07	2.47	0.40	0.36	3000	1.19	1.28	0.15	0.14
BRISBANE	1038.085	40.575	BN 1090		1.31	2.08	0.17	0.26	1500	0.64	0.64	0.06	0.03
BRISBANE	1038.6	40.060	BN 1080		1.17	2.01	0.25	0.29	1500	0.77	0.78	0.06	0.02
BRISBANE	1039.1	39.560	BN 1070		1.03	2.01	0.25	0.29	5000	1.16	1.62	0.15	0.21
BRISBANE	1039.565	39.095	BN 1060	Oxley Creek Gauge	1.06	1.83	0.23	0.29	5000	1.14	1.47	0.11	0.18
BRISBANE	1040.09	38.570	BN 1050	King Authur Terrace Gauge	1.32	1.90	0.15	0.24	5000	1.10	1.34	0.10	0.10
BRISBANE	1040.49	38.170	BN 1040		1.70	2.61	0.25	0.30	5000	1.43	1.82	0.14	0.13
BRISBANE	1041.01	37.650	BN 1030		1.40	2.01	0.17	0.20	4000	1.17	1.25	0.07	0.08
BRISBANE	1041.23	37.430	BN 1020		1.24	2.00	0.19	0.18	3000	1.00	1.06	0.09	0.08
BRISBANE	1041.46	37.200	BN 1010	Tennyson Power House Gauge	1.65	2.14	0.27	0.20	3000	1.04	1.10	0.10	0.05
BRISBANE	1041.7	36.960	BN 1000		1.66	2.03	0.14	0.15	1500	0.51	0.51	0.02	0.02
BRISBANE	1041.96	36.700	BN 990	Yeronga Street Gauge	1.94	2.55	0.21	0.21	2000	0.89	0.90	0.05	0.05
BRISBANE	1042.235	36.425	BN 980		2.43	2.85	0.20	0.16	2000	0.94	0.95	0.05	0.03
BRISBANE	1042.515	36.145	BN 970		2.01	2.48	0.27	0.19	6000	1.68	1.86	0.18	0.13
BRISBANE	1042.91	35.750	BN 960		2.11	2.61	0.27	0.16	3000	1.27	1.31	0.11	0.10
BRISBANE	1043.725	34.935	BN 950		2.00	2.18	0.15	0.23	5000	1.51	1.56	0.12	0.14
BRISBANE	1044.06	34.600	BN 940	Sandy Creek Gauge	2.00	2.21	0.21	0.19	4000	1.25	1.30	0.11	0.08
BRISBANE	1044.34	34.320	BN 930		2.18	2.44	0.19	0.20	2000	0.84	0.85	0.06	0.04
BRISBANE	1044.605	34.055	BN 920		1.80	2.18	0.17	0.21	1500	0.60	0.61	0.04	0.04
BRISBANE	1044.86	33.800	BN 910		1.42	1.93	0.18	0.20	2500	0.87	0.88	0.07	0.07
BRISBANE	1045.4	33.260	BN 900		1.40	1.89	0.16	0.24	1500	0.57	0.58	0.04	0.04
BRISBANE	1045.885	32.775	BN 890		1.31	1.99	0.18	0.16	1500	0.60	0.62	0.04	0.04
BRISBANE	1046.18	32.480	BN 880		1.36	1.76	0.11	0.10	2500	0.68	0.69	0.04	0.03
BRISBANE	1046.34	32.320	BN 870	Dutton Park Cemetery Gauge	1.76	1.87	0.10	0.09	3000	0.82	0.83	0.04	0.03
BRISBANE	1046.58	32.080	BN 860		1.60	1.84	0.18	0.11	4000	1.06	1.09	0.09	0.06
BRISBANE	1046.9	31.760	BN 850		1.85	2.25	0.19	0.19	4000	1.39	1.42	0.10	0.12
BRISBANE	1047.35	31.310	BN 840		2.33	2.75	0.18	0.18	6000	2.07	2.15	0.12	0.13
BRISBANE	1047.915	30.745	BN 830	Highgate Hill Gauge	2.00	2.67	0.13	0.15	5000	1.71	1.79	0.10	0.06
BRISBANE	1048.375	30.285	BN 820		1.26	1.89	0.11	0.13	1500	0.51	0.51	0.02	0.02
BRISBANE	1048.89	29.770	BN 810	St Lucia Ferry Gauge	2.01	2.39	0.18	0.11	2000	0.95	0.96	0.06	0.05
BRISBANE	1049.12	29.540	BN 800		1.88	2.30	0.14	0.14	2000	0.80	0.81	0.04	0.04
BRISBANE	1049.37	29.290	BN 790		2.34	2.74	0.15	0.16	2500	1.10	1.11	0.06	0.04

Table I-3 - HEC-RAS Predicted Velocities

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	100 YEAR ARI FLOOD AVERAGE VELOCITY m/s	100 YEAR ARI FLOOD CHANNEL VELOCITY m/s	100 YEAR ARI FLOOD LEFT BANK VELOCITY m/s	100 YEAR ARI FLOOD RIGHT BANK VELOCITY m/s	BANK FULL BANK FULL FLOW m^3/s	BANK FULL AVERAGE VELOCITY m/s	BANK FULL CHANNEL VELOCITY m/s	BANK FULL LEFT BANK VELOCITY m/s	BANK FULL RIGHT BANK VELOCITY m/s
BRISBANE	1049.59	29.070	BN 780		2.07	2.59	0.13	0.15	2000	0.83	0.83	0.03	0.03
BRISBANE	1049.87	28.790	BN 770		2.35	2.69	0.15	0.22	3000	1.27	1.28	0.06	0.07
BRISBANE	1050.43	28.230	BN 760		1.94	2.42	0.17	0.22	2000	0.88	0.89	0.04	0.07
BRISBANE	1050.86	27.800	BN 750		2.28	2.70	0.16	0.26	2000	0.92	0.93	0.06	0.05
BRISBANE	1051.36	27.300	BN 740		1.97	2.49	0.12	0.20	3000	1.11	1.14	0.06	0.04
BRISBANE	1051.895	26.765	BN 730		2.27	2.96	0.18	0.18	3000	1.45	1.48	0.08	0.06
BRISBANE	1052.31	26.350	BN 720		2.57	2.76	0.28	0.22	3000	1.36	1.38	0.08	0.06
BRISBANE	1052.37	26.290	BN 710	Merivale Bridge	Bridge				2500				
BRISBANE	1052.39	26.270	BN 700		2.63	2.76	0.33	0.17	2500	1.16	1.18	0.07	0.06
BRISBANE	1052.595	26.065	BN 690		2.73	2.89	0.20	0.15	4000	1.66	1.68	0.10	0.07
BRISBANE	1052.607	26.053	BN 680	William Jolly Bridge	Bridge				4000				
BRISBANE	1052.64	26.020	BN 670		2.50	2.64	0.16	0.18	1500	0.62	0.62	0.03	0.01
BRISBANE	1052.865	25.795	BN 660	Montague Road Gauge	2.57	2.81	0.08	0.10	4000	1.53	1.53	0.03	0.04
BRISBANE	1053.32	25.340	BN 650		2.65	2.67	0.31	0.19	1500	0.72	0.72	0.05	0.03
BRISBANE	1053.356	25.304	BN 640	Victoria Bridge	Bridge				1500				
BRISBANE	1053.385	25.275	BN630		2.58	2.67	0.26	0.20	3000	1.32	1.33	0.09	0.05
BRISBANE	1053.9	24.760	BN 620		2.46	2.72	0.13	0.21	3500	1.42	1.44	0.04	0.11
BRISBANE	1054.64	24.020	BN 610		1.61	1.68	0.11	0.21	3000	0.75	0.77	0.04	0.06
BRISBANE	1054.66	24.000	BN 600	Captain Cook Bridge	Bridge				3000				
BRISBANE	1054.68	23.980	BN 590		1.73	1.89		0.19	3000	0.81	0.84		0.04
BRISBANE	1054.97	23.690	BN 560		2.44	2.66	0.18	0.23	3000	1.14	1.16	0.06	0.07
BRISBANE	1055.28	23.380	BN 550		2.41	2.56	0.22	0.20	4000	1.40	1.42	0.08	0.09
BRISBANE	1055.42	23.240	BN 540		2.44	2.54	0.19	0.24	5000	1.69	1.71	0.10	0.13
BRISBANE	1055.96	22.700	BN 530	Port Office Gauge	2.16	2.27	0.20	0.07	5000	1.52	1.54	0.13	0.02
BRISBANE	1056.4	22.260	BN 520		2.73	2.87	0.18	0.17	5000	1.91	1.95	0.15	0.03
BRISBANE	1056.695	21.965	BN 510		2.57	2.73	0.13	0.13	3500	1.33	1.35	0.08	0.00
BRISBANE	1056.865	21.795	BN 500		2.78	2.84	0.25	0.08	1500	0.62	0.62	0.02	0.03
BRISBANE	1056.92	21.740	BN 495	Story Bridge	Bridge				1500				
BRISBANE	1056.95	21.710	BN 490		2.82	2.86		0.12	7000	2.37	2.38		0.04
BRISBANE	1057.09	21.570	BN 480		2.02	2.14	0.13	0.12	7000	1.70	1.76	0.11	0.07
BRISBANE	1057.53	21.130	BN 470		2.36	2.40	0.11	0.12	5000	1.55	1.55	0.04	0.06
BRISBANE	1058.04	20.620	BN 460		2.78	2.85	0.22	0.18	6000	2.13	2.16	0.15	0.17
BRISBANE	1058.23	20.430	BN 450		2.77	2.88	0.26	0.17	5000	1.87	1.89	0.14	0.07
BRISBANE	1058.53	20.130	BN 440		2.86	2.95	0.15	0.12	4000	1.54	1.55	0.08	0.08
BRISBANE	1058.735	19.925	BN 430		2.52	2.69	0.19	0.17	3000	1.08	1.10	0.06	0.07
BRISBANE	1059.035	19.625	BN 420		3.01	3.09	0.11	0.14	3500	1.41	1.42	0.04	0.04
BRISBANE	1059.54	19.120	BN 410		2.25	2.32	0.09	0.16	6000	1.70	1.72	0.05	0.14
BRISBANE	1059.99	18.670	BN 400		2.26	2.35	0.12	0.17	3500	1.12	1.13	0.08	0.07
BRISBANE	1060.345	18.315	BN 390		2.71	2.73	0.16	0.15	13000	3.45	3.50	0.24	0.21
BRISBANE	1060.535	18.125	BN 380		2.98	3.01	0.15	0.17	11000	3.41	3.46	0.19	0.13
BRISBANE	1061.015	17.645	BN 370		2.59	2.66	0.13	0.10	5000	1.67	1.68	0.07	0.05
BRISBANE	1061.53	17.130	BN 360		2.85	2.89	0.19		5000	1.78	1.79	0.09	0.02
BRISBANE	1062.02	16.640	BN 350		2.55	2.62	0.12	0.16	9000	2.53	2.60	0.14	0.16
BRISBANE	1062.535	16.125	BN 340		2.15	2.23	0.17	0.16	8000	1.97	2.04	0.16	0.16
BRISBANE	1062.94	15.720	BN 330		1.77	1.80	0.12	0.06	8000	1.63	1.65	0.11	0.08
BRISBANE	1063.31	15.350	BN 320	Newstead Park Gauge	1.97	1.99	0.09		6000	1.44	1.44	0.07	0.14
BRISBANE	1063.645	15.015	BN 310	Cresent Road Gauge	2.75	2.91	0.21	0.19	9000	2.73	2.89	0.21	0.18
BRISBANE	1064	14.660	BN 300		2.55	2.69	0.11	0.13	6000	1.86	1.91	0.12	0.08
BRISBANE	1064.49	14.170	BN 290		2.61	2.76	0.07	0.14	3500	1.19	1.20	0.06	0.05
BRISBANE	1065.01	13.650	BN 280		2.11	2.18	0.06	0.15	7000	1.75	1.76	0.08	0.12
BRISBANE	1065.503	13.157	BN 270		1.92	1.96	0.08		6000	1.38	1.39	0.09	0.08
BRISBANE	1065.99	12.670	BN 260	Cairncross Dock Gauge	1.67	1.67			14000	2.27	2.30		0.10
BRISBANE	1066.505	12.155	BN 250		1.80	1.82		0.07	14000	2.14	2.49		0.15
BRISBANE	1067.02	11.640	BN 240		1.64	1.74	0.18	0.11	13000	2.00	2.27	0.30	0.16
BRISBANE	1067.485	11.175	BN 230		1.89	2.06	0.21	0.12	8000	1.75	1.87	0.17	0.13
BRISBANE	1067.965	10.695	BN 220		2.14	2.23	0.13	0.13	6000	1.55	1.58	0.08	0.14
BRISBANE	1068.66	10.000	BN 210		2.37	2.41	0.21	0.24	9000	2.35	2.39	0.20	0.24
BRISBANE	1069.045	9.615	BN 200		2.34	2.39		0.20	7000	1.89	1.92		0.18
BRISBANE	1069.535	9.125	BN 190	Bulimba Power House Gauge	2.16	2.21		0.14	8000	1.95	1.99		0.18
BRISBANE	1070.025	8.635	BN 180		2.06	2.08	0.06	0.21	19000	3.38	3.60	0.14	0.18
BRISBANE	1070.53	8.130	BN 170		2.11	2.13	0.14	0.11	5000	1.24	1.25	0.08	0.05
BRISBANE	1071.04	7.620	BN 160		2.05	2.09	0.18	0.13	8000	1.84	1.87	0.15	0.13

Table I-3 - HEC-RAS Predicted Velocities

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	100 YEAR ARI FLOOD				BANK FULL				
					AVERAGE VELOCITY m/s	CHANNEL VELOCITY m/s	LEFT BANK VELOCITY m/s	RIGHT BANK VELOCITY m/s	BANK FULL FLOW m^3/s	AVERAGE VELOCITY m/s	CHANNEL VELOCITY m/s	LEFT BANK VELOCITY m/s	RIGHT BANK VELOCITY m/s
BRISBANE	1071.52	7.140	BN 150		1.53	1.55	0.14	0.06	11000	1.79	1.83	0.16	0.08
BRISBANE	1072.015	6.645	BN 140		1.92	1.92		0.07	17000	3.06	3.12		0.11
BRISBANE	1072.515	6.145	BN 130		1.86	1.89	0.13	0.12	750	0.16	0.17	0.01	0.01
BRISBANE	1072.995	5.665	BN 120		1.76	1.77	0.12	0.12	14000	2.54	2.55	0.20	0.18
BRISBANE	1073.485	5.175	BN 110		1.95	1.97	0.14	0.19	14000	2.81	2.85	0.22	0.12
BRISBANE	1074	4.660	BN 100		1.91	1.91	0.13	0.16	13000	2.60	2.62	0.20	0.22
BRISBANE	1074.46	4.200	BN 90		1.89	1.89	0.13	0.13	17000	3.18	3.24	0.27	0.12
BRISBANE	1074.985	3.675	BN 80		2.11	2.12	0.15	0.15	15000	3.31	3.33	0.26	0.24
BRISBANE	1075.48	3.180	BN 70		1.75	1.85	0.12	0.18	12000	2.25	2.39	0.16	0.25
BRISBANE	1076	2.660	BN 60		1.22	1.29	0.09	0.14	26000	2.88	3.11	0.11	0.42
BRISBANE	1076.495	2.165	BN 50		1.67	1.68		0.13	33000	4.95	4.96		0.22
BRISBANE	1077.01	1.650	BN 40		1.17	1.26	0.08	0.14	9000	1.16	1.24	0.08	0.14
BRISBANE	1077.51	1.150	BN 30		0.89	0.89	0.04	0.05	26000	2.36	2.38	0.15	0.15
BRISBANE	1078.04	0.620	BN 20		0.94	0.95	0.05	0.04	19000	1.92	1.95	0.10	0.10
BRISBANE	1078.525	0.135	BN 10		1.43	1.54	0.31	0.07	-	-	-	-	-
BRISBANE	1078.66	0.000	-	Western Inner Bar Gauge					-	-	-	-	-

Table I-4 - HEC-RAS Predicted Conveyances

LOCATION	MIKE 11 CHAINAGE (km)	AMTO CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	100 YEAR ARI TOTAL CONVEYANCE (m^3/s)	100 YEAR ARI CHANNEL CONVEYANCE (m^3/s)	100 YEAR ARI LEFT CONVEYANCE (m^3/s)	100 YEAR ARI RIGHT CONVEYANCE (m^3/s)	100 YEAR ARI % CHANNEL CONVEYANCE	100 YEAR ARI % LEFT CONVEYANCE	100 YEAR ARI % RIGHT CONVEYANCE	20 YEAR ARI TOTAL CONVEYANCE (m^3/s)	20 YEAR ARI CHANNEL CONVEYANCE (m^3/s)	20 YEAR ARI LEFT CONVEYANCE (m^3/s)	20 YEAR ARI RIGHT CONVEYANCE (m^3/s)	20 YEAR ARI % CHANNEL CONVEYANCE	20 YEAR ARI % LEFT CONVEYANCE	20 YEAR ARI % RIGHT CONVEYANCE
BRISBANE	1000	78.66	BN 2020		572181	515467	35924	20791	90.1	6.3	3.6	270084	253823	11100	5161	94.0	4.1	1.9
BRISBANE	1000.285	78.375	BN 2010		455798	388138	43063	24598	85.2	9.4	5.4	202694	186709	10941	5043	92.1	5.4	2.5
BRISBANE	1000.775	77.885	BN 2000		469461	411860	39718	17884	87.7	8.5	3.8	217749	201853	10716	5180	92.7	4.9	2.4
BRISBANE	1001.315	77.345	BN 1990		554485	412732	121822	19931	74.4	22.0	3.6	233868	190083	40787	2997	81.3	17.4	1.3
BRISBANE	1001.865	76.795	BN 1980		357587	319736	23561	14290	89.4	6.6	4.0	164502	154529	5846	4127	93.9	3.6	2.5
BRISBANE	1002.35	76.310	BN 1970		444458	368989	34059	41410	83.0	7.7	9.3	184104	170651	6416	7037	92.7	3.5	3.8
BRISBANE	1002.785	75.875	BN 1960		571203	463604	46654	60945	81.2	8.2	10.7	245720	217392	11480	16848	88.5	4.7	6.9
BRISBANE	1003.275	75.385	BN 1950		406807	361847	9137	35824	88.9	2.2	8.8	173581	165191	992	7398	95.2	0.6	4.3
BRISBANE	1003.775	74.885	BN 1940		405133	330959	37474	36700	81.7	9.2	9.1	180955	156906	12572	11477	86.7	6.9	6.3
BRISBANE	1004.3	74.360	BN 1930		346986	286115	16162	44709	82.5	4.7	12.9	149219	137998	4638	6582	92.5	3.1	4.4
BRISBANE	1004.81	73.850	BN 1920		544699	488061	15284	41354	89.6	2.8	7.6	214624	208719	3134	2770	97.2	1.5	1.3
BRISBANE	1005.325	73.335	BN 1910		526655	397545	78527	50583	75.5	14.9	9.6	197653	170400	21596	5658	86.2	10.9	2.9
BRISBANE	1005.87	72.790	BN 1900		399670	322554	64285	12831	80.7	16.1	3.2	154520	139187	13891	1442	90.1	9.0	0.9
BRISBANE	1006.3	72.360	BN 1890	Moggill Gauge	504765	461286	31034	12445	91.4	6.1	2.5	222266	213474	5849	2943	96.0	2.6	1.3
BRISBANE	1006.91	71.750	BN 1880		540594	463090	59892	17612	85.7	11.1	3.3	222499	211711	5668	5121	95.2	2.5	2.3
BRISBANE	1007.41	71.250	BN 1870		893635	695394	149714	48527	77.8	16.8	5.4	334569	298088	25109	11372	89.1	7.5	3.4
BRISBANE	1007.92	70.740	BN 1860		449763	402046	11866	35851	89.4	2.6	8.0	179494	174897	1353	3245	97.4	0.8	1.8
BRISBANE	1008.445	70.215	BN 1850		735885	690763	19426	25696	93.9	2.6	3.5	346454	336970	4477	5007	97.3	1.3	1.4
BRISBANE	1008.925	69.735	BN 1840		755176	716056	15060	24059	94.8	2.0	3.2	324257	316560	3445	4253	97.6	1.1	1.3
BRISBANE	1009.4	69.260	BN 1830		740203	678317	18305	43581	91.6	2.5	5.9	333301	322307	3982	7012	96.7	1.2	2.1
BRISBANE	1009.72	68.940	BN 1820		811928	734485	21606	55838	90.5	2.7	6.9	344150	338932	2296	2922	98.5	0.7	0.8
BRISBANE	1010.49	68.170	BN 1810		627096	596180	19281	11636	95.1	3.1	1.9	286312	281642	2190	2479	98.4	0.8	0.9
BRISBANE	1010.725	67.935	BN 1800		686738	659438	20898	6402	96.0	3.0	0.9	338551	331315	5276	1960	97.9	1.6	0.6
BRISBANE	1010.98	67.680	BN 1790		691381	653989	25029	12364	94.6	3.6	1.8	329012	320743	4701	3569	97.5	1.4	1.1
BRISBANE	1011.51	67.150	BN 1780		788892	697499	53176	38217	88.4	6.7	4.8	343526	329570	5849	8107	95.9	1.7	2.4
BRISBANE	1011.98	66.680	BN 1770		768693	654241	101958	12494	85.1	13.3	1.6	312344	298728	12369	1247	95.6	4.0	0.4
BRISBANE	1012.475	66.185	BN 1760		754567	646168	99809	8590	85.6	13.2	1.1	310805	294531	14330	1943	94.8	4.6	0.6
BRISBANE	1012.935	65.725	BN 1750		768103	668072	87473	12558	87.0	11.4	1.6	309654	303199	6111	344	97.9	2.0	0.1
BRISBANE	1013.445	65.215	BN 1740		787697	718233	41929	27536	91.2	5.3	3.5	328595	320733	7464	398	97.6	2.3	0.1
BRISBANE	1013.91	64.750	BN 1730		817126	535825	19691	261610	65.6	2.4	32.0	306305	235914	390	70001	77.0	0.1	22.9
BRISBANE	1014.31	64.350	BN 1720		821620	557683	68947	194990	67.9	8.4	23.7	312025	260958	1452	49616	83.6	0.5	15.9
BRISBANE	1014.61	64.050	BN 1710	Goodna Hospital Gauge	953822	710061	77468	166294	74.4	8.1	17.4	264167	218637	8164	37366	82.8	3.1	14.1
BRISBANE	1015.09	63.570	BN 1700		908263	866952	17130	24181	95.5	1.9	2.7	458515	450969	3441	4104	98.4	0.8	0.9
BRISBANE	1015.56	63.100	BN 1690		700452	657474	6447	36532	93.9	0.9	5.2	321989	314905	939	6145	97.8	0.3	1.9
BRISBANE	1016.14	62.520	BN 1680		757002	718828	23969	14205	95.0	3.2	1.9	347313	341501	2698	3113	98.3	0.8	0.9
BRISBANE	1016.64	62.020	BN 1670		862178	831409	25118	5652	96.4	2.9	0.7	284849	282404	469	1977	99.1	0.2	0.7
BRISBANE	1017.13	61.530	BN 1660		466582	384915	77142	4525	82.5	16.5	1.0	181203	166154	14047	1002	91.7	7.8	0.6
BRISBANE	1017.61	61.050	BN 1650		540474	462210	62629	15635	85.5	11.6	2.9	216590	213055	2748	787	98.4	1.3	0.4
BRISBANE	1017.92	60.740	BN 1640		500821	425293	57671	17856	84.9	11.5	3.6	202914	198943	3231	741	98.0	1.6	0.4
BRISBANE	1018.2	60.460	BN 1630		558809	517162	25733	15914	92.5	4.6	2.8	243418	239633	2029	1757	98.4	0.8	0.7
BRISBANE	1018.725	59.935	BN 1620		443699	421059	10679	11960	94.9	2.4	2.7	212911	208765	1954	2193	98.1	0.9	1.0
BRISBANE	1019.095	59.565	BN 1610		495632	466711	21525	7396	94.2	4.3	1.5	222666	220016	1752	898	98.8	0.8	0.4
BRISBANE	1019.49	59.170	BN 1600		560051	500255	38254	21543	89.3	6.8	3.8	242823	231123	8507	3193	95.2	3.5	1.3
BRISBANE	1019.865	58.795	BN 1590		447235	424229	12418	10589	94.9	2.8	2.4	211850	207433	2370	2047	97.9	1.1	1.0
BRISBANE	1020.115	58.545	BN 1580		608911	513384	50467	45061	84.3	8.3	7.4	248374	227858	12290	8226	91.7	4.9	3.3
BRISBANE	1020.525	58.135	BN 1570		855178	786457	50010	18711	92.0	5.8	2.2	331757	313602	10222	7934	94.5	3.1	2.4
BRISBANE	1020.83	57.830	BN 1560		639617	590633	38754	10231	92.3	6.1	1.6	305029	295871	7282	1877	97.0	2.4	0.6
BRISBANE	1021.095	57.565	BN 1550		461838	435820	16841	9177	94.4	3.6	2.0	210823	206740	3066	1017	98.1	1.5	0.5
BRISBANE	1021.539	57.121	BN 1540		522323	478757	24519	19047	91.7	4.7	3.6	227962	218252	5534	4176	95.7	2.4	1.8
BRISBANE	1021.715	56.945	BN 1530		592915	550449	33390	9076	92.8	5.6	1.5	240722	232494	7547	681	96.6	3.1	0.3
BRISBANE	1021.895	56.765	BN 1520		606555	558474	9134	38948	92.1	1.5	6.4	265201	255830	1688	7684	96.5	0.6	2.9
BRISBANE	1022.105	56.555	BN 1510		556098	535869	6262	13968	96.4	1.1	2.5	270233	267706	755	1772	99.1	0.3	0.7
BRISBANE	1022.575	56.085	BN 1500		860388	801411	20169	38809	93.1	2.3	4.5	352180	339315	3330	9535	96.3	0.9	2.7
BRISBANE	1023.04	55.620	BN 1490		670547	609509	45412	15626	90.9	6.8	2.3	322828	315447	4001	3380	97.7	1.2	1.0
BRISBANE	1023.57	55.090	BN 1480		699396	677247	16656	5493	96.8	2.4	0.8	322411	319038	2590	783	99.0	0.8	0.2
BRISBANE	1024.08	54.580	BN 1470		696432	656190	34020	6222	94.2	4.9	0.9	308335	298860	8482	993	96.9	2.8	0.3
BRISBANE	1024.563	54.097	BN 1460		645857	618880	19938	7039	95.8	3.1	1.1	263298	260269	2122	908	98.8	0.8	0.3
BRISBANE	1025.07	53.590	BN 1450		708908	677975	15618	15315	95.6	2.2	2.2	300902	294880	3048	2974	98.0	1.0	1.0
BRISBANE	1025.36	53.300	BN 1440		614681	574135	18687	21859	93.4	3.0	3.6	277822	273368	2826	1628	98.4	1.0	0.6
BRISBANE	1025.59	53.070	BN 1430		534096	502509	16438	15150	94.1	3.1	2.8	243042	239618	2136	1288	98.6	0.9	0.5

Table I-4 - HEC-RAS Predicted Conveyances

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	100 YEAR ARI							20 YEAR ARI						
					TOTAL CONVEYANCE (m^3/s)	CHANNEL CONVEYANCE (m^3/s)	LEFT CONVEYANCE (m^3/s)	RIGHT CONVEYANCE (m^3/s)	% CHANNEL CONVEYANCE	% LEFT CONVEYANCE	% RIGHT CONVEYANCE	TOTAL CONVEYANCE (m^3/s)	CHANNEL CONVEYANCE (m^3/s)	LEFT CONVEYANCE (m^3/s)	RIGHT CONVEYANCE (m^3/s)	% CHANNEL CONVEYANCE	% LEFT CONVEYANCE	% RIGHT CONVEYANCE
BRISBANE	1026.17	52.490	BN 1420		603147	580125	10124	12898	96.2	1.7	2.1	273264	269735	1970	1559	98.7	0.7	0.6
BRISBANE	1026.68	51.980	BN 1410	Mt Ommaney Gauge	617600	580004	31627	5968	93.9	5.1	1.0	277543	271816	5019	708	97.9	1.8	0.3
BRISBANE	1026.9	51.760	BN 1400		583010	540872	28929	13210	92.8	5.0	2.3	278512	271580	4203	2729	97.5	1.5	1.0
BRISBANE	1027.16	51.500	BN 1390		562209	543388	16645	2177	96.7	3.0	0.4	277066	273562	3267	236	98.7	1.2	0.1
BRISBANE	1027.68	50.980	BN 1380		1244963	1159168	36323	49472	93.1	2.9	4.0	525222	507354	8713	9155	96.6	1.7	1.7
BRISBANE	1028.18	50.480	BN 1370		1315831	1196068	42133	77631	90.9	3.2	5.9	537048	515977	6018	15053	96.1	1.1	2.8
BRISBANE	1028.68	49.980	BN 1360		1117645	1066603	46106	4936	95.4	4.1	0.4	465833	464263	1073	498	99.7	0.2	0.1
BRISBANE	1028.72	49.940	BN1350	Centenary Bridge	Bridge							Bridge						
BRISBANE	1028.76	49.900	BN 1340		940823	886758	33871	20193	94.3	3.6	2.1	387264	382316	2188	2761	98.7	0.6	0.7
BRISBANE	1029.2	49.460	BN 1330		868088	786563	51851	29674	90.6	6.0	3.4	383289	375322	6037	1930	97.9	1.6	0.5
BRISBANE	1029.68	48.980	BN 1320		1119674	1014903	57329	47442	90.6	5.1	4.2	530062	518847	6835	4380	97.9	1.3	0.8
BRISBANE	1030.22	48.440	BN 1310		1259074	1092284	136363	30428	86.8	10.8	2.4	521416	508113	8928	4374	97.4	1.7	0.8
BRISBANE	1030.87	47.790	BN 1300		1204430	1148975	40184	15272	95.4	3.3	1.3	481932	477740	1813	2380	99.1	0.4	0.5
BRISBANE	1031.26	47.400	BN 1290		634870	614754	14327	5790	96.8	2.3	0.9	283202	282171	579	452	99.6	0.2	0.2
BRISBANE	1031.7	46.960	BN 1280	Darra Wharf Gauge	354950	346986	3041	4924	97.8	0.9	1.4	176430	175253	435	742	99.3	0.2	0.4
BRISBANE	1031.995	46.665	BN 1270		460001	443031	7230	9740	96.3	1.6	2.1	207490	205185	1024	1282	98.9	0.5	0.6
BRISBANE	1032.23	46.430	BN 1260		555440	532132	11046	12263	95.8	2.0	2.2	255504	251530	2016	1958	98.4	0.8	0.8
BRISBANE	1032.585	46.075	BN 1250		441720	435663	892	5164	98.6	0.2	1.2	228701	227858	110	734	99.6	0.0	0.3
BRISBANE	1033.08	45.580	BN 1240		631484	609909	7829	13746	96.6	1.2	2.2	318819	317637	620	562	99.6	0.2	0.2
BRISBANE	1033.37	45.290	BN 1230		589070	575256	5278	8535	97.7	0.9	1.4	278324	276691	463	1170	99.4	0.2	0.4
BRISBANE	1033.9	44.760	BN 1220		606348	591179	9194	5975	97.5	1.5	1.0	299561	298232	478	851	99.6	0.2	0.3
BRISBANE	1034.37	44.290	BN 1210		600024	588048	4493	7482	98.0	0.7	1.2	300095	298163	967	965	99.4	0.3	0.3
BRISBANE	1034.89	43.770	BN 1200	Sherwood Gauge	507150	484222	6947	15981	95.5	1.4	3.2	256096	253753	1162	1181	99.1	0.5	0.5
BRISBANE	1035.414	43.246	BN 1190		506035	494654	9503	1878	97.8	1.9	0.4	239803	237948	1643	212	99.2	0.7	0.1
BRISBANE	1035.9	42.760	BN 1180		428992	415498	9291	4204	96.9	2.2	1.0	217902	216256	864	782	99.2	0.4	0.4
BRISBANE	1036.46	42.200	BN 1170		446921	438687	5043	3191	98.2	1.1	0.7	218914	218150	162	601	99.7	0.1	0.3
BRISBANE	1036.77	41.890	BN 1160		485034	468439	5766	10829	96.6	1.2	2.2	214626	212243	854	1529	98.9	0.4	0.7
BRISBANE	1036.915	41.745	BN 1150		478509	471145	5046	2317	98.5	1.1	0.5	252295	251867	249	180	99.8	0.1	0.1
BRISBANE	1037.09	41.570	BN 1140		429873	421457	7264	1153	98.0	1.7	0.3	232501	231773	608	119	99.7	0.3	0.1
BRISBANE	1037.11	41.550	BN 1130	Indooroopilly Bridge	Bridge							Bridge						
BRISBANE	1037.175	41.485	BN 1120		515979	507053	7194	1732	98.3	1.4	0.3	277412	276355	871	186	99.6	0.3	0.1
BRISBANE	1037.285	41.375	BN 1110	Clarence Road Gauge	549500	542132	5451	1918	98.7	1.0	0.3	283812	283022	578	211	99.7	0.2	0.1
BRISBANE	1037.625	41.035	BN 1100		593720	572209	17029	4483	96.4	2.9	0.8	285509	282308	2475	726	98.9	0.9	0.3
BRISBANE	1038.085	40.575	BN 1090		1311814	1239753	64049	8013	94.5	4.9	0.6	625041	623041	961	1039	99.7	0.2	0.2
BRISBANE	1038.6	40.060	BN 1080		1220366	1086038	62258	72070	89.0	5.1	5.9	466150	460354	414	5382	98.8	0.1	1.2
BRISBANE	1039.1	39.560	BN 1070		1240656	1053839	53216	133601	84.9	4.3	10.8	471928	459074	1206	11648	97.3	0.3	2.5
BRISBANE	1039.565	39.095	BN 1060	Oxley Creek Gauge	1359194	1184974	48087	126133	87.2	3.5	9.3	527176	516993	535	9648	98.1	0.1	1.8
BRISBANE	1040.09	38.570	BN 1050	King Authur Terrace Gauge	1483285	1391325	2132	89828	93.8	0.1	6.1	740731	735704	223	4804	99.3	0.0	0.6
BRISBANE	1040.49	38.170	BN 1040		1114236	1038776	3186	72274	93.2	0.3	6.5	582095	577546	353	4197	99.2	0.1	0.7
BRISBANE	1041.01	37.650	BN 1030		682433	651733	10486	20214	95.5	1.5	3.0	333385	332293	239	853	99.7	0.1	0.3
BRISBANE	1041.23	37.430	BN 1020		673236	630535	27366	15335	93.7	4.1	2.3	315679	313795	1064	821	99.4	0.3	0.3
BRISBANE	1041.46	37.200	BN 1010	Tennyson Power House Gauge	629956	607862	8447	13648	96.5	1.3	2.2	307077	305059	1509	510	99.3	0.5	0.2
BRISBANE	1041.7	36.960	BN 1000		762624	749205	1790	11629	98.2	0.2	1.5	444335	443647	199	489	99.8	0.0	0.1
BRISBANE	1041.96	36.700	BN 990	Yeronga Street Gauge	553664	537701	5246	10718	97.1	0.9	1.9	293475	292850	414	211	99.8	0.1	0.1
BRISBANE	1042.235	36.425	BN 980		506060	500748	1178	4135	99.0	0.2	0.8	285579	285174	125	280	99.9	0.0	0.1
BRISBANE	1042.515	36.145	BN 970		577911	564948	5083	7881	97.8	0.9	1.4	322682	321439	768	476	99.6	0.2	0.1
BRISBANE	1042.91	35.750	BN 960		500417	488412	10009	1995	97.6	2.0	0.4	249493	248737	500	256	99.7	0.2	0.1
BRISBANE	1043.725	34.935	BN 950		574763	570035	2590	2138	99.2	0.5	0.4	297360	296959	137	265	99.9	0.0	0.1
BRISBANE	1044.06	34.600	BN 940	Sandy Creek Gauge	531749	525826	4971	951	98.9	0.9	0.2	307127	306330	701	97	99.7	0.2	0.0
BRISBANE	1044.34	34.320	BN 930		460849	456230	3992	627	99.0	0.9	0.1	257032	256608	363	62	99.8	0.1	0.0
BRISBANE	1044.605	34.055	BN 920		505540	495677	4987	4877	98.0	1.0	1.0	271950	271277	250	422	99.8	0.1	0.2
BRISBANE	1044.86	33.800	BN 910		542911	522117	18389	2405	96.2	3.4	0.4	273568	272897	499	172	99.8	0.2	0.1
BRISBANE	1045.4	33.260	BN 900		536063	517630	14605	3828	96.6	2.7	0.7	261210	260159	441	609	99.6	0.2	0.2
BRISBANE	1045.885	32.775	BN 890		505967	480626	13986	11355	95.0	2.8	2.2	243150	242254	360	537	99.6	0.1	0.2
BRISBANE	1046.18	32.480	BN 880		690501	677545	8392	4563	98.1	1.2	0.7	419853	419344	409	100	99.9	0.1	0.0
BRISBANE	1046.34	32.320	BN 870	Dutton Park Cemetery Gauge	666021	663721	1097	1203	99.7	0.2	0.2	423747	423663	60	24	100.0	0.0	0.0
BRISBANE	1046.58	32.080	BN 860		612509	605306	3797	3407	98.8	0.6	0.6	350967	350371	514	82	99.8	0.1	0.0
BRISBANE	1046.9	31.760	BN 850		447127	437991	835	8301	98.0	0.2	1.9	227681	227386	87	208	99.9	0.0	0.1
BRISBANE	1047.35	31.310	BN 840		394397	389382	303	4713	98.7	0.1	1.2	228129	227891	29	209	99.9	0.0	0.1
BRISBANE	1047.915	30.745	BN 830	Highgate Hill Gauge	610837	599179	1421	10237	98.1	0.2	1.7	381709	381360	137	211	99.9	0.0	0.1

Table I-4 - HEC-RAS Predicted Conveyances

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	100 YEAR ARI							20 YEAR ARI						
					TOTAL CONVEYANCE (m^3/s)	CHANNEL CONVEYANCE (m^3/s)	LEFT CONVEYANCE (m^3/s)	RIGHT CONVEYANCE (m^3/s)	% CHANNEL CONVEYANCE	% LEFT CONVEYANCE	% RIGHT CONVEYANCE	TOTAL CONVEYANCE (m^3/s)	CHANNEL CONVEYANCE (m^3/s)	LEFT CONVEYANCE (m^3/s)	RIGHT CONVEYANCE (m^3/s)	% CHANNEL CONVEYANCE	% LEFT CONVEYANCE	% RIGHT CONVEYANCE
BRISBANE	1048.375	30.285	BN 820		789939	761835	3780	24324	96.4	0.5	3.1	438190	437986	76	129	100.0	0.0	0.0
BRISBANE	1048.89	29.770	BN 810	St Lucia Ferry Gauge	522367	515928	4228	2212	98.8	0.8	0.4	241955	241703	188	65	99.9	0.1	0.0
BRISBANE	1049.12	29.540	BN 800		609455	600734	5165	3556	98.6	0.8	0.6	331682	331230	249	203	99.9	0.1	0.1
BRISBANE	1049.37	29.290	BN 790		529125	523865	4310	950	99.0	0.8	0.2	306492	306217	227	48	99.9	0.1	0.0
BRISBANE	1049.59	29.070	BN 780		658504	649525	6366	2613	98.6	1.0	0.4	399118	398760	209	149	99.9	0.1	0.0
BRISBANE	1049.87	28.790	BN 770		588985	583373	4040	1572	99.0	0.7	0.3	334946	334650	98	198	99.9	0.0	0.1
BRISBANE	1050.43	28.230	BN 760		910072	891530	13977	4564	98.0	1.5	0.5	469012	468440	187	385	99.9	0.0	0.1
BRISBANE	1050.86	27.800	BN 750		848181	837211	8508	2462	98.7	1.0	0.3	469174	468417	611	146	99.8	0.1	0.0
BRISBANE	1051.36	27.300	BN 740		1013430	998659	11696	3074	98.5	1.2	0.3	618240	617437	583	220	99.9	0.1	0.0
BRISBANE	1051.895	26.765	BN 730		736167	721833	11827	2508	98.1	1.6	0.3	389061	388457	448	157	99.8	0.1	0.0
BRISBANE	1052.31	26.350	BN 720		779061	773012	4525	1524	99.2	0.6	0.2	410680	410220	357	103	99.9	0.1	0.0
BRISBANE	1052.37	26.290	BN 710	Merivale Bridge	Bridge							Bridge						
BRISBANE	1052.39	26.270	BN 700		776336	772353	2789	1195	99.5	0.4	0.2	415844	415262	472	110	99.9	0.1	0.0
BRISBANE	1052.595	26.065	BN 690		801070	797902	2665	503	99.6	0.3	0.1	472383	472131	217	36	99.9	0.0	0.0
BRISBANE	1052.607	26.053	BN 680	William Jolly Bridge	Bridge							Bridge						
BRISBANE	1052.64	26.020	BN 670		599039	596645	1319	1076	99.6	0.2	0.2	380066	379791	199	76	99.9	0.1	0.0
BRISBANE	1052.865	25.795	BN 660	Montague Road Gauge	527861	526418	1334	109	99.7	0.3	0.0	352647	352628	8	12	100.0	0.0	0.0
BRISBANE	1053.32	25.340	BN 650		362628	362357	43	228	99.9	0.0	0.1	194123	194087	10	27	100.0	0.0	0.0
BRISBANE	1053.356	25.304	BN 640	Victoria Bridge	Bridge							Bridge						
BRISBANE	1053.385	25.275	BN630		356090	354925	818	347	99.7	0.2	0.1	186868	186753	95	20	99.9	0.1	0.0
BRISBANE	1053.9	24.760	BN 620		372589	369592	531	2466	99.2	0.1	0.7	217250	216909	4	338	99.8	0.0	0.2
BRISBANE	1054.64	24.020	BN 610		617361	614118	307	2935	99.5	0.0	0.5	370375	369714	31	630	99.8	0.0	0.2
BRISBANE	1054.66	24.000	BN 600	Captain Cook Bridge	Bridge							Bridge						
BRISBANE	1054.68	23.980	BN 590		579194	573121		6073	99.0	0.0	1.0	367689	366954		735	99.8	0.0	0.2
BRISBANE	1054.97	23.690	BN 560		972507	964703	1494	6311	99.2	0.2	0.6	629645	628799	142	705	99.9	0.0	0.1
BRISBANE	1055.28	23.380	BN 550		1011175	1005454	4394	1327	99.4	0.4	0.1	658020	657449	401	171	99.9	0.1	0.0
BRISBANE	1055.42	23.240	BN 540		961915	958317	1491	2107	99.6	0.2	0.2	596027	595638	67	322	99.9	0.0	0.1
BRISBANE	1055.96	22.700	BN 530	Port Office Gauge	1051042	1047576	2568	898	99.7	0.2	0.1	643082	642634	448		99.9	0.1	0.0
BRISBANE	1056.4	22.260	BN 520		801994	799122	2534	338	99.6	0.3	0.0	491617	491070	547		99.9	0.1	0.0
BRISBANE	1056.695	21.965	BN 510		917018	914137	2733	148	99.7	0.3	0.0	598695	598141	554	0	99.9	0.1	0.0
BRISBANE	1056.865	21.795	BN 500		572493	571311	1144	38	99.8	0.2	0.0	395262	395081	180		100.0	0.0	0.0
BRISBANE	1056.92	21.740	BN 495	Story Bridge	Bridge							Bridge						
BRISBANE	1056.95	21.710	BN 490		596689	596329		361	99.9	0.0	0.1	425017	425017			100.0	0.0	0.0
BRISBANE	1057.09	21.570	BN 480		852010	848957	1010	2044	99.6	0.1	0.2	623767	623217	244	307	99.9	0.0	0.0
BRISBANE	1057.53	21.130	BN 470		671781	671294	369	118	99.9	0.1	0.0	461470	461432	23	15	100.0	0.0	0.0
BRISBANE	1058.04	20.620	BN 460		507478	506652	338	488	99.8	0.1	0.1	330855	330696	50	109	100.0	0.0	0.0
BRISBANE	1058.23	20.430	BN 450		509576	508102	707	767	99.7	0.1	0.2	338824	338632	151	41	99.9	0.0	0.0
BRISBANE	1058.53	20.130	BN 440		547876	547129	283	464	99.9	0.1	0.1	394732	394643	48	40	100.0	0.0	0.0
BRISBANE	1058.735	19.925	BN 430		476336	474166	542	1628	99.5	0.1	0.3	340108	339642	76	390	99.9	0.0	0.1
BRISBANE	1059.035	19.625	BN 420		421711	421196	135	380	99.9	0.0	0.1	313671	313645	9	17	100.0	0.0	0.0
BRISBANE	1059.54	19.120	BN 410		508420	507309	54	1056	99.8	0.0	0.2	357728	357476	3	249	99.9	0.0	0.1
BRISBANE	1059.99	18.670	BN 400		466569	465238	260	1071	99.7	0.1	0.2	318768	318578	88	103	99.9	0.0	0.0
BRISBANE	1060.345	18.315	BN 390		513249	512957	172	120	99.9	0.0	0.0	390772	390727	30	16	100.0	0.0	0.0
BRISBANE	1060.535	18.125	BN 380		604669	604251	170	248	99.9	0.0	0.0	470170	470089	29	52	100.0	0.0	0.0
BRISBANE	1061.015	17.645	BN 370		604381	603570	776	34	99.9	0.1	0.0	443928	443843	79	6	100.0	0.0	0.0
BRISBANE	1061.53	17.130	BN 360		563580	562977	602		99.9	0.1	0.0	432709	432537	172		100.0	0.0	0.0
BRISBANE	1062.02	16.640	BN 350		616367	615458	689	219	99.9	0.1	0.0	468560	468115	385	60	99.9	0.1	0.0
BRISBANE	1062.535	16.125	BN 340		645217	643290	605	1322	99.7	0.1	0.2	463831	463203	195	433	99.9	0.0	0.1
BRISBANE	1062.94	15.720	BN 330		800826	800063	440	323	99.9	0.1	0.0	577162	576827	154	182	99.9	0.0	0.0
BRISBANE	1063.31	15.350	BN 320	Newstead Park Gauge	536186	536038	148		100.0	0.0	0.0	406440	406413	27		100.0	0.0	0.0
BRISBANE	1063.645	15.015	BN 310	Cresent Road Gauge	621278	618467	2145	666	99.5	0.3	0.1	500465	499424	816	224	99.8	0.2	0.0
BRISBANE	1064	14.660	BN 300		670769	669123	1515	131	99.8	0.2	0.0	541442	540879	532	31	99.9	0.1	0.0
BRISBANE	1064.49	14.170	BN 290		635085	634070	888	127	99.8	0.1	0.0	515419	515158	229	32	99.9	0.0	0.0
BRISBANE	1065.01	13.650	BN 280		813116	812164	689	263	99.9	0.1	0.0	660492	660314	73	105	100.0	0.0	0.0
BRISBANE	1065.503	13.157	BN 270		919610	918778	832		99.9	0.1	0.0	758023	757863	160		100.0	0.0	0.0
BRISBANE	1065.99	12.670	BN 260	Caimcross Dock Gauge	1086542	1086542			100.0	0.0	0.0	904860	904860			100.0	0.0	0.0
BRISBANE	1066.505	12.155	BN 250		976146	975637		509	99.9	0.0	0.1	811936	811905		31	100.0	0.0	0.0
BRISBANE	1067.02	11.640	BN 240		1036259	1030838	2121	3300	99.5	0.2	0.3	857339	856200	724	414	99.9	0.1	0.0
BRISBANE	1067.485	11.175	BN 230		766947	762205	645	4097	99.4	0.1	0.5	617834	616266	173	1395	99.7	0.0	0.2
BRISBANE	1067.965	10.695	BN 220		724184	722411	38	1735	99.8	0.0	0.2	598741	598108	12	622	99.9	0.0	0.1

Table I-4 - HEC-RAS Predicted Conveyances

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	100 YEAR ARI TOTAL CONVEYANCE (m^3/s)	CHANNEL CONVEYANCE (m^3/s)	LEFT CONVEYANCE (m^3/s)	RIGHT CONVEYANCE (m^3/s)	% CHANNEL CONVEYANCE	% LEFT CONVEYANCE	% RIGHT CONVEYANCE	20 YEAR ARI TOTAL CONVEYANCE (m^3/s)	CHANNEL CONVEYANCE (m^3/s)	LEFT CONVEYANCE (m^3/s)	RIGHT CONVEYANCE (m^3/s)	% CHANNEL CONVEYANCE	% LEFT CONVEYANCE	% RIGHT CONVEYANCE
BRISBANE	1068.66	10.000	BN 210		628796	627875	220	701	99.9	0.0	0.1	524757	524407	60	291	99.9	0.0	0.1
BRISBANE	1069.045	9.615	BN 200		653733	652569		1164	99.8	0.0	0.2	558390	557846		545	99.9	0.0	0.1
BRISBANE	1069.535	9.125	BN 190	Bulimba Power House Gauge	703154	701974		1180	99.8	0.0	0.2	605729	604998		731	99.9	0.0	0.1
BRISBANE	1070.025	8.635	BN 180		775320	774695	4	621	99.9	0.0	0.1	676164	675859	2	303	100.0	0.0	0.0
BRISBANE	1070.53	8.130	BN 170		718031	717738	274	19	100.0	0.0	0.0	627123	627018	103	3	100.0	0.0	0.0
BRISBANE	1071.04	7.620	BN 160		731226	730142	364	720	99.9	0.0	0.1	646346	645727	153	466	99.9	0.0	0.1
BRISBANE	1071.52	7.140	BN 150		1209461	1208298	749	414	99.9	0.1	0.0	1107901	1107385	420	95	100.0	0.0	0.0
BRISBANE	1072.015	6.645	BN 140		772750	772747		3	100.0	0.0	0.0	690071	690071		0	100.0	0.0	0.0
BRISBANE	1072.515	6.145	BN 130		908334	907136	1096	102	99.9	0.1	0.0	835138	834481	606	50	99.9	0.1	0.0
BRISBANE	1072.995	5.665	BN 120		918726	918552	65	109	100.0	0.0	0.0	842304	842214	35	55	100.0	0.0	0.0
BRISBANE	1073.485	5.175	BN 110		775434	774716	79	639	99.9	0.0	0.1	715218	714754	44	419	99.9	0.0	0.1
BRISBANE	1074	4.660	BN 100		795478	795207	96	175	100.0	0.0	0.0	740730	740558	56	115	100.0	0.0	0.0
BRISBANE	1074.46	4.200	BN 90		803353	803217	76	60	100.0	0.0	0.0	754708	754623	48	38	100.0	0.0	0.0
BRISBANE	1074.985	3.675	BN 80		666783	666654	55	75	100.0	0.0	0.0	636100	636009	39	53	100.0	0.0	0.0
BRISBANE	1075.48	3.180	BN 70		740283	735674	61	4548	99.4	0.0	0.6	709723	706016	46	3661	99.5	0.0	0.5
BRISBANE	1076	2.660	BN 60		1086764	1080048	86	6630	99.4	0.0	0.6	1041255	1035731	64	5459	99.5	0.0	0.5
BRISBANE	1076.495	2.165	BN 50		695470	695416		53	100.0	0.0	0.0	678503	678457		46	100.0	0.0	0.0
BRISBANE	1077.01	1.650	BN 40		1037931	1028392	533	9007	99.1	0.1	0.9	1016981	1008152	465	8364	99.1	0.0	0.8
BRISBANE	1077.51	1.150	BN 30		1921670	1921328	26	316	100.0	0.0	0.0	1894493	1894202	22	269	100.0	0.0	0.0
BRISBANE	1078.04	0.620	BN 20		2148044	2146871	1045	128	99.9	0.0	0.0	2128242	2127217	917	108	100.0	0.0	0.0
BRISBANE	1078.525	0.135	BN 10		1320378	1295085	25237	57	98.1	1.9	0.0	1320378	1295085	25237	57	98.1	1.9	0.0
BRISBANE	1078.66	0.000	-	Western Inner Bar Gauge	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix J - Design Hydraulic Model Results

TABLE J-1 - Flood Levels for the Regulation Lines & Revegetation Case for Flood Events 100 Year ARI to 2 Year ARI

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	REGULATION LINES & REVEGETATION IN PLACE					
					100 YEAR ARI WL (m AHD)	50 YEAR ARI WL (m AHD)	20 YEAR ARI WL (m AHD)	10 YEAR ARI WL (m AHD)	5 YEAR ARI WL (m AHD)	2 YEAR ARI WL (m AHD)
BRISBANE	1000	78.66	BN 2020		22.79	19.75	13.30	7.34	4.83	1.83
BRISBANE	1000.285	78.375	BN 2010		22.57	19.56	13.12	7.24	4.76	1.80
BRISBANE	1000.775	77.885	BN 2000		22.31	19.32	12.87	7.08	4.63	1.76
BRISBANE	1001.315	77.345	BN 1990		22.22	19.21	12.71	6.94	4.50	1.70
BRISBANE	1001.865	76.795	BN 1980		21.69	18.74	12.29	6.71	4.32	1.63
BRISBANE	1002.35	76.310	BN 1970		21.50	18.53	11.98	6.49	4.17	1.59
BRISBANE	1002.785	75.875	BN 1960		21.48	18.51	11.92	6.42	4.09	1.56
BRISBANE	1003.275	75.385	BN 1950		21.15	18.19	11.60	6.24	3.96	1.52
BRISBANE	1003.775	74.885	BN 1940		20.88	17.95	11.34	6.05	3.82	1.50
BRISBANE	1004.3	74.360	BN 1930		20.42	17.54	10.91	5.84	3.68	1.49
BRISBANE	1004.81	73.850	BN 1920		20.39	17.49	10.79	5.72	3.58	1.48
BRISBANE	1005.325	73.335	BN 1910		20.20	17.32	10.63	5.58	3.46	1.47
BRISBANE	1005.87	72.790	BN 1900		19.88	17.04	10.37	5.38	3.30	1.45
BRISBANE	1006.3	72.360	BN 1890	Moggill Gauge	19.72	16.90	10.27	5.29	3.23	1.44
BRISBANE	1006.91	71.750	BN 1880		19.52	16.69	10.08	5.16	3.15	1.42
BRISBANE	1007.41	71.250	BN 1870		19.42	16.60	9.99	5.08	3.08	1.40
BRISBANE	1007.92	70.740	BN 1860		19.09	16.33	9.79	4.94	3.00	1.38
BRISBANE	1008.445	70.215	BN 1850		18.96	16.21	9.70	4.88	2.95	1.36
BRISBANE	1008.925	69.735	BN 1840		18.89	16.14	9.63	4.83	2.92	1.35
BRISBANE	1009.4	69.260	BN 1830		18.79	16.04	9.56	4.79	2.89	1.35
BRISBANE	1009.72	68.940	BN 1820		18.73	16.00	9.53	4.77	2.88	1.34
BRISBANE	1010.49	68.170	BN 1810		18.43	15.75	9.36	4.68	2.83	1.33
BRISBANE	1010.725	67.935	BN 1800		18.44	15.75	9.37	4.68	2.82	1.33
BRISBANE	1010.98	67.680	BN 1790		18.38	15.69	9.33	4.66	2.81	1.33
BRISBANE	1011.51	67.150	BN 1780		18.37	15.68	9.28	4.62	2.79	1.32
BRISBANE	1011.98	66.680	BN 1770		18.36	15.63	9.23	4.58	2.76	1.32
BRISBANE	1012.475	66.185	BN 1760		18.31	15.56	9.16	4.53	2.73	1.31
BRISBANE	1012.935	65.725	BN 1750		18.20	15.47	9.08	4.48	2.70	1.30
BRISBANE	1013.445	65.215	BN 1740		18.11	15.38	9.01	4.44	2.67	1.29
BRISBANE	1013.91	64.750	BN 1730		18.05	15.31	8.94	4.38	2.63	1.28
BRISBANE	1014.31	64.350	BN 1720		18.01	15.25	8.88	4.34	2.60	1.27
BRISBANE	1014.61	64.050	BN 1710	Goodna Hospital Gauge	18.05	15.27	8.83	4.30	2.58	1.27
BRISBANE	1015.09	63.570	BN 1700		17.91	15.16	8.80	4.29	2.57	1.27
BRISBANE	1015.56	63.100	BN 1690		17.75	15.03	8.71	4.25	2.55	1.26
BRISBANE	1016.14	62.520	BN 1680		17.67	14.95	8.65	4.21	2.53	1.26
BRISBANE	1016.64	62.020	BN 1670		17.60	14.87	8.56	4.13	2.47	1.24
BRISBANE	1017.13	61.530	BN 1660		17.37	14.66	8.38	3.98	2.37	1.22
BRISBANE	1017.61	61.050	BN 1650		17.26	14.47	8.21	3.87	2.30	1.20
BRISBANE	1017.92	60.740	BN 1640		17.14	14.34	8.09	3.80	2.26	1.19
BRISBANE	1018.2	60.460	BN 1630		17.08	14.29	8.05	3.77	2.25	1.19
BRISBANE	1018.725	59.935	BN 1620		16.76	14.01	7.88	3.68	2.20	1.18
BRISBANE	1019.095	59.565	BN 1610		16.62	13.87	7.77	3.63	2.17	1.17
BRISBANE	1019.49	59.170	BN 1600		16.49	13.76	7.68	3.57	2.14	1.17
BRISBANE	1019.865	58.795	BN 1590		16.22	13.53	7.54	3.50	2.10	1.16
BRISBANE	1020.115	58.545	BN 1580		16.29	13.57	7.53	3.48	2.09	1.16
BRISBANE	1020.525	58.135	BN 1570		16.28	13.54	7.49	3.44	2.06	1.15
BRISBANE	1020.83	57.830	BN 1560		16.11	13.41	7.41	3.40	2.04	1.15
BRISBANE	1021.095	57.565	BN 1550		15.91	13.24	7.31	3.36	2.02	1.14
BRISBANE	1021.539	57.121	BN 1540		15.74	13.09	7.19	3.29	1.98	1.14
BRISBANE	1021.715	56.945	BN 1530		15.78	13.10	7.17	3.27	1.97	1.13
BRISBANE	1021.895	56.765	BN 1520		15.69	13.04	7.13	3.24	1.95	1.13
BRISBANE	1022.105	56.555	BN 1510		15.49	12.87	7.02	3.19	1.93	1.13
BRISBANE	1022.575	56.085	BN 1500		15.52	12.87	7.01	3.18	1.92	1.12
BRISBANE	1023.04	55.620	BN 1490		15.23	12.64	6.89	3.14	1.90	1.12
BRISBANE	1023.57	55.090	BN 1480		15.17	12.60	6.85	3.11	1.88	1.12
BRISBANE	1024.08	54.580	BN 1470		15.12	12.54	6.79	3.07	1.87	1.11
BRISBANE	1024.563	54.097	BN 1460		15.05	12.47	6.72	3.02	1.84	1.11
BRISBANE	1025.07	53.590	BN 1450		14.95	12.38	6.65	2.98	1.81	1.10
BRISBANE	1025.36	53.300	BN 1440		14.80	12.25	6.57	2.94	1.80	1.10
BRISBANE	1025.59	53.070	BN 1430		14.61	12.10	6.48	2.91	1.78	1.10
BRISBANE	1026.17	52.490	BN 1420		14.50	11.99	6.40	2.86	1.75	1.09
BRISBANE	1026.68	51.980	BN 1410	Mt Ommaney Gauge	14.38	11.87	6.30	2.81	1.73	1.09
BRISBANE	1026.9	51.760	BN 1400		14.21	11.75	6.24	2.79	1.72	1.09
BRISBANE	1027.16	51.500	BN 1390		14.12	11.68	6.20	2.77	1.71	1.09
BRISBANE	1027.68	50.980	BN 1380		14.19	11.70	6.18	2.75	1.70	1.08
BRISBANE	1028.18	50.480	BN 1370		14.19	11.70	6.17	2.74	1.69	1.08
BRISBANE	1028.68	49.980	BN 1360		14.10	11.62	6.11	2.71	1.68	1.08
BRISBANE	1028.72	49.940	BN1350	Centenary Bridge						
BRISBANE	1028.76	49.900	BN 1340		13.97	11.49	6.02	2.67	1.66	1.08
BRISBANE	1029.2	49.460	BN 1330		13.80	11.37	5.95	2.64	1.65	1.07
BRISBANE	1029.68	48.980	BN 1320		13.80	11.37	5.95	2.64	1.64	1.07
BRISBANE	1030.22	48.440	BN 1310		13.85	11.35	5.93	2.62	1.64	1.07
BRISBANE	1030.87	47.790	BN 1300		13.81	11.33	5.89	2.60	1.63	1.07
BRISBANE	1031.26	47.400	BN 1290		13.69	11.24	5.83	2.57	1.61	1.07
BRISBANE	1031.7	46.960	BN 1280	Darra Wharf Gauge	13.33	10.95	5.68	2.51	1.58	1.06
BRISBANE	1031.995	46.665	BN 1270		13.41	10.96	5.63	2.47	1.57	1.06
BRISBANE	1032.23	46.430	BN 1260		13.28	10.86	5.57	2.44	1.55	1.06
BRISBANE	1032.585	46.075	BN 1250		13.03	10.67	5.47	2.41	1.54	1.05
BRISBANE	1033.08	45.580	BN 1240		12.90	10.53	5.38	2.37	1.52	1.05
BRISBANE	1033.37	45.290	BN 1230		12.83	10.45	5.32	2.34	1.51	1.05
BRISBANE	1033.9	44.760	BN 1220		12.57	10.25	5.22	2.30	1.49	1.05
BRISBANE	1034.37	44.290	BN 1210		12.42	10.13	5.14	2.27	1.48	1.05
BRISBANE	1034.89	43.770	BN 1200	Sherwood Gauge	12.32	10.02	5.07	2.24	1.46	1.04

TABLE J-1 - Flood Levels for the Regulation Lines & Revegetation Case for Flood Events 100 Year ARI to 2 Year ARI

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	REGULATION LINES & REVEGETATION IN PLACE					
					100 YEAR ARI WL (m AHD)	50 YEAR ARI WL (m AHD)	20 YEAR ARI WL (m AHD)	10 YEAR ARI WL (m AHD)	5 YEAR ARI WL (m AHD)	2 YEAR ARI WL (m AHD)
BRISBANE	1035.414	43.246	BN 1190		12.08	9.82	4.95	2.19	1.44	1.04
BRISBANE	1035.9	42.760	BN 1180		11.76	9.55	4.79	2.13	1.41	1.04
BRISBANE	1036.46	42.200	BN 1170		11.46	9.30	4.64	2.07	1.39	1.03
BRISBANE	1036.77	41.890	BN 1160		11.39	9.21	4.56	2.03	1.37	1.03
BRISBANE	1036.915	41.745	BN 1150		11.23	9.10	4.52	2.01	1.36	1.03
BRISBANE	1037.09	41.570	BN 1140		11.20	9.07	4.51	2.01	1.36	1.03
BRISBANE	1037.11	41.550	BN 1130	Indooroopilly Bridge						
BRISBANE	1037.175	41.485	BN 1120		11.10	9.00	4.35	1.95	1.34	1.02
BRISBANE	1037.285	41.375	BN 1110	Clarence Road Gauge	11.04	8.94	4.32	1.94	1.33	1.02
BRISBANE	1037.625	41.035	BN 1100		11.02	8.92	4.28	1.92	1.32	1.02
BRISBANE	1038.085	40.575	BN 1090		10.99	8.88	4.26	1.91	1.32	1.02
BRISBANE	1038.6	40.060	BN 1080		10.98	8.84	4.21	1.89	1.31	1.02
BRISBANE	1039.1	39.560	BN 1070		11.05	8.90	4.21	1.87	1.30	1.02
BRISBANE	1039.565	39.095	BN 1060	Oxley Creek Gauge	11.00	8.83	4.17	1.86	1.30	1.02
BRISBANE	1040.09	38.570	BN 1050	King Authur Terrace Gauge	10.93	8.79	4.17	1.86	1.30	1.02
BRISBANE	1040.49	38.170	BN 1040		10.80	8.68	4.11	1.85	1.29	1.01
BRISBANE	1041.01	37.650	BN 1030		10.86	8.70	4.11	1.85	1.29	1.01
BRISBANE	1041.23	37.430	BN 1020		10.80	8.65	4.08	1.83	1.29	1.01
BRISBANE	1041.46	37.200	BN 1010	Tennyson Power House Gauge	10.72	8.59	4.04	1.82	1.28	1.01
BRISBANE	1041.7	36.960	BN 1000		10.69	8.56	4.04	1.82	1.28	1.01
BRISBANE	1041.96	36.700	BN 990	Yeronga Street Gauge	10.58	8.43	3.97	1.80	1.27	1.01
BRISBANE	1042.235	36.425	BN 980		10.41	8.30	3.91	1.78	1.27	1.01
BRISBANE	1042.515	36.145	BN 970		10.40	8.29	3.90	1.78	1.26	1.01
BRISBANE	1042.91	35.750	BN 960		10.23	8.14	3.82	1.75	1.25	1.01
BRISBANE	1043.725	34.935	BN 950		9.98	7.91	3.67	1.69	1.23	1.00
BRISBANE	1044.06	34.600	BN 940	Sandy Creek Gauge	9.86	7.82	3.63	1.68	1.22	1.00
BRISBANE	1044.34	34.320	BN 930		9.69	7.68	3.56	1.65	1.21	1.00
BRISBANE	1044.605	34.055	BN 920		9.65	7.63	3.52	1.64	1.21	1.00
BRISBANE	1044.86	33.800	BN 910		9.59	7.57	3.49	1.63	1.20	1.00
BRISBANE	1045.4	33.260	BN 900		9.40	7.40	3.39	1.59	1.19	0.99
BRISBANE	1045.885	32.775	BN 890		9.23	7.21	3.28	1.56	1.17	0.99
BRISBANE	1046.18	32.480	BN 880		9.17	7.17	3.26	1.55	1.17	0.99
BRISBANE	1046.34	32.320	BN 870	Dutton Park Cemetery Gauge	9.11	7.13	3.25	1.55	1.17	0.99
BRISBANE	1046.58	32.080	BN 860		9.08	7.08	3.22	1.54	1.17	0.99
BRISBANE	1046.9	31.760	BN 850		8.87	6.91	3.14	1.52	1.16	0.99
BRISBANE	1047.35	31.310	BN 840		8.47	6.60	2.99	1.47	1.14	0.98
BRISBANE	1047.915	30.745	BN 830	Highgate Hill Gauge	8.24	6.40	2.91	1.45	1.13	0.98
BRISBANE	1048.375	30.285	BN 820		8.29	6.43	2.91	1.45	1.13	0.98
BRISBANE	1048.89	29.770	BN 810	St Lucia Ferry Gauge	8.08	6.24	2.80	1.41	1.12	0.98
BRISBANE	1049.12	29.540	BN 800		8.03	6.20	2.78	1.40	1.12	0.98
BRISBANE	1049.37	29.290	BN 790		7.85	6.05	2.72	1.39	1.11	0.98
BRISBANE	1049.59	29.070	BN 780		7.82	6.03	2.71	1.39	1.11	0.98
BRISBANE	1049.87	28.790	BN 770		7.70	5.94	2.67	1.37	1.10	0.98
BRISBANE	1050.43	28.230	BN 760		7.66	5.89	2.62	1.36	1.10	0.97
BRISBANE	1050.86	27.800	BN 750		7.53	5.79	2.58	1.34	1.09	0.97
BRISBANE	1051.36	27.300	BN 740		7.54	5.78	2.58	1.35	1.09	0.97
BRISBANE	1051.895	26.765	BN 730		7.37	5.62	2.50	1.32	1.08	0.97
BRISBANE	1052.31	26.350	BN 720		7.51	5.71	2.52	1.33	1.09	0.97
BRISBANE	1052.37	26.290	BN 710	Merivale Bridge						
BRISBANE	1052.39	26.270	BN 700		7.31	5.57	2.47	1.31	1.08	0.97
BRISBANE	1052.595	26.065	BN 690		7.22	5.50	2.45	1.31	1.08	0.97
BRISBANE	1052.607	26.053	BN 680	William Jolly Bridge						
BRISBANE	1052.64	26.020	BN 670		6.69	5.13	2.37	1.29	1.07	0.96
BRISBANE	1052.865	25.795	BN 660	Montague Road Gauge	6.54	5.03	2.34	1.28	1.07	0.96
BRISBANE	1053.32	25.340	BN 650		6.47	4.95	2.29	1.27	1.06	0.96
BRISBANE	1053.356	25.304	BN 640	Victoria Bridge						
BRISBANE	1053.385	25.275	BN630		6.40	4.90	2.27	1.26	1.05	0.96
BRISBANE	1053.9	24.760	BN 620		5.98	4.54	2.11	1.21	1.03	0.95
BRISBANE	1054.64	24.020	BN 610		5.86	4.42	2.03	1.19	1.03	0.95
BRISBANE	1054.66	24.000	BN 600	Captain Cook Bridge						
BRISBANE	1054.68	23.980	BN 590		5.76	4.34	2.00	1.18	1.02	0.95
BRISBANE	1054.97	23.690	BN 560		5.52	4.15	1.93	1.16	1.01	0.95
BRISBANE	1055.28	23.380	BN 550		5.44	4.11	1.92	1.16	1.01	0.95
BRISBANE	1055.42	23.240	BN 540		5.43	4.09	1.91	1.16	1.01	0.95
BRISBANE	1055.96	22.700	BN 530	Port Office Gauge	5.38	4.05	1.89	1.15	1.01	0.95
BRISBANE	1056.4	22.260	BN 520		5.13	3.86	1.82	1.14	1.00	0.95
BRISBANE	1056.695	21.965	BN 510		5.06	3.81	1.80	1.13	1.00	0.95
BRISBANE	1056.865	21.795	BN 500		5.27	3.95	1.85	1.14	1.00	0.95
BRISBANE	1056.92	21.740	BN 495	Story Bridge						
BRISBANE	1056.95	21.710	BN 490		5.16	3.88	1.82	1.13	1.00	0.95
BRISBANE	1057.09	21.570	BN 480		5.01	3.77	1.79	1.12	0.99	0.95
BRISBANE	1057.53	21.130	BN 470		4.87	3.67	1.76	1.12	0.99	0.95
BRISBANE	1058.04	20.620	BN 460		4.61	3.47	1.68	1.10	0.98	0.95
BRISBANE	1058.23	20.430	BN 450		4.53	3.40	1.66	1.09	0.98	0.95
BRISBANE	1058.53	20.130	BN 440		4.39	3.31	1.63	1.09	0.98	0.94
BRISBANE	1058.735	19.925	BN 430		4.42	3.32	1.63	1.09	0.98	0.94
BRISBANE	1059.035	19.625	BN 420		4.15	3.13	1.57	1.07	0.97	0.94
BRISBANE	1059.54	19.120	BN 410		4.11	3.09	1.55	1.07	0.97	0.94
BRISBANE	1059.99	18.670	BN 400		3.90	2.92	1.49	1.05	0.97	0.94
BRISBANE	1060.345	18.315	BN 390		3.64	2.74	1.43	1.04	0.96	0.94
BRISBANE	1060.535	18.125	BN 380		3.50	2.65	1.41	1.03	0.96	0.94
BRISBANE	1061.015	17.645	BN 370		3.46	2.61	1.39	1.03	0.96	0.94
BRISBANE	1061.53	17.130	BN 360		3.24	2.46	1.35	1.02	0.96	0.94

TABLE J-1 - Flood Levels for the Regulation Lines & Revegetation Case for Flood Events 100 Year ARI to 2 Year ARI

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	REGULATION LINES & REVEGETATION IN PLACE					
					100 YEAR ARI WL (m AHD)	50 YEAR ARI WL (m AHD)	20 YEAR ARI WL (m AHD)	10 YEAR ARI WL (m AHD)	5 YEAR ARI WL (m AHD)	2 YEAR ARI WL (m AHD)
BRISBANE	1062.02	16.640	BN 350		3.16	2.40	1.32	1.01	0.95	0.94
BRISBANE	1062.535	16.125	BN 340		3.12	2.36	1.31	1.01	0.95	0.94
BRISBANE	1062.94	15.720	BN 330		3.11	2.35	1.30	1.01	0.95	0.94
BRISBANE	1063.31	15.350	BN 320	Newstead Park Gauge	2.99	2.26	1.28	1.00	0.95	0.94
BRISBANE	1063.645	15.015	BN 310	Cresent Road Gauge	2.70	2.06	1.22	0.99	0.95	0.94
BRISBANE	1064	14.660	BN 300		2.66	2.04	1.21	0.99	0.94	0.94
BRISBANE	1064.49	14.170	BN 290		2.53	1.95	1.19	0.98	0.94	0.94
BRISBANE	1065.01	13.650	BN 280		2.55	1.96	1.19	0.98	0.94	0.94
BRISBANE	1065.503	13.157	BN 270		2.51	1.93	1.18	0.98	0.94	0.94
BRISBANE	1065.99	12.670	BN 260	Cairncross Dock Gauge	2.54	1.95	1.19	0.98	0.94	0.94
BRISBANE	1066.505	12.155	BN 250		2.46	1.90	1.17	0.98	0.94	0.94
BRISBANE	1067.02	11.640	BN 240		2.41	1.86	1.16	0.97	0.94	0.94
BRISBANE	1067.485	11.175	BN 230		2.29	1.78	1.14	0.97	0.94	0.94
BRISBANE	1067.965	10.695	BN 220		2.18	1.71	1.12	0.96	0.94	0.94
BRISBANE	1068.66	10.000	BN 210		2.00	1.59	1.09	0.96	0.93	0.94
BRISBANE	1069.045	9.615	BN 200		1.93	1.55	1.08	0.95	0.93	0.94
BRISBANE	1069.535	9.125	BN 190	Bulimba Power House Gauge	1.87	1.51	1.06	0.95	0.93	0.93
BRISBANE	1070.025	8.635	BN 180		1.80	1.46	1.05	0.95	0.93	0.93
BRISBANE	1070.53	8.130	BN 170		1.70	1.40	1.04	0.95	0.93	0.93
BRISBANE	1071.04	7.620	BN 160		1.62	1.34	1.02	0.94	0.93	0.93
BRISBANE	1071.52	7.140	BN 150		1.66	1.37	1.03	0.94	0.93	0.93
BRISBANE	1072.015	6.645	BN 140		1.62	1.35	1.02	0.94	0.93	0.93
BRISBANE	1072.515	6.145	BN 130		1.50	1.27	1.00	0.94	0.93	0.93
BRISBANE	1072.995	5.665	BN 120		1.46	1.25	1.00	0.94	0.93	0.93
BRISBANE	1073.485	5.175	BN 110		1.36	1.18	0.98	0.93	0.93	0.93
BRISBANE	1074	4.660	BN 100		1.28	1.14	0.97	0.93	0.93	0.93
BRISBANE	1074.46	4.200	BN 90		1.23	1.10	0.96	0.93	0.93	0.93
BRISBANE	1074.985	3.675	BN 80		1.09	1.02	0.94	0.93	0.92	0.93
BRISBANE	1075.48	3.180	BN 70		1.05	1.00	0.94	0.92	0.92	0.92
BRISBANE	1076	2.660	BN 60		1.07	1.01	0.94	0.92	0.92	0.92
BRISBANE	1076.495	2.165	BN 50		0.95	0.94	0.92	0.92	0.92	0.92
BRISBANE	1077.01	1.650	BN 40		0.97	0.95	0.93	0.92	0.92	0.92
BRISBANE	1077.51	1.150	BN 30		0.97	0.95	0.93	0.92	0.92	0.92
BRISBANE	1078.04	0.620	BN 20		0.95	0.94	0.92	0.92	0.92	0.92
BRISBANE	1078.525	0.135	BN 10		0.92	0.92	0.92	0.92	0.92	0.92
BRISBANE	1078.66	0.000	-	Western Inner Bar Gauge	0.92	0.92	0.92	0.92	0.92	0.92
BREMER	599.4	-	-		19.76	16.93	10.29	5.31	3.24	1.44
BREMER	600	-	-		19.76	16.93	10.29	5.31	3.24	1.45
OXLEY	599.4	-	-		10.96	8.80	4.17	1.86	1.30	1.01
OXLEY	600	-	-		10.96	8.80	4.17	1.86	1.30	1.02
BREAKFAST	599.4	-	-		3.06	2.31	1.29	1.00	0.95	0.94
BREAKFAST	600	-	-		3.06	2.31	1.29	1.00	0.95	0.94
BULIMBA	599.4	-	-		1.62	1.35	1.02	0.94	0.93	0.93
BULIMBA	600	-	-		1.62	1.35	1.02	0.94	0.93	0.93
CENTWEIR	0	-	-		14.10	11.62	6.11	2.71	1.68	1.08
CENTWEIR	0.08	-	-		13.97	11.49	6.02	2.67	1.66	1.08
INDOORWEIR	0	-	-		11.20	9.07	4.51	2.01	1.36	1.03
INDOORWEIR	0.085	-	-		11.10	9.00	4.35	1.95	1.34	1.02
WILLIAMWEIR	0	-	-		7.22	5.50	2.45	1.31	1.08	0.97
WILLIAMWEIR	0.045	-	-		6.69	5.13	2.37	1.29	1.07	0.96
VICTORIAWEIR	0	-	-		6.47	4.95	2.29	1.27	1.06	0.96
VICTORIAWEIR	0.065	-	-		6.40	4.90	2.27	1.26	1.05	0.96
CAPTAINWEIR	0	-	-		5.86	4.42	2.03	1.19	1.03	0.95
CAPTAINWEIR	0.04	-	-		5.76	4.34	2.00	1.18	1.02	0.95
STORYWEIR	0	-	-		5.27	3.95	1.85	1.14	1.00	0.95
STORYWEIR	0.085	-	-		5.16	3.88	1.82	1.13	1.00	0.95
MERIVALEWEIR	0	-	-		7.51	5.71	2.52	1.33	1.09	0.97
MERIVALEWEIR	0.08	-	-		7.31	5.57	2.47	1.31	1.08	0.97
GOODNALINK1	0	-	-		18.16	15.43	9.05	4.47	2.69	1.30
GOODNALINK1	1	-	-		17.50	14.78	8.48	4.06	2.42	1.23
GOODNALINK2	0	-	-		18.08	15.34	8.98	4.41	2.65	1.29
GOODNALINK2	1.07	-	-		17.71	14.99	8.68	4.23	2.54	1.26
STLUCIALINK1	0	-	-		11.04	8.89	4.20	1.87	1.30	1.02
STLUCIALINK1	1.05	-	-		10.22	8.11	3.78	1.73	1.24	1.00
STLUCIALINK2	0	-	-		10.99	8.81	4.17	1.86	1.30	1.02
STLUCIALINK2	1.05	-	-		10.24	8.13	3.79	1.74	1.25	1.01
STLUCIALINK3	0	-	-		10.88	8.76	4.15	1.86	1.30	1.02
STLUCIALINK3	0.85	-	-		10.40	8.29	3.90	1.78	1.26	1.01

TABLE J-2 - Discharges for the Regulation Lines & Revegetation Case for the Flood Events 100 Year ARI to 2 Year ARI

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	DESIGN EVENTS (REG LINE & REVEG CASE) 100 YEAR ARI Q (m^3/s)	50 YEAR ARI Q (m^3/s)	20 YEAR ARI Q (m^3/s)	10 YEAR ARI Q (m^3/s)	5 YEAR ARI Q (m^3/s)	2 YEAR ARI Q (m^3/s)
BRISBANE	1000.14	78.52	9235	7185	4225	1627	930	284
BRISBANE	1000.53	78.13	9234	7184	4223	1627	930	283
BRISBANE	1001.05	77.62	9232	7182	4219	1626	929	283
BRISBANE	1001.59	77.07	9229	7179	4214	1624	928	283
BRISBANE	1002.11	76.55	9227	7177	4211	1623	928	283
BRISBANE	1002.57	76.09	9225	7175	4207	1623	927	283
BRISBANE	1003.03	75.63	9223	7172	4202	1622	927	283
BRISBANE	1003.53	75.14	9220	7170	4198	1621	926	283
BRISBANE	1004.04	74.62	9218	7167	4193	1619	926	283
BRISBANE	1004.56	74.11	9215	7165	4189	1618	925	283
BRISBANE	1005.07	73.59	9212	7161	4181	1617	924	283
BRISBANE	1005.60	73.06	9208	7157	4172	1615	923	283
BRISBANE	1006.04	72.63	9206	7154	4165	1614	923	283
BRISBANE	1006.25	72.41	9570	7354	3648	1598	952	365
BRISBANE	1006.61	72.06	9570	7353	3646	1598	952	365
BRISBANE	1007.16	71.50	9569	7351	3642	1597	951	365
BRISBANE	1007.67	71.00	9567	7349	3637	1597	951	365
BRISBANE	1008.18	70.48	9567	7347	3634	1596	951	365
BRISBANE	1008.69	69.98	9566	7346	3631	1596	951	365
BRISBANE	1009.16	69.50	9565	7344	3629	1596	951	365
BRISBANE	1009.56	69.10	9565	7343	3626	1595	950	365
BRISBANE	1010.11	68.56	9563	7341	3623	1595	950	365
BRISBANE	1010.61	68.05	9563	7340	3621	1594	950	365
BRISBANE	1010.85	67.81	9562	7339	3620	1594	950	365
BRISBANE	1011.25	67.42	9562	7338	3618	1594	950	365
BRISBANE	1011.75	66.92	9561	7335	3614	1594	949	365
BRISBANE	1012.23	66.43	9559	7332	3610	1593	949	365
BRISBANE	1012.71	65.96	9557	7328	3605	1593	949	365
BRISBANE	1013.06	65.60	9555	7326	3602	1593	949	365
BRISBANE	1013.32	65.34	9363	7324	3600	1592	949	365
BRISBANE	1013.56	65.10	9362	7323	3598	1592	949	365
BRISBANE	1013.80	64.87	9290	7322	3596	1592	949	365
BRISBANE	1014.11	64.55	9289	7321	3592	1591	948	365
BRISBANE	1014.46	64.20	9287	7319	3588	1591	948	365
BRISBANE	1014.85	63.81	9284	7317	3583	1590	948	365
BRISBANE	1015.33	63.34	9283	7317	3581	1590	948	365
BRISBANE	1015.71	62.96	9282	7316	3579	1590	948	366
BRISBANE	1016.00	62.67	9352	7316	3578	1590	948	366
BRISBANE	1016.39	62.27	9351	7315	3576	1590	947	366
BRISBANE	1016.77	61.90	9349	7314	3574	1589	947	366
BRISBANE	1017.01	61.65	9538	7313	3572	1589	947	366
BRISBANE	1017.37	61.29	9537	7313	3570	1589	947	366
BRISBANE	1017.77	60.90	9536	7312	3568	1589	947	366
BRISBANE	1018.06	60.60	9535	7311	3566	1589	947	366
BRISBANE	1018.46	60.20	9534	7310	3564	1589	947	366
BRISBANE	1018.91	59.75	9532	7309	3563	1588	947	366
BRISBANE	1019.29	59.37	9531	7308	3561	1588	947	366
BRISBANE	1019.68	58.98	9529	7307	3560	1588	947	366
BRISBANE	1019.99	58.67	9528	7307	3559	1588	947	366
BRISBANE	1020.32	58.34	9527	7306	3557	1588	947	366
BRISBANE	1020.68	57.98	9525	7304	3554	1587	947	366
BRISBANE	1020.96	57.70	9524	7304	3553	1587	947	366
BRISBANE	1021.32	57.34	9523	7303	3552	1587	946	366
BRISBANE	1021.63	57.03	9523	7302	3550	1587	946	366
BRISBANE	1021.81	56.86	9523	7302	3549	1587	946	366
BRISBANE	1022.00	56.66	9522	7301	3548	1587	946	367
BRISBANE	1022.34	56.32	9522	7301	3547	1587	946	367
BRISBANE	1022.81	55.85	9522	7301	3545	1586	946	367
BRISBANE	1023.31	55.36	9522	7300	3544	1586	946	367
BRISBANE	1023.83	54.84	9522	7300	3543	1586	946	367
BRISBANE	1024.32	54.34	9521	7300	3541	1586	946	367
BRISBANE	1024.82	53.84	9521	7301	3539	1586	946	367
BRISBANE	1025.22	53.45	9521	7301	3538	1586	946	367

TABLE J-2 - Discharges for the Regulation Lines & Revegetation Case for the Flood Events 100 Year ARI to 2 Year ARI

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	DESIGN EVENTS (REG LINE & REVEG CASE) 100 YEAR ARI Q (m^3/s)	50 YEAR ARI Q (m^3/s)	20 YEAR ARI Q (m^3/s)	10 YEAR ARI Q (m^3/s)	5 YEAR ARI Q (m^3/s)	2 YEAR ARI Q (m^3/s)
BRISBANE	1025.48	53.19	9521	7301	3537	1586	946	367
BRISBANE	1025.88	52.78	9521	7302	3536	1586	946	367
BRISBANE	1026.43	52.24	9522	7304	3534	1585	946	367
BRISBANE	1026.79	51.87	9523	7305	3533	1585	946	367
BRISBANE	1027.03	51.63	9524	7307	3532	1585	946	367
BRISBANE	1027.42	51.24	9525	7308	3531	1585	946	367
BRISBANE	1027.93	50.73	9526	7312	3529	1585	946	367
BRISBANE	1028.43	50.23	9526	7317	3526	1585	946	367
BRISBANE	1028.72	49.94	9258	7315	3525	1585	946	367
BRISBANE	1028.98	49.68	9527	7318	3524	1585	946	367
BRISBANE	1029.44	49.22	9527	7313	3523	1585	946	367
BRISBANE	1029.95	48.71	9526	7308	3521	1585	946	368
BRISBANE	1030.55	48.11	9524	7302	3519	1584	946	368
BRISBANE	1031.07	47.59	9522	7298	3517	1584	946	368
BRISBANE	1031.48	47.18	9520	7295	3516	1584	946	368
BRISBANE	1031.85	46.81	9519	7293	3515	1584	946	368
BRISBANE	1032.11	46.55	9518	7291	3514	1584	946	368
BRISBANE	1032.41	46.25	9516	7289	3513	1584	946	368
BRISBANE	1032.83	45.83	9514	7287	3512	1584	946	368
BRISBANE	1033.23	45.44	9512	7285	3511	1584	946	368
BRISBANE	1033.64	45.03	9510	7282	3509	1584	946	368
BRISBANE	1034.14	44.53	9508	7279	3508	1584	946	368
BRISBANE	1034.63	44.03	9506	7277	3507	1584	946	368
BRISBANE	1035.15	43.51	9503	7274	3505	1584	946	368
BRISBANE	1035.66	43.00	9501	7272	3503	1584	946	368
BRISBANE	1036.18	42.48	9498	7269	3502	1584	946	368
BRISBANE	1036.62	42.05	9497	7268	3500	1583	946	368
BRISBANE	1036.84	41.82	9495	7267	3500	1583	946	368
BRISBANE	1037.00	41.66	9495	7266	3499	1583	946	369
BRISBANE	1037.11	41.55	9494	7266	3499	1583	946	369
BRISBANE	1037.23	41.43	9494	7265	3498	1583	946	369
BRISBANE	1037.46	41.21	9493	7264	3498	1583	945	369
BRISBANE	1037.86	40.81	9491	7263	3496	1583	945	369
BRISBANE	1038.34	40.32	9489	7261	3494	1583	945	369
BRISBANE	1038.85	39.81	9486	7258	3491	1583	945	369
BRISBANE	1039.15	39.51	9482	7254	3488	1583	945	369
BRISBANE	1039.38	39.28	9286	7195	3486	1583	945	369
BRISBANE	1039.62	39.04	9281	7192	3485	1583	945	369
BRISBANE	1039.75	38.91	9086	7164	3484	1583	945	369
BRISBANE	1039.96	38.70	8723	6963	3412	1582	946	414
BRISBANE	1040.17	38.49	8723	6962	3412	1582	946	414
BRISBANE	1040.37	38.29	8595	6962	3411	1582	946	414
BRISBANE	1040.75	37.91	8595	6961	3411	1582	946	414
BRISBANE	1041.12	37.54	8594	6960	3411	1582	946	415
BRISBANE	1041.35	37.32	8594	6960	3410	1582	946	415
BRISBANE	1041.58	37.08	8594	6959	3410	1582	946	415
BRISBANE	1041.83	36.83	8593	6959	3410	1582	946	415
BRISBANE	1042.10	36.56	8593	6959	3410	1582	946	415
BRISBANE	1042.37	36.29	8592	6959	3410	1582	946	415
BRISBANE	1042.51	36.15	8719	6959	3410	1582	946	415
BRISBANE	1042.71	35.95	8718	6959	3410	1582	946	415
BRISBANE	1042.96	35.70	8717	6959	3410	1582	946	415
BRISBANE	1043.05	35.61	8975	6991	3410	1582	946	415
BRISBANE	1043.10	35.57	8975	6991	3410	1582	946	415
BRISBANE	1043.42	35.24	9200	7057	3409	1582	946	415
BRISBANE	1043.89	34.77	9201	7057	3409	1582	946	415
BRISBANE	1044.20	34.46	9202	7057	3409	1582	946	415
BRISBANE	1044.47	34.19	9203	7058	3409	1582	946	416
BRISBANE	1044.73	33.93	9204	7058	3409	1582	946	416
BRISBANE	1045.13	33.53	9206	7058	3409	1582	946	416
BRISBANE	1045.64	33.02	9210	7059	3409	1582	946	416
BRISBANE	1046.03	32.63	9215	7059	3408	1582	946	416
BRISBANE	1046.26	32.40	9217	7060	3408	1582	946	416

TABLE J-2 - Discharges for the Regulation Lines & Revegetation Case for the Flood Events 100 Year ARI to 2 Year ARI

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	DESIGN EVENTS (REG LINE & REVEG CASE) 100 YEAR ARI Q (m³/s)	50 YEAR ARI Q (m³/s)	20 YEAR ARI Q (m³/s)	10 YEAR ARI Q (m³/s)	5 YEAR ARI Q (m³/s)	2 YEAR ARI Q (m³/s)
BRISBANE	1046.46	32.20	9218	7060	3408	1582	946	416
BRISBANE	1046.74	31.92	9220	7060	3408	1582	946	416
BRISBANE	1047.13	31.54	9222	7060	3408	1582	946	416
BRISBANE	1047.63	31.03	9223	7060	3408	1582	946	417
BRISBANE	1048.15	30.52	9223	7060	3408	1582	946	417
BRISBANE	1048.63	30.03	9221	7060	3408	1582	946	417
BRISBANE	1049.01	29.65	9218	7061	3408	1582	946	417
BRISBANE	1049.25	29.42	9217	7062	3408	1582	946	417
BRISBANE	1049.48	29.18	9215	7063	3408	1582	946	417
BRISBANE	1049.73	28.93	9212	7064	3408	1582	946	417
BRISBANE	1050.15	28.51	9212	7066	3408	1582	946	417
BRISBANE	1050.65	28.02	9225	7075	3408	1582	946	417
BRISBANE	1051.11	27.55	9238	7083	3408	1582	946	418
BRISBANE	1051.63	27.03	9253	7093	3408	1582	946	418
BRISBANE	1052.10	26.56	9301	7102	3408	1582	946	418
BRISBANE	1052.35	26.31	9335	7110	3408	1582	946	418
BRISBANE	1052.49	26.17	9348	7113	3408	1582	946	418
BRISBANE	1052.63	26.04	9360	7119	3408	1582	946	418
BRISBANE	1052.75	25.91	9356	7111	3408	1582	946	418
BRISBANE	1053.09	25.57	9347	7104	3408	1582	946	418
BRISBANE	1053.36	25.31	9327	7098	3408	1582	946	418
BRISBANE	1053.64	25.02	9309	7090	3408	1582	946	418
BRISBANE	1054.27	24.39	9329	7086	3407	1582	946	418
BRISBANE	1054.66	24.00	9314	7084	3407	1582	946	419
BRISBANE	1054.83	23.84	9310	7084	3407	1582	946	419
BRISBANE	1055.13	23.54	9304	7084	3407	1582	946	419
BRISBANE	1055.35	23.31	9300	7083	3407	1582	946	419
BRISBANE	1055.69	22.97	9291	7082	3407	1582	946	419
BRISBANE	1056.18	22.48	9270	7080	3408	1582	946	419
BRISBANE	1056.55	22.11	9260	7078	3408	1582	946	419
BRISBANE	1056.78	21.88	9254	7077	3408	1582	946	419
BRISBANE	1056.92	21.74	9245	7075	3408	1582	946	419
BRISBANE	1057.02	21.64	9241	7074	3408	1582	946	419
BRISBANE	1057.31	21.35	9235	7073	3408	1582	946	419
BRISBANE	1057.79	20.87	9225	7070	3408	1582	946	419
BRISBANE	1058.14	20.53	9219	7068	3408	1582	946	420
BRISBANE	1058.38	20.28	9221	7067	3408	1582	946	420
BRISBANE	1058.63	20.03	9223	7066	3408	1582	946	420
BRISBANE	1058.89	19.78	9224	7064	3408	1582	946	420
BRISBANE	1059.29	19.37	9225	7063	3408	1582	946	420
BRISBANE	1059.77	18.89	9222	7064	3408	1582	946	420
BRISBANE	1060.17	18.49	9219	7066	3408	1582	946	420
BRISBANE	1060.44	18.22	9218	7066	3408	1582	946	420
BRISBANE	1060.78	17.88	9217	7066	3408	1582	946	420
BRISBANE	1061.27	17.39	9213	7067	3408	1582	946	420
BRISBANE	1061.78	16.88	9210	7067	3408	1582	946	420
BRISBANE	1062.28	16.38	9206	7067	3408	1582	946	420
BRISBANE	1062.74	15.92	9205	7066	3408	1582	946	421
BRISBANE	1063.03	15.63	9206	7065	3408	1582	946	421
BRISBANE	1063.22	15.44	9200	7055	3408	1582	946	428
BRISBANE	1063.48	15.18	9198	7054	3408	1582	946	428
BRISBANE	1063.82	14.84	9197	7054	3408	1582	946	428
BRISBANE	1064.25	14.42	9197	7053	3408	1582	946	428
BRISBANE	1064.75	13.91	9197	7053	3408	1582	946	429
BRISBANE	1065.26	13.40	9197	7053	3408	1582	946	429
BRISBANE	1065.75	12.91	9197	7053	3408	1582	946	429
BRISBANE	1066.25	12.41	9197	7053	3408	1582	946	429
BRISBANE	1066.76	11.90	9197	7053	3408	1582	946	429
BRISBANE	1067.25	11.41	9197	7052	3408	1582	946	429
BRISBANE	1067.73	10.94	9197	7052	3408	1582	946	429
BRISBANE	1068.31	10.35	9197	7052	3408	1582	946	430
BRISBANE	1068.85	9.81	9197	7053	3408	1582	946	430
BRISBANE	1069.29	9.37	9198	7053	3408	1582	946	430

TABLE J-2 - Discharges for the Regulation Lines & Revegetation Case for the Flood Events 100 Year ARI to 2 Year ARI

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	DESIGN EVENTS (REG LINE & REVEG CASE) 100 YEAR ARI Q (m^3/s)	50 YEAR ARI Q (m^3/s)	20 YEAR ARI Q (m^3/s)	10 YEAR ARI Q (m^3/s)	5 YEAR ARI Q (m^3/s)	2 YEAR ARI Q (m^3/s)
BRISBANE	1069.78	8.88	9198	7053	3408	1582	946	430
BRISBANE	1070.28	8.38	9198	7054	3408	1582	946	430
BRISBANE	1070.79	7.87	9198	7054	3408	1583	946	430
BRISBANE	1071.28	7.38	9199	7054	3408	1583	946	430
BRISBANE	1071.77	6.89	9199	7054	3408	1583	946	430
BRISBANE	1072.02	6.64	9199	7054	3409	1583	946	430
BRISBANE	1072.27	6.39	9191	7051	3409	1583	951	504
BRISBANE	1072.76	5.90	9191	7051	3409	1583	951	504
BRISBANE	1073.24	5.42	9191	7051	3409	1583	952	504
BRISBANE	1073.74	4.92	9191	7051	3409	1583	952	504
BRISBANE	1074.23	4.43	9191	7051	3409	1583	952	505
BRISBANE	1074.72	3.94	9191	7051	3409	1583	952	505
BRISBANE	1075.23	3.43	9191	7051	3409	1583	952	505
BRISBANE	1075.74	2.92	9191	7051	3409	1583	953	505
BRISBANE	1076.25	2.41	9191	7052	3409	1583	953	505
BRISBANE	1076.75	1.91	9192	7052	3409	1583	953	505
BRISBANE	1077.26	1.40	9192	7052	3409	1583	953	506
BRISBANE	1077.78	0.88	9192	7052	3409	1583	953	506
BRISBANE	1078.28	0.38	9192	7052	3409	1583	953	506
BRISBANE	1078.59	0.07	9192	7052	3409	1583	953	506
BREMER	599.70	-	2204	1890	951	862	628	230
OXLEY	599.70	-	1195	849	474	400	307	164
BREAKFAST	599.70	-	408	335	249	201	168	99
BULIMBA	599.70	-	651	538	368	301	249	162
CENTWEIR	0.04	-	582	11	0	0	0	0
INDOORWEIR	0.04	-	0	0	0	0	0	0
WILLIAMWEIR	0.02	-	0	0	0	0	0	0
VICTORIAWEIR	0.03	-	0	0	0	0	0	0
CAPTAINWEIR	0.02	-	0	0	0	0	0	0
STORYWEIR	0.04	-	0	0	0	0	0	0
MERIVALEWEIR	0.04	-	0	0	0	0	0	0
GOODNALINK1	0.50	-	201	0	0	0	0	0
GOODNALINK2	0.54	-	75	0	0	0	0	0
STLUCIALINK1	0.53	-	226	66	0	0	0	0
STLUCIALINK2	0.53	-	259	31	0	0	0	0
STLUCIALINK3	0.43	-	127	0	0	0	0	0

TABLE J-3 - Affluxes Due to Regulation Lines and Revegetation Combined Effects for the 100 Year ARI Flood

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	100 YEAR ARI DESIGN WL (m AHD)	100 YEAR ARI REG LINES + REVEG WL (m AHD)	100 YEAR ARI REG LINES	100 YEAR ARI REVEGETATION	REVEGETATION AFFLUX (mm)	REG LINES AFFLUX (mm)	REG + REVEG AFLUX (mm)
BRISBANE	1000	78.66	BN 2020		22.76	22.79	22.78	22.77	10	20	30
BRISBANE	1000.285	78.375	BN 2010		22.57	22.57	22.56	22.58	10	-10	0
BRISBANE	1000.775	77.885	BN 2000		22.29	22.31	22.30	22.30	10	10	20
BRISBANE	1001.315	77.345	BN 1990		22.20	22.22	22.21	22.21	10	10	20
BRISBANE	1001.865	76.795	BN 1980		21.68	21.69	21.68	21.69	10	0	10
BRISBANE	1002.35	76.310	BN 1970		21.48	21.50	21.49	21.49	10	10	20
BRISBANE	1002.785	75.875	BN 1960		21.46	21.48	21.47	21.47	10	10	20
BRISBANE	1003.275	75.385	BN 1950		21.13	21.15	21.14	21.14	10	10	20
BRISBANE	1003.775	74.885	BN 1940		20.86	20.88	20.87	20.87	10	10	20
BRISBANE	1004.3	74.360	BN 1930		20.41	20.42	20.41	20.42	10	0	10
BRISBANE	1004.81	73.850	BN 1920		20.37	20.39	20.37	20.39	20	0	20
BRISBANE	1005.325	73.335	BN 1910		20.20	20.20	20.19	20.21	10	-10	0
BRISBANE	1005.87	72.790	BN 1900		19.89	19.88	19.87	19.90	10	-20	-10
BRISBANE	1006.3	72.360	BN 1890	Moggill Gauge	19.72	19.72	19.71	19.73	10	-10	0
BRISBANE	1006.91	71.750	BN 1880		19.51	19.52	19.50	19.53	20	-10	10
BRISBANE	1007.41	71.250	BN 1870		19.48	19.42	19.42	19.48	0	-60	-60
BRISBANE	1007.92	70.740	BN 1860		19.19	19.09	19.09	19.19	0	-100	-100
BRISBANE	1008.445	70.215	BN 1850		19.02	18.96	18.96	19.02	0	-60	-60
BRISBANE	1008.925	69.735	BN 1840		18.96	18.89	18.89	18.96	0	-70	-70
BRISBANE	1009.4	69.260	BN 1830		18.86	18.79	18.79	18.86	0	-70	-70
BRISBANE	1009.72	68.940	BN 1820		18.85	18.73	18.73	18.85	0	-120	-120
BRISBANE	1010.49	68.170	BN 1810		18.50	18.43	18.43	18.50	0	-70	-70
BRISBANE	1010.725	67.935	BN 1800		18.52	18.44	18.44	18.52	0	-80	-80
BRISBANE	1010.98	67.680	BN 1790		18.44	18.38	18.38	18.44	0	-60	-60
BRISBANE	1011.51	67.150	BN 1780		18.43	18.37	18.37	18.43	0	-60	-60
BRISBANE	1011.98	66.680	BN 1770		18.43	18.36	18.36	18.43	0	-70	-70
BRISBANE	1012.475	66.185	BN 1760		18.33	18.31	18.31	18.33	0	-20	-20
BRISBANE	1012.935	65.725	BN 1750		18.22	18.20	18.19	18.23	10	-30	-20
BRISBANE	1013.445	65.215	BN 1740		18.14	18.11	18.11	18.14	0	-30	-30
BRISBANE	1013.91	64.750	BN 1730		18.08	18.05	18.05	18.08	0	-30	-30
BRISBANE	1014.31	64.350	BN 1720		18.05	18.01	18.01	18.05	0	-40	-40
BRISBANE	1014.61	64.050	BN 1710	Goodna Hospital Gauge	18.08	18.05	18.04	18.09	10	-40	-30
BRISBANE	1015.09	63.570	BN 1700		17.94	17.91	17.90	17.95	10	-40	-30
BRISBANE	1015.56	63.100	BN 1690		17.81	17.75	17.75	17.81	0	-60	-60
BRISBANE	1016.14	62.520	BN 1680		17.71	17.67	17.66	17.72	10	-50	-40
BRISBANE	1016.64	62.020	BN 1670		17.62	17.60	17.60	17.62	0	-20	-20
BRISBANE	1017.13	61.530	BN 1660		17.39	17.37	17.37	17.39	0	-20	-20
BRISBANE	1017.61	61.050	BN 1650		17.26	17.26	17.25	17.27	10	-10	0
BRISBANE	1017.92	60.740	BN 1640		17.10	17.14	17.14	17.10	0	40	40
BRISBANE	1018.2	60.460	BN 1630		17.02	17.08	17.07	17.03	10	50	60
BRISBANE	1018.725	59.935	BN 1620		16.69	16.76	16.75	16.70	10	60	70
BRISBANE	1019.095	59.565	BN 1610		16.56	16.62	16.62	16.56	0	60	60
BRISBANE	1019.49	59.170	BN 1600		16.45	16.49	16.49	16.45	0	40	40
BRISBANE	1019.865	58.795	BN 1590		16.15	16.22	16.22	16.15	0	70	70
BRISBANE	1020.115	58.545	BN 1580		16.25	16.29	16.29	16.25	0	40	40
BRISBANE	1020.525	58.135	BN 1570		16.22	16.28	16.27	16.23	10	50	60
BRISBANE	1020.83	57.830	BN 1560		16.07	16.11	16.11	16.07	0	40	40
BRISBANE	1021.095	57.565	BN 1550		15.86	15.91	15.90	15.87	10	40	50
BRISBANE	1021.539	57.121	BN 1540		15.69	15.74	15.73	15.70	10	40	50
BRISBANE	1021.715	56.945	BN 1530		15.72	15.78	15.78	15.72	0	60	60
BRISBANE	1021.895	56.765	BN 1520		15.65	15.69	15.68	15.66	10	30	40
BRISBANE	1022.105	56.555	BN 1510		15.53	15.49	15.48	15.54	10	-50	-40
BRISBANE	1022.575	56.085	BN 1500		15.45	15.52	15.51	15.46	10	60	70
BRISBANE	1023.04	55.620	BN 1490		15.21	15.23	15.22	15.22	10	10	20
BRISBANE	1023.57	55.090	BN 1480		15.12	15.17	15.17	15.12	0	50	50
BRISBANE	1024.08	54.580	BN 1470		15.07	15.12	15.12	15.07	0	50	50
BRISBANE	1024.563	54.097	BN 1460		15.01	15.05	15.05	15.01	0	40	40
BRISBANE	1025.07	53.590	BN 1450		14.91	14.95	14.94	14.92	10	30	40
BRISBANE	1025.36	53.300	BN 1440		14.77	14.80	14.80	14.77	0	30	30
BRISBANE	1025.59	53.070	BN 1430		14.61	14.61	14.61	14.61	0	0	0
BRISBANE	1026.17	52.490	BN 1420		14.48	14.50	14.49	14.49	10	10	20
BRISBANE	1026.68	51.980	BN 1410	Mt Ommaney Gauge	14.38	14.38	14.38	14.38	0	0	0
BRISBANE	1026.9	51.760	BN 1400		14.25	14.21	14.20	14.26	10	-50	-40

TABLE J-3 - Affluxes Due to Regulation Lines and Revegetation Combined Effects for the 100 Year ARI Flood

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	100 YEAR ARI DESIGN WL (m AHD)	100 YEAR ARI REG LINES + REVEG WL (m AHD)	100 YEAR ARI REG LINES	100 YEAR ARI REVEGETATION	REVEGETATION AFFLUX (mm)	REG LINES AFFLUX (mm)	REG + REVEG AFLUX (mm)
BRISBANE	1027.16	51.500	BN 1390		14.11	14.12	14.11	14.12	10	0	10
BRISBANE	1027.68	50.980	BN 1380		14.17	14.19	14.18	14.18	10	10	20
BRISBANE	1028.18	50.480	BN 1370		14.19	14.19	14.18	14.20	10	-10	0
BRISBANE	1028.68	49.980	BN 1360		14.06	14.10	14.09	14.07	10	30	40
BRISBANE	1028.72	49.940	BN1350	Centenary Bridge			0.00		0	0	0
BRISBANE	1028.76	49.900	BN 1340		13.91	13.97	13.96	13.92	10	50	60
BRISBANE	1029.2	49.460	BN 1330		13.80	13.80	13.80	13.80	0	0	0
BRISBANE	1029.68	48.980	BN 1320		13.82	13.80	13.80	13.82	0	-20	-20
BRISBANE	1030.22	48.440	BN 1310		13.82	13.85	13.85	13.82	0	30	30
BRISBANE	1030.87	47.790	BN 1300		13.75	13.81	13.81	13.75	0	60	60
BRISBANE	1031.26	47.400	BN 1290		13.59	13.69	13.68	13.60	10	90	100
BRISBANE	1031.7	46.960	BN 1280	Darra Wharf Gauge	13.21	13.33	13.33	13.21	0	120	120
BRISBANE	1031.995	46.665	BN 1270		13.31	13.41	13.41	13.31	0	100	100
BRISBANE	1032.23	46.430	BN 1260		13.18	13.28	13.28	13.18	0	100	100
BRISBANE	1032.585	46.075	BN 1250		12.94	13.03	13.03	12.94	0	90	90
BRISBANE	1033.08	45.580	BN 1240		12.79	12.90	12.90	12.79	0	110	110
BRISBANE	1033.37	45.290	BN 1230		12.68	12.83	12.83	12.68	0	150	150
BRISBANE	1033.9	44.760	BN 1220		12.45	12.57	12.58	12.44	-10	130	120
BRISBANE	1034.37	44.290	BN 1210		12.29	12.42	12.42	12.29	0	130	130
BRISBANE	1034.89	43.770	BN 1200	Sherwood Gauge	12.19	12.32	12.32	12.19	0	130	130
BRISBANE	1035.414	43.246	BN 1190		11.94	12.08	12.08	11.94	0	140	140
BRISBANE	1035.9	42.760	BN 1180		11.65	11.76	11.75	11.66	10	100	110
BRISBANE	1036.46	42.200	BN 1170		11.35	11.46	11.46	11.35	0	110	110
BRISBANE	1036.77	41.890	BN 1160		11.28	11.39	11.39	11.28	0	110	110
BRISBANE	1036.915	41.745	BN 1150		11.12	11.23	11.23	11.12	0	110	110
BRISBANE	1037.09	41.570	BN 1140		11.07	11.20	11.19	11.08	10	120	130
BRISBANE	1037.11	41.550	BN 1130	Indooroopilly Bridge			0.00		0	0	0
BRISBANE	1037.175	41.485	BN 1120		10.98	11.10	11.10	10.98	0	120	120
BRISBANE	1037.285	41.375	BN 1110	Clarence Road Gauge	10.93	11.04	11.04	10.93	0	110	110
BRISBANE	1037.625	41.035	BN 1100		10.91	11.02	11.01	10.92	10	100	110
BRISBANE	1038.085	40.575	BN 1090		10.93	10.99	10.98	10.94	10	50	60
BRISBANE	1038.6	40.060	BN 1080		10.91	10.98	10.98	10.91	0	70	70
BRISBANE	1039.1	39.560	BN 1070		10.90	11.05	11.04	10.91	10	140	150
BRISBANE	1039.565	39.095	BN 1060	Oxley Creek Gauge	10.92	11.00	11.00	10.92	0	80	80
BRISBANE	1040.09	38.570	BN 1050	King Authur Terrace Gauge	10.84	10.93	10.93	10.84	0	90	90
BRISBANE	1040.49	38.170	BN 1040		10.71	10.80	10.80	10.71	0	90	90
BRISBANE	1041.01	37.650	BN 1030		10.74	10.86	10.86	10.74	0	120	120
BRISBANE	1041.23	37.430	BN 1020		10.71	10.80	10.81	10.70	-10	100	90
BRISBANE	1041.46	37.200	BN 1010	Tennyson Power House Gauge	10.62	10.72	10.72	10.62	0	100	100
BRISBANE	1041.7	36.960	BN 1000		10.59	10.69	10.69	10.59	0	100	100
BRISBANE	1041.96	36.700	BN 990	Yeronga Street Gauge	10.45	10.58	10.58	10.45	0	130	130
BRISBANE	1042.235	36.425	BN 980		10.30	10.41	10.41	10.30	0	110	110
BRISBANE	1042.515	36.145	BN 970		10.29	10.40	10.39	10.30	10	100	110
BRISBANE	1042.91	35.750	BN 960		10.22	10.23	10.22	10.23	10	0	10
BRISBANE	1043.725	34.935	BN 950		9.91	9.98	9.98	9.91	0	70	70
BRISBANE	1044.06	34.600	BN 940	Sandy Creek Gauge	9.75	9.86	9.86	9.75	0	110	110
BRISBANE	1044.34	34.320	BN 930		9.58	9.69	9.68	9.59	10	100	110
BRISBANE	1044.605	34.055	BN 920		9.53	9.65	9.65	9.53	0	120	120
BRISBANE	1044.86	33.800	BN 910		9.49	9.59	9.58	9.50	10	90	100
BRISBANE	1045.4	33.260	BN 900		9.31	9.40	9.40	9.31	0	90	90
BRISBANE	1045.885	32.775	BN 890		9.17	9.23	9.23	9.17	0	60	60
BRISBANE	1046.18	32.480	BN 880		9.09	9.17	9.17	9.09	0	80	80
BRISBANE	1046.34	32.320	BN 870	Dutton Park Cemetery Gauge	9.02	9.11	9.11	9.02	0	90	90
BRISBANE	1046.58	32.080	BN 860		8.97	9.08	9.08	8.97	0	110	110
BRISBANE	1046.9	31.760	BN 850		8.78	8.87	8.87	8.78	0	90	90
BRISBANE	1047.35	31.310	BN 840		8.41	8.47	8.47	8.41	0	60	60
BRISBANE	1047.915	30.745	BN 830	Highgate Hill Gauge	8.17	8.24	8.24	8.17	0	70	70
BRISBANE	1048.375	30.285	BN 820		8.23	8.29	8.28	8.24	10	50	60
BRISBANE	1048.89	29.770	BN 810	St Lucia Ferry Gauge	8.00	8.08	8.09	7.99	-10	90	80
BRISBANE	1049.12	29.540	BN 800		7.94	8.03	8.04	7.93	-10	100	90
BRISBANE	1049.37	29.290	BN 790		7.75	7.85	7.85	7.75	0	100	100
BRISBANE	1049.59	29.070	BN 780		7.74	7.82	7.82	7.74	0	80	80
BRISBANE	1049.87	28.790	BN 770		7.63	7.70	7.70	7.63	0	70	70

TABLE J-3 - Affluxes Due to Regulation Lines and Revegetation Combined Effects for the 100 Year ARI Flood

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	100 YEAR ARI DESIGN WL (m AHD)	100 YEAR ARI REG LINES + REVEG WL (m AHD)	100 YEAR ARI REG LINES	100 YEAR ARI REVEGETATION	REVEGETATION AFFLUX (mm)	REG LINES AFFLUX (mm)	REG + REVEG AFLUX (mm)
BRISBANE	1050.43	28.230	BN 760		7.61	7.66	7.66	7.61	0	50	50
BRISBANE	1050.86	27.800	BN 750		7.46	7.53	7.53	7.46	0	70	70
BRISBANE	1051.36	27.300	BN 740		7.46	7.54	7.54	7.46	0	80	80
BRISBANE	1051.895	26.765	BN 730		7.30	7.37	7.37	7.30	0	70	70
BRISBANE	1052.31	26.350	BN 720		7.40	7.51	7.51	7.40	0	110	110
BRISBANE	1052.37	26.290	BN 710	Merivale Bridge			0.00		0	0	0
BRISBANE	1052.39	26.270	BN 700		7.23	7.31	7.31	7.23	0	80	80
BRISBANE	1052.595	26.065	BN 690		7.14	7.22	7.22	7.14	0	80	80
BRISBANE	1052.607	26.053	BN 680	William Jolly Bridge			0.00		0	0	0
BRISBANE	1052.64	26.020	BN 670		6.63	6.69	6.69	6.63	0	60	60
BRISBANE	1052.865	25.795	BN 660	Montague Road Gauge	6.49	6.54	6.54	6.49	0	50	50
BRISBANE	1053.32	25.340	BN 650		6.42	6.47	6.47	6.42	0	50	50
BRISBANE	1053.356	25.304	BN 640	Victoria Bridge			0.00		0	0	0
BRISBANE	1053.385	25.275	BN630		6.24	6.40	6.40	6.24	0	160	160
BRISBANE	1053.9	24.760	BN 620		5.85	5.98	5.98	5.85	0	130	130
BRISBANE	1054.64	24.020	BN 610		5.78	5.86	5.87	5.77	-10	90	80
BRISBANE	1054.66	24.000	BN 600	Captain Cook Bridge			0.00		0	0	0
BRISBANE	1054.68	23.980	BN 590		5.70	5.76	5.76	5.70	0	60	60
BRISBANE	1054.97	23.690	BN 560		5.45	5.52	5.52	5.45	0	70	70
BRISBANE	1055.28	23.380	BN 550		5.40	5.44	5.44	5.40	0	40	40
BRISBANE	1055.42	23.240	BN 540		5.40	5.43	5.43	5.40	0	30	30
BRISBANE	1055.96	22.700	BN 530	Port Office Gauge	5.34	5.38	5.38	5.34	0	40	40
BRISBANE	1056.4	22.260	BN 520		5.09	5.13	5.13	5.09	0	40	40
BRISBANE	1056.695	21.965	BN 510		5.03	5.06	5.07	5.02	-10	40	30
BRISBANE	1056.865	21.795	BN 500		5.22	5.27	5.27	5.22	0	50	50
BRISBANE	1056.92	21.740	BN 495	Story Bridge			0.00		0	0	0
BRISBANE	1056.95	21.710	BN 490		5.12	5.16	5.16	5.12	0	40	40
BRISBANE	1057.09	21.570	BN 480		4.97	5.01	5.01	4.97	0	40	40
BRISBANE	1057.53	21.130	BN 470		4.83	4.87	4.87	4.83	0	40	40
BRISBANE	1058.04	20.620	BN 460		4.58	4.61	4.61	4.58	0	30	30
BRISBANE	1058.23	20.430	BN 450		4.50	4.53	4.53	4.50	0	30	30
BRISBANE	1058.53	20.130	BN 440		4.37	4.39	4.39	4.37	0	20	20
BRISBANE	1058.735	19.925	BN 430		4.41	4.42	4.42	4.41	0	10	10
BRISBANE	1059.035	19.625	BN 420		4.13	4.15	4.15	4.13	0	20	20
BRISBANE	1059.54	19.120	BN 410		4.09	4.11	4.11	4.09	0	20	20
BRISBANE	1059.99	18.670	BN 400		3.88	3.90	3.90	3.88	0	20	20
BRISBANE	1060.345	18.315	BN 390		3.65	3.64	3.64	3.65	0	-10	-10
BRISBANE	1060.535	18.125	BN 380		3.50	3.50	3.50	3.50	0	0	0
BRISBANE	1061.015	17.645	BN 370		3.45	3.46	3.46	3.45	0	10	10
BRISBANE	1061.53	17.130	BN 360		3.24	3.24	3.24	3.24	0	0	0
BRISBANE	1062.02	16.640	BN 350		3.16	3.16	3.16	3.16	0	0	0
BRISBANE	1062.535	16.125	BN 340		3.12	3.12	3.12	3.12	0	0	0
BRISBANE	1062.94	15.720	BN 330		3.11	3.11	3.11	3.11	0	0	0
BRISBANE	1063.31	15.350	BN 320	Newstead Park Gauge	2.99	2.99	2.99	2.99	0	0	0
BRISBANE	1063.645	15.015	BN 310	Cresent Road Gauge	2.72	2.70	2.70	2.72	0	-20	-20
BRISBANE	1064	14.660	BN 300		2.68	2.66	2.66	2.68	0	-20	-20
BRISBANE	1064.49	14.170	BN 290		2.55	2.53	2.53	2.55	0	-20	-20
BRISBANE	1065.01	13.650	BN 280		2.57	2.55	2.55	2.57	0	-20	-20
BRISBANE	1065.503	13.157	BN 270		2.53	2.51	2.51	2.53	0	-20	-20
BRISBANE	1065.99	12.670	BN 260	Cairncross Dock Gauge	2.54	2.54	2.54	2.54	0	0	0
BRISBANE	1066.505	12.155	BN 250		2.46	2.46	2.46	2.46	0	0	0
BRISBANE	1067.02	11.640	BN 240		2.43	2.41	2.41	2.43	0	-20	-20
BRISBANE	1067.485	11.175	BN 230		2.32	2.29	2.29	2.32	0	-30	-30
BRISBANE	1067.965	10.695	BN 220		2.20	2.18	2.18	2.20	0	-20	-20
BRISBANE	1068.66	10.000	BN 210		2.02	2.00	2.00	2.02	0	-20	-20
BRISBANE	1069.045	9.615	BN 200		1.95	1.93	1.93	1.95	0	-20	-20
BRISBANE	1069.535	9.125	BN 190	Bulimba Power House Gauge	1.89	1.87	1.87	1.89	0	-20	-20
BRISBANE	1070.025	8.635	BN 180		1.82	1.80	1.80	1.82	0	-20	-20
BRISBANE	1070.53	8.130	BN 170		1.72	1.70	1.70	1.72	0	-20	-20
BRISBANE	1071.04	7.620	BN 160		1.64	1.62	1.62	1.64	0	-20	-20
BRISBANE	1071.52	7.140	BN 150		1.67	1.66	1.66	1.67	0	-10	-10
BRISBANE	1072.015	6.645	BN 140		1.56	1.62	1.62	1.56	0	60	60
BRISBANE	1072.515	6.145	BN 130		1.50	1.50	1.50	1.50	0	0	0

TABLE J-3 - Affluxes Due to Regulation Lines and Revegetation Combined Effects for the 100 Year ARI Flood

LOCATION	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	100 YEAR ARI DESIGN WL (m AHD)	100 YEAR ARI REG LINES + REVEG WL (m AHD)	100 YEAR ARI REG LINES	100 YEAR ARI REVEGETATION	REVEGETATION AFFLUX (mm)	REG LINES AFFLUX (mm)	REG + REVEG AFLUX (mm)
BRISBANE	1072.995	5.665	BN 120		1.46	1.46	1.46	1.46	0	0	0
BRISBANE	1073.485	5.175	BN 110		1.36	1.36	1.36	1.36	0	0	0
BRISBANE	1074	4.660	BN 100		1.29	1.28	1.28	1.29	0	-10	-10
BRISBANE	1074.46	4.200	BN 90		1.22	1.23	1.23	1.22	0	10	10
BRISBANE	1074.985	3.675	BN 80		1.09	1.09	1.09	1.09	0	0	0
BRISBANE	1075.48	3.180	BN 70		1.06	1.05	1.05	1.06	0	-10	-10
BRISBANE	1076	2.660	BN 60		1.07	1.07	1.07	1.07	0	0	0
BRISBANE	1076.495	2.165	BN 50		0.96	0.95	0.95	0.96	0	-10	-10
BRISBANE	1077.01	1.650	BN 40		0.96	0.97	0.97	0.96	0	10	10
BRISBANE	1077.51	1.150	BN 30		0.97	0.97	0.97	0.97	0	0	0
BRISBANE	1078.04	0.620	BN 20		0.95	0.95	0.95	0.95	0	0	0
BRISBANE	1078.525	0.135	BN 10		0.92	0.92	0.92	0.92	0	0	0
BRISBANE	1078.66	0.000	-	Western Inner Bar Gauge	0.92	0.92	0.92	0.92	0	0	0
BREMER	599.4	-	-		19.76	19.76	19.75	19.77	10	-10	0
BREMER	600	-	-		19.76	19.76	19.75	19.77	10	-10	0
OXLEY	599.4	-	-		10.87	10.96	10.95	10.88	10	80	90
OXLEY	600	-	-		10.87	10.96	10.95	10.88	10	80	90
BREAKFAST	599.4	-	-		3.09	3.06	3.07	3.08	-10	-20	-30
BREAKFAST	600	-	-		3.08	3.06	3.06	3.08	0	-20	-20
BULIMBA	599.4	-	-		1.56	1.62	1.62	1.56	0	60	60
BULIMBA	600	-	-		1.56	1.62	1.62	1.56	0	60	60
CENTWEIR	0	-	-		14.06	14.10	14.09	14.07	10	30	40
CENTWEIR	0.08	-	-		13.91	13.97	13.96	13.92	10	50	60
INDOORWEIR	0	-	-		11.07	11.20	11.19	11.08	10	120	130
INDOORWEIR	0.085	-	-		10.98	11.10	11.10	10.98	0	120	120
WILLIAMWEIR	0	-	-		7.14	7.22	7.22	7.14	0	80	80
WILLIAMWEIR	0.045	-	-		6.63	6.69	6.69	6.63	0	60	60
VICTORIAWEIR	0	-	-		6.42	6.47	6.47	6.42	0	50	50
VICTORIAWEIR	0.065	-	-		6.24	6.40	6.40	6.24	0	160	160
CAPTAINWEIR	0	-	-		5.78	5.86	5.87	5.77	-10	90	80
CAPTAINWEIR	0.04	-	-		5.70	5.76	5.76	5.70	0	60	60
STORYWEIR	0	-	-		5.22	5.27	5.27	5.22	0	50	50
STORYWEIR	0.085	-	-		5.12	5.16	5.16	5.12	0	40	40
MERIVALEWEIR	0	-	-		7.40	7.51	7.51	7.40	0	110	110
MERIVALEWEIR	0.08	-	-		7.23	7.31	7.31	7.23	0	80	80
GOODNALINK1	0	-	-		18.18	18.16	18.16	18.18	0	-20	-20
GOODNALINK1	1	-	-		17.53	17.50	17.50	17.53	0	-30	-30
GOODNALINK2	0	-	-		18.11	18.08	18.08	18.11	0	-30	-30
GOODNALINK2	1.07	-	-		17.77	17.71	17.71	17.77	0	-60	-60
STLUCIALINK1	0	-	-		10.91	11.04	11.04	10.91	0	130	130
STLUCIALINK1	1.05	-	-		10.15	10.22	10.22	10.15	0	70	70
STLUCIALINK2	0	-	-		10.90	10.99	10.99	10.90	0	90	90
STLUCIALINK2	1.05	-	-		10.18	10.24	10.24	10.18	0	60	60
STLUCIALINK3	0	-	-		10.79	10.88	10.88	10.79	0	90	90
STLUCIALINK3	0.85	-	-		10.29	10.40	10.39	10.30	10	100	110

Legend

In - Regulation Lines set at Extent of Inundation
A - Regulation Lines adjusted until Maximum Afflux Achieved
B - Regulation Lines Set at 15 m Buffer Zone
E - Regulation Lines set at Extent of Cross Section
W - Regulation Lines set at 30 m for Wharfs In Lieu of 15 m Buffer Zone

J-4 - Development Levels & Locationof Regulation Lines for the Brisbane River

WATER LEVEL Location	MIKE 11 Chainage (km)	AMTD Chainage (km)	Cross Section Number	Reach No. and Name	100 Year ARI Development Levels (m AHD)	Limiting Factor Left Bank	Regulation Line Chainage Left (m)	Regulation Line Chainage Right (m)	Limiting Factor Right Bank
BRISBANE	1000.00	78.66	BN 2020	Reach 1 - Upper Boundary	23.09	In	446.7	772.6	In
BRISBANE	1000.29	78.38	BN 2010		22.87	In	644.2	892.1	In
BRISBANE	1000.78	77.89	BN 2000		22.61	In	790	1009.7	In
BRISBANE	1001.32	77.35	BN 1990		22.52	In	782.7	1088.80	A
BRISBANE	1001.87	76.80	BN 1980		21.99	In	823	1067.1	In
BRISBANE	1002.35	76.31	BN 1970	Reach 2 - Barellan Point	21.80	A	745.5	1001.0	In
BRISBANE	1002.79	75.88	BN 1960		21.78	In	664.5	972.1	In
BRISBANE	1003.28	75.39	BN 1950		21.45	In	517.8	787.0	In
BRISBANE	1003.78	74.89	BN 1940		21.18	In	705.5	960.5	In
BRISBANE	1004.30	74.36	BN 1930		20.72	In	540.5	795.6	In
BRISBANE	1004.81	73.85	BN 1920		20.69	In	498.3	817.6	In
BRISBANE	1005.33	73.34	BN 1910		20.50	In	461.3	826.1	In
BRISBANE	1005.87	72.79	BN 1900	Reach 3 - Riverview	20.18	A	430.4	717.4	In
BRISBANE	1006.30	72.36	BN 1890		20.02	In	531.6	776.4	In
BRISBANE	1006.91	71.75	BN 1880		19.82	A	387.1	812.2	In
BRISBANE	1007.41	71.25	BN 1870		19.72	In	350.2	765.60	A
BRISBANE	1007.92	70.74	BN 1860	Reach 4 - Redbank	19.39	In	580.3	840.1	A
BRISBANE	1008.45	70.22	BN 1850		19.26	In	583.3	866.2	In
BRISBANE	1008.93	69.74	BN 1840		19.19	In	517.7	814.4	In
BRISBANE	1009.40	69.26	BN 1830		19.09	In	550.7	823.30	A
BRISBANE	1009.72	68.84	BN 1820		19.03	In	405.5	738.3	A
BRISBANE	1010.49	68.17	BN 1810		18.73	In	30.8	284.6	In
BRISBANE	1010.73	67.94	BN 1800		18.74	A	265.5	504.3	In
BRISBANE	1010.98	67.68	BN 1790		18.68	In	73.4	335.2	In
BRISBANE	1011.51	67.15	BN 1780		18.67	In	296.6	695.80	A
BRISBANE	1011.98	66.68	BN 1770		18.66	A	250.2	766.1	In
BRISBANE	1012.48	66.19	BN 1760	Reach 5 - Goodna	18.61	In	767.2	1528.3	In
BRISBANE	1012.94	65.73	BN 1750		18.50	In	327.1	898.90	A
BRISBANE	1013.45	65.22	BN 1740		18.41	In	159.6	1004.1	In
BRISBANE	1013.91	64.74	BN 1730		18.35	In	204.9	1135.0	In
BRISBANE	1014.31	64.55	BN 1720		18.31	In	0	896.7	In
BRISBANE	1014.61	64.05	BN 1710	Reach 6 - Wacol	18.35	In	0	923.7	In
BRISBANE	1015.09	63.57	BN 1700		18.21	In	239.6	643.6	In
BRISBANE	1015.56	63.10	BN 1690		18.05	In	249.8	508.20	A
BRISBANE	1016.14	62.52	BN 1680		17.97	A	405	803.9	In
BRISBANE	1016.64	62.02	BN 1670		17.90	A	352.5	959.2	In
BRISBANE	1017.13	61.53	BN 1660		17.67	A	463.2	870.7	In
BRISBANE	1017.61	61.05	BN 1650		17.56	A	398.9	851.9	A
BRISBANE	1017.92	60.74	BN 1640		17.44	A	502.6	905.20	A
BRISBANE	1018.20	60.46	BN 1630		17.38	A	407.3	809.0	A
BRISBANE	1018.73	59.94	BN 1620		17.06	In	768.7	1141.0	In
BRISBANE	1019.10	59.57	BN 1610		16.92	In	124.2	648.9	In
BRISBANE	1019.49	59.17	BN 1600	Reach 7 - Riverhills	16.79	A	435.5	836.0	In
BRISBANE	1019.87	58.80	BN 1590		16.52	In	131.8	441.90	A
BRISBANE	1020.12	58.55	BN 1580		16.59	In	62.9	613.10	A
BRISBANE	1020.53	58.14	BN 1570		16.58	In	136.5	656.0	A
BRISBANE	1020.83	57.83	BN 1560		16.41	In	103.8	395.80	B
BRISBANE	1021.10	57.57	BN 1550		16.21	B	297	548.9	In
BRISBANE	1021.54	57.12	BN 1540		16.04	A	685	998.3	In
BRISBANE	1021.72	56.95	BN 1530		16.08	B	676	1012.4	In
BRISBANE	1021.90	56.77	BN 1520	Reach 8 - Westlake	15.99	In	828.4	1178.70	B
BRISBANE	1022.11	56.56	BN 1510		15.79	B	371.4	905.60	In
BRISBANE	1022.58	56.09	BN 1500		15.82	B	292.9	603.5	A
BRISBANE	1023.04	55.62	BN 1490		15.53	In	258	618.10	B
BRISBANE	1023.57	55.09	BN 1480		15.47	A	353.9	565.00	B
BRISBANE	1024.08	54.58	BN 1470		15.42	B	212.5	444.30	B
BRISBANE	1024.56	54.10	BN 1460		15.35	B	295.7	591.9	In
BRISBANE	1025.07	53.59	BN 1450		15.25	A	380.5	680.4	In
BRISBANE	1025.36	53.30	BN 1440		15.10	B	480.6	810.6	In
BRISBANE	1025.59	53.07	BN 1430		14.91	B	271.4	606.50	B
BRISBANE	1026.17	52.49	BN 1420		14.80	B	373.1	669.70	B
BRISBANE	1026.68	51.98	BN 1410		14.68	B	155	491.70	A
BRISBANE	1026.90	51.76	BN 1400	Reach 9 - Mermaid Reach	14.51	A	200.6	462.30	B
BRISBANE	1027.16	51.50	BN 1390		14.42	B	599.6	853.20	B
BRISBANE	1027.68	50.98	BN 1380		14.49	B	561.4	901.8	B
BRISBANE	1028.18	50.48	BN 1370		14.49	B	445.1	905.60	B
BRISBANE	1028.68	49.98	BN 1360		14.40	In	350.6	613.7	A
BRISBANE	1028.76	49.90	BN 1340		14.27	B	350.6	613.7	B

Legend

In - Regulation Lines set at Extent of Inundation
A - Regulation Lines adjusted until Maximum Afflux Achieved
B - Regulation Lines Set at 15 m Buffer Zone
E - Regulation Lines set at Extent of Cross Section
W - Regulation Lines set at 30 m for Wharfs in Lieu of 15 m Buffer Zone

J-4 - Development Levels & Locationof Regulation Lines for the Brisbane River

WATER LEVEL Location	MIKE 11 Chainage (km)	AMTD Chainage (km)	Cross Section Number	Reach No. and Name	100 Year ARI Development Levels (m AHD)	Limiting Factor Left Bank	Regulation Line Chainage Left (m)	Regulation Line Chainage Right (m)	Limiting Factor Right Bank
BRISBANE	1029.20	49.46	BN 1330		14.10	A	735.9	1023.80	B
BRISBANE	1029.68	48.98	BN 1320		14.10	B	744.3	1030.80	B
BRISBANE	1030.22	48.44	BN 1310		14.15	B	746.3	1119.9	B
BRISBANE	1030.87	47.79	BN 1300		14.11	B	525.5	804.5	B
BRISBANE	1031.26	47.40	BN 1290		13.99	B	457.5	682.5	B
BRISBANE	1031.70	46.96	BN 1280		13.63	B	703.4	923.40	B
BRISBANE	1032.00	46.67	BN 1270		13.71	B	682.7	985.7	B
BRISBANE	1032.23	46.43	BN 1260	Reach 10 - Sherwood Reach	13.58	B	576.1	919.70	B
BRISBANE	1032.59	46.08	BN 1250		13.33	B	473.1	769.70	B
BRISBANE	1033.08	45.58	BN 1240		13.20	B	730.3	972.3	B
BRISBANE	1033.37	45.29	BN 1230		13.13	B	671.1	941.3	B
BRISBANE	1033.90	44.76	BN 1220		12.87	B	678.7	925.20	B
BRISBANE	1034.37	44.29	BN 1210		12.72	B	465	707.60	B
BRISBANE	1034.89	43.77	BN 1200		12.62	B	533.8	792.20	B
BRISBANE	1035.41	43.25	BN 1190	Reach 11 - Chelmer Reach	12.38	B	504.6	788.80	B
BRISBANE	1035.90	42.76	BN 1180		12.06	B	424.8	682.40	B
BRISBANE	1036.46	42.20	BN 1170		11.76	B	443.8	674.40	B
BRISBANE	1036.77	41.89	BN 1160		11.69	B	150.3	451.8	B
BRISBANE	1036.92	41.75	BN 1150		11.53	B	420.5	683.90	B
BRISBANE	1037.09	41.57	BN 1140	Reach 12 - Indooroopilly Reach	11.50	B	49.2	271.40	A
BRISBANE	1037.18	41.49	BN 1120		11.40	A	103.8	318.90	A
BRISBANE	1037.29	41.38	BN 1110		11.34	B	239	523.10	B
BRISBANE	1037.63	41.04	BN 1100		11.32	B	576.3	943.20	B
BRISBANE	1038.09	40.58	BN 1090		11.29	B	892.8	1178.80	B
BRISBANE	1038.60	40.06	BN 1080		11.28	B	867.6	1280.00	B
BRISBANE	1039.10	39.56	BN 1070		11.35	B	845.9	1729.3	E
BRISBANE	1039.57	39.05	BN 1060	Reach 13 - Canoe Reach	11.30	B	868	1622.5	E
BRISBANE	1040.09	38.57	BN 1050		11.23	B	634.7	1201.9	E
BRISBANE	1040.49	38.17	BN 1040		11.10	B	870	1369.50	E
BRISBANE	1041.01	37.56	BN 1030		11.16	B	810	1344.7	E
BRISBANE	1041.23	37.43	BN 1020		11.10	B	861.4	1434.8	E
BRISBANE	1041.46	37.20	BN 1010		11.02	B	728.3	1277.10	E
BRISBANE	1041.70	36.96	BN 1000		10.99	B	925.1	1401.20	E
BRISBANE	1041.96	36.70	BN 990		10.88	B	633.9	1077.30	E
BRISBANE	1042.24	36.43	BN 980	Reach 14 - Long Pocket Reach	10.71	B	404.8	813.90	E
BRISBANE	1042.52	36.15	BN 970		10.70	B	322.5	808.70	E
BRISBANE	1042.91	35.75	BN 960		10.53	B	346	871.00	E
BRISBANE	1043.73	34.94	BN 950		10.28	B	199.6	490.70	B
BRISBANE	1044.06	34.60	BN 940		10.16	B	428.4	703.00	B
BRISBANE	1044.34	34.32	BN 930		9.99	B	374.6	624.30	B
BRISBANE	1044.61	34.06	BN 920		9.95	B	333.2	652.8	B
BRISBANE	1044.86	33.80	BN 910		9.89	B	408	726.4	B
BRISBANE	1045.40	33.26	BN 900	Reach 15 - Cemetery Reach	9.70	B	362.3	1026.20	B
BRISBANE	1045.89	32.78	BN 890		9.53	B	507.6	1179.1	B
BRISBANE	1046.18	32.48	BN 880		9.47	B	584.6	1086.5	B
BRISBANE	1046.34	32.32	BN 870		9.41	B	621.7	939.5	B
BRISBANE	1046.58	32.08	BN 860		9.38	B	661.2	1154.9	A
BRISBANE	1046.90	31.76	BN 850		9.17	B	284.7	778.40	B
BRISBANE	1047.35	31.31	BN 840		8.77	B	257.3	518.30	B
BRISBANE	1047.92	30.75	BN 830		8.54	B	302.6	535.6	B
BRISBANE	1048.38	30.29	BN 820	Reach 16 - St Lucia Reach	8.59	B	394.9	737.90	B
BRISBANE	1048.89	29.77	BN 810		8.38	B	593.1	950.6	B
BRISBANE	1049.12	29.54	BN 800	Reach 17 - Toowong Reach	8.33	B	180.8	455.4	B
BRISBANE	1049.37	29.29	BN 790		8.15	B	177.6	415.0	B
BRISBANE	1049.59	29.07	BN 780		8.12	B	816.4	1145.8	B
BRISBANE	1049.87	28.79	BN 770		8.00	B	200.3	468.60	A
BRISBANE	1050.43	28.23	BN 760		7.96	A	571.8	880.70	A
BRISBANE	1050.86	27.80	BN 750		7.83	B	614.3	873.5	B
BRISBANE	1051.36	27.30	BN 740	Reach 18 - Milton Reach	7.84	B	747	990.6	B
BRISBANE	1051.90	26.77	BN 730		7.67	A	895.9	1160.5	A
BRISBANE	1052.31	26.35	BN 720		7.81	B	125.9	398.00	B
BRISBANE	1052.39	26.27	BN 700		7.61	B	41.7	330.0	B
BRISBANE	1052.60	26.07	BN 690	Reach 19 - South Brisbane Reach	7.52	B	10.7	245.80	B
BRISBANE	1052.64	26.02	BN 670		6.99	B	0	261.10	B
BRISBANE	1052.87	25.80	BN 660		6.84	A	153.5	378.80	A
BRISBANE	1053.32	25.34	BN 650		6.77	B	0	365.20	B
BRISBANE	1053.39	25.80	BN 630		6.70	B	252.4	616.00	B
BRISBANE	1053.90	24.76	BN 620		6.28	B	630.5	935.4	B

Legend

In - Regulation Lines set at Extent of Inundation
A - Regulation Lines adjusted until Maximum Afflux Achieved
B - Regulation Lines Set at 15 m Buffer Zone
E - Regulation Lines set at Extent of Cross Section
W - Regulation Lines set at 30 m for Wharfs in Lieu of 15 m Buffer Zone

J-4 - Development Levels & Locationof Regulation Lines for the Brisbane River

WATER LEVEL Location	MIKE 11 Chainage (km)	AMTD Chainage (km)	Cross Section Number	Reach No. and Name	100 Year ARI Development Levels (m AHD)	Limiting Factor Left Bank	Regulation Line Chainage Left (m)	Regulation Line Chainage Right (m)	Limiting Factor Right Bank
BRISBANE	1054.64	24.02	BN 610		6.16	B	65.9	567.40	B
BRISBANE	1054.68	23.98	BN 590	Reach 20 - Town Reach	6.06	B	52.4	467.6	B
BRISBANE	1054.97	23.69	BN 560		5.82	B	269.4	588.8	B
BRISBANE	1055.28	23.38	BN 550		5.74	B	325.1	631.20	B
BRISBANE	1055.42	23.24	BN 540		5.73	B	271.6	615.60	B
BRISBANE	1055.96	22.70	BN 530		5.68	B	85.1	444.60	B
BRISBANE	1056.40	22.26	BN 520		5.43	B	109.9	414.10	B
BRISBANE	1056.70	21.97	BN 510		5.36	B	120	405.00	B
BRISBANE	1056.87	21.80	BN 500		5.57	B	1084.8	1345.00	B
BRISBANE	1056.95	21.71	BN 490	Reach 21 - Shaftston Reach	5.46	B	1058.7	1345.00	B
BRISBANE	1057.09	21.57	BN 480		5.31	B	100	407.80	B
BRISBANE	1057.53	21.13	BN 470		5.17	B	149.6	462.60	B
BRISBANE	1058.04	20.62	BN 460		4.91	B	271.4	613.00	B
BRISBANE	1058.23	20.43	BN 450		4.83	B	217	511.40	B
BRISBANE	1058.53	20.13	BN 440		4.69	B	273	519.70	B
BRISBANE	1058.74	19.93	BN 430	Reach 22 - Humbug Reach	4.72	B	184.8	474.90	B
BRISBANE	1059.04	19.63	BN 420		4.45	B	431.3	657.00	B
BRISBANE	1059.54	19.12	BN 410		4.41	B	455	805.00	B
BRISBANE	1059.99	18.67	BN 400		4.20	B	320	703.30	B
BRISBANE	1060.35	18.32	BN 390	Reach 23 - Bulimba Reach	3.94	B	386.2	676.70	B
BRISBANE	1060.54	18.13	BN 380		3.80	B	308.7	577.20	B
BRISBANE	1061.02	17.65	BN 370		3.76	B	634	955.00	B
BRISBANE	1061.53	17.13	BN 360		3.54	B	442	743.00	B
BRISBANE	1062.02	16.64	BN 350		3.46	B	315	673.10	B
BRISBANE	1062.54	16.13	BN 340		3.42	B	240.4	732.50	B
BRISBANE	1062.94	15.72	BN 330		3.41	B	326.6	868.00	B
BRISBANE	1063.31	15.35	BN 320	Reach 24 - Hamilton Reach	3.29	B	529.6	1001.00	B
BRISBANE	1063.65	15.02	BN 310		3.00	B	538	885.10	B
BRISBANE	1064.00	14.66	BN 300		2.96	B	483.2	845.60	B
BRISBANE	1064.49	14.17	BN 290		2.83	B	479.7	827.70	B
BRISBANE	1065.01	13.65	BN 280		2.85	B	722.2	1101.80	B
BRISBANE	1065.50	13.16	BN 270		2.81	W	671.9	1071.90	W
BRISBANE	1065.99	12.67	BN 260		2.84	W	590	1101.80	W
BRISBANE	1066.51	12.16	BN 250	Reach 25 - Quarries Reach	2.76	W	565.8	1051.70	W
BRISBANE	1067.02	11.64	BN 240		2.71	W	739.7	1169.10	W
BRISBANE	1067.49	11.18	BN 230		2.59	W	399.8	829.3	W
BRISBANE	1067.97	10.70	BN 220		2.50	W	462.5	906.80	W
BRISBANE	1068.66	10.00	BN 210	Reach 26 - Lytton Reach	2.50	W	1062.9	1520.30	W
BRISBANE	1069.05	9.62	BN 200		2.50	W	591.4	1015.70	W
BRISBANE	1069.54	9.13	BN 190		2.50	W	526.9	984.30	W
BRISBANE	1070.03	8.64	BN 180		2.50	W	206.3	656.20	W
BRISBANE	1070.53	8.13	BN 170		2.50	W	417	874.9	W
BRISBANE	1071.04	7.62	BN 160		2.50	W	608	1081.9	W
BRISBANE	1071.52	7.14	BN 150		2.50	W	451.4	938.70	W
BRISBANE	1072.02	6.65	BN 140		2.50	W	171.7	1074.10	W
BRISBANE	1072.52	6.15	BN 130		2.50	W	435.8	893.30	W
BRISBANE	1073.00	5.67	BN 120		2.50	W	571.9	1063.20	W
BRISBANE	1073.49	5.18	BN 110		2.50	W	494	991.40	W
BRISBANE	1074.00	4.66	BN 100	Reach 27 - Lytton Rocks Reach	2.50	W	658.7	1127.40	W
BRISBANE	1074.46	4.20	BN 90		2.50	W	667.4	1183.00	W
BRISBANE	1074.99	3.68	BN 80		2.50	W	825.4	1338.30	W
BRISBANE	1075.48	3.18	BN 70		2.50	W	994.7	1796.30	W
BRISBANE	1076.00	2.66	BN 60	Reach 28 - Pelican Banks Reach	2.50	W	927.8	2006.00	W
BRISBANE	1076.50	2.17	BN 50		2.50	W	748.5	1641.70	W
BRISBANE	1077.01	1.65	BN 40		2.50	W	418.7	2026.30	W
BRISBANE	1077.51	1.15	BN 30	Reach 29 - Lower Reach	2.50	W	621.6	1598.40	W
BRISBANE	1078.04	0.62	BN 20		2.50	W	618.9	1399.70	W
BRISBANE	1078.53	0.14	BN 10		2.50	W	691.5	1218.70	W
BRISBANE	1078.66	-	-		2.50		0	644.2	

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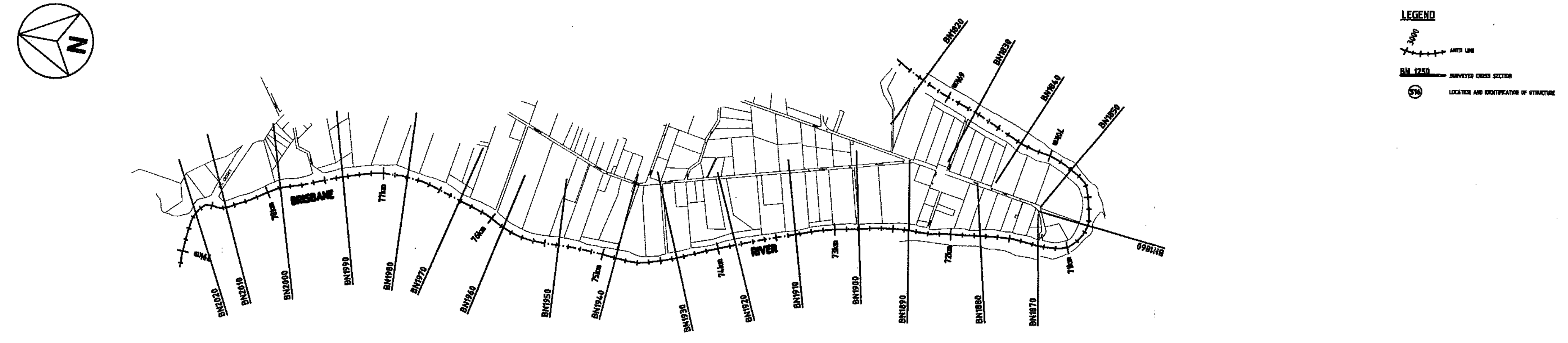
FIGURE J-1a

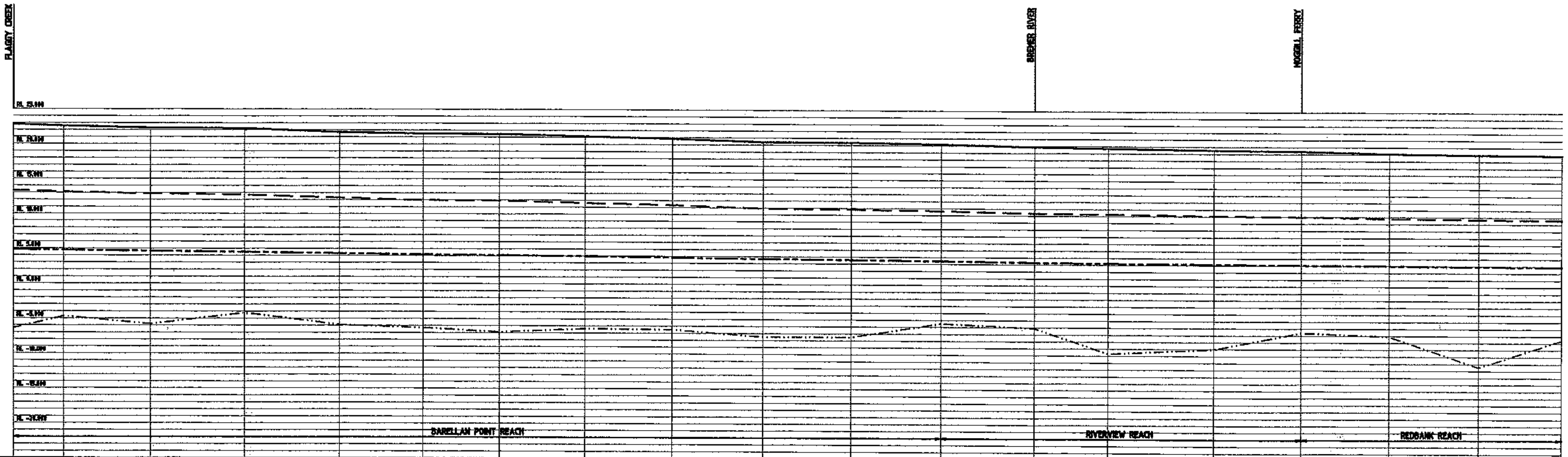
SINCLAIR KNIGHT MERZ

BRISBANE RIVER FLOOD STUDY
MIKE 11 DESIGN FLOOD PROFILES FOR THE 5, 20, AND 100 YEAR ARI
FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS
- REGULATION LINES AND REVEGETATION STRATEGY CASE



PLAN VIEW

KILOMETRES



DATUM RL. -25.000

CROSS SECTION NUMBER	5 YEAR ARI DESIGN FLOOD LEVEL	20 YEAR ARI DESIGN FLOOD LEVEL	100 YEAR ARI DESIGN FLOOD LEVEL	BED LEVEL (m AHD)	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 2020	4.830	13.380	22.790	-6.400	1000.000	78.660
BN 2010	4.760	13.120	22.570	-4.700	1000.285	78.375
BN 2000	4.430	12.870	22.310	-5.800	1000.775	77.885
BN 1990	4.500	12.710	22.220	-4.200	1001.315	77.345
BN 1980	4.320	12.290	21.690	-5.900	1001.845	76.795
BN 1970	4.170	11.980	21.590	-6.300	1002.350	76.310
BN 1960	4.090	11.920	21.480	-6.900	1002.785	75.875
BN 1950	3.910	11.600	21.150	-6.600	1003.275	75.385
BN 1940	3.820	11.340	20.880	-6.500	1003.775	74.885
BN 1930	3.680	10.910	20.420	-7.500	1004.300	74.360
BN 1920	3.580	10.790	20.390	-7.500	1004.810	73.850
BN 1910	3.440	10.430	20.200	-5.500	1005.325	73.335
BN 1900	3.380	10.370	19.880	-6.900	1005.870	72.790
BN 1890	3.730	10.270	19.720	-9.700	1006.300	72.360
BN 1880	3.150	10.080	19.520	-9.800	1006.910	71.750
BN 1870	3.080	9.990	19.420	-6.600	1007.410	71.250
BN 1860	3.000	9.790	19.090	-7.400	1007.920	70.740
BN 1850	2.950	9.700	18.960	-11.500	1008.445	70.215
BN 1840	2.920	9.630	18.890	-7.600	1008.925	69.735

LEGEND
- LOCATION AND IDENTIFICATION OF STRUCTURE
- 5 YEAR ARI DESIGN FLOOD
- 20 YEAR ARI DESIGN FLOOD
- 100 YEAR ARI DESIGN FLOOD
- EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 2020 TO BN 1840

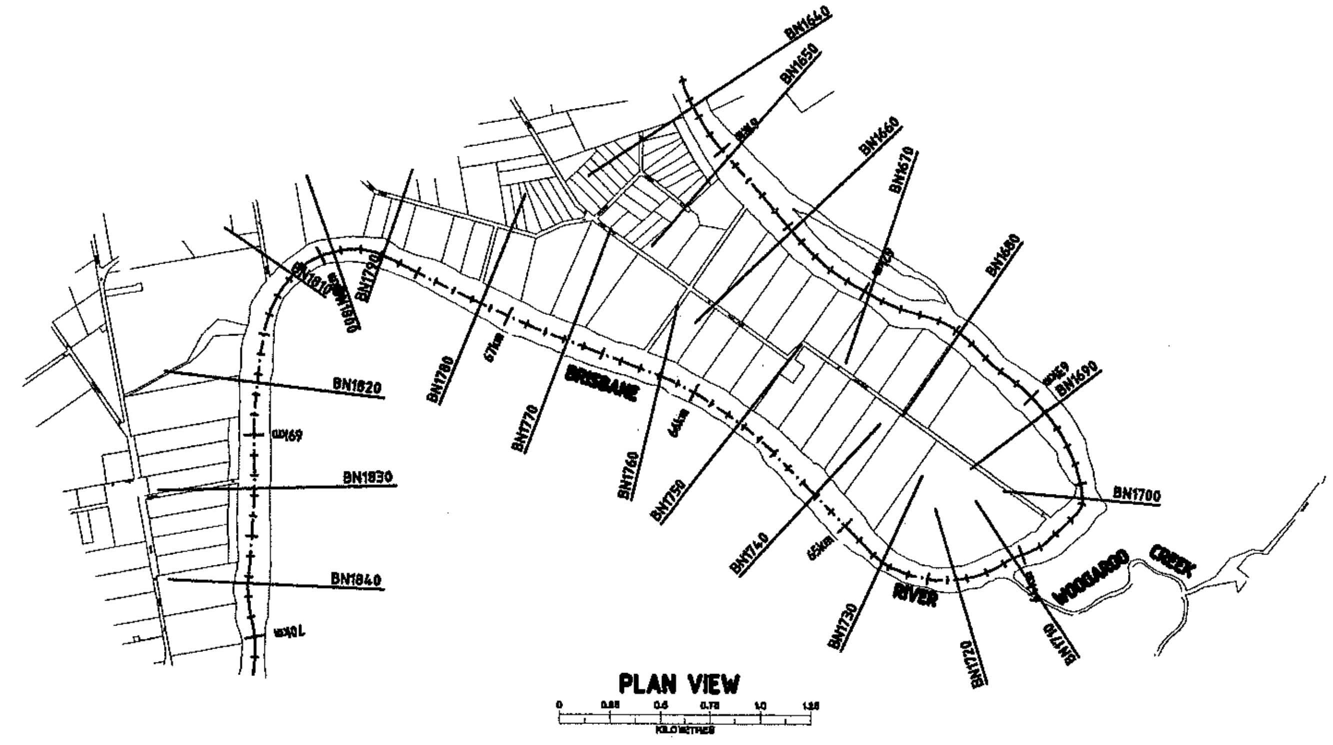
FILE NAME: 4157-156 PLOT SCALE: 1=30 DISK N°: ENDWG JOB N°: T00415? DATE: 23/3/97

SINCLAIR KNIGHT MERZ

FIGURE J-1b

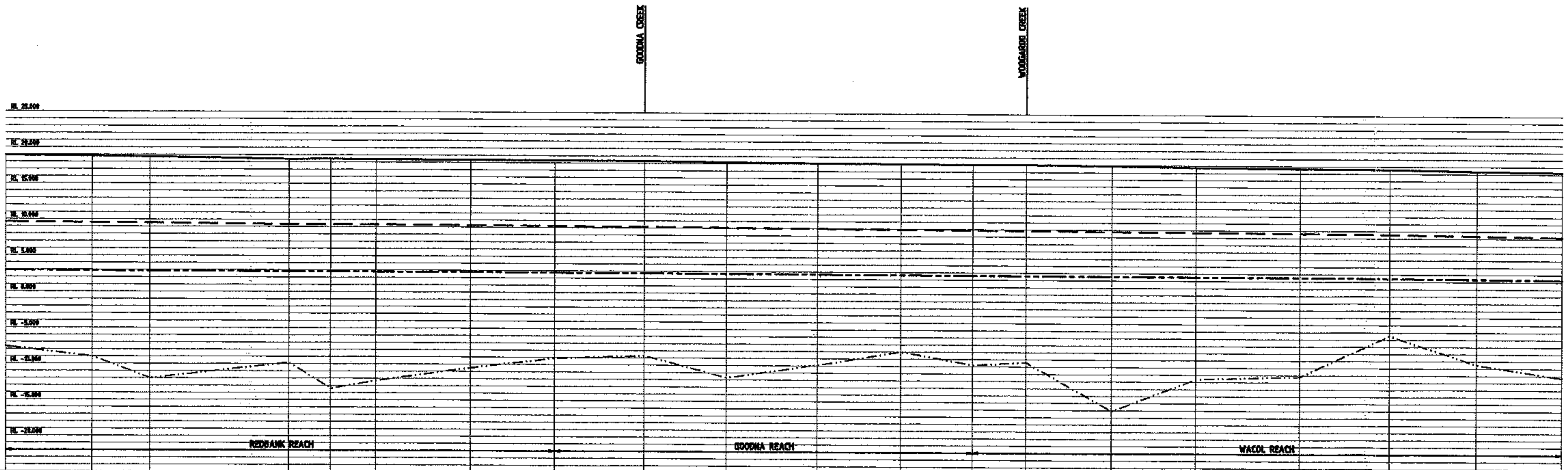
BRISBANE RIVER FLOOD STUDY

MIKE 11 DESIGN FLOOD PROFILES FOR THE 5, 20, AND 100 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS - REGULATION LINES AND REVEGETATION STRATEGY CASE



LEGEND

- AMTD LINE
- BN 1250 SURVEYED CROSS SECTION
- LOCATION AND IDENTIFICATION OF STRUCTURE



DATUM RL. -25.000

	5 YEAR ARI DESIGN FLOOD LEVEL	20 YEAR ARI DESIGN FLOOD LEVEL	100 YEAR ARI DESIGN FLOOD LEVEL	BED LEVEL (m AHD)	CROSS SECTION NUMBER	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
	2.920	9.630	18.890	-7.600	BN 1840	1008.725	69.735
	2.890	9.560	18.790	-5.000	BN 1830	1009.400	69.260
	2.880	9.534	18.736	-12.000	BN 1820	1009.720	68.640
	2.830	9.360	18.630	-9.800	BN 1810	1010.490	68.370
	2.820	9.370	18.640	-13.400	BN 1800	1010.725	67.935
	2.810	9.334	18.380	-12.300	BN 1790	1010.960	67.600
	2.790	9.280	18.370	-10.500	BN 1780	1011.510	67.150
	2.760	9.230	18.340	-9.100	BN 1770	1011.980	66.680
	2.730	9.160	18.310	-8.700	BN 1760	1012.475	66.185
	2.700	9.080	18.280	-11.700	BN 1750	1012.935	65.725
	2.670	9.018	18.110	-7.900	BN 1740	1013.445	65.215
	2.630	8.940	18.050	-9.000	BN 1730	1013.910	64.740
	2.640	8.880	18.010	-9.800	BN 1720	1014.310	64.350
	2.560	8.830	18.050	-9.400	BN 1710	1014.610	64.050
	2.570	8.800	17.910	-16.100	BN 1700	1015.090	63.570
	2.550	8.716	17.750	-11.600	BN 1690	1015.560	63.100
	2.530	8.650	17.670	-11.200	BN 1680	1016.140	62.520
	2.470	8.560	17.600	-5.500	BN 1670	1016.640	62.020
	2.370	8.390	17.370	-9.500	BN 1660	1017.130	61.530
	2.300	8.210	17.260	-17.300	BN 1650	1017.610	61.050

BRISBANE RIVER - BN 1840 TO BN 1650

LEGEND

- LOCATION AND IDENTIFICATION OF STRUCTURE
- 5 YEAR ARI DESIGN FLOOD
- 20 YEAR ARI DESIGN FLOOD
- 100 YEAR ARI DESIGN FLOOD
- EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

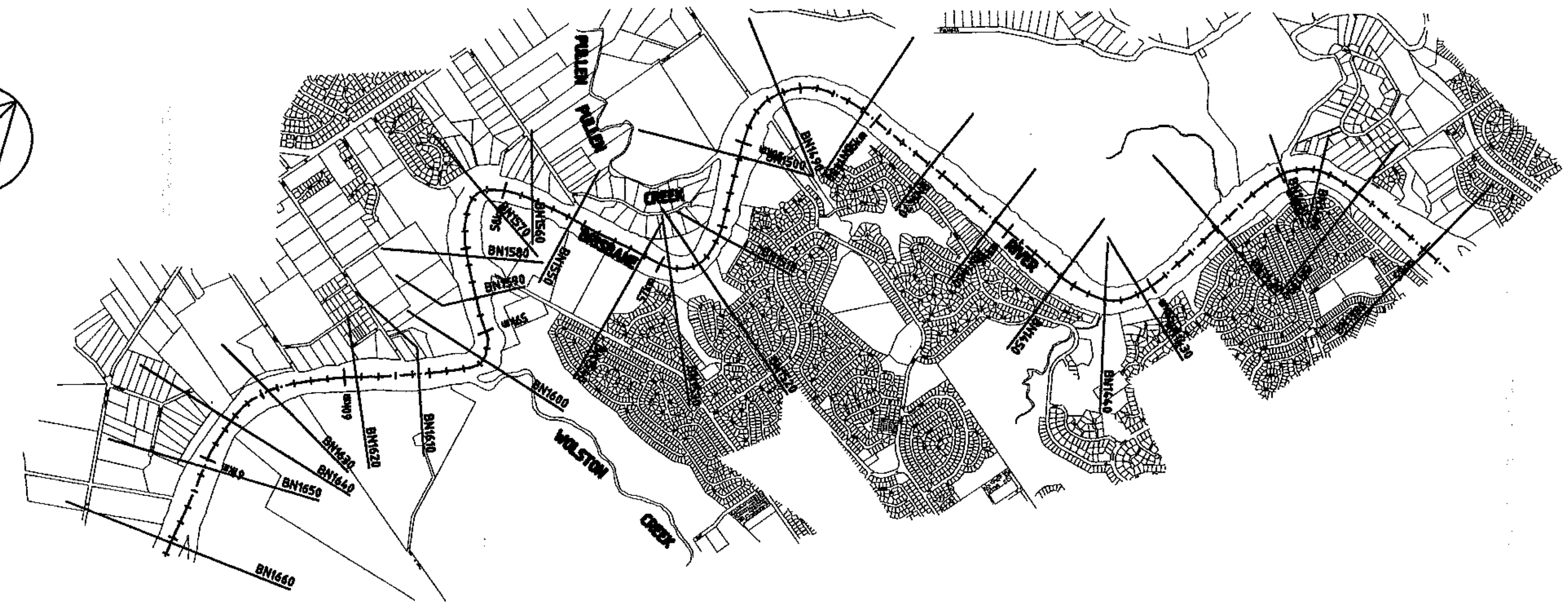
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

FILE NAME: 4157-157 DISK N°: C:\DWG JOB N°: T00415? DATE: 23/3/97
PLOT SCALE: 1=30

SINCLAIR KNIGHT MERZ

FIGURE J-1c

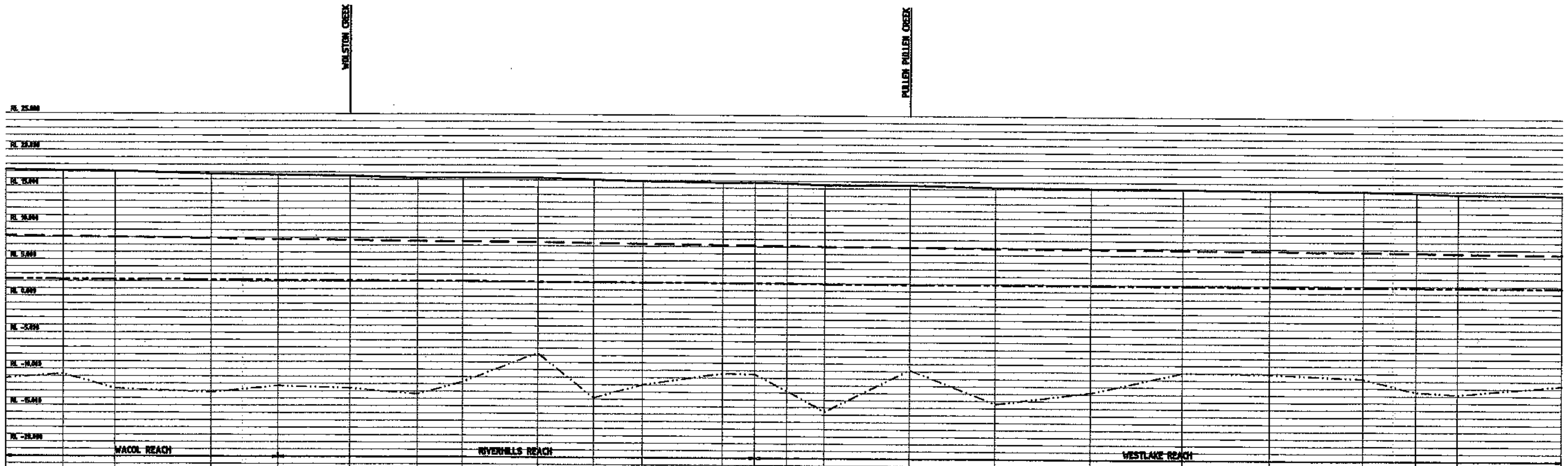
BRISBANE RIVER FLOOD STUDY
MIKE 11 DESIGN FLOOD PROFILES FOR THE 5, 10, AND 20 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS - REGULATION LINES AND REVEGETATION STRATEGY CASE



PLAN VIEW

0 0.25 0.5 0.75 1.0 1.25 KILOMETRES

LEGEND
AMTD LINE
BN 1250 SURVEYED CROSS SECTION
LOCATION AND IDENTIFICATION OF STRUCTURE



DATUM RL. -25.000

5 YEAR ARI DESIGN FLOOD LEVEL	2.300	2.240	2.250	2.280	2.230	2.140	2.180	2.090	2.040	2.040	2.020	1.980	1.970	1.950	1.930	1.920	1.900	1.880	1.870	1.840	1.810	1.800	1.780	1.750
20 YEAR ARI DESIGN FLOOD LEVEL	8.710	8.890	8.850	7.880	7.770	7.680	7.540	7.530	7.490	7.410	7.310	7.180	7.170	7.130	7.020	7.010	6.880	6.850	6.790	6.720	6.650	6.570	6.480	6.400
100 YEAR ARI DESIGN FLOOD LEVEL	17.360	17.144	17.080	16.760	16.620	16.490	16.220	16.290	16.280	16.110	15.910	15.740	15.780	15.670	15.490	15.520	15.230	15.170	15.120	15.050	14.950	14.800	14.650	14.500
BED LEVEL (m AHD)	-11.300	-10.730	-12.700	-13.200	-12.300	-12.600	-13.400	-11.700	-7.700	-13.000	-12.000	-10.680	-10.500	-12.800	-15.600	-9.800	-16.600	-12.800	-11.000	-10.100	-14.700	-12.500	-12.000	-11.600
CROSS SECTION NUMBER	BN 1650	BN 1640	BN 1630	BN 1620	BN 1610	BN 1600	BN 1590	BN 1580	BN 1570	BN 1560	BN 1550	BN 1540	BN 1530	BN 1520	BN 1510	BN 1500	BN 1490	BN 1480	BN 1470	BN 1460	BN 1450	BN 1440	BN 1430	BN 1420
MIKE 11 CHAINAGE (km)	1017.610	1017.978	1018.280	1018.725	1019.095	1019.450	1019.865	1020.165	1020.525	1020.830	1021.095	1021.539	1021.715	1021.895	1022.305	1022.575	1023.040	1023.570	1024.080	1024.563	1025.070	1025.340	1025.590	1026.170
AMTD CHAINAGE (km)	61.050	60.740	60.460	59.935	59.565	59.178	58.795	58.545	58.135	57.830	57.565	57.125	56.945	56.765	56.555	56.085	55.620	55.090	54.580	54.097	53.590	53.300	53.070	52.490

LEGEND
LOCATION AND IDENTIFICATION OF STRUCTURE
5 YEAR ARI DESIGN FLOOD
20 YEAR ARI DESIGN FLOOD
100 YEAR ARI DESIGN FLOOD
EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

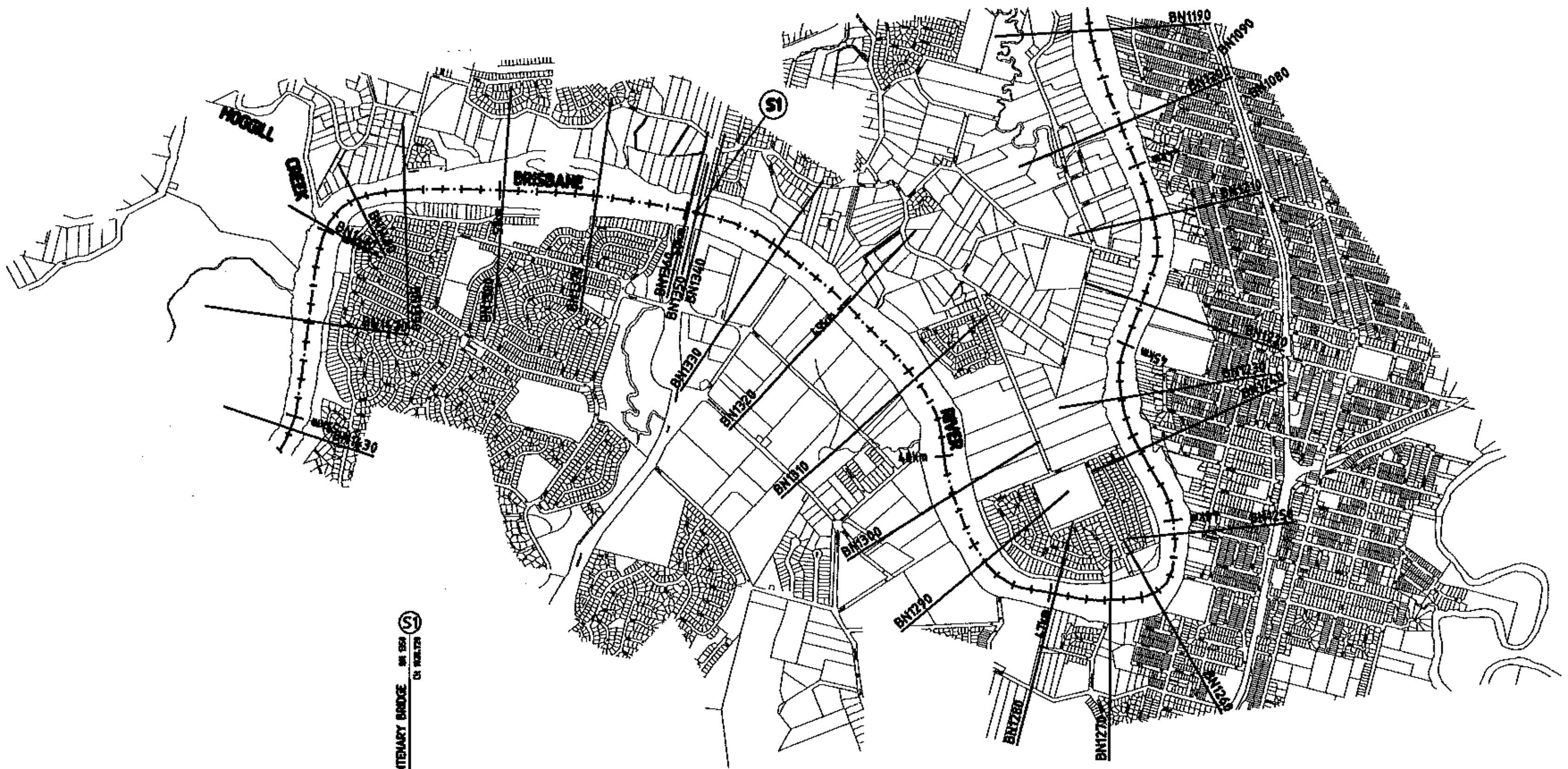
BRISBANE RIVER - BN 1650 TO BN 1420

FILE NAME: 4157-158 PLOT SCALE: 1=30 DISK N°: C:\DWG JOB N°: T004157 DATE: 23/3/97

FIGURE J-1d

BRISBANE RIVER FLOOD STUDY

MIKE 11 DESIGN FLOOD PROFILES FOR THE 5, 20, AND 100 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS - REGULATION LINES AND REVEGETATION STRATEGY CASE



PLAN VIEW

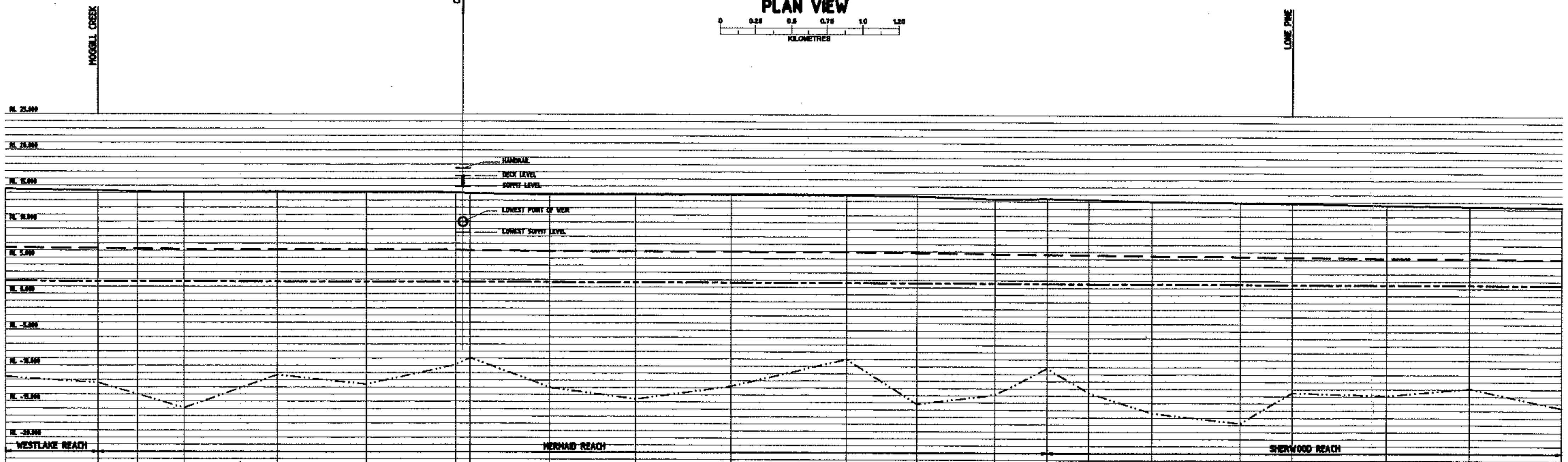
0 0.25 0.5 0.75 1.0 1.25 KILOMETRES

LEGEND

AMTD LINE

BN 1250 SURVEYED CROSS SECTION

S14 LOCATION AND IDENTIFICATION OF STRUCTURE



DATUM RL. -25.000

CROSS SECTION NUMBER	BN 1420	BN 1410	BN 1400	BN 1390	BN 1380	BN 1370	BN 1360
5 YEAR ARI DESIGN FLOOD LEVEL	1.750	1.730	1.720	1.710	1.700	1.670	1.660
20 YEAR ARI DESIGN FLOOD LEVEL	6.400	6.360	6.240	6.200	6.180	6.170	6.110
100 YEAR ARI DESIGN FLOOD LEVEL	14.500	14.390	14.270	14.120	14.190	14.150	14.100
BED LEVEL (m AHD)	-11.600	-12.400	-16.000	-15.900	-11.300	-12.600	-3.900
MIKE 11 CHAINAGE (km)	1026.174	1026.640	1026.980	1027.160	1027.680	1028.100	1028.680
AMTD CHAINAGE (km)	52.190	51.984	51.760	51.566	50.980	50.480	49.980

CROSS SECTION NUMBER	BN 1340	BN 1330	BN 1320	BN 1310	BN 1300	BN 1290	BN 1280	BN 1270
5 YEAR ARI DESIGN FLOOD LEVEL	1.660	1.650	1.640	1.640	1.630	1.610	1.590	1.570
20 YEAR ARI DESIGN FLOOD LEVEL	6.020	5.950	5.950	5.930	5.890	5.830	5.680	5.430
100 YEAR ARI DESIGN FLOOD LEVEL	13.970	13.880	13.880	13.850	13.810	13.690	13.330	13.410
BED LEVEL (m AHD)	-4.900	-13.040	-14.600	-12.800	-9.880	-15.200	-13.950	-16.200
MIKE 11 CHAINAGE (km)	1028.760	1029.300	1029.680	1030.220	1030.670	1031.260	1031.780	1031.995
AMTD CHAINAGE (km)	49.904	49.460	48.980	48.440	47.790	47.408	46.940	46.665

CROSS SECTION NUMBER	BN 1260	BN 1250	BN 1240	BN 1230	BN 1220	BN 1210	BN 1200
5 YEAR ARI DESIGN FLOOD LEVEL	1.560	1.540	1.520	1.510	1.490	1.480	1.460
20 YEAR ARI DESIGN FLOOD LEVEL	5.570	5.470	5.380	5.320	5.220	5.140	5.070
100 YEAR ARI DESIGN FLOOD LEVEL	13.280	13.030	12.980	12.870	12.570	12.420	12.320
BED LEVEL (m AHD)	-13.400	-16.400	-17.600	-13.500	-13.900	-12.900	-15.600
MIKE 11 CHAINAGE (km)	1032.230	1032.585	1033.040	1033.370	1033.900	1034.370	1034.890
AMTD CHAINAGE (km)	46.430	46.075	45.540	45.290	44.744	44.294	43.770

LEGEND

S14 LOCATION AND IDENTIFICATION OF STRUCTURE

5 YEAR ARI DESIGN FLOOD

20 YEAR ARI DESIGN FLOOD

100 YEAR ARI DESIGN FLOOD

EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

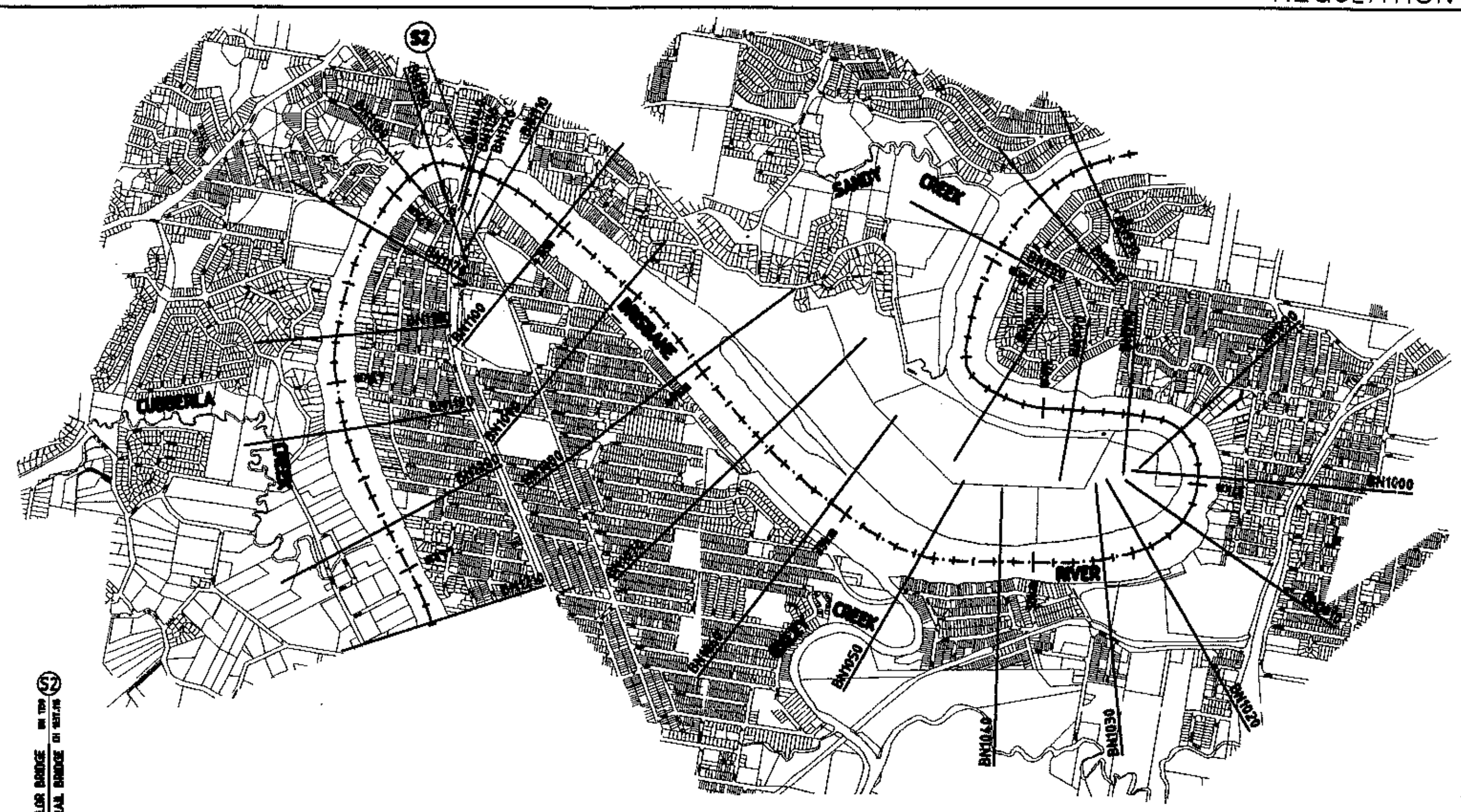
BRISBANE RIVER - BN 1420 TO BN 1200

FILE NAME: 415?-505 PLOT SCALE: 1=30 DISK N: C:\DWG JOB N: T00457 DATE: 23/5/97

FIGURE J-1e

SINCLAIR KNIGHT MERZ

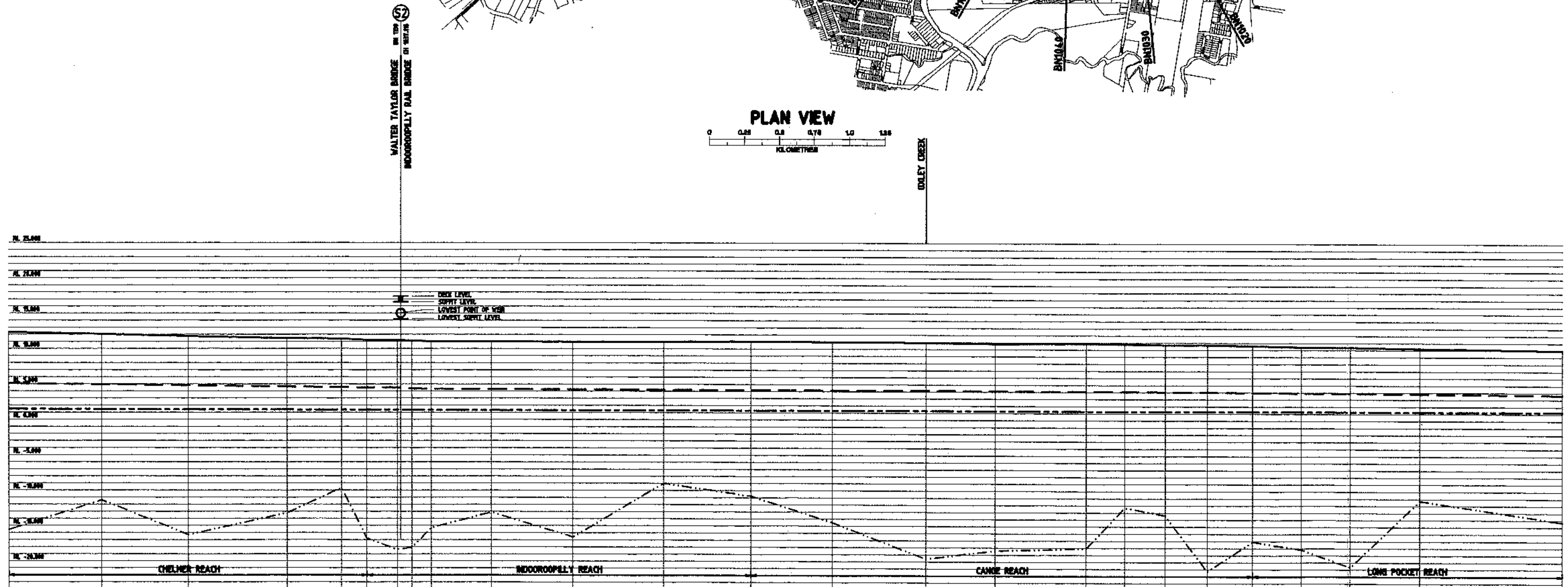
BRISBANE RIVER FLOOD STUDY
MIKE 11 DESIGN FLOOD PROFILES FOR THE 5, 20, AND 100 YEAR ARI
FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS
- REGULATION LINES AND REVEGETATION STRATEGY CASE



PLAN VIEW

0 0.25 0.5 0.75 1.0 1.25
KILOMETRES

LEGEND
AMTD LINE
BN 1250 SURVEYED CROSS SECTION
S16 LOCATION AND IDENTIFICATION OF STRUCTURE



DATUM RL. -25.000

5 YEAR ARI DESIGN FLOOD LEVEL	1.440	1.440	1.410	1.390	1.370	1.340	1.340	1.340	1.330
20 YEAR ARI DESIGN FLOOD LEVEL	3.870	4.950	4.790	4.640	4.580	4.520	4.510	4.350	4.320
100 YEAR ARI DESIGN FLOOD LEVEL	12.370	12.080	11.760	11.460	11.390	11.230	11.200	11.100	11.040
BED LEVEL (m AHD)	-15.600	-11.400	-16.300	-13.200	-9.700	-16.800	-18.400	-18.900	-15.300
CROSS SECTION NUMBER	BN 1200	BN 1190	BN 1180	BN 1170	BN 1160	BN 1150	BN 1140	BN 1120	BN 1110
MIKE 11 CHAINAGE (km)	1034.890	1035.414	1035.900	1036.460	1036.770	1036.915	1037.080	1037.175	1037.285
AMTD CHAINAGE (km)	43.770	43.246	42.760	42.200	41.890	41.745	41.574	41.465	41.375

5 YEAR ARI DESIGN FLOOD LEVEL	1.320	1.320	1.310	1.300	1.300	1.300	1.290	1.290
20 YEAR ARI DESIGN FLOOD LEVEL	4.280	4.260	4.230	4.210	4.170	4.170	4.170	4.110
100 YEAR ARI DESIGN FLOOD LEVEL	11.020	10.990	10.980	11.050	11.100	10.730	10.800	10.840
BED LEVEL (m AHD)	-13.100	-16.600	-9.080	-10.800	-14.560	-19.600	-18.400	-18.900
CROSS SECTION NUMBER	BN 1100	BN 1090	BN 1080	BN 1070	BN 1060	BN 1050	BN 1040	BN 1030
MIKE 11 CHAINAGE (km)	1037.625	1038.085	1038.600	1039.100	1039.565	1040.090	1040.490	1041.010
AMTD CHAINAGE (km)	41.035	40.575	40.060	39.560	39.050	38.570	38.170	37.560

5 YEAR ARI DESIGN FLOOD LEVEL	1.270	1.280	1.280	1.270	1.270	1.260	1.250	1.230
20 YEAR ARI DESIGN FLOOD LEVEL	4.080	4.040	4.010	3.970	3.910	3.900	3.820	3.670
100 YEAR ARI DESIGN FLOOD LEVEL	10.800	10.720	10.490	10.580	10.410	10.450	10.230	9.980
BED LEVEL (m AHD)	-12.300	-13.400	-21.300	-17.100	-18.200	-20.700	-11.300	-14.300
CROSS SECTION NUMBER	BN 1020	BN 1010	BN 1000	BN 990	BN 980	BN 970	BN 960	BN 950
MIKE 11 CHAINAGE (km)	1041.230	1041.440	1041.700	1041.960	1042.235	1042.515	1042.910	1043.725
AMTD CHAINAGE (km)	37.430	37.280	36.960	36.700	36.425	36.145	35.750	34.935

LEGEND
S16 LOCATION AND IDENTIFICATION OF STRUCTURE
5 YEAR ARI DESIGN FLOOD
20 YEAR ARI DESIGN FLOOD
100 YEAR ARI DESIGN FLOOD
EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 1200 TO BN 950

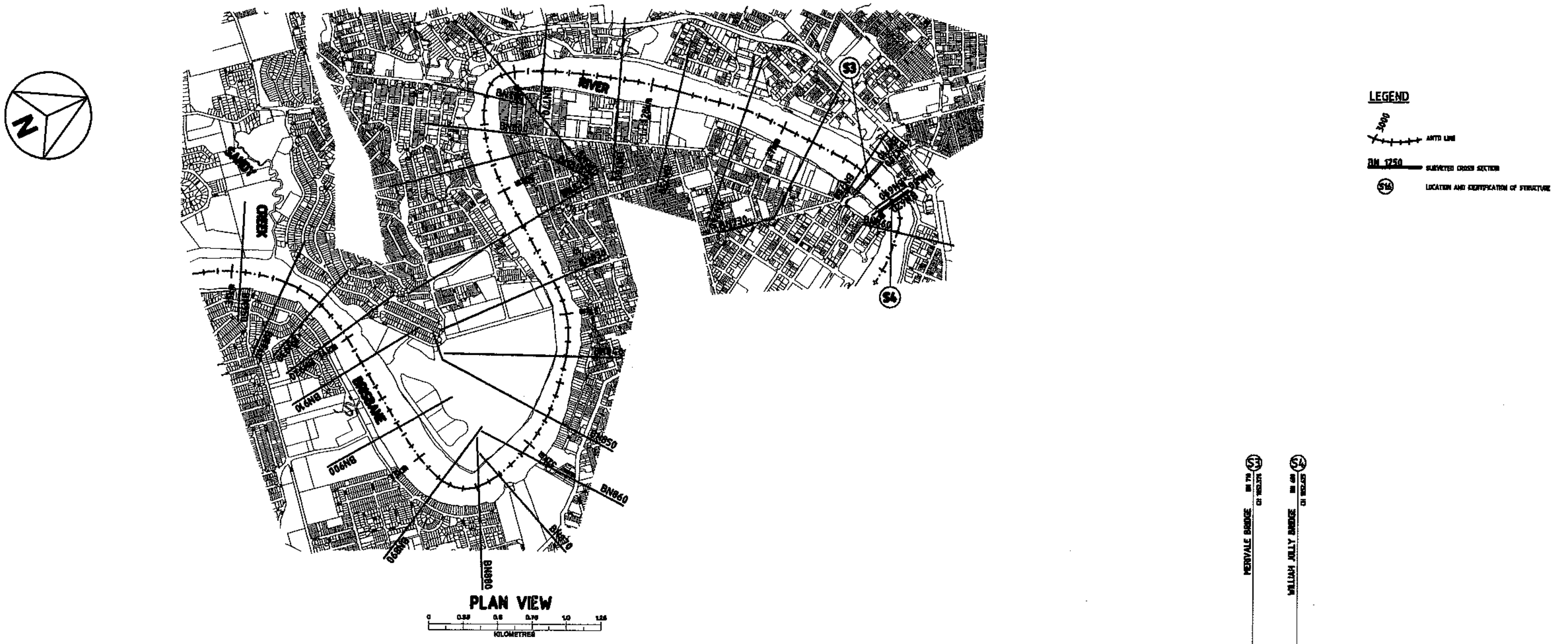
FILE NAME: 4157-160 PLOT SCALE: 1=30 DISK N°: CADWG JOB N°: T004157 DATE: 23/3/97

BCC.121.0323

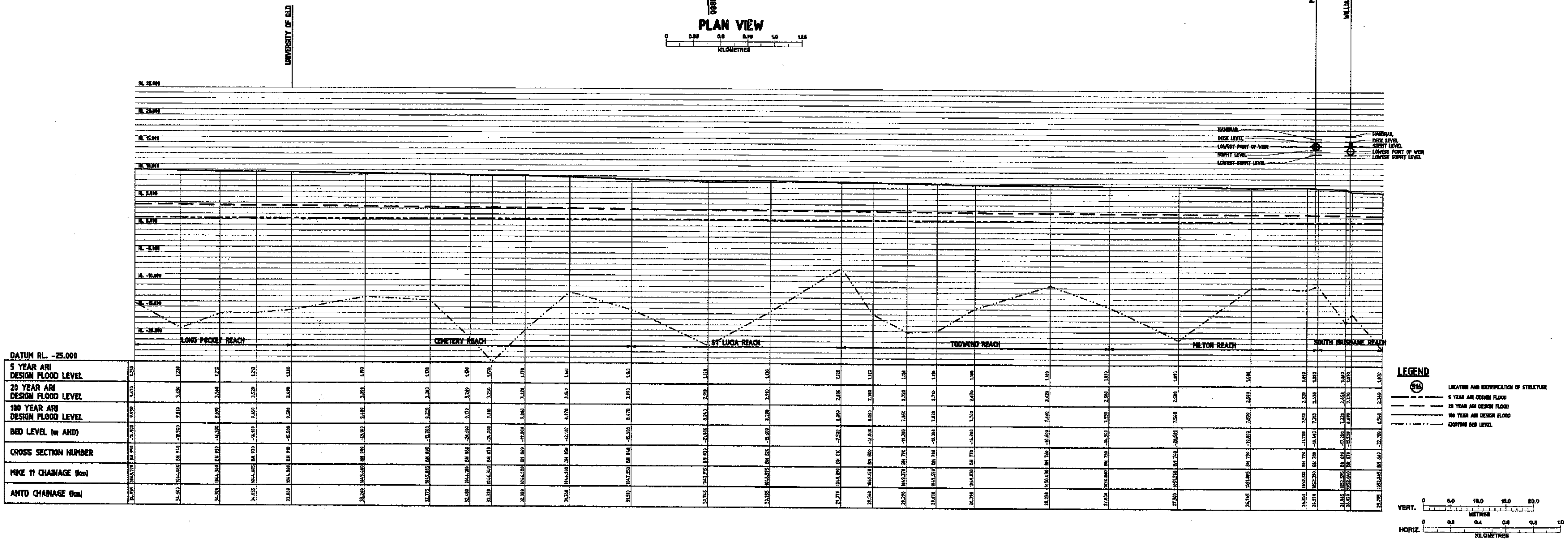
FIGURE J-1f

BRISBANE RIVER FLOOD STUDY
MIKE 11 DESIGN FLOOD PROFILES FOR THE 5, 20, AND 100 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS - REGULATION LINES AND REVEGETATION STRATEGY CASE

SINCLAIR KNIGHT MERZ



PLAN VIEW



BRISBANE RIVER - BN 950 TO BN 660

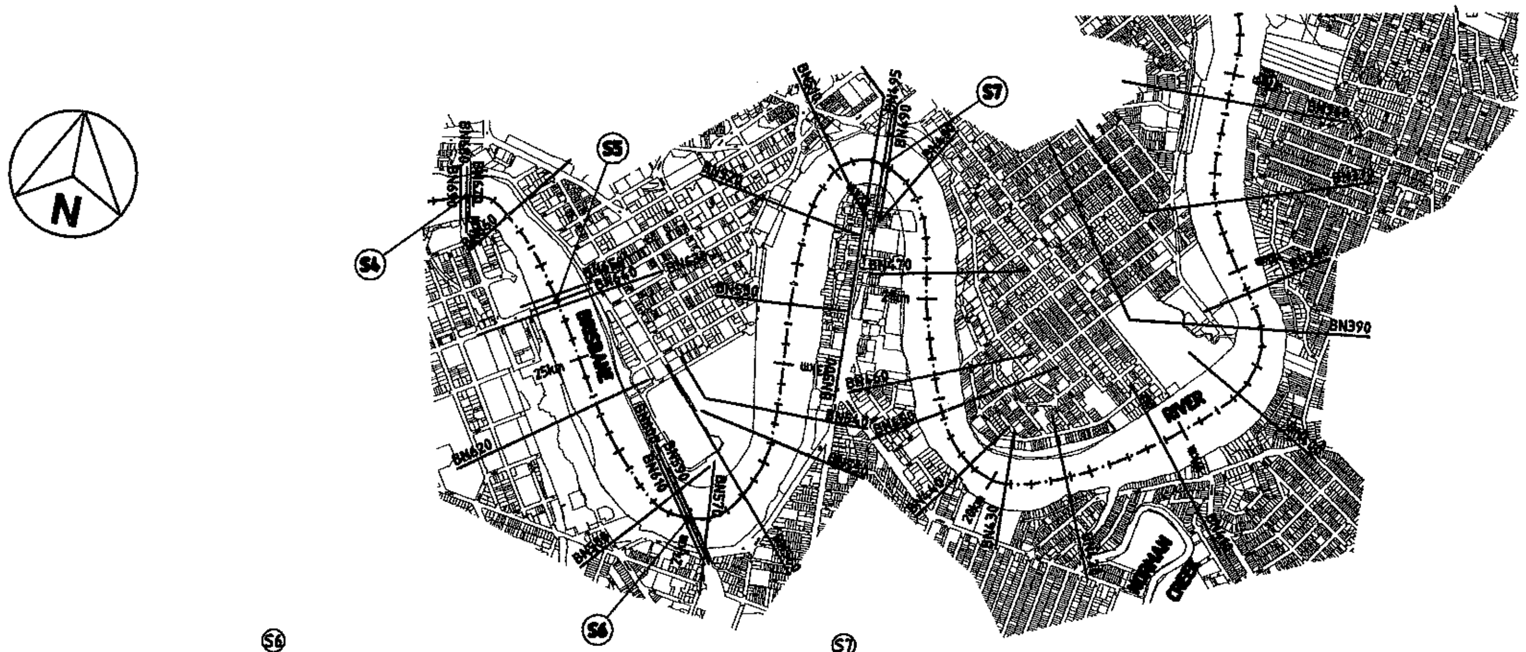
FILE NAME: 415... PLOT SCALE: 1=30

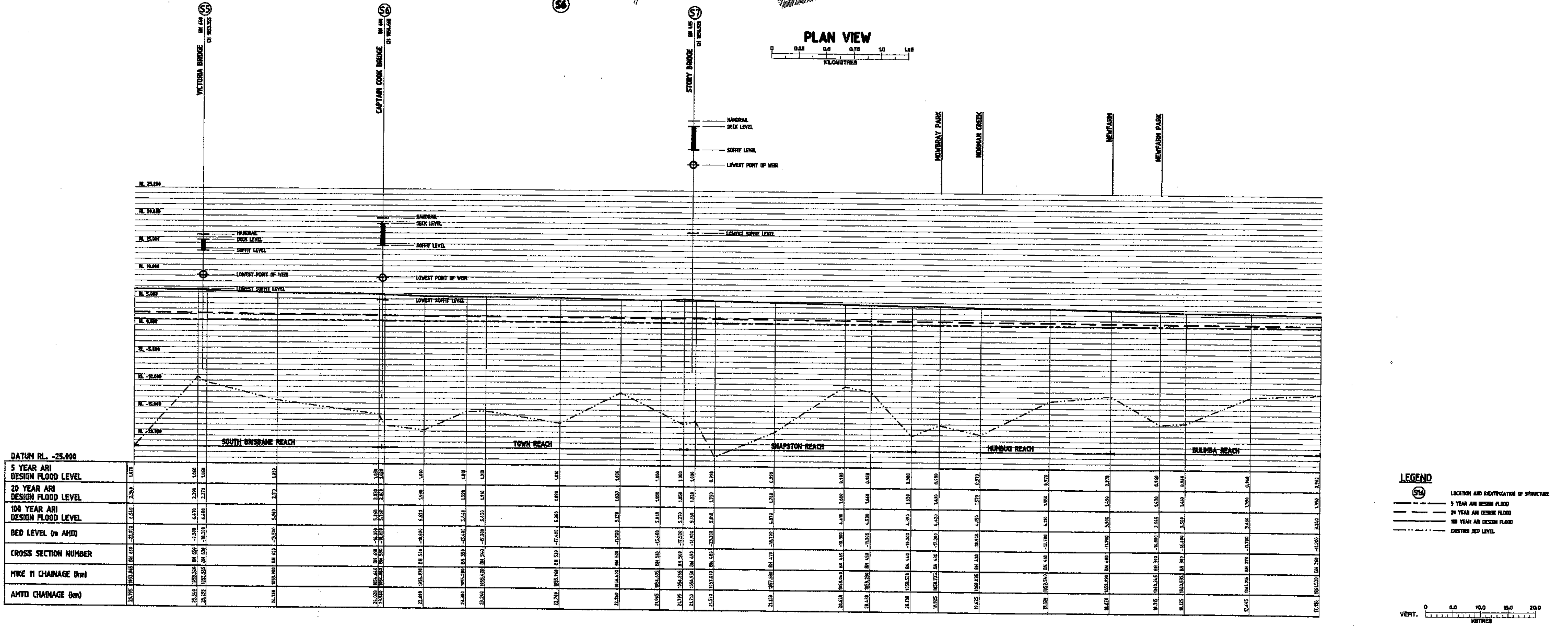
SINCLAIR KNIGHT MERZ

FIGURE J-1g

BRISBANE RIVER FLOOD STUDY

MIKE 11 DESIGN FLOOD PROFILES FOR THE 5, 20, AND 100 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS - REGULATION LINES AND REVEGETATION STRATEGY CASE



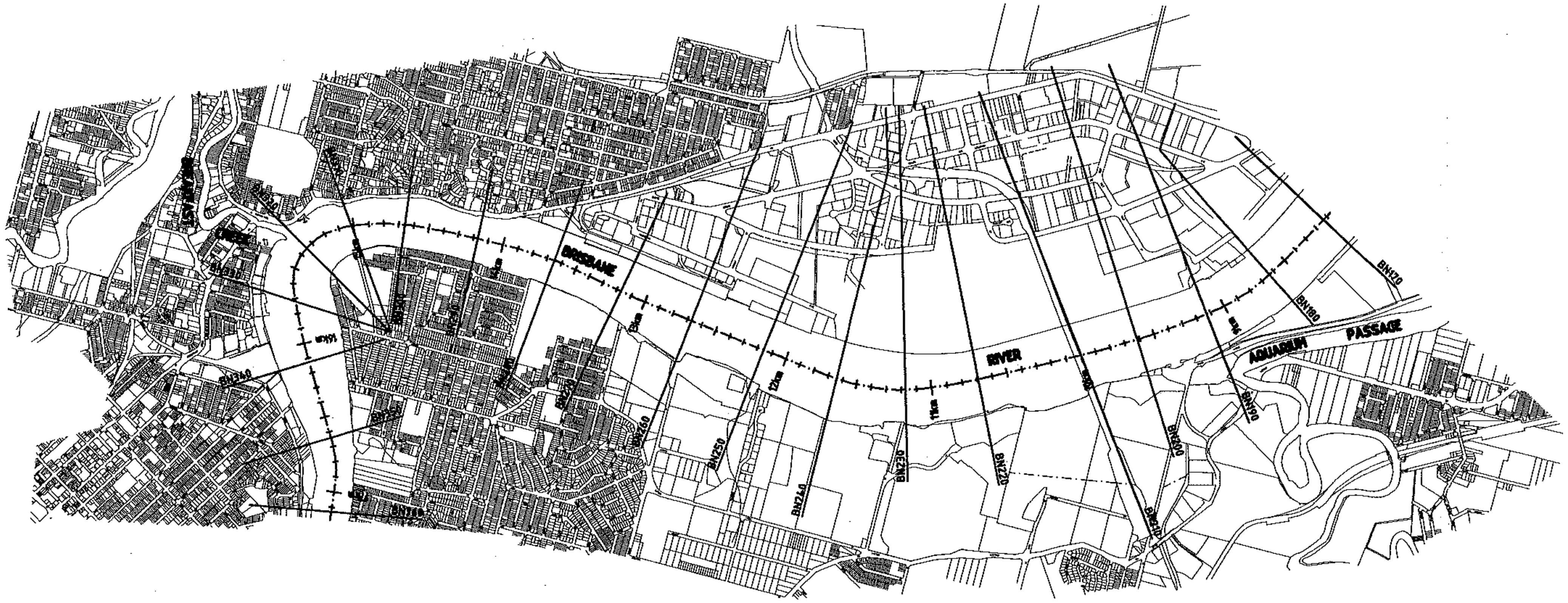


BRISBANE RIVER - BN 660 TO BN 360

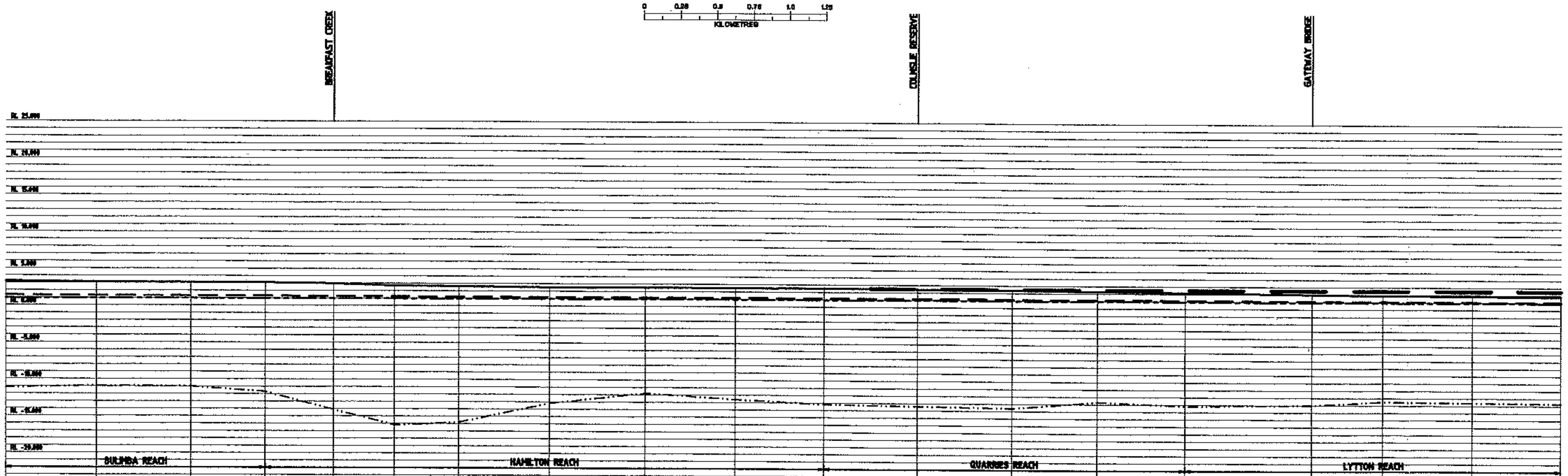
PLOT SCALE: 1=30

FIGURE J-1h

BRISBANE RIVER FLOOD STUDY
MIKE 11 DESIGN FLOOD PROFILES FOR THE 5, 20, AND 100 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS - REGULATION LINES AND REVEGETATION STRATEGY CASE



PLAN VIEW



DATUM RL. -25.000

5 YEAR ARI DESIGN FLOOD LEVEL	0.960	0.959	0.958	0.959	0.958	0.958	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.930	0.930	0.930	0.930
20 YEAR ARI DESIGN FLOOD LEVEL	1.350	1.320	1.310	1.300	1.280	1.220	1.210	1.190	1.190	1.180	1.190	1.170	1.160	1.140	1.120	1.090	1.080	1.060	1.050
100 YEAR ARI DESIGN FLOOD LEVEL	3.210	3.160	3.120	3.170	2.990	2.780	2.640	2.530	2.550	2.510	2.540	2.440	2.410	2.290	2.180	2.000	1.930	1.870	1.800
BED LEVEL (m AHD)	-11.200	-10.900	-11.000	-11.700	-14.100	-16.280	-15.800	-13.200	-11.800	-12.600	-13.200	-13.400	-13.400	-12.700	-13.200	-13.000	-12.500	-12.600	-12.700
CROSS SECTION NUMBER	BN 360	BN 350	BN 340	BN 330	BN 320	BN 310	BN 300	BN 290	BN 280	BN 270	BN 260	BN 250	BN 240	BN 230	BN 220	BN 210	BN 200	BN 190	BN 180
MIKE 11 CHAINAGE (km)	1961.530	1962.020	1962.535	1962.940	1963.310	1963.445	1964.000	1964.498	1965.010	1965.503	1965.990	1966.505	1967.020	1967.485	1967.965	1968.640	1969.065	1969.535	1970.025
AMTD CHAINAGE (km)	17.330	16.444	16.125	15.720	15.350	15.215	14.640	14.170	13.650	13.157	12.670	12.155	11.640	11.175	10.675	10.000	9.615	9.125	8.635

BRISBANE RIVER - BN 360 TO BN 180

LEGEND
5 YEAR ARI DESIGN FLOOD
20 YEAR ARI DESIGN FLOOD
100 YEAR ARI DESIGN FLOOD
EXISTING BED LEVEL

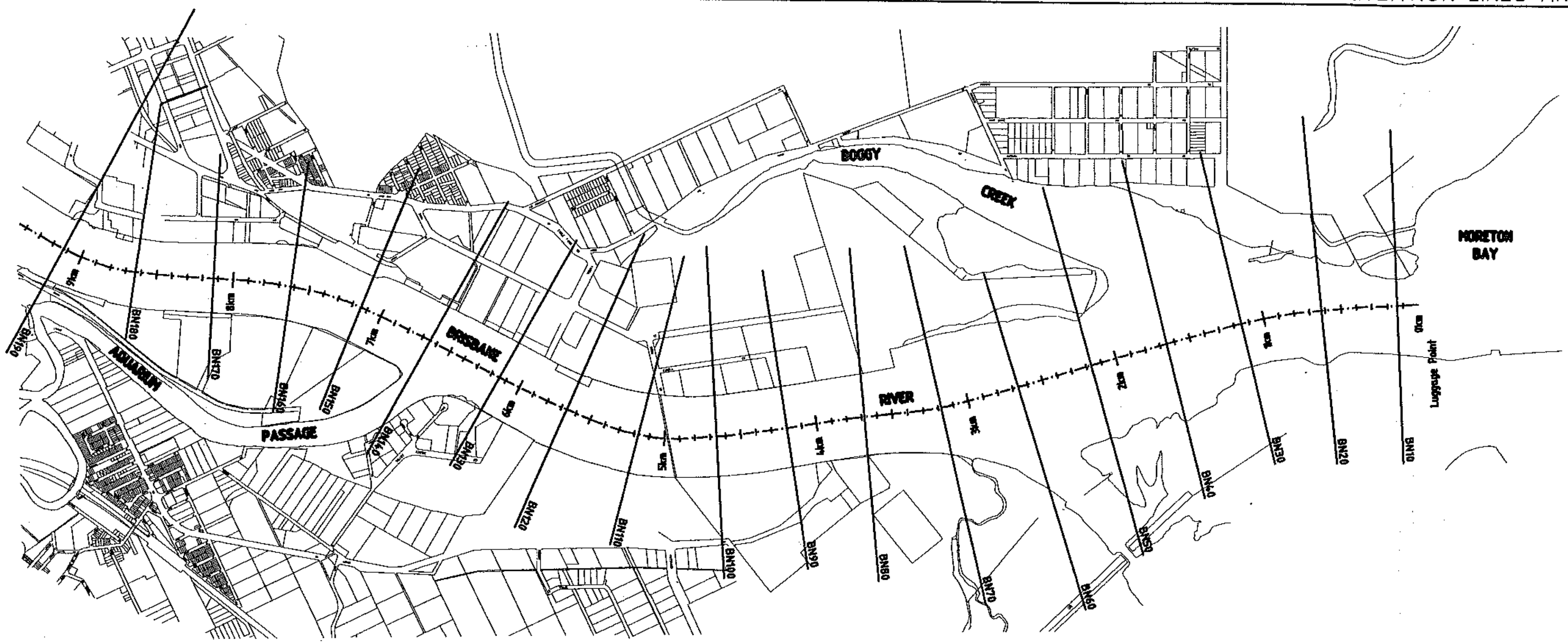
VERT. 0 5.0 10.0 15.0 20.0 METRES
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

FILE NAME: 415... PLOT SCALE: 1=30

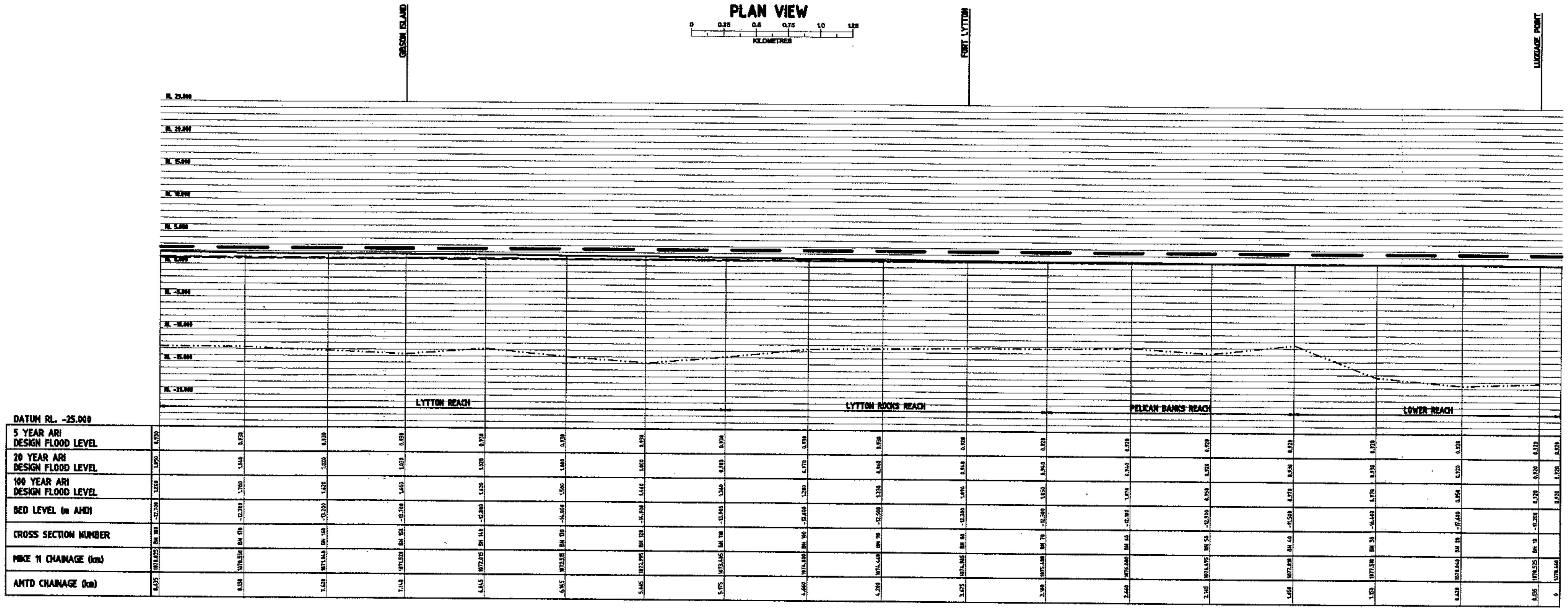
SINCLAIR KNIGHT MERZ

FIGURE J-1i

BRISBANE RIVER FLOOD STUDY
MIKE 11 DESIGN FLOOD PROFILES FOR THE 5, 20, AND 100 YEAR ARI
FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS
- REGULATION LINES AND REVEGETATION STRATEGY CASE



PLAN VIEW



LEGEND

- LOCATION AND IDENTIFICATION OF STRUCTURE
- 5 YEAR ARI DESIGN FLOOD
- 20 YEAR ARI DESIGN FLOOD
- 100 YEAR ARI DESIGN FLOOD
- 100 YEAR ARI MORETON BAY STORM SURGE LEVEL (RL 2.5m AHD, INCLUDING 300mm ALLOWANCE FOR GREENHOUSE EFFECT)
- EXISTING BED LEVEL

VERT. METRES
HORIZ. KILOMETRES

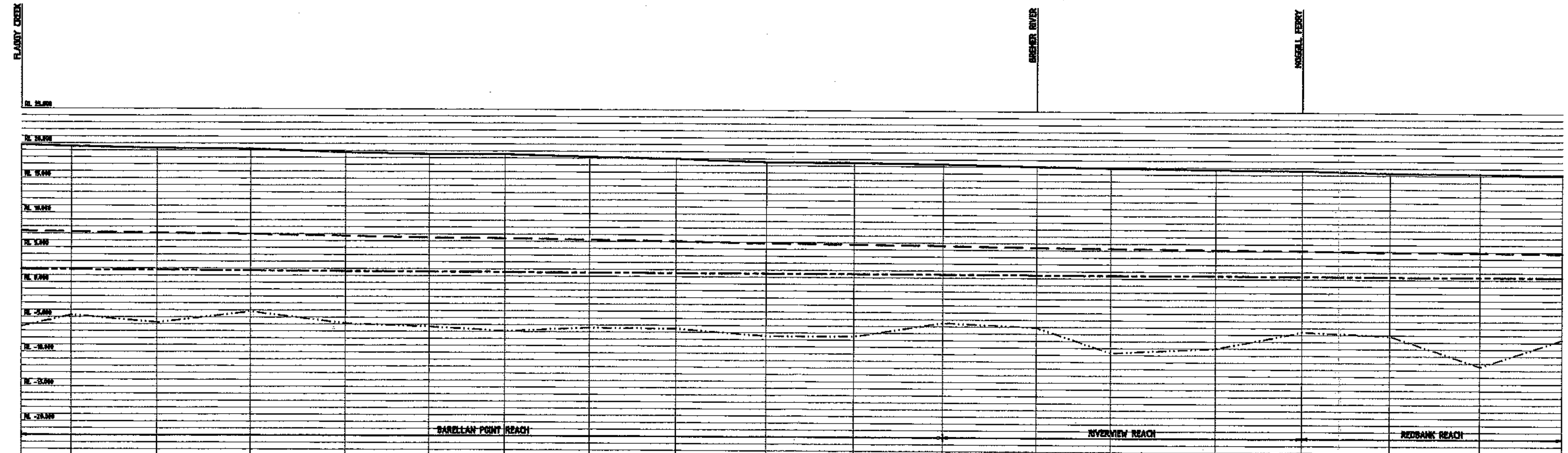
BRISBANE RIVER - BN 180 TO BN 10

FILE NAME: 4157-306 PLOT SCALE: 1=30 DISK N: C:\DWG JOB N: T00415? DATE: 23/3/97

FIGURE J-2a

SINCLAIR KNIGHT MERZ

BRISBANE RIVER FLOOD STUDY
MIKE 11 DESIGN FLOOD PROFILES FOR THE 2, 10, AND 50 YEAR ARI
FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS
- REGULATION LINES AND REVEGETATION STRATEGY CASE



DATUM RL. -25.000

2 YEAR ARI DESIGN FLOOD LEVEL	1.830	1.860	1.760	1.700	1.630	1.590	1.560	1.520	1.500	1.490	1.480	1.470	1.450	1.440	1.420	1.400	1.380	1.360	1.350
10 YEAR ARI DESIGN FLOOD LEVEL	7.340	7.240	7.080	6.940	6.710	6.490	6.420	6.240	6.050	5.840	5.720	5.580	5.380	5.290	5.160	5.080	4.960	4.850	4.830
50 YEAR ARI DESIGN FLOOD LEVEL	19.750	19.560	19.320	19.210	18.740	18.530	18.510	18.190	17.950	17.540	17.490	17.320	17.040	16.900	16.690	16.600	16.330	16.210	16.140
BED LEVEL (m AHD)	-6.400	-4.700	-5.600	-4.200	-5.900	-6.300	-6.900	-6.400	-6.500	-7.500	-7.500	-5.500	-6.100	-9.700	-9.000	-6.600	-7.300	-11.500	-7.600
CROSS SECTION NUMBER	BN 2020	BN 2010	BN 2000	BN 1990	BN 1980	BN 1970	BN 1960	BN 1950	BN 1940	BN 1930	BN 1920	BN 1910	BN 1900	BN 1890	BN 1880	BN 1870	BN 1860	BN 1850	BN 1840
MIKE 11 CHAINAGE (km)	1000.000	1000.285	1000.775	1001.315	1001.865	1002.350	1002.785	1003.275	1003.775	1004.300	1004.810	1005.325	1005.870	1006.300	1006.910	1007.410	1007.920	1008.445	1008.925
AMTD CHAINAGE (km)	78.660	78.375	77.885	77.345	76.795	76.310	75.875	75.385	74.885	74.360	73.850	73.335	72.790	72.360	71.750	71.250	70.740	70.215	69.735

LEGEND
LOCATION AND IDENTIFICATION OF STRUCTURE
2 YEAR ARI DESIGN FLOOD
10 YEAR ARI DESIGN FLOOD
50 YEAR ARI DESIGN FLOOD
EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 2020 TO BN 1840

FILE NAME: 4157-165 DISK N°: C:\DWG JOB N°: T004157 DATE: 23/3/97
PLOT SCALE: 1=30

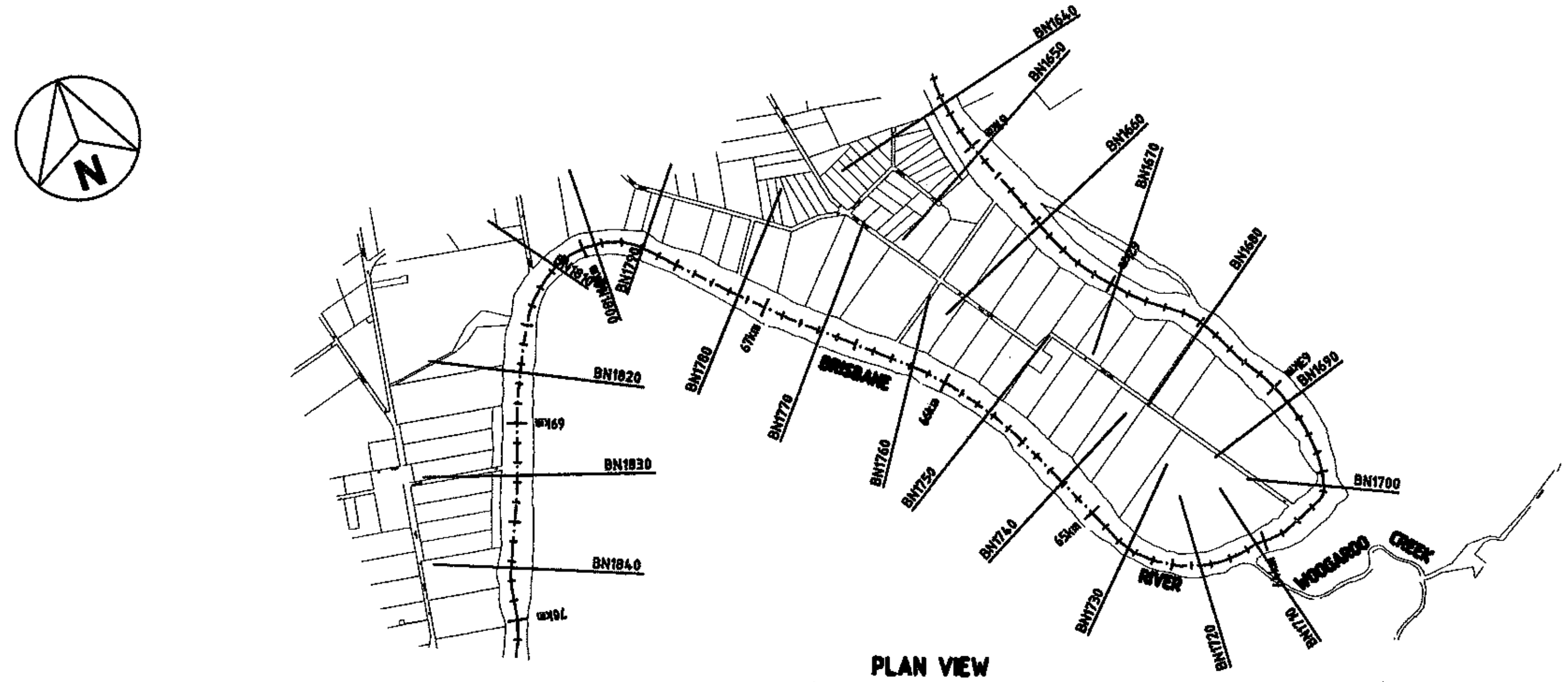
BCC.121.0328

FIGURE J-2b

BRISBANE RIVER FLOOD STUDY

MIKE 11 DESIGN FLOOD PROFILES FOR THE 2, 10, AND 50 YEAR ARI
FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS
- REGULATION LINES AND REVEGETATION STRATEGY CASE

SINCLAIR KNIGHT MERZ

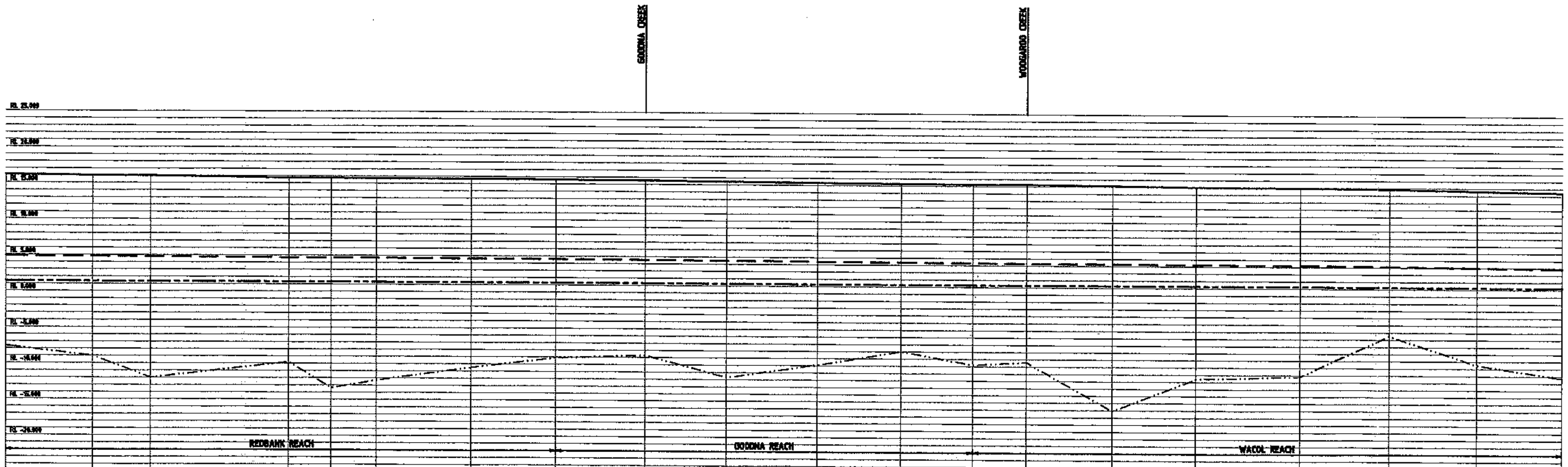


PLAN VIEW

0 0.25 0.5 0.75 1.0 1.25
KILOMETRES

LEGEND

AMTD LINE
BN 1250 SURVEYED CROSS SECTION
LOCATION AND IDENTIFICATION OF STRUCTURE



DATUM RL. -25.000

2 YEAR ARI DESIGN FLOOD LEVEL	1.350	1.350	1.340	1.330	1.330	1.330	1.320	1.320	1.310	1.300	1.290	1.280	1.270	1.270	1.270	1.260	1.240	1.240	1.220	1.200
10 YEAR ARI DESIGN FLOOD LEVEL	4.830	4.790	4.770	4.680	4.680	4.440	4.420	4.590	4.530	4.480	4.440	4.380	4.340	4.300	4.250	4.250	4.210	4.130	3.980	3.870
50 YEAR ARI DESIGN FLOOD LEVEL	16.160	16.040	16.000	15.750	15.750	15.490	15.680	15.630	15.560	15.470	15.380	15.310	15.250	15.270	15.160	15.030	14.950	14.870	14.660	14.470
BED LEVEL (m AHD)	-7.600	-9.000	-12.000	-9.800	-13.400	-12.300	-10.500	-9.100	-4.700	-11.700	-9.900	-8.800	-9.800	-9.400	-15.100	-11.600	-11.200	-5.500	-9.500	-11.300
CROSS SECTION NUMBER	BN 1840	BN 1830	BN 1820	BN 1810	BN 1800	BN 1790	BN 1780	BN 1770	BN 1760	BN 1750	BN 1740	BN 1730	BN 1720	BN 1710	BN 1700	BN 1690	BN 1680	BN 1670	BN 1660	BN 1650
MIKE 11 CHAINAGE (km)	1008.925	1009.400	1009.720	1010.490	1010.725	1010.940	1011.510	1011.980	1012.475	1012.935	1013.445	1013.910	1014.310	1014.610	1015.090	1015.560	1016.160	1016.650	1017.130	1017.610
AMTD CHAINAGE (km)	69.795	69.260	68.860	68.170	67.935	67.680	67.150	66.680	66.185	65.725	65.215	64.740	64.350	64.050	63.570	63.100	62.520	62.030	61.530	61.050

BRISBANE RIVER - BN 1840 TO BN 1650

LEGEND

LOCATION AND IDENTIFICATION OF STRUCTURE
2 YEAR ARI DESIGN FLOOD
10 YEAR ARI DESIGN FLOOD
50 YEAR ARI DESIGN FLOOD
EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

PLOT SCALE: 1=30

SINCLAIR KNIGHT MERZ

FIGURE J-2c

BRISBANE RIVER FLOOD STUDY

MIKE 11 DESIGN FLOOD PROFILES FOR THE 2, 10, AND 50 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS - REGULATION LINES AND REVEGETATION STRATEGY CASE

PLAN VIEW

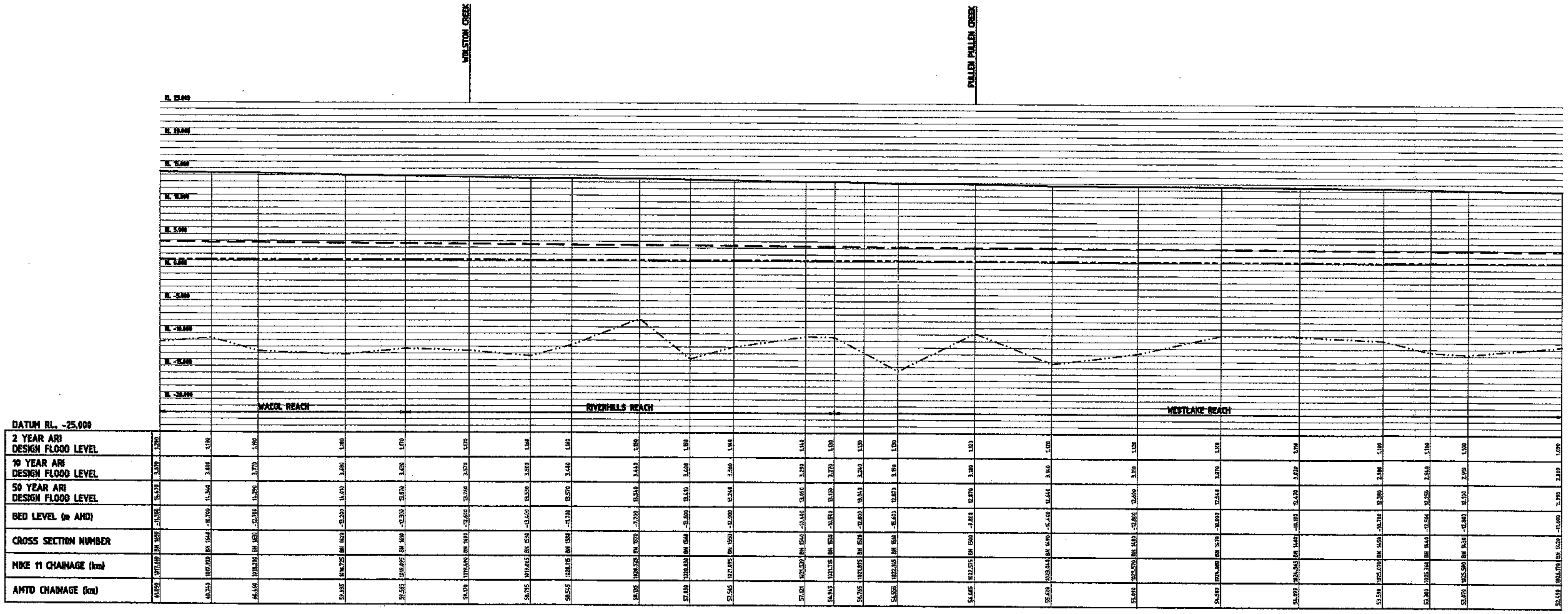
0 0.25 0.5 0.75 1.0 1.25 KILOMETRES

LEGEND

AMTD LINE

BN 1250 SURVEYED CROSS SECTION

LOCATION AND IDENTIFICATION OF STRUCTURE



BRISBANE RIVER - BN 1650 TO BN 1420

LEGEND

LOCATION AND IDENTIFICATION OF STRUCTURE

2 YEAR ARI DESIGN FLOOD

10 YEAR ARI DESIGN FLOOD

50 YEAR ARI DESIGN FLOOD

EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

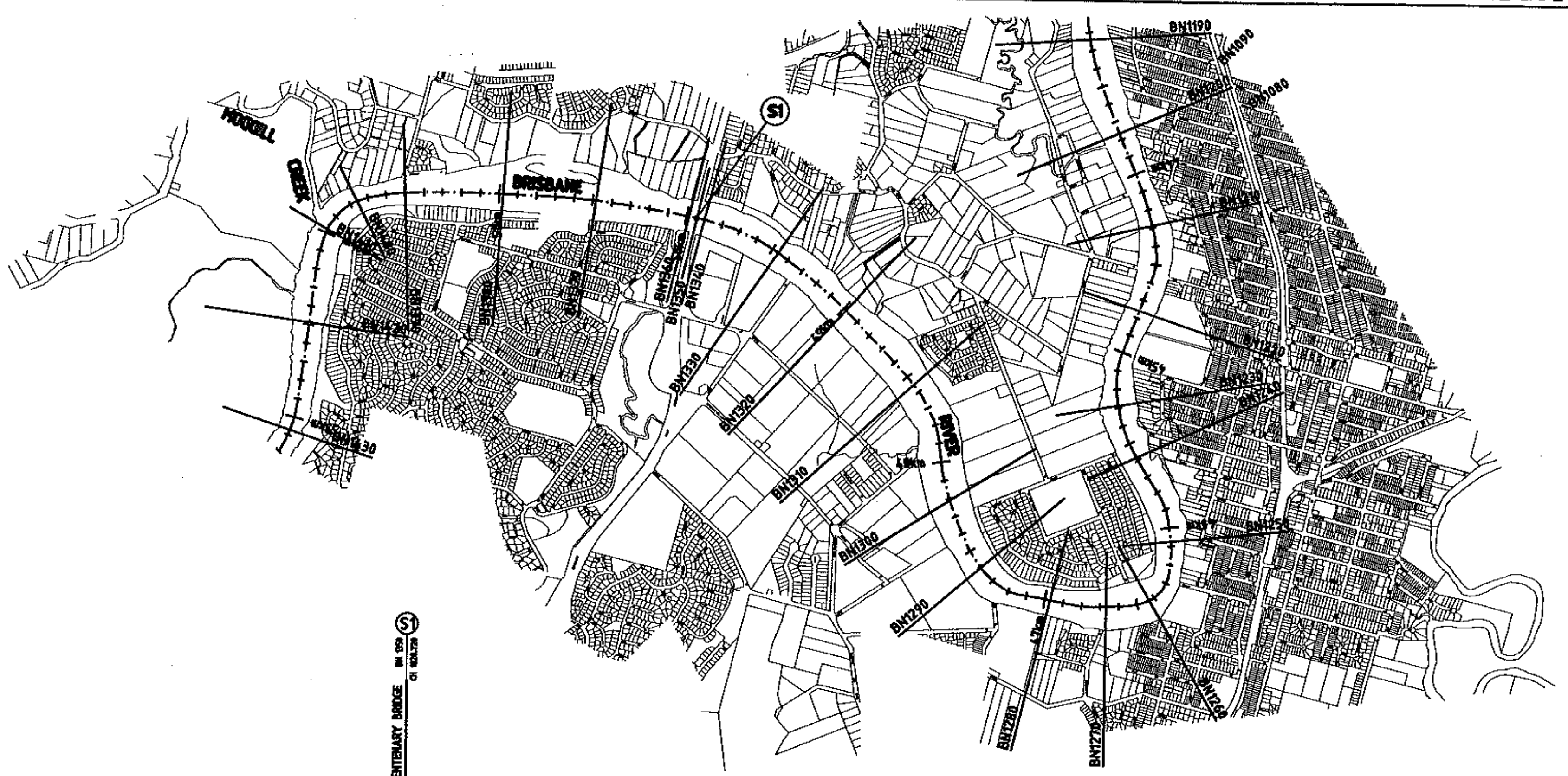
FILE NAME: 415/-10/ PLOT SCALE: 1:30

BCC.121.0330

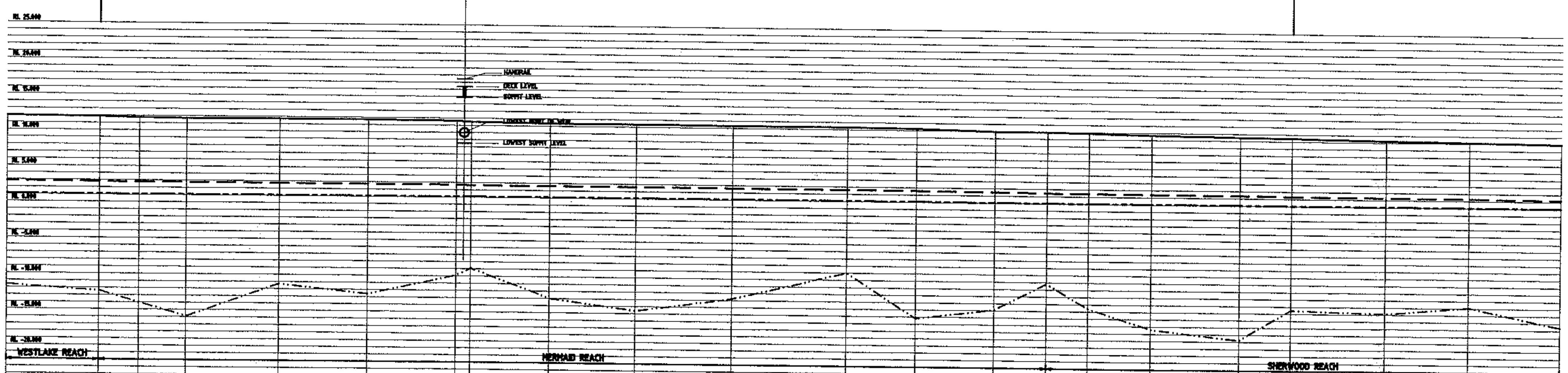
SINCLAIR KNIGHT MERZ

FIGURE J-2d

BRISBANE RIVER FLOOD STUDY
MIKE 11 DESIGN FLOOD PROFILES FOR THE 2, 10, AND 50 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS - REGULATION LINES AND REVEGETATION STRATEGY CASE



PLAN VIEW



DATUM RL. -25.000

2 YEAR ARI DESIGN FLOOD LEVEL	1.090	1.090	1.090	1.090	1.080	1.080	1.080	1.080	1.070	1.070	1.070	1.070	1.070	1.060	1.060	1.060	1.050	1.050	1.050	1.050	1.050	1.040
10 YEAR ARI DESIGN FLOOD LEVEL	2.864	2.810	2.790	2.770	2.750	2.740	2.710	2.670	2.660	2.640	2.620	2.600	2.570	2.530	2.470	2.440	2.410	2.370	2.340	2.300	2.270	2.240
50 YEAR ARI DESIGN FLOOD LEVEL	11.990	11.870	11.750	11.680	11.700	11.700	11.620	11.490	11.370	11.370	11.350	11.330	11.240	10.950	10.960	10.860	10.670	10.530	10.450	10.250	10.130	10.020
BED LEVEL (m AHD)	-11.600	-12.400	-14.000	-15.900	-11.300	-12.600	-9.900	-8.300	-13.000	-14.400	-12.800	-9.800	-15.200	-13.900	-10.200	-13.400	-16.600	-17.800	-13.500	-13.900	-12.900	-15.600
CROSS SECTION NUMBER	BN 1420	BN 1410	BN 1400	BN 1390	BN 1380	BN 1370	BN 1360	BN 1350	BN 1330	BN 1320	BN 1310	BN 1300	BN 1290	BN 1280	BN 1270	BN 1260	BN 1250	BN 1240	BN 1230	BN 1220	BN 1210	BN 1200
MIKE 11 CHAINAGE (km)	1024.170	1026.680	1026.980	1027.160	1027.480	1028.180	1028.680	1028.760	1029.280	1029.480	1030.220	1030.870	1031.260	1031.780	1031.995	1032.230	1032.585	1033.000	1033.370	1033.900	1034.370	1034.850
AMTD CHAINAGE (km)	52.470	51.980	51.760	51.500	50.980	50.480	49.980	49.940	49.440	48.980	48.440	47.780	47.480	46.960	46.445	46.430	46.075	45.580	45.290	44.740	44.290	43.770

LEGEND

- LOCATION AND IDENTIFICATION OF STRUCTURE
- 2 YEAR ARI DESIGN FLOOD
- 10 YEAR ARI DESIGN FLOOD
- 50 YEAR ARI DESIGN FLOOD
- EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 1420 TO BN 1200

PLOT SCALE: 1=30

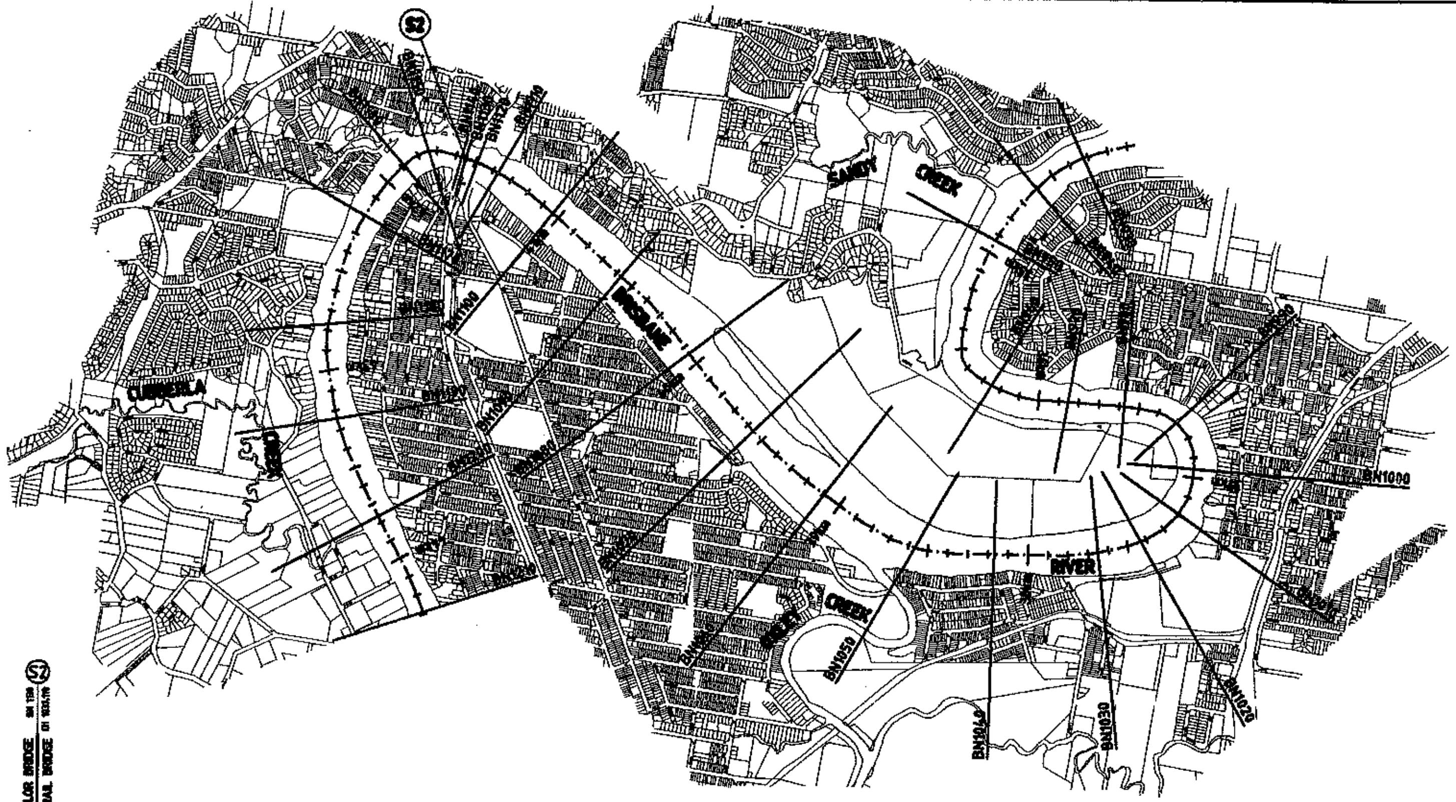
BCC.121.0331

SINCLAIR KNIGHT MERZ

FIGURE J-2e

BRISBANE RIVER FLOOD STUDY

MIKE 11 DESIGN FLOOD PROFILES FOR THE 2, 10, AND 50 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS - REGULATION LINES AND REVEGETATION STRATEGY CASE



LEGEND

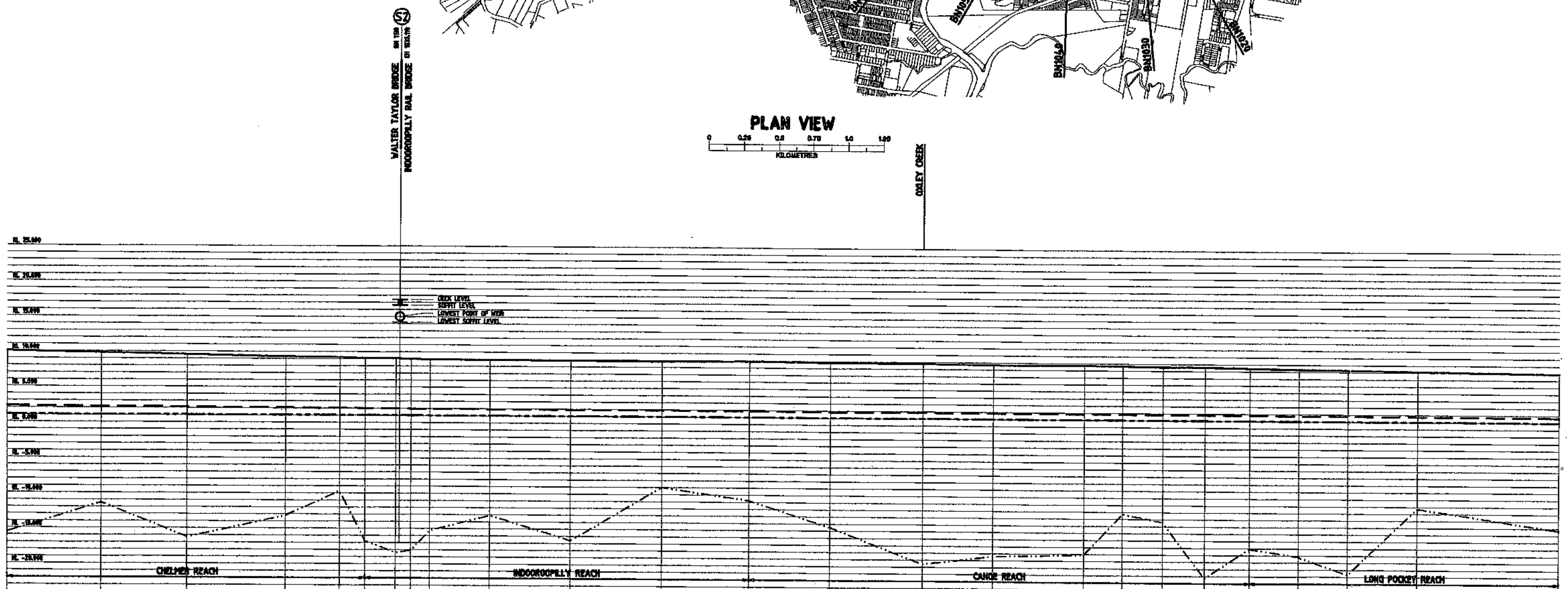
AMTD LINE

BN 1250 SURVEYED CROSS SECTION

LOCATION AND IDENTIFICATION OF STRUCTURE

PLAN VIEW

0 0.25 0.5 0.75 1.0 1.25 KILOMETRES



DATUM RL. -25.000

CROSS SECTION NUMBER	2 YEAR ARI DESIGN FLOOD LEVEL	10 YEAR ARI DESIGN FLOOD LEVEL	50 YEAR ARI DESIGN FLOOD LEVEL	BED LEVEL (m AHD)	MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)
BN 1200	1.044	2.240	10.020	-15.600	1034.891	43.779
BN 1190	1.040	2.190	9.820	-11.400	1035.454	43.266
BN 1180	1.040	2.130	9.550	-16.340	1035.900	42.740
BN 1170	1.036	2.070	9.380	-13.200	1036.440	42.280
BN 1160	1.034	2.038	9.210	-9.700	1036.778	41.890
BN 1150	1.030	2.010	9.100	-16.800	1036.915	41.745
BN 1140	1.030	2.010	9.070	-18.400	1037.098	41.570
BN 1120	1.026	1.950	9.080	-18.100	1037.175	41.485
BN 1110	1.020	1.940	8.940	-15.300	1037.285	41.375
BN 1100	1.028	1.920	8.920	-13.100	1037.625	41.035
BN 1090	1.028	1.910	8.880	-15.600	1038.085	40.575
BN 1080	1.028	1.890	8.860	-9.000	1038.600	40.060
BN 1070	1.020	1.870	8.900	-12.800	1039.100	39.560
BN 1060	1.020	1.860	8.830	-14.500	1039.565	39.050
BN 1050	1.020	1.860	8.790	-19.400	1040.090	38.570
BN 1040	1.010	1.850	8.610	-16.400	1040.490	38.170
BN 1030	1.010	1.850	8.700	-18.100	1041.010	37.560
BN 1020	1.010	1.830	8.650	-12.300	1041.230	37.430
BN 1010	1.010	1.820	8.590	-13.400	1041.460	37.200
BN 1000	1.010	1.820	8.560	-21.300	1041.700	36.960
BN 990	1.010	1.800	8.430	-17.100	1041.960	36.700
BN 980	1.010	1.780	8.380	-18.200	1042.235	36.425
BN 970	1.010	1.780	8.350	-20.700	1042.515	36.145
BN 960	1.010	1.750	8.140	-11.300	1042.910	35.750
BN 950	1.000	1.690	7.910	-16.300	1043.725	34.935

LEGEND

LOCATION AND IDENTIFICATION OF STRUCTURE

2 YEAR ARI DESIGN FLOOD

10 YEAR ARI DESIGN FLOOD

50 YEAR ARI DESIGN FLOOD

EXISTING BED LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

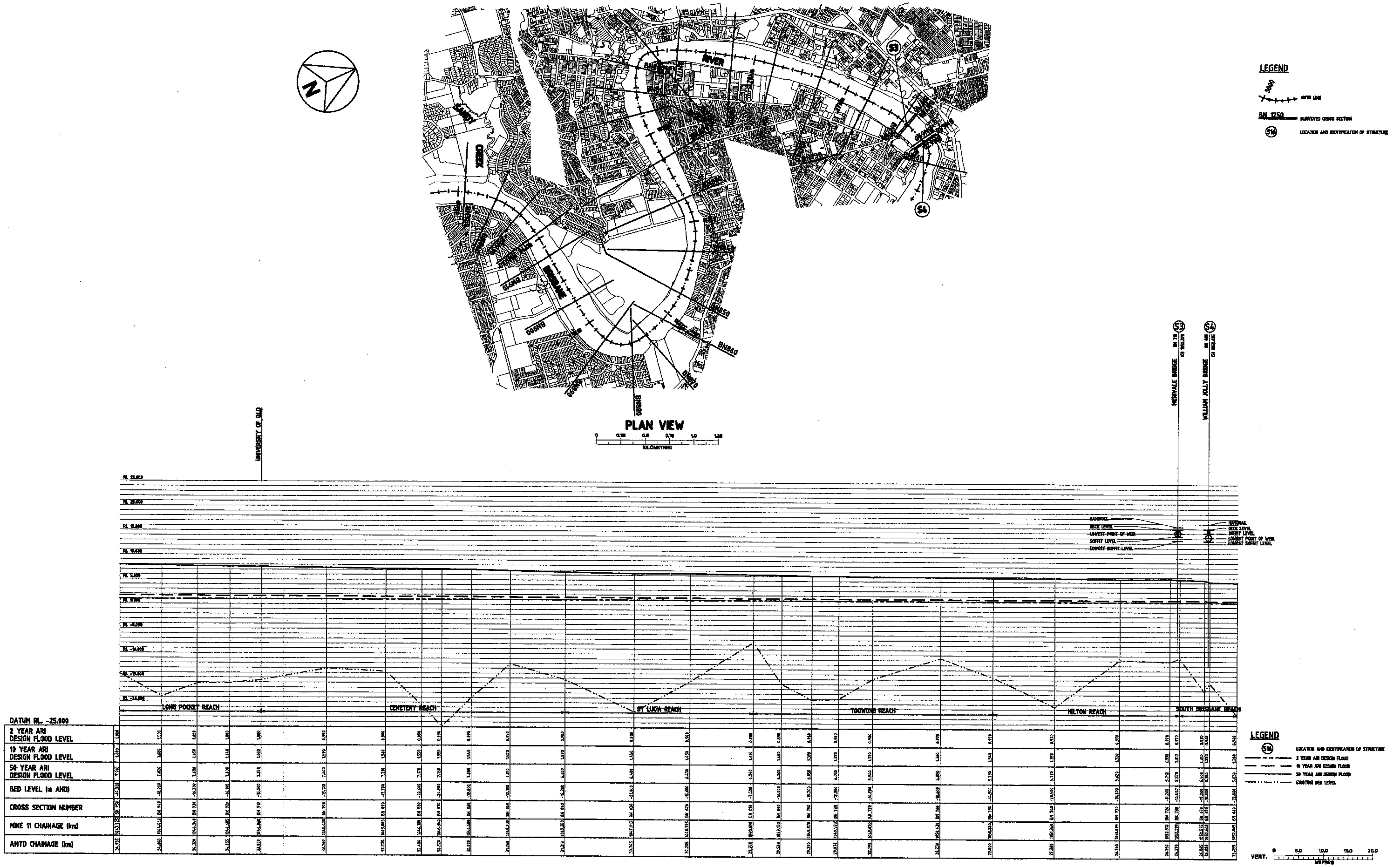
BRISBANE RIVER - BN 1200 TO BN 950

FILE NAME: 4157-187 PLOT SCALE: 1=30 DISK N°: CNDWG JOB N°: T00415? DATE: 23/3/97

SINCLAIR KNIGHT MERZ

FIGURE J-2f

BRISBANE RIVER FLOOD STUDY
MIKE 11 DESIGN FLOOD PROFILES FOR THE 2, 10, AND 50 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS - REGULATION LINES AND REVEGETATION STRATEGY CASE



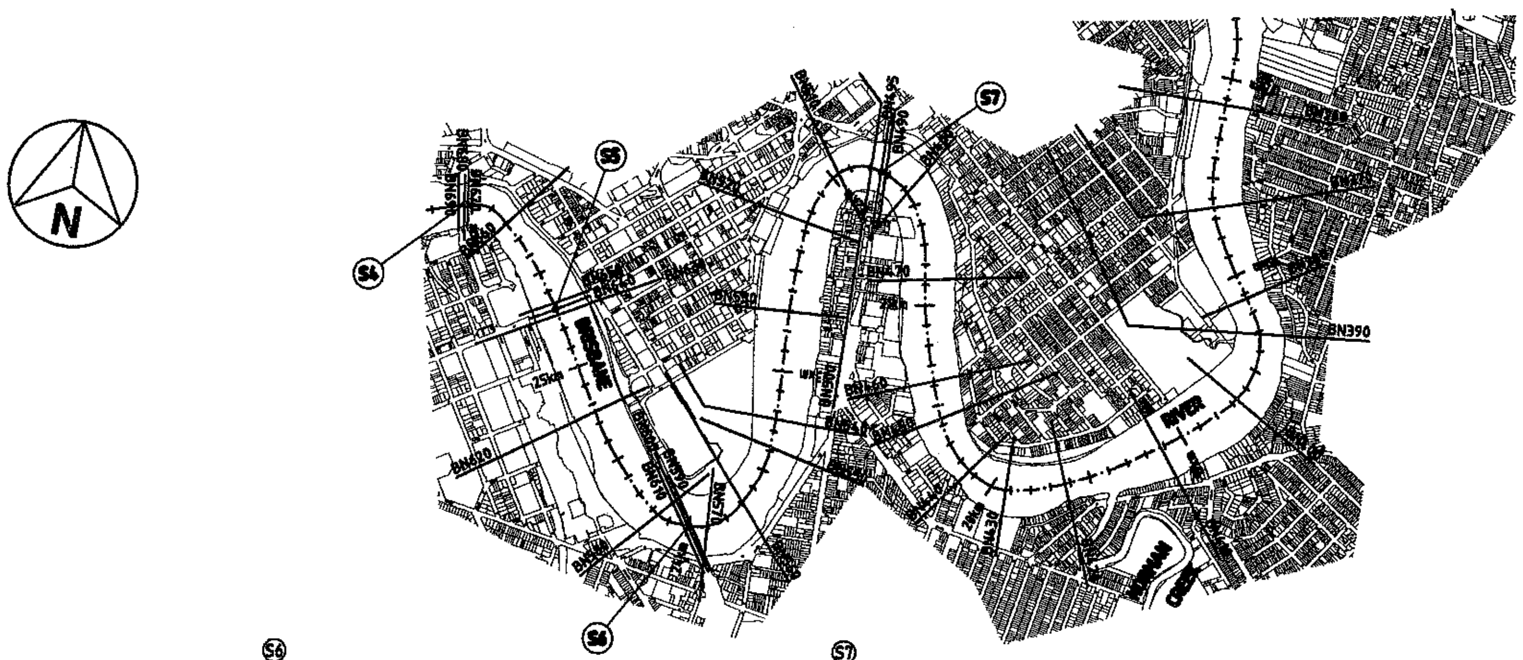
BRISBANE RIVER - BN 950 TO BN 660

PLOT SCALE: 1=30

FIGURE J-2g

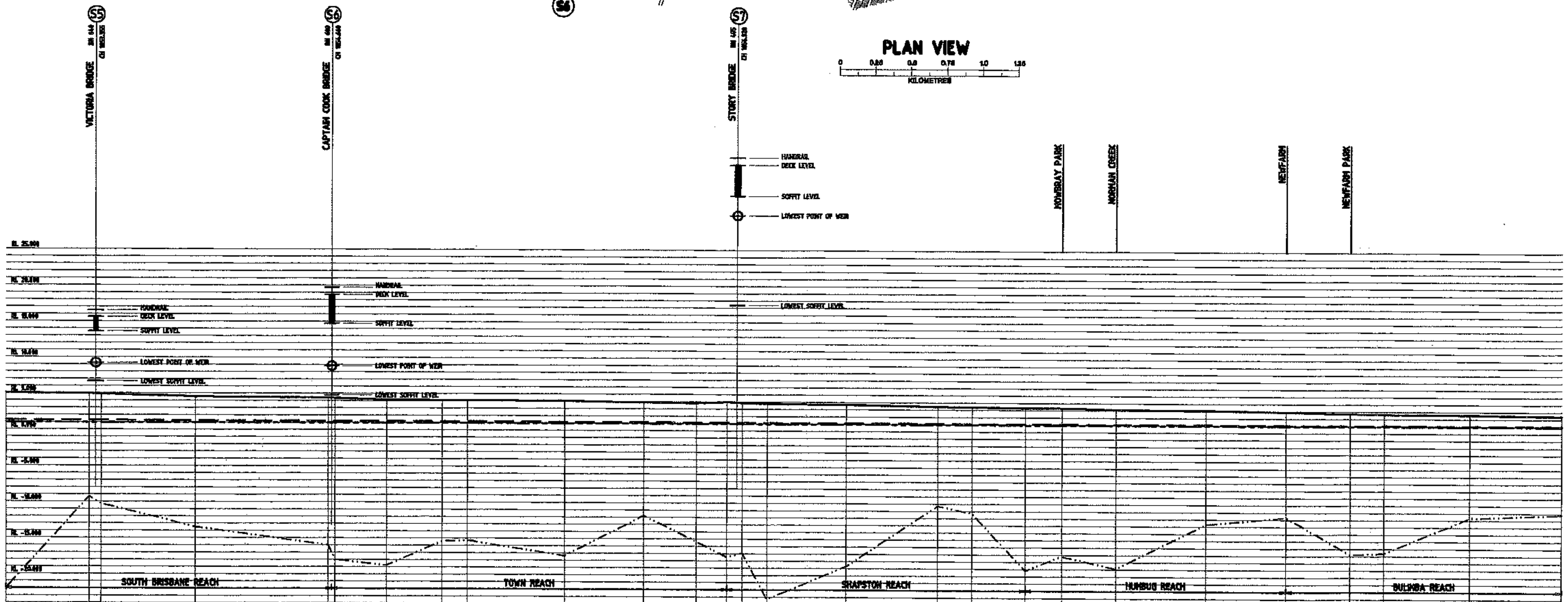
SINCLAIR KNIGHT MERZ

BRISBANE RIVER FLOOD STUDY
MIKE 11 DESIGN FLOOD PROFILES FOR THE 2, 10, AND 50 YEAR ARI
FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS
- REGULATION LINES AND REVEGETATION STRATEGY CASE



PLAN VIEW

LEGEND
AMTD LINE
BN 1250 SURVEYED CROSS SECTION
LOCATION AND IDENTIFICATION OF STRUCTURE



DATUM RL. -25.000

2 YEAR ARI DESIGN FLOOD LEVEL	0.960	0.960	0.960	0.950	0.950	0.950	0.950	0.950	0.950
10 YEAR ARI DESIGN FLOOD LEVEL	1.280	1.270	1.260	1.270	1.190	1.180	1.160	1.160	1.160
50 YEAR ARI DESIGN FLOOD LEVEL	5.030	4.950	4.900	4.540	4.420	4.340	4.350	4.110	4.090
BED LEVEL (m AHD)	-22.800	-9.300	-10.300	-13.550	-16.900	-18.000	-18.050	-15.400	-15.300
CROSS SECTION NUMBER	BN 660	BN 650	BN 630	BN 620	BN 610	BN 590	BN 560	BN 550	BN 540
MIKE 11 CHAINAGE (km)	1052.865	1053.320	1053.385	1053.980	1054.440	1054.460	1054.970	1055.280	1055.420
AMTD CHAINAGE (km)	25.735	25.340	25.275	24.760	24.020	23.980	23.490	23.380	23.240

2 YEAR ARI DESIGN FLOOD LEVEL	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
10 YEAR ARI DESIGN FLOOD LEVEL	1.150	1.140	1.130	1.140	1.130	1.120	1.120	1.100	1.090
50 YEAR ARI DESIGN FLOOD LEVEL	4.050	3.860	3.890	3.950	3.880	3.770	3.670	3.470	3.460
BED LEVEL (m AHD)	-17.490	-11.800	-15.400	-17.500	-16.900	-23.300	-18.700	-10.300	-11.300
CROSS SECTION NUMBER	BN 530	BN 520	BN 510	BN 500	BN 490	BN 480	BN 470	BN 460	BN 450
MIKE 11 CHAINAGE (km)	1055.960	1056.440	1056.695	1056.865	1056.950	1057.090	1057.530	1058.040	1058.230
AMTD CHAINAGE (km)	22.700	22.260	21.965	21.795	21.710	21.570	21.130	20.620	20.430

2 YEAR ARI DESIGN FLOOD LEVEL	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940
10 YEAR ARI DESIGN FLOOD LEVEL	1.090	1.090	1.070	1.070	1.050	1.040	1.030	1.030	1.020
50 YEAR ARI DESIGN FLOOD LEVEL	3.390	3.320	3.230	3.090	2.920	2.740	2.650	2.610	2.460
BED LEVEL (m AHD)	-17.290	-17.280	-16.900	-12.700	-11.700	-16.800	-16.600	-13.700	-11.200
CROSS SECTION NUMBER	BN 440	BN 430	BN 420	BN 410	BN 400	BN 390	BN 380	BN 370	BN 364
MIKE 11 CHAINAGE (km)	1058.530	1058.735	1059.035	1059.540	1059.990	1060.345	1060.535	1061.015	1061.530
AMTD CHAINAGE (km)	20.130	19.925	19.625	19.120	18.470	18.315	18.125	17.645	17.130

LEGEND
LOCATION AND IDENTIFICATION OF STRUCTURE
2 YEAR ARI DESIGN FLOOD
10 YEAR ARI DESIGN FLOOD
50 YEAR ARI DESIGN FLOOD
EXISTING BED LEVEL

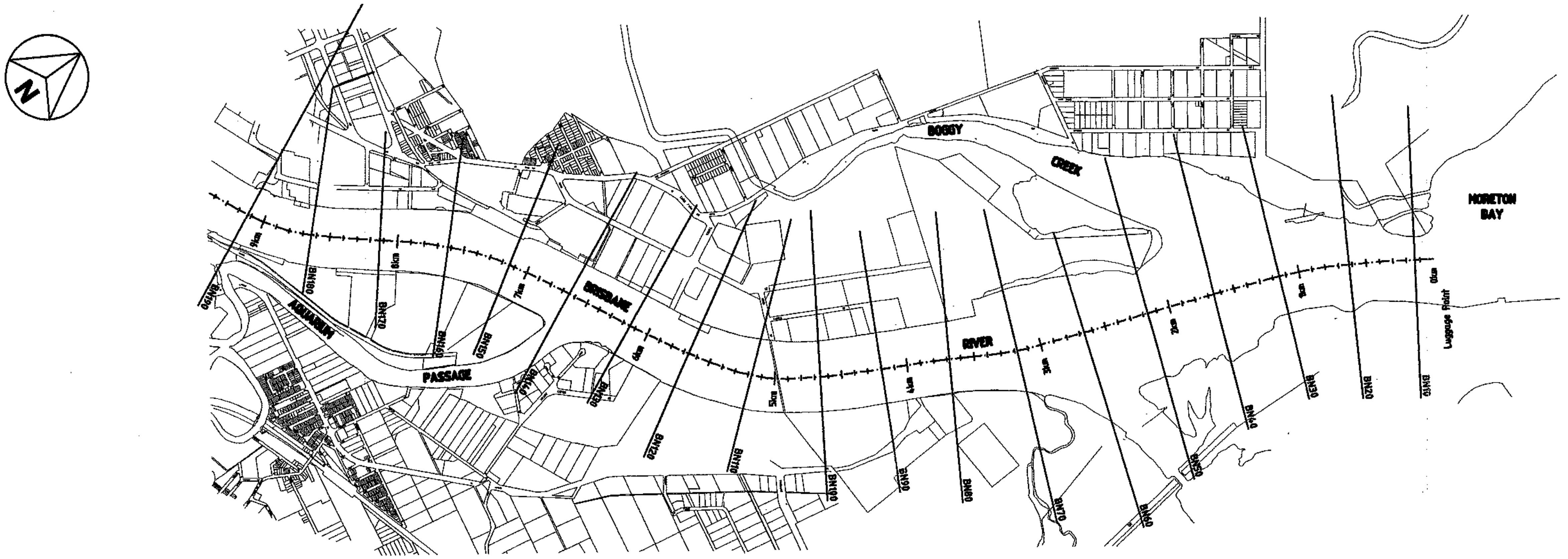
VERT. 0 5.0 10.0 15.0 20.0 METRES
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 660 TO BN 360

FILE NAME: 4157-171 PLOT SCALE: 1=30 DISK N°: CNOWG JOB N°: T00415? DATE: 23/3/97

FIGURE J-2i

BRISBANE RIVER FLOOD STUDY
MIKE 11 DESIGN FLOOD PROFILES FOR THE 2, 10, AND 50 YEAR ARI FLOOD EVENTS (MHWS) COMBINED TAILWATER AND RIVER FLOODING CONDITIONS - REGULATION LINES AND REVEGETATION STRATEGY CASE

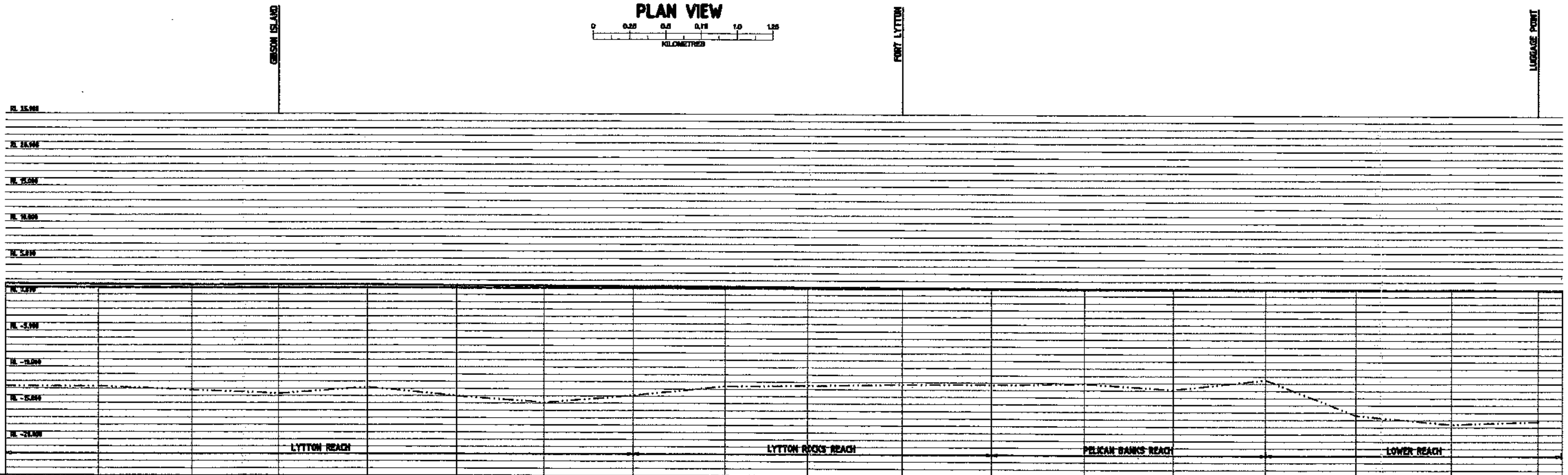


LEGEND

- AMTD LINE
- BN 1250 — SURVEYED CROSS SECTION
- (516) LOCATION AND IDENTIFICATION OF STRUCTURE

PLAN VIEW

0 0.25 0.5 0.75 1.0 1.25 KILOMETRES



DATUM RL. -25.000

2 YEAR ARI DESIGN FLOOD LEVEL	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
10 YEAR ARI DESIGN FLOOD LEVEL	0.950	0.950	0.940	0.940	0.940	0.940	0.940	0.930	0.930	0.930	0.930	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
50 YEAR ARI DESIGN FLOOD LEVEL	1.460	1.400	1.340	1.370	1.350	1.270	1.250	1.180	1.140	1.100	1.020	1.000	1.010	0.940	0.950	0.950	0.940	0.920	0.920
BED LEVEL (m AHD)	-12.700	-12.700	-13.200	-13.700	-12.800	-14.000	-14.900	-13.900	-12.600	-12.500	-12.300	-12.300	-12.100	-12.900	-11.500	-16.400	-17.600	-17.200	
CROSS SECTION NUMBER	BN 180	BN 170	BN 160	BN 150	BN 140	BN 130	BN 120	BN 110	BN 100	BN 90	BN 80	BN 70	BN 60	BN 50	BN 40	BN 30	BN 20	BN 10	
MIKE 11 CHAINAGE (km)	1070.025	1070.530	1071.040	1071.520	1072.015	1072.515	1072.995	1073.485	1074.000	1074.440	1074.985	1075.480	1076.000	1076.495	1077.010	1077.510	1078.040	1078.525	1078.660
AMTD CHAINAGE (km)	8.635	8.130	7.620	7.140	6.645	6.145	5.665	5.175	4.660	4.220	3.675	3.180	2.660	2.165	1.650	1.150	0.620	0.135	0

LEGEND

- (516) LOCATION AND IDENTIFICATION OF STRUCTURE
- 2 YEAR ARI DESIGN FLOOD
- 10 YEAR ARI DESIGN FLOOD
- 50 YEAR ARI DESIGN FLOOD
- EXISTING BED LEVEL

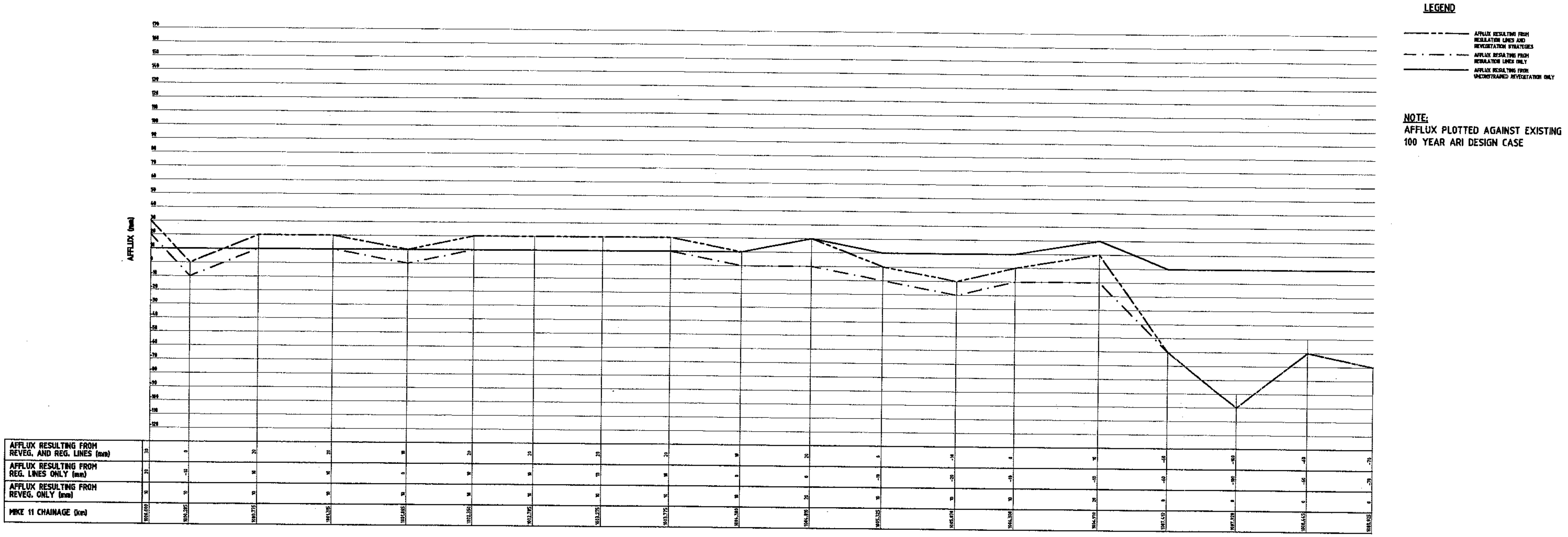
VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 180 TO BN 10

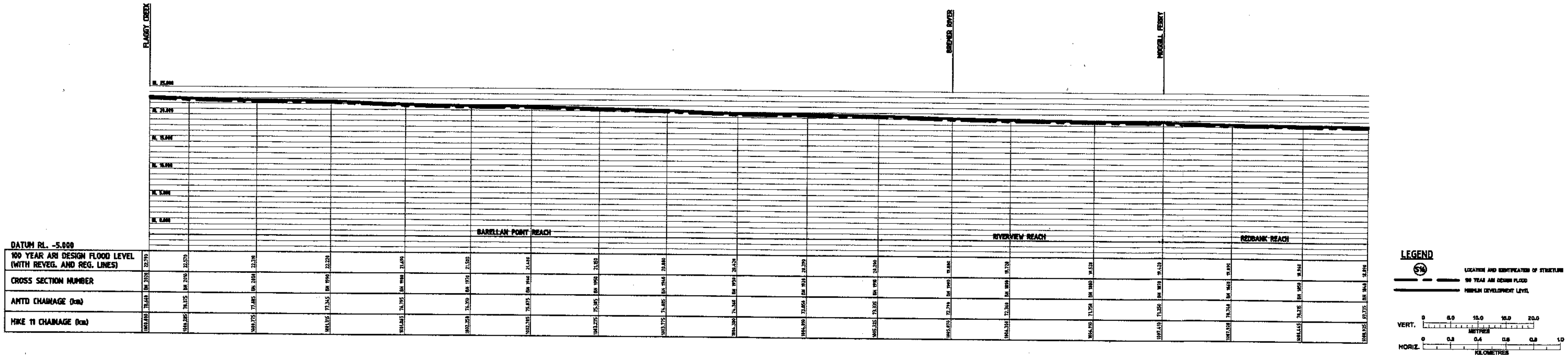
FILE NAME: 415/-1/3 PLOT SCALE: 1=30 DISK Nº: C:\DWG JOB Nº: T004157 DATE: 23/3/97

FIGURE J-3a
BRISBANE RIVER FLOOD STUDY
AFFLUX FOR THE 100 YEAR ARI DESIGN FLOODS - REGULATION LINES AND REVEGETATION STRATEGY CASE



LEGEND

NOTE:
AFFLUX PLOTTED AGAINST EXISTING 100 YEAR ARI DESIGN CASE

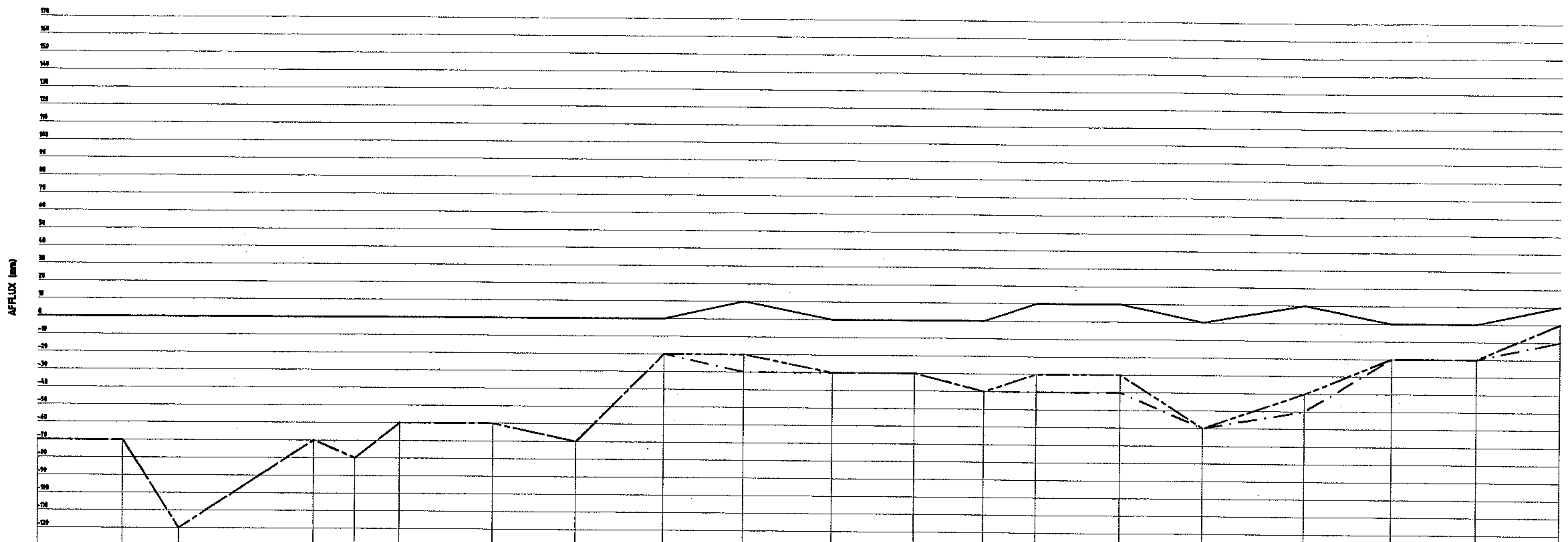


BRISBANE RIVER - BN 2020 TO BN 1840

SINCLAIR KNIGHT MERZ

FIGURE J-3b

BRISBANE RIVER FLOOD STUDY
AFFLUX FOR THE 100 YEAR ARI DESIGN FLOOD - REGULATION LINES AND REVEGETATION STRATEGY CASE

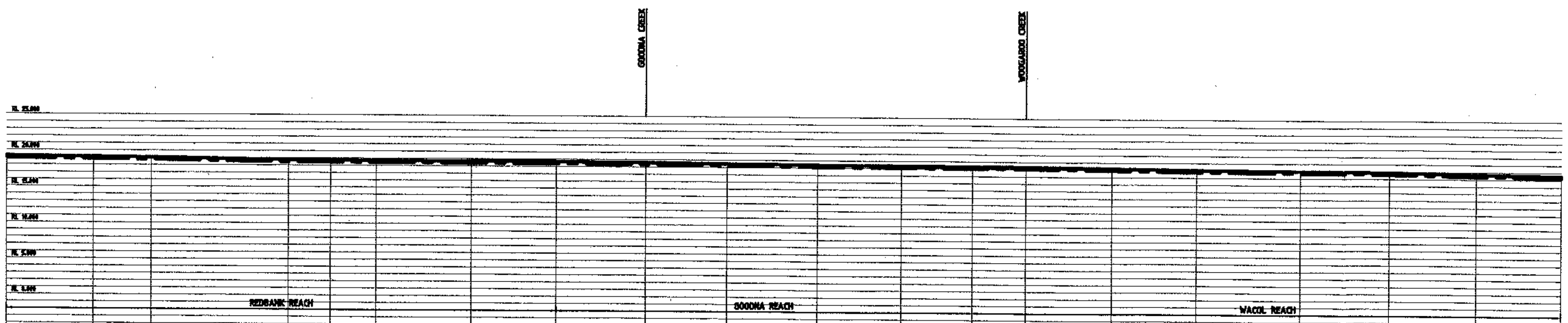


AFFLUX RESULTING FROM REVEG. AND REG. LINES (mm)	-70	-70	-120	-70	-80	-60	-60	-70	-20	-20	-30	-30	-40	-30	-30	-60	-40	-20	-20	0
AFFLUX RESULTING FROM REG. LINES ONLY (mm)	-70	-70	-120	-70	-80	-60	-60	-70	-20	-30	-30	-30	-40	-40	-40	-60	-50	-20	-20	-10
AFFLUX RESULTING FROM REVEG. ONLY (mm)	0	0	0	0	0	0	0	0	0	10	0	0	0	10	10	0	10	0	0	10
MIKE 11 CHAINAGE (km)	1008.925	1009.400	1009.720	1010.490	1010.725	1010.980	1011.510	1011.980	1012.475	1012.935	1013.445	1013.910	1014.310	1014.610	1015.090	1015.560	1016.140	1016.640	1017.130	1017.610

LEGEND

- AFFLUX RESULTING FROM REGULATION LINES AND REVEGETATION STRATEGIES
- AFFLUX RESULTING FROM REGULATION LINES ONLY
- AFFLUX RESULTING FROM UNCONSTRAINED REVEGETATION ONLY

NOTE:
AFFLUX PLOTTED AGAINST EXISTING 100 YEAR ARI DESIGN CASE



DATUM RL. -5.000

100 YEAR ARI DESIGN FLOOD LEVEL (WITH REVEG. AND REG. LINES)	18.830	18.750	18.730	18.630	18.440	18.384	18.378	18.360	18.314	18.290	18.110	18.058	18.019	18.058	17.910	17.750	17.478	17.440	17.374	17.264
CROSS SECTION NUMBER	BN 1840	BN 1830	BN 1820	BN 1810	BN 1800	BN 1790	BN 1780	BN 1770	BN 1760	BN 1750	BN 1740	BN 1730	BN 1720	BN 1710	BN 1700	BN 1690	BN 1680	BN 1670	BN 1660	BN 1650
AMTD CHAINAGE (km)	69.735	69.260	68.840	68.170	67.935	67.440	67.150	66.680	66.185	65.725	65.275	64.760	64.550	64.050	63.570	63.100	62.520	62.020	61.530	61.050
MIKE 11 CHAINAGE (km)	1008.925	1009.400	1009.720	1010.490	1010.725	1010.980	1011.510	1011.980	1012.475	1012.935	1013.445	1013.910	1014.310	1014.610	1015.090	1015.560	1016.140	1016.640	1017.130	1017.610

BRISBANE RIVER - BN 1840 TO BN 1650

LEGEND

- LOCATION AND IDENTIFICATION OF STRUCTURE
- 100 YEAR ARI DESIGN FLOOD
- MINIMUM DEVELOPMENT LEVEL

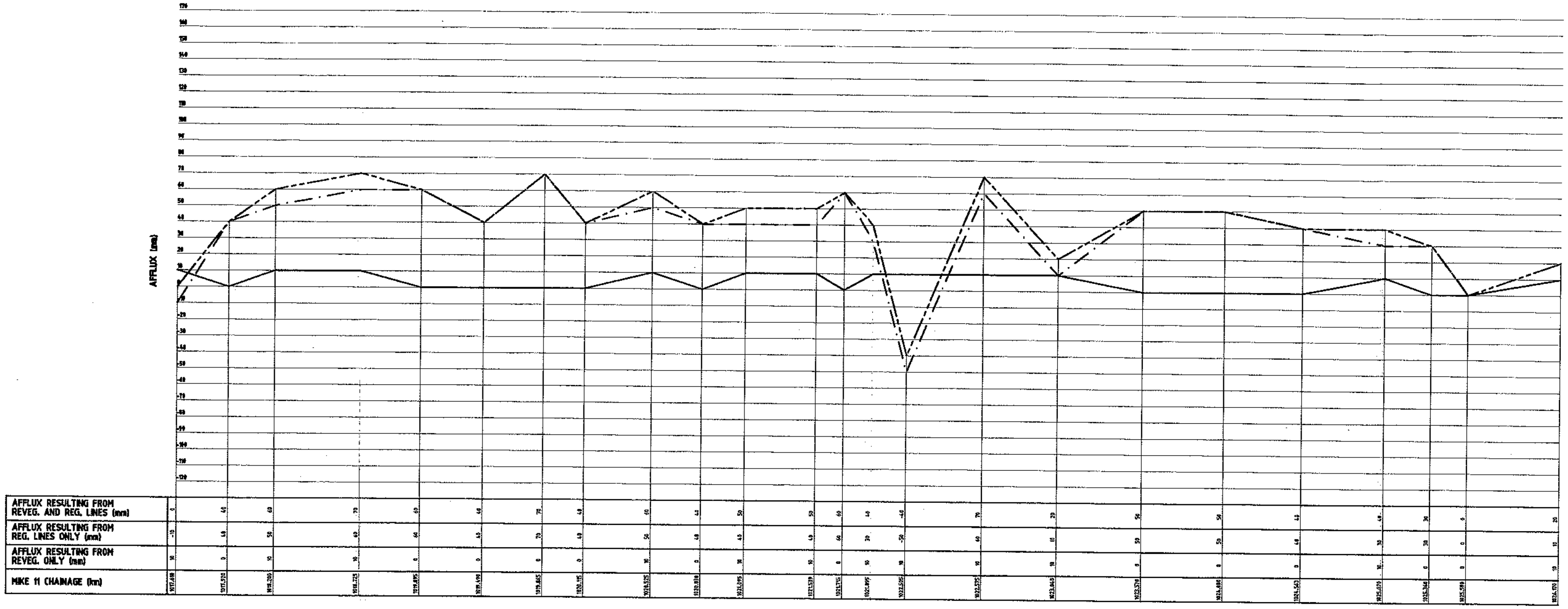
VERT. 0 5.0 10.0 15.0 20.0 METRES
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

FILE NAME: 415/... PLOT SCALE: 1=30 DISK N: C:\DWG JOB N: T00415 DATE: 23/3/97

SINCLAIR KNIGHT MERZ

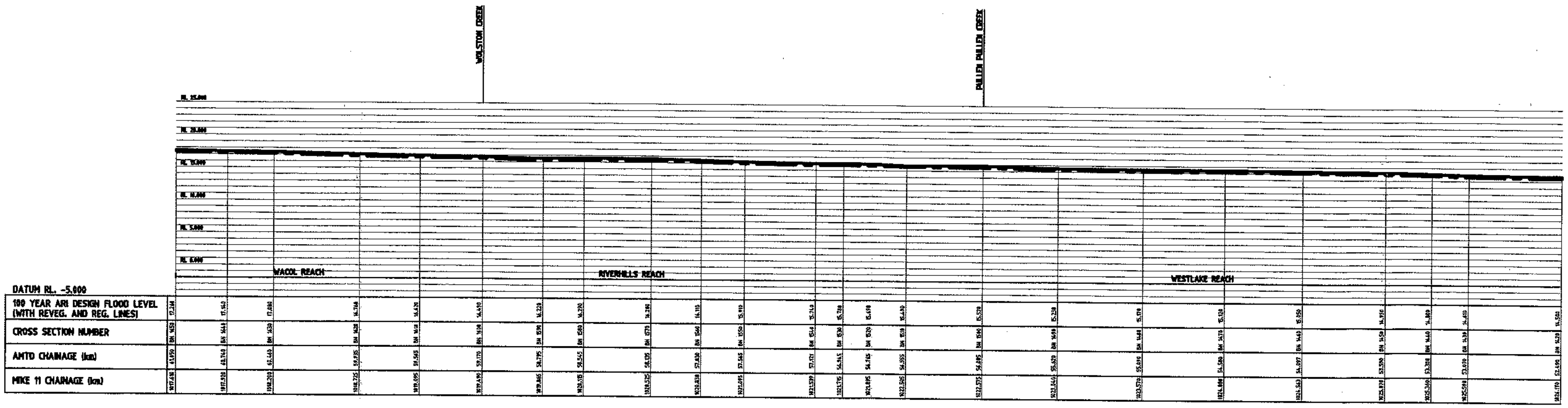
FIGURE J-3c

BRISBANE RIVER FLOOD STUDY
AFFLUX FOR THE 100 YEAR ARI DESIGN FLOOD
- REGULATION LINES AND REVEGETATION STRATEGY CASE



LEGEND

NOTE:
AFFLUX PLOTTED AGAINST EXISTING 100 YEAR ARI DESIGN CASE



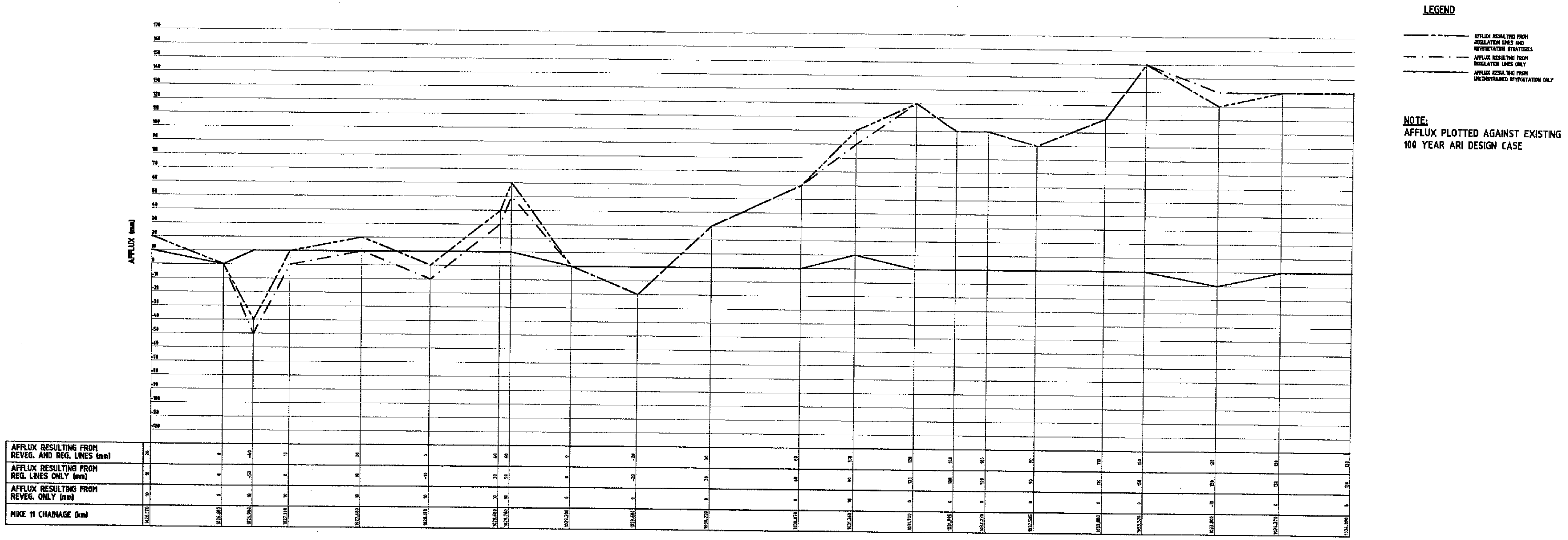
LEGEND

BRISBANE RIVER - BN 1650 TO BN 1420

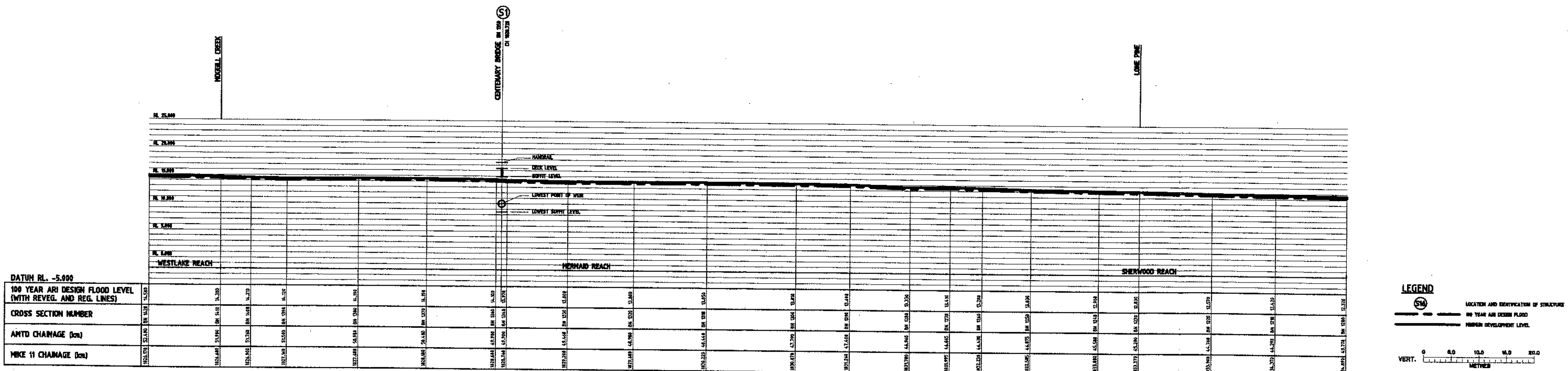
PLOT SCALE: 1=30

SINCLAIR KNIGHT MERZ

FIGURE J-3d
BRISBANE RIVER FLOOD STUDY
AFFLUX FOR THE 100 YEAR ARI DESIGN FLOOD - REGULATION LINES AND REVEGETATION STRATEGY CASE



NOTE: AFFLUX PLOTTED AGAINST EXISTING 100 YEAR ARI DESIGN CASE



VERT. 0 5.0 10.0 15.0 20.0 METRES

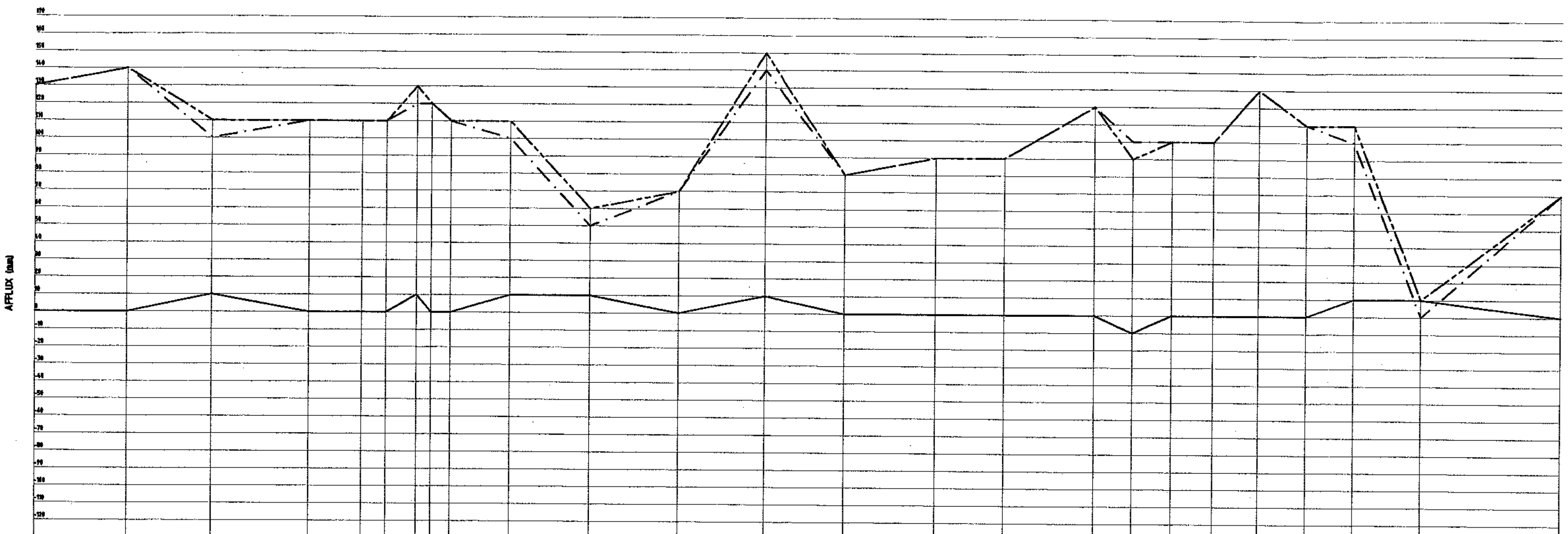
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 1420 TO BN 1200

PLOT SCALE: 1=30

FIGURE J-3e

BRISBANE RIVER FLOOD STUDY
AFFLUX FOR THE 100 YEAR ARI DESIGN FLOOD - REGULATION LINES AND REVEGETATION STRATEGY CASE

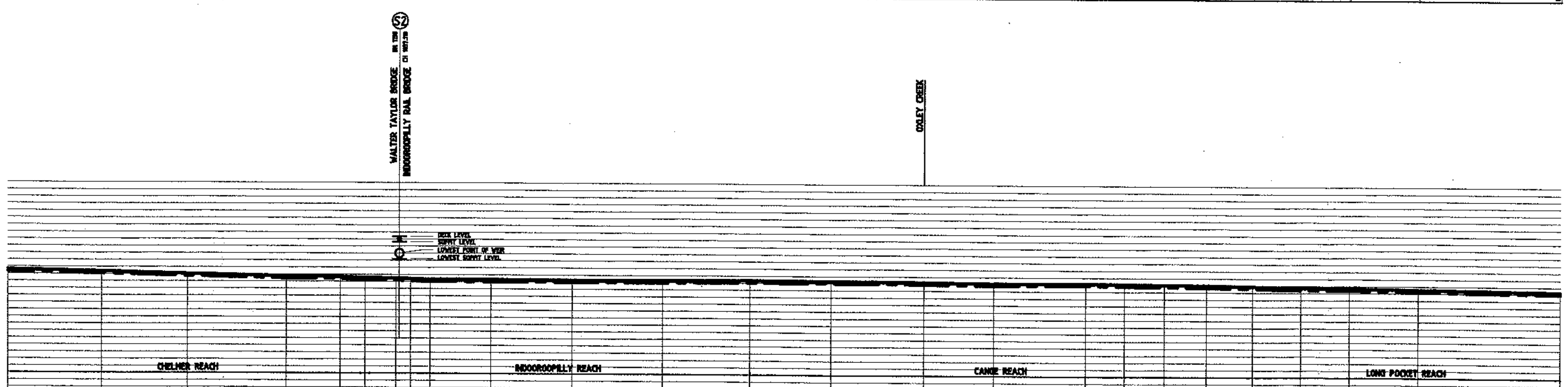


LEGEND

- AFFLUX RESULTING FROM REGULATION LINES AND REVEGETATION STRATEGIES
- AFFLUX RESULTING FROM REGULATION LINES ONLY
- AFFLUX RESULTING FROM UNCONSTRAINED REVEGETATION ONLY

NOTE:
AFFLUX PLOTTED AGAINST EXISTING 100 YEAR ARI DESIGN CASE

AFFLUX RESULTING FROM REVEG. AND REG. LINES (mm)	130	140	110	110	110	110	130	120	110	110	60	70	150	80	90	90	120	90	100	100	130	110	110	10	70
AFFLUX RESULTING FROM REG. LINES ONLY (mm)	130	140	100	110	110	110	120	120	110	100	50	70	140	80	90	90	120	100	100	100	130	110	100	0	70
AFFLUX RESULTING FROM REVEG. ONLY (mm)	0	0	10	0	0	0	10	0	0	10	10	0	10	0	0	0	0	-10	0	0	0	0	10	10	0
MIKE 11 CHAINAGE (km)	1034.890	1035.414	1035.980	1036.460	1036.770	1036.945	1037.090	1037.175	1037.285	1037.625	1038.035	1038.600	1039.180	1039.565	1040.090	1040.490	1041.010	1041.230	1041.460	1041.700	1041.960	1042.235	1042.515	1042.910	1043.725



DATUM RL. -5.000

100 YEAR ARI DESIGN FLOOD LEVEL (WITH REVEG. AND REG. LINES)	12.320	12.080	11.760	11.440	11.390	11.230	11.280	11.180	11.040	11.020	10.990	10.780	11.050	11.000	10.930	10.900	10.860	10.800	10.720	10.690	10.580	10.410	10.400	10.230	9.980
CROSS SECTION NUMBER	BN 1200	BN 1190	BN 1180	BN 1170	BN 1164	BN 1150	BN 1144	BN 1128	BN 1110	BN 1100	BN 1090	BN 1080	BN 1070	BN 1060	BN 1050	BN 1040	BN 1030	BN 1020	BN 1010	BN 1000	BN 990	BN 980	BN 970	BN 960	BN 950
AMTD CHAINAGE (km)	43.770	43.246	42.760	42.220	41.890	41.745	41.570	41.485	41.375	41.035	40.575	40.040	39.540	38.950	38.570	38.170	37.560	37.430	37.280	36.944	36.700	36.425	36.145	35.754	34.935
MIKE 11 CHAINAGE (km)	1034.890	1035.414	1035.980	1036.460	1036.770	1036.945	1037.090	1037.175	1037.285	1037.625	1038.035	1038.600	1039.180	1039.565	1040.090	1040.490	1041.010	1041.230	1041.460	1041.700	1041.960	1042.235	1042.515	1042.910	1043.725

LEGEND

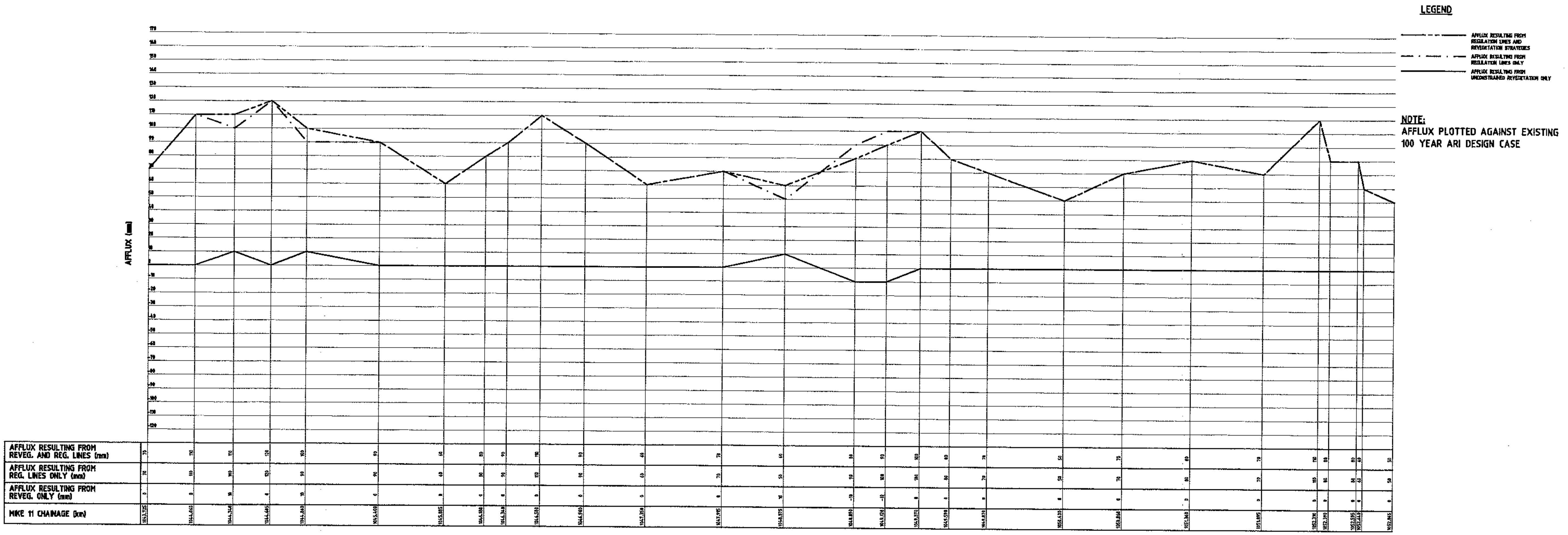
- LOCATION AND IDENTIFICATION OF STRUCTURE
- 100 YEAR ARI DESIGN FLOOD
- MINIMUM DEVELOPMENT LEVEL

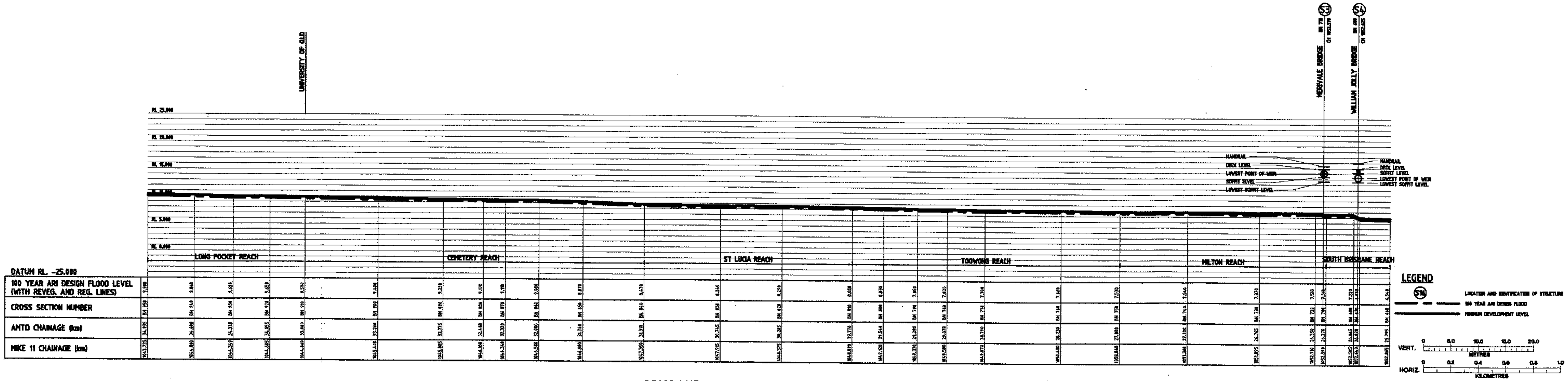
VERT. 0 5.0 10.0 15.0 20.0 METRES
HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

BRISBANE RIVER - BN 1200 TO BN 950

FIGURE J-3f

BRISBANE RIVER FLOOD STUDY
AFFLUX FOR THE 100 YEAR ARI DESIGN FLOOD - REGULATION LINES AND REVEGETATION STRATEGY CASE





BRISBANE RIVER - BN 950 TO BN 660

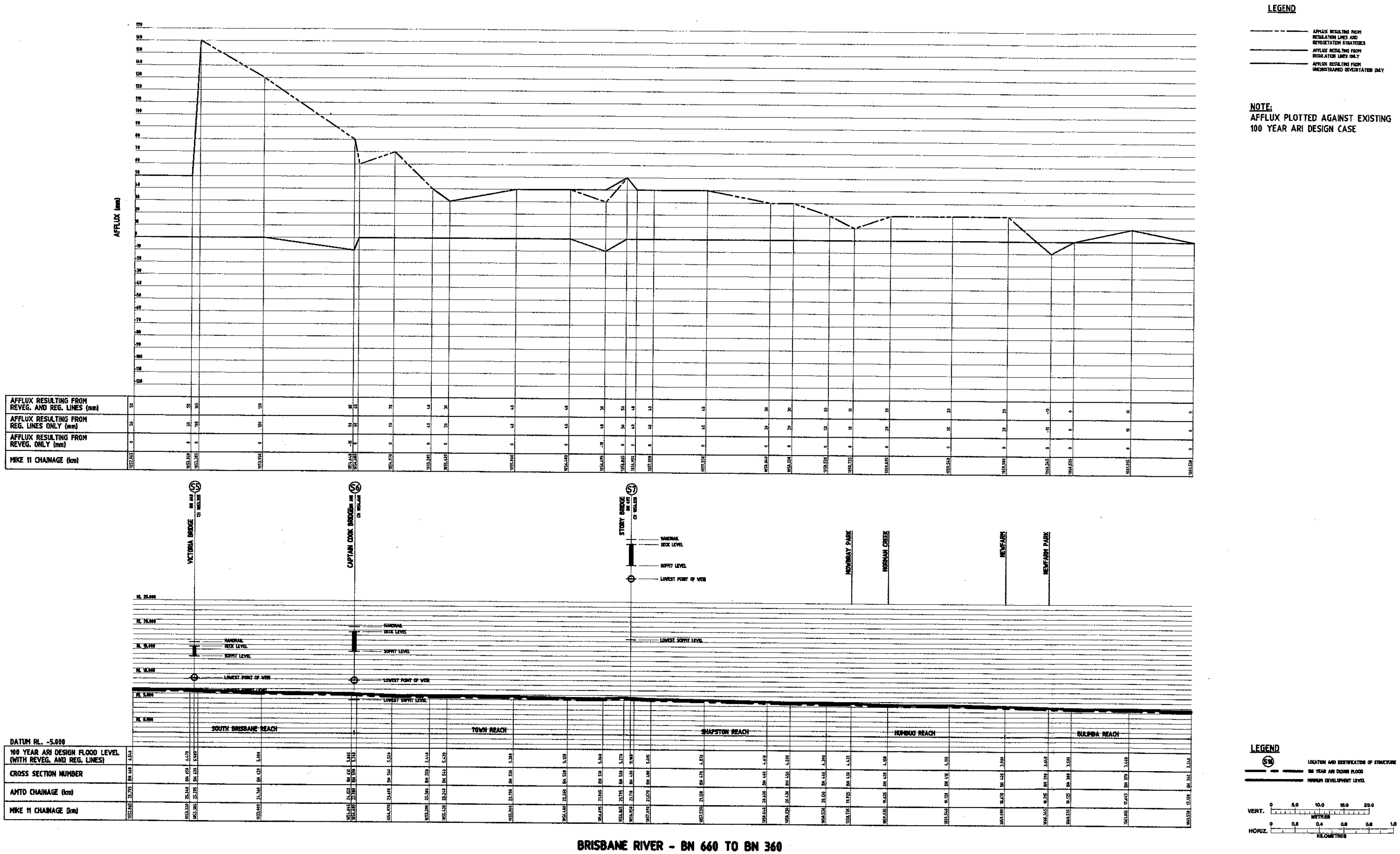
FILE NAME: 415/-323
PLOT SCALE: 1=30

SINCLAIR KNIGHT MERZ

FIGURE J-3g

BRISBANE RIVER FLOOD STUDY

AFFLUX FOR THE 100 YEAR ARI DESIGN FLOOD - REGULATION LINES AND REVEGETATION STRATEGY CASE



BRISBANE RIVER - BN 660 TO BN 360

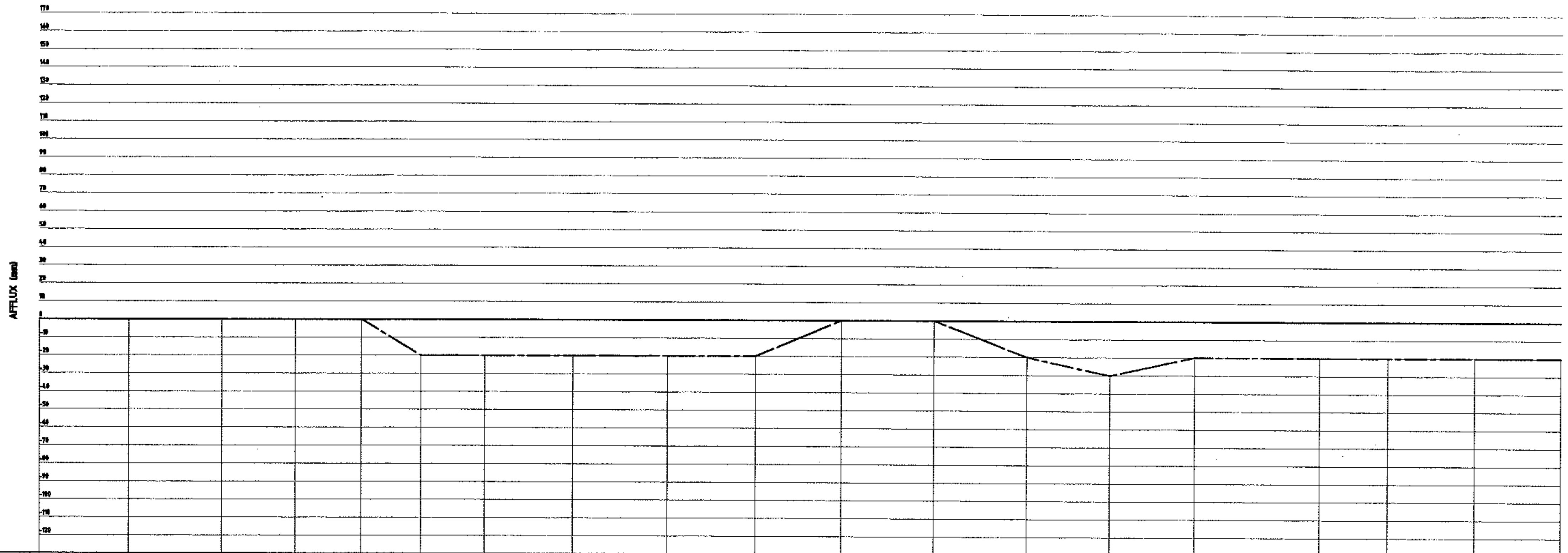
FILE NAME: 415/-324 PLOT SCALE: 1=30

SINCLAIR KNIGHT MERZ

FIGURE J-3h

BRISBANE RIVER FLOOD STUDY

AFFLUX FOR THE 100 YEAR ARI DESIGN FLOOD - REGULATION LINES AND REVEGETATION STRATEGY CASE



AFFLUX RESULTING FROM REVEG. AND REG. LINES (mm)	0	0	0	0	0	-20	-20	-20	-20	-20	0	0	-20	-30	-20	-20	-20	-20	-20
AFFLUX RESULTING FROM REG. LINES ONLY (mm)	0	0	0	0	0	-20	-20	-20	-20	-20	0	0	-20	-30	-20	-20	-20	-20	-20
AFFLUX RESULTING FROM REVEG. ONLY (mm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIKE 11 CHAINAGE (km)	1061.530	1062.020	1062.535	1062.940	1063.310	1063.645	1064.080	1064.490	1065.010	1065.503	1065.998	1066.505	1067.020	1067.485	1067.965	1068.460	1069.045	1069.535	1070.025

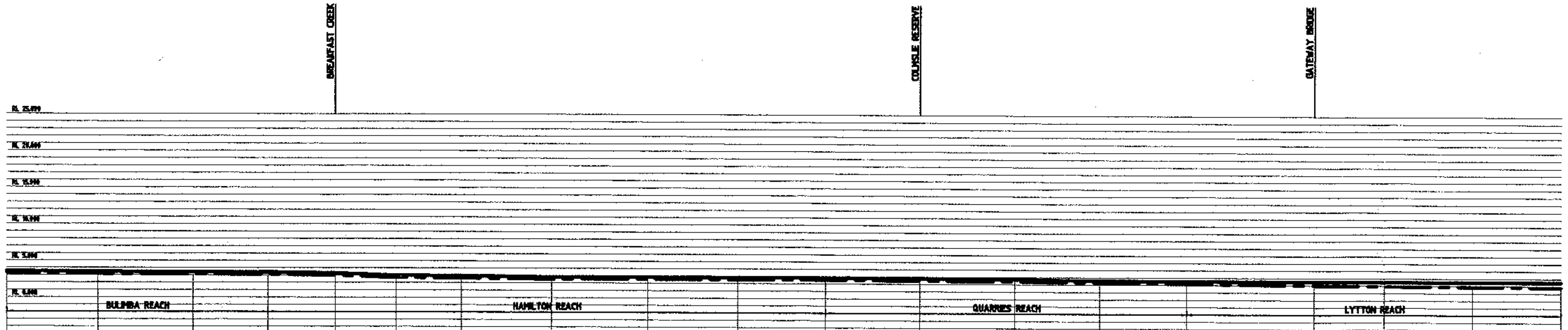
LEGEND

AFFLUX RESULTING FROM REGULATION LINES AND REVEGETATION STRATEGIES

AFFLUX RESULTING FROM REGULATION LINES ONLY

AFFLUX RESULTING FROM UNCONSTRAINED REVEGETATION ONLY

NOTE:
AFFLUX PLOTTED AGAINST EXISTING 100 YEAR ARI DESIGN CASE



DATUM RL. -5.000

100 YEAR ARI DESIGN FLOOD LEVEL (WITH REVEG. AND REG. LINES)	3.244	3.160	3.120	3.110	2.990	2.790	2.640	2.530	2.550	2.510	2.540	2.460	2.410	2.290	2.180	2.000	1.930	1.810	1.800
CROSS SECTION NUMBER	BN 360	BN 350	BN 340	BN 330	BN 320	BN 310	BN 300	BN 290	BN 280	BN 270	BN 260	BN 250	BN 240	BN 230	BN 220	BN 210	BN 200	BN 190	BN 180
AMTD CHAINAGE (km)	17.138	16.640	16.125	15.720	15.350	15.015	14.660	14.170	13.650	13.157	12.670	12.155	11.640	11.175	10.695	10.000	9.615	9.125	8.635
MIKE 11 CHAINAGE (km)	1061.530	1062.020	1062.535	1062.940	1063.310	1063.645	1064.080	1064.490	1065.010	1065.503	1065.998	1066.505	1067.020	1067.485	1067.965	1068.460	1069.045	1069.535	1070.025

BRISBANE RIVER - BN 360 TO BN 180

LEGEND

LOCATION AND IDENTIFICATION OF STRUCTURE

100 YEAR ARI DESIGN FLOOD

MINIMUM DEVELOPMENT LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

FIGURE J-3i

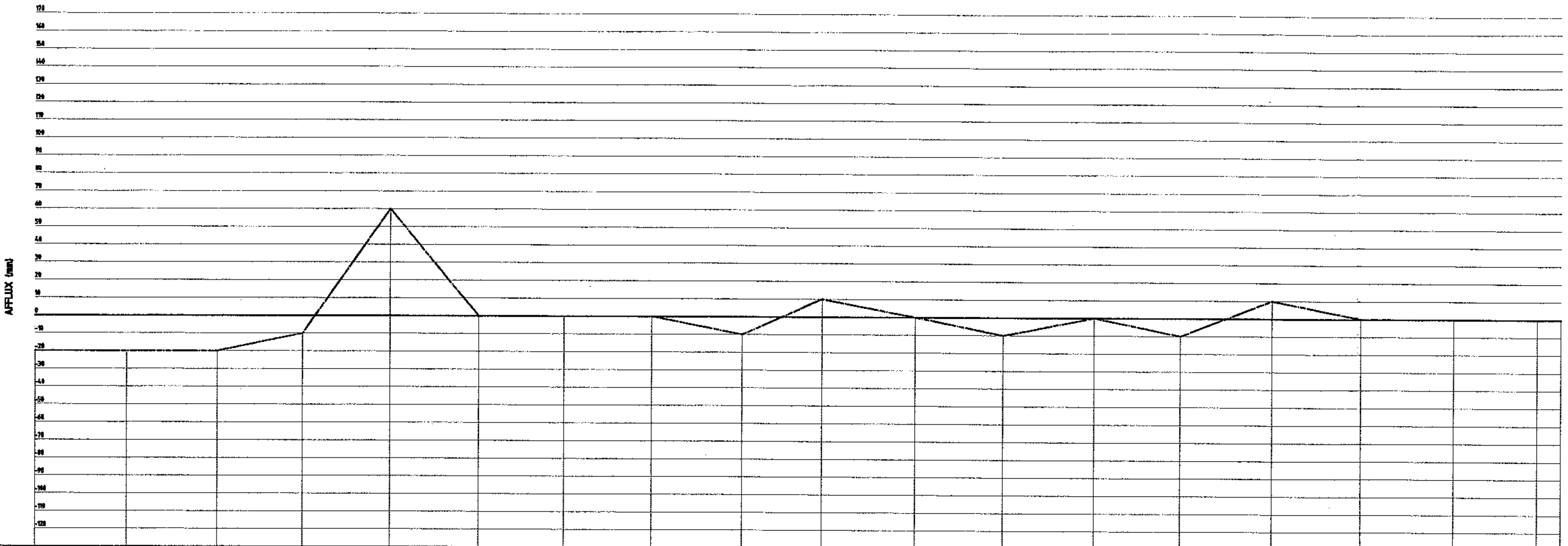
BRISBANE RIVER FLOOD STUDY

AFFLUX FOR THE 100 YEAR ARI DESIGN FLOOD - REGULATION LINES AND REVEGETATION STRATEGY CASE

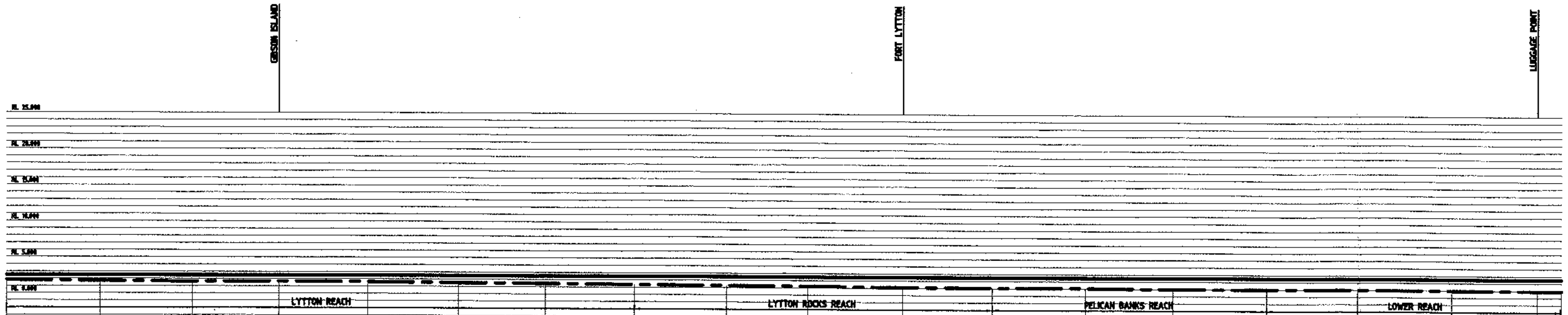
LEGEND

- — — — AFFLUX RESULTING FROM REGULATION LINES AND REVEGETATION STRATEGIES
- — · — · AFFLUX RESULTING FROM REGULATION LINES ONLY
- ——— AFFLUX RESULTING FROM UNCONSTRAINED REVEGETATION ONLY

NOTE:
AFFLUX PLOTTED AGAINST EXISTING 100 YEAR ARI DESIGN CASE



AFFLUX RESULTING FROM REVEG. AND REG. LINES (mm)	-20	-20	-20	-10	60	0	0	0	-10	10	0	-10	0	-10	10	0	0	0	0
AFFLUX RESULTING FROM REG. LINES ONLY (mm)	-20	-20	-20	-10	60	0	0	0	-10	10	0	-10	0	-10	10	0	0	0	0
AFFLUX RESULTING FROM REVEG. ONLY (mm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIKE 11 CHAINAGE (km)	1070.025	1070.530	1071.040	1071.520	1072.015	1072.515	1072.995	1073.485	1074.000	1074.440	1074.985	1075.480	1076.000	1076.495	1077.010	1077.510	1078.050	1078.525	1078.660



DATUM RL. -5.000

100 YEAR ARI DESIGN FLOOD LEVEL (WITH REVEG. AND REG. LINES)	1.800	1.700	1.620	1.640	1.630	1.500	1.440	1.340	1.280	1.230	1.090	1.050	1.070	0.950	0.970	0.970	0.950	0.920	0.920
CROSS SECTION NUMBER	BN 180	BN 170	BN 160	BN 150	BN 140	BN 130	BN 120	BN 110	BN 100	BN 90	BN 80	BN 70	BN 60	BN 50	BN 40	BN 30	BN 20	BN 10	
AMTD CHAINAGE (km)	8.635	8.130	7.620	7.140	6.645	6.145	5.665	5.175	4.660	4.200	3.675	3.180	2.660	2.165	1.650	1.150	0.620	0.135	0
MIKE 11 CHAINAGE (km)	1070.025	1070.530	1071.040	1071.520	1072.015	1072.515	1072.995	1073.485	1074.000	1074.440	1074.985	1075.480	1076.000	1076.495	1077.010	1077.510	1078.040	1078.525	1078.660

BRISBANE RIVER - BN 180 TO BN 10

LEGEND

- LOCATION AND IDENTIFICATION OF STRUCTURE
- 100 YEAR ARI DESIGN FLOOD
- MINIMUM DEVELOPMENT LEVEL

VERT. 0 5.0 10.0 15.0 20.0 METRES

HORIZ. 0 0.2 0.4 0.6 0.8 1.0 KILOMETRES

FILE ... 415 ... PLOT SCALE: 1=30

Appendix K - Hydraulic Structure Reference Sheets

SINCLAIR KNIGHT MERZ

CENTENARY BRIDGE

HYDRAULIC STRUCTURE REFERENCE SHEET - VERS 3.1

CREEK:	Brisbane River	DATE OF SURVEY:	Mar-95
LOCATION:	Centenary Highway	UBD REF:	177 Q17
AERIAL PHOTO No:	Film BCC100, Sheet 5	STRUCTURE ID	S1
BCC XS No:	BN 1350	AMTD(m):	49 940

STRUCTURE DESCRIPTION: Bridge; Concrete Piers and Superstructure

STRUCTURE SIZE: 4 Spans @ 42.3m; 1 Span @ 48.3m.
For Culverts: Number of cells/pipes & sizes For Bridges: Number of Spans & their lengths.

UPSTREAM INVERT LEVEL: -15.9 UPSTREAM OBVERT LEVEL: 8.5

DOWNSTREAM INVERT LEVEL: -15.9 DOWNSTREAM OBVERT LEVEL: 8.5
For culverts give floor level. For bridges give bed level.

For Culverts
LENGTH OF CULVERT BARREL AT INVERT (m):

LENGTH OF CULVERT BARREL AT OBVERT (m):

TYPE OF LINING:
(e.g. concrete, stones, brick, corrugated iron)

IS THERE A SURVEYED WEIR PROFILE? YES - XSECTION BN1350
If yes give details ie. plan number and/or survey book number.
Note This Section should be the highest part of the road eg crown, kerb, hand rails guard rails whichever is higher.

WEIR WIDTH (m): 10.6m LOWEST POINT OF WEIR (m AHD): 10.0m PIER WIDTH: 0.76m
(In the direction of flow, ie. distance from u/s face to d/s face)

HEIGHT OF GUARD RAILS: 1067mm

DESCRIPTION OF ALL HAND AND GAURD RAILS AND HEIGHTS TO TOP AND UNDERSIDE OF GUARD RAILS.

Posts:	102mm x 102mm
Verticals:	16mm dia
Handrails:	102 x 52 TFC

The following should also be provided.
Wingwall and Headwall details, entrance details eg pipe flush with embankment or projecting, socket or square end, details of entrance rounding, levels.
For Bridges, details of piers and section under bridge including abutment details.
Specify Survey Book No.

CONSTRUCTION DATE OF CURRENT STRUCTURE: 1963 PLAN NUMBER:

HAS THE STRUCTURE BEEN UPGRADED? No
If yes, explain type and date of upgrade. Include plan number and location if applicable.

ADDITIONAL COMMENTS: Structure has approximately 41 year ARI flood Immunity

SUMMARY OF STRUCTURE CHARACTERISTICS

ARI	DISCHARGE		WATER SURFACE ELEVATION	MAX AFFLUX	AREA		VELOCITY	
	QWEIR	QSTRUCTURE			WEIR	STRUCTURE	WEIR	STRUCTURE
(years)	(m^3/s)	(m^3/s)	(m AHD)	(mm)	(m^2)	(m^2)	(m/s)	(m/s)
PMF	26640	14317	33.23	570	8904	3389	2.95	4.3
10 000	18626	14090	28.11	610	6597	3316	2.8	4.3
2 000	10963	13424	23.48	560	4006	3306	2.65	4.08
1 000	5690	12881	21.43	250	3193	3289	1.7	3.9
500	3054	11483	18.55	230	1908	3265	1.6	3.45
200	1380	10400	16.36	220	999	3256	1.48	3.1
100	377	9085	14.06	150	418	3301	1	2.7
50	9	9294	11.54	90	17	2866	1.4	2.5
20	-	3516	6.05	80	-	1812	-	1.9
10	-	1589	2.67	40	-	1307	-	1.2
5	-	949	1.66	20	-	1140	-	0.82
2	-	371	1.08	10	-	1058	-	0.5

Note: Qweir & Qstructure are the maximum discharges through the structure and maynot occur at the same time.

STRUCTURE 1-CENTENARY BRIDGE (LOOKING UPSTREAM)

INDOOROOPILLY - WALTER TAYLOR BRIDGE

HYDRAULIC STRUCTURE REFERENCE SHEET - VERS 3.1

CREEK: Brisbane River		DATE OF SURVEY	Mar-95
LOCATION: Honour Avenue		UBD REF:	178 K7
AERIAL PHOTO No:	Film BCC100, Sheet 4	STRUCTURE ID	S2
BCC XS No:	BN 1130	AMTD(m):	41 550

STRUCTURE DESCRIPTION: Single span suspension bridge; concrete towers; steel girders; timber decking.

STRUCTURE SIZE: Span: 152.4m
For Culverts: Number of cells/pipes & sizes For Bridges: Number of Spans & their lengths.

UPSTREAM INVERT LEVEL: -15.9 UPSTREAM OBVERT LEVEL: 14.2

DOWNSTREAM INVERT LEVEL: -15.7 DOWNSTREAM OBVERT LEVEL: 14.2
For culverts give floor level. For bridges give bed level.

For Culverts
LENGTH OF CULVERT BARREL AT INVERT (m):

LENGTH OF CULVERT BARREL AT OBVERT (m):

TYPE OF LINING:
(e.g. concrete, stones, brick, corrugated iron)

IS THERE A SURVEYED WEIR PROFILE? YES - XSECTION BN1130
If yes give details ie. plan number and/or survey book number.
Note This Section should be the highest part of the road eg crown, kerb, hand rails guard rails whichever is higher.

WEIR WIDTH (m): 10.3m LOWEST POINT OF WEIR (m AHD): 15.0m PIER WIDTH: 10.1m
(In the direction of flow, ie. distance from u/s face to d/s face) (Base of tower)

HEIGHT OF GUARD RAILS: 1067 mm

DESCRIPTION OF ALL HAND AND GAURD RAILS AND HEIGHTS TO TOP AND UNDERSIDE OF GUARD RAILS.

Galv. steel chain fencing

The following should also be provided.
Wingwall and Headwall details, entrance details eg pipe flush with embankment or projecting, socket or square end, details of entrance rounding, levels.
For Bridges, details of piers and section under bridge including abutment details.
Specify Survey Book No.

CONSTRUCTION DATE OF CURRENT STRUCTURE: 1936 PLAN NUMBER:

HAS THE STRUCTURE BEEN UPGRADED? No
If yes, explain type and date of upgrade. Include plan number and location if applicable.

ADDITIONAL COMMENTS: Greater than 100 year ARI flood immunity

NB Walter Taylor Bridge & Albert Bridge modelled as a single bridge

SUMMARY OF STRUCTURE CHARACTERISTICS

ARI	DISCHARGE		WATER		AREA		VELOCITY	
(years)	QWEIR (m^3/s)	QSTRUCTURE (m^3/s)	SURFACE ELEVATION (m AHD)	MAX AFFLUX (mm)	WEIR (m^2)	STRUCTURE (m^2)	WEIR (m/s)	STRUCTURE (m/s)
PMF	7487	29071	28.88	2055	1249	4170	6.5	6.6
10 000	2211	26236	23.12	190	809	4088	5.25	5.9
2 000	725	20782	19.1	380	219	4065	2	4.9
1 000	10	18392	17.35	250	19	4046	1.7	4.4
500	-	14461	14.73	190	-	3892	-	3.6
200	-	11706	12.92	150	-	3700	-	3.1
100	-	9392	11.07	90	-	3181	-	2.9
50	-	7227	8.98	80	-	2833	-	2.5
20	-	3487	4.47	150	-	2041	-	1.67
10	-	1587	2	60	-	1741	-	0.9
5	-	949	1.35	20	-	1583	-	0.59
2	-	372	1.03	10	-	1511	-	0.35

Note: Qweir & Qstructure are the maximum discharges through the structure and maynot occur at the same time.

INDOOROOPILLY - RAIL BRIDGE

HYDRAULIC STRUCTURE REFERENCE SHEET - VERS 3.1

CREEK:	Brisbane River	DATE OF SURVEY	NA
LOCATION:	Railway crossing, Indooroopilly	UBD REF:	178 K7
AERIAL PHOTO No:	Film BCC100, Sheet 4	STRUCTURE ID	S2
BCC XS No:	BN 1130	AMTD(m):	41 550

STRUCTURE DESCRIPTION: Truss bridge; Steel superstructure; Concrete piers.

STRUCTURE SIZE: 2 Spans @ 104.2m
For Culverts: Number of cells/pipes & sizes For Bridges: Number of Spans & their lengths.

UPSTREAM INVERT LEVEL: -15.9 UPSTREAM OBVERT LEVEL:

DOWNSTREAM INVERT LEVEL: -15.7 DOWNSTREAM OBVERT LEVEL:
For culverts give floor level. For bridges give bed level.

For Culverts
LENGTH OF CULVERT BARREL AT INVERT (m):

LENGTH OF CULVERT BARREL AT OBVERT (m):

TYPE OF LINING:
(e.g. concrete, stones, brick, corrugated iron)

IS THERE A SURVEYED WEIR PROFILE? NO
If yes give details ie. plan number and/or survey book number.
Note This Section should be the highest part of the road eg crown, kerb, hand rails guard rails whichever is higher.

WEIR WIDTH (m): 8.4m LOWEST POINT OF WEIR (m AHD): 15.0m PIER WIDTH:
(In the direction of flow, ie. distance from u/s face to d/s face)

HEIGHT OF GUARD RAILS: 1067 mm

DESCRIPTION OF ALL HAND AND GAURD RAILS AND HEIGHTS TO TOP AND UNDERSIDE OF GUARD RAILS.

The following should also be provided.
Wingwall and Headwall details, entrance details eg pipe flush with embankment or projecting, socket or square end, details of entrance rounding, levels.
For Bridges, details of piers and section under bridge including abutment details.
Specify Survey Book No.

CONSTRUCTION DATE OF CURRENT STRUCTURE: 1952 PLAN NUMBER:

HAS THE STRUCTURE BEEN UPGRADED? No
If yes, explain type and date of upgrade. Include plan number and location if applicable.

ADDITIONAL COMMENTS: Greater than 100 year ARI immunity

NB Walter Taylor Bridge & Albert Bridge modelled as a single bridge

STRUCTURE 2-INDOOROOPILLY BRIDGES (LOOKING UPSTREAM)

STRUCTURE 2-INDOOROOPILLY BRIDGES (LOOKING DOWNSTREAM)

MERIVAL BRIDGE

HYDRAULIC STRUCTURE REFERENCE SHEET - VERS 3.1

CREEK: Brisbane River		DATE OF SURVEY	Mar-95
LOCATION: Railway Link: South Brisbane - Roma Street		UBD REF:	159 J11
AERIAL PHOTO No: Film BCC100, Sheet 3		STRUCTURE ID	S3
BCC XS No: BN 710		AMTD(m):	26 290

STRUCTURE DESCRIPTION: Single span arch bridge and approaches; Concrete deck & piers.

STRUCTURE SIZE: Centre span: 132.9m; Approach spans either side: 33.45m.
For Culverts: Number of cells/pipes & sizes For Bridges: Number of Spans & their lengths.

UPSTREAM INVERT LEVEL: -15.9 UPSTREAM OBVERT LEVEL: 14.1

DOWNSTREAM INVERT LEVEL: -15.4 DOWNSTREAM OBVERT LEVEL: 14.1
For culverts give floor level. For bridges give bed level.

For Culverts
LENGTH OF CULVERT BARREL AT INVERT (m):

LENGTH OF CULVERT BARREL AT OBVERT (m):

TYPE OF LINING:
(e.g. concrete, stones, brick, corrugated iron)

IS THERE A SURVEYED WEIR PROFILE? YES - XSECTION BN710
If yes give details ie. plan number and/or survey book number.
Note This Section should be the highest part of the road eg crown, kerb, hand rails guard rails whichever is higher.

WEIR WIDTH (m): 13.4m LOWEST POINT OF WEIR (m AHD): 15.1m PIER WIDTH: Varies
(In the direction of flow, ie. distance from u/s face to d/s face)

HEIGHT OF GUARD RAILS: 1067 mm

DESCRIPTION OF ALL HAND AND GAURD RAILS AND HEIGHTS TO TOP AND UNDERSIDE OF GUARD RAILS.

The following should also be provided.
Wingwall and Headwall details, entrance details eg pipe flush with embankment or projecting, socket or square end, details of entrance rounding, levels.
For Bridges, details of piers and section under bridge including abutment details.
Specify Survey Book No.

CONSTRUCTION DATE OF CURRENT STRUCTURE: 1981 PLAN NUMBER:

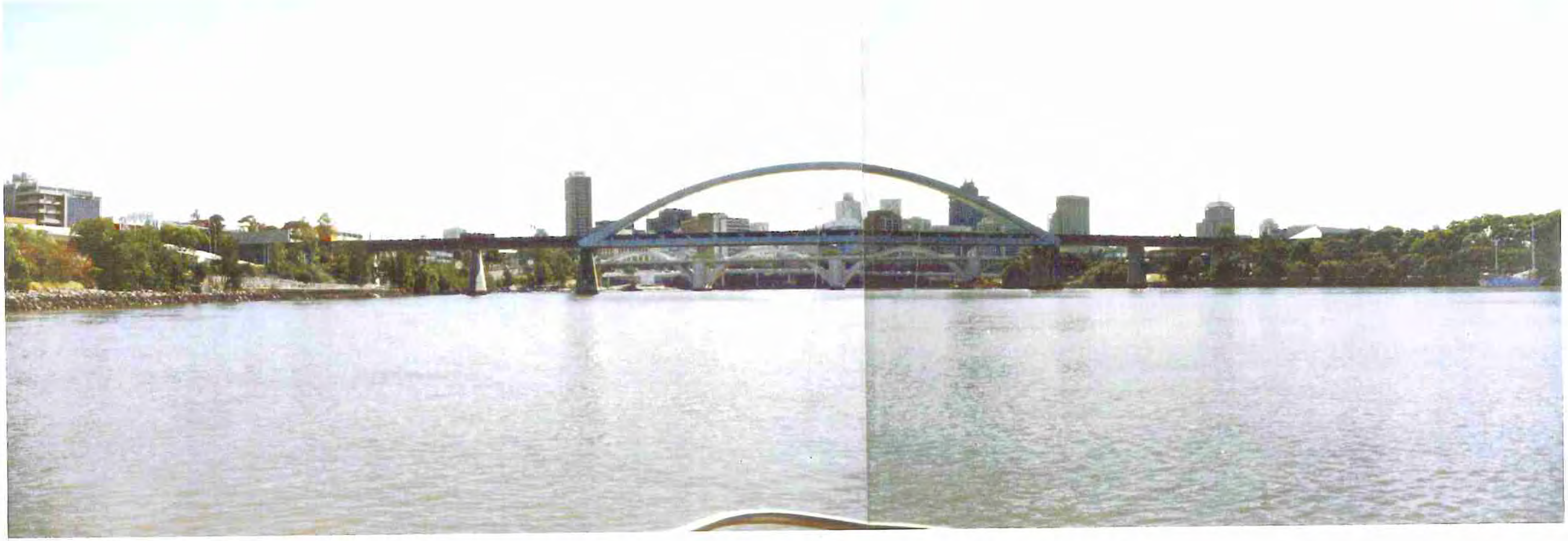
HAS THE STRUCTURE BEEN UPGRADED? No
If yes, explain type and date of upgrade. Include plan number and location if applicable.

ADDITIONAL COMMENTS: Greater than 100 year ARI immunity

SUMMARY OF STRUCTURE CHARACTERISTICS

ARI	DISCHARGE		WATER		AREA		VELOCITY	
	QWEIR	QSTRUCTURE	SURFACE ELEVATION	MAX AFFLUX	WEIR	STRUCTURE	WEIR	STRUCTURE
(years)	(m^3/s)	(m^3/s)	(m AHD)	(mm)	(m^2)	(m^2)	(m/s)	(m/s)
PMF	2909	32954	22.98	1050	648	4414	5.2	7.2
10 000	1555	27406	19.72	630	415	4412	4.1	6
2 000	8	19989	15.59	410	62	3525	2	5.6
1 000	-	17416	13.92	320	-	3132	-	5.5
500	-	13779	11.06	240	-	2456	-	5
200	-	11386	9.16	200	-	2366	-	4.7
100	-	9250	7.4	270	-	2023	-	4.45
50	-	7079	5.65	160	-	1761	-	3.9
20	-	3397	2.49	50	-	1508	-	2.2
10	-	1586	1.32	20	-	1491	-	1.05
5	-	949	1.08	10	-	1444	-	0.68
2	-	423	0.97	0	-	1425	-	0.4

Note: Qweir & Qstructure are the maximum discharges through the structure and maynot occur at the same time.



STRUCTURE 3-MERIVALE BRIDGE (LOOKING DOWNSTREAM)

WILLIAM JOLLY BRIDGE

HYDRAULIC STRUCTURE REFERENCE SHEET - VERS 3.1

CREEK:	Brisbane River	DATE OF SURVEY	Mar-95
LOCATION:	Grey Street	UBD REF:	159 K11
AERIAL PHOTO No:	Film BCC100, Sheet 3	STRUCTURE ID	S4
BCC XS No:	BN 680	AMTD(m):	26 035

STRUCTURE DESCRIPTION: Arch bridge with approaches; Concrete and granite piers, steel girders, concrete deck.

STRUCTURE SIZE: 3 spans @ 72.5m.
For Culverts: Number of cells/pipes & sizes For Bridges: Number of Spans & their lengths.

UPSTREAM INVERT LEVEL: -15.9 UPSTREAM OBVERT LEVEL: 13.5

DOWNSTREAM INVERT LEVEL: -15.4 DOWNSTREAM OBVERT LEVEL: 13.5
For culverts give floor level. For bridges give bed level.

For Culverts
LENGTH OF CULVERT BARREL AT INVERT (m):

LENGTH OF CULVERT BARREL AT OBVERT (m):

TYPE OF LINING:
(e.g. concrete, stones, brick, corrugated iron)

IS THERE A SURVEYED WEIR PROFILE? YES - XSECTION BN680
If yes give details ie. plan number and/or survey book number.
Note This Section should be the highest part of the road eg crown, kerb, hand rails guard rails whichever is higher.

WEIR WIDTH (m): 20.1m LOWEST POINT OF WEIR (m AHD): 14.3m PIER WIDTH: 6.6m
(In the direction of flow, ie. distance from u/s face to d/s face)

HEIGHT OF GUARD RAILS: 1067 mm

DESCRIPTION OF ALL HAND AND GAURD RAILS AND HEIGHTS TO TOP AND UNDERSIDE OF GUARD RAILS.

Concrete balustrade

The following should also be provided.
Wingwall and Headwall details, entrance details eg pipe flush with embankment or projecting, socket or square end, details of entrance rounding, levels.
For Bridges, details of piers and section under bridge including abutment details.
Specify Survey Book No.

CONSTRUCTION DATE OF CURRENT STRUCTURE: 1927 PLAN NUMBER:

HAS THE STRUCTURE BEEN UPGRADED? No
If yes, explain type and date of upgrade. Include plan number and location if applicable.

ADDITIONAL COMMENTS: Greater than 100 year ARI immunity

SUMMARY OF STRUCTURE CHARACTERISTICS

ARI	DISCHARGE		WATER		AREA		VELOCITY	
	QWEIR	QSTRUCTURE	SURFACE ELEVATION	MAX AFFLUX	WEIR	STRUCTURE	WEIR	STRUCTURE
(years)	(m^3/s)	(m^3/s)	(m AHD)	(mm)	(m^2)	(m^2)	(m/s)	(m/s)
PMF	2909	32954	22.98	1050	648	4414	5.2	7.2
10 000	1555	27406	19.72	630	415	4412	4.1	6
2 000	8	19989	15.59	410	62	3525	2	5.6
1 000	-	17416	13.92	320	-	3132	-	5.5
500	-	13779	11.06	240	-	2456	-	5
200	-	11386	9.16	200	-	2366	-	4.7
100	-	9250	7.4	270	-	2023	-	4.45
50	-	7079	5.65	160	-	1761	-	3.9
20	-	3397	2.49	50	-	1508	-	2.2
10	-	1586	1.32	20	-	1491	-	1.05
5	-	949	1.08	10	-	1444	-	0.68
2	-	423	0.97	0	-	1425	-	0.4

Note: Qweir & Qstructure are the maximum discharges through the structure and maynot occur at the same time.

STRUCTURE 4-WILLIAM JOLLY BRIDGE (LOOKING DOWNSTREAM)

VICTORIA BRIDGE

HYDRAULIC STRUCTURE REFERENCE SHEET - VERS 3.1

CREEK:	Brisbane River	DATE OF SURVEY	Mar-95
LOCATION:	Melbourne Street	UBD REF:	159 M12
AERIAL PHOTO No:	Film BCC100, Sheet 3	STRUCTURE ID	S5
BCC XS No:	BN 640	AMTD(m):	25 305

STRUCTURE DESCRIPTION: Concrete bridge; Single span with cantilever ends resting on abutments.

STRUCTURE SIZE: Centre span: 136.1m; End contilevers: 85.3m.
For Culverts: Number of cells/pipes & sizes For Bridges: Number of Spans & their lengths.

UPSTREAM INVERT LEVEL: -15.9 UPSTREAM OBVERT LEVEL: 6.76

DOWNSTREAM INVERT LEVEL: -15.4 DOWNSTREAM OBVERT LEVEL: 6.76
For culverts give floor level. For bridges give bed level.

For Culverts
LENGTH OF CULVERT BARREL AT INVERT (m):

LENGTH OF CULVERT BARREL AT OBVERT (m):

TYPE OF LINING:
(e.g. concrete, stones, brick, corrugated iron)

IS THERE A SURVEYED WEIR PROFILE? YES - XSECTION BN640
If yes give details ie. plan number and/or survey book number.
Note This Section should be the highest part of the road eg crown, kerb, hand rails guard rails whichever is higher.

WEIR WIDTH (m): 21.9m LOWEST POINT OF WEIR (m AHD): 9.2m PIER WIDTH: 4.0m (Base)
(In the direction of flow, ie. distance from u/s face to d/s face)

HEIGHT OF GUARD RAILS: 1067 mm

DESCRIPTION OF ALL HAND AND GAURD RAILS AND HEIGHTS TO TOP AND UNDERSIDE OF GUARD RAILS.

The following should also be provided.
Wingwall and Headwall details, entrance details eg pipe flush with embankment or projecting, socket or square end, details of entrance rounding, levels.
For Bridges, details of piers and section under bridge including abutment details.
Specify Survey Book No.

CONSTRUCTION DATE OF CURRENT STRUCTURE: 1960 PLAN NUMBER:

HAS THE STRUCTURE BEEN UPGRADED? No
If yes, explain type and date of upgrade. Include plan number and location if applicable.

ADDITIONAL COMMENTS: Greater than 100 year ARI immunity

SUMMARY OF STRUCTURE CHARACTERISTICS

ARI	DISCHARGE		WATER SURFACE ELEVATION	MAX AFFLUX	AREA		VELOCITY	
(years)	QWEIR (m^3/s)	QSTRUCTURE (m^3/s)	(m AHD)	(mm)	WEIR (m^2)	STRUCTURE (m^2)	WEIR (m/s)	STRUCTURE (m/s)
PMF	3523	32348	20.07	1920	931	4217	5.6	7.1
10 000	961	27920	16.61	110	271	4174	5.5	6.4
2 000	95	19900	12.55	300	93	4148	1.8	4.7
1 000	60	17389	11.42	380	42	4072	1.2	4.2
500	-	13786	9.36	270	-	3688	-	3.6
200	-	11363	7.88	210	-	3497	-	3.15
100	-	9223	6.42	180	-	3335	-	2.7
50	-	7066	4.92	150	-	2985	-	2.3
20	-	3397	2.28	80	-	2288	-	1.45
10	-	1586	1.26	20	-	2061	-	0.76
5	-	949	1.06	10	-	1964	-	0.5
2	-	423	0.96	10	-	1966	-	0.29

Note: Qweir & Qstructure are the maximum discharges through the structure and maynot occur at the same time.

STRUCTURE 5-VICTORIA BRIDGE (LOOKING UPSTREAM)

CAPTAIN COOK BRIDGE

HYDRAULIC STRUCTURE REFERENCE SHEET - VERS 3.1

CREEK:	Brisbane River	DATE OF SURVEY	Mar-95
LOCATION:	Riverside Expressway	UBD REF:	159 R16
AERIAL PHOTO No:	Film BCC100, Sheet 3	STRUCTURE ID	S6
BCC XS No:	BN 600	AMTD(m):	24 000

STRUCTURE DESCRIPTION: Bridge; Concrete piers, girders and deck.

STRUCTURE SIZE: 1 @ 42.7m; 1 @ 182.9m; 1 @ 146.3m; 1 @ 109.7m; 1 @ 73.2m.
For Culverts: Number of cells/pipes & sizes For Bridges: Number of Spans & their lengths.

UPSTREAM INVERT LEVEL: -15.9 UPSTREAM OBVERT LEVEL: 4.8

DOWNSTREAM INVERT LEVEL: -15.4 DOWNSTREAM OBVERT LEVEL: 4.8
For culverts give floor level. For bridges give bed level.

For Culverts
LENGTH OF CULVERT BARREL AT INVERT (m):

LENGTH OF CULVERT BARREL AT OBVERT (m):

TYPE OF LINING:
(e.g. concrete, stones, brick, corrugated iron)

IS THERE A SURVEYED WEIR PROFILE? YES - XSECTION BN600
If yes give details ie. plan number and/or survey book number.
Note This Section should be the highest part of the road eg crown, kerb, hand rails guard rails whichever is higher.

WEIR WIDTH (m): 27.1m LOWEST POINT OF WEIR (m AHD): 8.8m PIER WIDTH: 5.6m (Base)
(In the direction of flow, ie. distance from u/s face to d/s face)

HEIGHT OF GUARD RAILS: 1067 mm

DESCRIPTION OF ALL HAND AND GAURD RAILS AND HEIGHTS TO TOP AND UNDERSIDE OF GUARD RAILS.

The following should also be provided.
Wingwall and Headwall details, entrance details eg pipe flush with embankment or projecting, socket or square end, details of entrance rounding, levels.
For Bridges, details of piers and section under bridge including abutment details.
Specify Survey Book No.

CONSTRUCTION DATE OF CURRENT STRUCTURE: 1968 PLAN NUMBER:

HAS THE STRUCTURE BEEN UPGRADED? No
If yes, explain type and date of upgrade. Include plan number and location if applicable.

ADDITIONAL COMMENTS: Greater than 100 year ARI immunity

SUMMARY OF STRUCTURE CHARACTERISTICS

ARI (years)	DISCHARGE QWEIR (m^3/s)	DISCHARGE QSTRUCTURE (m^3/s)	WATER SURFACE ELEVATION (m AHD)	MAX AFFLUX (mm)	AREA WEIR (m^2)	AREA STRUCTURE (m^2)	VELOCITY WEIR (m/s)	VELOCITY STRUCTURE (m/s)
PMF	2921	33049	17.86	500	1450	7332	2.5	4.3
10 000	1085	27618	15.15	260	794	7277	1.9	3.65
2 000	124	19869	11.69	150	117	6680	1.8	2.9
1 000	15	17399	10.48	120	56	6385	1.1	2.65
500	-	13739	8.54	100	-	5530	-	2.4
200	-	11360	7.14	90	-	5137	-	2.15
100	-	9229	5.78	80	-	4494	-	2
50	-	7033	4.36	60	-	3913	-	1.75
20	-	3397	2.01	30	-	3015	-	1.1
10	-	1586	1.19	10	-	2747	-	0.57
5	-	949	1.03	10	-	2654	-	0.37
2	-	424	0.95	0	-	2719	-	0.21

Note: Qweir & Qstructure are the maximum discharges through the structure and maynot occur at the same time.

STRUCTURE 6-CAPTAIN COOK BRIDGE (LOOKING UPSTREAM)

SINCLAIR KNIGHT MERZ

STORY BRIDGE

HYDRAULIC STRUCTURE REFERENCE SHEET - VERS 3.1

CREEK:	Brisbane River	DATE OF SURVEY	Mar-95
LOCATION:	Bradfield Highway	UBD REF:	160 B9
AERIAL PHOTO No:	Film BCC100, Sheet 3	STRUCTURE ID	S7
BCC XS No:	BN 495	AMTD(m):	21 740

STRUCTURE DESCRIPTION: Suspension bridge; Steel superstructure, concrete piers. Single span with cantilever ends and an extensive southern approach.

STRUCTURE SIZE: Centre span: 281.6m; Cantilever ends: 82.1m.
For Culverts: Number of cells/pipes & sizes For Bridges: Number of Spans & their lengths.

UPSTREAM INVERT LEVEL: -15.9 UPSTREAM OBVERT LEVEL: 17.4

DOWNSTREAM INVERT LEVEL: -15.5 DOWNSTREAM OBVERT LEVEL: 17.4
For culverts give floor level. For bridges give bed level.

For Culverts
LENGTH OF CULVERT BARREL AT INVERT (m):

LENGTH OF CULVERT BARREL AT OBVERT (m):

TYPE OF LINING:
(e.g. concrete, stones, brick, corrugated iron)

IS THERE A SURVEYED WEIR PROFILE? YES - XSECTION BN495
If yes give details ie. plan number and/or survey book number.
Note This Section should be the highest part of the road eg crown, kerb, hand rails guard rails whichever is higher.

WEIR WIDTH (m): 28.2m LOWEST POINT OF WEIR (m AHD): 29.8m PIER WIDTH: 9.6m (Base)
(In the direction of flow, ie. distance from u/s face to d/s face)

HEIGHT OF GUARD RAILS: 1067 mm

DESCRIPTION OF ALL HAND AND GAURD RAILS AND HEIGHTS TO TOP AND UNDERSIDE OF GUARD RAILS.

The following should also be provided.
Wingwall and Headwall details, entrance details eg pipe flush with embankment or projecting, socket or square end, details of entrance rounding, levels.
For Bridges, details of piers and section under bridge including abutment details.
Specify Survey Book No.

CONSTRUCTION DATE OF CURRENT STRUCTURE: 1935 PLAN NUMBER:

HAS THE STRUCTURE BEEN UPGRADED? No
If yes, explain type and date of upgrade. Include plan number and location if applicable.

ADDITIONAL COMMENTS: Greater than 100 year ARI immunity

SUMMARY OF STRUCTURE CHARACTERISTICS

ARI	DISCHARGE		WATER SURFACE ELEVATION	MAX AFFLUX	AREA		VELOCITY	
(years)	QWEIR (m^3/s)	QSTRUCTURE (m^3/s)	(m AHD)	(mm)	WEIR (m^2)	STRUCTURE (m^2)	WEIR (m/s)	STRUCTURE (m/s)
PMF	-	35862	16.59	270	-	7479	-	4.7
10 000	-	28658	14.19	240	-	6472	-	4.3
2 000	-	19991	10.9	180	-	5128	-	3.8
1 000	-	17413	9.74	170	-	4585	-	3.7
500	-	13737	7.88	150	-	4021	-	3.3
200	-	11330	6.53	120	-	3550	-	3.1
100	-	9143	5.22	100	-	3179	-	2.8
50	-	7028	3.93	80	-	2851	-	2.4
20	-	3397	1.84	30	-	2369	-	1.4
10	-	1586	1.14	10	-	2175	-	0.72
5	-	950	1	0	-	2137	-	0.46
2	-	424	0.95	10	-	2119	-	0.27

Note: Qweir & Qstructure are the maximum discharges through the structure and maynot occur at the same time.

STRUCTURE 7-STORY BRIDGE (LOOKING UPSTREAM)

GATEWAY BRIDGE

HYDRAULIC STRUCTURE REFERENCE SHEET - VERS 3.1

CREEK:	Brisbane River	DATE OF SURVEY	NA
LOCATION:	Gateway Motorway	UBD REF:	141 M20
AERIAL PHOTO No:	Film BCC100, Sheet 2	STRUCTURE ID	
BCC XS No:	BN210	AMTD(m):	10 000

STRUCTURE DESCRIPTION: Bridge; Concrete piers, girders and deck.
Single span with cantilever ends and extensive north and south approachs.

STRUCTURE SIZE: Centre span: 260m; Contilever ends: 130m.
For Culverts: Number of cells/pipes & sizes For Bridges: Number of Spans & their lengths.

UPSTREAM INVERT LEVEL: UPSTREAM OBVERT LEVEL:

DOWNSTREAM INVERT LEVEL: DOWNSTREAM OBVERT LEVEL:
For culverts give floor level. For bridges give bed level.

For Culverts
LENGTH OF CULVERT BARREL AT INVERT (m):

LENGTH OF CULVERT BARREL AT OBVERT (m):

TYPE OF LINING:
(e.g. concrete, stones, brick, corrugated iron)

IS THERE A SURVEYED WEIR PROFILE? NO
If yes give details ie. plan number and/or survey book number.
Note This Section should be the highest part of the road eg crown, kerb, hand rails guard rails whichever is higher.

WEIR WIDTH (m): 21.9m LOWEST POINT OF WEIR (m AHD): >PMF Flood Level PIER WIDTH: 13.5m
(In the direction of flow, ie. distance from u/s face to d/s face)

HEIGHT OF GUARD RAILS: 1067 mm

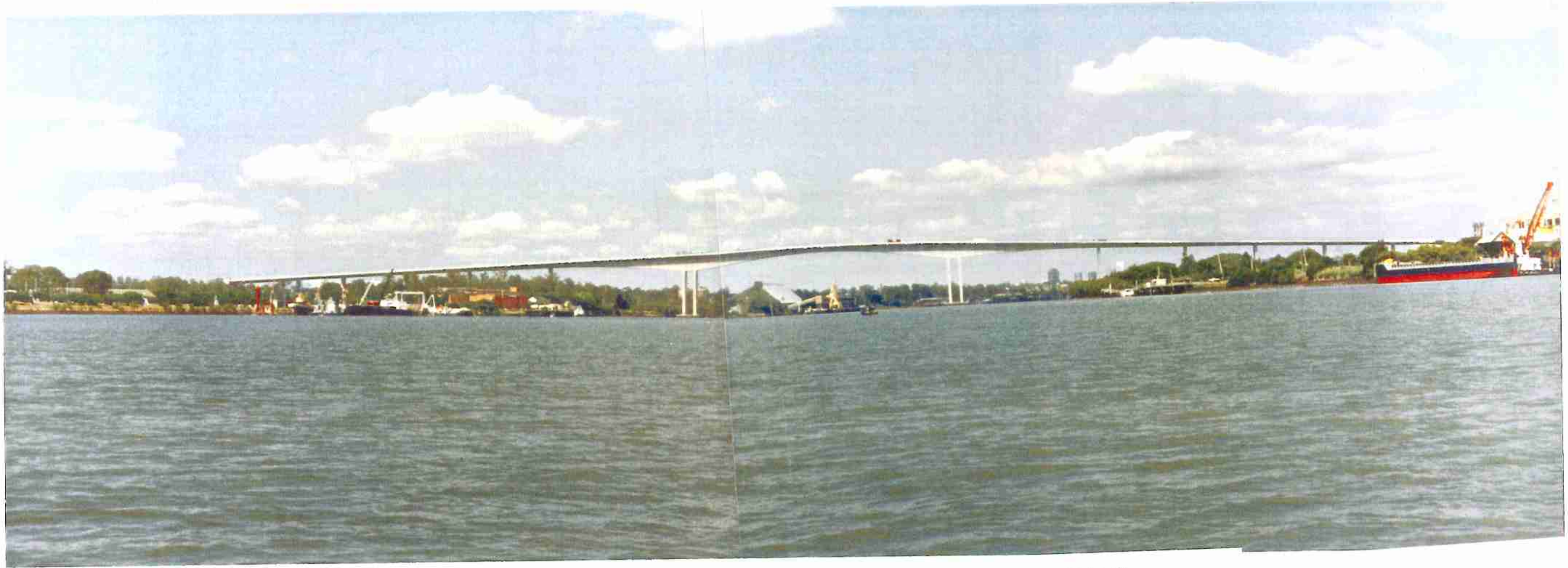
DESCRIPTION OF ALL HAND AND GAURD RAILS AND HEIGHTS TO TOP AND UNDERSIDE OF GUARD RAILS.

The following should also be provided.
Wingwall and Headwall details, entrance details eg pipe flush with embankment or projecting, socket or square end, details of entrance rounding, levels.
For Bridges, details of piers and section under bridge including abutment details.
Specify Survey Book No.

CONSTRUCTION DATE OF CURRENT STRUCTURE: 1981 PLAN NUMBER: .

HAS THE STRUCTURE BEEN UPGRADED? No
If yes, explain type and date of upgrade. Include plan number and location if applicable.

ADDITIONAL COMMENTS: Greater than 100 year ARI immunity



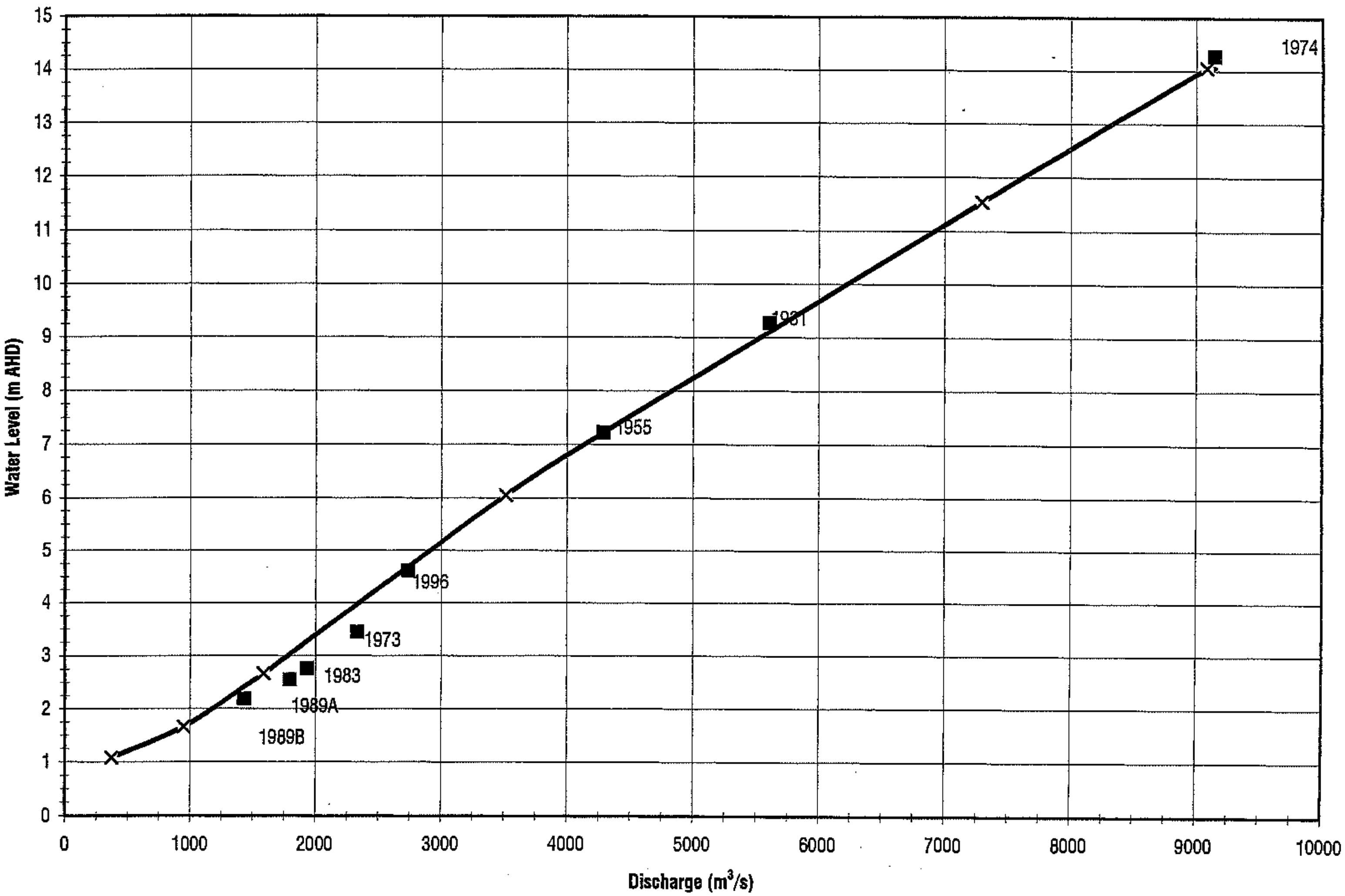
STRUCTURE 8-GATEWAY BRIDGE (LOOKING UPSTREAM)

Appendix L - Rating Curves at Structures

Centenary Bridge
CH 1028.72

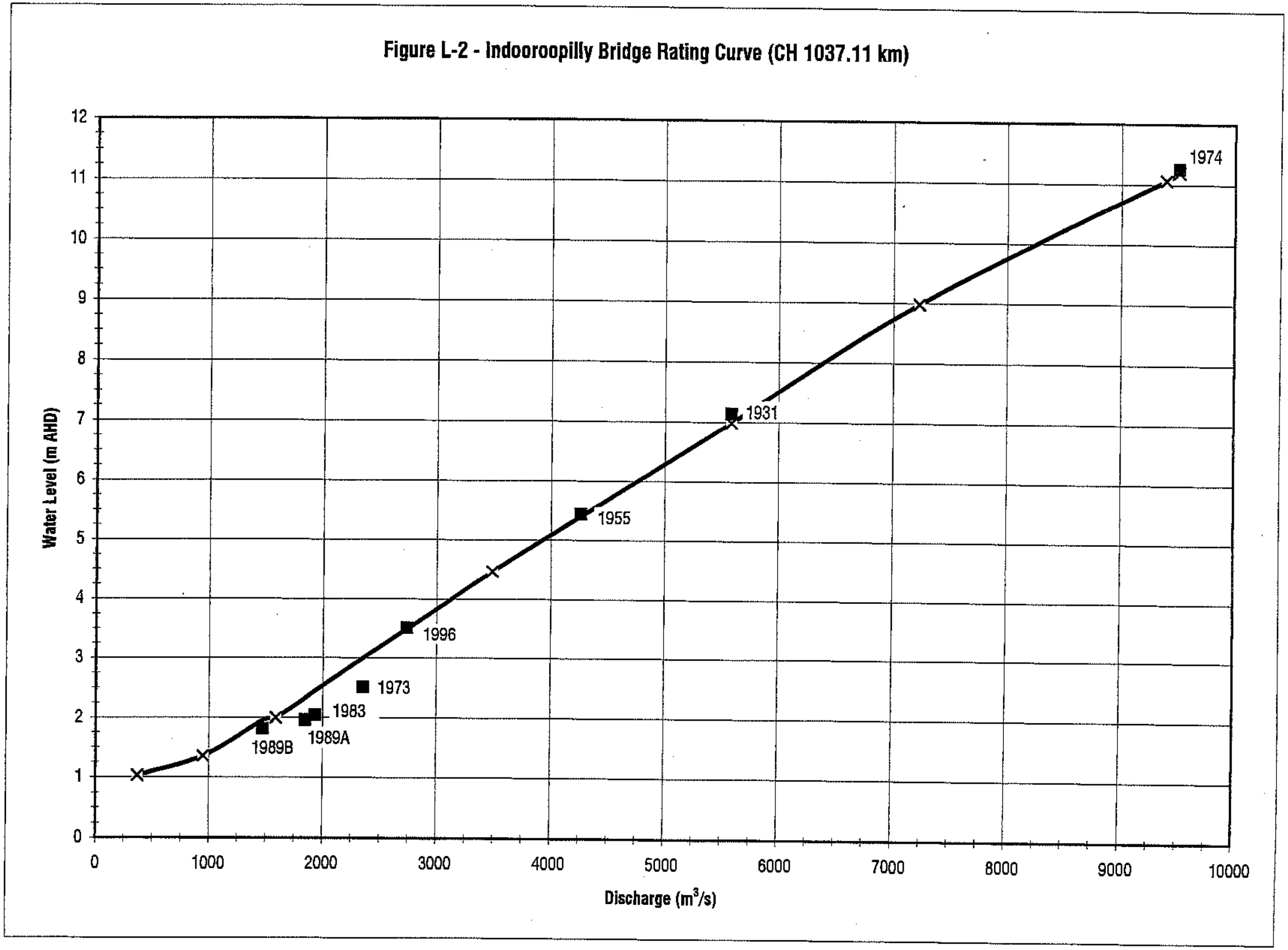
Q (m^3/s)	Design WL (m AHD)
371	1.08
949	1.66
1587	2.67
3516	6.05
7294	11.54
9085	14.06

Figure L-1 - Centenary Bridge Rating Curve (CH 1028.72 km)



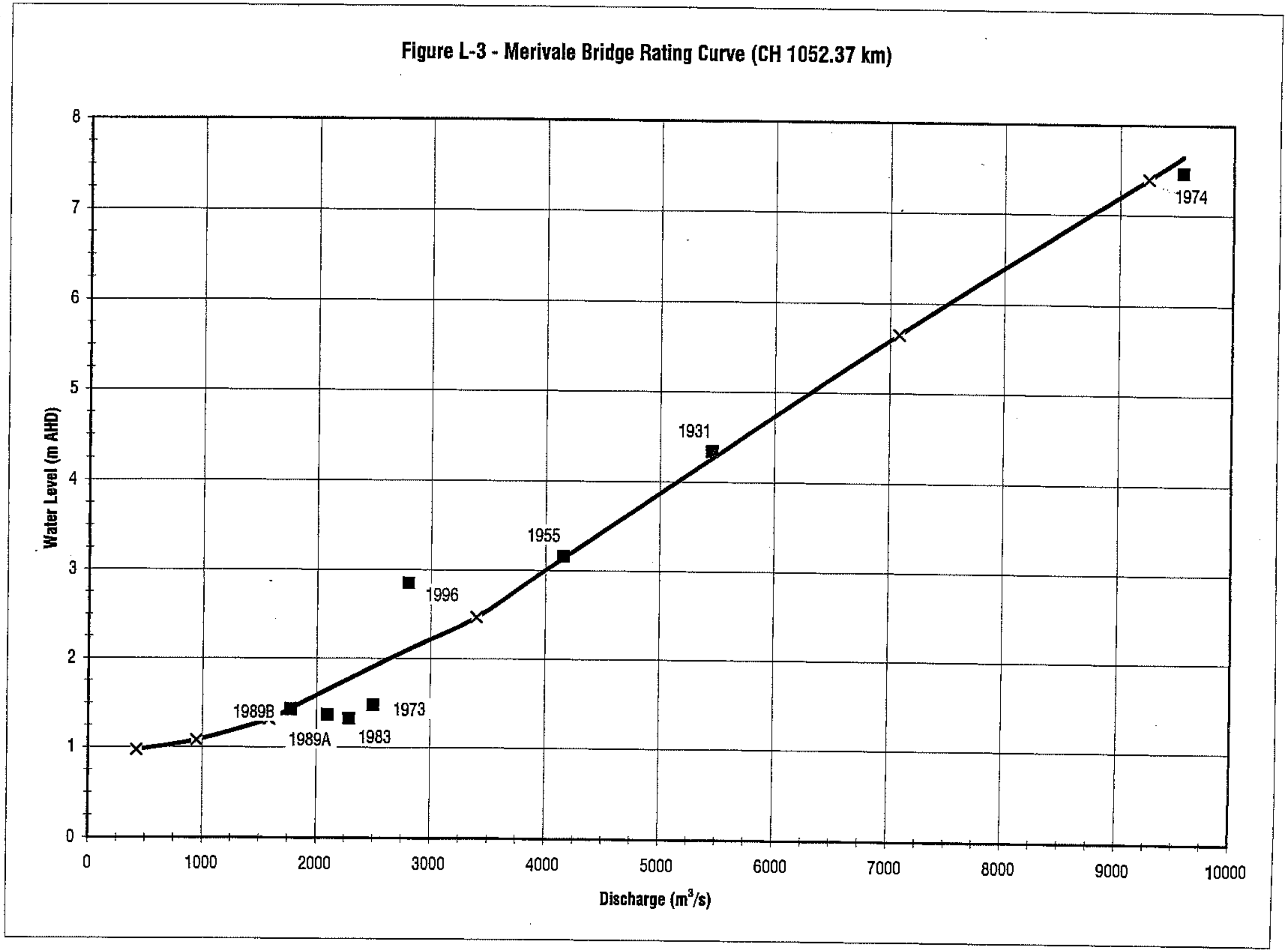
Indooroopilly Bridge
1037.11

Q (m^3/s)	Design WL (m AHD)
372	1.03
949	1.35
1587	2
3487	4.47
7227	8.98
9392	11.07



Merivale Bridge
1052.37

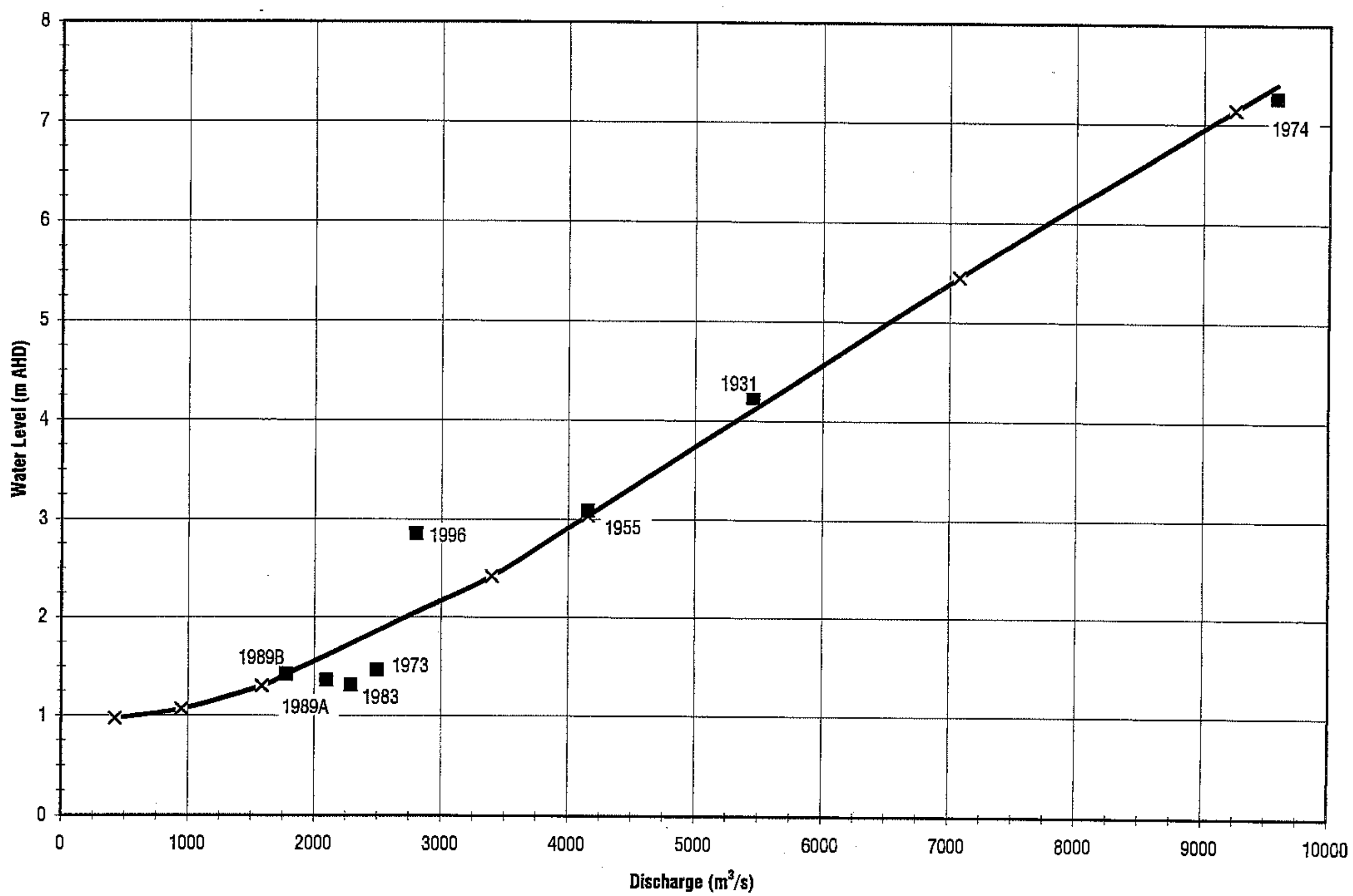
Q (m^3/s)	Design WL (m AHD)
423	0.97
949	1.08
1586	1.32
3397	2.49
7079	5.65
9250	7.40



William Jolly Bridge
1052.625

Q (m^3/s)	Design WL (m AHD)
423	0.97
949	1.07
1586	1.30
3397	2.42
7074	5.45
9248	7.14

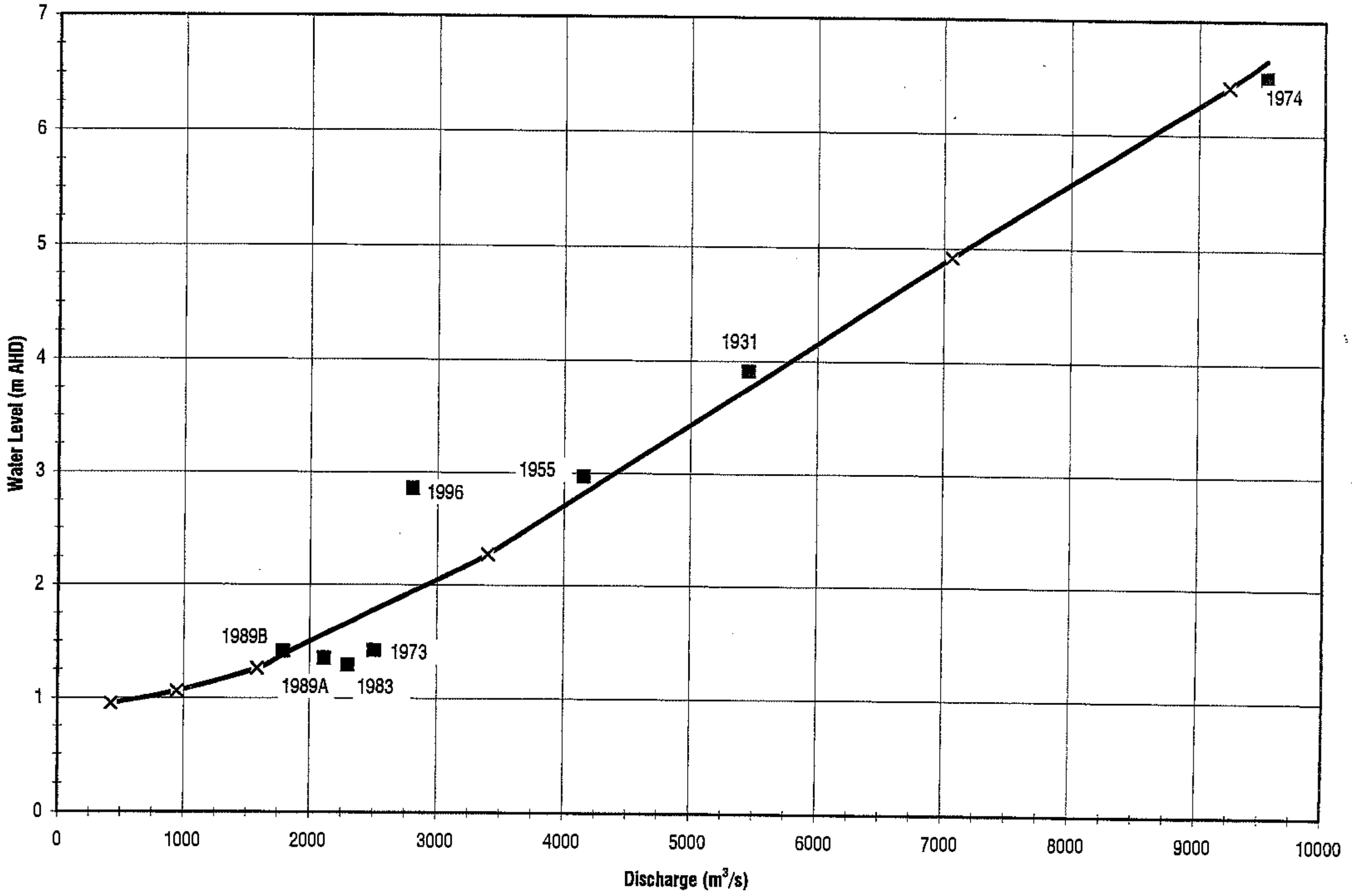
Figure L-4 - William Jolly Bridge Rating Curve (CH 1052.63 km)



Victoria Bridge
1053.355

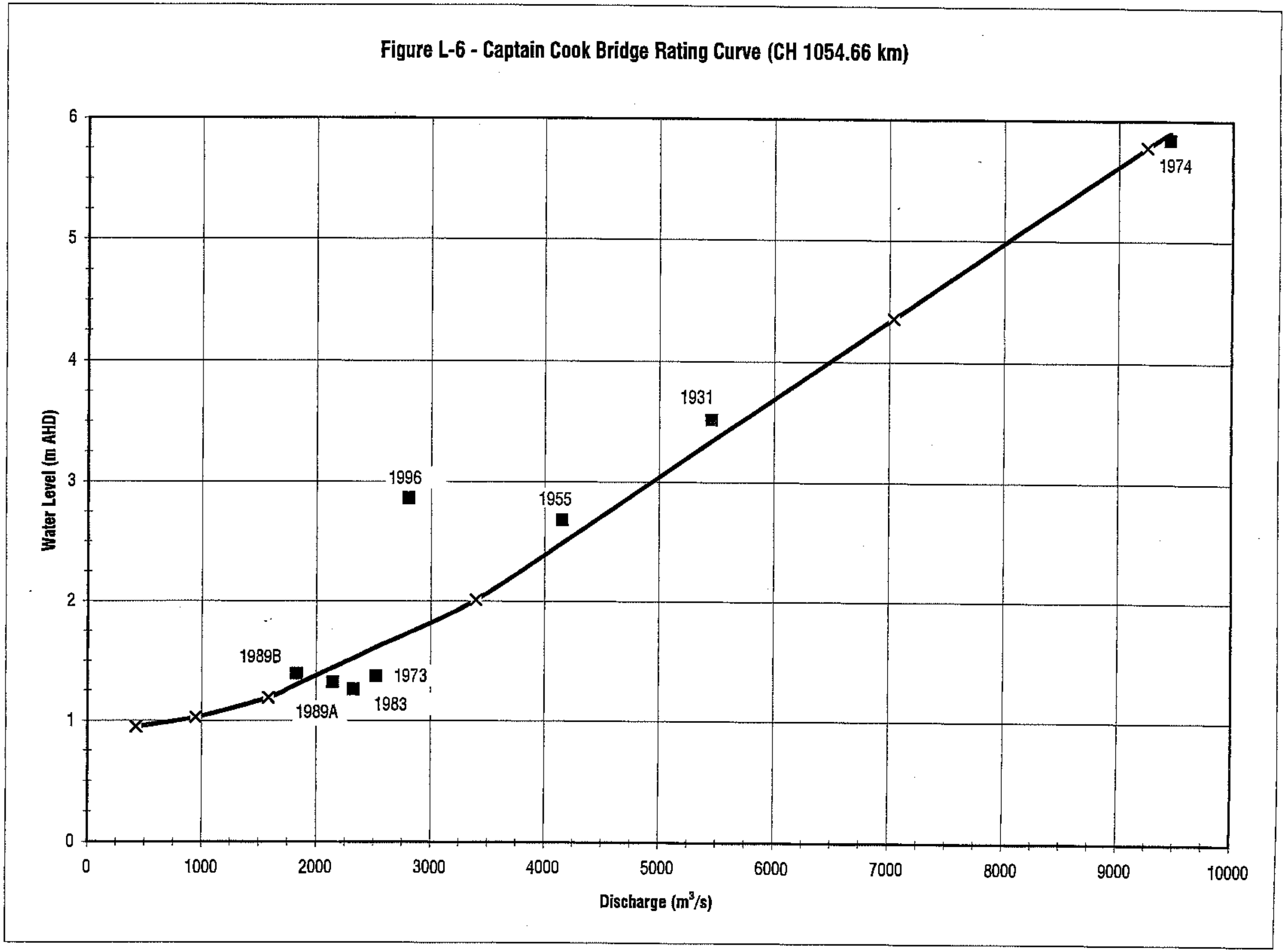
Q (m^3/s)	Design WL (m AHD)
423	0.95
949	1.06
1586	1.26
3397	2.28
7066	4.92
9240	6.42

Figure L-5 - Victoria Bridge Rating Curve (CH 1053.36 km)



Captain Cook Bridge
1054.66

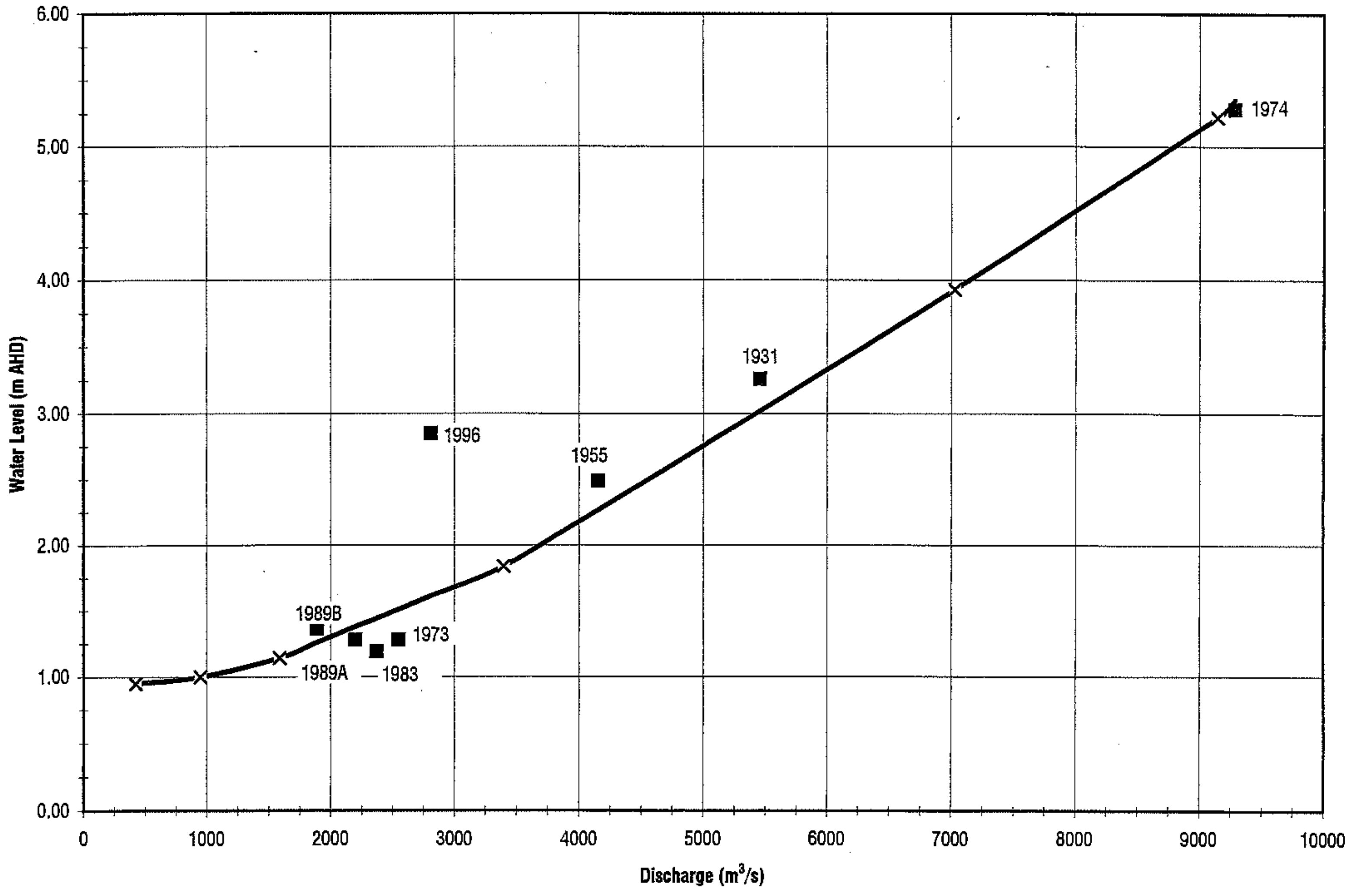
Q (m^3/s)	Design WL (m AHD)
424	0.95
949	1.03
1586	1.19
3397	2.01
7039	4.36
9253	5.78



Story Bridge
1056.92

Q (m^3/s)	Design WL (m AHD)
424	0.95
950	1.00
1586	1.14
3397	1.84
7028	3.93
9143	5.22

Figure L-7 - Story Bridge Rating Curve (CH 1056.92 km)



BCC.121.0377

Appendix M - Flood Forecasting Model Results

TABLE M-1 - Flood Forecasting Model Results

MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	1996 Flood Event Small "n" MIKE 11 WL (m AHD)	1996 Flood Event Small "n" FF Model WL (m AHD)	1996 Flood Event Small "n" Difference (m)	1996 Flood Event Large "n" FF Model WL (m AHD)	1996 Flood Event Large "n" Difference (m)	100 Year ARI Event Large "n" MIKE 11 WL (m AHD)	100 Year ARI Event Large "n" FF Model WL (m AHD)	100 Year ARI Event Large "n" Difference (m)
1000	78.66	BN 2020		9.49	9.5	0.01	9.9	0.41	22.76	22.76	0.00
1000.285	78.375	BN 2010		9.40	9.41	0.01	9.82	0.42	22.57	22.57	0.00
1000.775	77.885	BN 2000		9.23	9.24	0.01	9.68	0.45	22.29	22.29	0.00
1001.315	77.345	BN 1990		9.09	9.1	0.01	9.58	0.49	22.20	22.20	0.00
1001.865	76.795	BN 1980		8.84	8.85	0.01	9.38	0.54	21.68	21.68	0.00
1002.35	76.310	BN 1970		8.57	8.58	0.01	9.19	0.62	21.48	21.48	0.00
1002.785	75.875	BN 1960		8.47	8.48	0.01	9.15	0.68	21.46	21.46	0.00
1003.275	75.385	BN 1950		8.25	8.26	0.01	8.99	0.74	21.13	21.13	0.00
1003.775	74.885	BN 1940		8.06	8.07	0.01	8.84	0.78	20.86	20.86	0.00
1004.3	74.360	BN 1930		7.80	7.82	0.02	8.62	0.82	20.41	20.41	0.00
1004.81	73.850	BN 1920		7.68	7.69	0.01	8.53	0.85	20.37	20.38	0.01
1005.325	73.335	BN 1910		7.53	7.55	0.02	8.41	0.88	20.20	20.20	0.00
1005.87	72.790	BN 1900		7.38	7.39	0.01	8.23	0.85	19.89	19.89	0.00
1006.3	72.360	BN 1890	Moggill Gauge	7.37	7.39	0.02	8.17	0.80	19.72	19.72	0.00
1006.91	71.750	BN 1880		7.27	7.28	0.01	8	0.73	19.51	19.51	0.00
1007.41	71.250	BN 1870		7.21	7.22	0.01	7.91	0.70	19.48	19.48	0.00
1007.92	70.740	BN 1860		7.04	7.05	0.01	7.75	0.71	19.19	19.19	0.00
1008.445	70.215	BN 1850		6.99	7.01	0.02	7.66	0.67	19.02	19.02	0.00
1008.925	69.735	BN 1840		6.93	6.95	0.02	7.61	0.68	18.96	18.96	0.00
1009.4	69.260	BN 1830		6.85	6.87	0.02	7.54	0.69	18.86	18.86	0.00
1009.72	68.940	BN 1820		6.81	6.83	0.02	7.51	0.70	18.85	18.85	0.00
1010.49	68.170	BN 1810		6.65	6.67	0.02	7.37	0.72	18.50	18.50	0.00
1010.725	67.935	BN 1800		6.65	6.66	0.01	7.37	0.72	18.52	18.52	0.00
1010.98	67.680	BN 1790		6.60	6.62	0.02	7.33	0.73	18.44	18.44	0.00
1011.51	67.150	BN 1780		6.54	6.56	0.02	7.28	0.74	18.43	18.43	0.00
1011.98	66.680	BN 1770		6.47	6.49	0.02	7.22	0.75	18.43	18.43	0.00
1012.475	66.185	BN 1760		6.39	6.41	0.02	7.14	0.75	18.33	18.33	0.00
1012.935	65.725	BN 1750		6.32	6.34	0.02	7.07	0.75	18.22	18.22	0.00
1013.445	65.215	BN 1740		6.26	6.28	0.02	7.01	0.75	18.14	18.14	0.00
1013.91	64.750	BN 1730		6.19	6.21	0.02	6.94	0.75	18.08	18.08	0.00
1014.31	64.350	BN 1720		6.11	6.13	0.02	6.87	0.76	18.05	18.05	0.00
1014.61	64.050	BN 1710	Goodna Hospital Gauge	6.06	6.08	0.02	6.82	0.76	18.08	18.08	0.00
1015.09	63.570	BN 1700		6.05	6.07	0.02	6.8	0.75	17.94	17.95	0.01
1015.56	63.100	BN 1690		5.97	6	0.03	6.73	0.76	17.81	17.81	0.00
1016.14	62.520	BN 1680		5.91	5.94	0.03	6.67	0.76	17.71	17.72	0.01
1016.64	62.020	BN 1670		5.80	5.82	0.02	6.57	0.77	17.62	17.62	0.00
1017.13	61.530	BN 1660		5.66	5.68	0.02	6.4	0.74	17.39	17.39	0.00
1017.61	61.050	BN 1650		5.56	5.58	0.02	6.23	0.67	17.26	17.26	0.00
1017.92	60.740	BN 1640		5.48	5.51	0.03	6.12	0.64	17.10	17.10	0.00
1018.2	60.460	BN 1630		5.49	5.51	0.02	6.08	0.59	17.02	17.03	0.01
1018.725	59.935	BN 1620		5.42	5.45	0.03	5.96	0.54	16.69	16.70	0.01
1019.095	59.565	BN 1610		5.37	5.39	0.02	5.86	0.49	16.56	16.56	0.00
1019.49	59.170	BN 1600		5.33	5.36	0.03	5.78	0.45	16.45	16.45	0.00
1019.865	58.795	BN 1590		5.28	5.31	0.03	5.68	0.40	16.15	16.15	0.00
1020.115	58.545	BN 1580		5.28	5.3	0.02	5.64	0.36	16.25	16.25	0.00
1020.525	58.135	BN 1570		5.27	5.3	0.03	5.6	0.33	16.22	16.22	0.00
1020.83	57.830	BN 1560		5.23	5.25	0.02	5.53	0.30	16.07	16.07	0.00
1021.095	57.565	BN 1550		5.16	5.19	0.03	5.45	0.29	15.86	15.86	0.00
1021.539	57.121	BN 1540		5.10	5.13	0.03	5.33	0.23	15.69	15.69	0.00
1021.715	56.945	BN 1530		5.10	5.13	0.03	5.31	0.21	15.72	15.72	0.00
1021.895	56.765	BN 1520		5.09	5.12	0.03	5.28	0.19	15.65	15.65	0.00
1022.105	56.555	BN 1510		5.09	5.11	0.02	5.26	0.17	15.53	15.53	0.00
1022.575	56.085	BN 1500		5.02	5.05	0.03	5.18	0.16	15.45	15.46	0.01
1023.04	55.620	BN 1490		4.92	4.95	0.03	5.1	0.18	15.21	15.21	0.00
1023.57	55.090	BN 1480		4.88	4.91	0.03	5.08	0.20	15.12	15.12	0.00
1024.08	54.580	BN 1470		4.81	4.84	0.03	5.02	0.21	15.07	15.07	0.00
1024.563	54.097	BN 1460		4.72	4.75	0.03	4.94	0.22	15.01	15.01	0.00
1025.07	53.590	BN 1450		4.67	4.7	0.03	4.88	0.21	14.91	14.91	0.00
1025.36	53.300	BN 1440		4.60	4.64	0.04	4.81	0.21	14.77	14.77	0.00
1025.59	53.070	BN 1430		4.54	4.57	0.03	4.74	0.20	14.61	14.61	0.00
1026.17	52.490	BN 1420		4.51	4.54	0.03	4.7	0.19	14.48	14.49	0.01
1026.68	51.980	BN 1410	Mt Ommaney Gauge	4.43	4.46	0.03	4.61	0.18	14.38	14.38	0.00
1026.9	51.760	BN 1400		4.38	4.42	0.04	4.56	0.18	14.25	14.25	0.00
1027.16	51.500	BN 1390		4.35	4.39	0.04	4.52	0.17	14.11	14.11	0.00
1027.68	50.980	BN 1380		4.32	4.36	0.04	4.5	0.18	14.17	14.17	0.00
1028.18	50.480	BN 1370		4.27	4.31	0.04	4.48	0.21	14.19	14.20	0.01
1028.68	49.980	BN 1360		4.17	4.21	0.04	4.43	0.26	14.06	14.06	0.00
1028.72	49.940	BN1350	Centenary Bridge								
1028.76	49.900	BN 1340		4.08	4.12	0.04	4.35	0.27	13.91	13.91	0.00
1029.2	49.460	BN 1330		3.98	4.03	0.05	4.29	0.31	13.80	13.80	0.00
1029.68	48.980	BN 1320		3.95	3.99	0.04	4.28	0.33	13.82	13.82	0.00
1030.22	48.440	BN 1310		3.89	3.93	0.04	4.26	0.37	13.82	13.82	0.00
1030.87	47.790	BN 1300		3.79	3.84	0.05	4.23	0.44	13.75	13.75	0.00
1031.26	47.400	BN 1290		3.71	3.76	0.05	4.18	0.47	13.59	13.59	0.00
1031.7	46.960	BN 1280	Darra Wharf Gauge	3.59	3.65	0.06	4.04	0.45	13.21	13.21	0.00
1031.995	46.665	BN 1270		3.60	3.65	0.05	3.99	0.39	13.31	13.31	0.00
1032.23	46.430	BN 1260		3.57	3.62	0.05	3.94	0.37	13.18	13.18	0.00
1032.585	46.075	BN 1250		3.52	3.57	0.05	3.85	0.33	12.94	12.94	0.00
1033.08	45.580	BN 1240		3.48	3.54	0.06	3.79	0.31	12.79	12.79	0.00
1033.37	45.290	BN 1230		3.43	3.49	0.06	3.73	0.30	12.68	12.68	0.00
1033.9	44.760	BN 1220		3.35	3.41	0.06	3.65	0.30	12.45	12.45	0.00
1034.37	44.290	BN 1210		3.29	3.35	0.06	3.6	0.31	12.29	12.29	0.00
1034.89	43.770	BN 1200	Sherwood Gauge	3.23	3.29	0.06	3.53	0.30	12.19	12.19	0.00

TABLE M-1 - Flood Forecasting Model Results

				1996 Flood Event					100 Year ARI Event		
MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	Small "n" MIKE 11 WL (m AHD)	Small "n" FF Model WL (m AHD)	Small "n" Difference (m)	Large "n" FF Model WL (m AHD)	Large "n" Difference (m)	Large "n" MIKE 11 WL (m AHD)	Large "n" FF Model WL (m AHD)	Large "n" Difference (m)
1035.414	43.246	BN 1190		3.15	3.21	0.06	3.42	0.27	11.94	11.94	0.00
1035.9	42.760	BN 1180		3.06	3.12	0.06	3.29	0.23	11.65	11.66	0.01
1036.46	42.200	BN 1170		2.98	3.05	0.07	3.17	0.19	11.35	11.35	0.00
1036.77	41.890	BN 1160		2.95	3.02	0.07	3.11	0.16	11.28	11.28	0.00
1036.915	41.745	BN 1150		2.92	2.99	0.07	3.06	0.14	11.12	11.12	0.00
1037.09	41.570	BN 1140		2.93	2.99	0.06	3.06	0.13	11.07	11.07	0.00
1037.11	41.550	BN 1130	Indooroopilly Bridge								
1037.175	41.485	BN 1120		2.79	2.86	0.07	2.93	0.14	10.98	10.98	0.00
1037.285	41.375	BN 1110	Clarence Road Gauge	2.77	2.84	0.07	2.9	0.13	10.93	10.93	0.00
1037.625	41.035	BN 1100		2.73	2.81	0.08	2.86	0.13	10.91	10.91	0.00
1038.085	40.575	BN 1090		2.72	2.79	0.07	2.85	0.13	10.93	10.93	0.00
1038.6	40.060	BN 1080		2.63	2.71	0.08	2.8	0.17	10.91	10.91	0.00
1039.1	39.560	BN 1070		2.54	2.62	0.08	2.77	0.23	10.90	10.90	0.00
1039.565	39.095	BN 1060	Oxley Creek Gauge	2.49	2.57	0.08	2.76	0.27	10.92	10.92	0.00
1040.09	38.570	BN 1050	King Authur Terrace Gauge	2.46	2.55	0.09	2.76	0.30	10.84	10.84	0.00
1040.49	38.170	BN 1040		2.40	2.48	0.08	2.71	0.31	10.71	10.71	0.00
1041.01	37.650	BN 1030		2.38	2.46	0.08	2.71	0.33	10.74	10.75	0.01
1041.23	37.430	BN 1020		2.36	2.44	0.08	2.68	0.32	10.71	10.71	0.00
1041.46	37.200	BN 1010	Tennyson Power House Gauge	2.32	2.4	0.08	2.64	0.32	10.62	10.62	0.00
1041.7	36.960	BN 1000		2.32	2.4	0.08	2.64	0.32	10.59	10.59	0.00
1041.96	36.700	BN 990	Yeronga Street Gauge	2.27	2.34	0.07	2.58	0.31	10.45	10.45	0.00
1042.235	36.425	BN 980		2.21	2.29	0.08	2.53	0.32	10.30	10.30	0.00
1042.515	36.145	BN 970		2.20	2.28	0.08	2.52	0.32	10.29	10.29	0.00
1042.91	35.750	BN 960		2.12	2.19	0.07	2.44	0.32	10.22	10.23	0.01
1043.725	34.935	BN 950		1.94	2.01	0.07	2.28	0.34	9.91	9.91	0.00
1044.06	34.600	BN 940	Sandy Creek Gauge	1.91	1.98	0.07	2.24	0.33	9.75	9.75	0.00
1044.34	34.320	BN 930		1.86	1.92	0.06	2.18	0.32	9.58	9.59	0.01
1044.605	34.055	BN 920		1.84	1.9	0.06	2.15	0.31	9.53	9.53	0.00
1044.86	33.800	BN 910		1.81	1.87	0.06	2.11	0.30	9.49	9.50	0.01
1045.4	33.260	BN 900		1.73	1.79	0.06	2.01	0.28	9.31	9.31	0.00
1045.885	32.775	BN 890		1.71	1.72	0.01	1.9	0.19	9.17	9.17	0.00
1046.18	32.480	BN 880		1.71	1.72	0.01	1.89	0.18	9.09	9.09	0.00
1046.34	32.320	BN 870	Dutton Park Cemetery Gauge	1.71	1.72	0.01	1.88	0.17	9.02	9.02	0.00
1046.58	32.080	BN 860		1.70	1.72	0.02	1.85	0.15	8.97	8.97	0.00
1046.9	31.760	BN 850		1.70	1.71	0.01	1.77	0.07	8.78	8.78	0.00
1047.35	31.310	BN 840		1.70	1.71	0.01	1.72	0.02	8.41	8.41	0.00
1047.915	30.745	BN 830	Highgate Hill Gauge	1.70	1.71	0.01	1.72	0.02	8.17	8.17	0.00
1048.375	30.285	BN 820		1.69	1.7	0.01	1.72	0.03	8.23	8.24	0.01
1048.89	29.770	BN 810	St Lucia Ferry Gauge	1.69	1.7	0.01	1.71	0.02	8.00	8.00	0.00
1049.12	29.540	BN 800		1.69	1.7	0.01	1.71	0.02	7.94	7.94	0.00
1049.37	29.290	BN 790		1.69	1.69	0.00	1.71	0.02	7.75	7.76	0.01
1049.59	29.070	BN 780		1.68	1.69	0.01	1.7	0.02	7.74	7.74	0.00
1049.87	28.790	BN 770		1.68	1.69	0.01	1.7	0.02	7.63	7.63	0.00
1050.43	28.230	BN 760		1.68	1.68	0.00	1.7	0.02	7.61	7.61	0.00
1050.86	27.800	BN 750		1.67	1.68	0.01	1.69	0.02	7.46	7.46	0.00
1051.36	27.300	BN 740		1.67	1.68	0.01	1.69	0.02	7.46	7.46	0.00
1051.895	26.765	BN 730		1.67	1.67	0.00	1.68	0.01	7.30	7.30	0.00
1052.31	26.350	BN 720		1.66	1.67	0.01	1.68	0.02	7.40	7.41	0.01
1052.37	26.290	BN 710	Merivale Bridge								
1052.39	26.270	BN 700		1.66	1.66	0.00	1.68	0.02	7.23	7.23	0.00
1052.595	26.065	BN 690		1.66	1.66	0.00	1.67	0.01	7.14	7.14	0.00
1052.607	26.053	BN 680	William Jolly Bridge								
1052.64	26.020	BN 670		1.65	1.66	0.01	1.67	0.02	6.63	6.63	0.00
1052.865	25.795	BN 660	Montague Road Gauge	1.65	1.66	0.01	1.67	0.02	6.49	6.49	0.00
1053.32	25.340	BN 650		1.65	1.65	0.00	1.67	0.02	6.42	6.42	0.00
1053.356	25.304	BN 640	Victoria Bridge								
1053.385	25.275	BN630		1.65	1.65	0.00	1.66	0.01	6.24	6.24	0.00
1053.9	24.760	BN 620		1.64	1.65	0.01	1.66	0.02	5.85	5.85	0.00
1054.64	24.020	BN 610		1.64	1.64	0.00	1.65	0.01	5.78	5.78	0.00
1054.66	24.000	BN 600	Captain Cook Bridge								
1054.68	23.980	BN 590		1.64	1.64	0.00	1.65	0.01	5.70	5.70	0.00
1054.97	23.690	BN 560		1.64	1.64	0.00	1.65	0.01	5.45	5.45	0.00
1055.28	23.380	BN 550		1.64	1.64	0.00	1.65	0.01	5.40	5.40	0.00
1055.42	23.240	BN 540		1.64	1.64	0.00	1.64	0.00	5.40	5.40	0.00
1055.96	22.700	BN 530	Port Office Gauge	1.63	1.63	0.00	1.64	0.01	5.34	5.34	0.00
1056.4	22.260	BN 520		1.63	1.63	0.00	1.64	0.01	5.09	5.09	0.00
1056.695	21.965	BN 510		1.63	1.63	0.00	1.63	0.00	5.03	5.03	0.00
1056.865	21.795	BN 500		1.63	1.63	0.00	1.63	0.00	5.22	5.22	0.00
1056.92	21.740	BN 495	Story Bridge								
1056.95	21.710	BN 490		1.63	1.63	0.00	1.63	0.00	5.12	5.12	0.00
1057.09	21.570	BN 480		1.63	1.63	0.00	1.63	0.00	4.97	4.97	0.00
1057.53	21.130	BN 470		1.63	1.62	-0.01	1.63	0.00	4.83	4.83	0.00
1058.04	20.620	BN 460		1.62	1.62	0.00	1.63	0.01	4.58	4.58	0.00
1058.23	20.430	BN 450		1.62	1.62	0.00	1.63	0.01	4.50	4.50	0.00
1058.53	20.130	BN 440		1.62	1.62	0.00	1.62	0.00	4.37	4.37	0.00
1058.735	19.925	BN 430		1.62	1.62	0.00	1.62	0.00	4.41	4.41	0.00
1059.035	19.625	BN 420		1.62	1.61	-0.01	1.62	0.00	4.13	4.13	0.00
1059.54	19.120	BN 410		1.61	1.61	0.00	1.62	0.01	4.09	4.09	0.00
1059.99	18.670	BN 400		1.61	1.61	0.00	1.61	0.00	3.88	3.88	0.00
1060.345	18.315	BN 390		1.61	1.61	0.00	1.61	0.00	3.65	3.65	0.00
1060.535	18.125	BN 380		1.61	1.61	0.00	1.61	0.00	3.50	3.50	0.00
1061.015	17.645	BN 370		1.61	1.6	-0.01	1.61	0.00	3.45	3.45	0.00
1061.53	17.130	BN 360		1.60	1.6	0.00	1.6	0.00	3.24	3.24	0.00

TABLE M-1 - Flood Forecasting Model Results

				1996 Flood Event					100 Year ARI Event		
MIKE 11 CHAINAGE (km)	AMTD CHAINAGE (km)	CROSS SECTION NUMBER	STRUCTURE\GAUGE IDENTIFICATION	Small "n" MIKE 11 WL (m AHD)	Small "n" FF Model WL (m AHD)	Small "n" Difference (m)	Large "n" FF Model WL (m AHD)	Large "n" Difference (m)	Large "n" MIKE 11 WL (m AHD)	Large "n" FF Model WL (m AHD)	Large "n" Difference (m)
1062.02	16.640	BN 350		1.60	1.6	0.00	1.6	0.00	3.16	3.16	0.00
1062.535	16.125	BN 340		1.60	1.59	-0.01	1.6	0.00	3.12	3.12	0.00
1062.94	15.720	BN 330		1.59	1.59	0.00	1.59	0.00	3.11	3.11	0.00
1063.31	15.350	BN 320	Newstead Park Gauge	1.59	1.59	0.00	1.59	0.00	2.99	3.00	0.01
1063.645	15.015	BN 310	Cresent Road Gauge	1.59	1.59	0.00	1.59	0.00	2.72	2.72	0.00
1064	14.660	BN 300		1.59	1.58	-0.01	1.59	0.00	2.68	2.68	0.00
1064.49	14.170	BN 290		1.58	1.58	0.00	1.58	0.00	2.55	2.55	0.00
1065.01	13.650	BN 280		1.58	1.58	0.00	1.58	0.00	2.57	2.57	0.00
1065.503	13.157	BN 270		1.58	1.57	-0.01	1.58	0.00	2.53	2.53	0.00
1065.99	12.670	BN 260	Cairncross Dock Gauge	1.58	1.57	-0.01	1.58	0.00	2.54	2.54	0.00
1066.505	12.155	BN 250		1.57	1.57	0.00	1.57	0.00	2.46	2.46	0.00
1067.02	11.640	BN 240		1.57	1.57	0.00	1.57	0.00	2.43	2.43	0.00
1067.485	11.175	BN 230		1.57	1.57	0.00	1.57	0.00	2.32	2.32	0.00
1067.965	10.695	BN 220		1.57	1.56	-0.01	1.57	0.00	2.20	2.20	0.00
1068.66	10.000	BN 210		1.56	1.56	0.00	1.56	0.00	2.02	2.02	0.00
1069.045	9.615	BN 200		1.56	1.56	0.00	1.56	0.00	1.95	1.95	0.00
1069.535	9.125	BN 190	Bulimba Power House Gauge	1.56	1.55	-0.01	1.55	-0.01	1.89	1.89	0.00
1070.025	8.635	BN 180		1.55	1.55	0.00	1.55	0.00	1.82	1.82	0.00
1070.53	8.130	BN 170		1.55	1.55	0.00	1.55	0.00	1.72	1.72	0.00
1071.04	7.620	BN 160		1.55	1.54	-0.01	1.54	-0.01	1.64	1.64	0.00
1071.52	7.140	BN 150		1.54	1.54	0.00	1.54	0.00	1.67	1.67	0.00
1072.015	6.645	BN 140		1.54	1.54	0.00	1.54	0.00	1.56	1.56	0.00
1072.515	6.145	BN 130		1.54	1.53	-0.01	1.53	-0.01	1.50	1.50	0.00
1072.995	5.665	BN 120		1.53	1.53	0.00	1.53	0.00	1.46	1.46	0.00
1073.485	5.175	BN 110		1.53	1.53	0.00	1.53	0.00	1.36	1.36	0.00
1074	4.660	BN 100		1.53	1.52	-0.01	1.53	0.00	1.29	1.29	0.00
1074.46	4.200	BN 90		1.52	1.52	0.00	1.52	0.00	1.22	1.22	0.00
1074.985	3.675	BN 80		1.52	1.52	0.00	1.52	0.00	1.09	1.09	0.00
1075.48	3.180	BN 70		1.51	1.51	0.00	1.51	0.00	1.06	1.06	0.00
1076	2.660	BN 60		1.51	1.51	0.00	1.51	0.00	1.07	1.07	0.00
1076.495	2.165	BN 50		1.51	1.51	0.00	1.51	0.00	0.96	0.96	0.00
1077.01	1.650	BN 40		1.51	1.51	0.00	1.51	0.00	0.96	0.96	0.00
1077.51	1.150	BN 30		1.51	1.51	0.00	1.51	0.00	0.97	0.97	0.00
1078.04	0.620	BN 20		1.51	1.51	0.00	1.51	0.00	0.95	0.95	0.00
1078.525	0.135	BN 10		1.51	1.51	0.00	1.51	0.00	0.92	0.92	0.00

Appendix N - Community Consultation Information Bulletin/Questionnaire

Brisbane River Flood Study

We Need Your Help

Brisbane City

Our Business - A Better Brisbane

About the study

As part of Brisbane City Council's ongoing commitment to the enhancement of Brisbane's waterways, a flood study is currently being undertaken of the Brisbane River from Moreton Bay to the City boundary at Moggill.

The aims of the study are to :

- calculate design flood levels along the length of the river;
- develop a flood forecasting model;
- set flood regulation lines along the river; and
- develop a revegetation strategy.

What is revegetation?

Brisbane City Council wants to enhance the urban amenity and environmental value of the waterways within Brisbane by identifying areas along river and creek corridors which are suitable for revegetation with endemic native trees and shrubs.

Revegetation however, is limited by local ownership and flooding constraints. It may only occur where flood levels on private properties are not increased due to tree planting. It is anticipated that in the future, the Brisbane River may support a range of vegetation communities varying in type, form and density along the river banks, forming an ecological corridor. Significant areas at the top of the river bank may also be available for revegetation.

Why we need your help

Copies of this flyer will be distributed to environmental groups situated along the Brisbane River corridor. Due to the length of the Brisbane River, an A1 size plan of the study area has been provided to your Group Coordinator.

Community groups such as yours possess valuable knowledge about the river's history and areas which are of ecological significance. We want to collect any comments you may have about the Brisbane River so it can be managed effectively and areas suitable for revegetation investigated in the flood study. You can help by taking a few moments to complete the attached questionnaire and return it to:

Reply Paid Permit 11
Sinclair Knight Merz
PO Box 246
SPRING HILL QLD 4004

Please note that responses to the questionnaire will be confidential. You may distribute this questionnaire to any parties you feel may contribute to this study. The closing date for submissions is Friday 29 August, 1997. If you have any enquiries relating to the study or to information contained in this flyer, please contact Scott Abbey on phone (076) 398 400 or fax (076) 398 490.

Monash University

for Brisbane City

BRISBANE RIVER FLOOD STUDY

REVIEW OF HYDROLOGICAL ASPECTS

Professor Russell Mein
Department of Civil Engineering

9 December 1998

SUMMARY

This report provides the findings of a brief overview of the hydrological methodology used for the estimation of the 100 year average recurrence interval (ARI) design flood in the Brisbane River Study (SKM, 1998). [This flood is designated Q100 throughout the report.]

The review concludes that:

(i) the overall approach for the hydrologic component of the Study (ie., calibration of a hydrologic model, verification with independent data, running the model with design inputs, and evaluation of the effect of Wivenhoe dam) is appropriate;

(ii) there appears to be an incompatibility between the design rainfalls (based on data from this century), and the flood frequency curve (dominated by flow events from the last century). It seems preferable more weight be placed on the recent data;

(iii) unless there are compensating factors not yet identified, the Q100 obtained in the Study is likely to be an over-estimate, due to:
- the non-use of an areal reduction factor on the design catchment rainfall
- the use of zero losses for the design event
- the assumption that the Somerset and Wivenhoe Dams are full at the start of the design event.

Recommendations are made as to how to address these issues to refine the estimate of the Q100 event.

Comments are also made on aspects of the frequency analysis used in the study.

1.0 INTRODUCTION

Brisbane City Council (BCC) has recently undertaken a flood study for the Brisbane River. The Study report (SKM, 1988) documents the hydrologic and hydraulic work undertaken to meet a number of objectives. This included the calculation of flood flows and levels at a number of locations on the Brisbane River, and particularly along its lower reaches.

In a letter dated 17 November 1998 from the Manager, Waterways, Urban Management Division (BCC), the author was requested to "review the design event hydrology and process for determining the Q100 flow with dams in place". The commission was for "a high level review rather than a detailed analysis".

To meet this stated objective, this review deals separately with four aspects:

(i) the general hydrologic methodology and approach;
(ii) the input data and assumptions used to estimate the Q100 flood;
(iii) the frequency analyses performed in the Study;
(iv) the apparent incompatibility between rainfall-based estimates and the largest recorded floods.

2.0 GENERAL HYDROLOGIC METHODOLOGY

The approach used for estimating the Q100 flow in the Brisbane River Study (SKM, 1998) can be summarised as :

(i) fitting the XP-RAFTS runoff routing model to data from four observed flood events;
(ii) evaluating the model performance on a further four events (verification);
(iii) estimating the appropriate design storm (with an ARI of 100 years) and loss rates for input to the calibrated model, and
(iv) running the model to estimate the Q100 flows for the Brisbane River catchment, with and without the Wivenhoe Dam in place.

This approach is a well accepted one, and in accordance with best design practice. The use of frequency analysis of recorded data to provide additional information for model calibration, as was done here, is strongly supported.

It should be noted that steps (iii) and (iv) involve assumptions which are critical to obtaining a design flood with the required ARI (100 years). The next section deals with these.

3.0 INPUT DATA FOR THE Q100 ESTIMATE

To estimate the Q100 flow for the Brisbane River, with Wivenhoe Dam in place, a number of important assumptions have had to be made. These are documented in the study report (SKM, 1998) and, for the most part, are considered appropriate for their purpose.

There are, however, three instances where the assumptions would be expected to lead to a conservative result, ie. a high estimate of the 'true' Q100. These are considered separately below.

3.1 Depth of the Design Storm

The area of the Brisbane River catchment modelled in this study is 13 570 square kilometres. The design rainfall for so large a catchment was calculated by (p66, SKM, 1998):

(i) *breaking up the catchment into some 250 sub-areas (each of about 50 square* kilometres in area);

(ii) *computing, for each sub-area independently, the design 100 year ARI rainfall from* Australian Rainfall and Runoff *(ARR, 1987), using temporal patterns for zone 3;*

(iii) using these sub-area rainfalls, *without areal reduction factors*, as the design storm input to the catchment model.

The resultant design storm depth raises some concerns. Step (iii) implicitly assumes that every sub-catchment in the Brisbane River catchment will be subjected to its own 100 year ARI storm in a 100 year ARI design storm for the entire catchment. This assumption is a very conservative one, and would correspond to a more extreme event than a 100 year ARI design storm.

A better procedure [as now documented in the draft manuscript of Book VI (ARR, 1998) intended to update and replace Chapter 13 (ARR, 1987)] is to compute a suitable areal *reduction factor (ARF)* for the whole catchment, and apply it to each sub-catchment rainfall.

The question arises as to what ARF is appropriate for the Brisbane River catchment. Figure 2.6 of ARR (1987) does not apply; it only covers storms up to 24h duration and catchments of 1000 square kilometres in area. If it were adopted, this figure, based on USA data, would seem to suggest an ARF of 0.9 or less [*if extrapolated way beyond its range to 36h and 13 570 square kilometres*].

A recent study is more relevant. Using Victorian data, Siriwardena and Weinmann (1996) have produced ARFs which show that ARR (1987) Figure 2.6 is conservative for that State. Their analyses give an ARF of 0.75 for a 36h, 100 year ARF, storm over 10 000 square kilometres.

The figure for Queensland may well be different, and the Queensland Department of Natural Resources is currently analysing Queensland data to determine local ARFs. If the outcome is anything like the Victorian experience, it is quite possible that an ARF of 0.8 or less should be applied to the Brisbane River design storms. A corresponding reduction of around 25% or more in the design rainfall depth used in the Study would have a major impact on the Q100 estimate.

Recommendation 1. That an appropriate areal reduction factor be applied to the input design rainfalls used in the Brisbane River Flood Study.

3.2 Losses from Rainfall

Table 5-22 (p44, SKM, 1998) shows that a range of initial and continuing loss combinations were needed to model the eight events selected for fitting and testing of the XP-RAFTS model. Even for the major January 1974 event, continuing losses of 2.5 mm/h were found to apply.

In normal practice, it would be hard to justify the adoption of zero losses for computation of the design Q100 event, as was done in this study. [See Section 5 for further discussion] All of the evidence, and the recommendations for Queensland in ARR (1987), would suggest the use of a modest initial loss, and a continuing loss of the order of 2.5 mm/h, for an event of this severity. It might be noted here that there is no evidence (eg Hill et al, 1996) that storm losses decrease with event magnitude.

The use of zero losses would be expected to result in an overestimate of Q100.

Recommendation 2. That reasonable (non-zero) design loss rates be used to estimate Q100

3.3 Initial Dam Storage

The Study report notes (p7, SKM, 1998) that the capacity of Wivenhoe Dam at Full Supply Level is 1 150 000 ML. This is a large volume, and significant in comparison to the design flood volumes routed through it for the Q100 calculation.

A similar comment would also apply to the Somerset dam.

The assumption that both Wivenhoe and Somerset Dams are full at the start of the design event may well prove to be over-conservative, and contribute to an overestimate of Q100. A probability analysis, such as being recommended in the draft Book VI (ARR, 1998) would show the most likely state of these reservoirs for use in the calculations. If the outcome of such an analysis shows some level of drawdown is statistically the likely case, then the estimate of Q100 would be reduced as a consequence.

Recommendation 3. That a probability analysis be conducted to determine the most suitable design values of initial storage levels for the Wivenhoe and Somerset Dams for downstream flood calculations.

4.0 FLOOD FREQUENCY ANALYSIS

Given the extent of the data record of flows at gauging stations in the catchment, the frequency analyses of these data could have been given more attention. For instance, a table documenting the annual series of both peaks and volumes would be useful, accompanied by tabulation (in rank order) of the corresponding plotting positions. Parameters of the fitted LPIII distribution would have been helpful for this review.

The adoption of eye-fit curves (Figs 7-12,13,14) is not standard practice; ARR (1987) would recommend the LPIII distribution. For the latter, it would appear that some of the low flows should be removed to reduce the (apparent) negative skew which has lead to the eye-fit curve plotting above the LPIII in Figures 7-13 and 7-14. Such removal would lift the LPIII (similar to Example 2, ARR 1987, p223), perhaps to be similar to the eye-fit curve, but perhaps not.

Recommendation 4 (Less weight). Repeat the frequency analyses with low flows removed, for both peaks and volumes. Use the fitted LPIII distribution, rather than eye-fit curves.

Points for the biggest historic floods could be labelled with event dates. An important reason for this is to highlight the 'fit' of the large events of the 1800s with more recent data, and to show the position in the series of the 1974 event. It would be very useful to examine (if the study hasn't already) the effect of the Wivenhoe and Somerset Dams would have on such as event with different degrees of drawdown.

Recommendation 5 (Less weight). Compute and highlight the effect of the Wivenhoe and Somerset Dams on the 1974 flood using the calibrated model, and the most probable initial state of the storages (assuming Wivenhoe Dam had been in place well before 1974).

5.0 THE APPARENT INCOMPATIBILITY BETWEEN MODEL RESULTS AND THE FLOOD FREQUENCY CURVE

A major 'dilemma' which emerges from the Study can be summarised as:

- the RAFTS model performed satisfactorily for the Brisbane River catchment for a wide range of events, but
- even with a Q100 design storm which is perhaps 25-30% too large (Section 4.1), it still takes zero losses to achieve a 'match' with the Q100 peak from the flood frequency curve.

In other words, there appears to be an incompatibility between the rainfall-based estimate of Q100, and that obtained from the frequency analysis of recorded floods. Each approach is considered further below.

The design rainfalls for the catchment were obtained from ARR (1987), and thus based primarily on recorded data this century. The coverage of the catchment by the gauge network is considered good. Hence, the derived design rainfall, when input with average loss rates into a calibrated catchment model, would be expected to give reasonable estimates of flow.

On the other hand, the flood frequency curve is dominated by flood events from more than 100 years ago. The top four floods used to derive the curve were, in order of rank, 1841, 1893 (1), 1893 (2), and 1844 (as advised by Scott Abby, SKM). The biggest flood for the last 100 years (1974) only ranks as number five in this sequence, and has an apparent AEP of about 1 in 40. The unusual sequencing of these events (and the incompatibility with rainfall-based estimates referred to above) raises some concerns about the homogeneity of the historic data.

A number of reasons for the seemingly high number of large floods which occurred last century can be postulated; they include a more extreme weather environment then, or doubtful rating curves. Whatever reason seems most plausible, a decision has to be made as to whether to put more weight on the more recent rainfall and flow data. It could be argued, with justification, that measurement and checking procedures for both rainfall and flow have improved, and that the recent data are more likely to be representative of the future. This reviewer would certainly adopt such a course.

Recommendation 6. That steps be taken to resolve the apparent incompatibility between rainfall-based estimates and those from the frequency curve; this would include a sensitivity study of the influence of the nineteenth century floods on the Study outcomes.

6.0 CONCLUSION

The correct hydrologic strategy for determining design floods has been used in the Brisbane River Flood Study (SKM, 1998). However, an apparent incompatibility between rainfall-based and flood frequency estimates of the Q100 flood, raises some uncertainties about the Study outcomes. Conservative assumptions in key input variables point to the likelihood that the magnitude of the Q100 obtained in this Study is an over-estimate.

Recommendations for the work needed to address the issues of concern have been highlighted in this report, and repeated below. It will be noted that the first three involve flood volumes; given the non-linearity of the runoff routing model relating flows to volumes, they can be expected to have a proportionately greater effect on flood peaks.

(Note: Recommendations 1 and 6 are considered most important.)

Recommendation 1. That an appropriate areal reduction factor be applied to the input design rainfalls used in the Brisbane River Flood Study.

Recommendation 2. That reasonable (non-zero) design loss rates be used to estimate Q100

Recommendation 3. ***That a probability analysis be conducted to determine the most suitable design values of initial storage levels for the Wivenhoe and Somerset Dams for downstream flood calculations.***

Recommendation 4 (Less weight). ***Repeat the frequency analyses with low flows removed, for both peaks and volumes. Use the fitted LPIII distribution, rather than eye-fit curves.***

Recommendation 5 (Less weight). ***Compute and highlight the effect of the Wivenhoe and Somerset Dams on the 1974 flood using the calibrated model, and the most probable initial state of the storages (assuming Wivenhoe Dam had been in place well before 1974).***

Recommendation 6. ***That steps be taken to resolve the apparent incompatibility between rainfall-based estimates and those from the frequency curve; this would include a sensitivity study of the influence of the nineteenth century floods on the Study outcomes.***

6.0 REFERENCES

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City Design

BRISBANE RIVER FLOOD STUDY

June 1999

DRAFT

SINCLAIR KNIGHT MERZ

TABLE OF CONTENTS

Appendices

1. Introduction

The Brisbane River is an integral part of Brisbane. It has been the focus of City life, trade and commerce since the settlement of Brisbane. Thousands of residential, commercial and industrial properties are situated on the floodplain and along the banks of the River.

Until 1994 the State Government and Brisbane City Council's Water Supply and Department controlled the River. During the period up to 1994 a number of studies were carried out on the Brisbane River. While these studies included assessment of flooding, their primary focus was on the major dams and water supply for the City. The most recent Council study was completed by Council's Water Supply and Sewerage Department in 1984. The Department of Natural Resources (DNR) completed, to draft stage, a study of the River in 1993.

In 1994 control of the River passed to the then Works Department of Council (now Waterways Program). The Works Department determined that a study of the River was required that:

- determined the impacts of flooding on the City;
- was consistent with similar studies carried out for the major creeks of Brisbane;
- would provide improved data for advising the community and emergency services personnel during major floods; and
- would support development control and strategic planning in the River corridor.

This report provides an overview of the study, discusses key findings and presents options to address these findings. The report also recommends actions, for consideration by Council, designed to address the issues raised in this study.

2. Objective

The objective of this current study is to:

- investigate and understand flood behaviour in the River corridor. No previous study has assessed the flood carrying capacity of the River and its floodplain, the impact of development on flooding along the River and any actions required to minimise the impacts of flooding on development. The scope of this study also includes assessment of the effect of development in the catchment and cross-river structures on flood levels in the River, the significance on flood behaviour of re-vegetation strategies in Council's "Strategic Plan for Management of Brisbane Waterways" and the relevance of flood regulation lines in the Brisbane River corridor. There are currently no flood regulation lines set for the Brisbane River.

- determine flood levels to apply to development. Current development levels for the River corridor are based on the 1984 study. Flood profiles were developed for the River in that study, but not to the same rigorous standard as that now applied to Brisbane's Creeks. A key outcome from this study is to determine appropriate development levels in the River corridor.

- develop and provide improved flood emergency information. It is necessary to update flood level data so that Council can provide high quality flood advice to the public during a flood event. The Bureau of Meteorology provides flood warnings based on the three main gauges located at Moggill, Jindalee and the Port Office. The study will provide a flood forecasting model and data at other locations throughout the City so that Council can provide advice to residents more specific to their location and can more adequately advise emergency service personnel about affected areas and escape routes.

3. Study Approach

There are 160 years of recorded flood data at the Port Office gauge. The approach to the study is designed to make maximum use of this record. The historic record was analysed to determine the frequency of occurrence of significant historical floods (e.g. 1841, 1893 and 1974) and to predict the magnitude of specific "design" flood events (e.g. the 1 in 100 year flood). However, the construction of Somerset Dam (1943) and Wivenhoe Dam (1985) means that the flood record prior to 1943 cannot be directly compared with the record after dam construction. The historic flood record needs to be adjusted to take into account the effect of these dams.

This adjustment to the flood record was undertaken by establishing hydrologic and hydraulic computer models of the River. The models were calibrated to rainfall, flood flow and flood level data measured during floods which occurred after construction of the dams. The models were then modified by removing the dams and re-run to estimate the flood flows and levels in the River without the dams. In this way the 160 years of flood record for the River was adjusted to the same basis of "without dams".

The adjusted record was analysed to produce a flood frequency relationship for the River. Using this relationship the 1 in 100 year flood flow was determined "without dams".

To calculate the 1 in 100 year design flood for the current situation with dams, the hydrologic and hydraulic models were used. A "design" rainfall was applied over the catchment so that the model, without dams, calculated the 1 in 100 year "design" flood flow to be the same value as the flow determined by the flood frequency analysis. The models were then modified to include both Wivenhoe and Somerset Dams and re-run to provide an estimate of the 1 in 100 year design flood flows and levels along the River for the current situation with dams.

4. Preliminary Findings

The significant preliminary finding of the study was that the 1 in 100 year design flood levels in the River are significantly higher than the current development control level. The preliminary findings predicted that the 1 in 100 year design flood level will vary by approximately 2 m higher than the 1984 levels at the Port Office to more than 3 m higher further upstream. The levels estimated in the 1984 study formed the basis of development control levels in the Brisbane River corridor.

Another preliminary finding, which is contrary to the commonly held view, was that the 1974 flood is only the fourth largest on record and is estimated to have a frequency of occurrence of approximately only 1 in 40 years.

The hydrologic and hydraulic models developed in the study calibrated well to recorded flood data and were used to adjust the historic record for the effects of Wivenhoe and Somerset Dams. Analysis of the resulting flood frequency relationship estimated the 1 in 100 year design flow at 9,500 m^3/s at the Port Office (including the mitigation effects of Wivenhoe and Somerset Dams). This flow is significantly higher than the design flow of 6,800 m^3/s

estimated in the 1984 study. It is similar, however to the 1 in 100 year flow of 9,380 m^3/s estimated in the 1993 DNR study.

The preliminary finding that the 1 in 100 year design flood level may be at least 2 m above current development control levels is of significant concern to Council. Professor Russell Mein of Monash University was commissioned to undertake an independent review of the work. While Professor Mein was satisfied that the overall approach to the hydrologic component of the study is appropriate, he raised a number of issues which he believed may influence the key findings of the study. These issues are:

- the flood record appears to be dominated by events in the last century which may affect the flood frequency analysis and hence the estimate of the 1 in 100 year design flow;
- the study may have over estimated the 1 in 100 year design flow due to:
  - non-use of an areal reduction factor on the design rainfall event;
  - use of zero losses for the design rainfall event; and
  - the assumption that Somerset and Wivenhoe dams are full at the start of the design event; and
- the method of fitting the flood frequency curve to the recorded data may not be appropriate.

In addition, Council became aware that the operating rules that the State Government will apply to Wivenhoe Dam during a major flood event have been revised since the 1984 study. Council were advised of the changes in 1998.

5. Assessment of Areas of Concern

The impact on the estimation of the 1 in 100 year design flood flow of the issues raised by Professor Mein and the new operating rules have been reviewed in the study. It is important that Council is confident that the estimate at the 1 in 100 year design flood is reliable, particularly if the calculated design flood level is different to the current development control level.

5.1 Historic Flood Record

During a flood event the maximum level of the flood is recorded. These recorded levels are then used to estimate the associated flood flow at a specific point in the River by applying the stage – discharge curve (sometimes referred to as the rating curve) for the River.

The stage – discharge curve provides the relationship between water level (stage) and flow. The curve is determined by measuring the velocity of flow in the stream then computing the flow rate for a number of water levels by multiplying the cross-sectional area by the measured velocity.

This is how the 160 years of historical flood flow records for the Brisbane River were developed. However, significant works have been carried out in the River which may impact on the recorded flood levels at the Port office and hence the recorded flood flow.

It is known from historical records that there was a bar at the mouth of the River when Brisbane was first settled and that the River was deepened by about fifteen feet at some stage around the turn of the century.

It was assumed in previous studies, and in the initial work in this study, that the historic flood record had been corrected for all changes caused by the removal of the bar and navigational dredging. Subsequent research of historic records has shown that this assumption is not valid.

The effect on recorded flood levels of these changes needs to be estimated so that all recorded flood levels are relative to the current state of the River. This is because flows for these historic events can only be estimated using the current stage – discharge curve at the Port office. The impact of these changes on the historic flood record are discussed below.

Brisbane River Bar

The bar caused a considerable barrier at the mouth of the River, with a quoted depth over the bar at low water of four feet (1.22m). The bar was removed in 1864. Records from the latter part of the nineteenth century show that the effect of removing the bar (on floods prior to 1864) was estimated to be in the order of 10 feet.

The hydraulic model developed in this study allows us to understand the effect of such a bar on flood levels up the River. The modelling approach to simulate the conditions that would exist if there were a bar at the mouth of the River is to vary water levels in Moreton Bay to assess the sensitivity of flood levels at the Port Office. The model showed that recorded flood levels (prior to 1864) may have been reduced by up to 0.4 metres when the bar was removed. The effect of removing the bar is clearly not as significant as estimated in the 19th century (i.e. 10 feet or approximately 3m). Recorded flood levels prior to 1864 need to be reduced by 0.4m to be consistent with records of floods after 1864.

Dredging

Records show that in 1917 the River was deepened by about fifteen feet to allow boats easy passage to the port at the current South Bank reach. Henderson, the Chief Hydrologist at the time and author of the text 'Open Channel Hydraulics' (still used by Universities) estimated, during design work for the dredging in 1896, that the effect of the dredging would be to reduce flood levels by about five feet.

The gauge at Moggill has a continuous flood record from 1891. The record is unaffected by the removal of the bar and dredging. Comparison of the stage – discharge curves for the Moggill and the Port Office gauges suggests that dredging will reduce smaller floods, but may have virtually no impact on larger floods.

On the basis of this finding all flood levels recorded prior to 1917, except the two largest floods recorded in 1841 and 1893 need to be reduced by about 5 feet (or 1.52m) to be consistent with levels recorded for floods occurring after 1917. The effect of dredging will be cumulative with the effects of removing the bar, so the recorded levels of floods prior to 1864 need to be reduced by a total of 1.92 metres from their actual measured value to be consistent.

Adopted Historic Flood Record

The adopted historic flood record for the Brisbane River is summarised in Table 1. The historic record of flood levels prior to 1917 was adjusted to account for removal of the bar and dredging as discussed above.

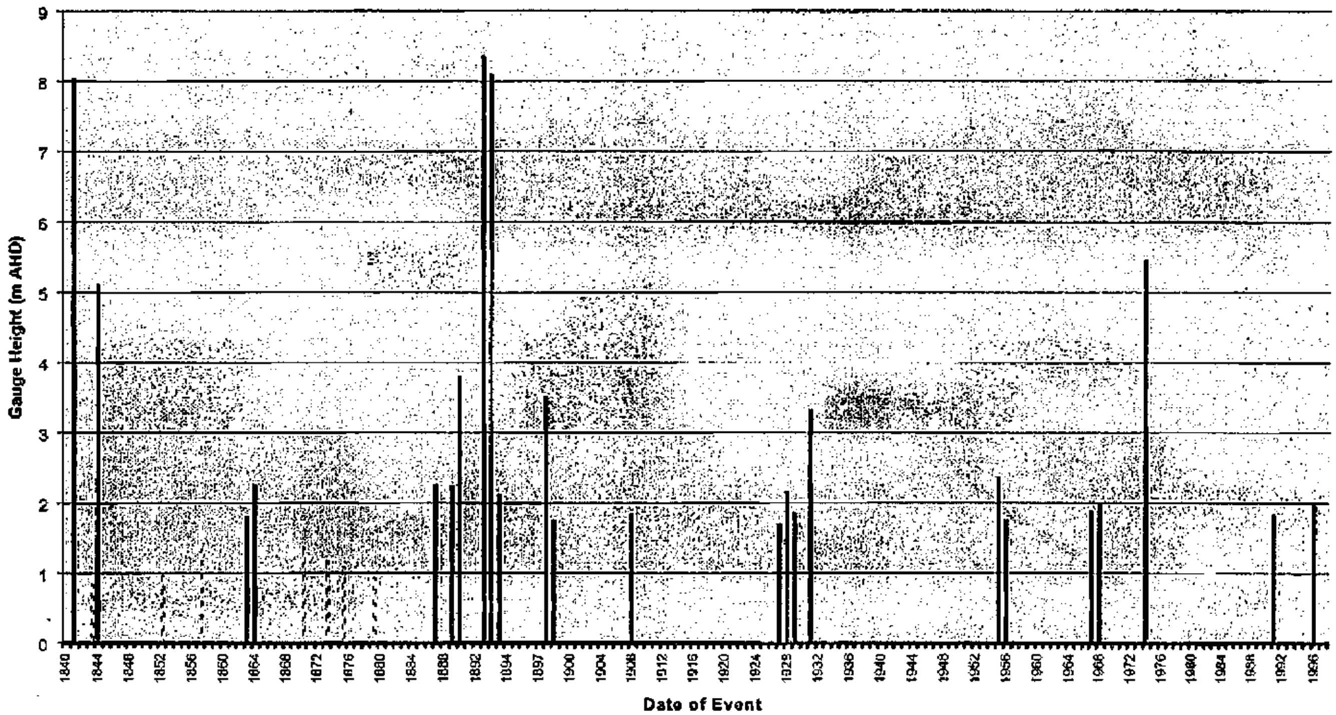
In addition, the record after 1943 was adjusted to take into account the effects of Somerset Dam, while records after 1985 were also adjusted to account for the effects of Wivenhoe Dam. The method of analysis to make these adjustments is described in Section 3.

Table 1 Adopted Historic Flood Record

Date	Recorded Flood Level (metres AHD)	Adjusted Flood Level (m AHD)	Discharge, Adjusted for Removal of Bar and Dredging (m^3/s)	Discharge, Adjusted to Account for Somerset and Wivenhoe Dams (m^3/s)
1841	8.43	8.03	14100	14100
1843	2.76	0.84	1940	1940
1844	7.03	5.11	8924	8924
1845	6.5	4.58	8120	8120
1852	2.91	0.99	2252	2252
1857	3.27	1.35	2963	2963
1863	3.32	1.80	3789	3789
1864	3.78	2.26	4574	4574
1870	2.89	1.37	3001	3001
1873	2.69	1.17	2614	2614
1875	2.61	1.09	2455	2455
1879	2.46	0.94	2149	2149
1887	3.78	2.26	4574	4574
1889	3.75	2.23	4525	4525
1890	5.33	3.81	6972	6972
1893	8.35	8.35	14600	14600
1898	5.02	3.45	8500	8500
1908	3.35	1.83	6100	6100
1927	1.70	1.70	3618	3618
1928	2.15	2.15	4398	4398
1929	1.85	1.85	3884	3884
1931	3.32	3.32	7000	6245
1955	2.36	2.36	5990	6704
1956	1.75	1.75	3707	4189
1967	1.87	1.87	2600	2990
1968	1.97	1.97	4200	4704
1971	1.47	1.47	2100	2478
1974	5.45	5.45	9873	10364
1991	1.82	1.82	1700	2387
1996	2.00	2.00	2400	3087

Figure 1 shows the adjusted historic flood record plotted on a time scale for all floods higher the 1.7 m at the Port Office (this is the Bureau of Meteorology's definition of a minor flood). It can be seen that the adjustments made to the historic flood record result in a more even distribution of floods across the whole period of record.

Figure 1 – Brisbane River Flooding since 1841 (adjusted)



A thorough review has been completed of all elements which have affected the historic flood record. The principal effect has been to reduce significantly the recorded value of the 1844 flood flows, with the 1974 flood now the third largest (rather than the fourth largest) flood on record, with a frequency of occurrence of approximately 1 in 50 years.

The work undertaken in this study provides reasonable confidence that the adjusted flood record provides a good estimate of historic flood events and is a sound basis for estimating the 1 in 100 year design flood.

5.2 Flood Frequency Curve

The adopted historic flood record was analysed to determine the flood frequency relationship for the Brisbane River at the Port office. The relationship is used to estimate the 1 in 100 year design flood (without dams).

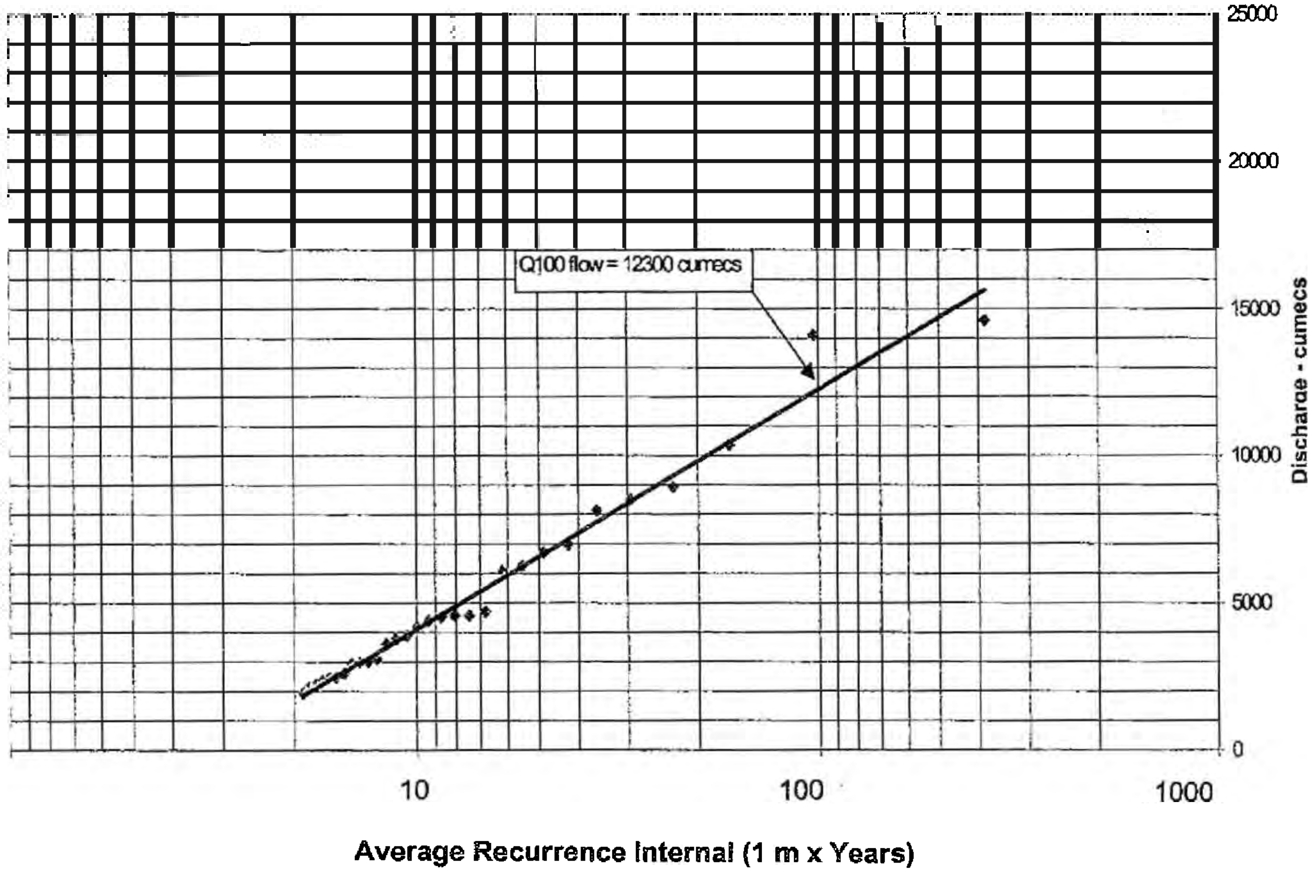
In his review Professor Mein suggested that a Log Pearson Type III (LPTIII) distribution be used rather than the "fit by eye" adopted in the initial work.

The LPTIII analysis produced a similar estimate of the 1 in 100 year flood flow event as the "fit by eye" method. Because the "fit by eye" curve appears to fit the data better it has been adopted.

The adopted historic flood record (Table 1) is plotted on Figure 2 and the adopted "fit by eye" flood frequency curve is fitted. The 1 in 100 year design flood flow is estimated at 12,300 m^3/s(without dams).

When this flood is run through the hydrologic and hydraulic models with both Somerset and Wivenhoe Dams in place, the calculated flood flow at the Port office is reduced to 8,600 m^3/s This is approximately 1,000 m^3/s less than the estimate of 9,560 m^3/s developed in the initial work on the study (refer Section 4), but still some 1,800 m^3/s larger than the 6,800 m^3/s estimated in the 1984 study.

Figure 2 Flood Frequency Curve at Port Office



5.3 Effect of Water Level in Dams

Professor Mein questioned the assumption made in the initial work that the dams would be full at the start of the analysis.

The Department of Natural Resources supplied 96 years of daily rainfall data for the Wivenhoe Dam catchment and daily storage volumes in Wivenhoe Dam since its construction. The storage behaviour of Wivenhoe Dam was simulated for the 96 years of record.

The analysis showed that the mean water level in the dam was 66.4 m (the spillway is at RL 67 m) and that the water level was above 65 m at least 90% of the time. Analysis of rainfall records for the 1974 flood show that general rain preceding the main event was sufficient to fill the dam to spillway level.

Therefore, the assumption that the dam will be full at the start of the analysis is considered reasonable.

5.4 Areal Distribution of Rainfall and Losses

Wivenhoe Dam is a major influence in the catchment, controlling some 50% of the catchment. Therefore, different patterns of rainfall, each producing the same 1 in 100 year design flood in the "without dams" case, will produce a different flood flow in the "with dams" condition. This is because each different rainfall pattern will produce a different volume of run off from the catchment that is influenced by the dams.

Five different rainfall patterns were analysed. Actual rainfall patterns obtained from the Bureau of Meteorology for the significant floods of 1893, 1931, 1955, 1974 and 1996 were analysed.

To simulate the 1 in 100 year design flood event the recorded areal and temporal patterns of each rainfall event were adopted. The depth of rainfall was increased (compared with the actual event) until the model (without dams) produced the 1 in 100 year flow estimated by the flood frequency analysis (i.e. 12,300 m^3/s– refer Section 5.2). Wivenhoe and Somerset Dams were then included in the model to assess the effects of areal distribution of rainfall on the 1 in 100 year design flood with dams.

The results, summarised in Table 2, show a significant variation in the estimate of the 1 in 100 year design flood flow at the Port Office. The adopted 1 in 100 year design flow of 8,600 m^3/s, estimated using rainfall with an areal and temporal pattern based on Bureau of Meteorology analysis of all rainfall records in the catchment, is within the range of values calculated from specific flood rainfall patterns.

It is not possible to define precisely the probability that a particular pattern of rainfall will occur. From records of historic floods we know the pattern of rainfall can vary considerably and that the impact on floods in the River will be significant. Based on the analyses described above it is concluded that the adoption of the rainfall pattern derived by the Bureau of Meteorology provides a reasonable basis to estimate the 1 in 100 year design flood in the Brisbane River.

Table 2 Effect of Rainfall Pattern on Estimate of Flood Flow

Rainfall Pattern Event	1 in 100 Year Flow With Dams ($m^{3/s}$)
1893	8,810
1931	8,270
1955	8,150
1974	8,180
1996	10,050

5.5 Dam Operating Rules

The rules applied to the operation of Wivenhoe Dam in a major flood were altered in 1994. The analysis of these new rules showed that for the estimated 1 in 100 year design flow of 8,600 m^3/s there will be no change in flood flow at the Port Office, compared with the original 1984 rules. This is because the mitigation effects of Wivenhoe Dam diminish as the magnitude of the flood increases. The operating rules have virtually no impact on floods larger than 8,000 m^3/s.

6. Flood Levels Along The River

The hydraulic model has been used to calculate a flood profile along the entire length of the Brisbane River within the City of Brisbane. This profile is plotted on Figure 3, together with the flood profile adopted from the study.

At the Port Office gauge the flood level corresponding to the calculated 1 in 100 year design flow of 8,600 m^3/s is estimated to be 5.0 m, AHD. The current development design flood level, based on the 1984 study, is 3.8 m AHD some 1.2 m lower than the level predicted in this study. From the two flood profiles plotted on Figure 3 it can be seen that the flood levels calculated in this study vary from about 1.0 m to almost 3.0 m higher than the current development design flood level in Brisbane.

7. Conclusion

An extensive and comprehensive analysis has been undertaken of flooding in the Brisbane River within the City of Brisbane. All elements of the study have been subjected to independent peer review because the key findings have significant implications for Council. The overall approach to the study, the detailed methodology and results have all been scrutinised and tested.

Exhaustive research of all aspects of the data used in the study has been undertaken. It was found that the historic record required adjustment to account for changes in the River since flood records were first kept in 1841.

As a consequence the results of the study are considered to provide the "best estimate" of flooding in the Brisbane River corridor within the City of Brisbane.

Flood Behaviour In the River Corridor

The study has provided a comprehensive understanding of flood behaviour in the River corridor and the interaction between flooding and development. Flood profiles along the River have been developed and peak flood levels and flows at each cross-section have been tabulated.

Major hydraulic structures along the River (e.g. bridges) were assessed. It was determined that no upgrade of these structures was required to mitigate the impact of flooding.

Waterway management issues have also been addressed in the study. This involved testing the impact of re-vegetation along the River in accordance with the current "Strategic Plan for Management of Brisbane Waterways" and assessing the potential to set regulation lines to manage development in the corridor.

It was found that the re-vegetation strategy will increase flood levels by a maximum of 20 mm.

A comprehensive assessment of the application of Council's Flood Regulation Line policy was completed and potential strategies to implement flood regulation lines were assessed.

An interesting finding of the study is that while navigational dredging will certainly reduce the impact of less severe floods it may have virtually no impact on major floods in the River.

Flood Levels To Apply To Development

The major finding of this study is that the calculated 1 in 100 year design flood flow is 8,600 m^3/s The corresponding flood level is about 1.0 to 2.0 m higher than the current development control level in the Brisbane River corridor. This is a significant outcome of the Study, and options to deal with the issues raised by this finding are discussed in Section 8.

Flood Emergency Information

A flood forecasting model has been developed for the Brisbane River in conjunction with development of flood "contours" for inclusion in Council's Bimap system. In addition, an assessment has been made of possible escape routes and areas within the City which may become insolated during major flood events. This data has been incorporated into Council's Flood Information Centre's operating procedures.

8. Options To Address Issues Associated With Increased Design Flood Levels

Significant floods have occurred six times in the last 160 years in Brisbane. These floods cause significant damage and disruption to Brisbane, even with the mitigating effect of Wivenhoe Dam. Larger, though rarer, floods may also occur. There is a perception in Brisbane that Wivenhoe Dam will control and limit the damage associated with all future floods. This is not the case and complacency in the community as a result of this perception could well lead to increased damages due to the failure of flood affected residents to react to flood warnings.

Because there has only been one major flood since 1893 (i.e. in the last 100 years), it is an attractive option to suggest that the 1974 flood, modified to take into account the affects of Wivenhoe Dam, could represent the 1 in 100 year design flood. This view was implied by Professor Mein in his comment that the historic record appears to be biased to the early part of the record.

This option could be supported by an argument that data recorded in the 19th Century is of doubtful accuracy and therefore should be ignored. On this basis the design flood flow would be 6,800 m^3/s, consistent with the current development control design flood levels for the River.

However, on the basis of the thorough and intensive research undertaken in this study, this approach cannot be supported. The simple option of saying that the current development control level represents the 1 in 100 flood level is not valid.

Therefore, there are essentially two options available to Council to deal with the issues raised by the finding of this study that the 1 in 100 year design flood is 1.0 to 2.0 m higher than the current development control levels. These are:

- maintain the current development control levels; or

- adopt the 1 in 100 year design flood levels calculated in this study.

Option 1 Maintain Current Development Control Levels

The implications of adopting this option are:

- Development design levels within the River corridor remain consistent with development since 1984.

- The flood immunity of properties is less than previously assessed. For example, the flood corresponding to current development control levels has a 1 in 55 year average recurrence interval.

- The average flood damages associated with flooding will be significantly larger (on the basis of the flood frequency analysis in this study) than if development levels are increased as in Option 2.
- There are potential legal implications for Council by allowing development to occur in higher risk areas. As a minimum developers and residents may need to be advised of the actual flood risk on their property.

- Property owners may not be able to insure their property for flood risk, or may face very high premiums to obtain adequate cover.

- Council may lose access to National Disaster Relief (NDR) funding.

- It will be necessary to review and modify existing flood emergency plans.

Option 2 Adopt 1 in 100 Year Design Levels In This Study

This option preserves the position which Council believes it now has, with respect to development control, on the assumption that the current development control level is in fact the 1 in 100 year flood level. While adopting this option would offset the negative implications of Option 1, it will cause some transitional problems. These may be summarised as follows:

- existing development. There will be no requirement to change, but Council must recognise the increased flood risk to these properties (many of the implications of Option 1 will apply to this case).

- current applications. Each application will need to be treated on its merits, but ideally Council should attempt to impose new conditions.

- new development. Impose new conditions.

- re-development. Attempt to impose new conditions, but recognise that a "sliding scale" may be required to integrate with adjacent development (e.g. need to consider aesthetics).

Mitigation Strategies

There are also a wide range of structural and non-structural measures which may be implemented in conjunction with either of these options to reduce the damage and disruption associated with major floods in the River. A workshop was organised to develop and assess the strategies available to Council. The participants included experts in floodplain management, risk management, legal aspects and river engineering.

The strategies developed through the workshop are summarised in Table 3. The strategies have been ranked on the basis of a preliminary benefit – cost analysis, undertaken using available data and previous reports. The assessment of the strategies showed that non-structural options generally offered a more attractive benefit – cost ratio compared with the structural options, largely because of the large capital costs associated with structural options.

Table 3 Flood Risk Management Strategies

Rank	Strategy	Aim	Implications	Effectiveness
1	Develop flood risk plans for essential services (lifelines)	A Other Lifelines – Limited catastrophic disruption to lifelines by a major flood B Transport Lifeline	▪ Reduced residual risk ▪ Better understanding of community risk	Good
2	Develop flood action plan for each residential property	Reduce residential AADs by 50%	▪ Increase awareness of flood risk ▪ Better knowledge of power to respond to a flood warning	Good
3	Flood warning – community awareness	Improve dissemination/ understanding of flood warnings	▪ Raised risk awareness (community concern) (primarily avoid deaths) ▪ Save 50% residential damage	Very high
4	Develop flood action plans for each industrial/ commercial property	Reduce commercial/ industrial AADs by 50%	▪ Raised awareness of flood risk ▪ Reduced losses in floods	Good
5	Accept flood study and leave planning requirements as is	Maintain current standards FL+'98 H_{100} + 0.5	▪ NDR funds available ▪ May have to defend Planning requirements in court ▪ May impact on subdivisions ▪ Rating based may change due to property re-valuation	Medium
6	Modify Wivenhoe Dam	Reduce frequency of flooding of properties	▪ Loss of water supply – Water Supply (1.1G1), - Flood Supply (1.4G1) ▪ Detailed study needed ▪ Reduce peak discharges to 1984 study scenarios	Medium
7	Flood Control Dam(s)	Reduce frequency of flooding of properties	▪ Conflict with agriculture ▪ Environmental flows ▪ Possible dam use	Good

			▪ Benefits for Ipswich & Brisbane	
8	Review town planning, requirements (+ building codes)	Develop risk based planning conditions and building codes	▪ Redevelopment of existing properties ▪ Extensions to existing properties	Good long term
9	Levees	Reduce frequency of flooding op properties	▪ Could be 8m high ▪ Only protect limited areas	Very poor
10	Review Residential Properties in high hazard area	Reduce elements of risk in high hazard areas	▪ Remove properties under great threats ▪ Raising does not solve all problems	Medium
11	Reduce afflux at bridges	Reduce frequency of flood levels in local areas	▪ Reduce flood levels (debris blockage) ▪ Possible impacts on transportation system	Medium
12	BCC to subsidise/ underwrite residential flood insurance	To offset financial loss to affected residents	▪ Does not reduce AADs ▪ Financial risk to Council	Poor
13	No change-adopt current development control levels	To maintain the status quo	▪ Flood/development levels remain consistent ▪ Flood immunity reduced ▪ Liability to Council's ▪ Loss of NDR funds	Poor

Note that strategies ranked 5 and 13 are in fact Options 2 and 1 respectively. In the assessment for ranking purposes these two options were considered without other mitigation strategies being adopted in conjunction.

In principle, any of the mitigation strategies listed in Table 3 could be implemented in conjunction with either of the two options proposed. In the case of Option 1, adopting any of these strategies may be sufficient to offset the impacts on residents whose properties lie below the 1 in 100 year flood levels calculated in this study. This approach gives rise to a third option.

Option 3 Maintain Current Development Controls With Complimentary Mitigation Strategies

This option consists of maintaining the current development controls (Option 1) in conjunction with a range of short and medium term non-structural flood mitigation strategies.

Short Term Strategies

- Investigate alternative operating rules for Wivenhoe Dam with the State Government.
- Develop a flood risk strategy for essential services.

Medium Term Strategies

- Develop risk based planning conditions and building codes.
- Develop flood action plans for each residential property (this could include some commercial/industrial properties).
- Undertake and maintain a community awareness campaign including advise and verification and developments of the true flood immunity of their property or development.
- Remove residential properties in high hazard areas.

The workshop assessed, on the basis of available data, that these mitigation strategies have the potential to offset the additional damages which may be attributed to maintaining the current development control levels.

If this option is adopted it would be prudent to undertake a risk assessment to quantify the potential flood damages and ensure that risk minimisation strategies are effective and appropriate.

9. Recommendations

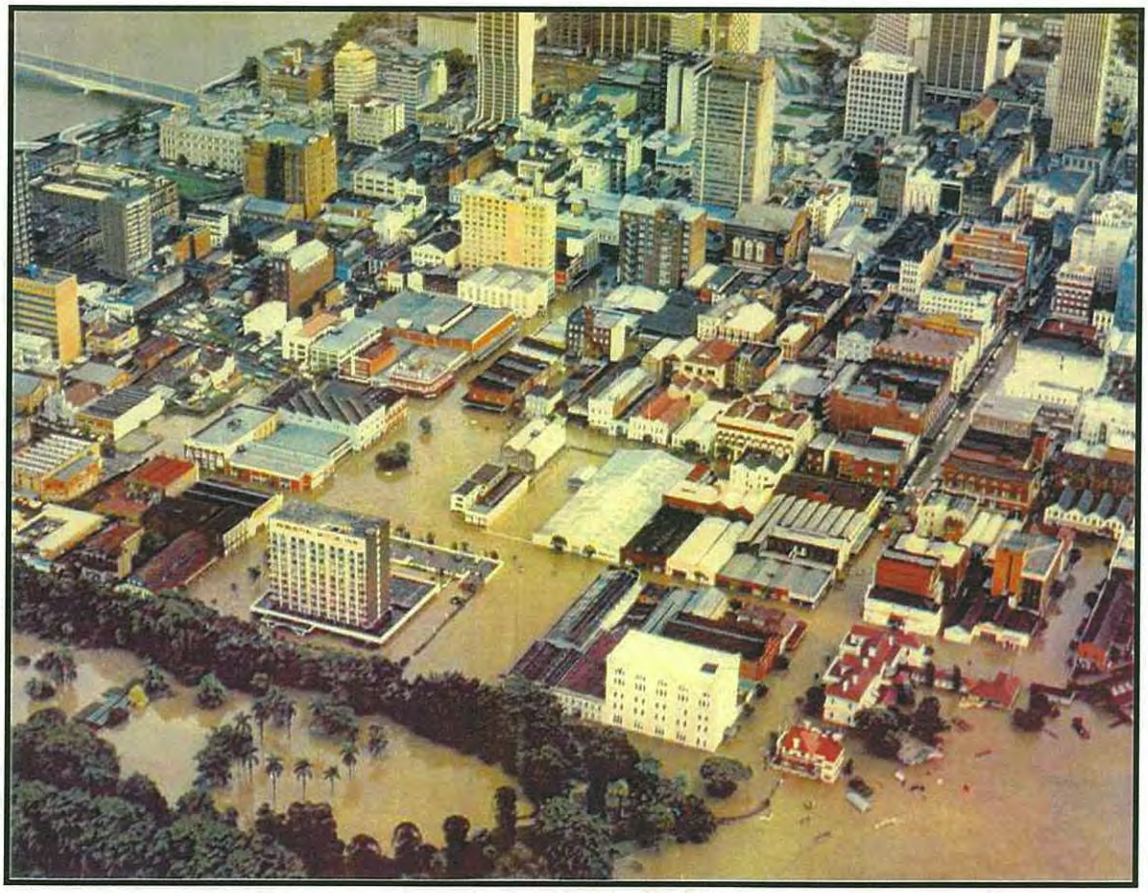
The recommendations of this study are:

- Council adopt the 1 in 100 year design flood flow as calculated in this study and the associated flood profile along the River;
- Council maintains the current development control levels along the Brisbane River in conjunction with strategies listed below;
- Council implement a range of non-structural flood mitigation strategies, including:
  - Develop a flood risk strategy for essential services.
  - Develop risk based planning conditions and building codes.
  - Develop flood action plans for each residential property (this could include some commercial/industrial properties).
  - Undertake and maintain a community awareness campaign including advise and verification and developments of the true flood immunity of their property or development.
  - Remove residential properties in high hazard areas.
- Council more accurately assess the risks, benefits and costs of these recommendations and review the detailed implementation of the recommendations in the light of this risk assessment.
- That the regulation line analysis be used to establish the boundary of the waterway corridor for the Brisbane River.

Brisbane City

Further Investigations for the Brisbane River Flood Study

December 1999



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A	December 1999	Further investigations for the Brisbane River Flood Study	[redacted]	Ken Morris
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C				

The release of revision A is approved by: [redacted] Date: 20/12/1999

K J Morris
Principal Engineer – Floodplain and Creek Studies

Copy No: 3 of 3

Executive Summary

The Brisbane River Flood Study, June 1999, highlighted further study that could impact on the estimate of the Q100 flood. The flood frequency analysis is highly dependent on the assumed flood discharge of the 1893 flood. This report provided further research to gain a better understanding of this flood. Included in this report is further work on the assumptions pertaining to the state of the Dam and its effect on flood levels.

Analysis of the 1893 flood discharge was undertaken. Flood discharge hydrographs were produced by hydrologic modelling using 1893 recorded rainfall records. Survey data from the Victoria Bridge to Moreton Bay, surveyed in 1873, was used to augment the existing cross-sections in the Brisbane River MIKE11 hydraulic model. Using MIKE11 it was possible to determine the peak flood flows which produced flood levels similar to those recorded in 1893.

It was concluded that the best estimate of the discharge of the 1893 flood was 11 600 m^3/s. The estimate of the discharge of the 1893 flood, used in the flood frequency analysis for the Brisbane River Flood Study in June 1999, was 14 600 m^3/s.

The revised estimate of the 1893 flood discharge reduces the estimate of the Q100 flood by 600 m^3/s. Q100 discharge is 8000 m^3/s. The peak flood level at the Port Office Gauge is reduced by 0.3m. Q100 flood height is 4.7 m AHD at the Port Office Gauge.

A report containing the original flood operation procedures and a copy of the current release procedures for Wivenhoe and Somerset Dams was obtained from the DNR. Careful analysis of these procedures revealed that there is little difference between original and current operating procedures.

Even though the operating procedures have changed very little since Wivenhoe Dam was constructed, the magnitude of the Probable Maximum Flood (PMF) and the magnitude of the Q100 flood event have increased.

The current operating procedures have less impact the larger the flood event. This means that the dam has less impact on reducing the peak of the revised Q100 flood. Wivenhoe Dam's operating procedures have more impact on the smaller flood events (Q2-10) than larger flood events, (Q100).

The sensitivity of a Q100 flood to the water level in Wivenhoe Dam was investigated. Q100 design rainfall was applied to the RAFTS model of the Brisbane River catchment. Wivenhoe Dam water levels were set at 100%, 90%, 75% and 50%. The resultant hydrographs at the Port Office Gauge were plotted.

It was calculated that a Q100 event with Wivenhoe Dam at 50% storage will reduce the peak of the flood by 1800 m^3/s. The probability of the dam being 50% full at the start of a Q100 rainfall event was also investigated.

The DNR supplied a daily simulation of Wivenhoe Dam storage for 96 years using recorded rainfall data. The storage levels in the dam *just proceeding* a historic flood event were measured. Seven out of the nine historic flood events are at or above the Full Supply Level.

The probability of the volume of the dam being greater than 90%, 75% and 50% full supply level was found to be 0.8, 0.95 and 0.98 respectively. The Wivenhoe Dam storage never fell below 65% in the simulation. It fells to 75% storage only twice in 95 years of simulation.

The years where the dam storage is around 75% are the result of low rainfall summers and very dry winters. A Q100 event never occurs in a very dry season. It generally occurs in a season of wet winters and high rainfall summers.

The probability that the dam is at 50% storage at the start of a Q100 event would mean that the dam would need to be almost empty at the start of the wet season. The probability of the dam being almost empty at the start of the wet season is zero.

1.0 Introduction

City Design completed a Final Report of the Brisbane River Flood Study in June 1999. This further work has been commissioned by Waterways Program to gain further understanding of the 1893 flood events and on Wivenhoe Dam's impact on Brisbane River flooding.

2.0 Scope of Work

The scope of the work is detailed as follows:

a) Analyse the 1893 flood. Use the cross sections surveyed in the 1870's and the measured hyetographs to determine the peak flood flows and the peak flood levels for the largest flood of 1893. Compare this with the recorded flood flows and flood levels.

b) Investigate the effects of the changing operating rules for Wivenhoe Dam. Find the original estimates of the impact of Wivenhoe Dam on the Flood Levels.

c) Investigate the sensitivity of dam storage. Analyse the impact on Q100 flood levels when the dam is:
   - 90% full;
   - 75% full; and
   - 50% full.

d) Develop a probability matrix to identify the risks associated with events occurring simultaneously. For example, the dam being full and a Q100 rainfall event occurring.

Each section of the work has a direct effect on the estimate of the Q100 flood in the Brisbane River. Section (a) will potentially have the most dramatic effect.

3.0 The 1893 Floods

3.1 Hydrology

During research on the Brisbane River Flood Study we found rainfall records of 22 rainfall stations in the Brisbane River catchment, for the period containing the first 1893 flood event. Each rainfall station had recorded totals (in inches), at 24-hour intervals. The rainfall station at Cromanhurst recorded 35.71 inches in 24 hours, from 8:00am 2nd February 1893 to 8:00am 3rd February 1893. The rainfall station at Yandina, (close to the catchment), had rainfall totals at varying intervals, (2 to 8 hours), for the 48 hours starting 9:00am 1 February 1893. A map showing rainfall depth contours across the Brisbane River catchment for 96 hours, ending 4th February 1893 was used.

The temporal pattern of the rainfall at Cromanhurst and Yandina were used as typical temporal patterns for the catchment. The original temporal pattern at Cromanhurst is in 24-hour totals and thus removes many of the peaks and troughs of the rainfall. Combining the 96hr temporal pattern of Cromanhurst and including within it the intermediate 48 hour temporal pattern recordings from the Yandina rainfall station produced another temporal pattern, "Cromanhurst Peaked". This was done to give a temporal pattern which would contain the "peaks and troughs" of the rainfall.

Using HYDCON, (a software program written for the Brisbane River Flood Study), rainfall files were generated which simulated the rainfall across the catchment 1893. Each of the three different temporal patterns produced a different rainfall file.

A RAFTS model of the Brisbane River catchment used the rainfall file produced and flows at the Port Office gauge were calculated.

3.1.1 Initial and Continuing Loss

Losses in the RAFTS model have a major effect, particularly on long duration rainfall events. It is practice to put in an initial loss and a continuing loss.

Initial loss is used to simulate initial catchment wetting when no runoff is produced. There were widespread rainfalls in the 2 days proceeding our simulated rainfalls therefore a zero initial loss was modelled.

Continuing loss accounts for infiltration once the catchment is saturated and is expressed in mm/hr. Modelling began by using a standard 2.5mm/hr continuing loss. This meant that the total loss for the 24hrs amounted to 60mm and to 240mm for 96hrs. It was found that discharge at the Port Office Gauge was lower than historical measurements.

3.1.2 Results

Table 3.1 shows the results of each of the eight model simulations, each time varying the temporal pattern and continuing loss. The discharge calculated is at the Port Office Gauge.

Table 3.1 – Modelled Discharge at Port Office gauge

Losses – Initial and Continuing (mm, mm/hr)	Cromanhurst Temporal Pattern	Cromanhurst Peaked Temporal Pattern	Yandina Temporal Pattern
0 & 2.5	9,146 m^3/s	9,360 m^3/s	7,977 m^3/s
0 & 1.0	11,196 m^3/s	11,361 m^3/s	10,281 m^3/s
0 & 0.5	12,577 m^3/s	12,758 m^3/s	11,351 m^3/s
0 & 0	18,310 m^3/s	19,014 m^3/s	12,959 m^3/s
Calibrated 1974 model losses	9,644 m^3/s	9,894 m^3/s	8,607 m^3/s

In the Brisbane River Flood Study, June 1999, Appendix A10 contains *Table 10.2 –Measurements of the 1893 Flood Event.* This table is reproduced below.

Source	Flow Estimate
Henderson's report to Parliament 1896 – 24000000cubic feet/minute	11,300 m^3/s
Using the adjusted level and look up on the port office gauge stage discharge curve (a circular reference to the item above) – (done 1999)	11,600 m^3/s
Using a measured level at the Moggill gauge and look-up the Moggill Stage discharge curve (there is little flood flow reduction between Moggill and Brisbane) – (done 1999)	14,600 m^3/s
Flood Velocity measurements at Indooroopilly Bridge calculated a flood flow of 600,000 cubic feet/sec. – (done 1893)	16,990 m^3/s
Flood Velocity measurements at Victoria Bridge gives a flow as "494,000 cubic feet/sec excluding the flow through South Brisbane" - (done 1893)	14,000 m^3/s +

These five sources in the above table indicate that the discharge for the 1893 flood lies between 11,000 and 17,000 m^3/s. Of the fifteen peak discharges calculated in Table 3.1 above, only six lie within this range. It can be noted that the Yandina Temporal pattern produced lower discharges despite having similar losses in the RAFTS model. A continuing loss of zero millimetres per hour was considered unrealistic and with Yandina falling outside the Brisbane River catchment it was concluded that the Yandina temporal patterns would not be trialed in the hydraulic model. Therefore four hydrographs, *Cromanhurst* and *Cromanhurst Peaked*, with continuing losses of 0.5 and 1.0 mm/hr were trialed in the hydraulic model.

3.2 Hydraulics

3.2.1 Geometric data

Survey data from the Victoria Bridge to Moreton Bay, surveyed by Staff Commander Bedwell and Navel Lieutenant Connor R.N. in 1873, was used to augment the existing cross-sections in the Brisbane River MIKE11 hydraulic model. Essentially the channel of the Brisbane River was replaced by this data for cross sections from the Victoria Bridge to the mouth of the River. No cross sections upstream of the Victoria Bridge were modified.

The bed resistance used in the "1893" MIKE11model was the same as the bed resistance used in the Brisbane River Flood Study MIKE 11 model.

3.2.2 Flood Hydrographs

Hydrographs generated in RAFTS were subsequently "routed" through the "1893" MIKE 11 model. As an initial trial four hydrographs were selected. The four hydrographs correspond to the *Cromanhurst* and *Cromanhurst Peaked* temporal patterns with continuing losses of 1.0 mm/hr and 0.5 mm/hr. Peak water levels were then compared to recorded water levels in 1893.

3.2.3 Tailwater Level

While tidal records have been found at the state archives for the years 1884 – 1973, these were not used in the analysis. Instead the Mean High Water Springs level (MHWS) of 0.92 m AHD was used.

The sensitivity of the tailwater level was investigated. The tailwater level was reduced to 0.0 m AHD, (a change of 920mm), to investigate what effects this may on results upstream. The results of the modelling indicated a change of 30mm at the Newstead Park Gauge and a change of 2mm at the Port Office Gauge. It can be concluded that the model is not very sensitive to changes in the tailwater level during large flood events such as the 1893 flood.

3.2.4 Results

The hydrographs that produce results closest to the recorded flood heights in 1893 are *Cromanhurst* and *Cromanhurst Peaked* temporal patterns with a continuing loss of 1mm/hr. These results compare well with measured values downstream of the Victoria Bridge.

Table 3.2 summarises the results of the hydraulic modelling. Detailed tabular results are contained in Table 3.4 and illustrated in Figure 3.1. It may be seen that the calculated values differ slightly to the recorded flood heights upstream of the Yeronga Street Gauge. Changes to the river may have occurred upstream of the Victoria Bridge but no attempt to quantify this has been taken in this investigation.

Table 3.2 – Comparison of Flood Peak Heights with Discharge at the Port Office Gauge

Peak Flood Heights at Port Office			Peak Discharge at Port Office	
Recorded in 1893	**Cromanhurst** Cont Loss1.0 mm/hr	**Cromanhurst Peaked** Cont Loss1.0 mm/hr	**Cromanhurst** Cont Loss1.0 mm/hr	**Cromanhurst Peaked** Cont Loss1.0 mm/hr
8.35	8.263	8.366	11 426 m^3/s	11 635 m^3/s

It can be concluded from this study that the best estimate of the discharge of the 1st flood in February 1893 is 11 600 m^3/s.

The estimate of the discharge of the February 1893 flood, used in the Brisbane River Flood Study in June 1999, was 14 600 m^3/s.

3.2.5 Effect on the Q100 Flood Discharge

The effect on the original estimate of the Q100 flood is shown below in Table 3.3.

Table 3.3 – Effect on Q100 Flood Discharge

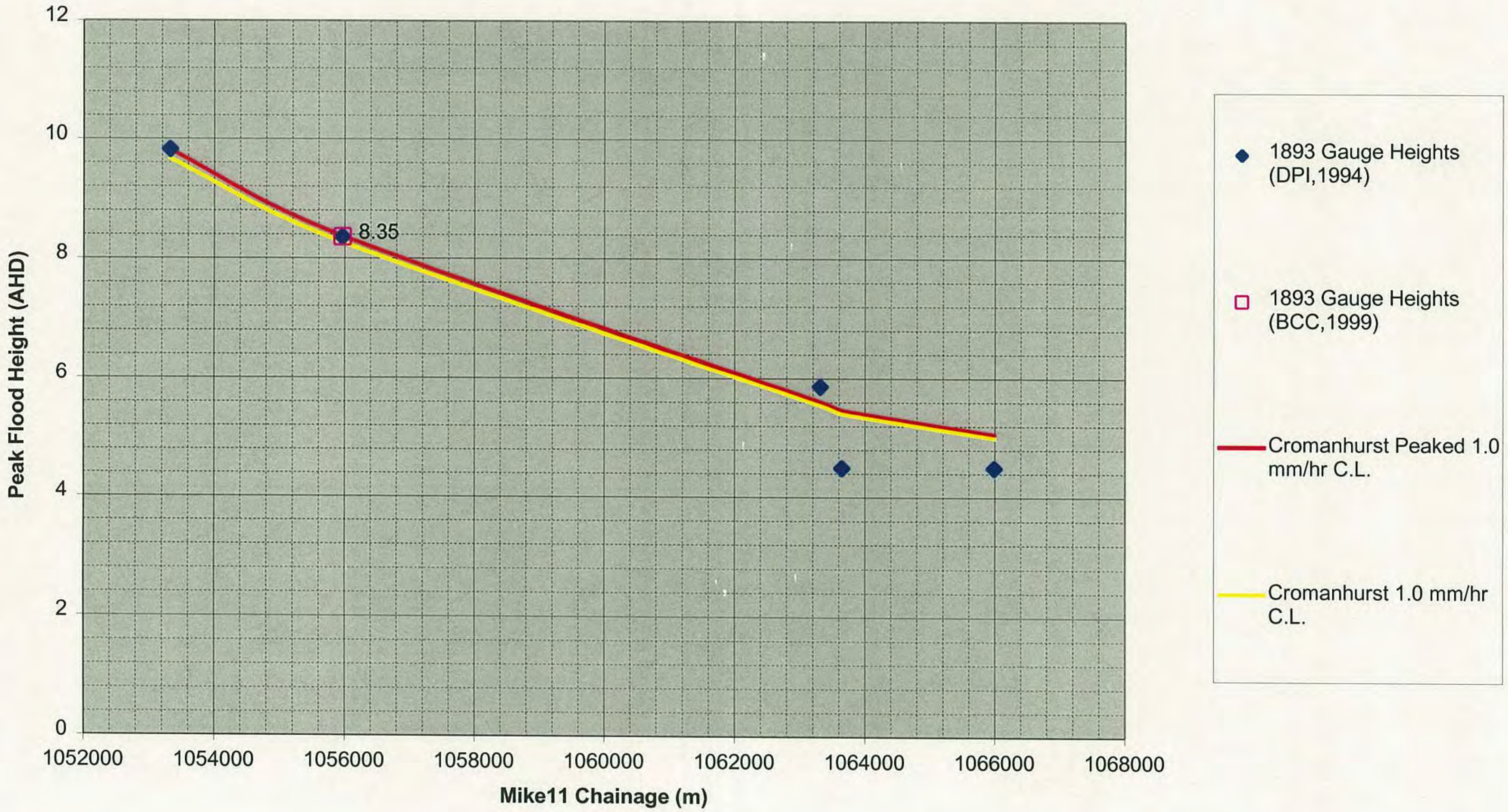
	Discharge at Port Office Gauge (m^3/s)	Water Level at Port Office Gauge (m AHD)
Brisbane River Flood Study – June 1999	8600	5.0
Brisbane River Flood Study – Further Investigations – November 1999	8000	4.7

Table 3.4 - Comparison of Recorded Peak Flood Heights (Feb 1893) to Modelled Peak Flood Heights

				Peak Flood Heights (m AHD)					
				Measured Gauge Data		Model Run #1	Model Run #2	Model Run #3	Model Run #4
MIKE11 Chainage (m)	AMTD Chainage (km)	Brisbane River Cross Section Label	Location	Source - DPI 1994†	Source – BCC 1999‡	Cromanhurst Peaked Temporal Pattern Continuing Loss 1.0 mm/hr	Cromanhurst Peaked Temporal Pattern Continuing Loss 0.5 mm/hr	Cromanhurst Recorded Temporal Pattern Continuing Loss 1.0 mm/hr	Cromanhurst Recorded Temporal Pattern Continuing Loss 0.5 mm/hr
1053320	25.304	BN 640	Victoria Bridge	9.82		9.804	10.413	9.667	10.313
1055960	22.7	BN 530	Port Office Gauge	8.351	8.35	8.366	8.892	8.263	8.822
1063310	15.35	BN 320	Newstead Park Gauge	5.86		5.605	5.94	5.546	5.891
1063645	15.015	BN 310	Crescent Road Gauge	4.49		5.46	5.775	5.403	5.728
1065990	12.67	BN 260	Cairncross Dock Gauge	4.49		5.056	5.36	5.002	5.315

† - Brisbane River Flood Study, Department of Primary Industries 1994
‡ - Brisbane River Flood Study, Brisbane City Council 1999

Figure 3.1 - Peak Flood Heights



4.0 Operating Rules for Wivenhoe Dam

The Department of Natural Resources holds a number of documents about the design and construction of Wivenhoe dam. A copy was obtained of Hydrology Report No:143005.PR/4. This document was titled, Report on Downstream Flooding, Queensland Water Resources Commission, November 1984. Chapter 7 of this report contains the flood operation procedures for Wivenhoe and Somerset Dams. This chapter was originally provided by Mr K. Hegerty from the Brisbane City Council.

A copy of the current release procedures for Wivenhoe Dam was obtained. These two procedures were compared to find the differences between them and the impact it would have on a Q100 flood.

Appendix A contains a copy of the original flood operation procedures for Wivenhoe Dam and a copy of the current operating rules for Wivenhoe Dam.

Careful analysis of these procedures reveals that there is little difference between previous and current operating procedures. The current procedures are a little more prescriptive for small dam releases. However, the governing principles of each step of the releases are the same.

Even though the operating procedures have changed very little since Wivenhoe Dam was constructed, the magnitude of the Probable Maximum Flood (PMF) and the magnitude of the Q100 flood event have increased.

It is perceived that the current operating procedures have less impact on the Q100 flood event but in actuality the Q100 flood event has increased in magnitude which means that the dam has less impact on reducing the peak of the flood.

Wivenhoe Dam's operating procedures have more impact on the smaller flood events (Q2-10) than larger flood events, (Q100).

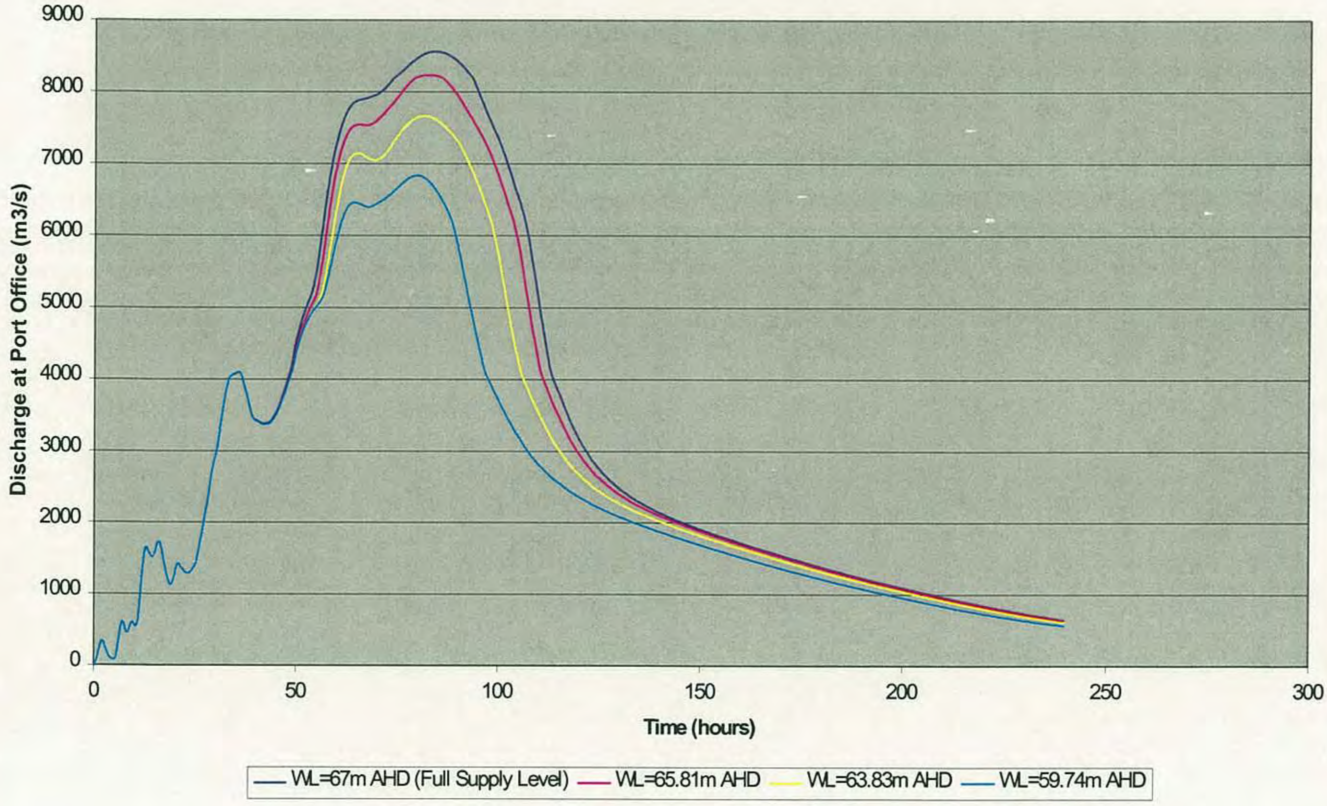
5.0 Investigation of the Sensitivity of Initial Dam Storage.

The Department of Natural Resources had previously supplied Wivenhoe Dam's Stage-Storage curve. This curve was used to determine what water level in the dam corresponded to it being 90%, 75%, and 50% full. The XP-RAFTS model of the Brisbane River catchment contained a model of Wivenhoe Dam. It is possible to represent the Dam being 90%, 75% and 50% full by changing the starting water level in the dam. The Q100 rainfall event was run using the model and the resultant hydrographs at the Port Office Gauge were plotted.

The Brisbane River MIKE11 model was used to see the effects of the varying discharge on water levels along the Brisbane River. The effects at the Port Office Gauge were plotted.

Figure 5.1 shows the difference between discharge hydrographs at the Port Office Gauge, due to varying initial water levels in Wivenhoe Dam. It can be seen from these results that a Q100 event with Wivenhoe Dam at 50% will reduce the peak of the flood by 1800 m^3/s. The probability of the dam being 50% full is examined in section 6.0.

Figure 5.1 Discharge Hydrographs at the Port Office Gauge - varying initial water levels in Wivenhoe Dam



6.0 Determination of Probabilities

In Appendix A10.2 of the Brisbane River Flood Study, June 1999, information on simulated storage volumes in Wivenhoe Dam can be found. The Department of Natural Resources used 96 years of daily rainfall data in the Wivenhoe Dam catchment and daily storage volumes in Wivenhoe Dam since its construction to compile a simulated daily storage volume.

These volumes were interrogated to find the storage levels in the dam *just proceeding* a historic flood event. Table 6.1gives these results.

Table 6.1 - Simulated and Recorded Volumes in the Wivenhoe Dam before Historic Flood Events.

Date	**Volume in Wivenhoe Dam (ML)**
15/3/1908	1 188 766
1/2/1931	1 128 075
26/3/1955	1 223 844
1/6/1973	1 146 020
24/1/1974	1 258 450
19/6/1983	1 194 462
3/3/1989	1 163 961
23/4/1989	1 230 573
30/4/1996	1 020 308

The average volume in Wivenhoe Dam, just proceeding a historic flood event is 1 171 916 ML. Full Supply Level is at 1 151 000 ML. Figure 6.1 shows a detailed graph of the simulated period and plots these proceeding volumes on the graph. **Seven out of the nine historic flood events are at or above the Full Supply Level.**

Figure 10.1, from the Brisbane River Flood Study, shows the Dam Storage vrs Percentage of Time Exceeded. Using this graph, the probability of the volume of the dam being greater than 90%, 75% and 50% full supply level was determined and tabulated in Table 6.2.

Table 6.2 – Probability of Dam Storage Exceedance

Wivenhoe Dam Storage	**Probability of Dam Exceeding Storage**
90%	80%
75%	95%
50%	98%

This table demonstrates that the probability of the dam being less than 75% full is very low. Figure 6.1 shows that once the dam initially fills, it never again falls below being 65% full for the rest of the simulation. It falls to being 75% full only twice in 95 years of simulation.

The years where the dam supply is around 75% are the result of low rainfall summers and very dry winters. These years are typical of "El Nino" events.

A Q100 event never occurs in a very dry season. It generally occurs in a season of wet winters and high rainfall summers. These years are typical of "La Nina" events.

The probability curve (Figure 10.1) could be deemed to apply at the start of a wet season. The probability that the dam is at 50% supply at the start of a Q100 event would mean that the dam would need to be almost empty at the start of the wet season. The probability of the dam being almost empty at the start of the wet season is zero.

The effect for Q100 discharge estimates is zero.

Figure 6.1 - Wivenhoe Dam - Simulated Water Levels, 1900 - 1996

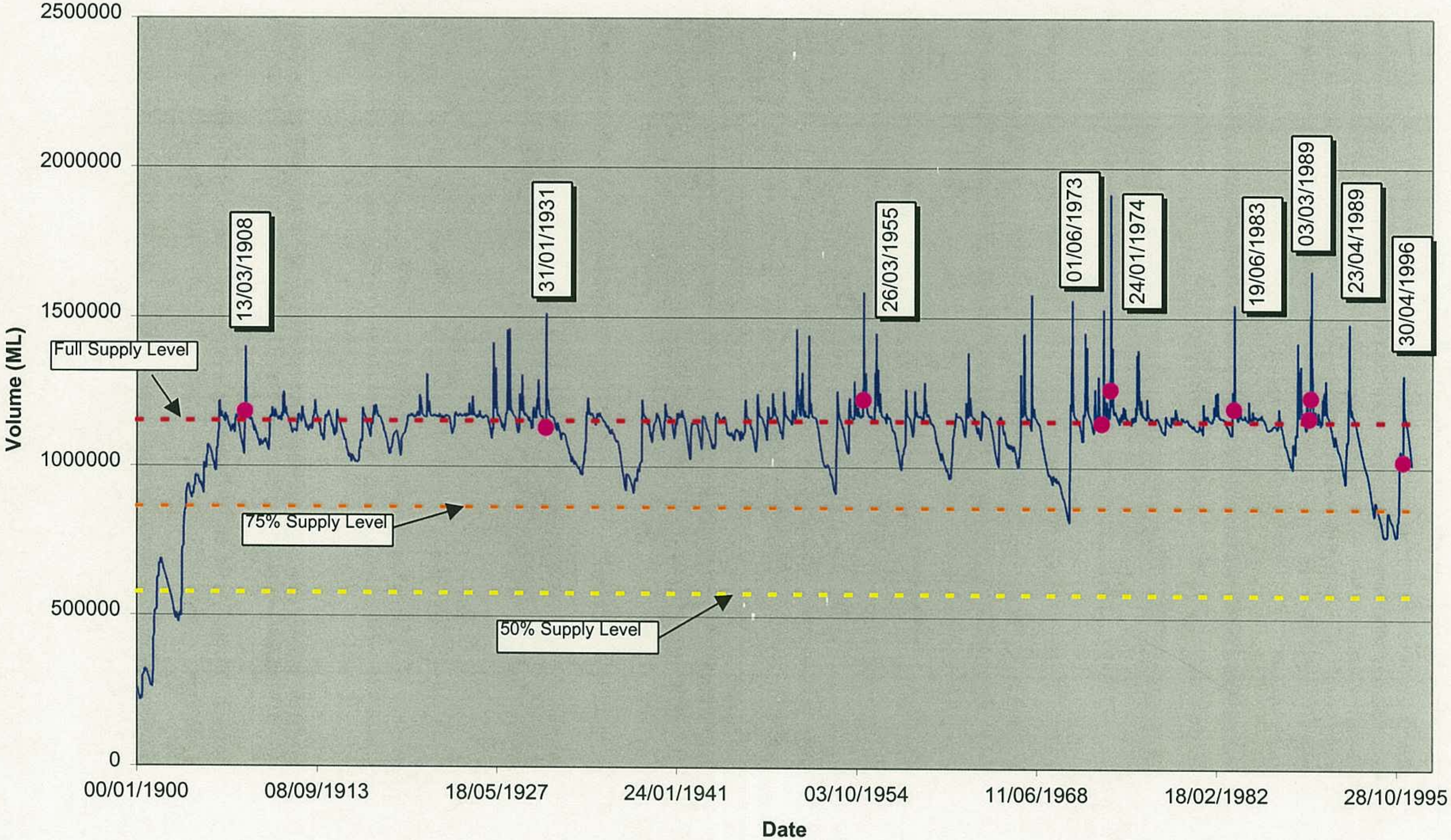
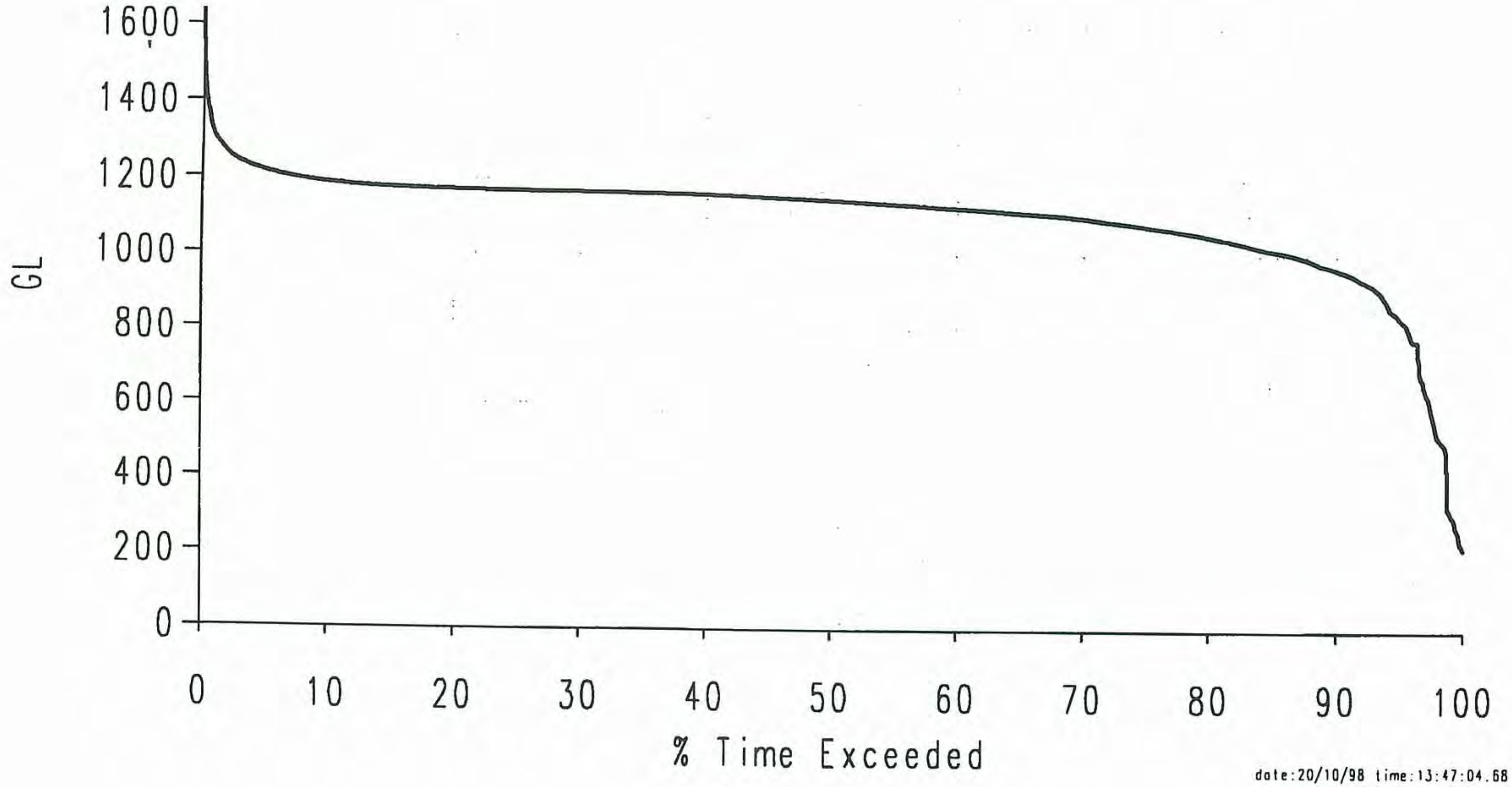


Figure 10.1 – Dam Storage vrs % of time Exceeded



BCC.045.0316

Appendix A

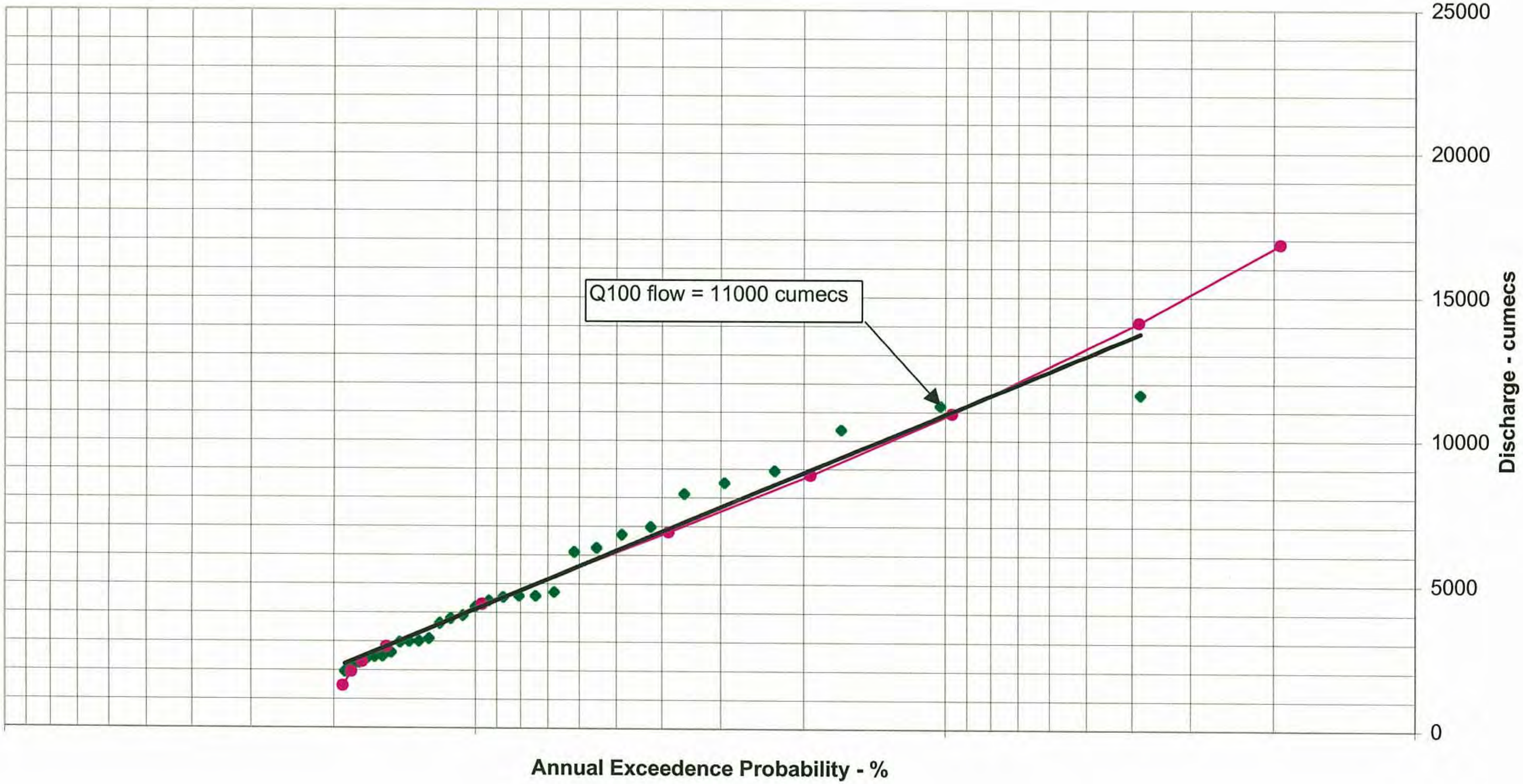
A1 Contains the revised Flood Frequency data for the Port Office Gauge.

A2 Contains Chapter 7 from Hydrology Report No:143005.PR/4, Report on Downstream Flooding, Queensland Water Resources Commission, November 1984. It contains the original flood operation procedures for Wivenhoe and Somerset Dams.

Also contained is a graph and table of the current release procedures for Wivenhoe Dam.

A2 Contains Brisbane River Cross section, which are a combination of survey conducted in 1873 and survey conducted in 1997. The cross sections are located from the Victoria Bridge to the mouth of the Brisbane River

Figure A1- Revised Flood Frequency Curve at Port Office Gauge - No Dams Effective



RANK m	DATE	Q	AEP	ADJUSTED AEP
1	1893	11600	1.987	0.385
2	1841	11200	5.298	1.025
3	1974	10364	8.609	1.666
4	1844	8924	11.921	2.307
5	1898	8500	15.232	2.948
6	1845	8120	18.543	3.589
7	1890	6972	21.854	4.230
8	1955	6704	25.166	4.871
9	1931	6245	28.477	5.512
10	1908	6100	31.788	6.153
11	1968	4704	35.099	6.793
12	1864	4574	38.411	7.434
13	1887	4574	41.722	8.075
14	1889	4525	45.033	8.716
15	1928	4398	48.344	9.357
16	1956	4189	51.656	9.998
17	1929	3884	54.967	10.639
18	1863	3789	58.278	11.280
19	1927	3618	61.589	11.921
20	1996	3087	64.901	12.561
21	1870	3001	68.212	13.202
22	1967	2990	71.523	13.843
23	1857	2963	74.834	14.484
24	1873	2614	78.146	15.125
25	1971	2478	81.457	15.766
26	1875	2455	84.768	16.407
27	1991	2387	88.079	17.048
28	1852	2252	91.391	17.689
29	1879	2149	94.702	18.329
30	1843	1940	98.013	18.970

	log q	(log q) squared	(log q) cubed
	4.064	16.520	67.144
	4.049	16.396	66.392
	4.016	16.124	64.748
	3.951	15.607	61.655
	3.929	15.440	60.672
	3.910	15.284	59.755
	3.843	14.771	56.772
	3.826	14.641	56.021
	3.796	14.406	54.678
	3.785	14.329	54.239
	3.672	13.487	49.531
	3.660	13.398	49.041
	3.660	13.398	49.041
	3.656	13.363	48.851
	3.643	13.273	48.357
	3.622	13.120	47.521
	3.589	12.883	46.239
	3.578	12.806	45.825
	3.558	12.663	45.059
	3.490	12.177	42.493
	3.477	12.092	42.046
	3.476	12.080	41.987
	3.472	12.053	41.845
	3.417	11.678	39.906
	3.394	11.520	39.100
	3.390	11.492	38.957
	3.378	11.410	38.542
	3.353	11.240	37.681
	3.332	11.104	37.001
	3.288	10.810	35.540
sum	109.276	399.564	1466.638
mean =	3.643		
Standard Deviation =		0.229	
		g (skewness) =	0.331

0.300 0.4308
0.400

N = 155

P* = 0.193548387

Number of Flood Events 30

Log Pearson III Data
Y-Axis X-Axis

AEP	0.300	0.400	Ky	KyS	log(Qy)	Qy	Adjusted AEP
99	-2.104	-2.029	-2.0809	-0.48252	3.160	1445.438	19.161
95	-1.555	-1.524	-1.54545	-0.35662	3.286	1931.542	18.387
90	-1.245	-1.231	-1.24069	-0.28552	3.357	2275.086	17.419
80	-0.853	-0.855	-0.85362	-0.19562	3.447	2798.317	15.484
50	-0.05	-0.067	-0.05524	-0.01147	3.631	4276.147	9.677
20	0.824	0.816	0.821536	0.188972	3.831	6784.082	3.871
10	1.309	1.317	1.311464	0.300199	3.943	8764.323	1.935
5	1.726	1.75	1.733391	0.395832	4.038	10923.225	0.968
2	2.211	2.261	2.226399	0.507059	4.150	14111.662	0.387
1	2.544	2.615	2.565866	0.583427	4.226	16824.671	0.194

Frequency Factors Ky for use with Log-Pearson Type III Distribution

	1.0101	1.0526	1.1111	1.25	2	5	10	20	50	100	200	500
					Percent							
	99	95	90	80	50	20	10	5	2	1	0.5	0.2
-3.9	-4.341	-1.932	-1.020	-0.245	0.414	0.510	0.513	0.513	0.513	0.513	0.513	0.513
-3.8	-4.314	-1.943	-1.040	-0.264	0.414	0.522	0.526	0.526	0.526	0.526	0.526	0.526
-3.7	-4.285	-1.953	-1.059	-0.283	0.414	0.535	0.540	0.541	0.541	0.541	0.541	0.541
-3.6	-4.256	-1.963	-1.077	-0.302	0.414	0.549	0.555	0.555	0.556	0.556	0.556	0.556
-3.5	-4.225	-1.971	-1.096	-0.322	0.413	0.562	0.570	0.571	0.571	0.571	0.571	0.571
-3.4	-4.193	-1.980	-1.113	-0.341	0.411	0.577	0.587	0.588	0.588	0.588	0.588	0.588
-3.3	-4.159	-1.987	-1.131	-0.361	0.408	0.591	0.604	0.606	0.606	0.606	0.606	0.606
-3.2	-4.125	-1.993	-1.148	-0.381	0.405	0.606	0.622	0.624	0.625	0.625	0.625	0.625
-3.1	-4.089	-1.999	-1.164	-0.401	0.400	0.621	0.641	0.644	0.645	0.645	0.645	0.645
-3.0	-4.051	-2.003	-1.180	-0.420	0.396	0.636	0.660	0.665	0.666	0.667	0.667	0.667
-2.9	-4.013	-2.007	-1.195	-0.440	0.390	0.651	0.681	0.688	0.689	0.690	0.690	0.690
-2.8	-3.973	-2.010	-1.210	-0.460	0.384	0.666	0.702	0.711	0.714	0.714	0.714	0.714
-2.7	-3.932	-2.012	-1.224	-0.479	0.376	0.681	0.724	0.736	0.740	0.740	0.741	0.741
-2.6	-3.889	-2.013	-1.238	-0.499	0.369	0.696	0.747	0.762	0.768	0.769	0.769	0.769
-2.5	-3.845	-2.012	-1.250	-0.518	0.360	0.711	0.771	0.790	0.798	0.799	0.800	0.800
-2.4	-3.800	-2.011	-1.262	-0.537	0.351	0.725	0.795	0.819	0.830	0.832	0.833	0.833
-2.3	-3.753	-2.009	-1.274	-0.555	0.341	0.739	0.819	0.850	0.864	0.867	0.869	0.869
-2.2	-3.705	-2.006	-1.284	-0.574	0.330	0.752	0.844	0.882	0.900	0.905	0.907	0.909
-2.1	-3.656	-2.001	-1.294	-0.592	0.319	0.765	0.869	0.915	0.939	0.946	0.949	0.951
-2.0	-3.605	-1.996	-1.303	-0.609	0.307	0.777	0.895	0.949	0.980	0.990	0.995	0.998
-1.9	-3.553	-1.989	-1.311	-0.627	0.294	0.788	0.920	0.984	1.023	1.037	1.044	1.049
-1.8	-3.499	-1.981	-1.318	-0.643	0.282	0.799	0.945	1.020	1.069	1.087	1.097	1.105
-1.7	-3.444	-1.972	-1.324	-0.660	0.268	0.808	0.970	1.056	1.116	1.140	1.155	1.165
-1.6	-3.388	-1.962	-1.329	-0.675	0.254	0.817	0.994	1.093	1.166	1.197	1.216	1.231
-1.5	-3.330	-1.951	-1.333	-0.691	0.240	0.825	1.018	1.131	1.217	1.256	1.282	1.303
-1.4	-3.271	-1.938	-1.337	-0.705	0.225	0.832	1.041	1.168	1.270	1.318	1.351	1.380
-1.3	-3.211	-1.925	-1.339	-0.719	0.210	0.838	1.064	1.206	1.324	1.383	1.424	1.462
-1.2	-3.149	-1.910	-1.340	-0.733	0.195	0.844	1.086	1.243	1.379	1.449	1.501	1.550
-1.1	-3.087	-1.894	-1.341	-0.745	0.180	0.848	1.107	1.280	1.435	1.518	1.581	1.643
-1.0	-3.023	-1.877	0.000	-0.758	0.164	0.852	1.128	1.317	1.492	1.588	1.664	1.741
-0.9	-2.957	-1.859	-1.339	-0.769	0.148	0.854	1.147	1.353	1.549	1.660	1.749	1.842
-0.8	-2.891	-1.839	-1.336	-0.780	0.132	0.856	1.166	1.389	1.606	1.733	1.837	1.948
-0.7	-2.824	-1.819	-1.333	-0.790	0.116	0.857	1.183	1.423	1.663	1.806	1.926	2.057
-0.6	-2.755	-1.797	-1.329	-0.800	0.099	0.857	1.200	1.458	1.720	1.880	2.016	2.169
-0.5	-2.686	-1.774	-1.323	-0.808	0.083	0.857	1.216	1.491	1.777	1.955	2.108	2.283
-0.4	-2.615	-1.750	-1.317	-0.816	0.067	0.855	1.231	1.524	1.834	2.029	2.201	2.399
-0.3	-2.544	-1.726	-1.309	-0.824	0.050	0.853	1.245	1.555	1.890	2.104	2.294	2.517
-0.2	-2.472	-1.700	-1.301	-0.830	0.033	0.850	1.258	1.586	1.945	2.178	2.388	2.637
-0.1	-2.400	-1.673	-1.292	-0.836	0.017	0.846	1.270	1.616	2.000	2.253	2.482	2.757
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0.4	-2.029	-1.524	-1.231	-0.855	-0.067	0.816	1.317	1.750	2.261	2.615	2.949	3.366
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0.9	-1.660	-1.353	-1.147	-0.854	-0.148	0.769	1.339	1.859	2.498	2.957	3.401	3.969
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1.3	-1.383	-1.206	-1.064	-0.838	-0.210	0.719	1.339	1.925	2.667	3.211	3.745	4.438
1.4	-1.318	-1.168	-1.041	-0.832	-0.225	0.705	1.337	1.938	2.706	3.271	3.828	4.553
1.5	-1.256	-1.131	-1.018	-0.825	-0.240	0.691	1.333	1.951	2.743	3.330	3.910	4.667
1.6	-1.197	-1.093	-0.994	-0.817	-0.254	0.675	1.329	1.962	2.780	3.388	3.990	4.779
1.7	-1.140	-1.056	-0.970	-0.808	-0.268	0.660	1.324	1.972	2.815	3.444	4.069	4.890
1.8	-1.087	-1.020	-0.945	-0.799	-0.282	0.643	1.318	1.981	2.848	3.499	4.147	4.999
1.9	-1.037	-0.984	-0.920	-0.788	-0.294	0.627	1.311	1.989	2.881	3.553	4.223	5.108
2.0	-0.990	-0.949	-0.895	-0.777	-0.307	0.609	1.303	1.996	2.912	3.605	4.298	5.215
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2.2	-0.905	-0.882	-0.844	-0.752	-0.330	0.574	1.284	2.006	2.970	3.705	4.444	5.424
2.3	-0.867	-0.850	-0.819	-0.739	-0.341	0.555	1.274	2.009	2.997	3.753	4.515	5.527
2.4	-0.832	-0.819	-0.795	-0.725	-0.351	0.537	1.262	2.011	3.023	3.800	4.584	5.628
2.5	-0.799	-0.790	-0.771	-0.711	-0.360	0.518	1.250	2.012	3.048	3.845	4.652	5.728
2.6	-0.769	-0.762	-0.747	-0.696	-0.369	0.499	1.238	2.013	3.071	3.889	4.718	5.826
2.7	-0.740	-0.736	-0.724	-0.681	-0.376	0.479	1.224	2.012	3.093	3.932	4.783	5.923
2.8	-0.714	-0.711	-0.702	-0.666	-0.384	0.460	1.210	2.010	3.114	3.973	4.847	6.019
2.9	-0.690	-0.688	-0.681	-0.651	-0.390	0.440	1.195	2.007	3.134	4.013	4.909	6.113
3.0	-0.667	-0.665	-0.660	-0.636	-0.396	0.420	1.180	2.003	3.152	4.051	4.970	6.205
3.1	-0.645	-0.644	-0.641	-0.621	-0.400	0.401	1.164	1.999	3.169	4.089	5.029	6.296
3.2	-0.625	-0.624	-0.622	-0.606	-0.405	0.381	1.148	1.993	3.185	4.125	5.087	6.386
3.3	-0.606	-0.606	-0.604	-0.591	-0.408	0.361	1.131	1.987	3.200	4.159	5.144	6.474
3.4	-0.588	-0.588	-0.587	-0.577	-0.411	0.341	1.113	1.980	3.214	4.193	5.199	6.561
3.5	-0.571	-0.571	-0.570	-0.562	-6.413	0.322	1.096	1.971	3.226	4.225	5.253	6.646
3.6	-0.556	-0.555	-0.555	-0.549	-0.414	0.302	1.077	1.963	3.238	4.256	5.306	6.730
3.7	-0.541	-0.541	-0.540	-0.535	-0.414	0.283	1.059	1.953	3.249	4.285	5.357	6.813
3.8	-0.526	-0.526	-0.526	-0.522	-0.414	0.264	1.040	1.943	3.258	4.314	5.407	6.894
3.9	-0.513	-0.513	-0.513	-0.510	-0.414	0.245	1.020	1.932	3.267	4.341	5.456	6.974

7. FLOOD OPERATION PROCEDURES FOR WIVENHOE AND SOMERSET DAMS

(This section was provided by Mr. K. Hegerty from the Brisbane City Council.)

Since Wivenhoe Dam and Somerset Dam are to be operated in series to mitigate flooding in the lower catchment, it was important that the most effective combination of procedures for the two dams should be determined. Five procedures for each of Somerset and Wivenhoe Dams, giving a total of twenty-five combinations, were tested. The procedures are described briefly below.

(a) Somerset Dam Procedures

1. Store all water from Stanley River catchment until the inflow to Wivenhoe Dam has peaked and then release water from Somerset Dam at a rate such that the inflow to Wivenhoe Dam is not increased above that peak.

2. Route the Stanley River flood through Somerset Dam with minimal mitigation. Owing to the storage-discharge characteristics of the dam, a significant degree of mitigation can be achieved for some floods using this procedure.

3. Release at 75% of the inflow rate until the upper Brisbane flood peak reaches Gregors Creek gauge and then shut down the releases until the inflow to Wivenhoe Dam has peaked. Releases then begin again at a rate that does not increase the inflow rate to Wivenhoe Dam beyond that peak.

4. Release at 75% of the inflow rate until the upper Brisbane River flood peak reaches Gregors Creek gauge. Releases are then held constant until the inflow to Wivenhoe Dam has peaked and they are then increased without increasing the inflow to Wivenhoe Dam beyond that peak.

5. Raise Somerset Dam spillway gates to permit uncontrolled discharge over the spillway once the flood storage between Full Supply Level and spillway crest level has filled. Low level outlets remain closed until the inflow to Wivenhoe Dam has peaked or the level in Somerset Dam exceeds 102.2 m

(b) Wivenhoe Dam Procedures

The operation of Wivenhoe Dam, for all procedures, begins by storing the whole of the inflow until the lake level exceeds EL 67.250 m. Different procedures are then used, as follows.

1. Release water from Wivenhoe Dam onto the flow from Lockyer Creek at a rate to ensure that Fernvale Bridge is not submerged unncessarily.

2. Release from Wivenhoe Dam onto the flow from Lockyer Creek so that Fernvale Bridge is not submerged prematurely and once Fernvale Bridge is submerged by Lockyer Creek flows, continue the release at a rate such that Mt. Crosby Weir bridge is not submerged.

3. Release from Wivenhoe Dam onto the flow from Lockyer Creek at a rate such that Fernvale and Mt. Crosby Weir bridges are not submerged prematurely. The maximum flow at Lowood is to be the lesser of 3500 m^3/s and either the peak flow of Lockyer Creek or the peak flow of the Bremer River, whichever is the greater.

4. Release from Wivenhoe Dam onto the flow from Lockyer Creek at a rate such that Fernvale and Mt. Crosby Weir bridges are not submerged prematurely. The maximum level on the Lowood flood gauge is not to exceed 14 m.

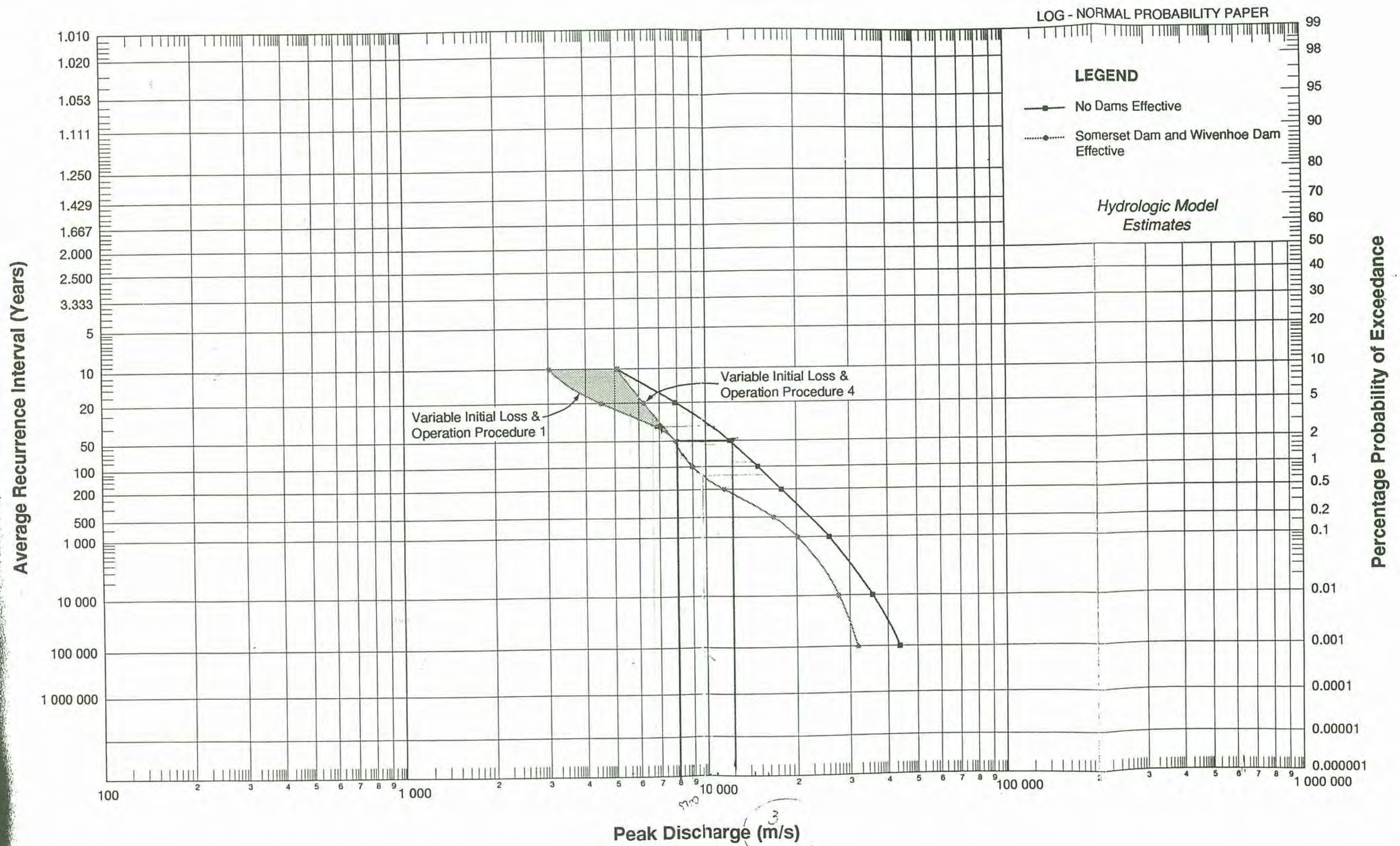
5. Release from Wivenhoe Dam onto the flow from Lockyer Creek at a rate such that Fernvale and Mt. Crosby Weir bridges are not submerged prematurely. Once it is evident that Mt. Crosby Weir bridge will be submerged, releases can be increased so that the level of the Lowood flood gauge does not exceed 14 m until either (a) the Lockyer Creek flood peak flow passes the junction with the Brisbane River, or (b) the lake level in Wivenhoe Dam exceeds EL 73.5 m. The releases are then increased until the level in Wivenhoe Dam begins to fall.

For procedures 3, 4, and 5 and when the Lockyer Creek peak flow causes the level on the Lowood flood gauge to exceed 14 m, the level on the gauge should return to 14 m as quickly as practicable and is to remain at this level until the flood storages of Wivenhoe and Somerset Dams are emptied.

The opening of the Wivenhoe Dam spillway gates is restricted to one 500 mm increment of one gate per 10 minute time interval for lake levels below EL 71.5 and per 6 minute time interval for lake levels above EL 71.5. For simultaneous operation of two gates, it was assumed that either the gate increments were reduced to 250 mm or that the time intervals were increased to 20 and 12 minutes respectively.

The operating procedures for Wivenhoe Dam were designed so that initial release operations did not adversely affect later operations in the event of the flood magnitude's being larger than originally estimated.

Flood Frequency Curve
Brisbane River at Port Office Gauge
Comparison Pre-Dams to Post-Dams



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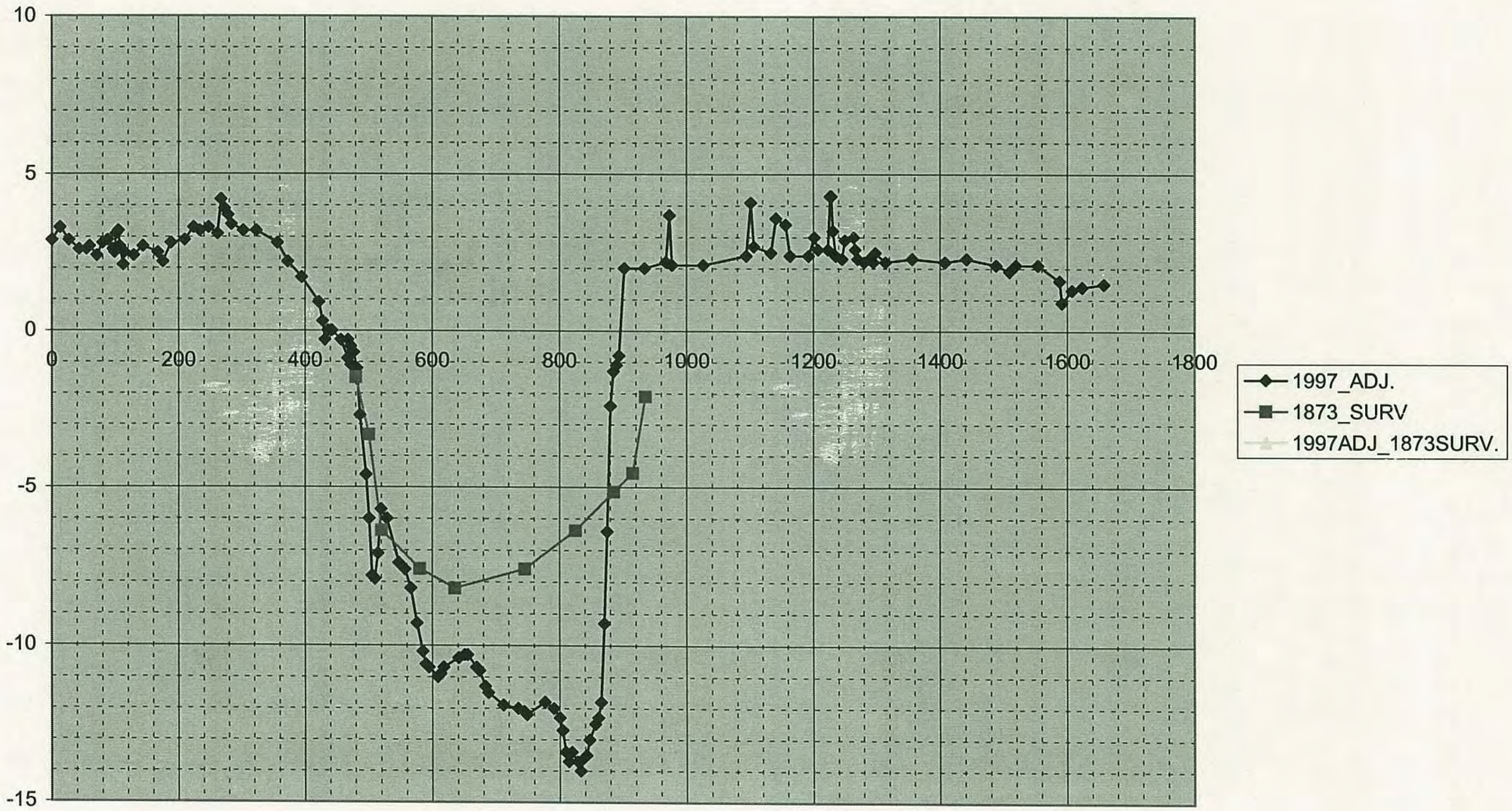
Procedure	Reservoir Level	Applicable Limits		
0	EL < 67.25	$Q_{Wivenhoe} = 0\ m^3/sec$ Ie. NO releases		$Q_{Moggill} < 4000\ m^3/sec$
1A	67.25 < EL < 67.5	$Q_{Wivenhoe} < 110\ m^3/sec$	$Q_{Colleges\ Crossing} < 175\ m^3/sec$ with care not to submerge Twin Bridges prematurely	
1B	67.5 < EL < 67.75	$Q_{Wivenhoe} < 210\ m^3/sec$	$Q_{Butrons/Noogoorah} < 250\ m^3/sec$ with care not to submerge Colleges Crossing prematurely	
1C	67.75 < EL < 68.0	$Q_{Wivenhoe} < 500\ m^3/sec$	$Q_{Kholo} < 550\ m^3/sec$ with care not to submerge Burtons/Noogoorah prematurely	
1D	68.0 < EL < 68.25	$Q_{Wivenhoe} < 900\ m^3/sec$	$Q_{Mt\ Crosby} < 1900\ m^3/sec$ with care not to submerge Kholo prematurely	
1E	68.25 < EL < 68.5	$Q_{Wivenhoe} < 1500\ m^3/sec$	$Q_{Mt\ Crosby} < 1900\ m^3/sec$ with care not to submerge Kholo prematurely	
2	68.25 < EL < 74.0	$Q_{Lowood} < 3500\ m^3/sec$	Q_{Lowood} < peak of Lockyer & Q_{Lowood} < peak of Bremer	Gates ARE NOT to be overtopped
3	68.25 < EL < 74.0	$Q_{Lowood} < 3500\ m^3/sec$	$Q_{Moggill} < 4000\ m^3/sec$	
4	EL > 74.0 OR Dam safety may be compromised	Gates are to be opened until reservoir level begins to fall	Gate opening interval restrictions NO longer apply	

BN130



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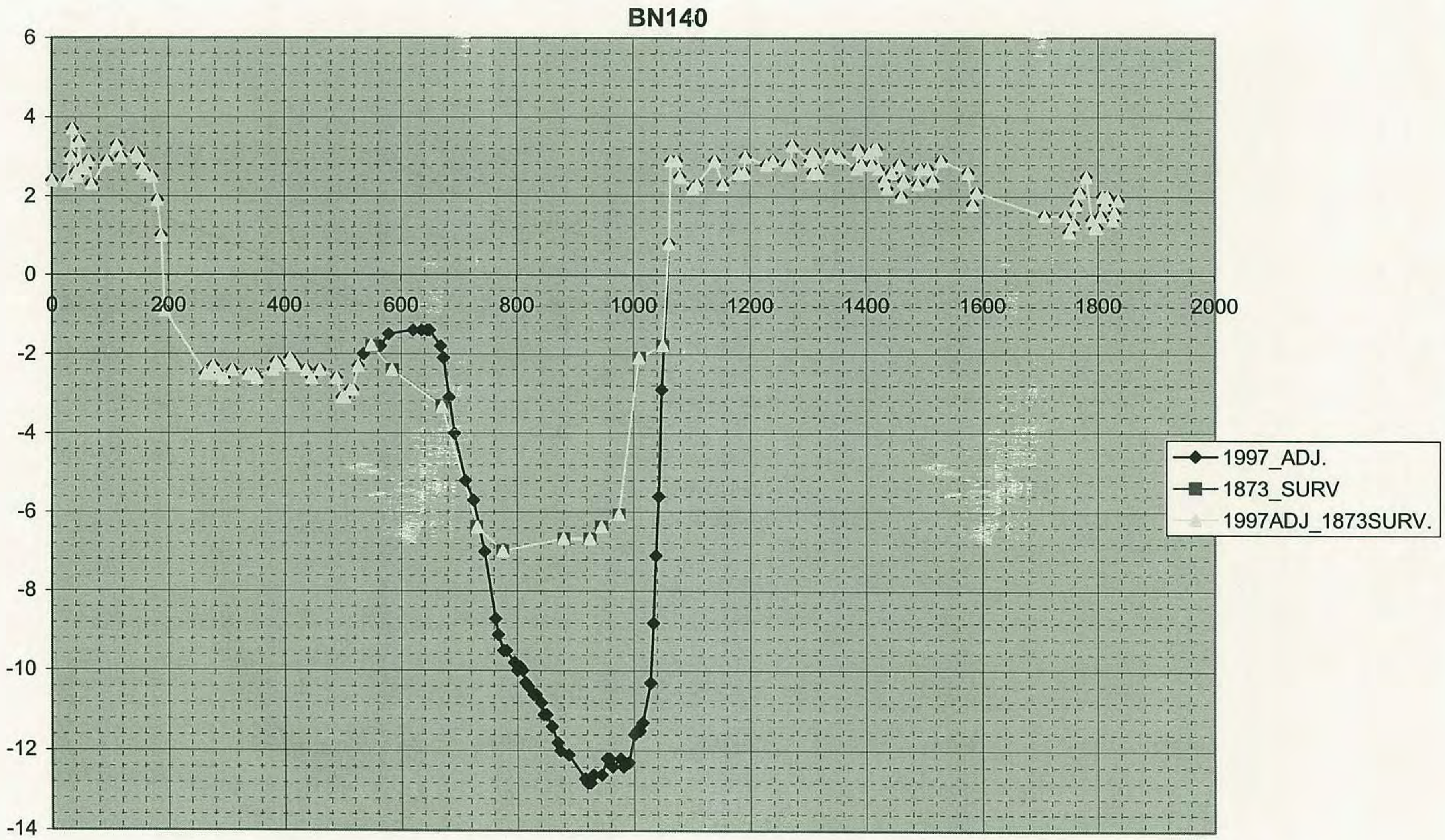
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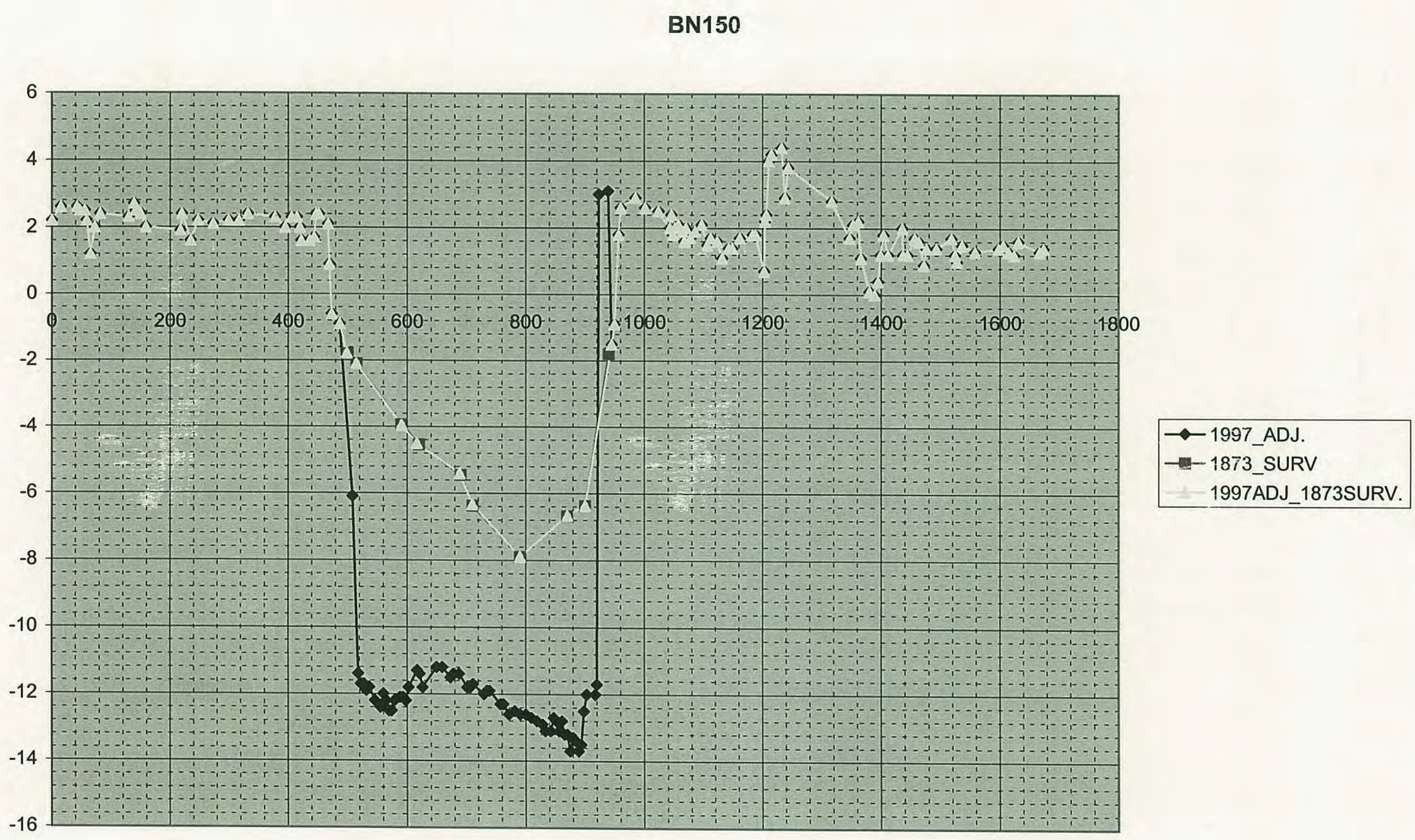
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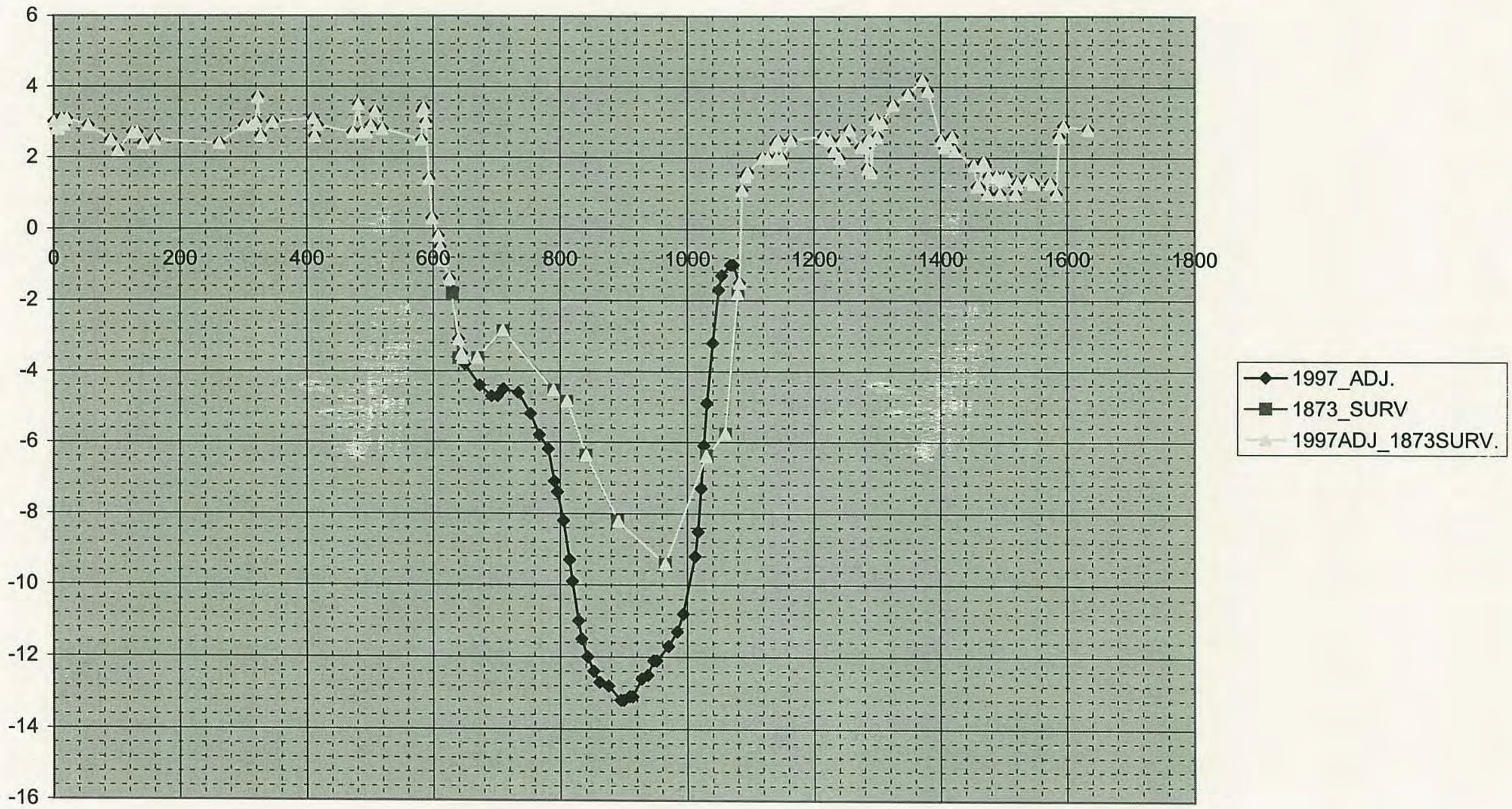

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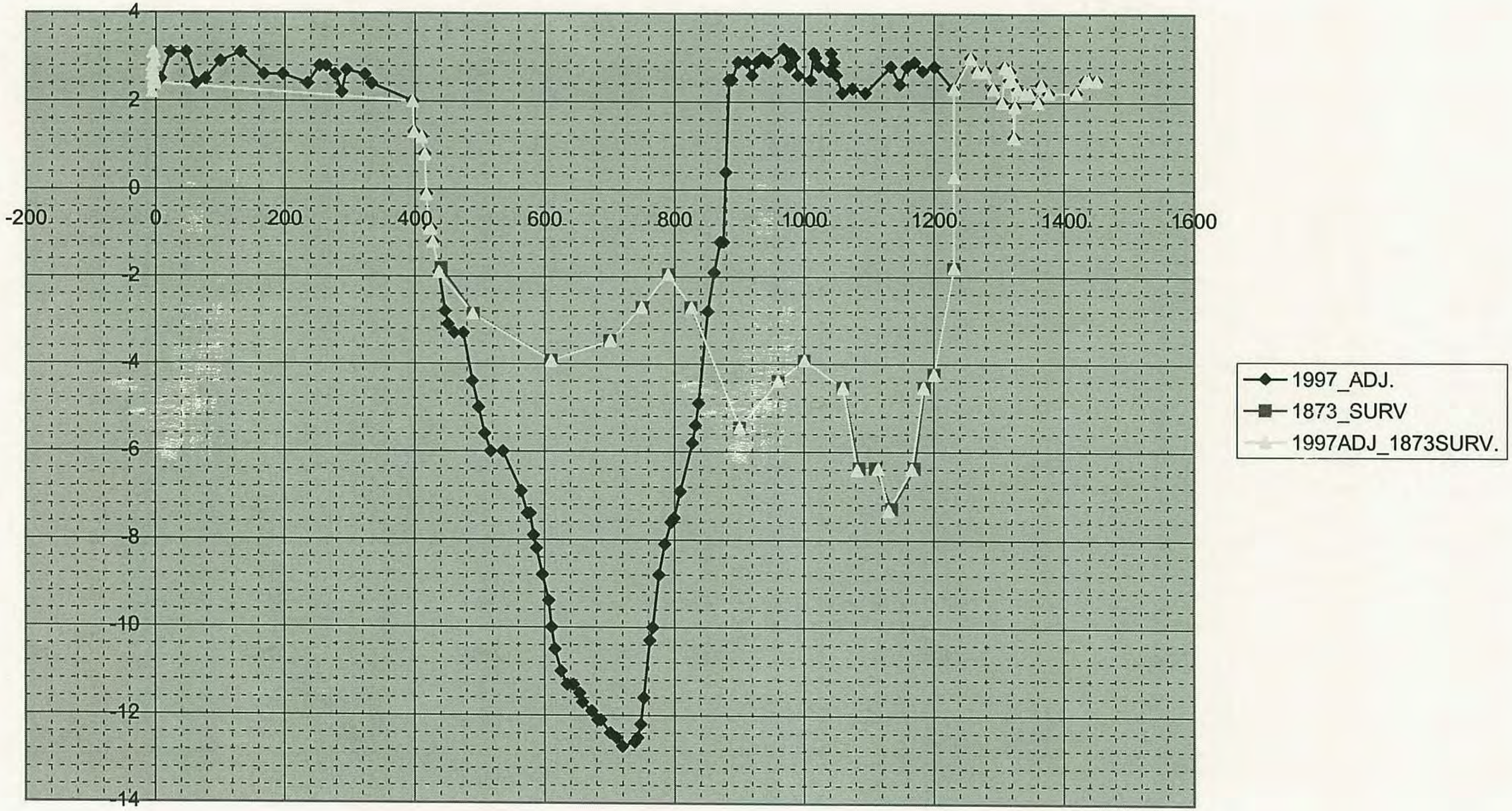

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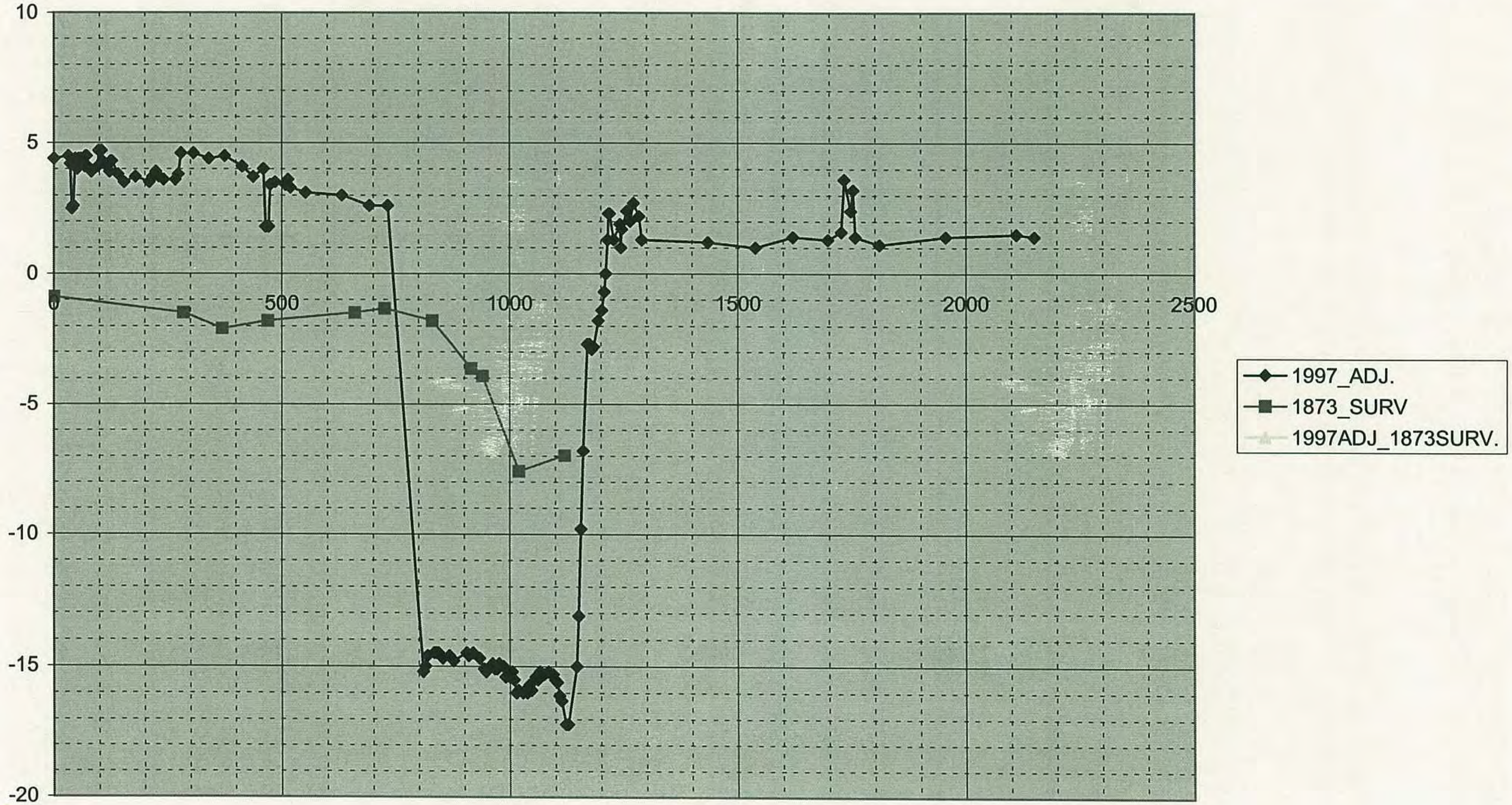

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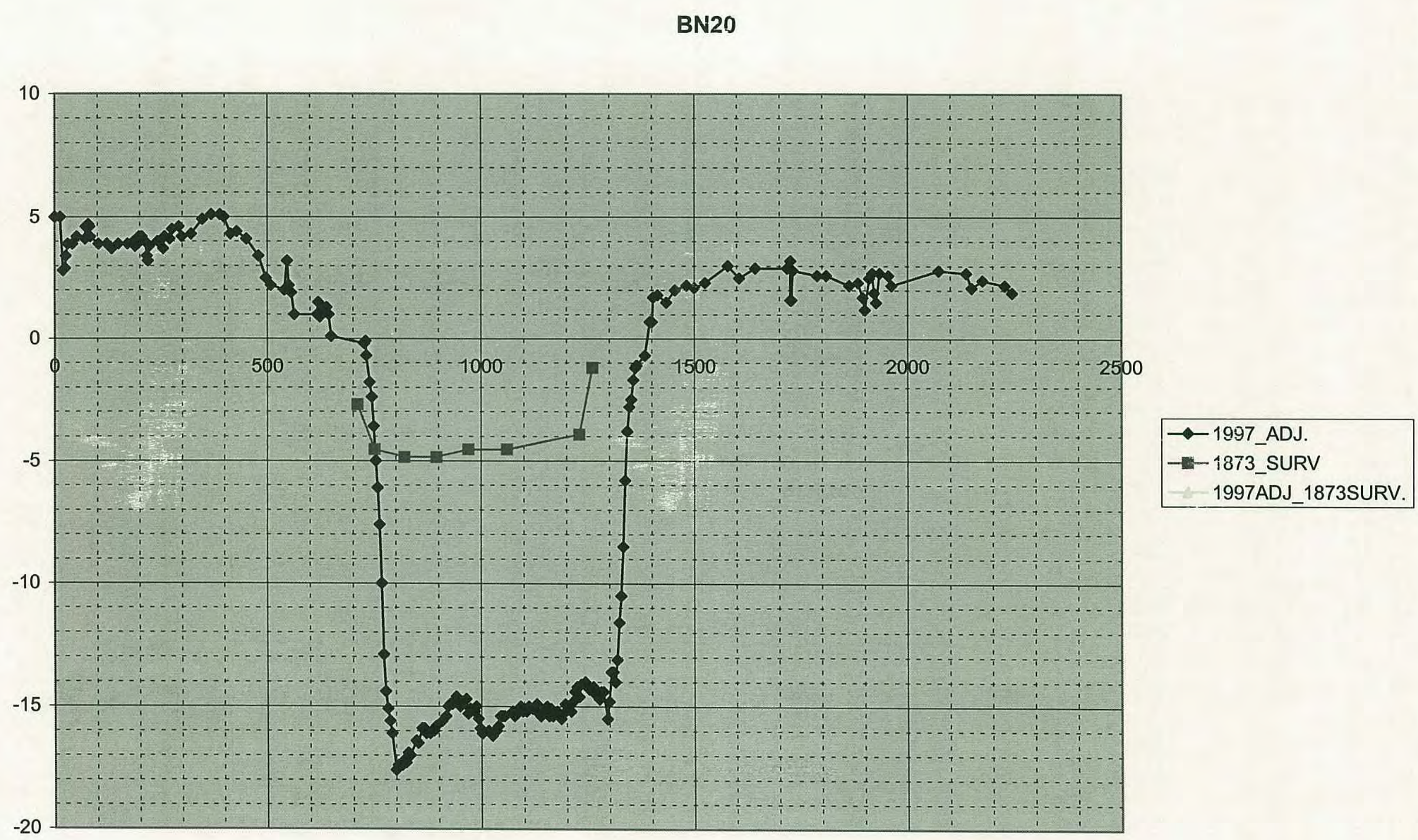
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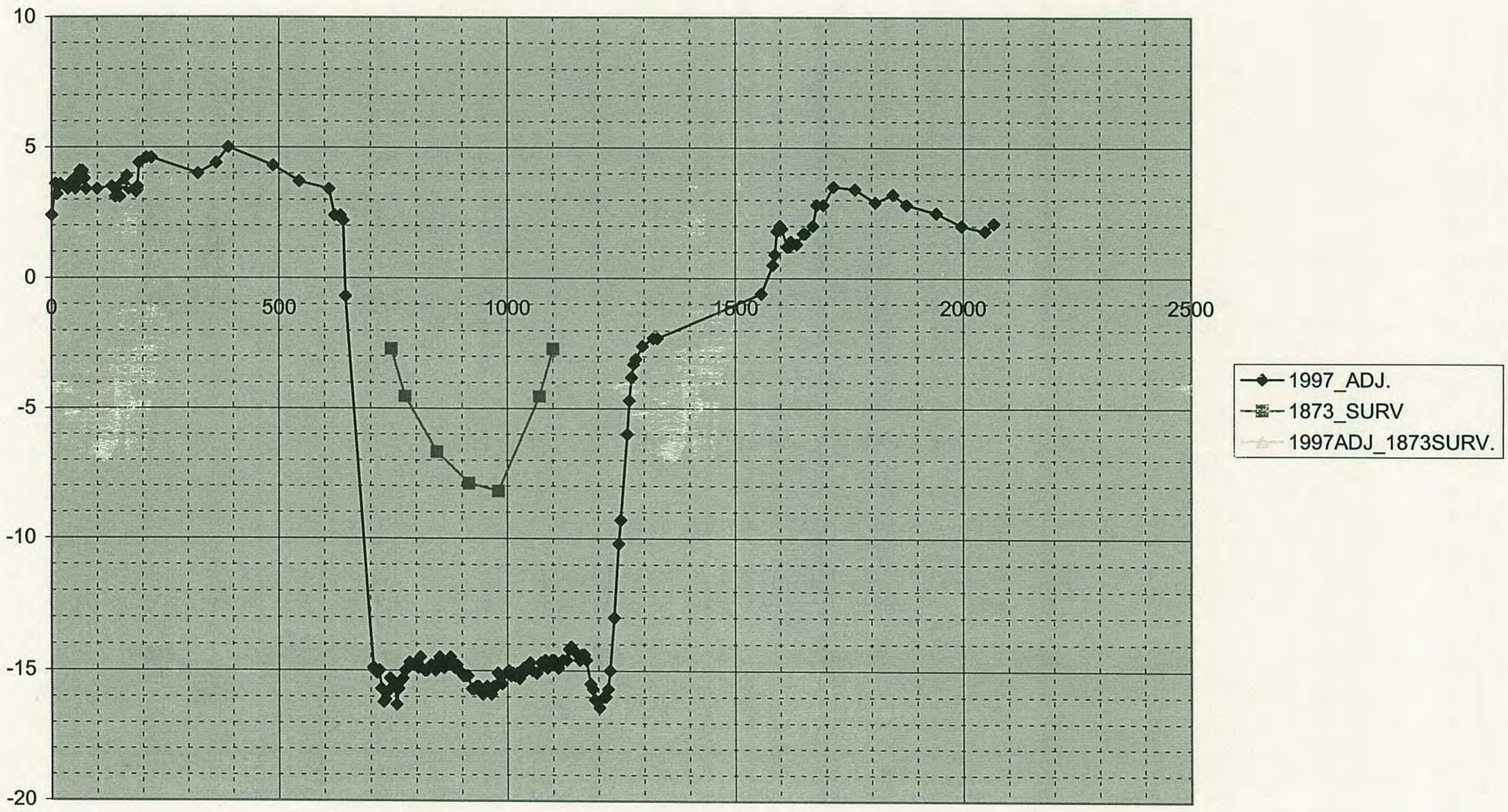

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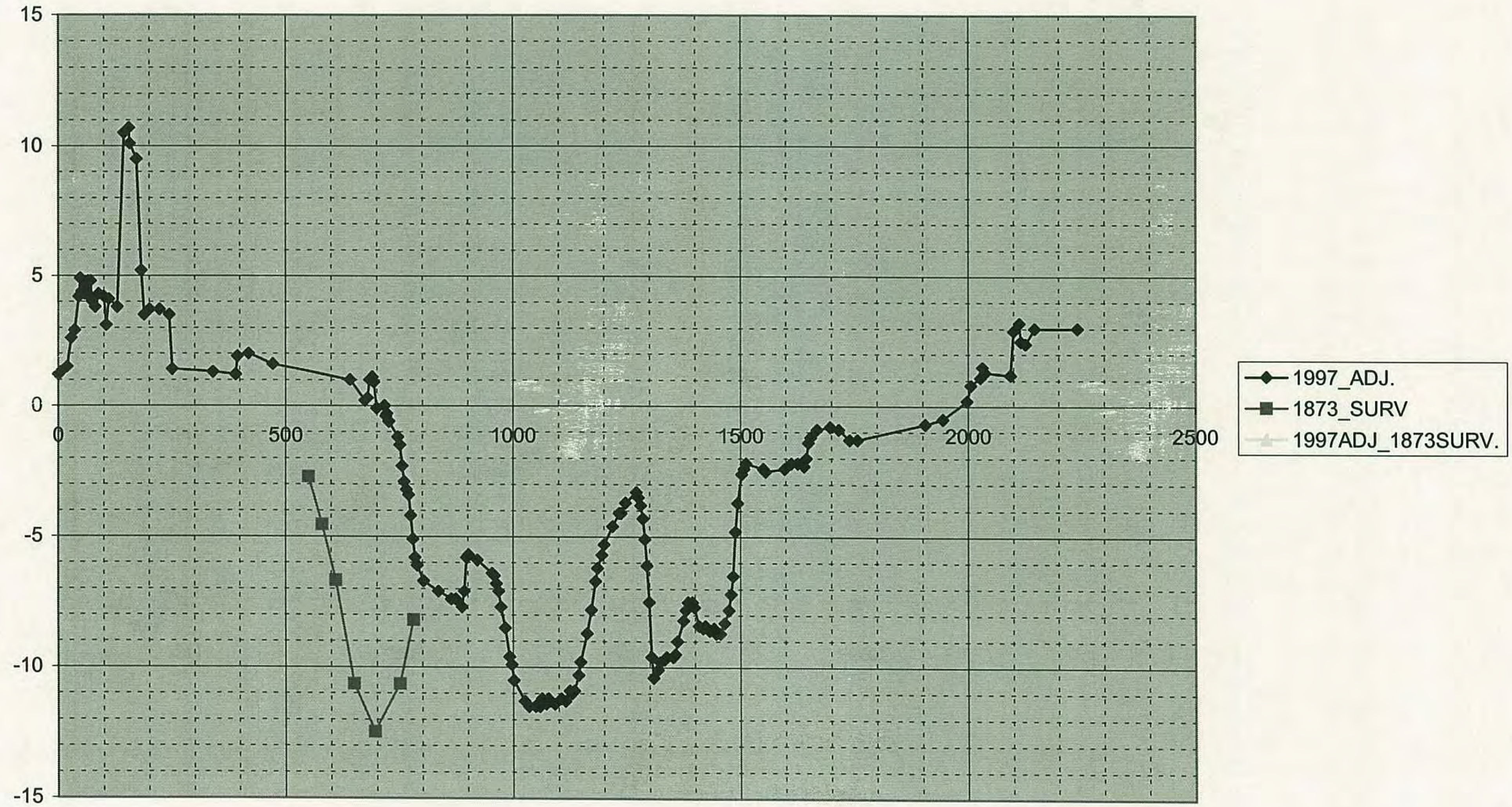

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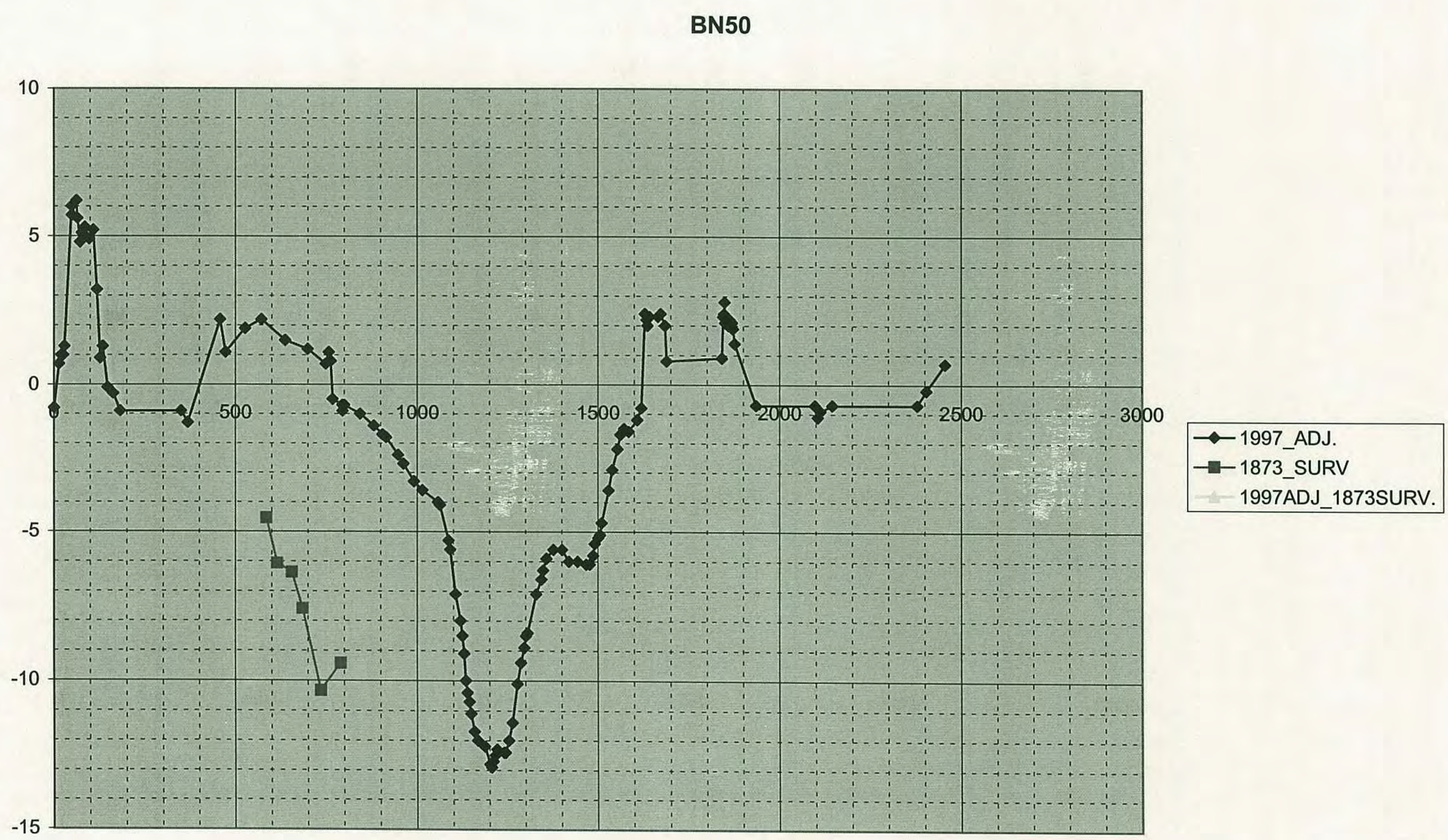
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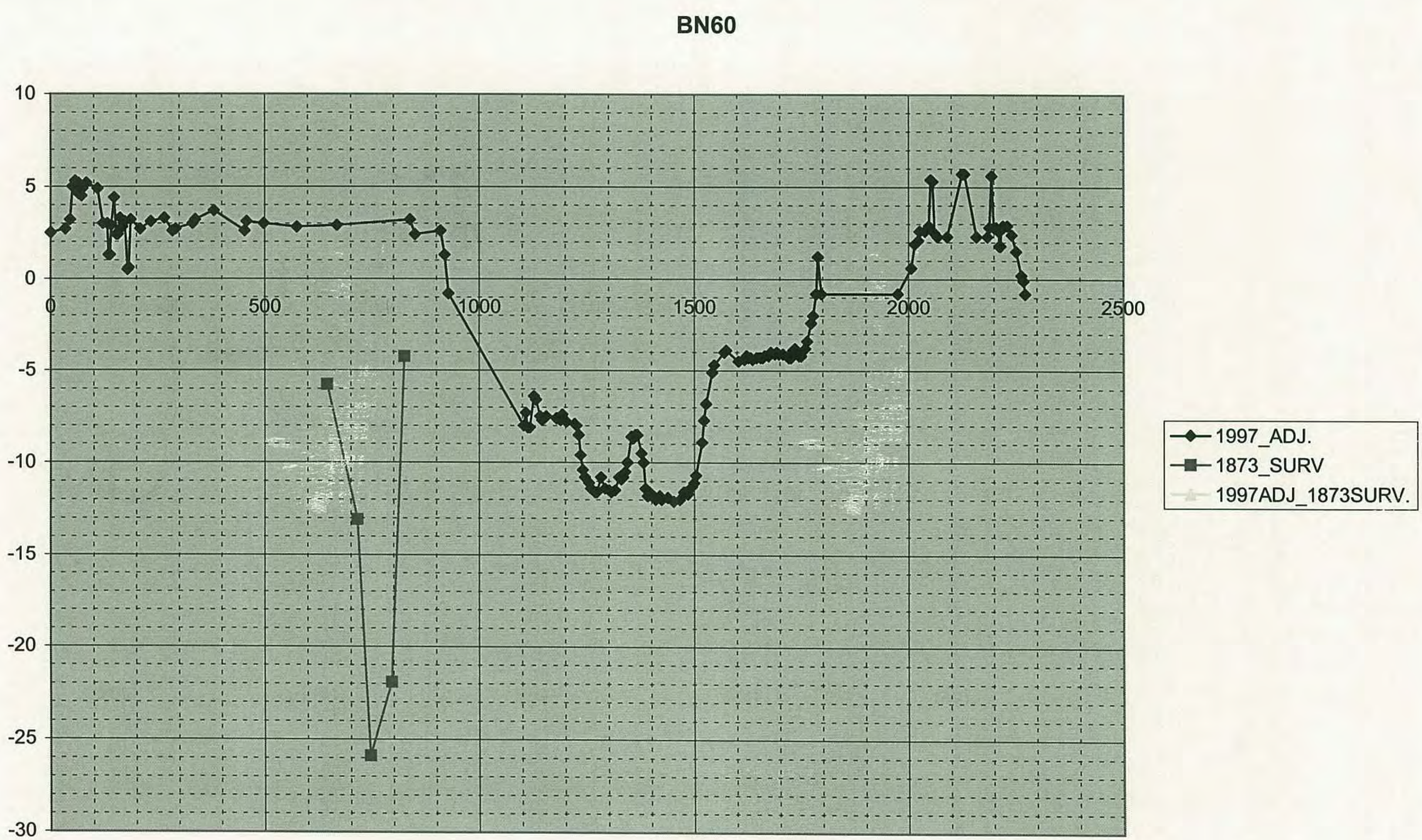
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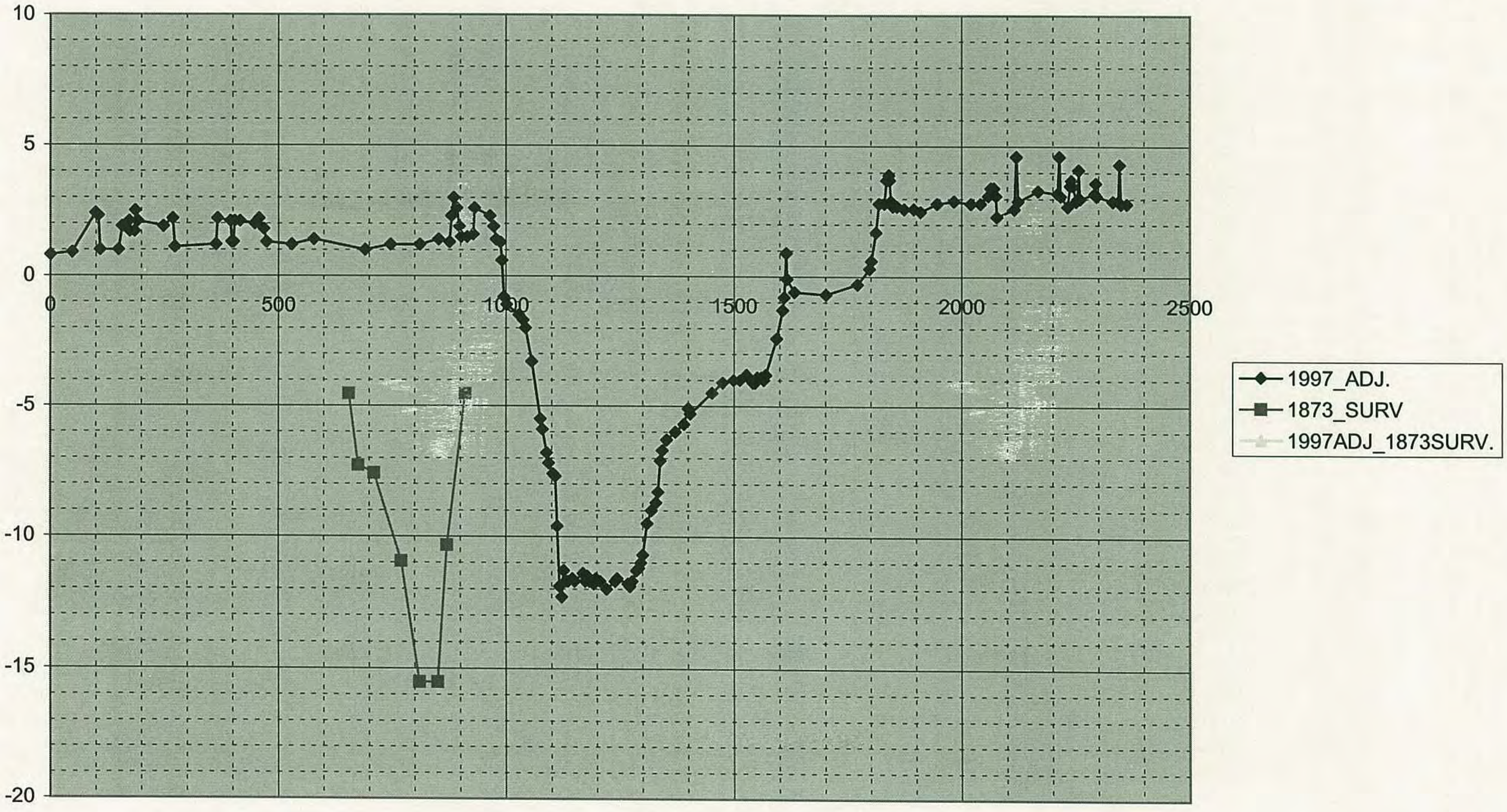

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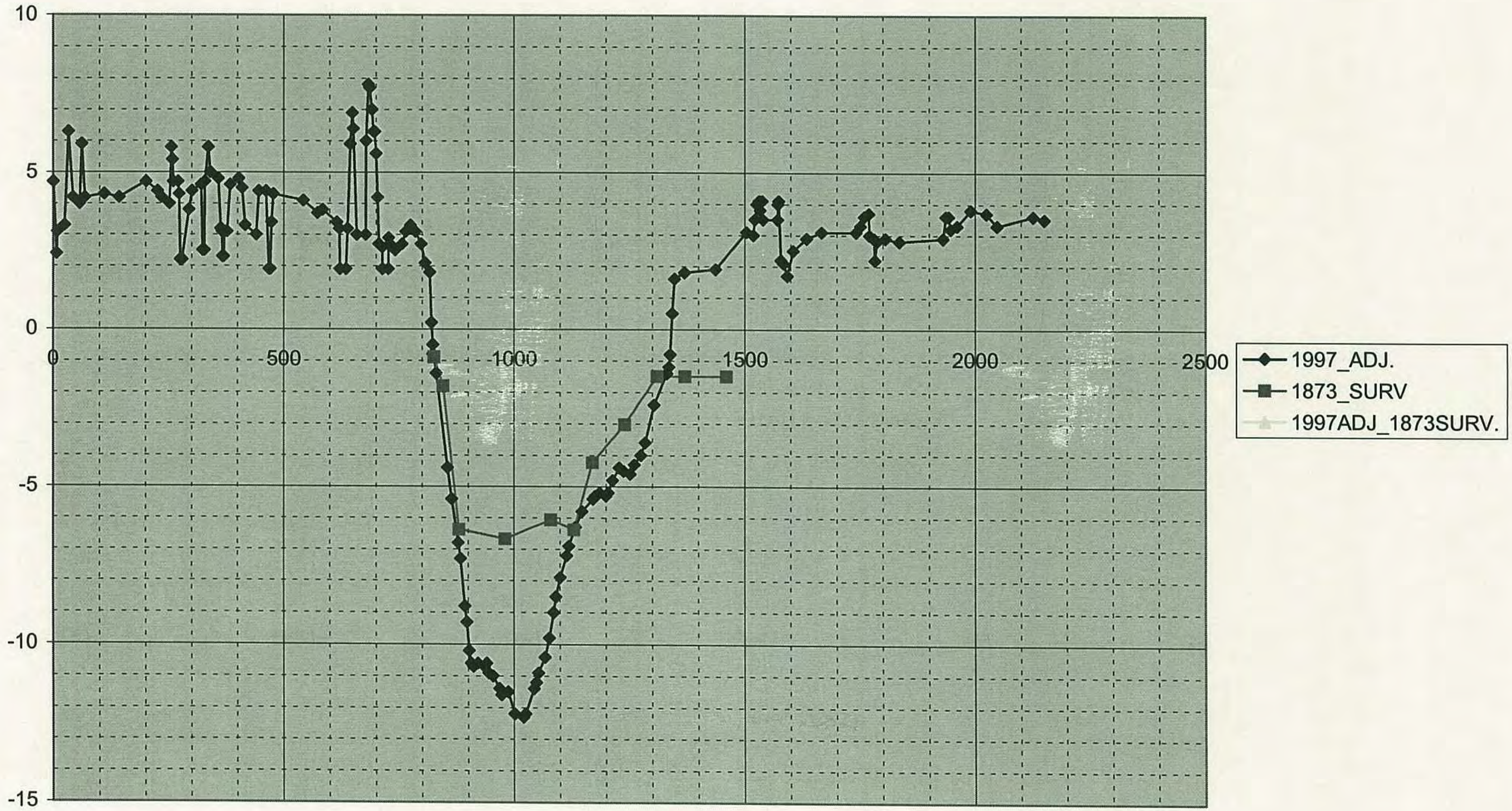
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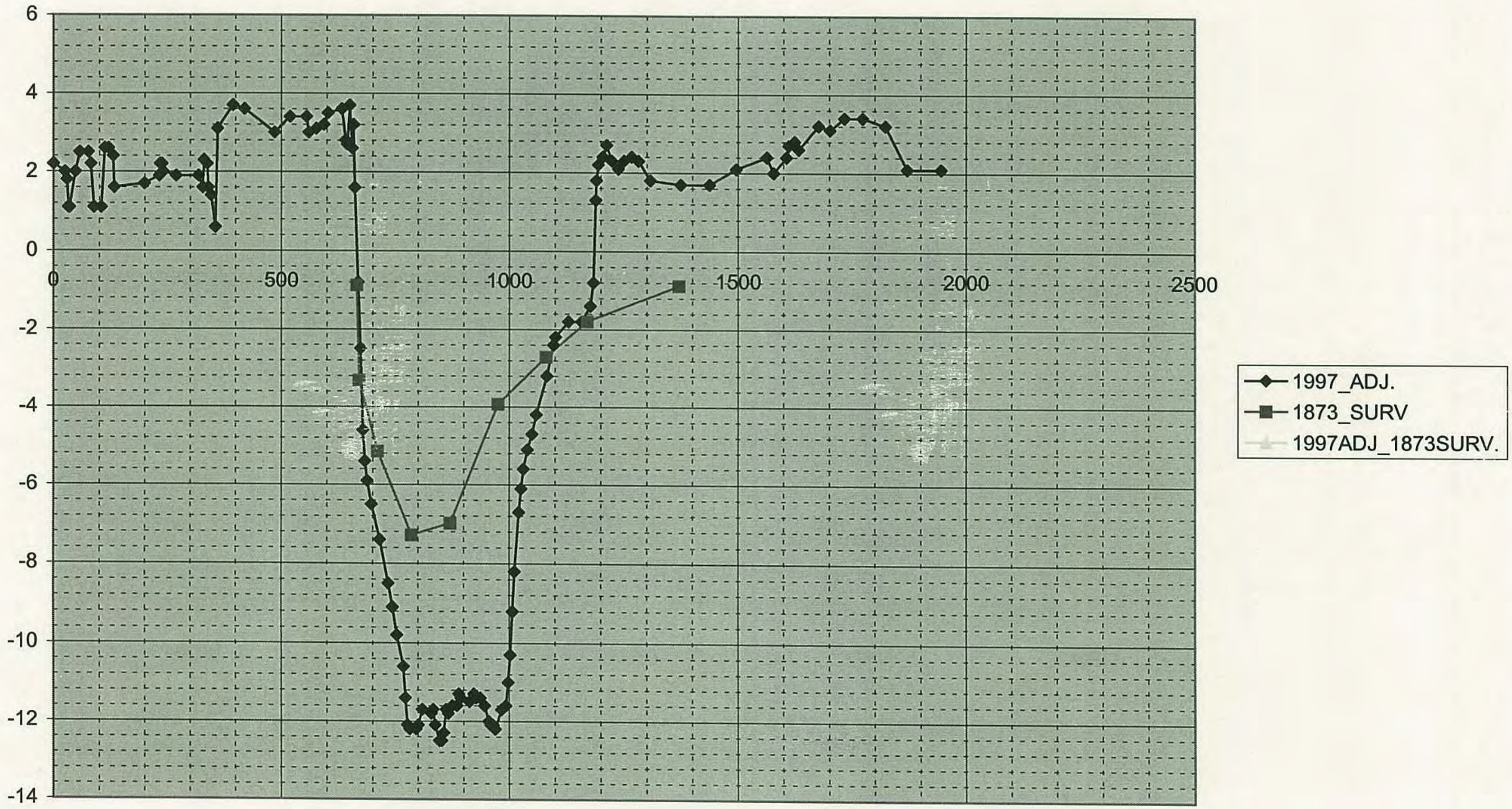

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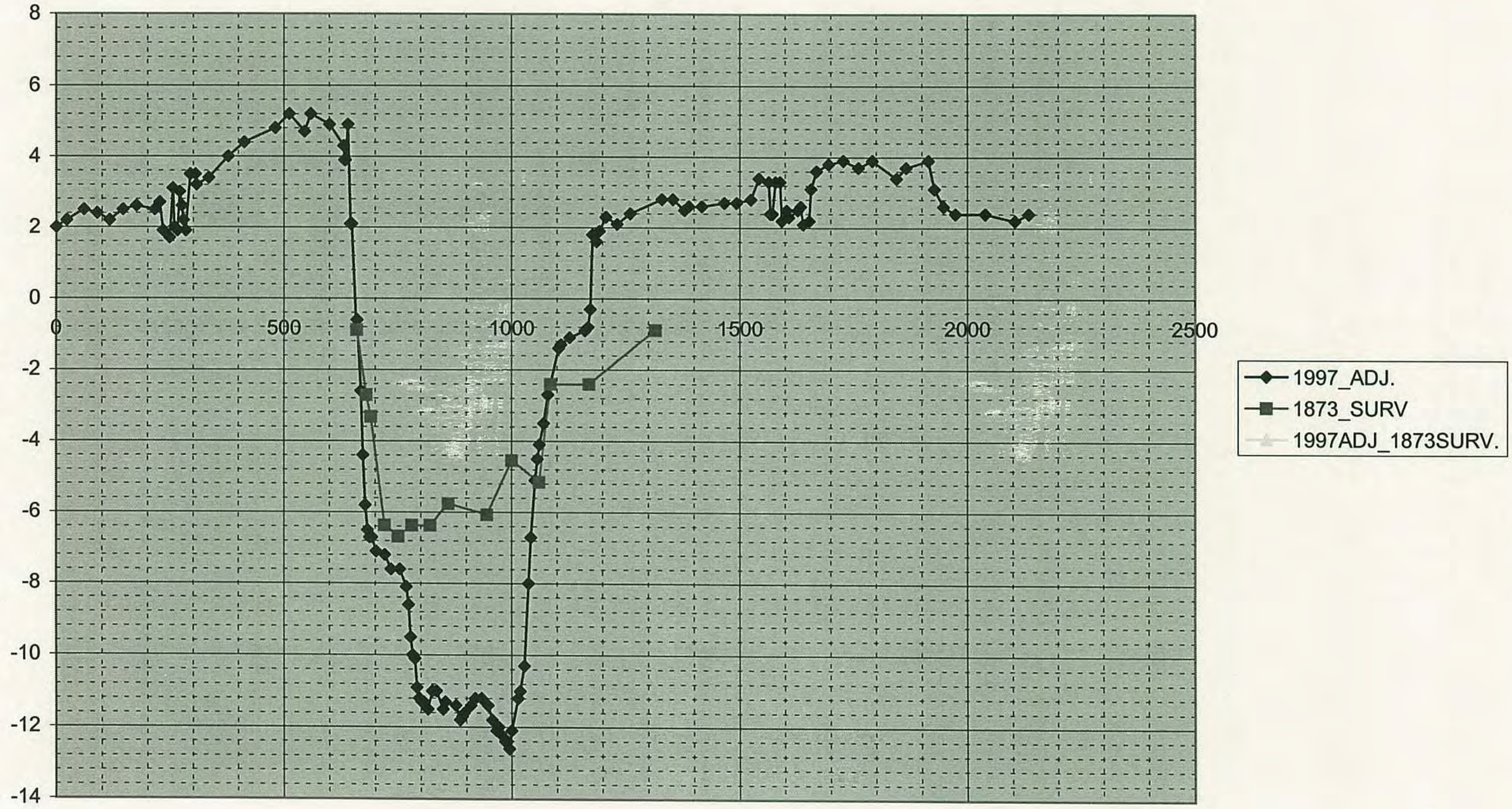

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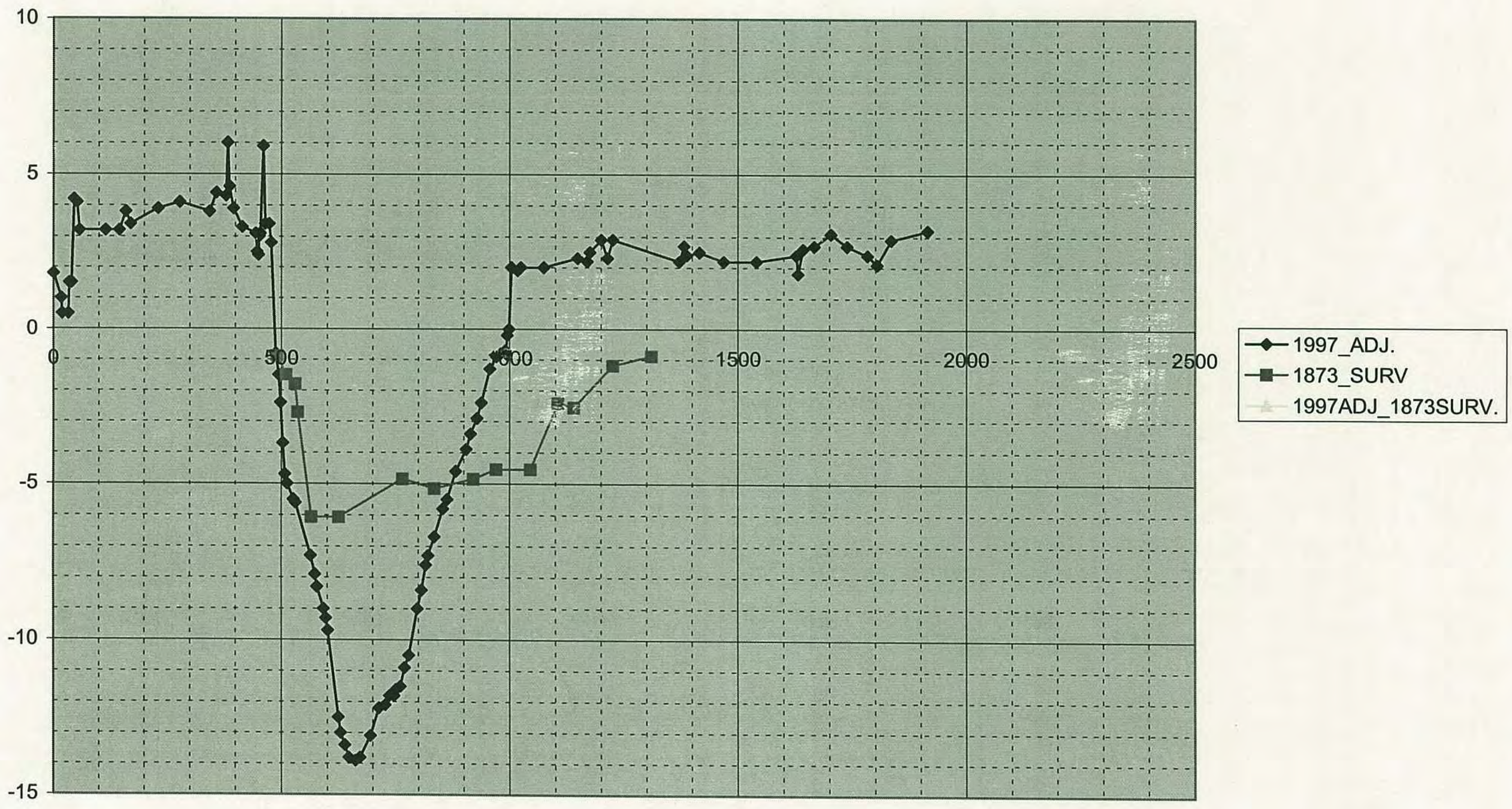

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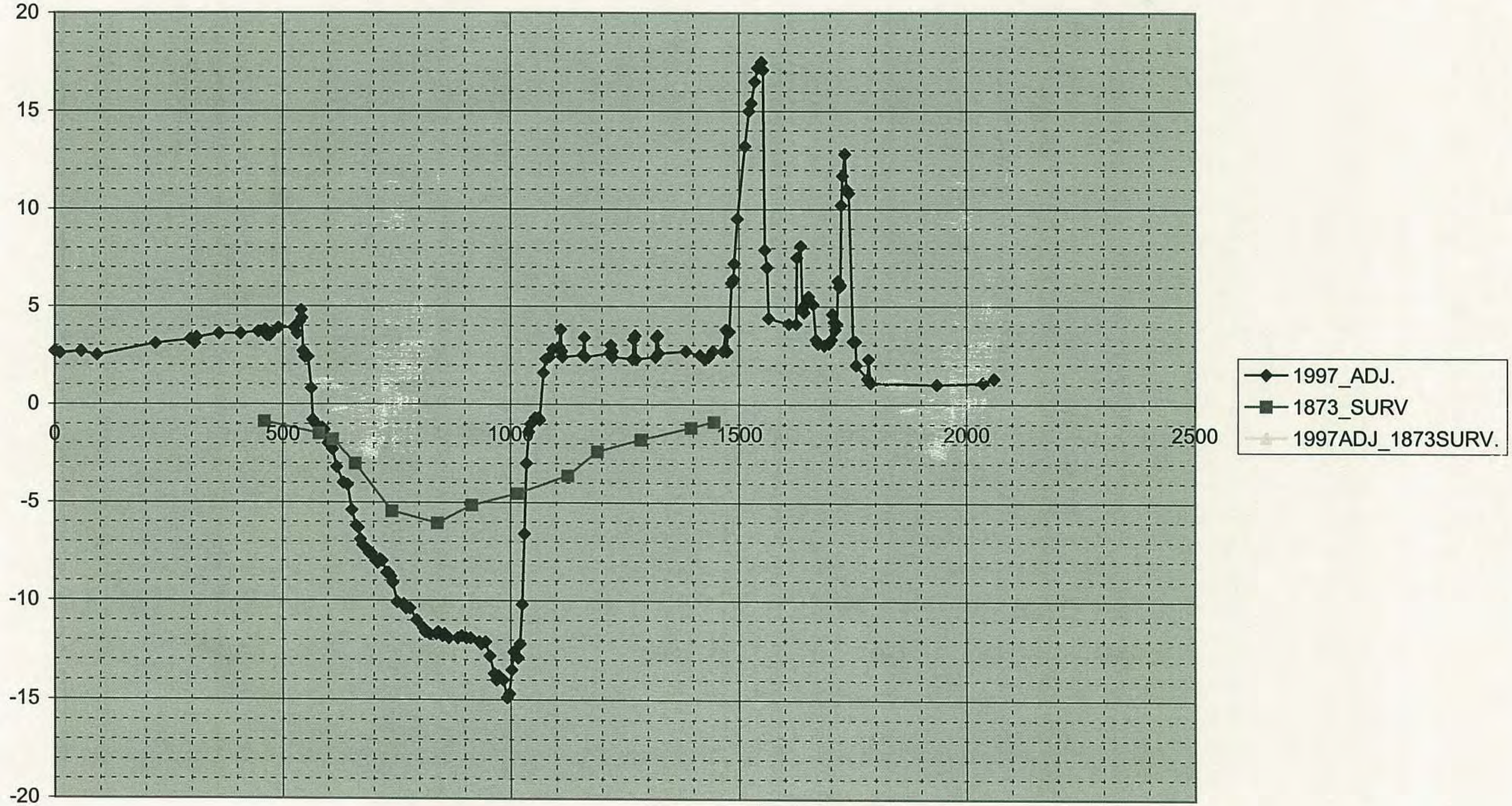

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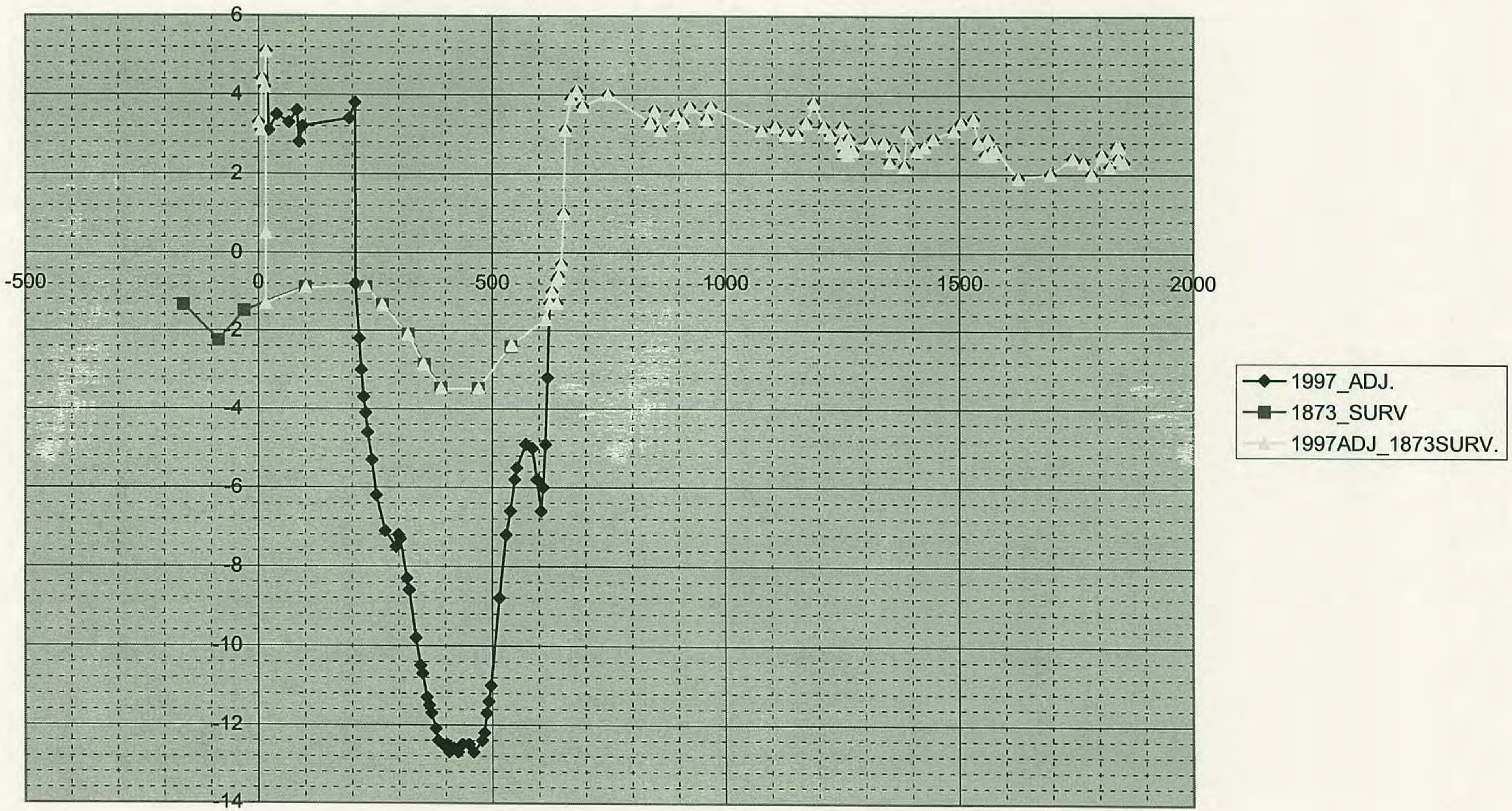

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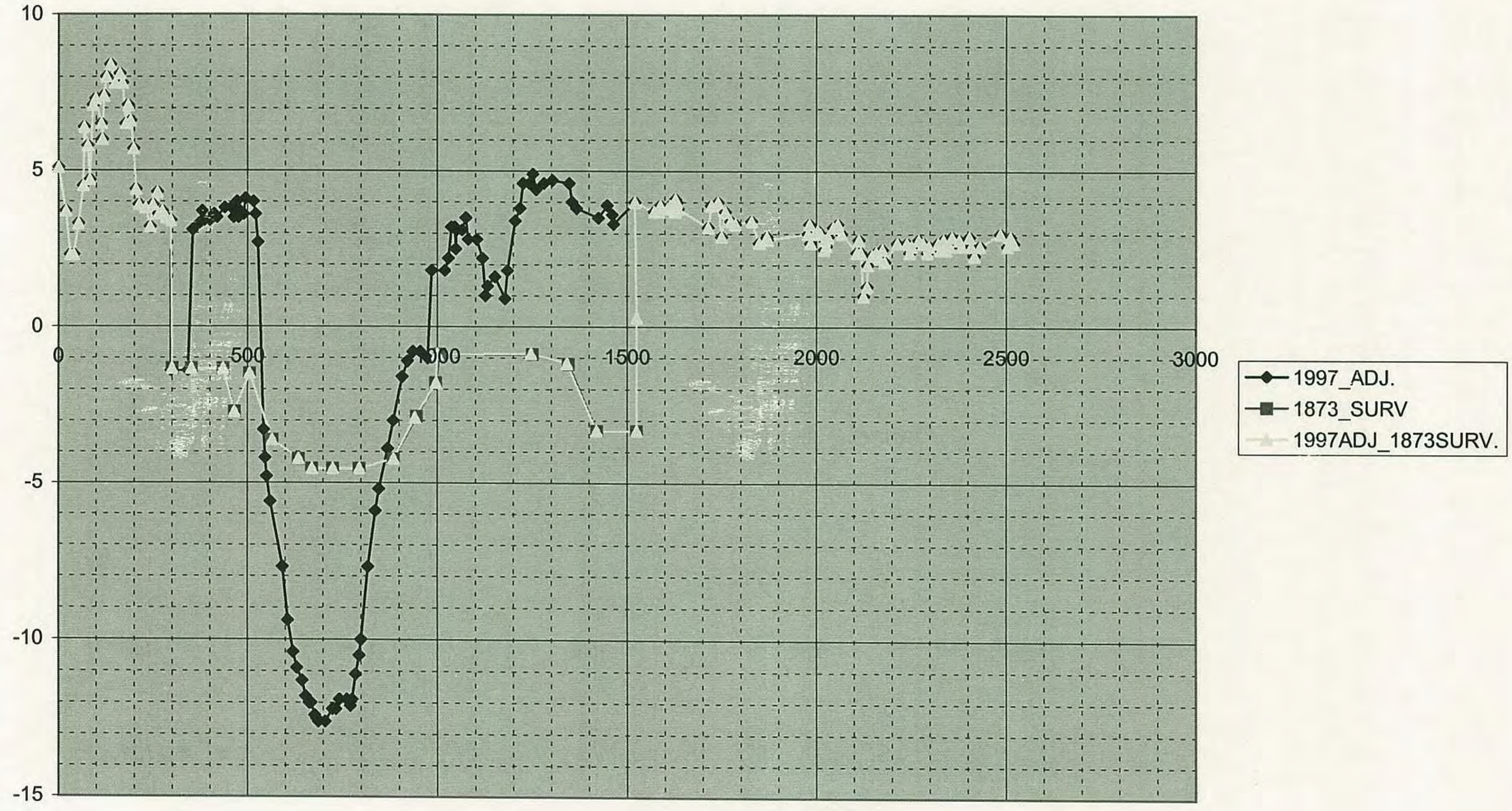
1997_ADJ.
1873_SURV
1997ADJ_1873SURV.

BN190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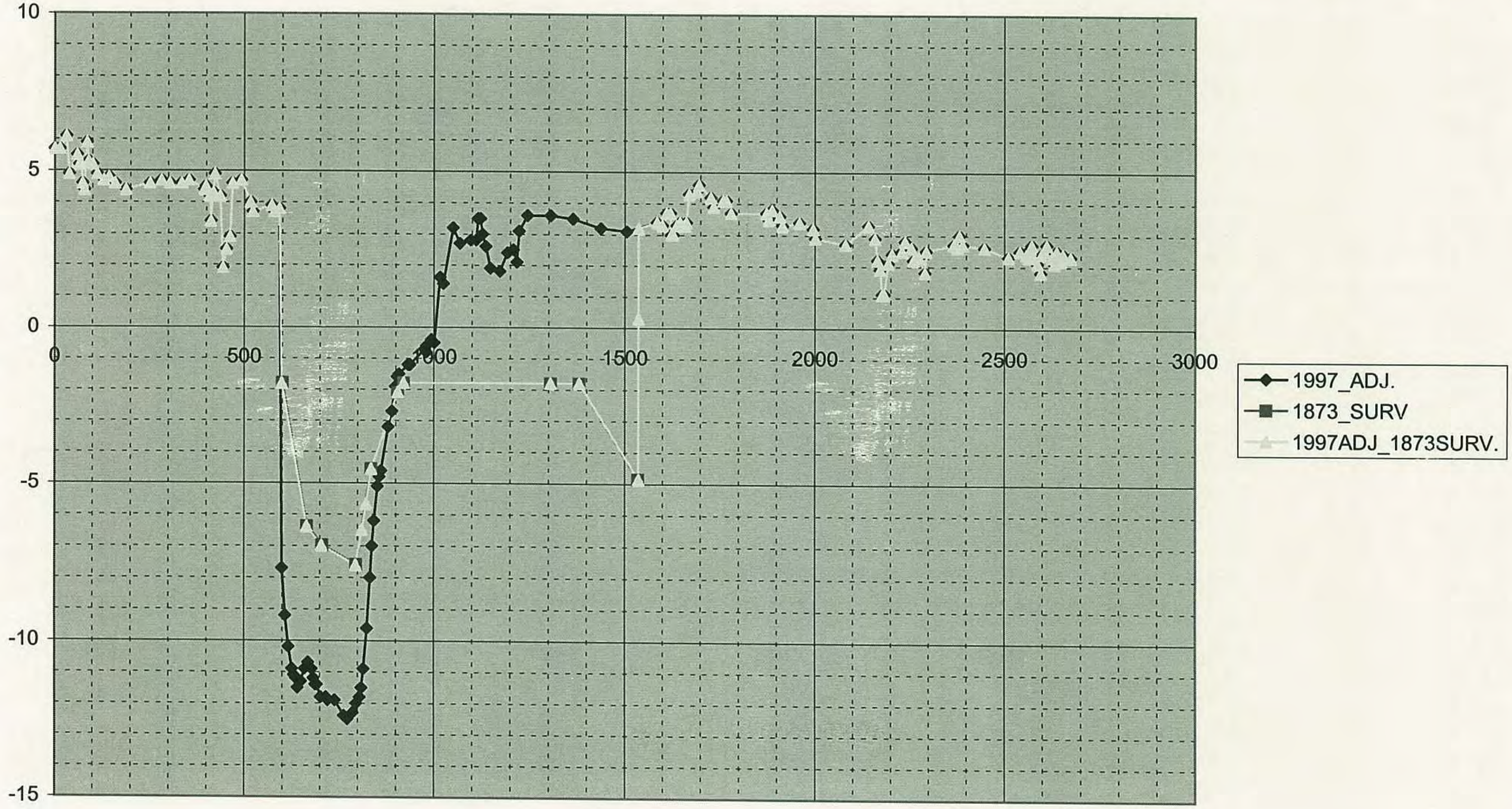

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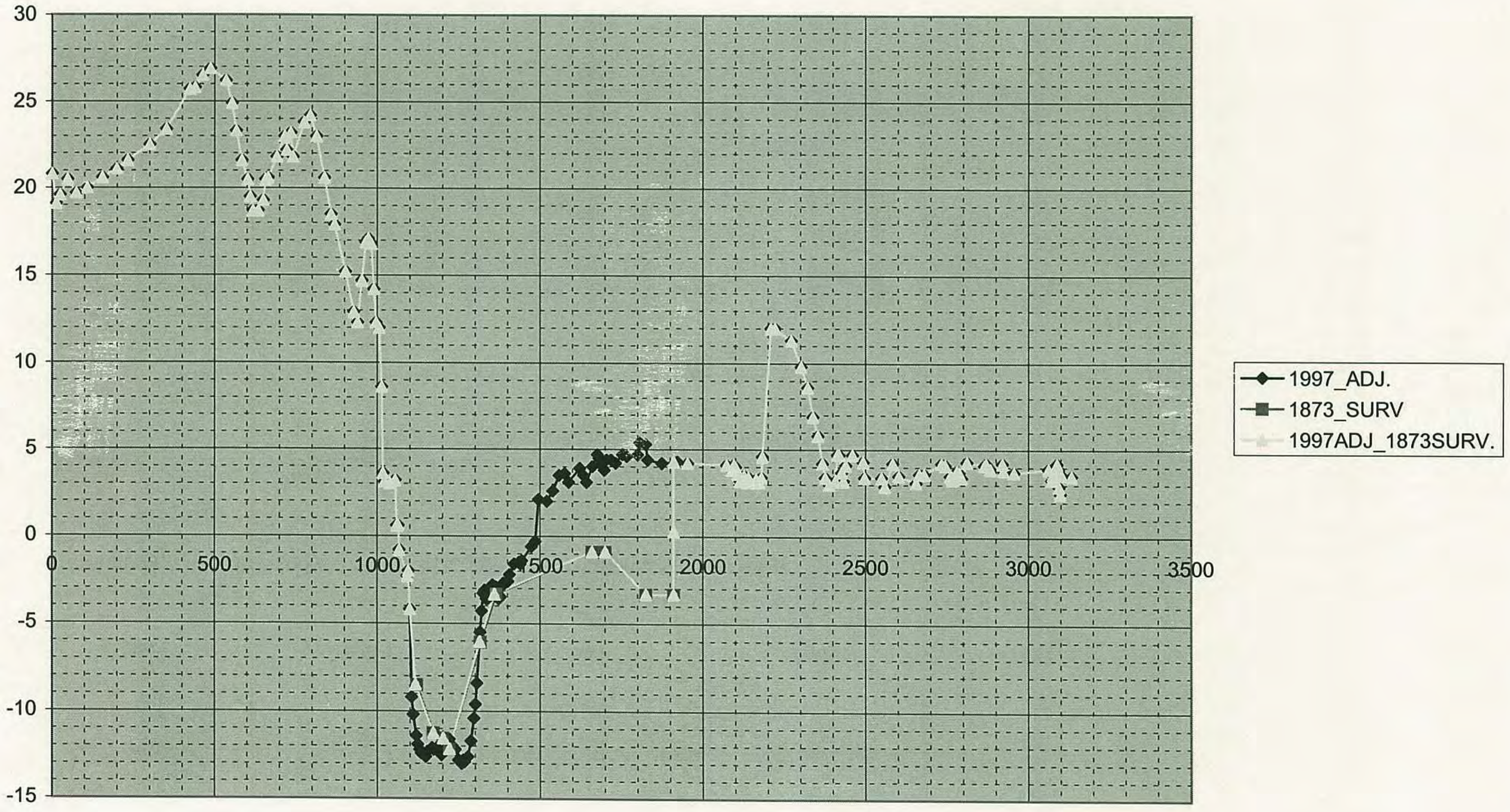
BN210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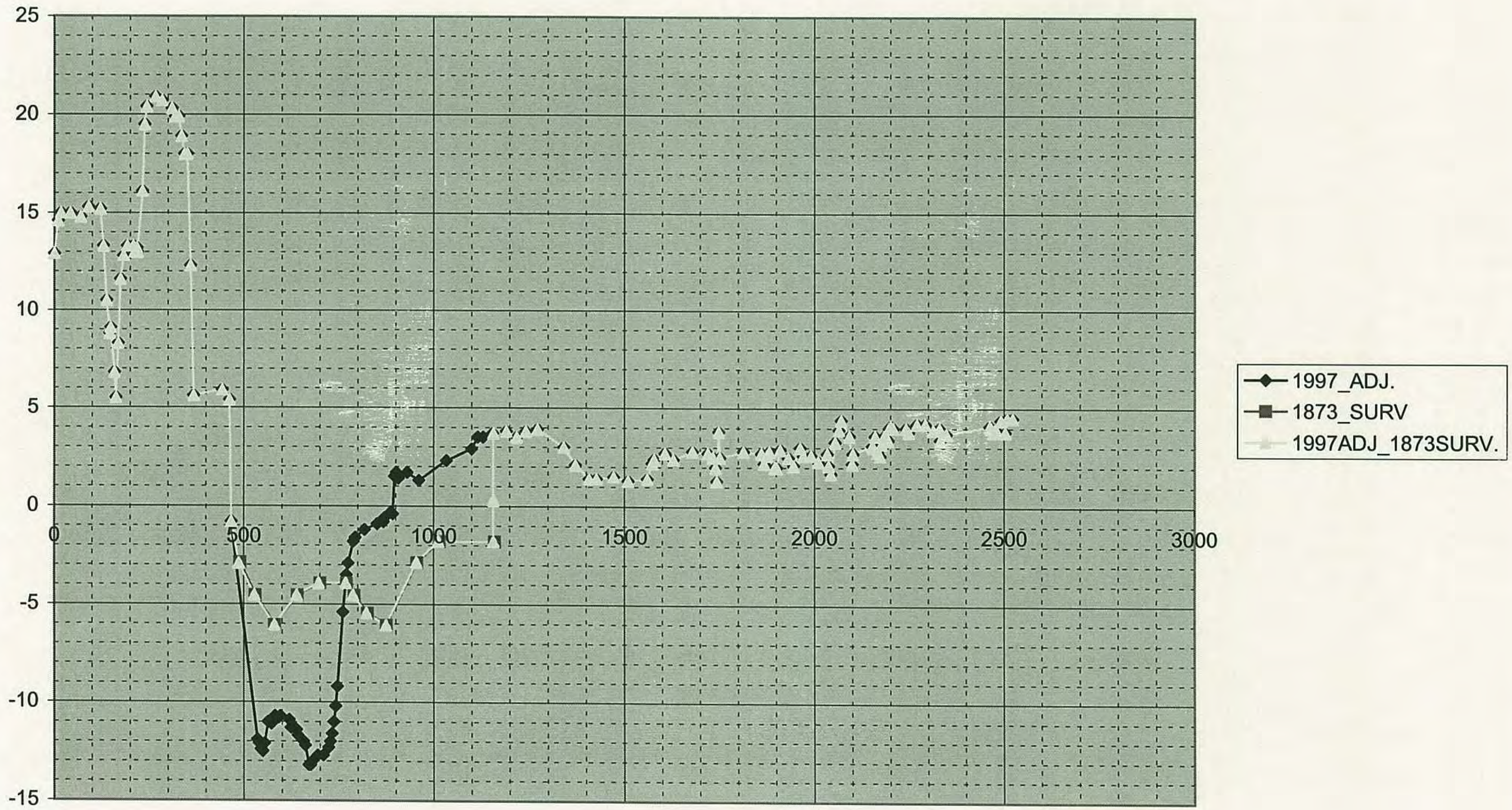
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1873_SURV
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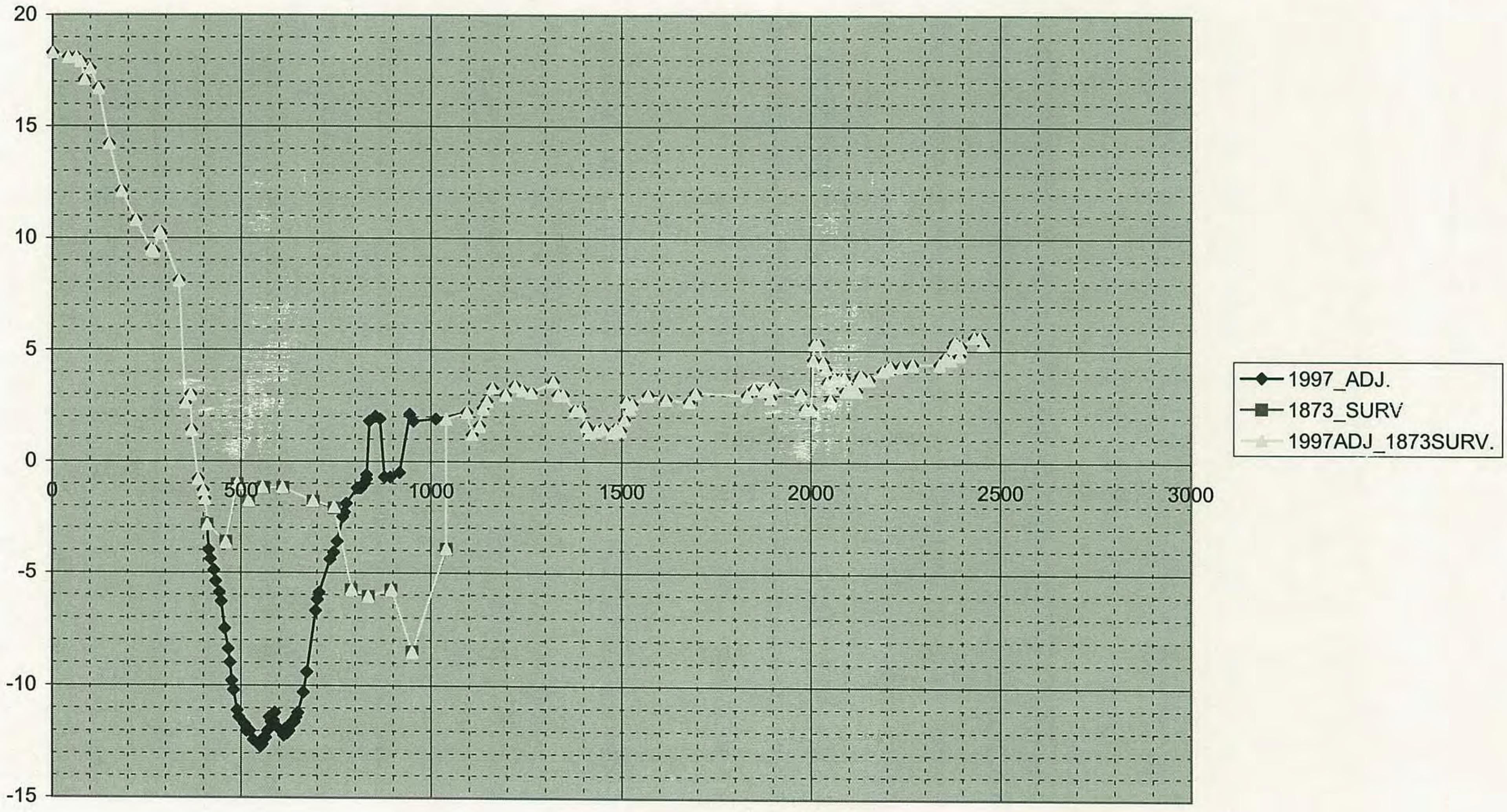
BN230



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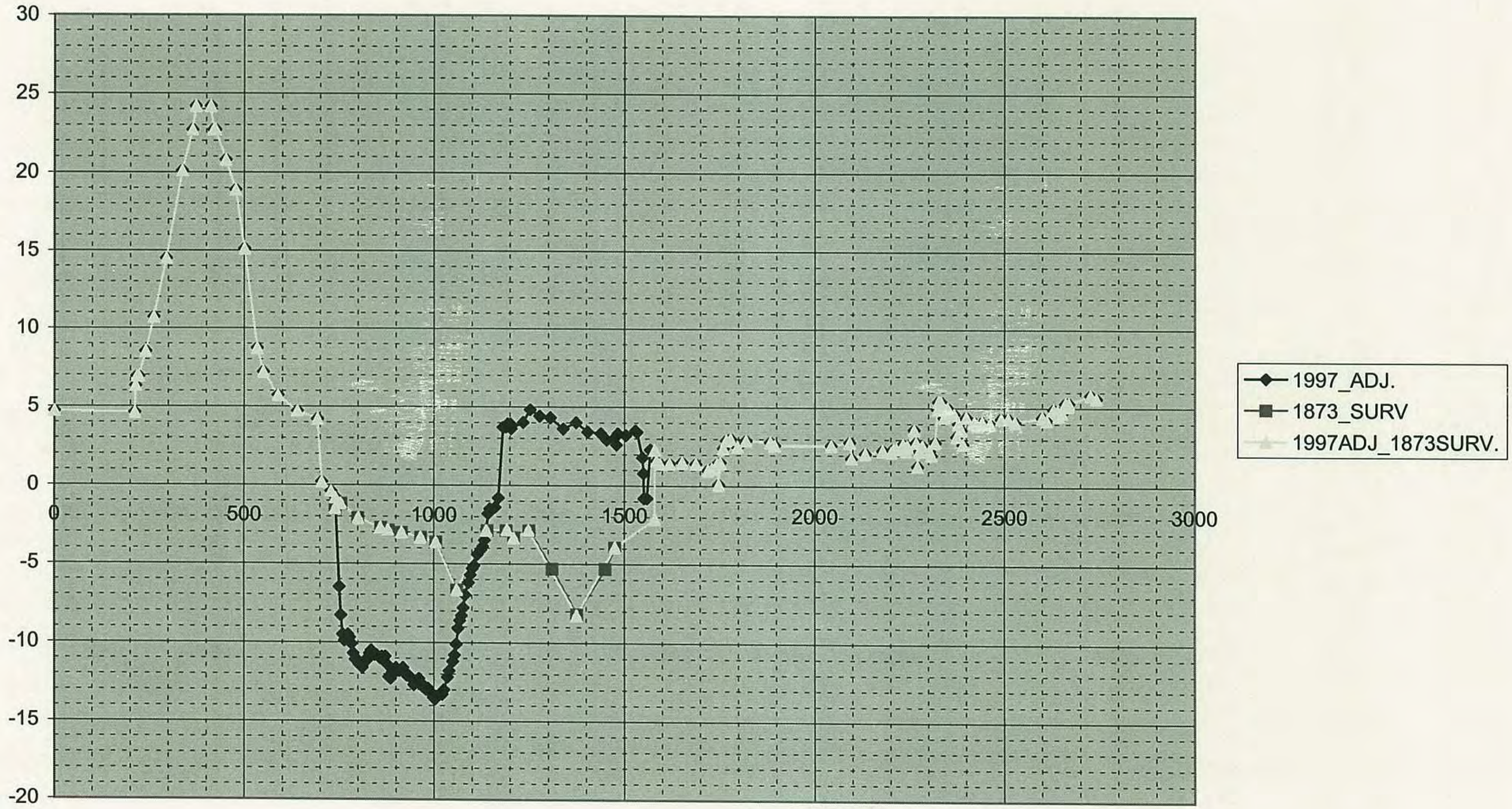
1997_ADJ.
1873_SURV
1997ADJ_1873SURV.

BN240



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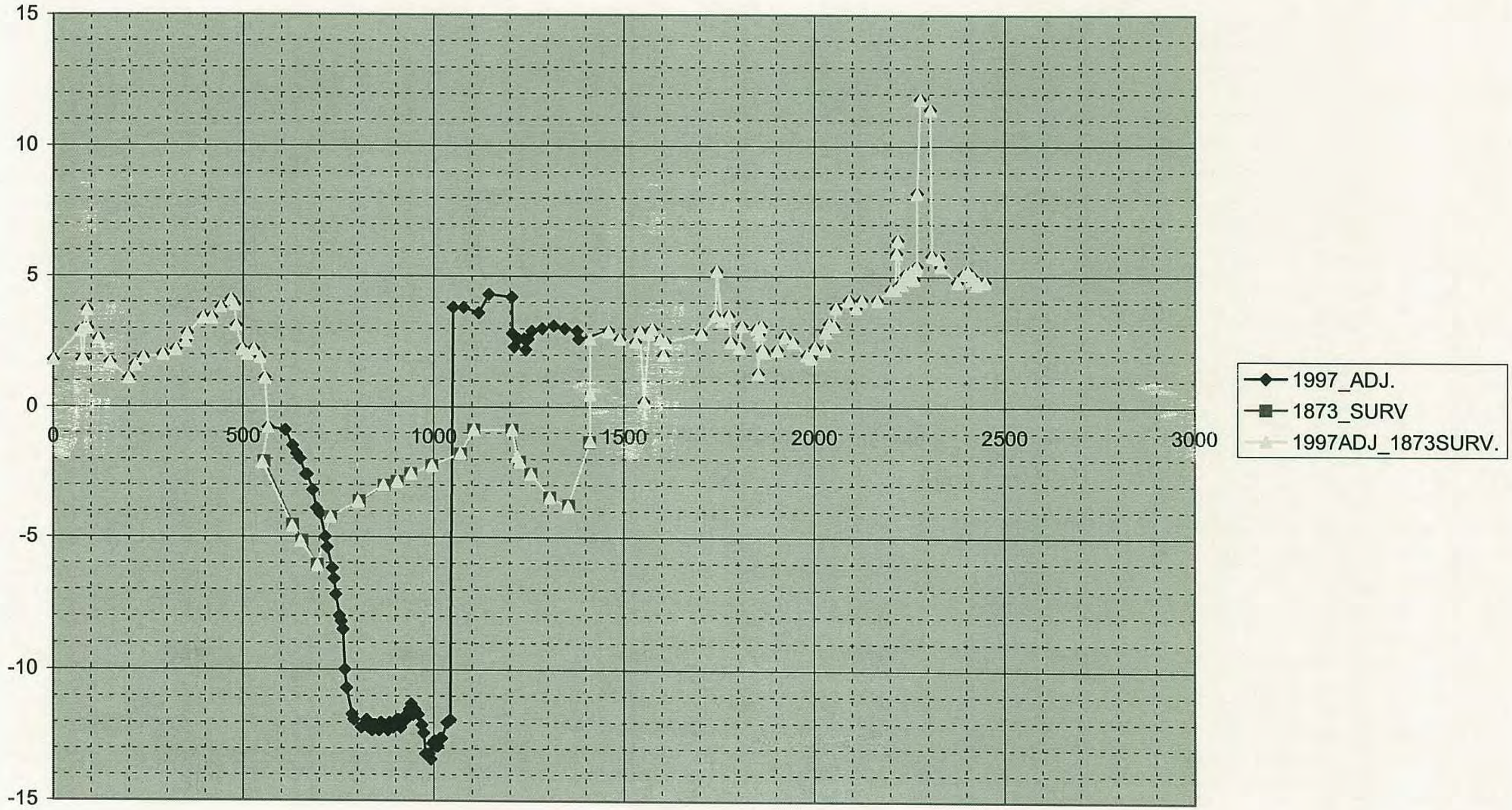
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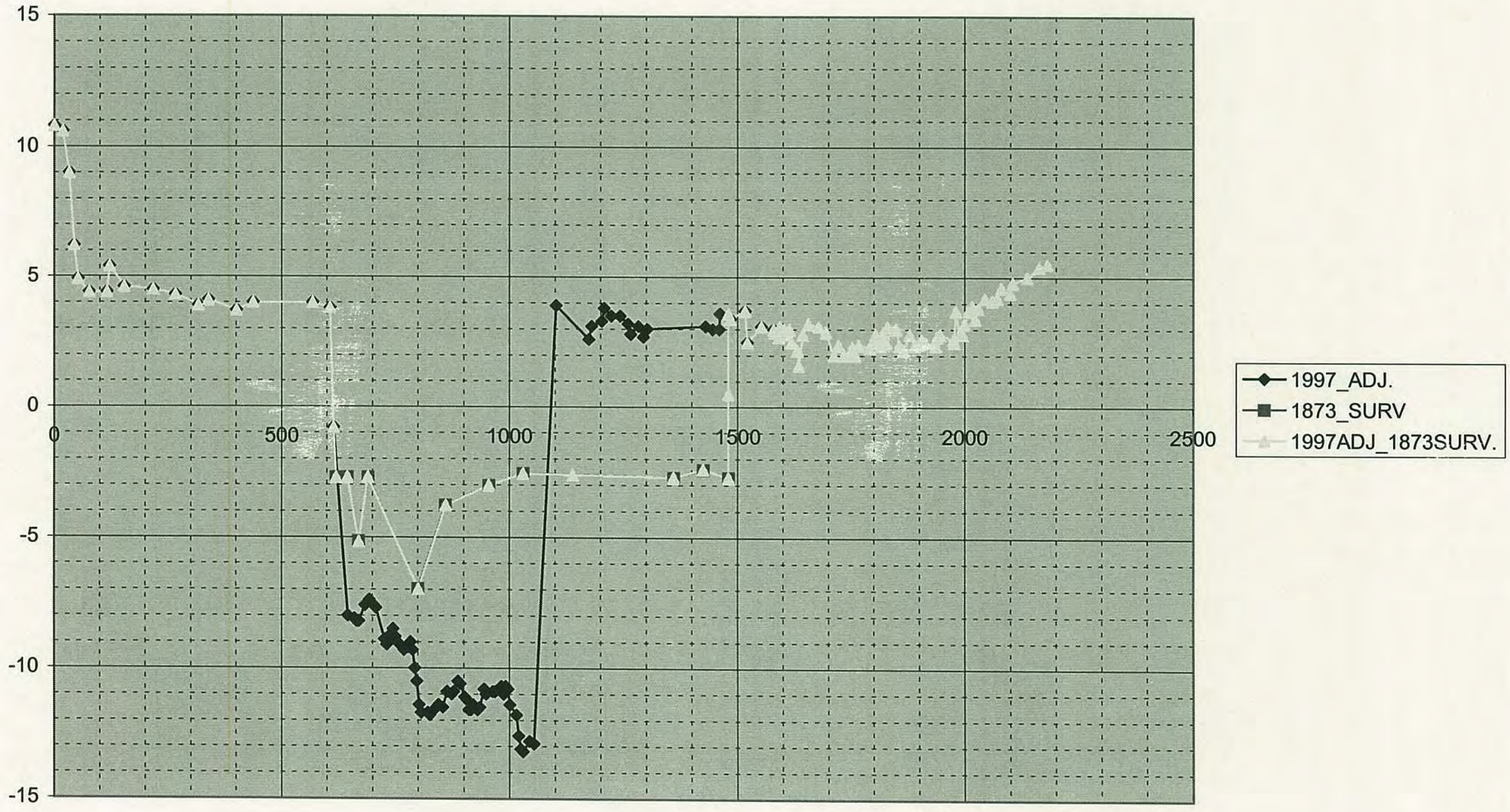
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1873_SURV
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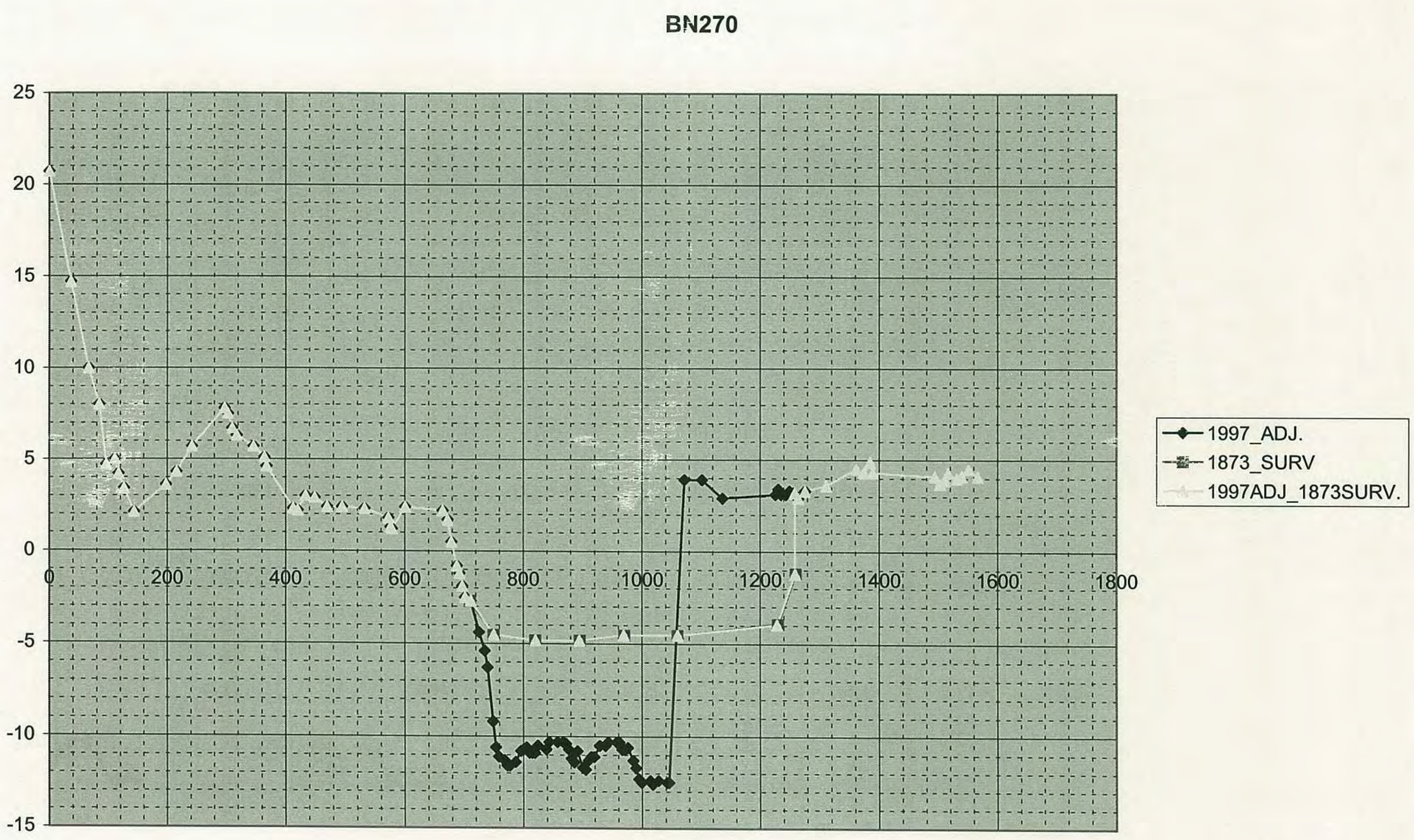
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1873_SURV
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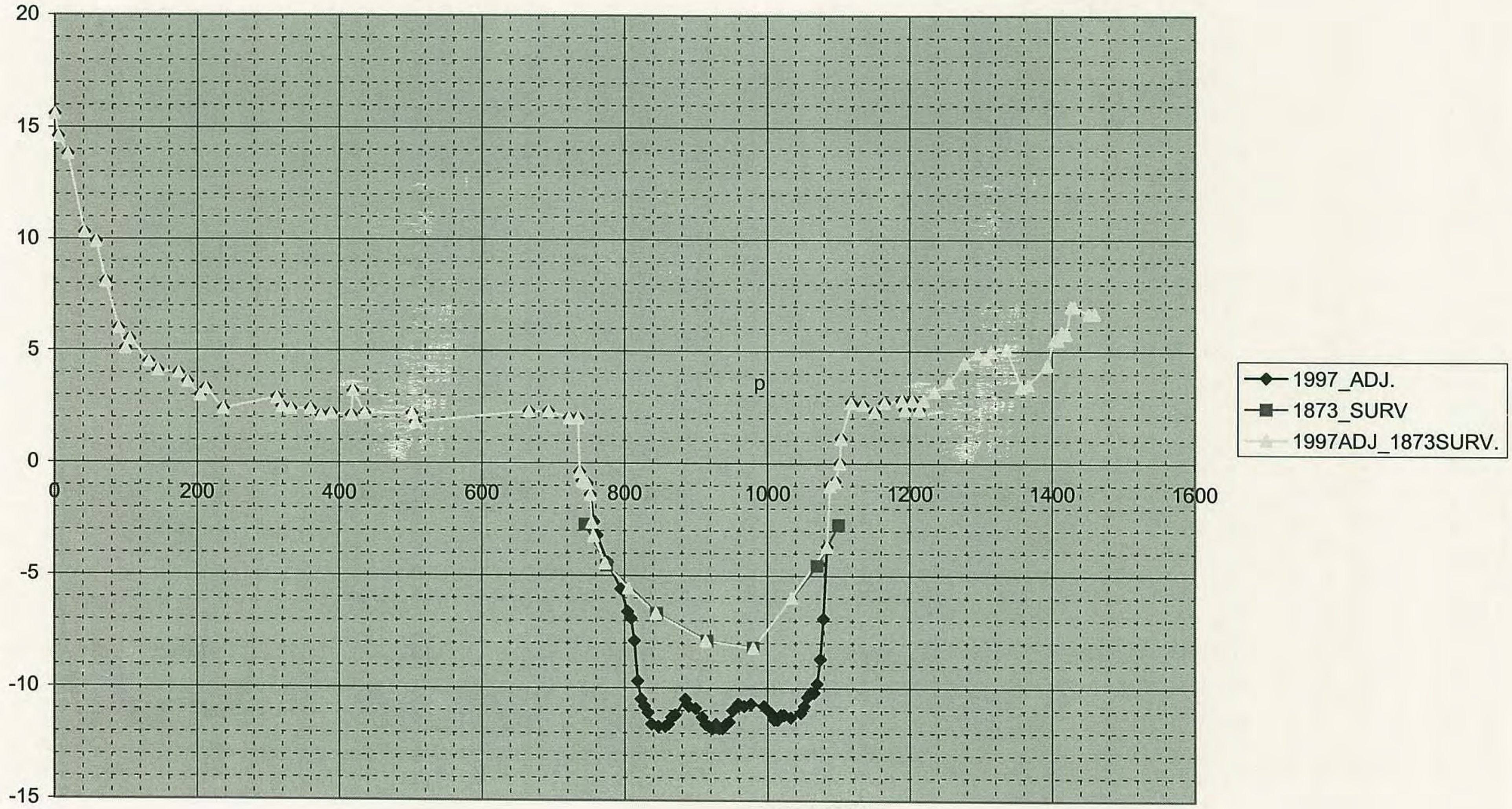
BN280



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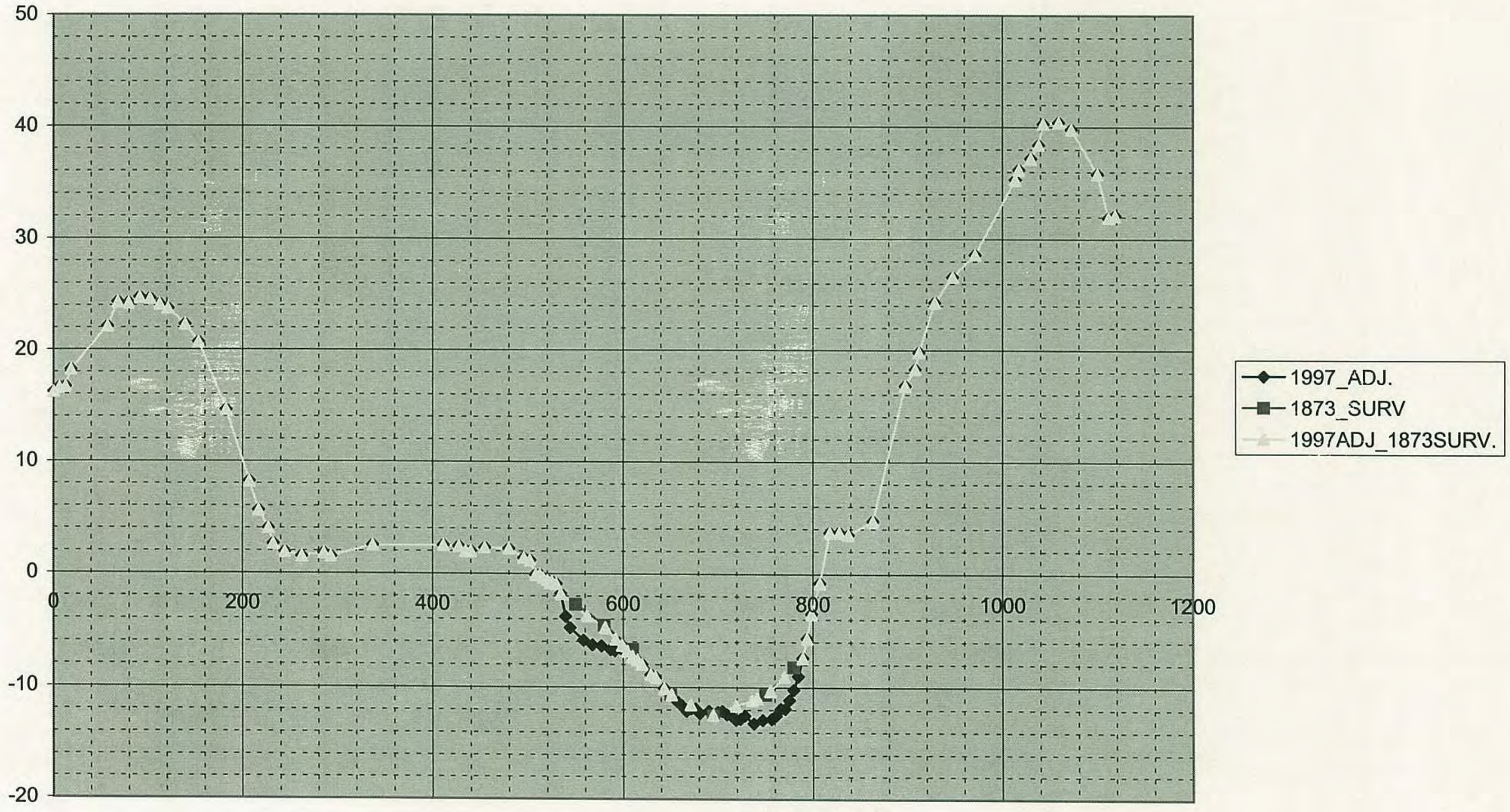

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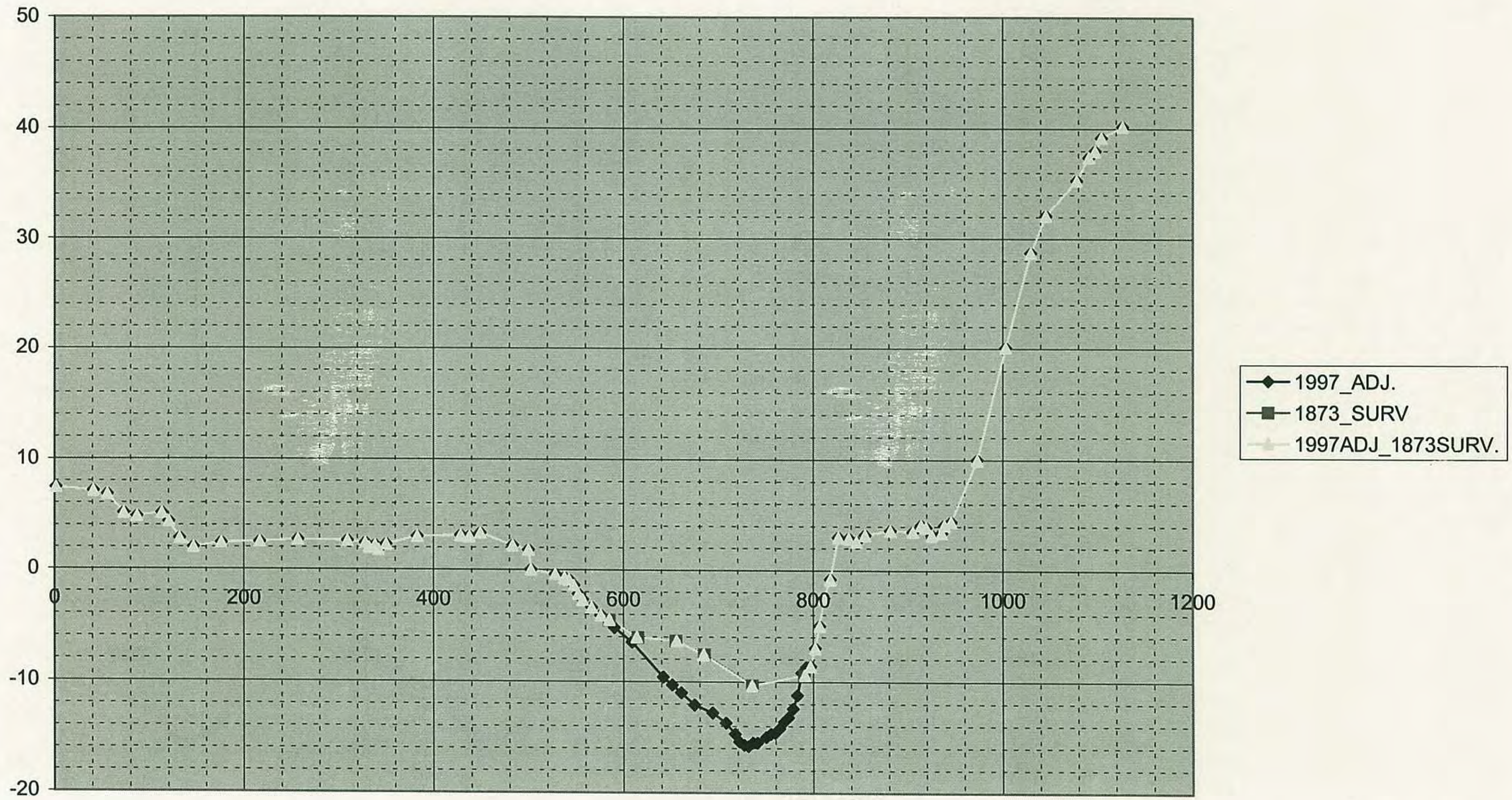
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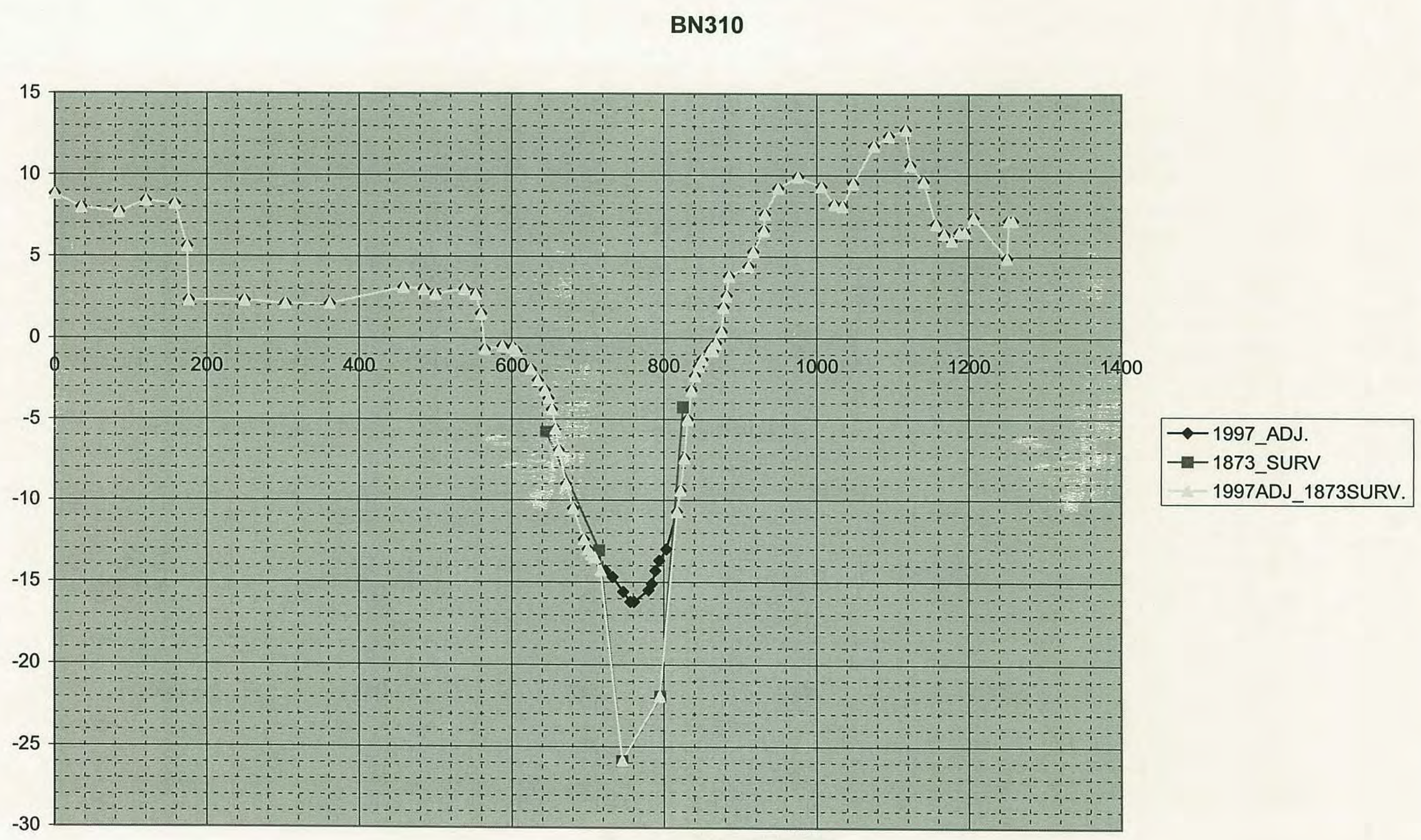
1997ADJ_1873SURV.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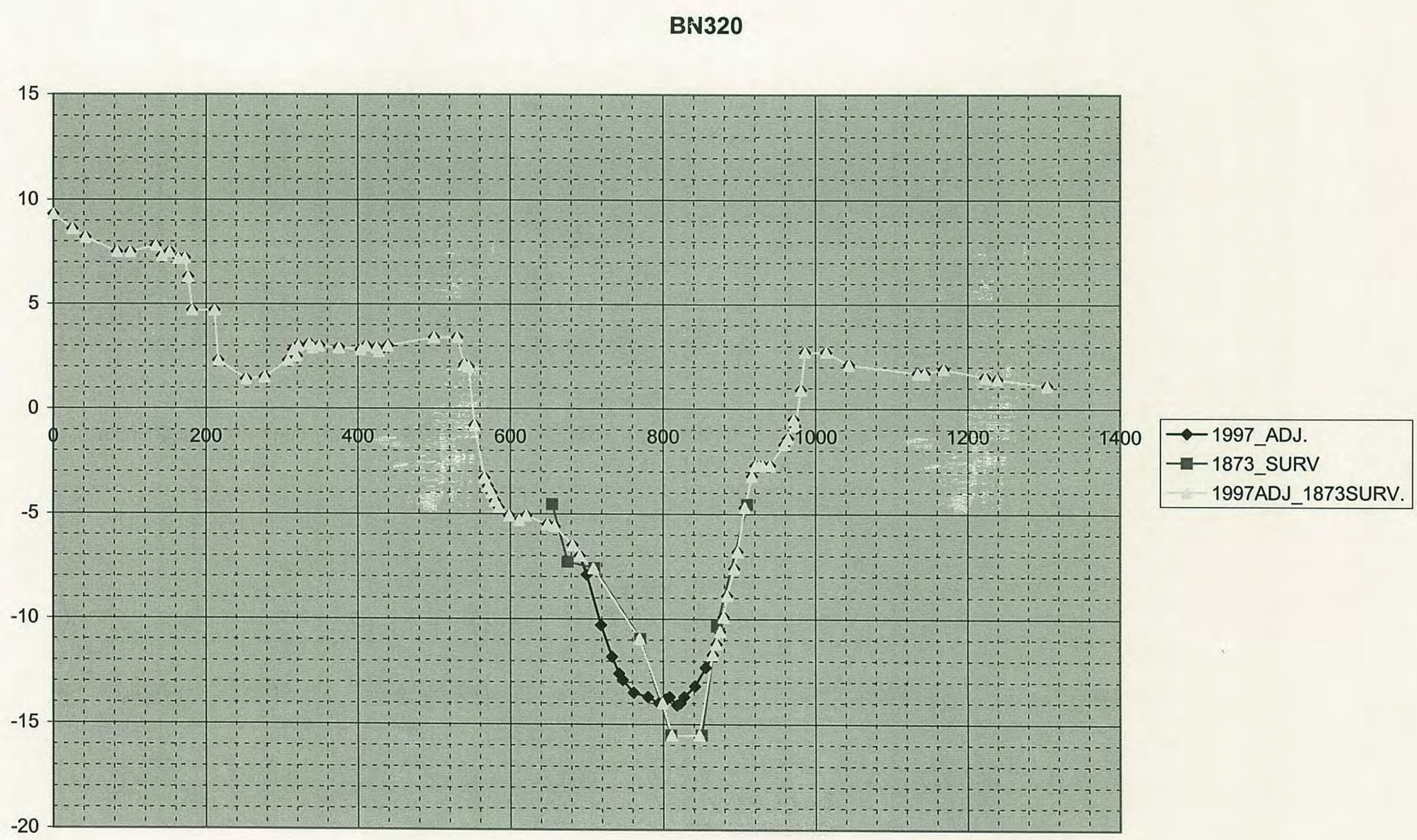
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1997ADJ_1873SURV.

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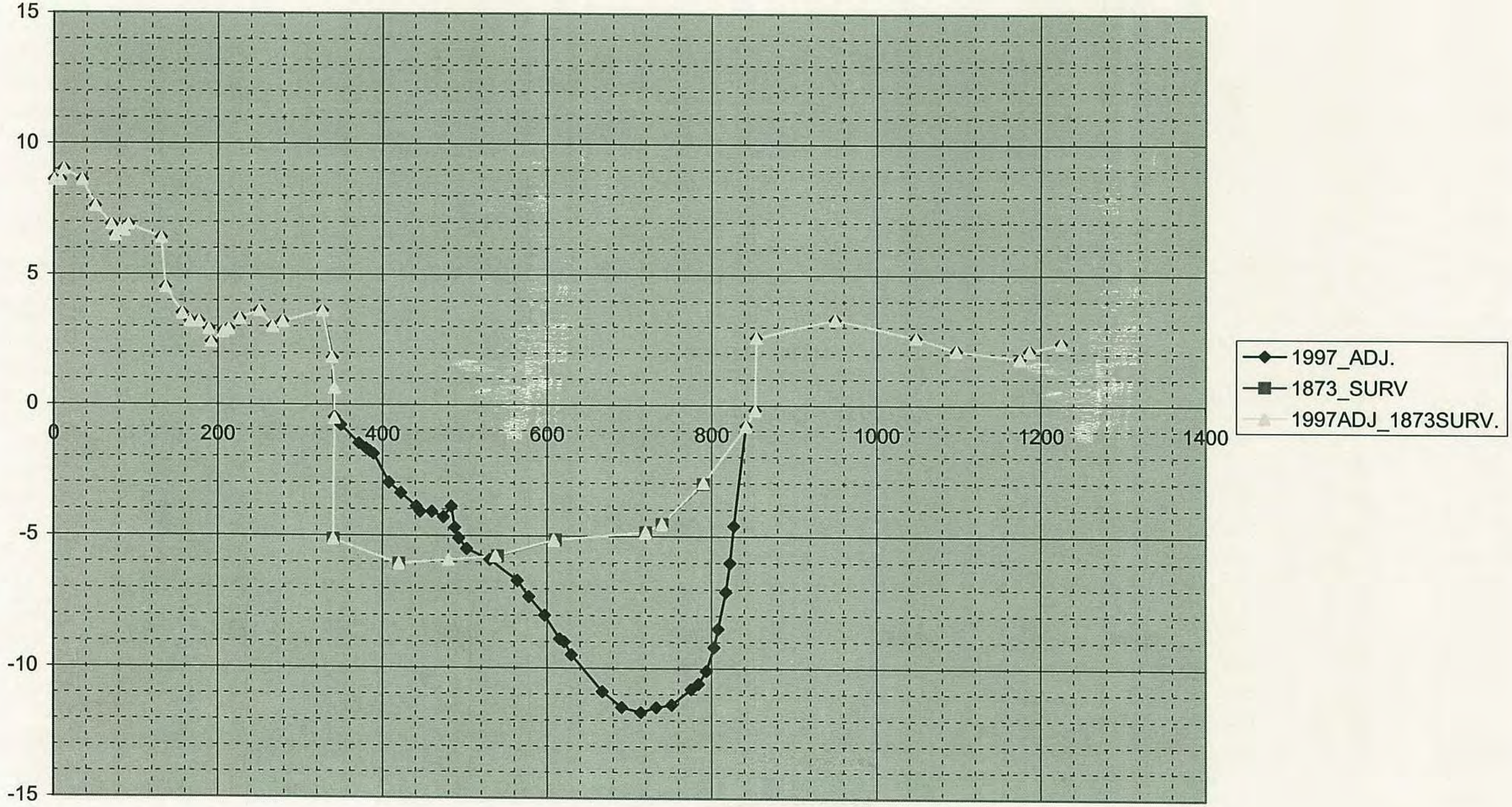
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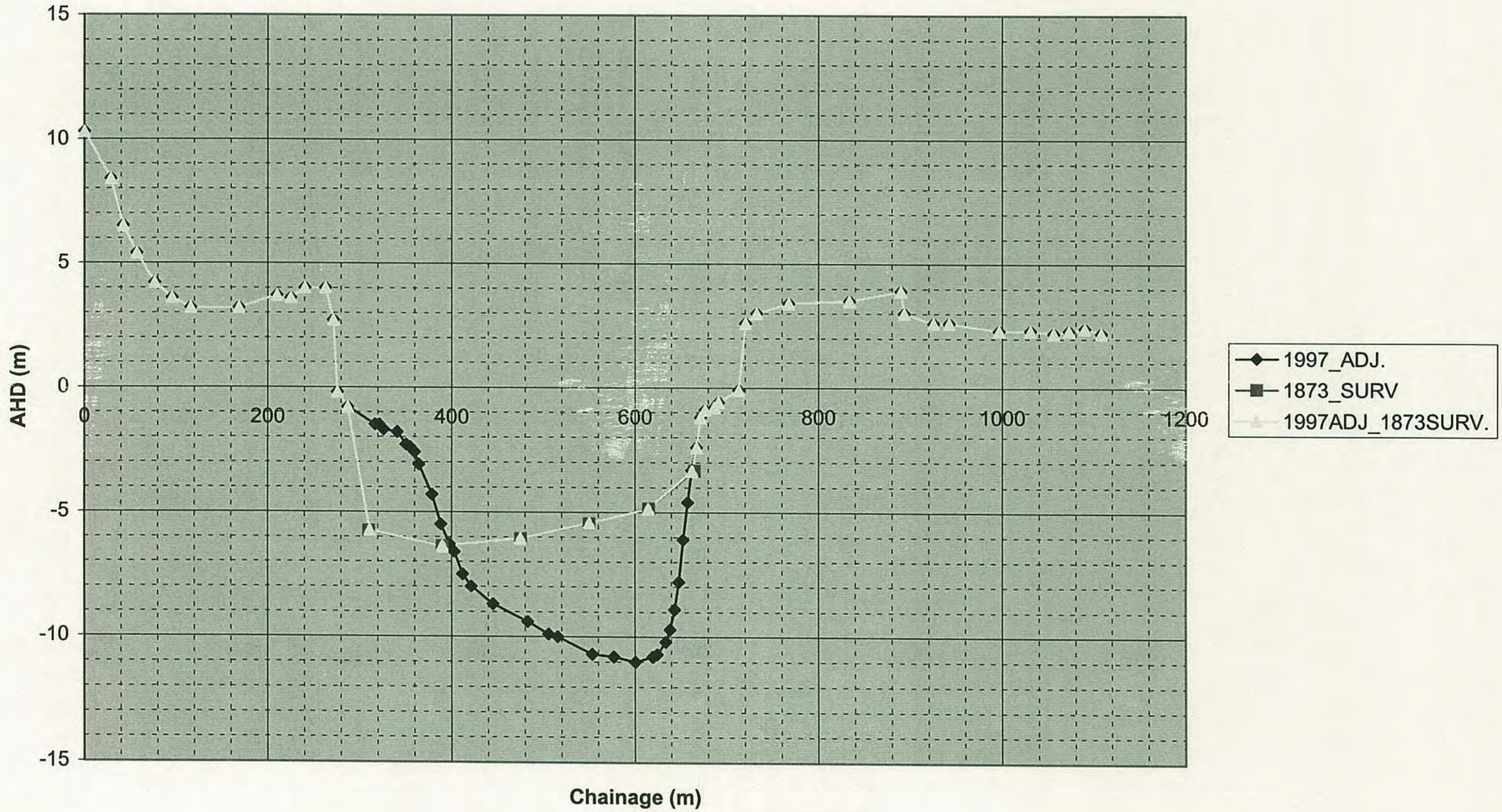

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Chainage (m)
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1997ADJ_1873SURV.

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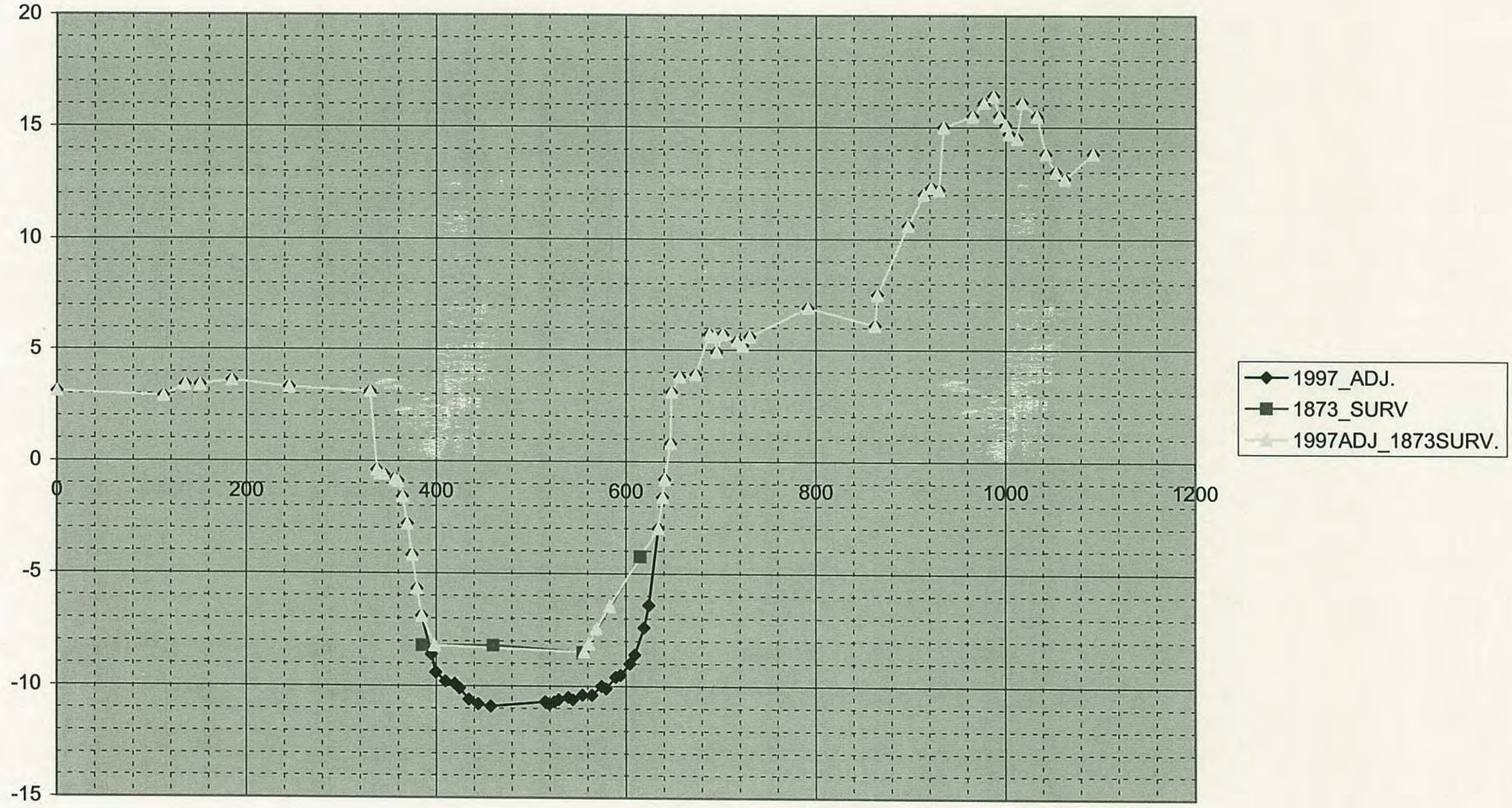

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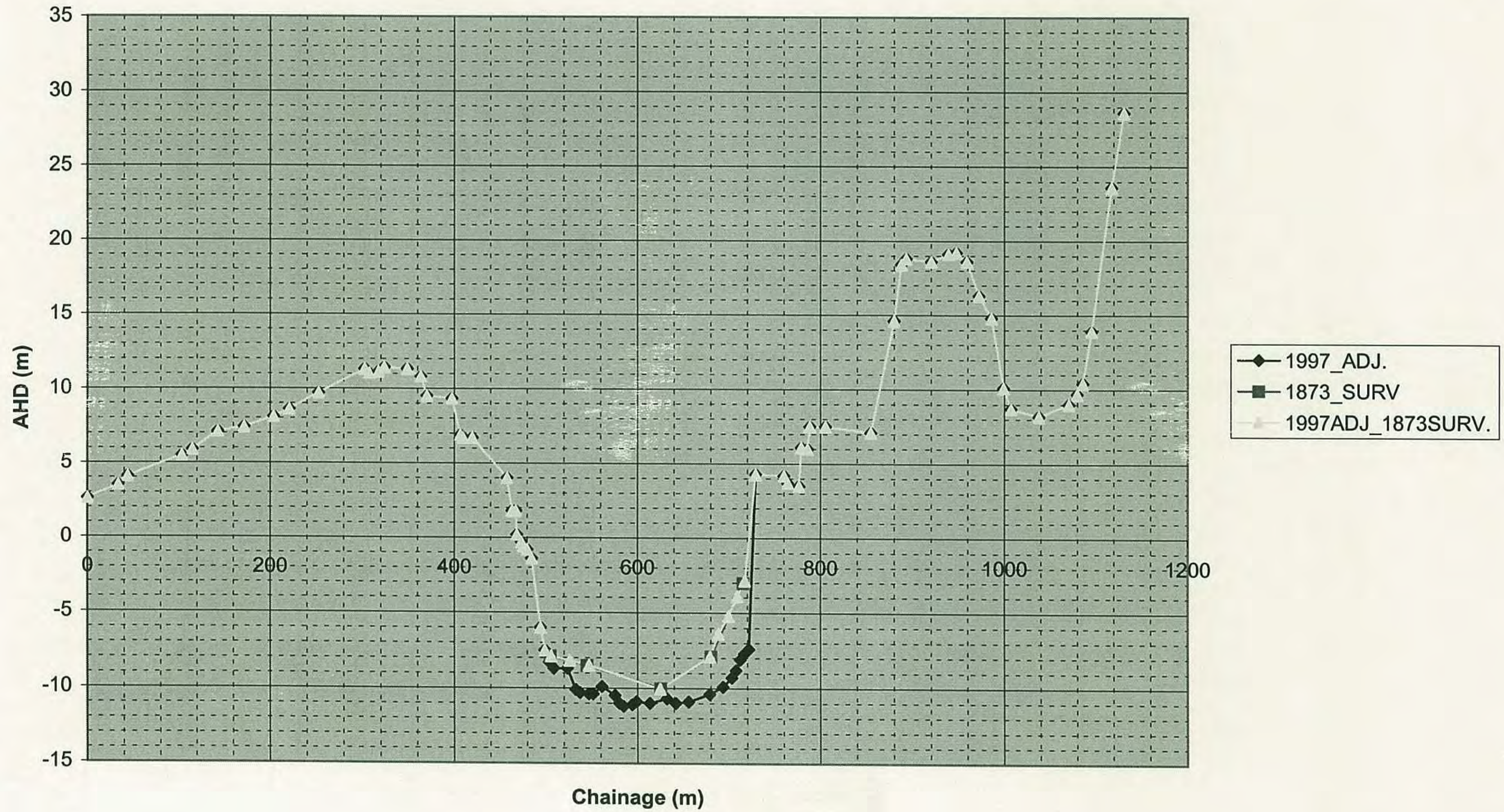

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Chainage (m)
1997_ADJ.
1873_SURV
1997ADJ_1873SURV.

BN370

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1997_ADJ.
1873_SURV
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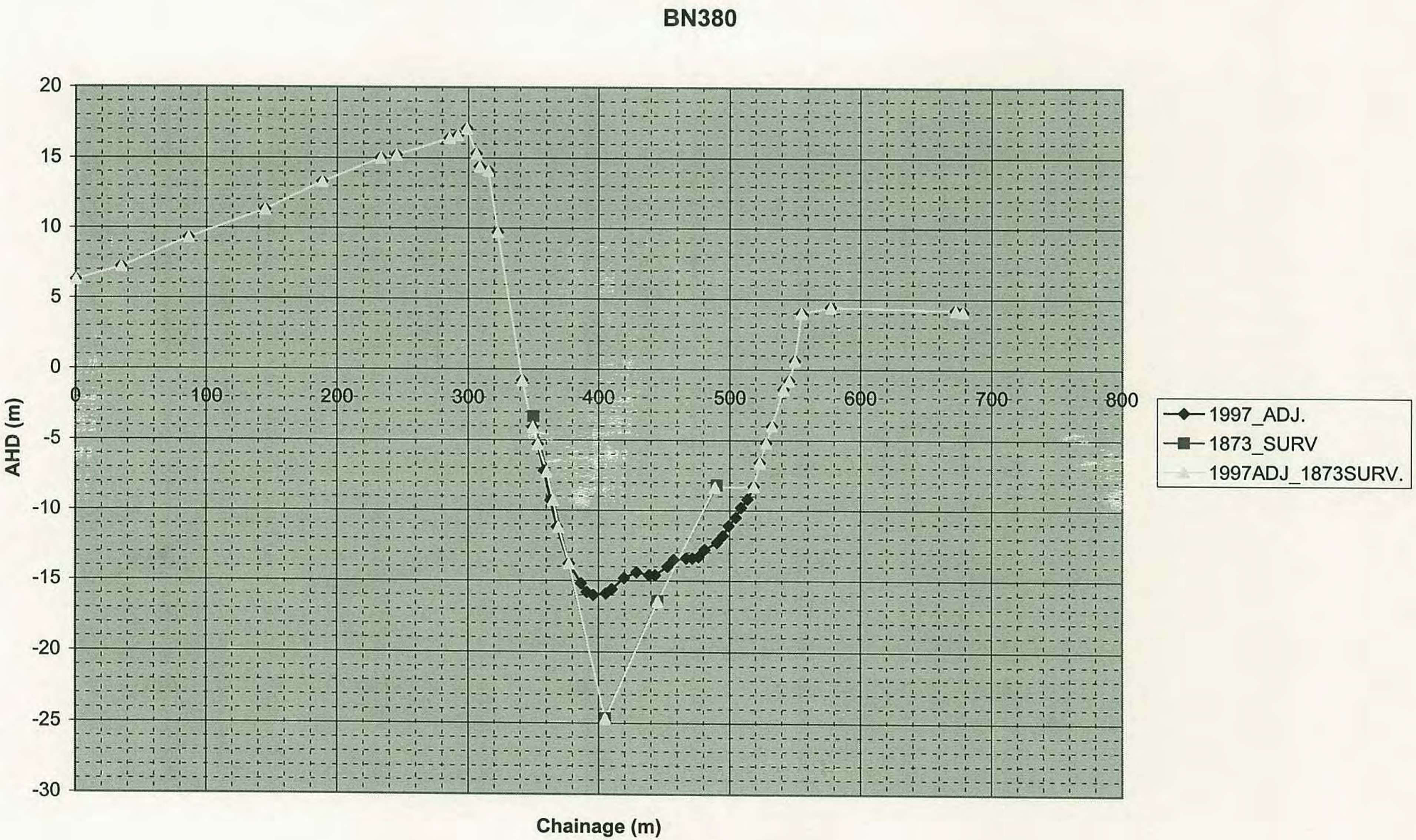

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Chainage (m)
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1997ADJ_1873SURV.

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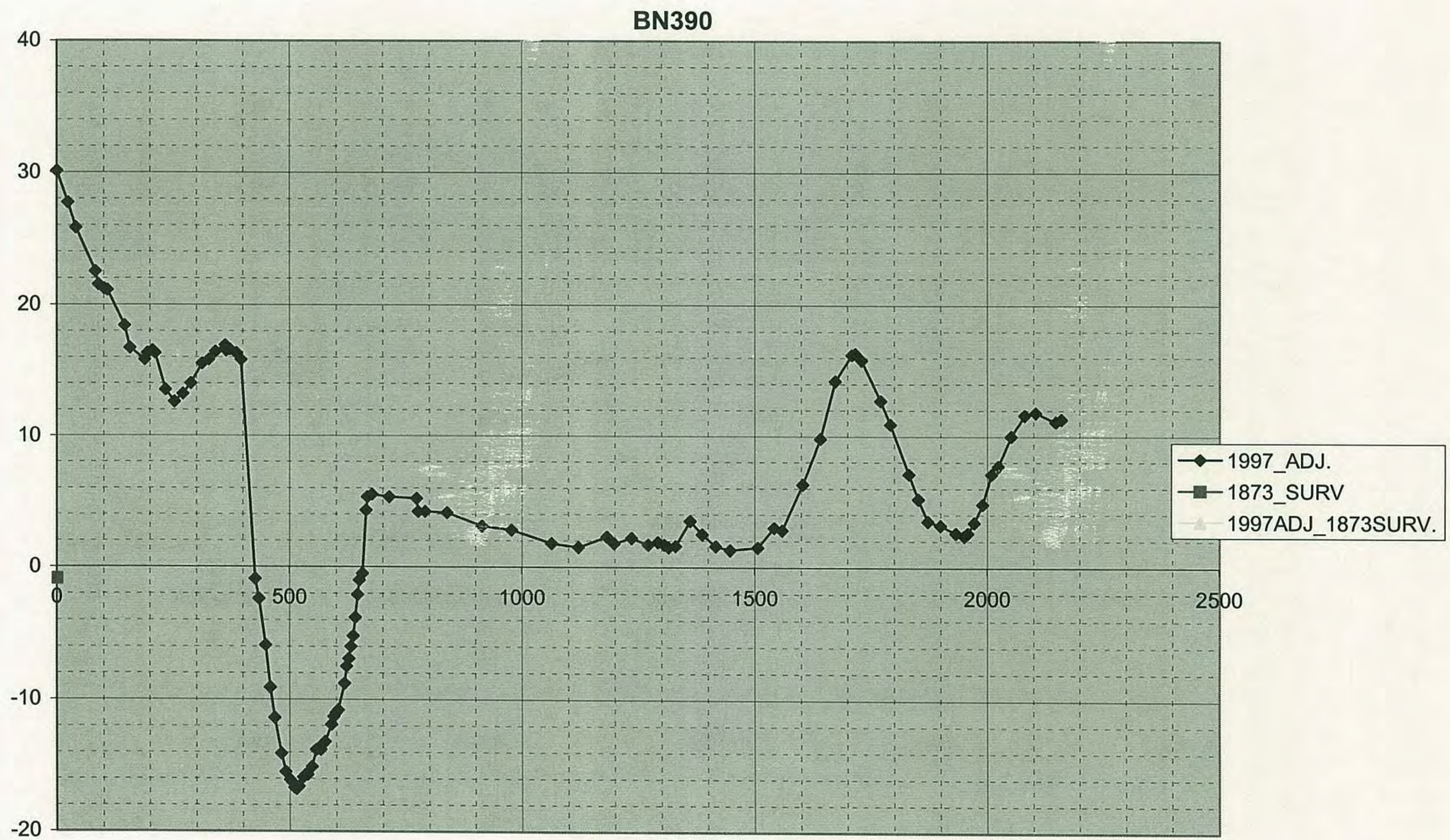
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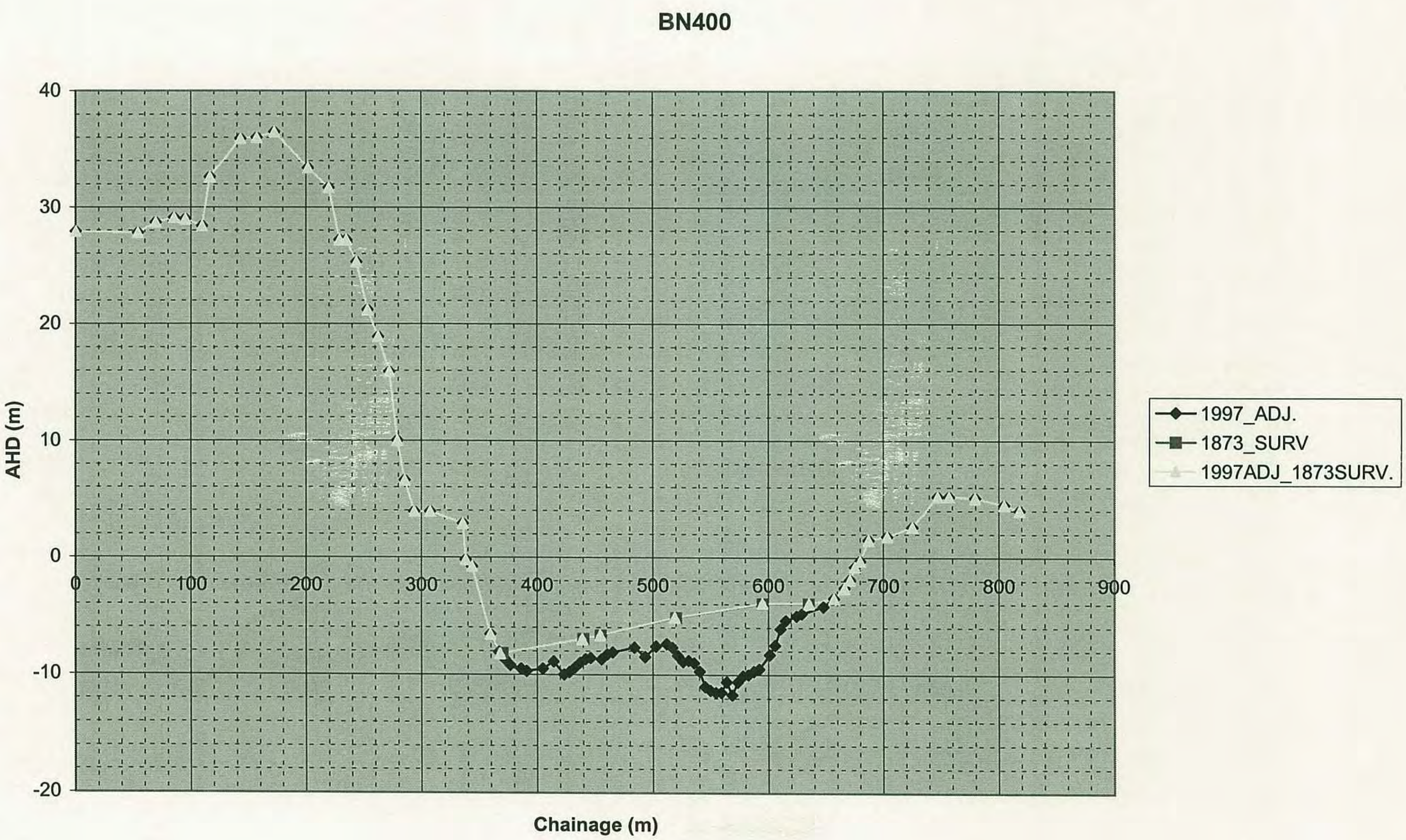
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Chainage (m)
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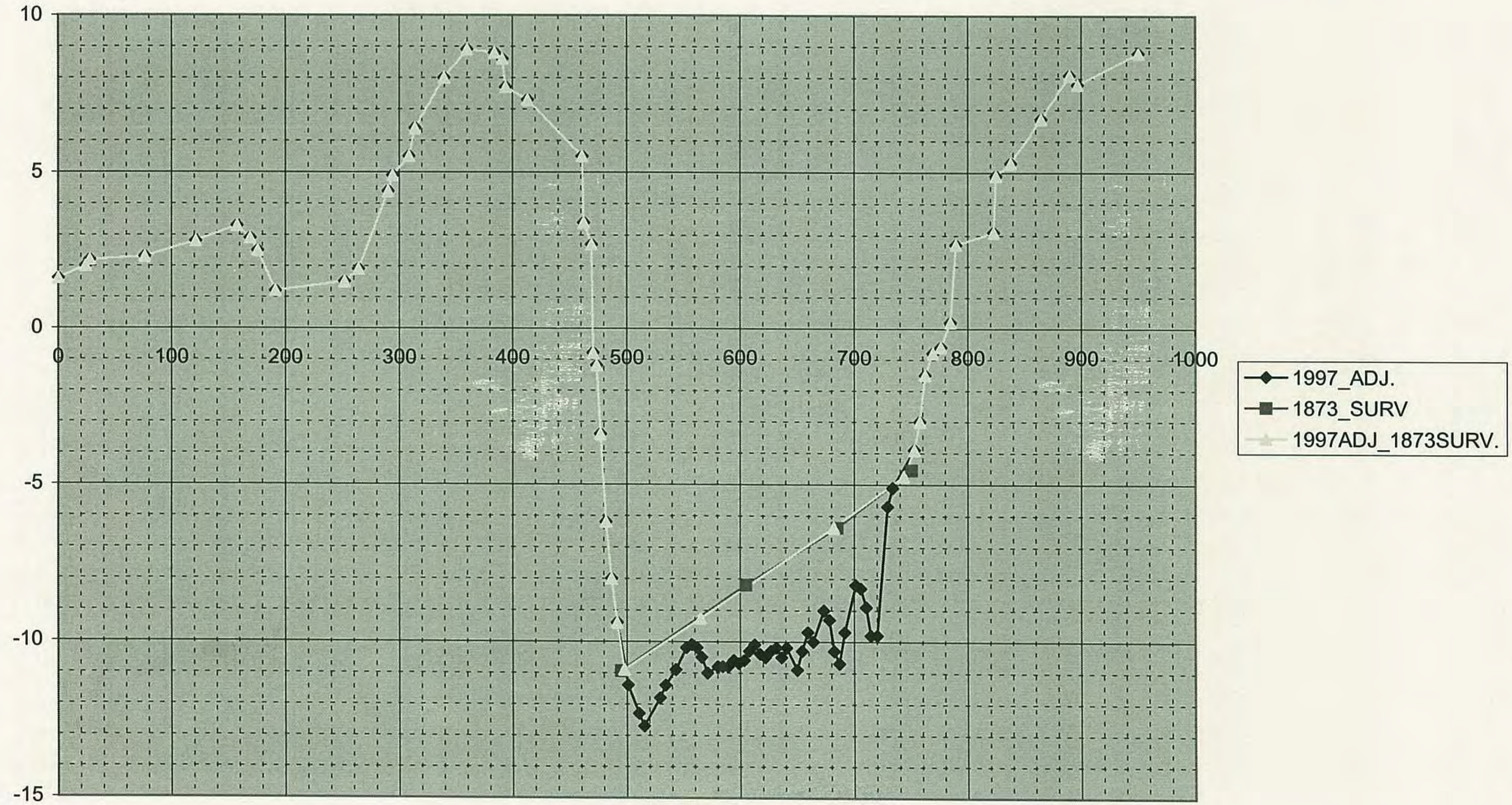
1873_SURV
1997ADJ_1873SURV.

BN410



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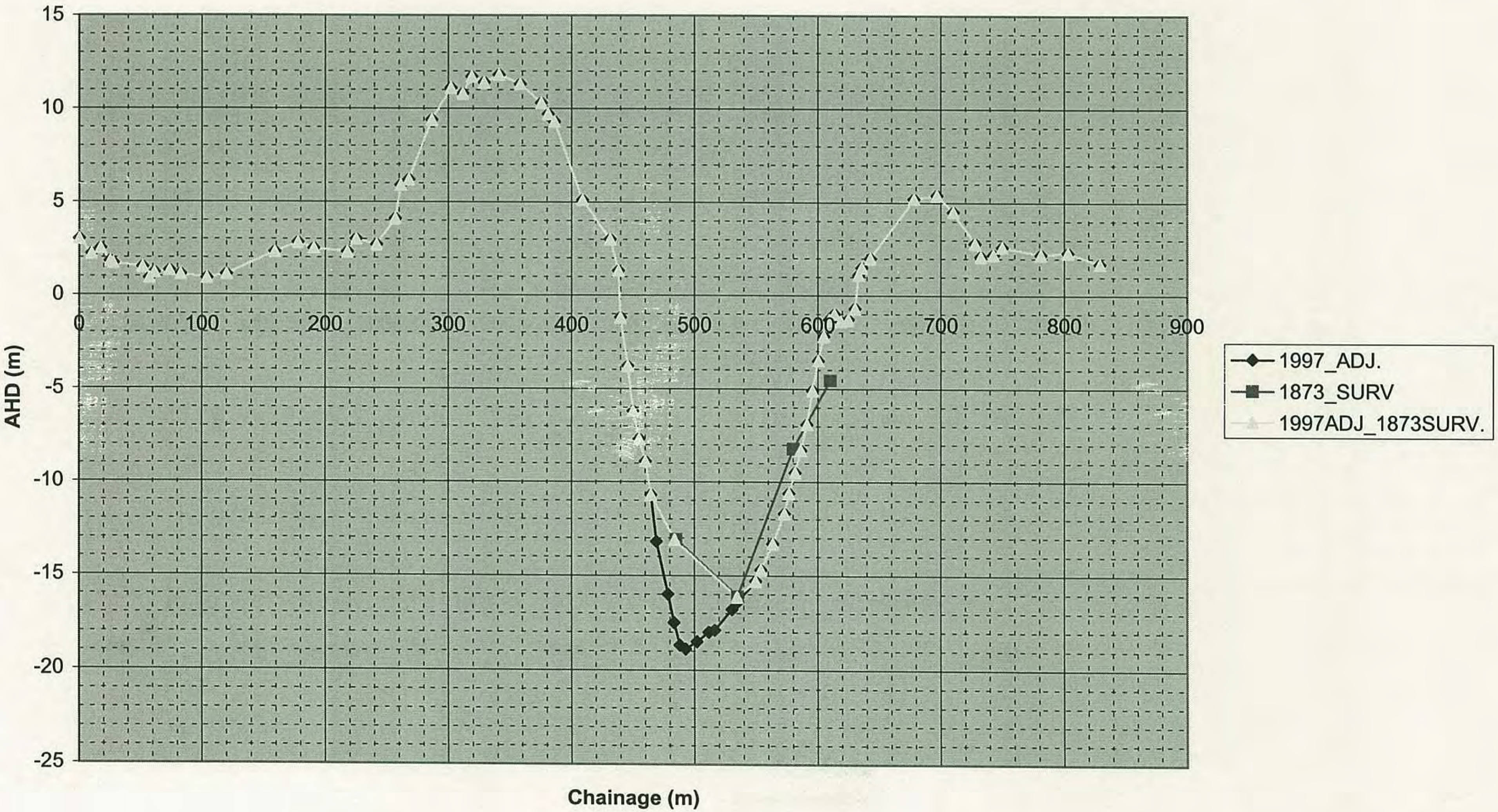

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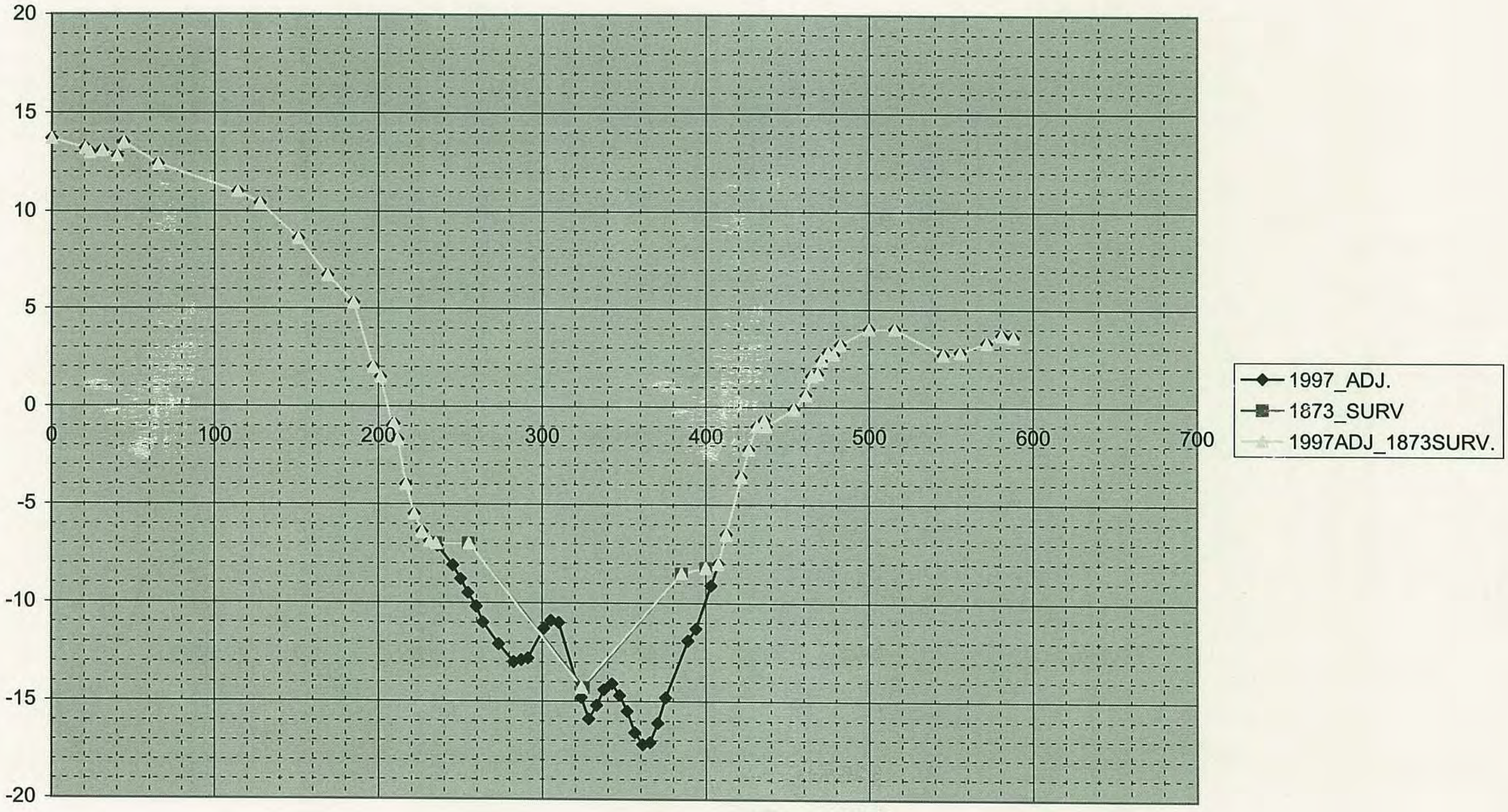

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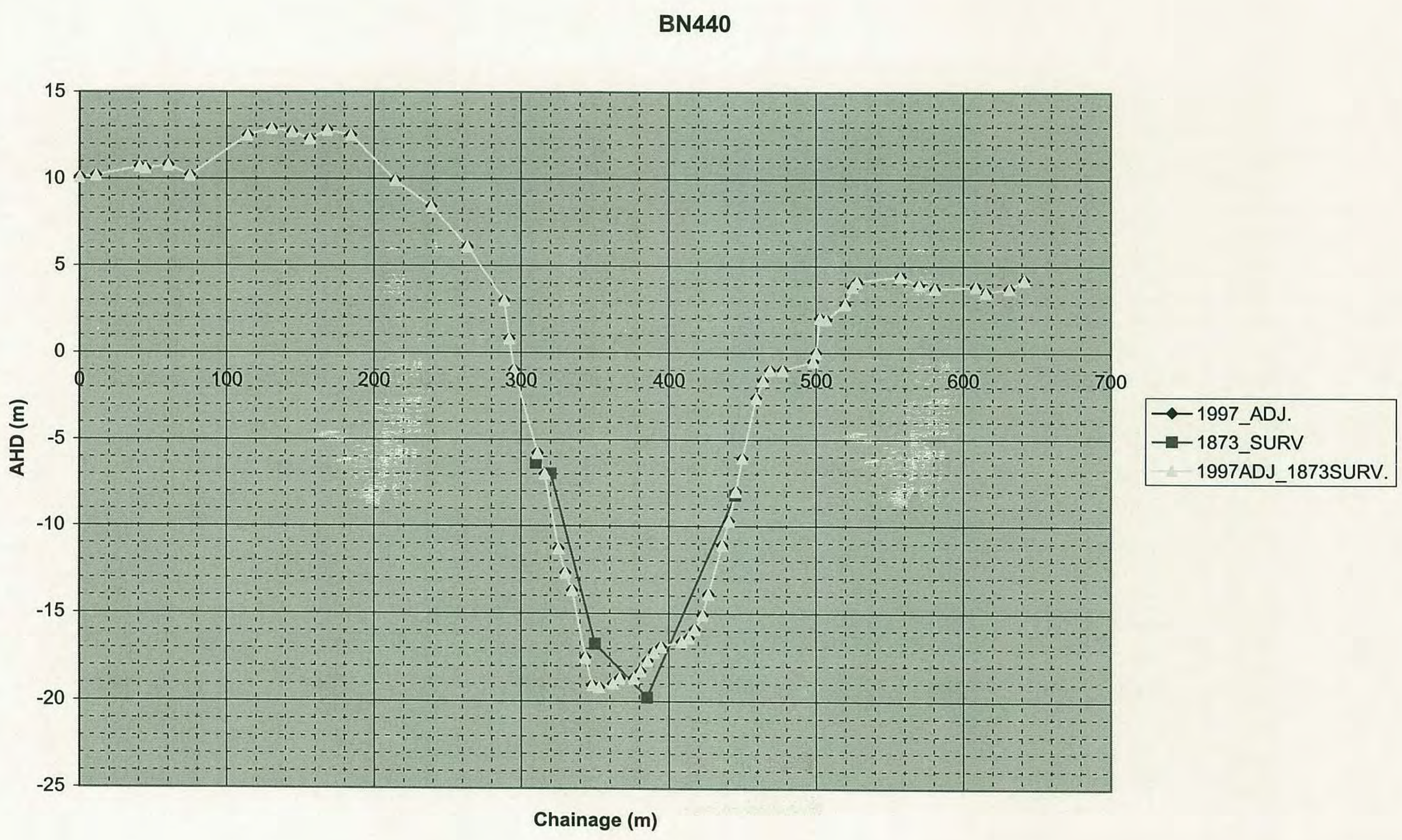
1997_ADJ.
1873_SURV
1997ADJ_1873SURV.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AHD (m)
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Chainage (m)
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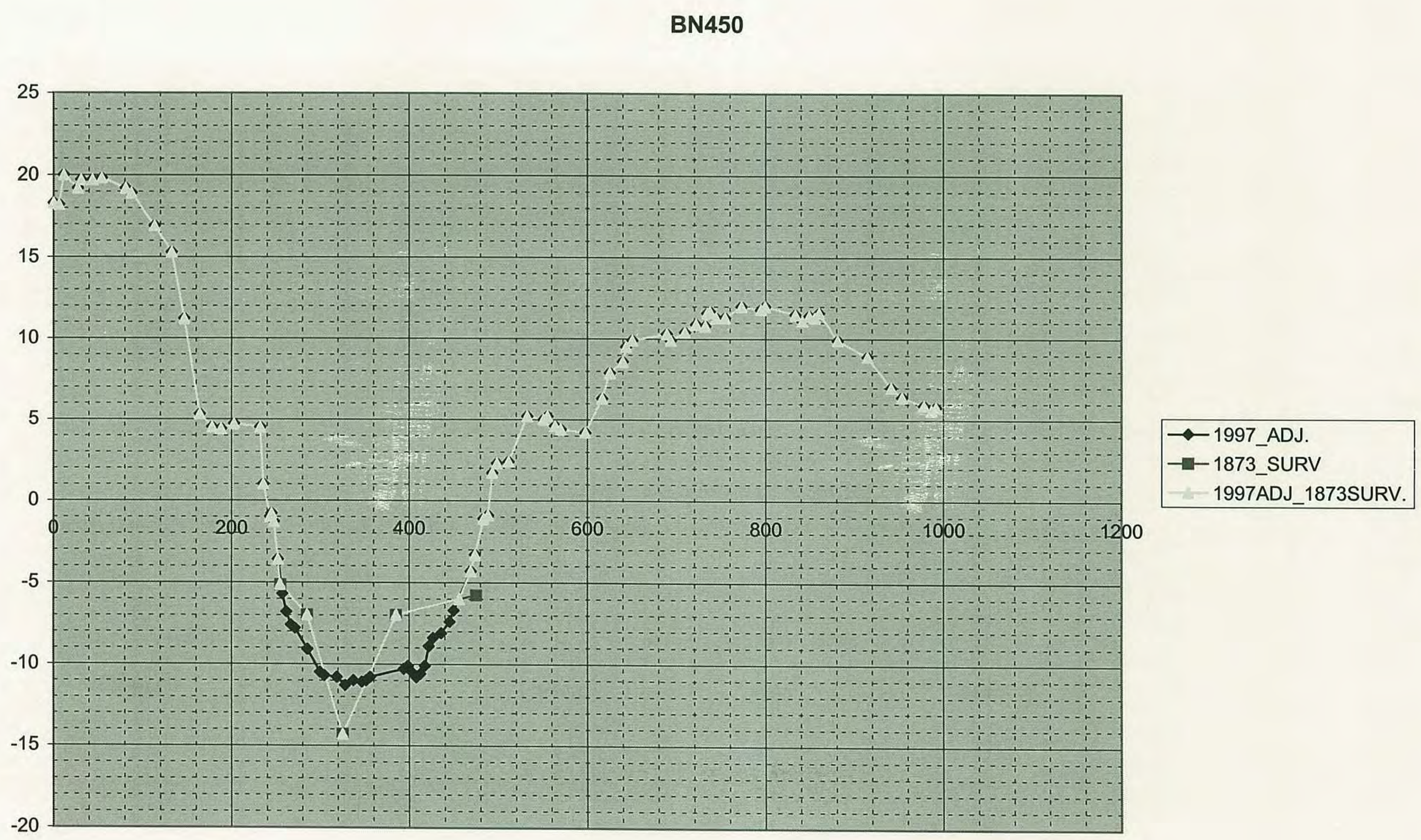
1873_SURV
1997ADJ_1873SURV.

BCC.045.0369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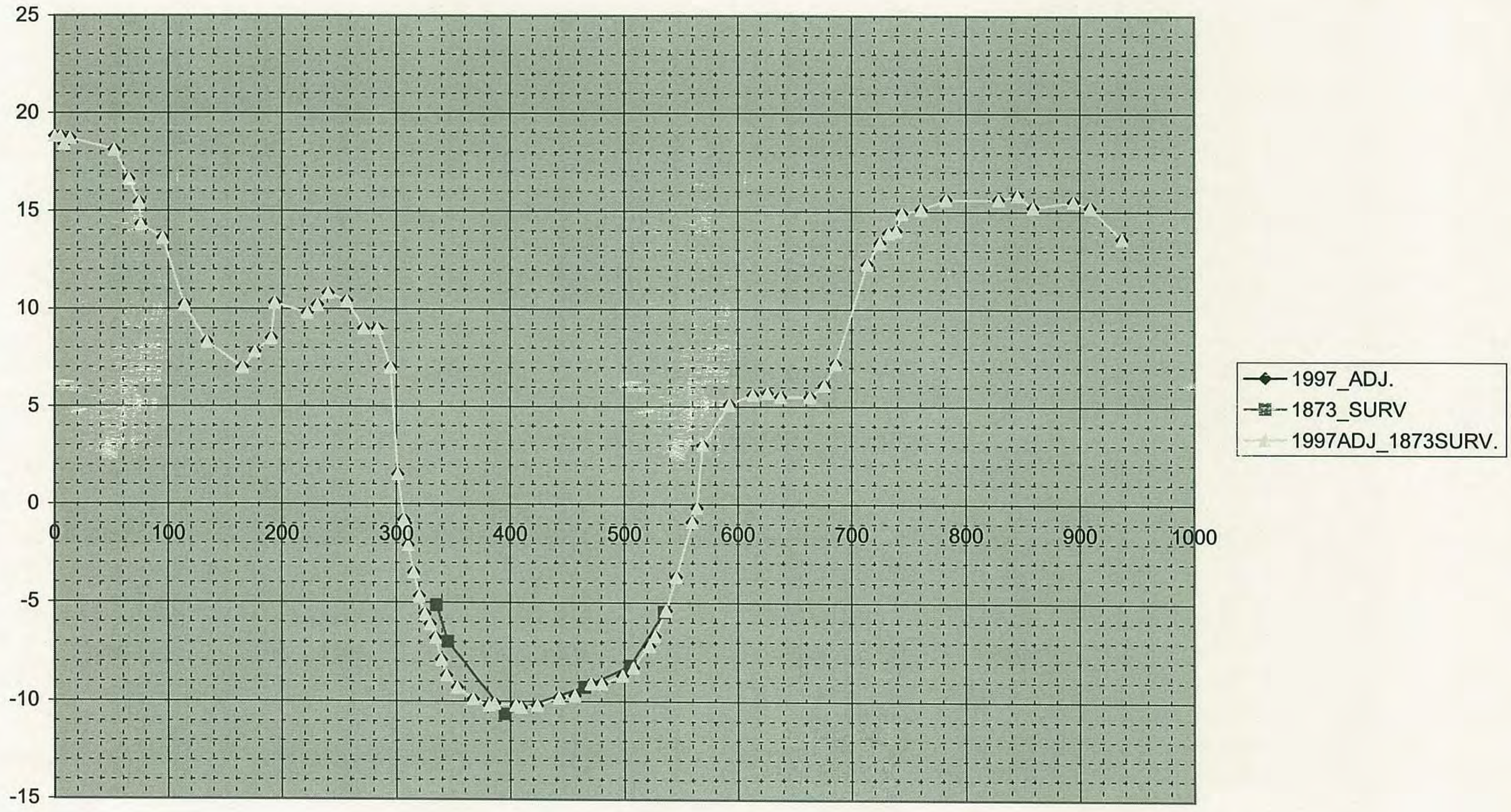
1997ADJ_1873SURV.

BCC.045.0370

BN460



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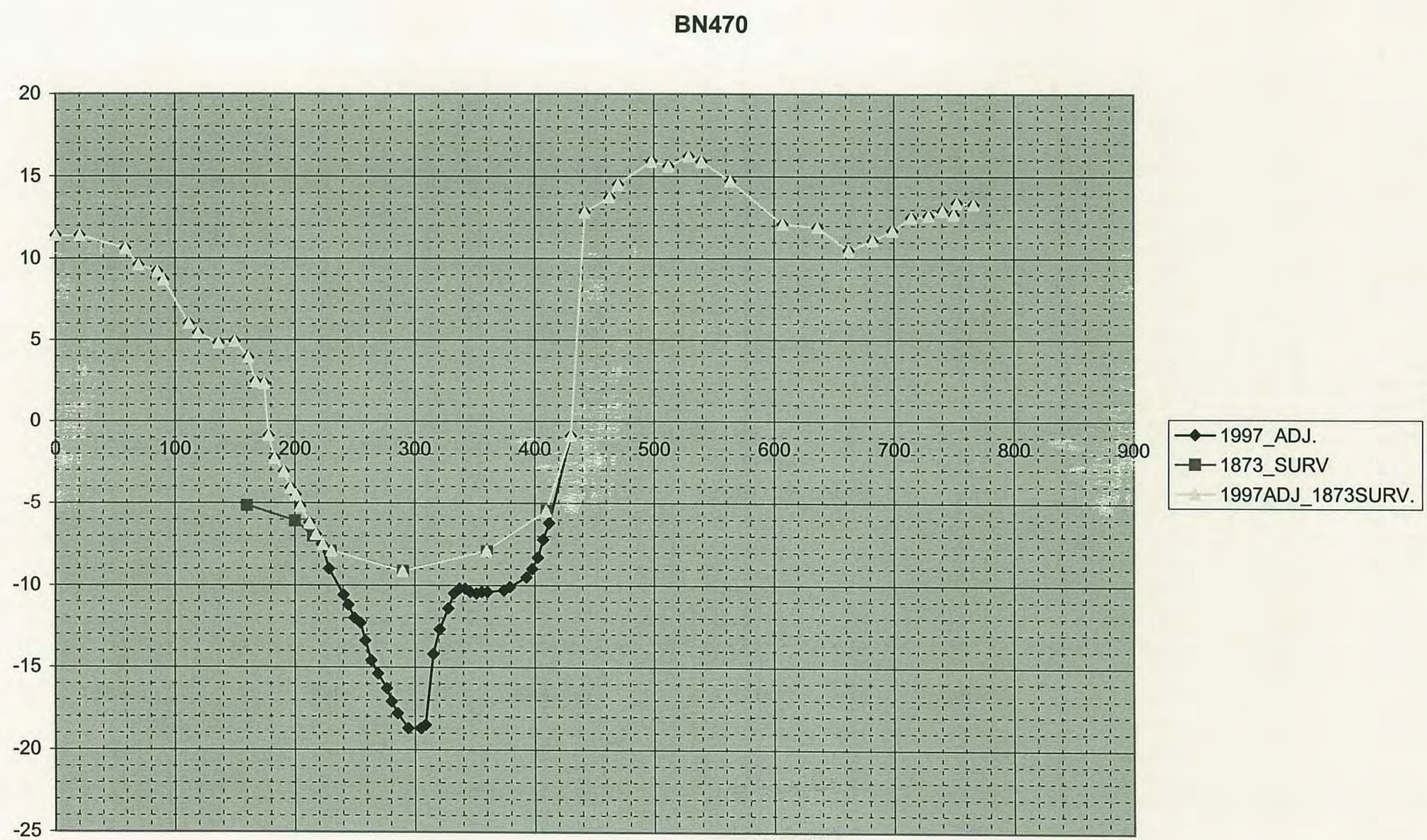
1997ADJ_1873SURV.



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1997_ADJ.
1873_SURV
1997ADJ_1873SURV.

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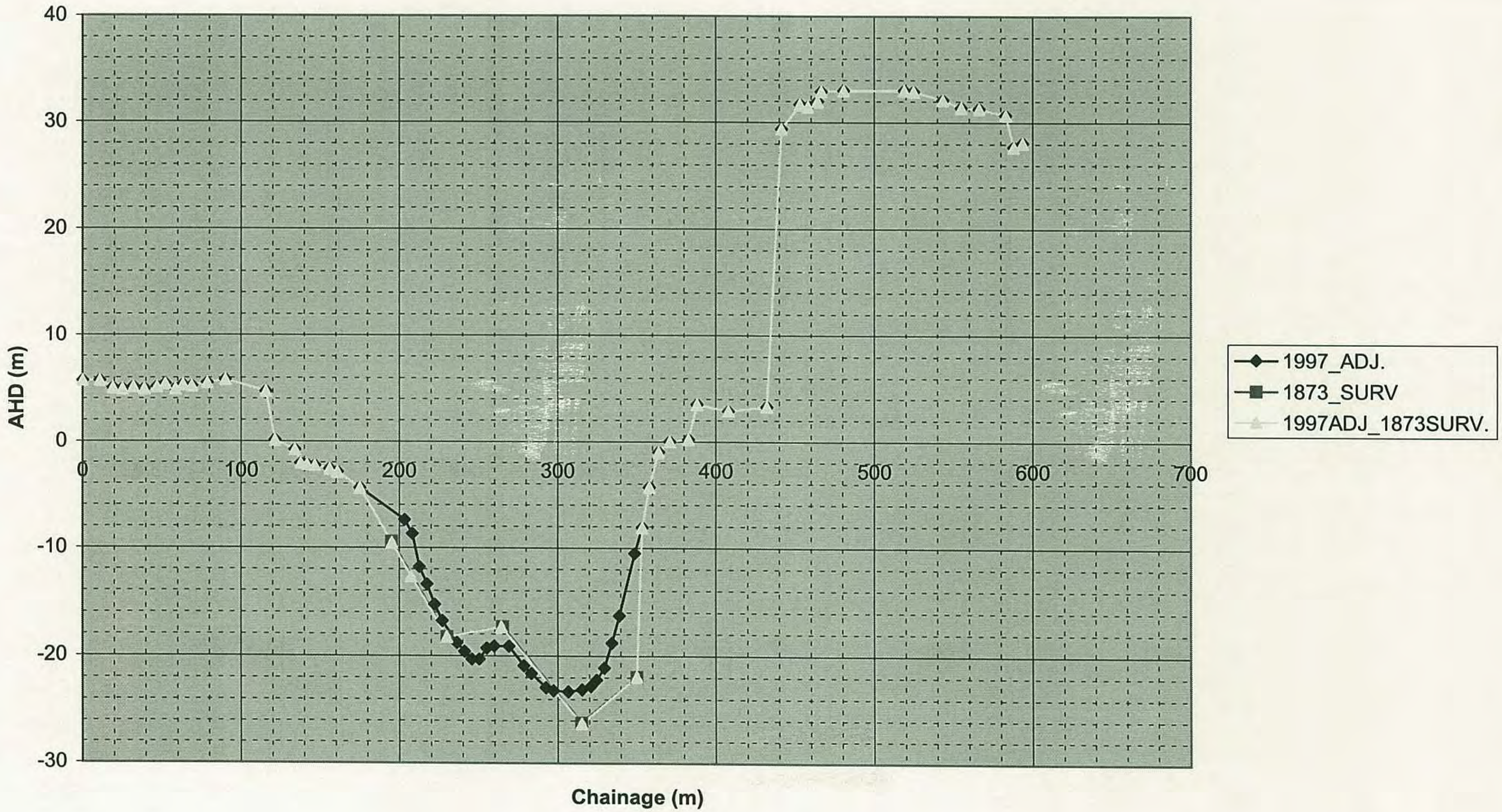
BN480



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Chainage (m)
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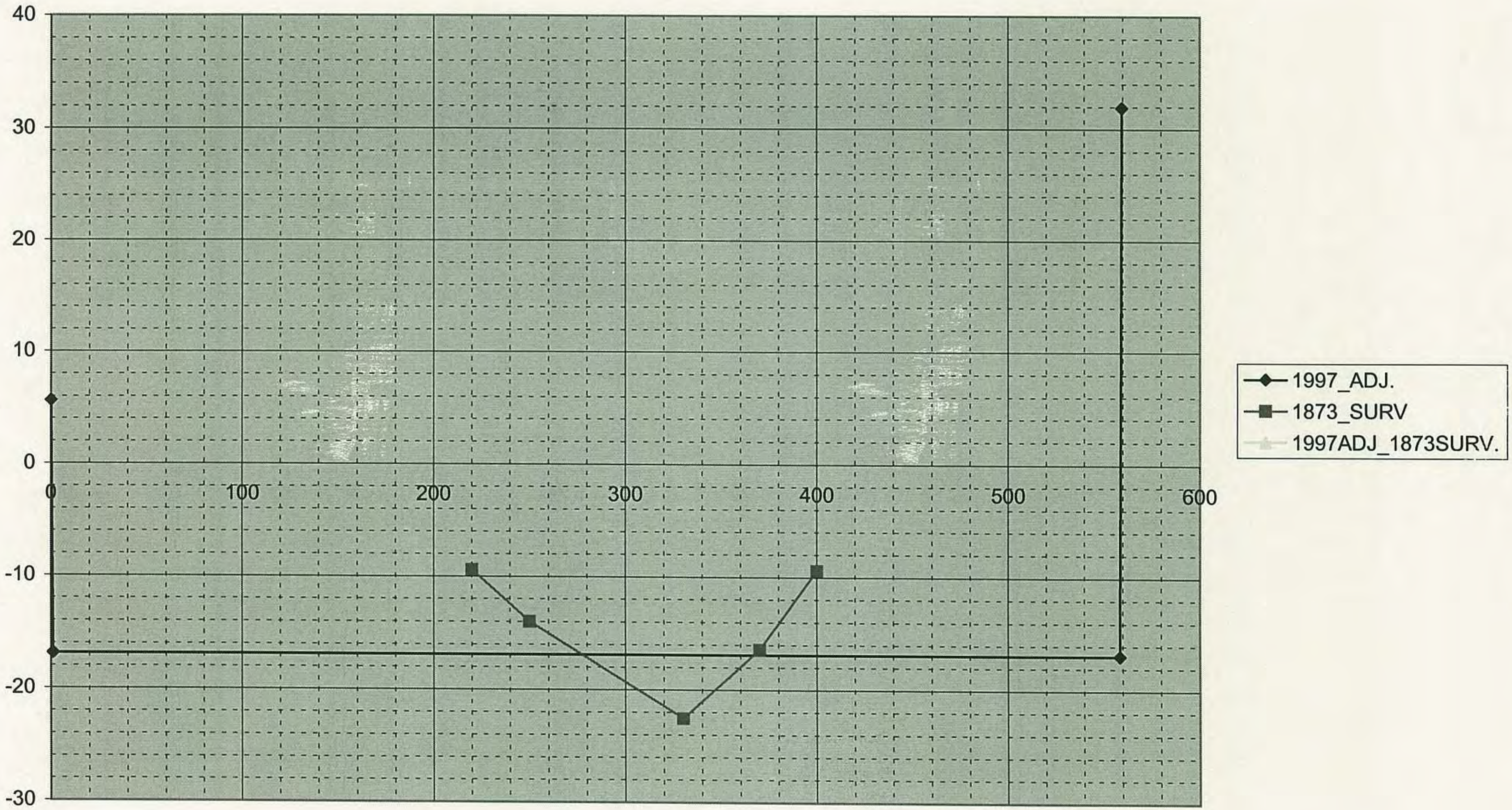
1997ADJ_1873SURV.

BN490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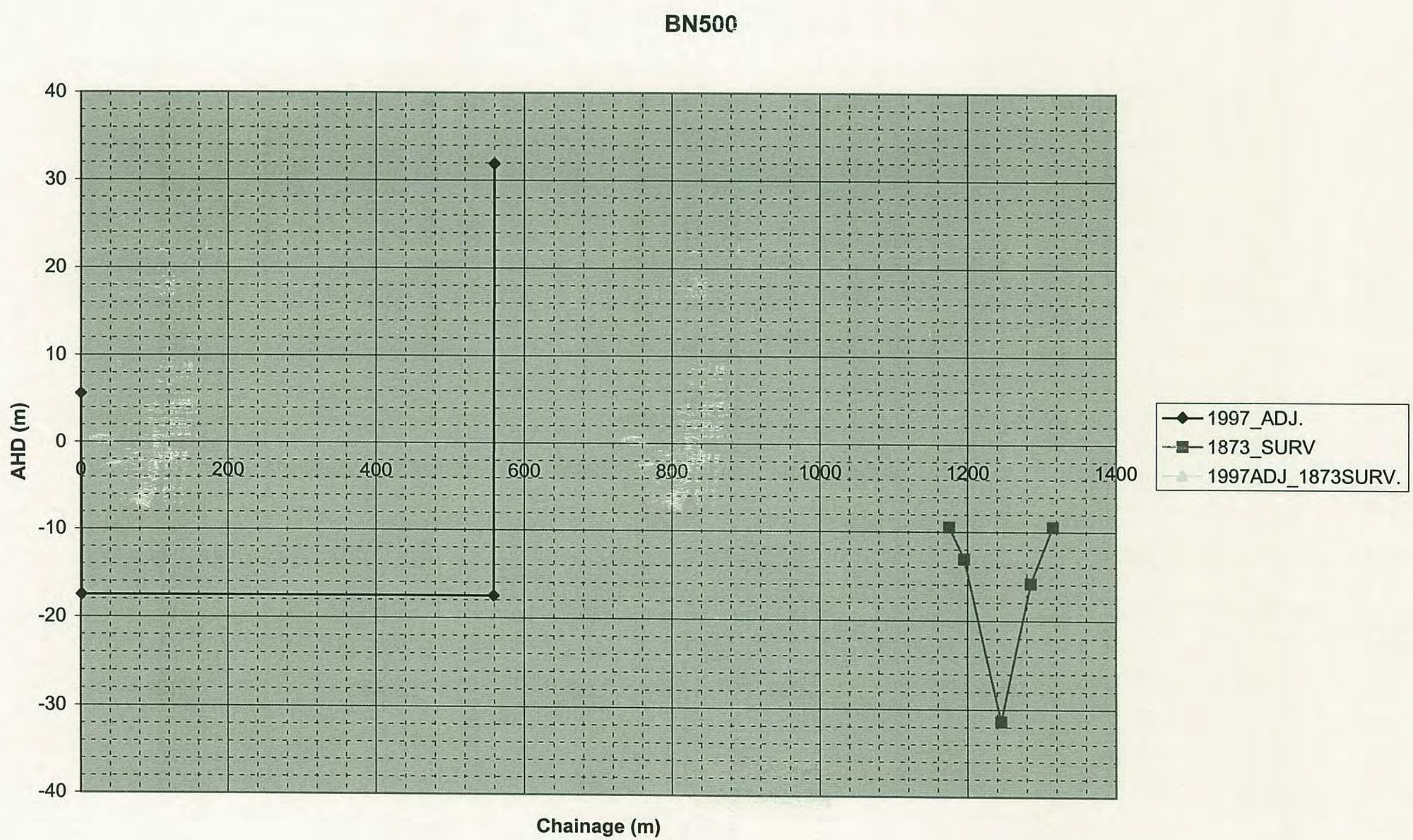

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Chainage (m)
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1873_SURV
1997ADJ_1873SURV.

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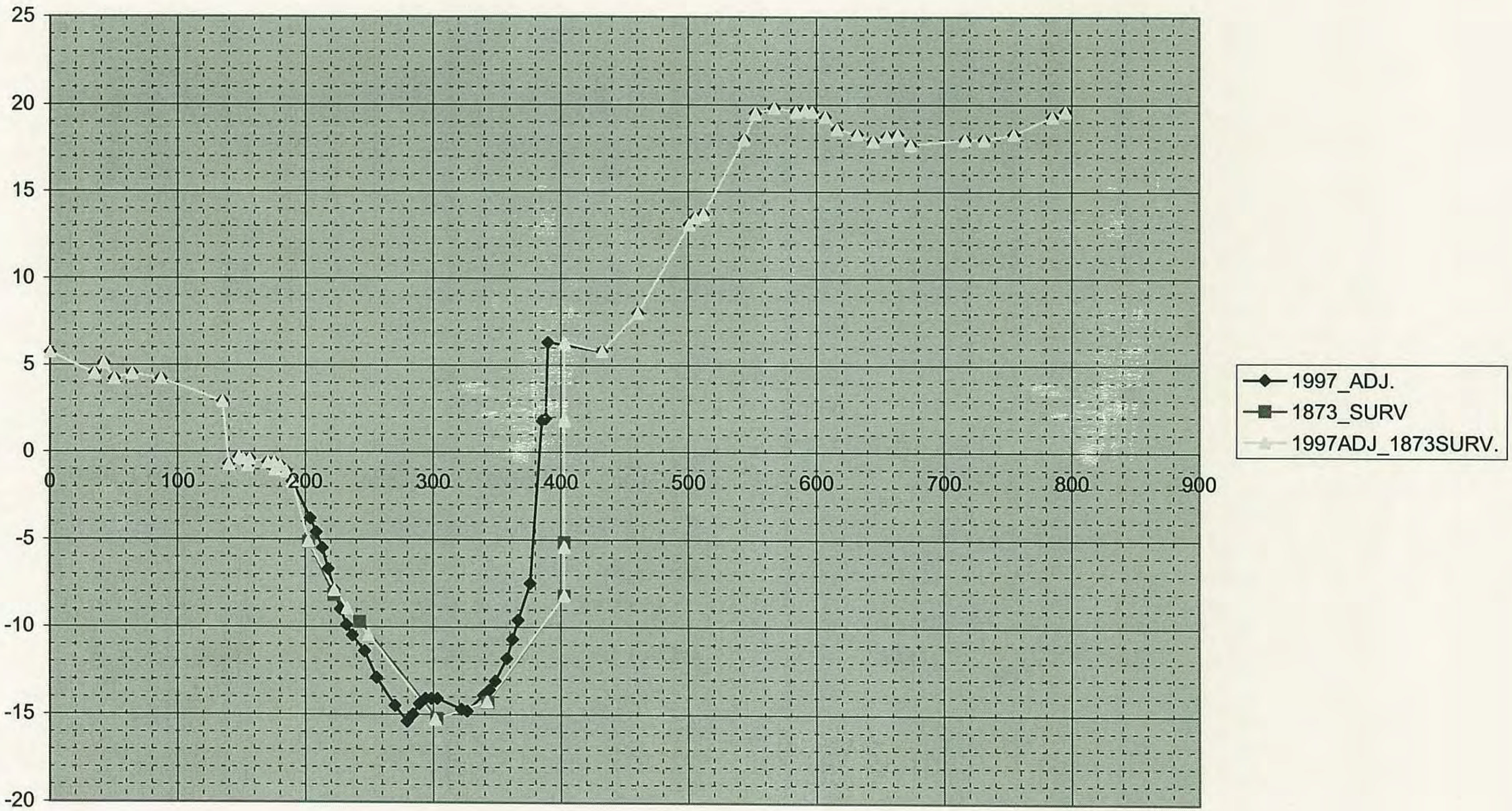

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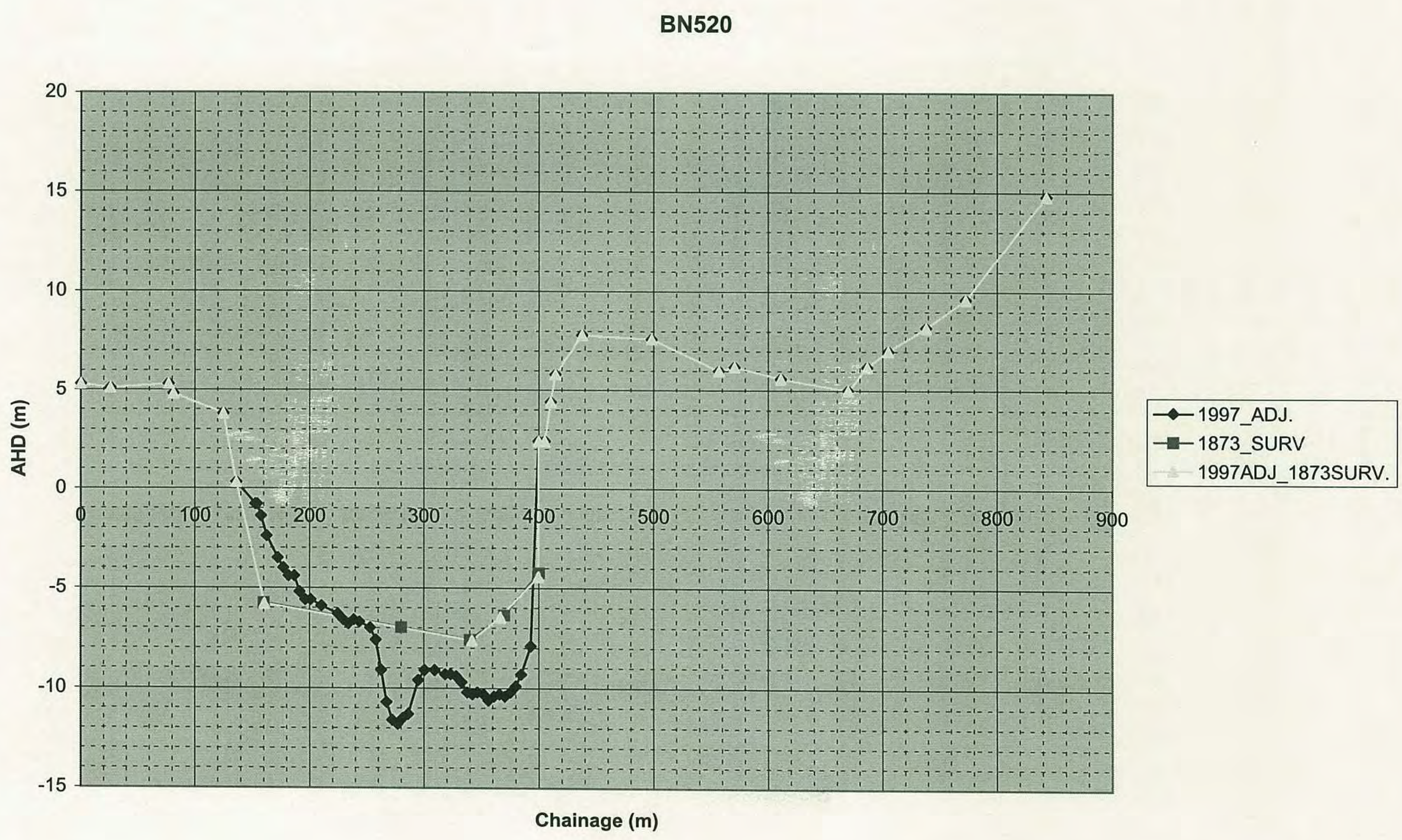
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Chainage (m)
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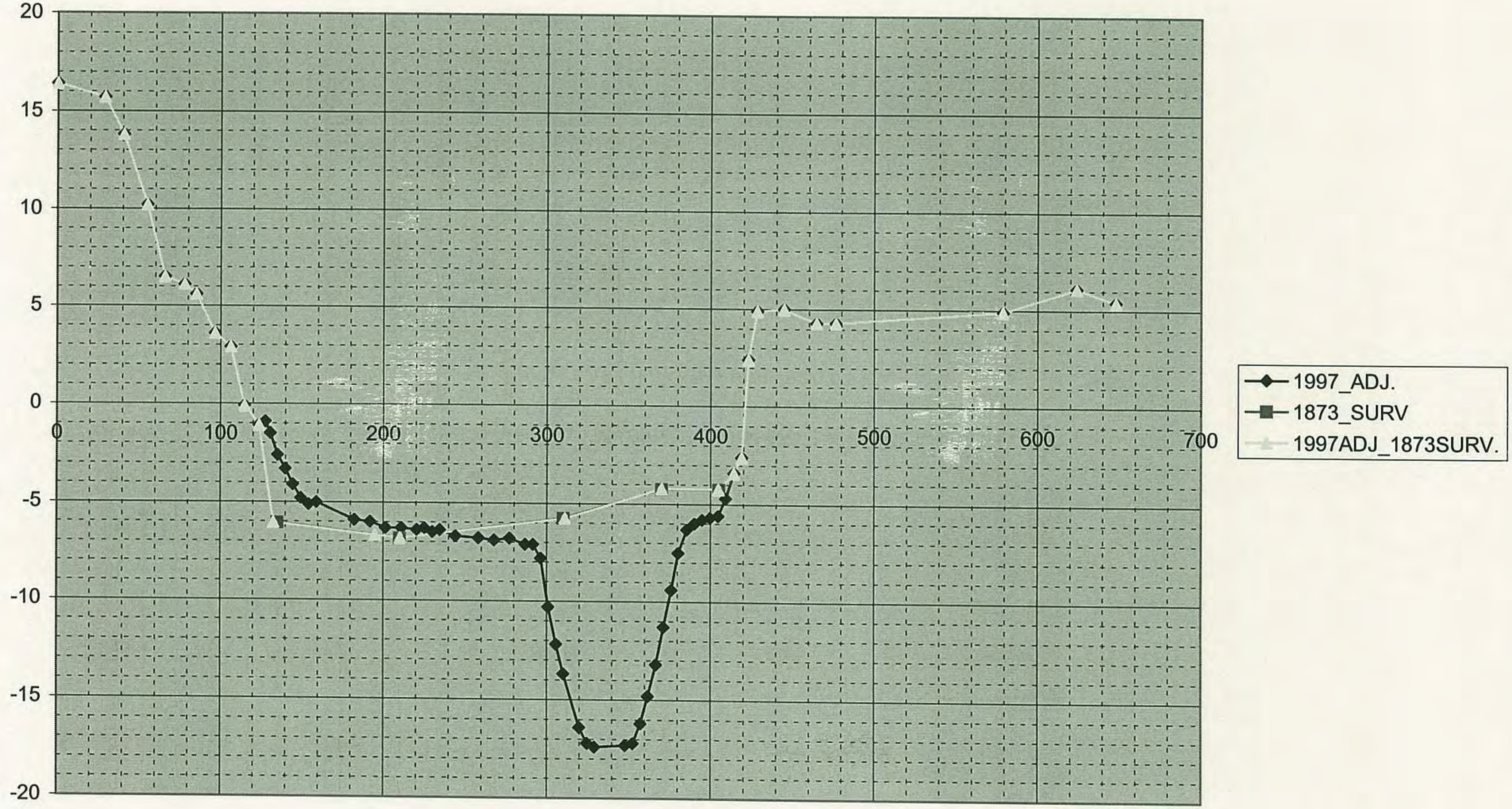
BCC.045.0377

BN530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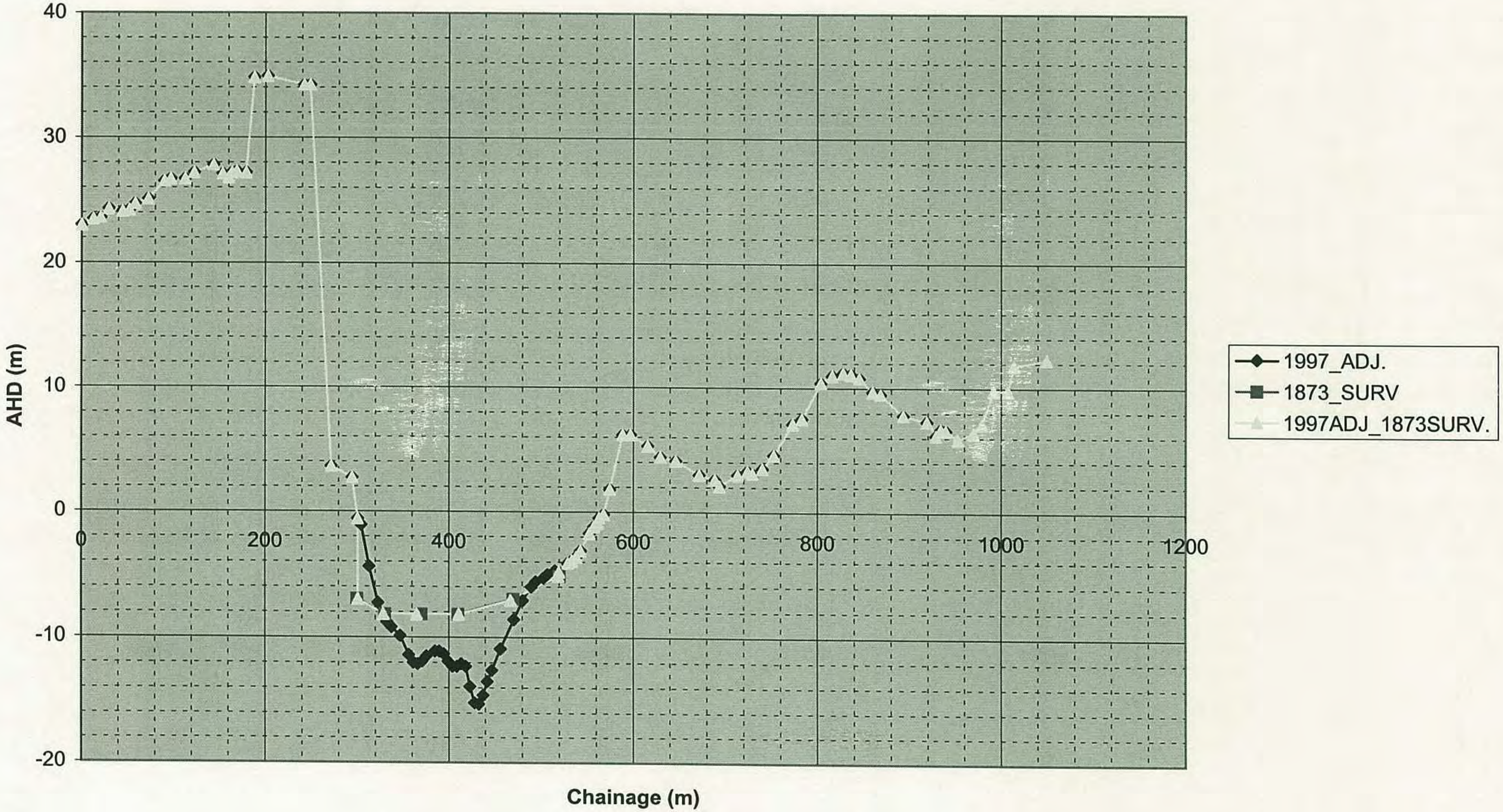
1997_ADJ.
1873_SURV
1997ADJ_1873SURV.

BN540



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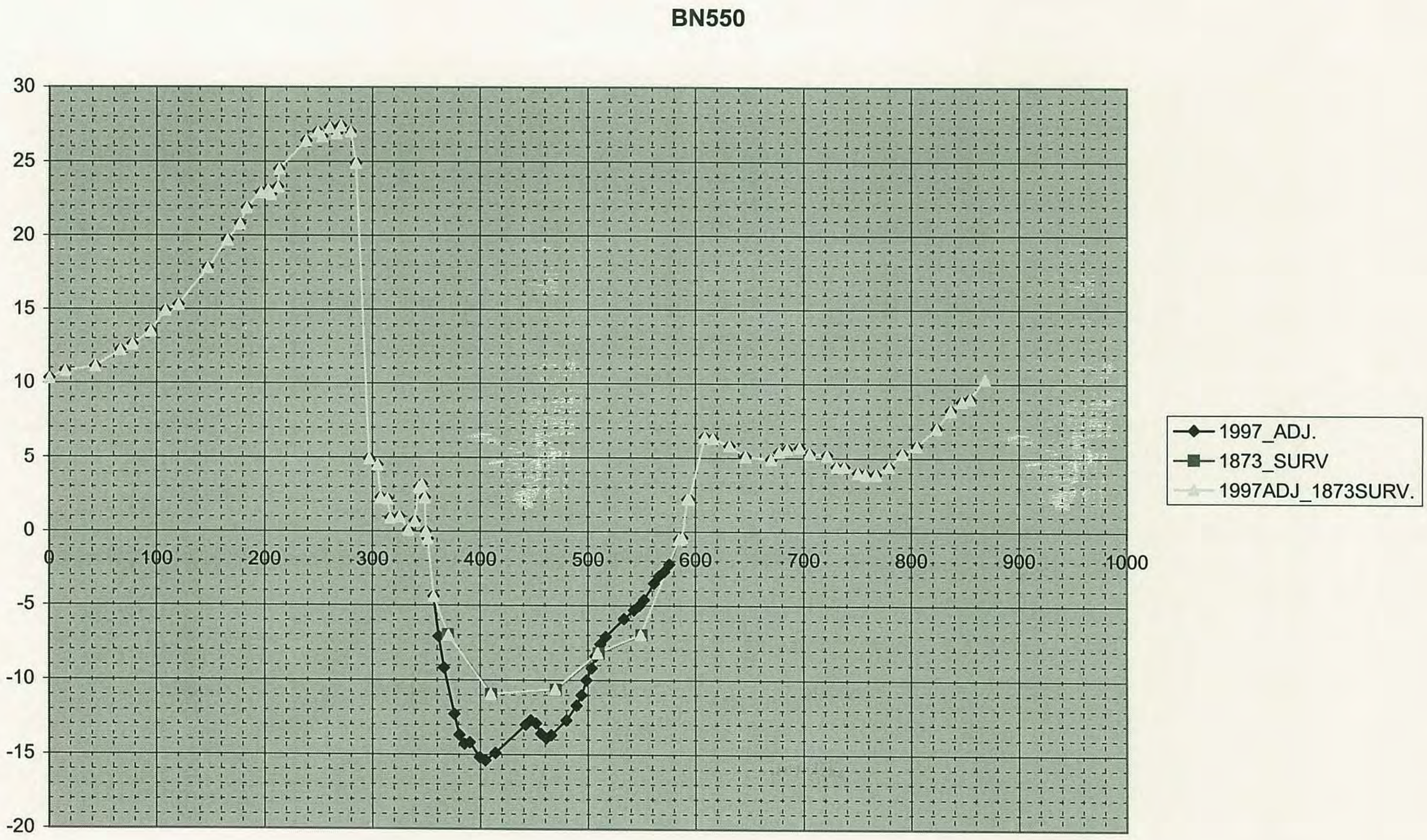
Chainage (m)
1997_ADJ.
1873_SURV
1997ADJ_1873SURV.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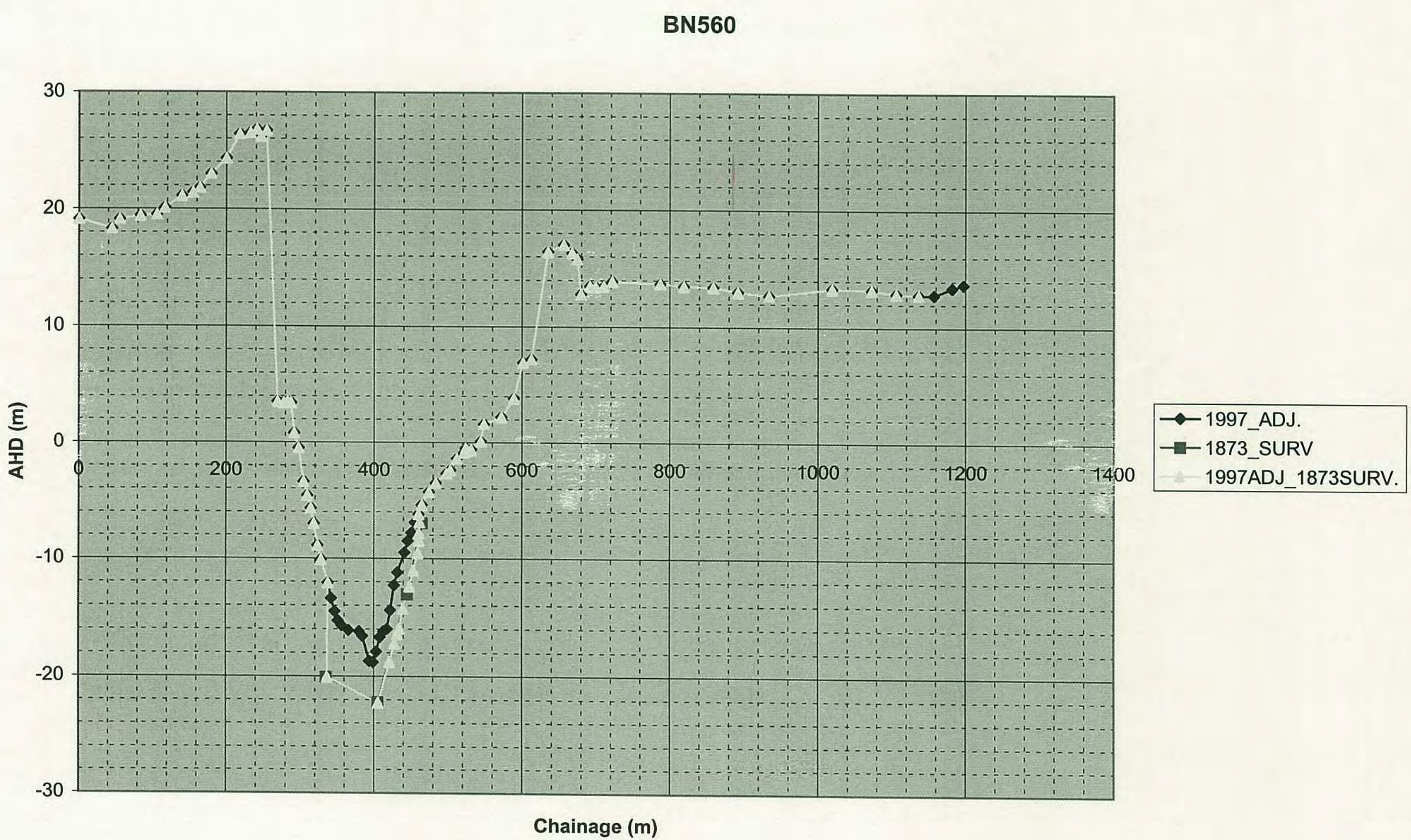
1997ADJ_1873SURV.

BCC.045.0380



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Chainage (m)
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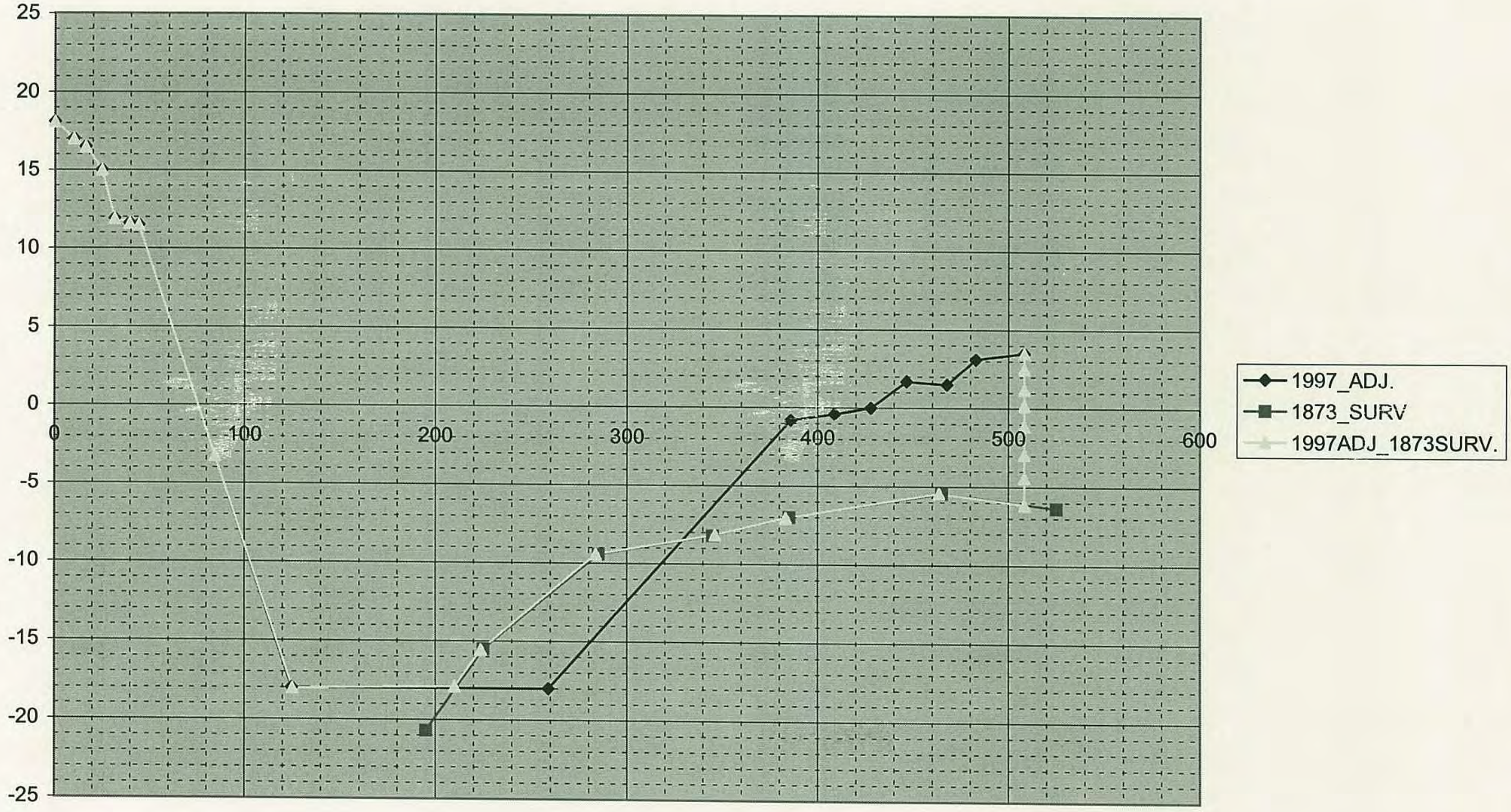
1873_SURV
1997ADJ_1873SURV.

BN590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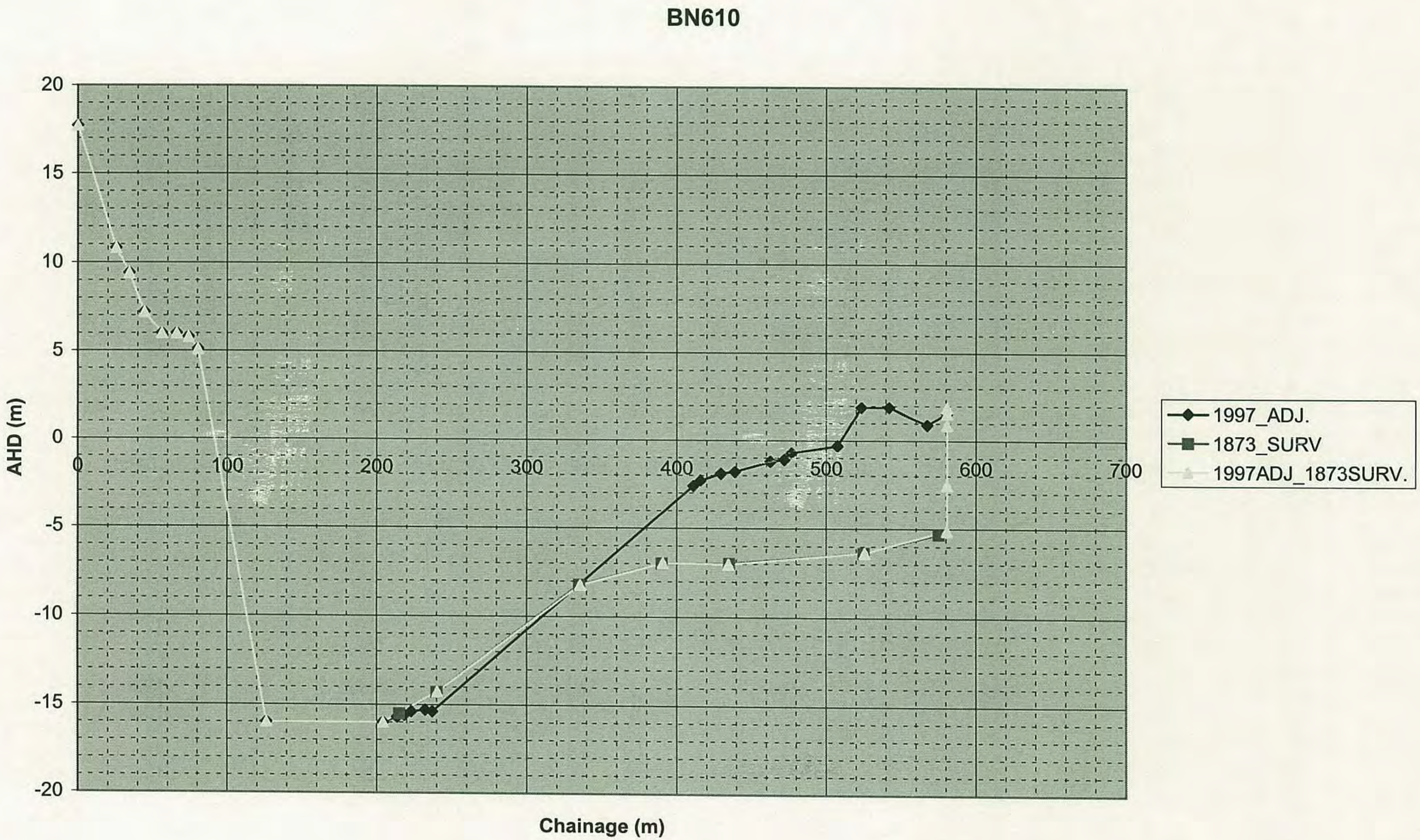
1997_ADJ.
1873_SURV
1997ADJ_1873SURV.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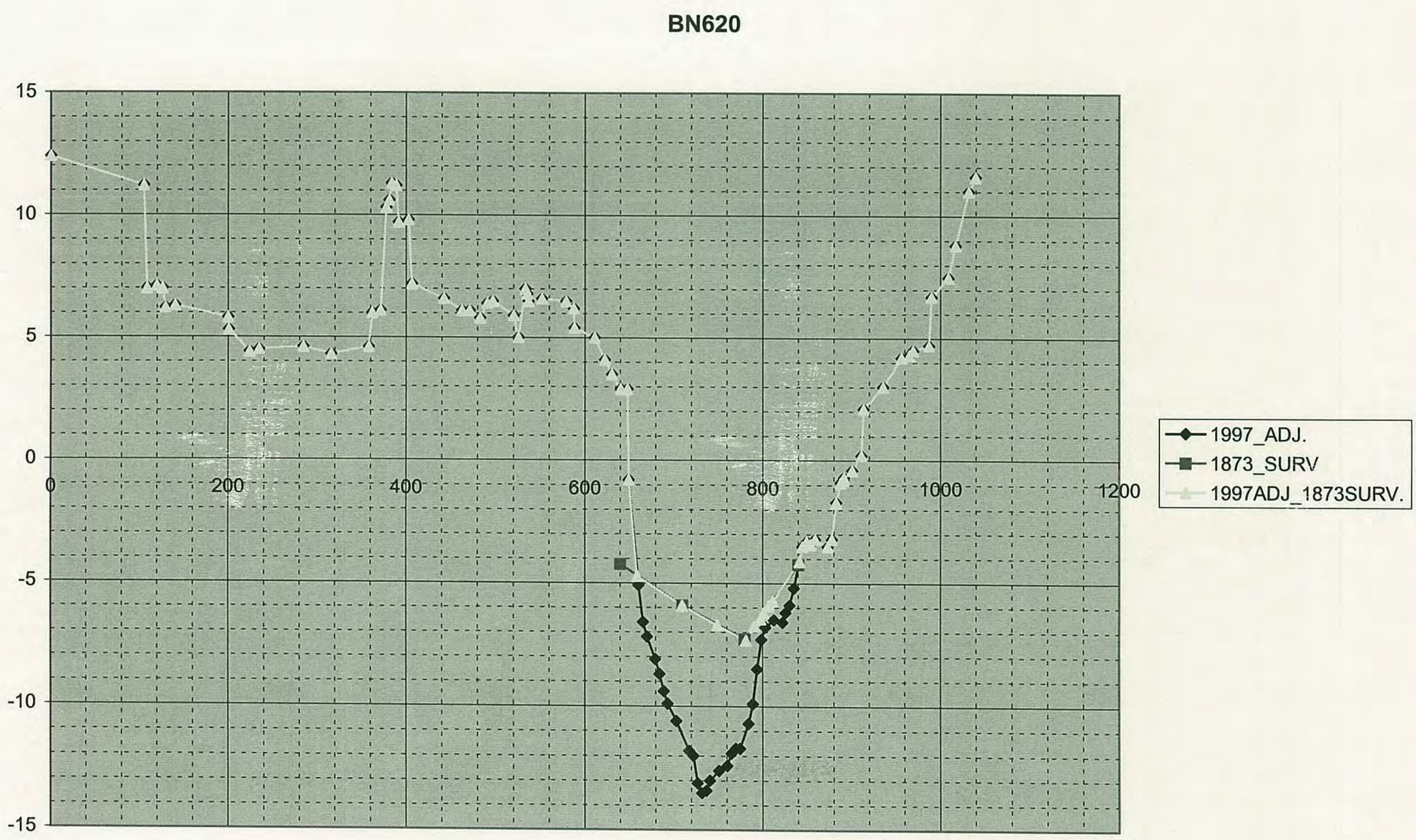
Chainage (m)
1997_ADJ.
1873_SURV
1997ADJ_1873SURV.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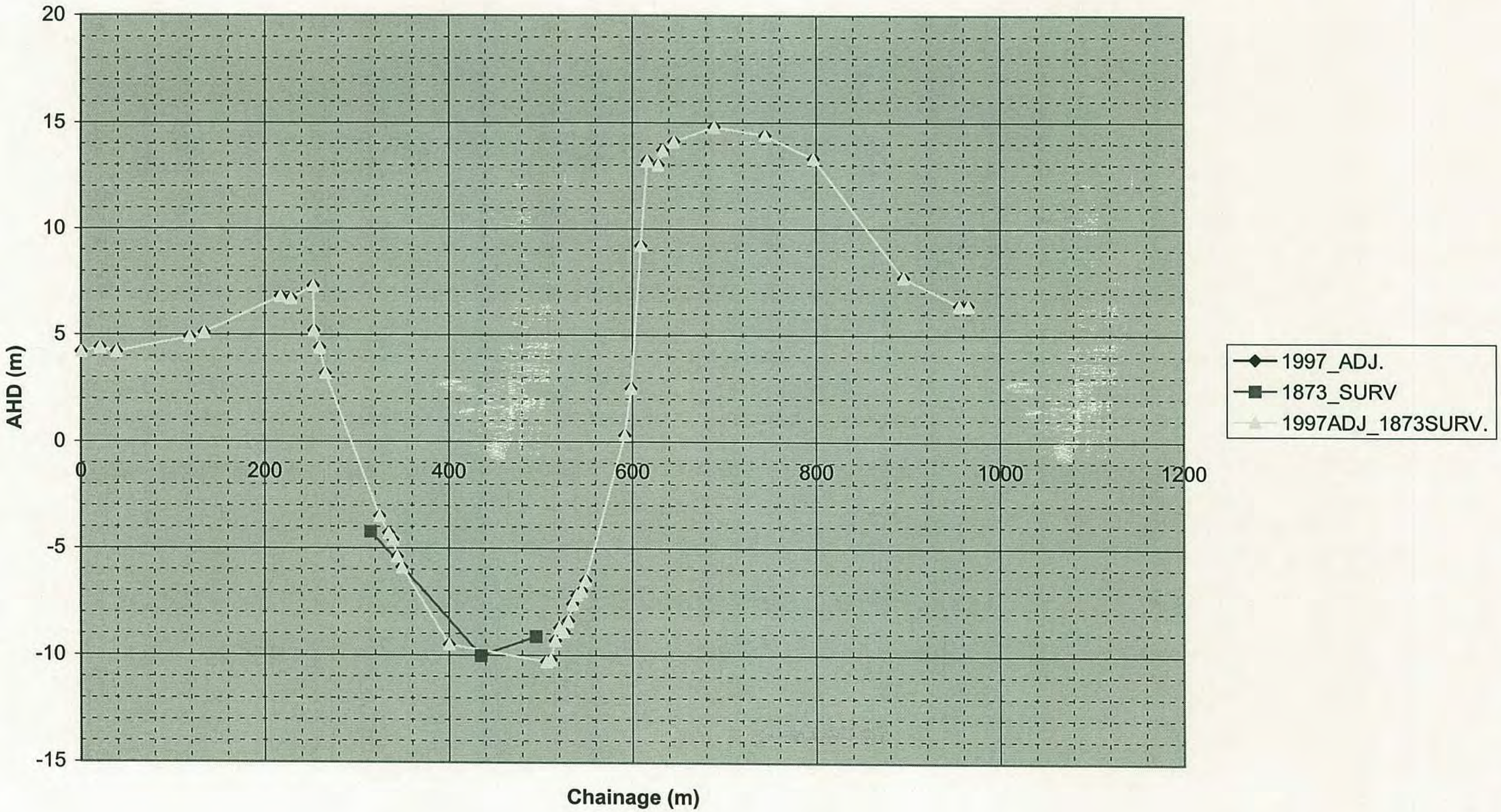
1873_SURV
1997ADJ_1873SURV.

BN630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AHD (m)
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1200
Chainage (m)
1997_ADJ.
1873_SURV
1997ADJ_1873SURV.

Brisbane River Flood Levels
Updated 25/01/2000

CELL ID	Q20 PEAK FLOOD LEVEL (m AHD)	Q50 PEAK FLOOD LEVEL (m AHD)	Q100 PEAK FLOOD LEVEL (m AHD)
BN1	1.05	1.10	1.19
BN2	1.57	1.80	2.21
BN3	1.60	1.84	2.26
BN4	1.60	1.84	2.27
BN5	1.62	1.87	2.30
BN6	1.64	1.90	2.34
BN7	1.75	2.04	2.53
BN8	1.87	2.20	2.74
BN9	1.93	2.27	2.83
BN10	1.99	2.34	2.92
BN11	2.05	2.42	3.03
BN12	2.10	2.48	3.10
BN13	2.14	2.55	3.19
BN14	2.18	2.59	3.26
BN15	2.22	2.64	3.33
BN16	2.27	2.70	3.41
BN17	2.33	2.77	3.50
BN18	2.38	2.84	3.58
BN19	2.45	2.92	3.68
BN20	2.50	2.98	3.77
BN21	2.52	3.02	3.81
BN22	2.60	3.11	3.94
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BN27	2.86	3.45	4.37
BN28	2.90	3.49	4.43
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BN132	10.33	11.86	13.95
BN133	10.39	11.92	14.02
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BN135	10.57	12.12	14.23
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BN137	10.71	12.27	14.39
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BN153	12.09	13.72	15.94
BN154	12.17	13.81	16.03
BN155	12.29	13.93	16.15
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BN157	12.46	14.11	16.35
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BN161	12.84	14.48	16.73
BN162	13.00	14.64	16.88
BN163	13.10	14.74	16.97
BN164	13.19	14.84	17.09
BN165	13.27	14.93	17.20
BN166	13.34	15.01	17.28
BN167	13.41	15.07	17.34
BN168	13.49	15.15	17.42
BN169	13.57	15.25	17.53
BN170	13.66	15.34	17.64
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BN172	13.83	15.52	17.83
BN173	13.91	15.60	17.92
BN174	13.97	15.66	17.97
BN175	14.06	15.76	18.07
BN300	1.93	2.27	2.83
BN301	2.45	2.92	3.68
BN302	2.50	2.98	3.77
BN303	3.14	3.79	4.81
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BN305	11.51	13.10	15.29
BN306	13.10	14.74	16.97
BN307	13.19	14.84	17.09
BN308	13.27	14.93	17.20

City Design - Flood Modelling Services

RECALIBRATION OF THE MIKE11 HYDRAULIC MODEL AND DETERMINATION OF THE 1 IN 100 AEP FLOOD LEVELS

- Draft
- 23/12/2003

- Draft
- 23/12/2003

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SKM

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Executive Summary

In June 1998 SKM developed a MIKE11 hydraulic model as part of the Brisbane River Flood Study for Brisbane City Council. This model was then used as a base model for the model developed for the Ipswich Rivers Flood Studies (SKM 2000). During the Ipswich Study, many additional rivers and creeks were added to the hydraulic model.

These additional rivers/creeks changed the Brisbane River routing characteristics, consequently the model needed to be re-calibrated. Re-calibration was only performed within the Ipswich City Council boundary.

Further work was therefore required to re-calibrate the hydraulic model within the Brisbane City boundary. The purpose of this report is to present the findings of the re-calibration of the Brisbane River model.

The 1974 and 1955 flood events were used to calibrate the hydraulic model. These events were chosen because they provide an adequate calibration envelope so that the 1 in 100 year design event can be accurately modelled.

Calibration was generally achieved to within the general specification tolerances.

A design 1 in 100 AEP event was run based on a flow of 6000 m^3/s at the Brisbane Port Office Gauge. This corresponds to the 'best guess' report by the expert panel (IRP 2003).

1. Introduction

The purpose of this report is to present the findings of the re-calibration of the Brisbane River Hydraulic Model. This model was calibrated using the 1974 and 1955 flood events.

The Calibration process involved

- Updating and re-running the 1955 RAFTS Model
- Re-calibrating the 1955 RAFTS Model (loss rates only)
- Extraction of hydrographs from the 1955 RAFTS model and input into MIKE11
- Extraction of hydrographs from the 1974 RAFTS model and input into MIKE11
- Adjusting roughness values in the 1974 and 1955 MIKE11 model. Iterating until the best match between predicted water levels and recorded water levels was achieved.

The 1974 and 1955 events were chosen because there is reliable historical flood level data for flood events. The flows for these events in the subject reach of the river are approximately 10 000 m^3/s (1974) and 4400 m^3/s (1955). This provides an envelope in which the design event can be accurately predicted. A design 1 in 100 AEP event was run based on a flow of 6000 m^3/s at the Brisbane Port Office Gauge. This corresponds to the 'best guess' report by the expert panel (IRP 2003).

2. Hydrology

2.1 General

A RAFTS hydrologic model was developed as part of the Brisbane River Flood Study (SKM 1998). This study required that hydrologic model calibration/verification be undertaken for a total of 8 historical flood events. These events are presented in **Table 1**.

- **Table 1 Brisbane River Flood Study Calibration/Verification Events**

Calibration Events	Verification Events
January 1974	February 1931
June 1983	March 1955
Late April 1989	July 1973
May 1996	Early April 1989

In June 2000, the Ipswich Rivers Flood Studies (SKM 2000) was completed. All rivers within the study area fell within the Brisbane River Catchment and thus the Brisbane River RAFTS model was used as a basis of the Studies. Sub-catchment areas were refined in order to better represent the river network within the study area and therefore model re-calibration had to be undertaken. The re-calibration was performed on 4 events for the Ipswich Rivers Flood Studies. These calibration events are presented in **Table 2**.

- **Table 2 Ipswich River Flood Studies Calibration Events**

Calibration Events
January 1974
June 1983
Late April 1989
May 1996

Verification events were not re-run for the Ipswich River Flood Studies.

For this investigation, it was considered that the 1974 and 1955 historical flood events would provide the best calibration range for the 1 in 100 AEP flood event. It was therefore necessary to rerun the 1974 and 1955 historical flood events and extract the hydrographs for use in the MIKE11 hydraulic model.

2.2 1974 Historical Flood Event

The 1974 event was originally modelled using RAFTS as part of the Brisbane River Flood Study (SKM 1998). As part of the Ipswich Rivers Flood Studies (SKM 2000) the Brisbane River RAFTS model was updated and re-calibrated. Re-calibration of the 1974 hydrologic model was not required. A comparison of the RAFTS predicted hydrographs and recorded hydrographs for the 1974 flood event have been provided in Appendix A. These hydrographs have been directly taken from the Ipswich Rivers Flood Studies Report (SKM 2000).

2.3 1955 Historical Flood Event

The 1995 event was not re-run as part of the Ipswich Rivers Flood Studies and subsequently the 1955 had to be run through the updated Brisbane River RAFTS model. As a result, loss rates reported in the Brisbane River Flood Study Report (SKM 1998) were adjusted to provide a better calibration. **Table 3** presents the adopted loss rates.

- **Table 3 Rainfall Losses March 1955 calibration**

Catchment Location	New Model Initial Loss	New Model Continuing Loss	Old Model Initial Loss	Old Model Continuing Loss
Brisbane	100	2.5	100	2.5
Bremer	50	1.5	50	1.5
Lockyer	90	1.8	85	2.5
Somerset	130	2.5	130	2.5
Wivenhoe	60	2.0	20	1.8

A comparison of the RAFTS predicted hydrographs and recorded hydrographs for the 1955 flood event have been provided in **Appendix A**. The magnitude of the discharge was matched for the key locations. Generally a good match was achieved however the timing of the peak discharge predicted by the RAFTS model for the Vernor gauging station was earlier than that of the recorded hydrograph. One possible explanation for the delay in the recorded hydrograph at Vernor Gauge is the storage of runoff by Somerset Dam. Although the dam was not completed, some storage was available. This storage could have resulted in delaying flows from the upstream portion of the catchment. This explanation would seem reasonable as the remainder of the hydrographs provide good agreement with timing.

The only catchment parameters adjusted for the 1955 event were loss rates. Various loss regimes were trialed in order to match the timing of the hydrograph at Vernor Gauge. The adopted loss regime presented in **Table 3** provides the best overall match.

SKM

3. Hydraulic Model Calibration

3.1 General

The hydraulic model MIKE developed for the Brisbane River Flood Study (SKM 1998) was used as a base model for the model developed for the Ipswich Rivers Flood Studies (SKM 2000). During the Ipswich Study, many additional rivers and creeks were added to the hydraulic model.

These additional rivers/creeks changed the Brisbane River routing characteristics, consequently the model needed to be re-calibrated. Re-calibration was only performed within the Ipswich City Council boundary, and therefore further work was required to re-calibrate the hydraulic model within the Brisbane City boundary.

Generally, the upper reach of the Brisbane River from MIKE11 model chainage BNE 964km to BNE 990 km consists of mainly open grassed and treed floodplains with severe meanders at various locations. Rural properties are located at various levels along this reach.

The reach of the Brisbane river from MIKE11 model chainage BNE 990 km to BNE 1040 km consists of mainly open grassed and treed floodplains with severe meanders at various locations. Residential properties are located at various intervals and levels along this reach. These residential properties could be described as low density areas.

From chainage BNE 1040 km to BNE 1070 km the reach could be described as medium to high density residential areas which include the inner city area. The general shape of the river could be described as severely meandering.

The lower reach of the Brisbane River from BNE 1070 km to BNE 10788.66 km is relatively uniform with no major bends. Industry and residential properties line the banks along with mangrove swamps close to the river outlet.

The hydraulic model used for this assessment extends outside the Brisbane City Boundary however for completeness all results have been provided. Chainage 967.41 kms and downstream fall within the Brisbane City Boundary.

Model calibration involves the selection of appropriate model schematisatisation and model parameters in order to match simulated and recorded water levels and discharges. This involves an iterative process and the careful selection of roughness parameters which reflect channel and floodplain conditions and an accurate description of flow movement.

3.2 Channel Roughness

Channel roughness values (Mannings 'n') selected were initially based on site visits, examination of aerial photographs and past experience from other flood studies. In order to achieve a reasonable match between recorded and predicted flood levels, roughness values were modified in some locations to better reflect the hydraulic behaviour of the flood.

The model has been re-calibrated against the 1974 and 1955 flood events. This was achieved by matching the water levels predicted by the MIKE11 hydraulic model with actual recorded data by altering the channel roughness values in the MIKE11 model.

The hydraulic model was first calibrated for the 1974 event. The same roughness values were then used for the 1955 event. The figure in **Appendix C** compares the roughness parameters used in the previous model and that of the new model.

Generally, acceptable calibration is considered to be achieved when predicted levels are within general calibration tolerances of 150 mm of maximum height records. 100 mm of continuous flood level records and 200 mm of other sources of flood levels.

3.3 January 1974 Flood Event

The January 1974 flood event was the largest flood event that has occurred in the Brisbane River System in recent times. This event was considered to be the primary calibration event because a large amount of recorded flood level information was available.

At the time of this flood Wivenhoe dam had not been constructed and this enabled good calibration of the discharge hydrographs to be achieved. The Merivale Bridge was not constructed until 1975 and therefore not modelled for the 1974 calibration.

3.4 March 1955 Flood Event

The 1955 flood event commenced on the 26 March 1955 and was the third largest recorded flood event this century. The event continued over a period of three days. Although Somerset Dam was not fully completed for the 1955 its storage had been constructed. At the time of the flood, the only structures on the Brisbane River downstream of Mt Crosby weir were Indooroopilly Bridge, William Jolly Bridge, Victoria Bridge and the Story Bridge.

The adopted tailwater level at the Western Inner Bar for this event was 1.3 m AHD which is consistent with the tailwater adopted for the Brisbane River Flood Study (SKM 1998).

4. Results

For gauging stations with continuous records it was possible to compare the recorded hydrograph with hydrographs predicted by the model. For the 1974 event, predicted and recorded hydrographs generally good agreement (Refer **Appendix B**).

For the 1955 event, the peak water levels for the predicted hydrographs generally matched the peak of the recorded hydrographs. The timing for predicted hydrographs occurs earlier than the recorded hydrograph, this appears to be caused by the same problem that affected the RAFTS hydrographs already mentioned in **section 2.3.** The hydrographs for the Port Office Gauge did not match, however it appears that there are errors in the recorded hydrograph, as it is not consistent with the rest of the hydrographs.

For both events the recorded spot levels varied significantly depending on whether the level was taken on the outside or inside of the bend. The predicted levels outside the maximum allowable tolerance of 0.2m were checked and in most cases were deemed to be likely due to superelevation at bends or incorrect recorded level information. This was primarily decided by looking at surrounding levels and identifying outliers in the recorded levels.

In some reaches of the Brisbane River, higher than expected roughness values were required to achieve calibration. After checking the locations where high values were required, it was found that high roughness values corresponded to bends in the river. A plot of bend locations and corresponding roughness are presented in **Appendix C.**

4.1 Flood Levels

Table 4 & 5 outline the peak flood levels predicted by the model at the gauging stations for both the 1974 and 1955 flood events. A complete record can be found in **Appendix D.** For the 1974 event, predicted flood levels were generally within 100mm of the recorded levels at continuous flood level gauges.

▪ **Table 4 Peak Flood Levels 1974**

Chainage	Predicted Flood Level	Recorded Flood Level		Difference
		Left Bank	Right Bank	
Mt. Crosby Weir (43003A)	26.81	26.74		0.07
Mt. Crosby (040142/040818)	26.75	26.83		-0.08
Moggill Gauge	19.91	19.93	20.04	-0.08
Goodna Hospital Gauge	18.44		18.43	0.01
Mt Ommaney Gauge	14.67	14.55	14.58	0.10
Darra Wharf Gauge	13.52	13.36	13.79	-0.05

Sherwood Gauge	12.43		12.52	-0.09
Clarence Road Gauge	11.14		11.20	-0.06
Oxley Creek Gauge	11.15		11.01	0.14
King Authur Terrace Gauge	11.11		11.04	0.07
Tennyson Power House Gauge	10.93		10.83	0.10
Yeronga Street Gauge	10.77		10.83	-0.06
Sandy Creek Gauge	9.81		9.81	0.00
Dutton Park Cemetery Gauge	9.50		9.57	-0.08
Highgate Hill Gauge	8.29		8.36	-0.07
St Lucia Ferry Gauge	8.15		8.09	0.06
Montague Road Gauge	6.46		6.56	-0.10
Port Office Gauge	5.28	4.95	5.44	0.09
Newstead Park Gauge	2.88	2.60	3.30	-0.07
Cresent Road Gauge	2.61	2.63	2.63	-0.02
Cairncross Dock Gauge	2.47		2.49	-0.02
Bulimba Power House Gauge	1.83		1.90	-0.07
Western Inner Bar Gauge	1.55		1.55	-0.01

Predicted flood levels for the 1955 event were generally within 150 mm of the recorded levels. Water Levels toward the lower end of the Brisbane River were higher in the Mike11 model than the recorded levels; this could be a result of

- less development along the river bank than the 1974 case
- changes in river bathymetry due to erosion sedimentation and or dredging
- for this event only the Story, Victoria, William Jolly and Indooroopilly bridges had been constructed.
- for this event the majority of gauging stations were only manually read as opposed to automatic readings for the 1974 flood

Nevertheless a good calibration was achieved for the 1974 event and a reasonable calibration was achieved for the 1955 event. The 1974 event is considered to be the primary calibration event because it better reflects current river conditions and because more historical data is available.

Table 5 Peak Flood Levels 1955

Chainage	Predicted Flood Level	Recorded Flood Level	Difference
Clarence Road Gauge	5.30	5.56	-0.26
King Authur Terrace Gauge	5.18	5.10	0.08
Yeronga Street Gauge	4.98	4.95	0.03
Sandy Creek Gauge	4.41	4.65	-0.25
Dutton Park Cemetery Gauge	4.22	4.12	0.09
Highgate Hill Gauge	3.62	3.82	-0.20
Port Office Gauge	2.50	2.28	0.22
Newstead Park Gauge	1.72	1.75	-0.03
Western Inner Bar Gauge	1.30	1.30	0.00

4.2 Peak Flows

Predicted discharges for the Port Office Gauge were 9979 m^3/s (1974) and 4364 m^3/s (1955). A complete record of peak flows predicted by the model can be found in **Appendix D.**

5. Design Event Modelling

5.1 Background

In October 2003 a review was undertaken of the Brisbane River catchment hydrology. As part of this review, it was decided that the design 1 in 100 AEP event would be based on a flow of 6000 m^3/s at the Brisbane Port Office Gauge. This corresponds to the 'best guess' report by the expert panel (IRP 2003).

Because no events that corresponded to 6000 m^3/s at the Port Office Gauge had previously been modelled, it was decided that a CRC FORGE event (modelled as part of the SKM 2003 review) would be used as a base model for the 1 in 100 AEP design event. Hydrographs for the CRC-FORGE event would be scaled accordingly to give a discharge of 6000 m^3/s at the Port Office Gauge.

The 1% AEP CRC-FORGE event is spatially distributed with areal reduction factors using a standard AR&R (1987) temporal pattern. It was run using the 'Post Dams' case with a critical duration of 72 hours (Refer Brisbane River Flood Study Review, SKM, Oct 2003). The discharges predicted by this event are presented in **Table 6**. It should be noted that these discharges were calculated before the model was fully calibrated.

- **Table 6 CRC-FORGE event – RAFTS Model – Discharges**

Gauge Location	Chainage	Discharge
Savages crossing	Ch 948270 m	5368 m^3/s
Moggill	Ch 1006300 m	5043 m^3/s
Port Office	Ch 1055690 m	5044 m^3/s

This CRC-FORGE event was chosen because it was the only event that gave a reasonably consistent discharge throughout the Brisbane River.

5.2 Results

Hydrographs were extracted from the RAFTS model and input into the calibrated MIKE 11 model. This produced a peak at the Port Office Gauge discharge of 5273 m^3/s (refer **Table 7**).

- **Table 7 CRC-FORGE event – MIKE 11 Model – Discharges**

Gauge Location	Chainage	Discharge
Savages crossing	Ch 948270 m	5084 m^3/s
Moggill	Ch 1006300 m	5298 m^3/s
Port Office	Ch 1055690 m	5273 m^3/s

The difference between the values in **Table 6** and **Table 7** are the result of routing affects.

The expert review panel (IRP 2003) recommended a discharge of 6 000 m^3/s at the Port Office Gauge for the 1% AEP event. During the work SKM undertook there was no RAFTS run that produced this flow and hence a factored event was derived.

To achieve the desired discharge at the Port Office Gauge, all the input hydrographs were scaled up by a factor of 1.117 (ie 6000m^3/s / 5273m^3/s = 1.117) and the MIKE 11 model re-run. The resulting discharge at the Port Office Gauge was 5971 m^3/s (refer **Table 8**). This is only 0.5% less then 6000 m^3/s and therefore considered acceptable. A full record of discharges is presented in **Appendix E.**

- **Table 8 CRC-FORGE event – MIKE 11 Model – Discharges (with scaled up hydrographs)**

Gauge Location	Chainage	Discharge
Savages crossing	Ch 948270 m	5775 m^3/s
Moggill	Ch 1006300 m	6011 m^3/s
Port Office	Ch 1055690 m	5971 m^3/s

Flood levels for the 1 in 100 year AEP event are outlined in **Table 9,** a full record of flood levels are presented in **Appendix E.**

- **Table 9 CRC-FORGE event – MIKE 11 Model – Flood Levels (with scaled up hydrographs)**

Gauge Location	Chainage	Level
Savages crossing	Ch 948270 m	39.34 m
Moggill	Ch 1006300 m	14.36 m
Port Office	Ch 1055690 m	3.16 m

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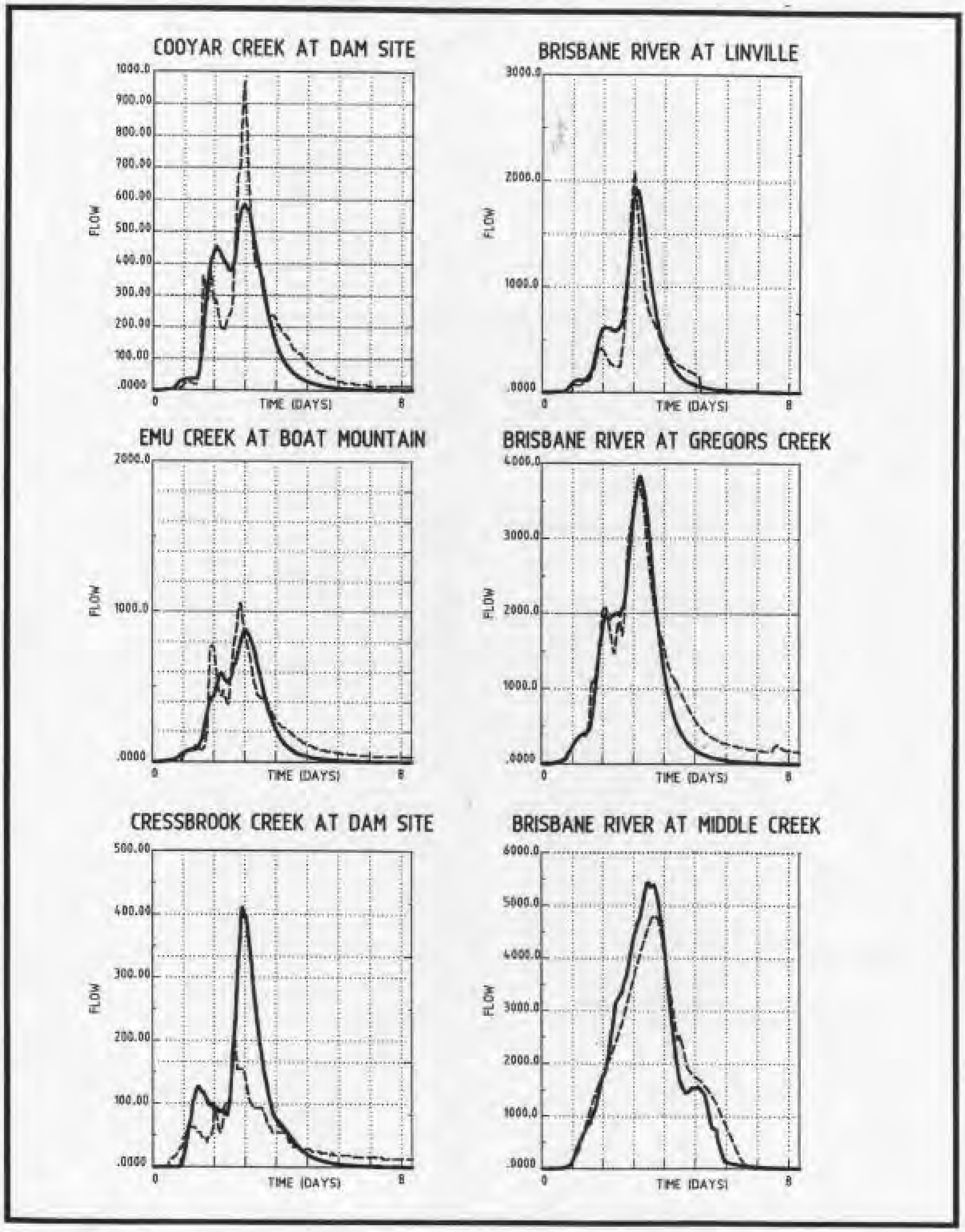
Appendix A Hydrological Hydrograph Comparison

FIGURE C-2a

SINCLAIR KNIGHT MERZ

IPSWICH RIVERS FLOOD STUDY
JANUARY 1974 FLOOD HYDROGRAPHS



LEGEND

--------- RECORDED DISCHARGE

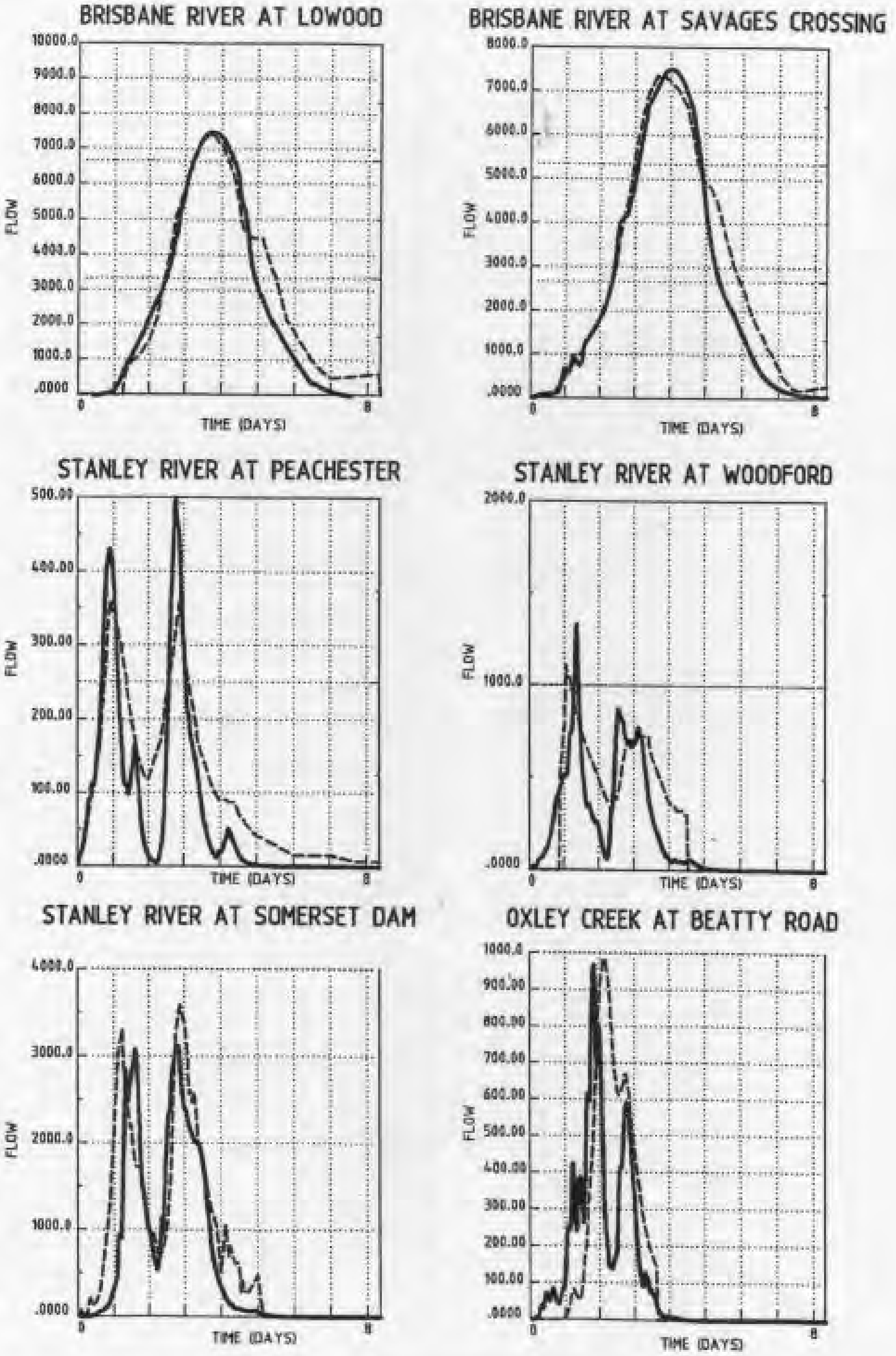
———— PREDICTED DISCHARGE

FILE NAME: 04390-22 PLOT SCALE: 1:100 DISK N°: U:\FWUD JOB N°: T004390 DATE: 20-05-99

SINCLAIR KNIGHT MERZ

FIGURE C-2b

IPSWICH RIVERS FLOOD STUDY
JANUARY 1974 FLOOD HYDROGRAPHS

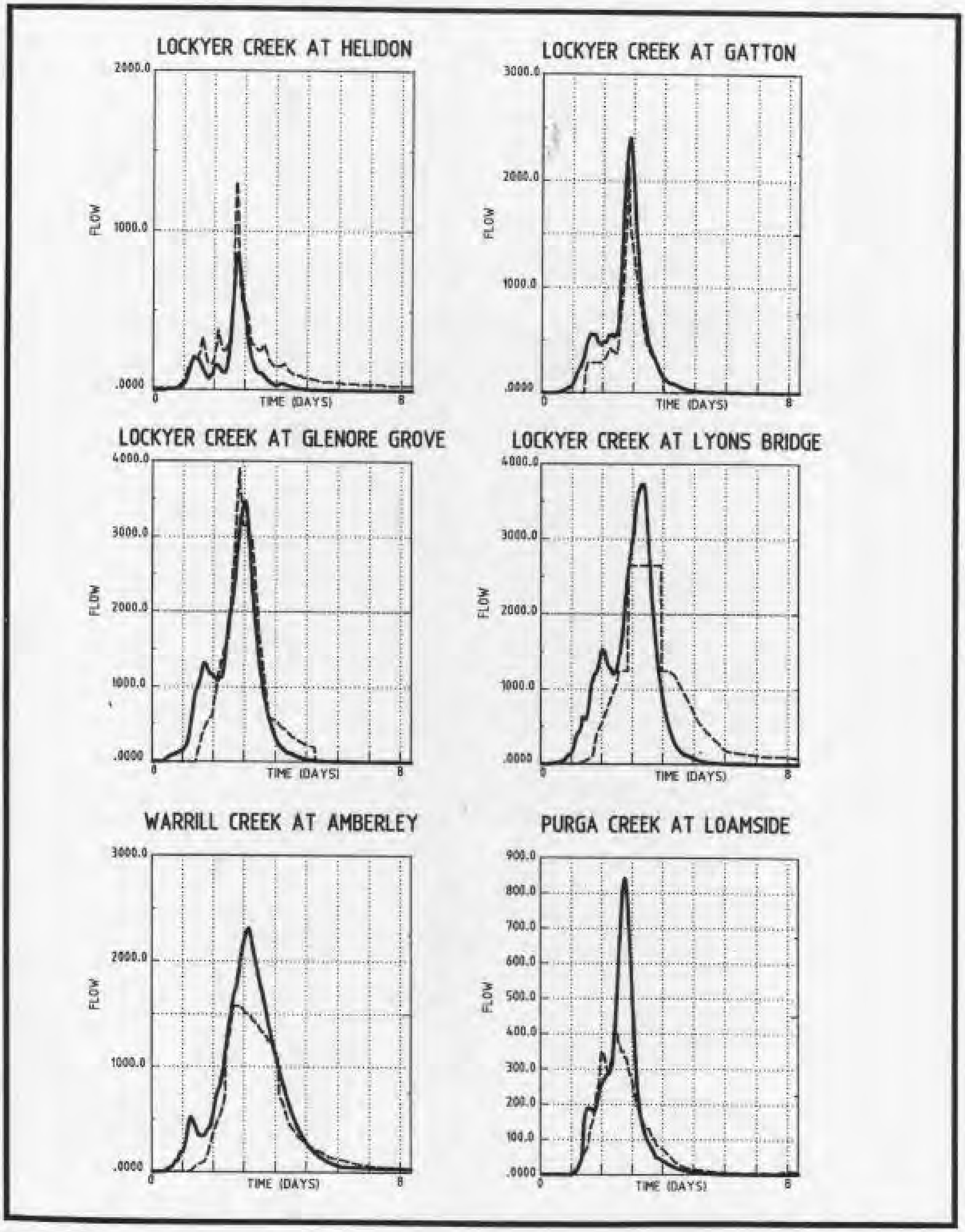


LEGEND
--------- RECORDED DISCHARGE
———— PREDICTED DISCHARGE

FILE NAME: 04390-22 PLOT SCALE: 1:100 DISK N°: U:\FWUD JOB N°: T004390 DATE: 20-05-99

FIGURE C-2c

IPSWICH RIVERS FLOOD STUDY
JANUARY 1974 FLOOD HYDROGRAPHS



LEGEND

-------- RECORDED DISCHARGE

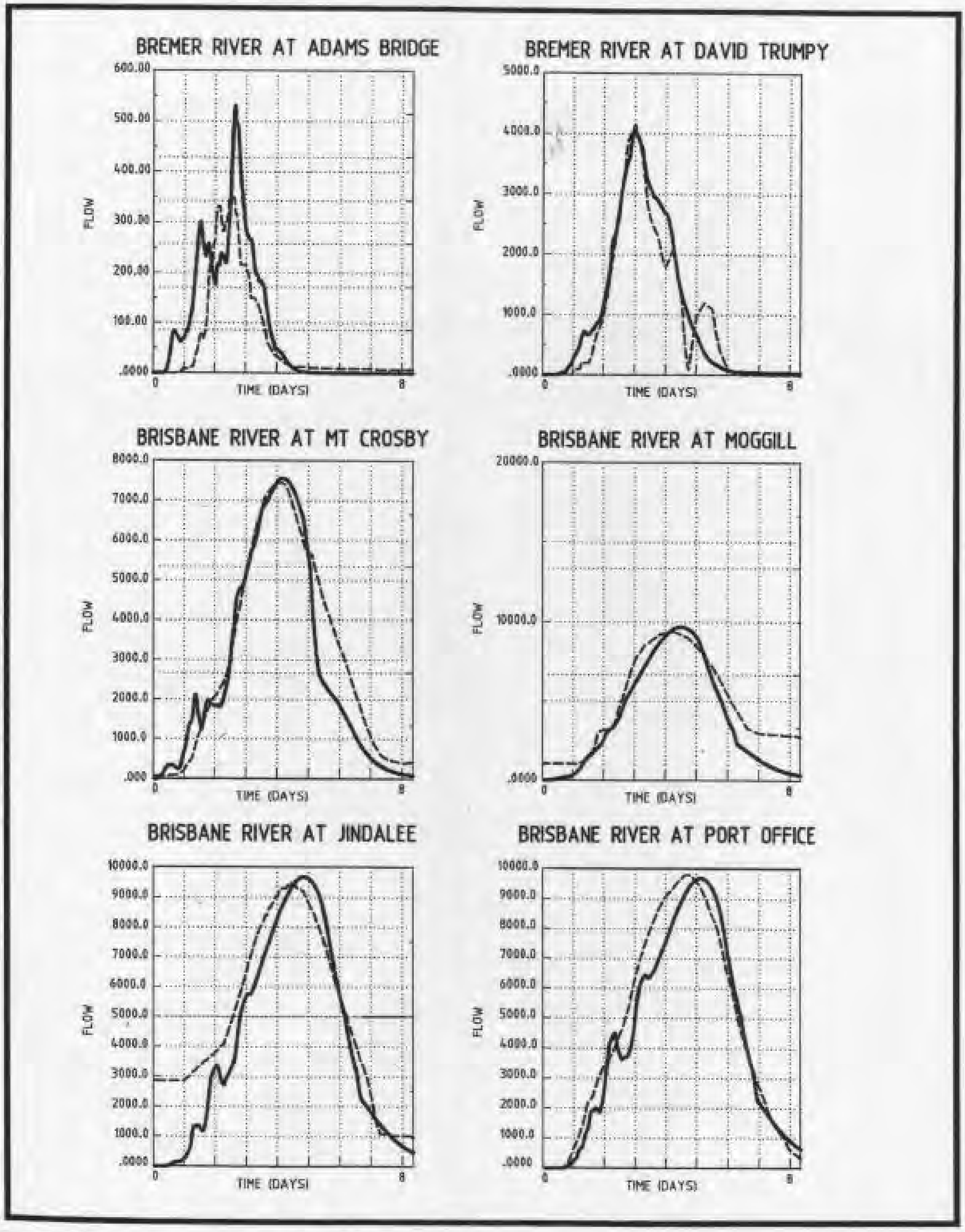
———— PREDICTED DISCHARGE

FILE NAME: 04390-22 DISK Nº: U:\FWUD JOB Nº: T004390 DATE: 26-05-99
PLOT SCALE: 1:100

SINCLAIR KNIGHT MERZ

FIGURE C-2d

IPSWICH RIVERS FLOOD STUDY
JANUARY 1974 FLOOD HYDROGRAPHS



LEGEND

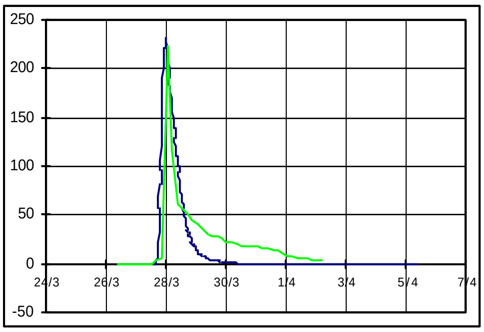
- - - - - - - - RECORDED DISCHARGE

———————— PREDICTED DISCHARGE

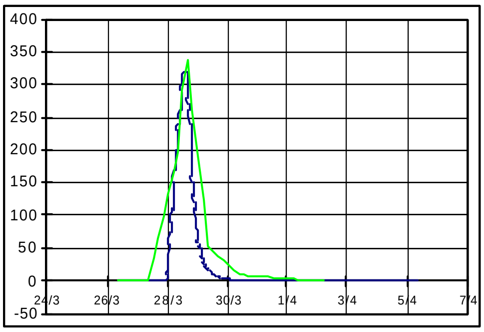
FILE NAME: 04390-22 DISK No: QI\FWUD JOB No: T004390 DATE: 20-15-99
PLOT SCALE: 1:100

1955 Historical Event Comparison

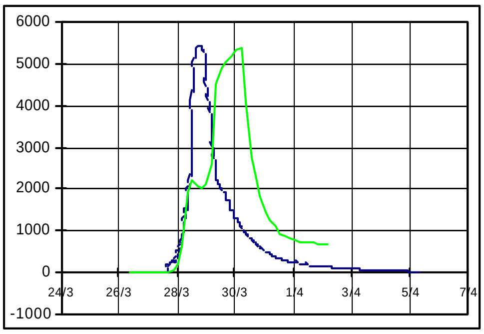
143203A Lockyer Creek AMTD 99.5
HEL-OUT Helidon Predicted
-------- DISCHARGE (m^3/S) Recorded



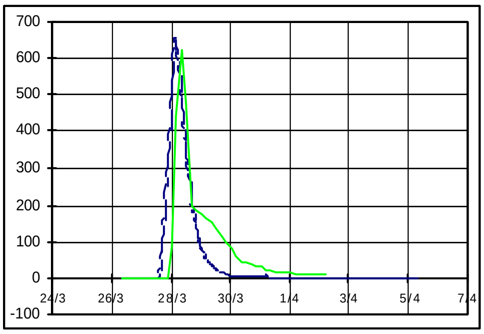
143102A Warrill Creek AMTD 50.9
KAL-OUT Kalbar Predicted
-------- DISCHARGE (m^3/S) Recorded



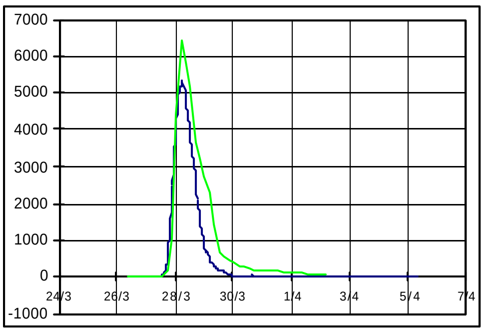
143001B Brisbane River AMTD 140.1
SAV11 Vernor Predicted
-------- DISCHARGE (m^3/S) Recorded



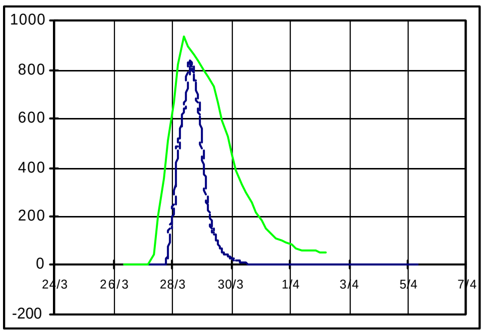
143204A Lockyer Creek AMTD 62.0
LYO + Wilsons Weir Predicted
-------- DISCHARGE (m^3/S) Recorded



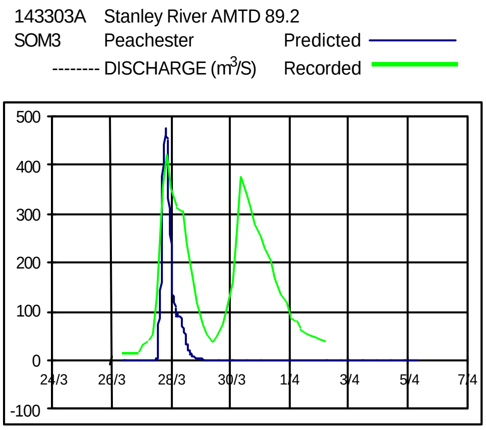
143005A Brisbane River AMTD 230.9
WIV8 Watts Bridge Predicted
-------- DISCHARGE (m^3/S) Recorded



143206A Lockyer Creek AMTD 36.4
LYO-OUT Brightview Weir Predicted
-------- DISCHARGE (m^3/S) Recorded

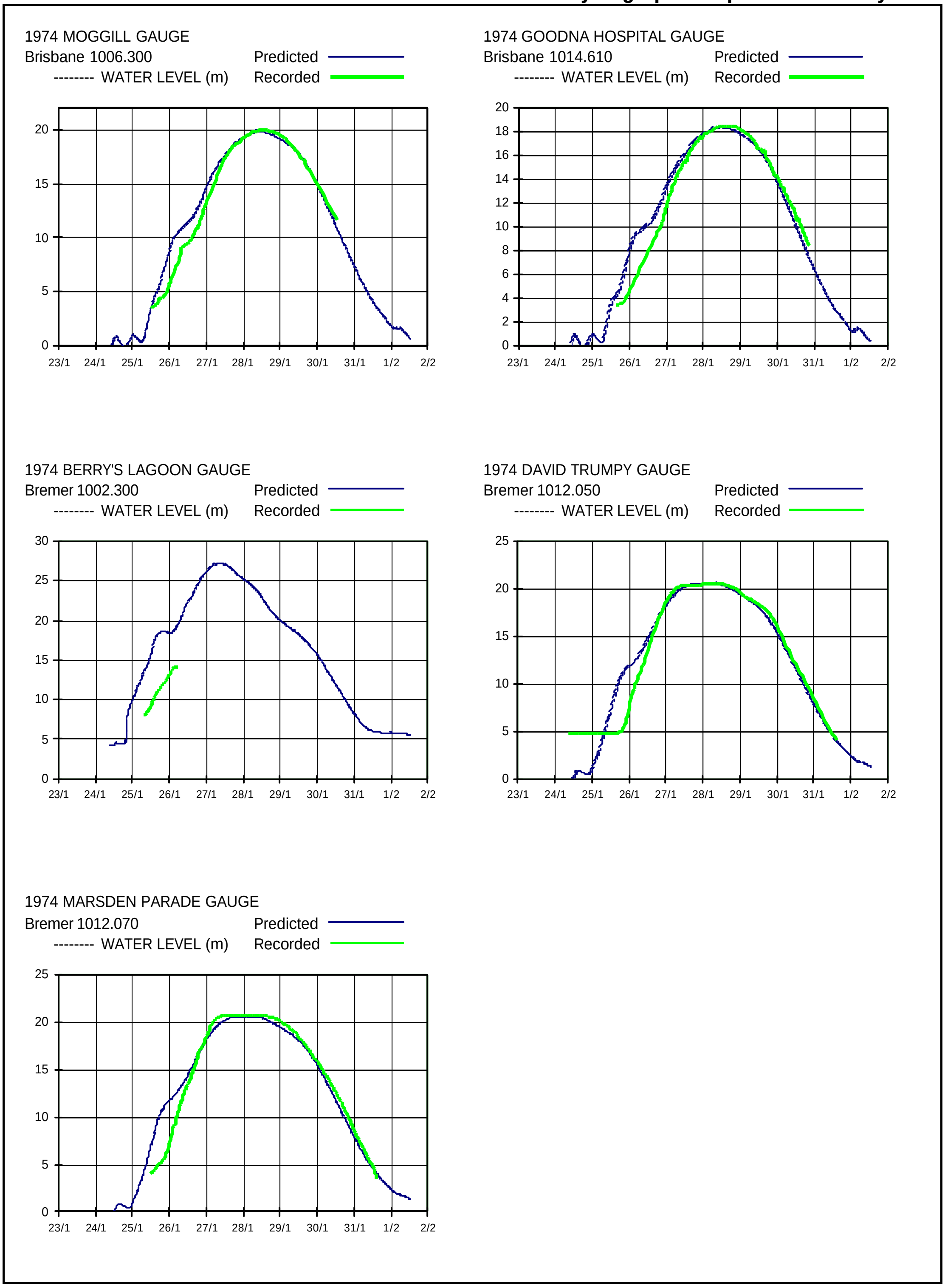


1955 Historical Event Comparison

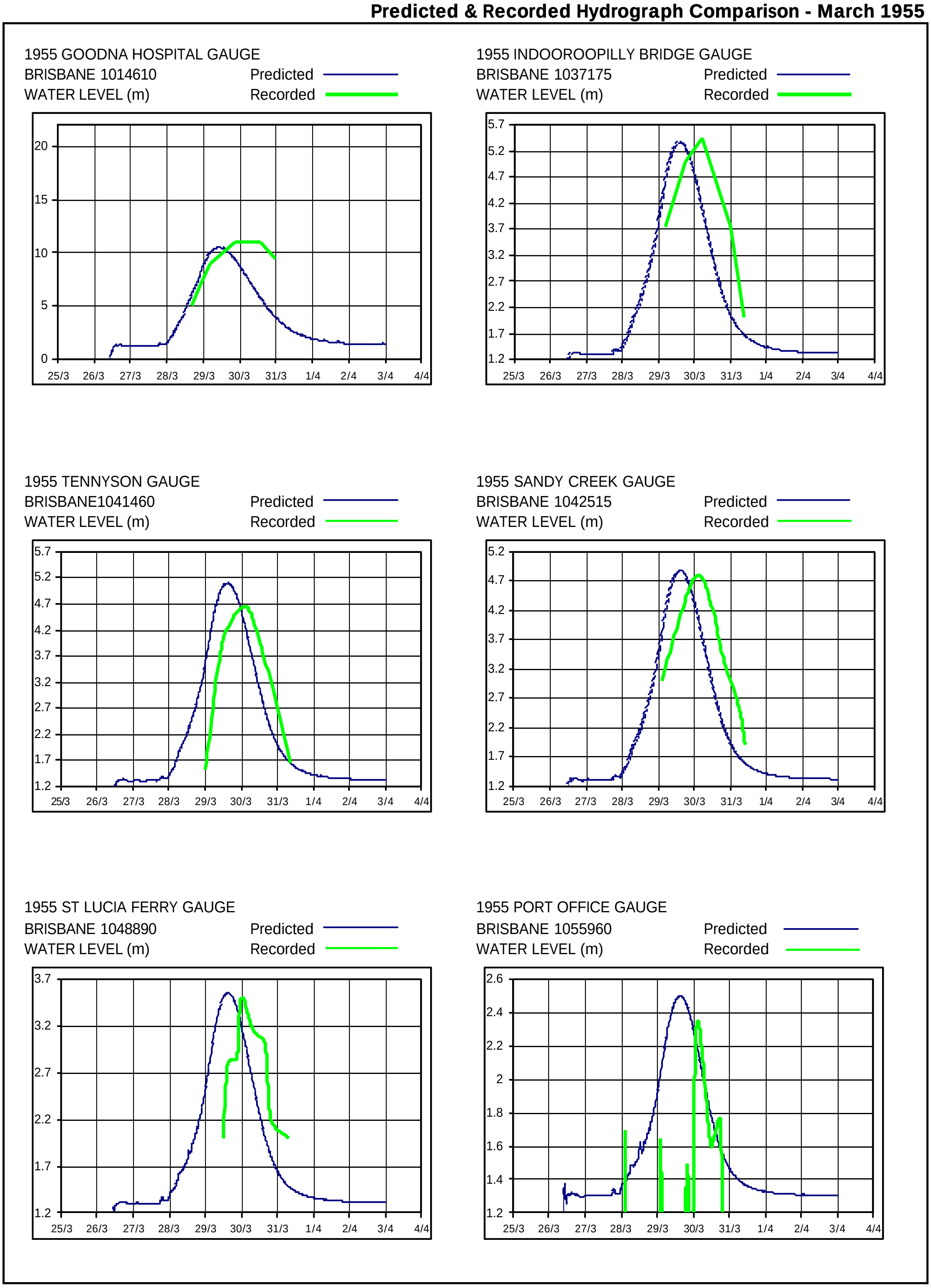


Appendix B Hydraulic Hydrograph Comparison

Predicted & Recorded Hydrograph Comparison - January 1974



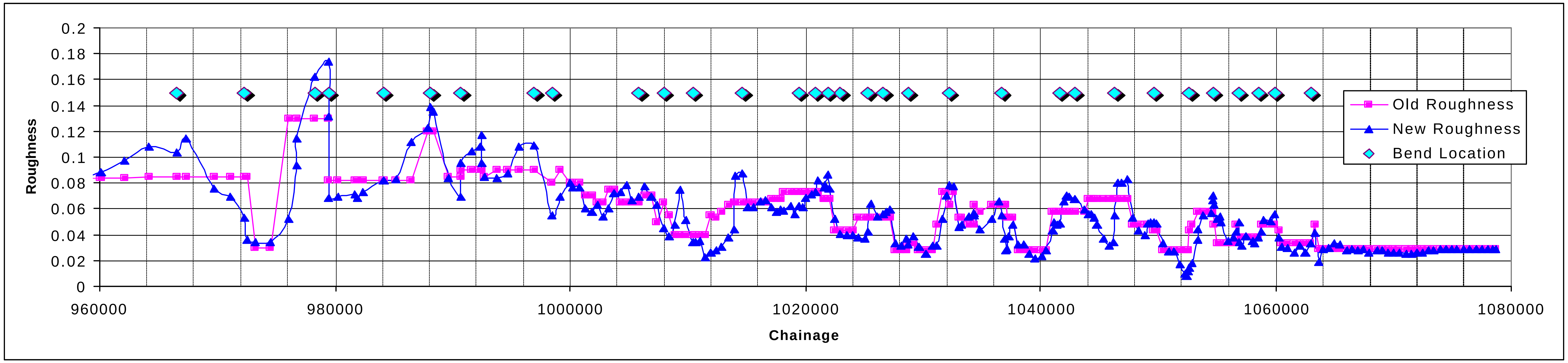
Predicted & Recorded Hydrograph Comparison - March 1955



Appendix C Roughness Parameters

SKM

Comparison of Roughness Values for New Model and Previous Model



SKM

Chainage [m]	Roughness (Previous Model)	Roughness (New Model)	Difference		Chainage [m]	Roughness (Previous Model)	Roughness (New Model)	Difference
931570	0.084	0.086	0.002		980330	0.082	0.069	-0.013
933670	0.084	0.086	0.002		981660	0.082	0.071	-0.011
934270	0.084	0.086	0.002		981960	0.082	0.069	-0.013
934620	0.084	0.086	0.002		982460	0.082	0.073	-0.009
936070	0.084	0.086	0.002		984160	0.082	0.082	0.000
936820	0.084	0.086	0.002		985260	0.082	0.083	0.001
939770	0.084	0.086	0.002		986480	0.082	0.112	0.030
942320	0.084	0.086	0.002		987960	0.120	0.123	0.003
943570	0.084	0.086	0.002		988160	0.120	0.139	0.019
944120	0.084	0.086	0.002		988360	0.120	0.135	0.015
945570	0.084	0.086	0.002		989700	0.085	0.084	-0.001
947170	0.084	0.086	0.002		990700	0.085	0.070	-0.015
950270	0.084	0.086	0.002		990760	0.090	0.095	0.005
952320	0.084	0.086	0.002		991710	0.090	0.105	0.015
953870	0.084	0.086	0.002		992420	0.090	0.108	0.018
954920	0.084	0.086	0.002		992450	0.090	0.117	0.027
955970	0.084	0.086	0.002		992470	0.090	0.095	0.005
958770	0.084	0.086	0.002		992670	0.085	0.085	0.000
960170	0.084	0.088	0.004		993760	0.090	0.084	-0.006
962070	0.084	0.097	0.013		994760	0.090	0.087	-0.003
964170	0.085	0.108	0.023		995690	0.090	0.108	0.018
966610	0.085	0.104	0.019		996980	0.090	0.109	0.019
967410	0.085	0.115	0.030		998460	0.080	0.055	-0.025
969790	0.085	0.075	-0.010		999160	0.090	0.069	-0.021
971160	0.085	0.070	-0.015		1000000	0.080	0.081	0.001
972260	0.085	0.053	-0.032		1000285	0.080	0.077	-0.003
972600	0.085	0.036	-0.049		1000775	0.080	0.077	-0.003
973260	0.030	0.034	0.004		1001315	0.070	0.061	-0.009
974580	0.030	0.034	0.004		1001865	0.070	0.057	-0.013
976020	0.130	0.052	-0.078		1002350	0.065	0.063	-0.002
976750	0.130	0.094	-0.036		1002785	0.065	0.054	-0.011
976750	0.130	0.114	-0.016		1003275	0.075	0.060	-0.015
978280	0.130	0.162	0.032		1003775	0.075	0.072	-0.003
979507	0.130	0.174	0.044		1004300	0.065	0.073	0.008
979513	0.130	0.132	0.002		1004810	0.065	0.078	0.013
979530	0.082	0.069	-0.013		1005325	0.065	0.067	0.002

Chainage [m]	Roughness (Previous Model)	Roughness (New Model)	Difference		Chainage [m]	Roughness (Previous Model)	Roughness (New Model)	Difference
1005870	0.065	0.070	0.005		1021539	0.068	0.076	0.008
1006300	0.070	0.078	0.008		1021715	0.068	0.078	0.010
1006910	0.070	0.069	-0.001		1021895	0.068	0.086	0.018
1007410	0.050	0.063	0.013		1022105	0.068	0.075	0.007
1007920	0.065	0.045	-0.020		1022575	0.043	0.052	0.009
1008445	0.055	0.039	-0.016		1023040	0.043	0.041	-0.002
1008925	0.040	0.048	0.008		1023570	0.043	0.040	-0.003
1009400	0.040	0.075	0.035		1024080	0.043	0.040	-0.003
1009820	0.040	0.052	0.012		1024563	0.053	0.037	-0.016
1010490	0.040	0.034	-0.006		1025070	0.053	0.037	-0.016
1010725	0.040	0.034	-0.006		1025360	0.053	0.042	-0.011
1010980	0.040	0.035	-0.005		1025590	0.053	0.064	0.011
1011510	0.040	0.022	-0.018		1026170	0.053	0.054	0.001
1011980	0.055	0.026	-0.029		1026680	0.053	0.056	0.003
1012475	0.053	0.028	-0.025		1026900	0.053	0.058	0.005
1012935	0.058	0.031	-0.027		1027160	0.053	0.059	0.006
1013445	0.063	0.038	-0.025		1027680	0.028	0.033	0.005
1013920	0.065	0.044	-0.021		1028180	0.028	0.031	0.003
1014110	0.065	0.086	0.021		1028680	0.028	0.037	0.009
1014610	0.065	0.088	0.023		1028760	0.033	0.032	-0.001
1015090	0.065	0.061	-0.004		1029200	0.033	0.039	0.006
1015560	0.065	0.062	-0.003		1029680	0.028	0.031	0.003
1016140	0.065	0.066	0.001		1030220	0.028	0.025	-0.003
1016640	0.065	0.067	0.002		1030870	0.028	0.032	0.004
1017130	0.068	0.061	-0.007		1031260	0.048	0.031	-0.017
1017610	0.068	0.058	-0.010		1031700	0.073	0.052	-0.021
1017920	0.068	0.060	-0.008		1031995	0.073	0.071	-0.002
1018200	0.073	0.058	-0.015		1032230	0.063	0.078	0.015
1018725	0.073	0.062	-0.011		1032585	0.073	0.077	0.004
1019095	0.073	0.056	-0.017		1033080	0.053	0.046	-0.007
1019490	0.073	0.062	-0.011		1033370	0.053	0.048	-0.005
1019865	0.073	0.061	-0.012		1033900	0.048	0.054	0.006
1020115	0.073	0.068	-0.005		1034370	0.048	0.055	0.007
1020525	0.073	0.071	-0.002		1034414	0.063	0.056	-0.007
1020830	0.073	0.073	0.000		1034890	0.058	0.044	-0.014
1021095	0.073	0.082	0.009		1035900	0.063	0.052	-0.011

Chainage [m]	Roughness (Previous Model)	Roughness (New Model)	Difference		Chainage [m]	Roughness (Previous Model)	Roughness (New Model)	Difference
1036460	0.063	0.066	0.003		1049120	0.048	0.049	0.001
1036770	0.063	0.055	-0.008		1049370	0.048	0.050	0.002
1036915	0.063	0.037	-0.026		1049590	0.043	0.049	0.006
1037090	0.063	0.028	-0.035		1049870	0.043	0.049	0.006
1037175	0.053	0.028	-0.025		1050430	0.028	0.033	0.005
1037285	0.053	0.039	-0.014		1050860	0.028	0.027	-0.001
1037625	0.053	0.048	-0.005		1051360	0.028	0.027	-0.001
1038085	0.028	0.032	0.004		1051895	0.028	0.017	-0.011
1038600	0.028	0.033	0.005		1052310	0.028	0.010	-0.018
1039100	0.028	0.025	-0.003		1052390	0.028	0.008	-0.020
1039565	0.028	0.022	-0.006		1052595	0.028	0.012	-0.016
1040090	0.028	0.024	-0.004		1052640	0.043	0.014	-0.029
1040490	0.028	0.028	0.000		1052865	0.048	0.018	-0.030
1041010	0.058	0.044	-0.014		1053320	0.058	0.036	-0.022
1041230	0.058	0.050	-0.008		1053385	0.058	0.044	-0.014
1041460	0.058	0.048	-0.010		1053900	0.058	0.055	-0.003
1041700	0.058	0.049	-0.009		1054490	0.058	0.057	-0.001
1041960	0.058	0.065	0.007		1054640	0.058	0.066	0.008
1042235	0.058	0.070	0.012		1054680	0.058	0.071	0.013
1042515	0.058	0.069	0.011		1054760	0.048	0.063	0.015
1042910	0.058	0.068	0.010		1054970	0.033	0.052	0.019
1043725	0.058	0.059	0.001		1055280	0.033	0.054	0.021
1044060	0.068	0.056	-0.012		1055420	0.033	0.049	0.016
1044340	0.068	0.056	-0.012		1055960	0.033	0.035	0.002
1044605	0.068	0.053	-0.015		1056400	0.033	0.038	0.005
1044860	0.068	0.048	-0.020		1056695	0.048	0.042	-0.006
1045400	0.068	0.037	-0.031		1056865	0.038	0.050	0.012
1045885	0.068	0.031	-0.037		1056950	0.038	0.034	-0.004
1046180	0.068	0.034	-0.034		1057090	0.038	0.032	-0.006
1046340	0.068	0.055	-0.013		1057530	0.038	0.039	0.001
1046580	0.068	0.080	0.012		1058040	0.038	0.035	-0.003
1046900	0.068	0.080	0.012		1058230	0.038	0.034	-0.004
1047350	0.068	0.083	0.015		1058530	0.038	0.037	-0.001
1047915	0.048	0.053	0.005		1058735	0.048	0.042	-0.006
1048375	0.048	0.043	-0.005		1059035	0.048	0.051	0.003
1048890	0.048	0.040	-0.008		1059540	0.048	0.051	0.003

Chainage [m]	Roughness (Previous Model)	Roughness (New Model)	Difference		Chainage [m]	Roughness (Previous Model)	Roughness (New Model)	Difference
1059990	0.048	0.056	0.008		1069535	0.029	0.026	-0.003
1060345	0.043	0.038	-0.005		1070025	0.029	0.026	-0.003
1060535	0.033	0.031	-0.002		1070530	0.029	0.026	-0.003
1061015	0.033	0.030	-0.003		1071040	0.029	0.025	-0.004
1061530	0.033	0.026	-0.007		1071520	0.029	0.025	-0.004
1062020	0.033	0.032	-0.001		1072015	0.029	0.026	-0.003
1062535	0.033	0.026	-0.007		1072515	0.029	0.027	-0.002
1062940	0.033	0.033	0.000		1072995	0.029	0.028	-0.001
1063310	0.048	0.042	-0.006		1073485	0.029	0.028	-0.001
1063645	0.029	0.019	-0.010		1074000	0.029	0.029	0.000
1064000	0.029	0.029	0.000		1074460	0.029	0.029	0.000
1064490	0.029	0.029	0.000		1074985	0.029	0.029	0.000
1065010	0.029	0.033	0.004		1075480	0.029	0.029	0.000
1065503	0.029	0.032	0.003		1076000	0.029	0.029	0.000
1065990	0.029	0.028	-0.001		1076495	0.029	0.029	0.000
1066505	0.029	0.029	0.000		1077010	0.029	0.029	0.000
1067020	0.029	0.028	-0.001		1077510	0.029	0.029	0.000
1067485	0.029	0.029	0.000		1078040	0.029	0.029	0.000
1067965	0.029	0.026	-0.003		1078525	0.029	0.029	0.000
1068660	0.029	0.028	-0.001		1078660	0.029	0.029	0.000
1069045	0.029	0.028	-0.001					

Appendix D MIKE11 Results

Figure D-2a Flood Calibration Profile - January 1974
Brisbane River

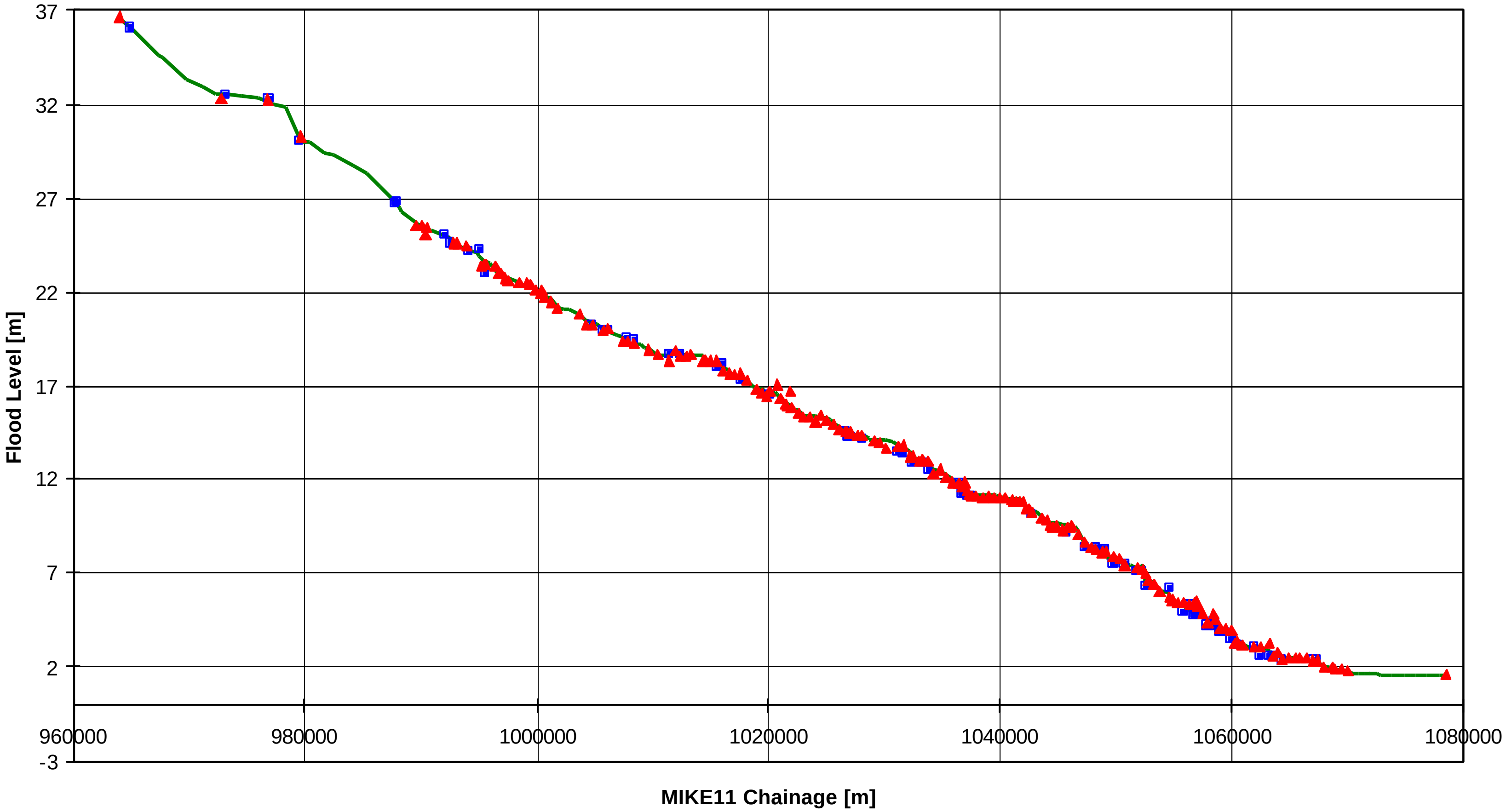
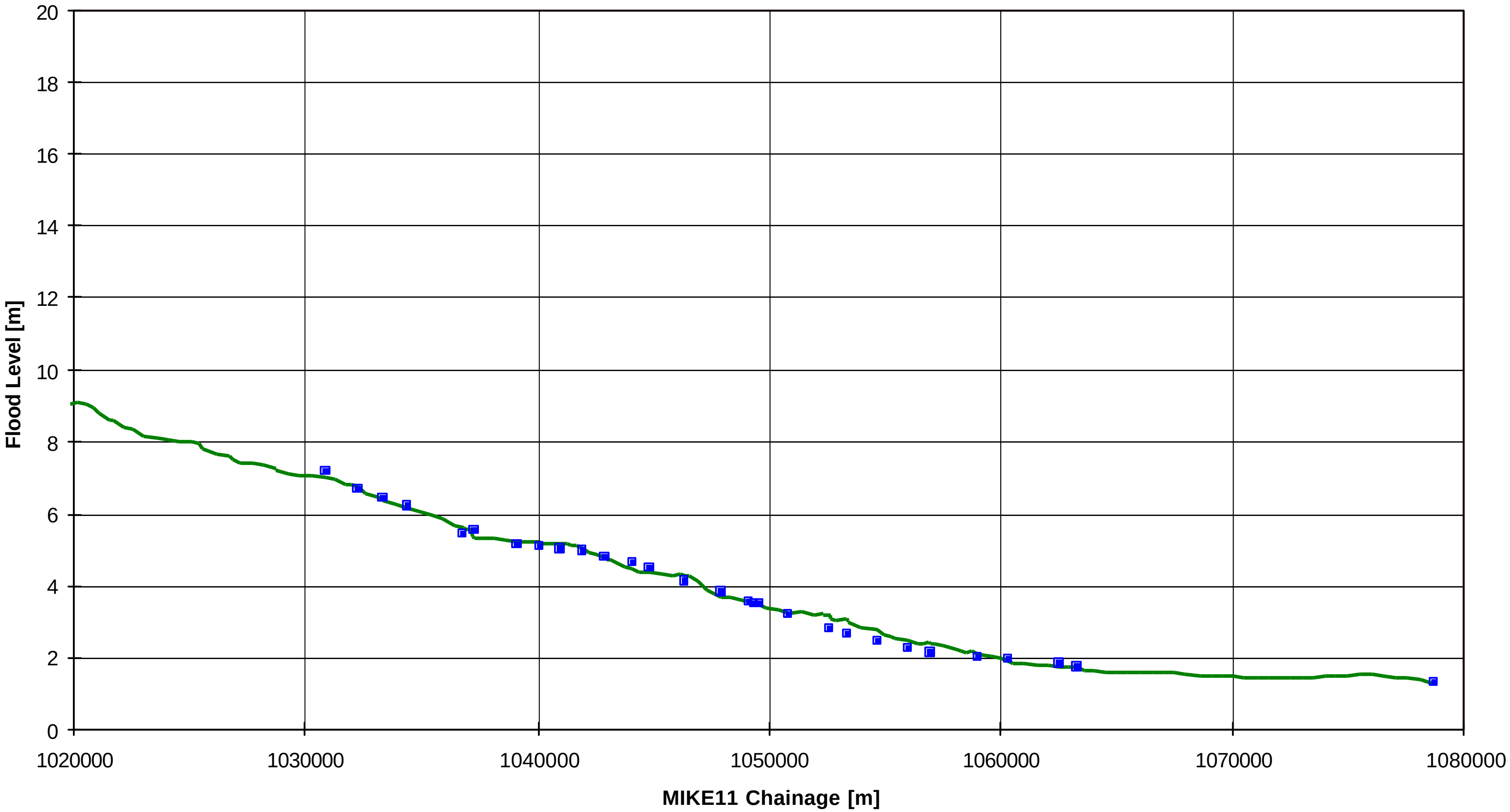


Figure D-2a Flood Calibration Profile - March 1955
Brisbane River



MIKE11 Chainage [m]	Comments	1974 Flood Event				1955 Flood Event		
		Flood Levels	F.L Left	F.L. Right	Difference	Flood Levels	F.L	Difference
		36.60		36.69	-0.09	31.51		
964170		36.49				31.37		
		36.06	36.08		-0.02	30.87		
966610		35.17				29.81		
967410		34.63				29.32		
	Cabbage Tree Crk.	34.50				29.20		
969790		33.36				28.16		
971160		32.89				27.68		
972260		32.62				27.44		
		32.62		32.3	0.32	27.42		
973260		32.61	32.49		0.12	27.41		
974580		32.38				27.24		
976020		32.31				27.15		
		32.14		32.23	-0.09	26.89		
		32.10	32.31		-0.21	26.84		
978280		31.82				26.41		
979507		30.10	30		0.10	24.40		
979513		30.03				24.36		
979530		30.09				24.36		
		30.06		30.25	-0.19	24.32		
980330		29.91				24.14		
981660		29.48				23.71		
982460		29.31				23.50		
984160		28.79				23.01		
985260		28.37				22.57		
986480		27.67				21.83		
	Mt. Crosby Weir (43003A)	26.81	26.74		0.07	20.84		
987960	Mt. Crosby (040142/040818)	26.75	26.826		-0.08	20.77		
988160		26.49				20.46		
988360		26.29				20.19		
		25.68		25.55	0.13	19.40		
989700		25.63				19.34		
		25.49		25.55	-0.06	19.19		
		25.47		25.52	-0.05	19.16		
		25.38		25.03	0.35	19.06		
		25.36		25.43	-0.07	19.03		
990700		25.30				18.97		
990760		25.26				18.93		
991710		25.08				18.67		
		24.99	25.06		-0.07	18.56		
992420		24.92				18.48		
992450	Colleges Crossing	24.86				18.43		
992470		24.82				18.41		
992670		24.76	24.61		0.15	18.31		
		24.64		24.58	0.06	18.16		
		24.53		24.58	-0.05	18.01		
993760		24.28				17.68		
		24.23		24.45	-0.22	17.59		
		24.19	24.21		-0.02	17.52		
994760		24.06				17.30		
		23.88	24.3		-0.42	17.07		
		23.81		23.45	0.36	16.98		
		23.70		23.51	0.19	16.83		
		23.64	23.02	23.51	0.37	16.75		
995690		23.62				16.73		
		23.52				16.57		
		23.13		23.45	-0.32	15.96		
		23.05				15.84		
		22.98		22.96	0.02	15.73		
996980		22.84				15.52		
		22.83		22.99	-0.16	15.49		
		22.81				15.46		
		22.79				15.43		
		22.78		22.72	0.06	15.40		
		22.72		22.53	0.19	15.31		
998460		22.54				14.99		

MIKE11 Chainage [m]	Comments	1974 Flood Event				1955 Flood Event		
		Flood Levels	F.L Left	F.L. Right	Difference	Flood Levels	F.L	Difference
		22.51		22.47	0.04	14.95		
999160		22.37				14.76		
		22.36		22.44	-0.08	14.75		
		22.26		22.38	-0.12	14.64		
		22.18		22.11	0.07	14.55		
1000000		22.14				14.51		
1000285		21.95		21.92	0.03	14.34		
		21.88		22.17	-0.29	14.27		
1000775		21.69		21.68	0.01	14.08		
1001315		21.60		21.5	0.10	13.93		
1001865		21.23		21.1	0.13	13.58		
1002350		21.12				13.37		
1002785		21.12				13.34		
1003275		20.92				13.11		
1003775		20.76		20.83	-0.07	12.94		
1004300		20.42		20.25	0.17	12.53		
1004810		20.40	20.25	20.25	0.15	12.43		
1005325		20.25				12.22		
1005870		20.03	19.93	19.97	0.07	11.94		
1006200		19.95				11.86		
1006200		19.95				11.86		
1006300	Moggill Gauge	19.91	19.93	20.04	-0.08	11.82		
1006300		19.91				11.82		
1006910		19.69				11.61		
1007410		19.61		19.33	0.28	11.50		
1007780		19.40				11.34		
1007780		19.40				11.34		
1007920		19.29	19.6	19.33	-0.18	11.26		
1008445		19.21	19.46	19.21	-0.13	11.24		
1008925		19.16				11.19		
1009400		19.03				11.08		
1009720		18.96		18.88	0.08	11.00		
1010490		18.59		18.69	-0.10	10.80		
1010725		18.64				10.83		
1010980		18.60				10.80		
1011510		18.67	18.63	18.3	0.21	10.80		
1011980		18.71		18.8	-0.10	10.80		
1012475		18.70	18.63	18.6	0.08	10.79		
1012475		18.70				10.79		
1012935		18.66		18.6	0.06	10.76		
1013190		18.65				10.74		
1013190		18.65				10.74		
1013445		18.63		18.63	0.00	10.73		
1013680		18.62				10.72		
1013680		18.62				10.72		
1013910		18.61				10.70		
1014310		18.55		18.3	0.25	10.62		
1014610	Goodna Hospital Gauge	18.44		18.43	0.01	10.49		
1014610		18.44				10.49		
1015090		18.26		18.3	-0.05	10.37		
1015560		18.08	17.96	18.33	-0.07	10.26		
1015850		18.01				10.20		
1015850		18.01				10.20		
1016140		17.94	18.15	17.78	-0.03	10.14		
1016640		17.78		17.63	0.15	9.97		
1016890		17.65				9.84		
1016890		17.65				9.84		
1017130		17.51		17.54	-0.03	9.72		
1017610		17.42	17.29	17.66	-0.05	9.58		
1017920		17.28				9.47		
1018200		17.24		17.26	-0.02	9.46		
1018725		16.96				9.30		
1019095		16.89		16.83	0.06	9.22		
1019490		16.84		16.65	0.19	9.18		
1019490		16.84				9.18		
1019865		16.57		16.47	0.10	9.03		

MIKE11 Chainage [m]	Comments	1974 Flood Event				1955 Flood Event		
		Flood Levels	F.L Left	F.L. Right	Difference	Flood Levels	F.L	Difference
1020115		16.71	16.56	16.71	0.07	9.06		
1020525		16.69				9.03		
1020830		16.53		17.02	-0.49	8.94		
1021095		16.30		16.26	0.04	8.80		
1021539		16.06		16.04	0.02	8.61		
1021715		16.08		15.98	0.10	8.58		
1021895		15.97		16.74	-0.77	8.51		
1022105		15.81		15.86	-0.05	8.42		
1022575		15.70		15.52	0.18	8.31		
1023040		15.42		15.31	0.11	8.14		
1023570		15.34		15.31	0.03	8.10		
1024080		15.31		15.13	0.18	8.05		
1024563		15.27		15.4	-0.13	8.00		
1025070		15.26		15.19	0.07	7.97		
1025360		15.14				7.90		
1025590		14.98		14.94	0.04	7.81		
1026170		14.77		14.64	0.13	7.67		
1026680	Mt Ommaney Gauge	14.67	14.55	14.58	0.10	7.56		
1026900		14.52	14.24	14.55	0.12	7.48		
1027160		14.35	14.24	14.46	0.00	7.40		
1027680		14.39		14.32	0.07	7.37		
1028180		14.40	14.12	14.3	0.19	7.35		
1028680		14.26				7.25		
	Centenary Bridge	14.21				7.20		
1028760		14.16				7.15		
1029200		14.03		14.09	-0.06	7.05		
1029680		14.04		13.97	0.07	7.04		
1030220		14.05		13.63	0.42	7.04		
1030870		13.99				6.99	7.17	-0.18
1031260		13.82	13.51	13.73	0.20	6.92		
1031700	Darra Wharf Gauge	13.52	13.36	13.79	-0.05	6.79		
1031995		13.66				6.80		
1032230		13.55		13.18	0.37	6.71	6.7	0.01
1032585		13.23	12.9	13.33	0.11	6.55		
1033080		13.07		12.99	0.08	6.43		
1033370		12.97	12.9	13.02	0.01	6.37	6.41	-0.04
1033900		12.73	12.57	12.96	-0.04	6.24		
1034370		12.51		12.26	0.25	6.11	6.23	-0.12
1034890	Sherwood Gauge	12.43		12.52	-0.09	6.04		
1035414		12.26		12.14	0.12	5.94		
1035900		12.03		11.87	0.16	5.80		
1036460		11.78	11.74	11.77	0.02	5.65		
1036770		11.73	11.24	11.59	0.31	5.57	5.47	0.10
1036915		11.58	11.32	11.65	0.10	5.53		
1037090		11.60	11.2	11.84	0.08	5.54		
	Indooroopilly Bridge	11.50				5.50		
1037175		11.19	11.13	11.47	-0.11	5.34		
1037285	Clarence Road Gauge	11.14		11.2	-0.06	5.30	5.56	-0.26
1037625		11.18	11.07	11.1	0.09	5.29		
1038085		11.22		11.1	0.12	5.27		
1038600		11.19		11.04	0.15	5.22		
1039100		11.16		11.07	0.09	5.18	5.16	0.02
1039200		11.16				5.18		
1039200		11.16				5.18		
1039565	Oxley Creek Gauge	11.15		11.01	0.14	5.18		
1039670		11.15				5.18		
1039670		11.15				5.18		
1039828		11.14				5.18		
1039828		11.14				5.18		
1040090	King Authur Terrace Gauge	11.11		11.04	0.07	5.18	5.1	0.08
1040250		11.07				5.16		
1040250		11.07				5.16		
1040490		10.97		11.01	-0.04	5.11		
1041010		11.03		10.89	0.14	5.13	5.02	0.11
1041230		11.01		10.83	0.18	5.10		
1041460	Tennyson Power House Gauge	10.93		10.83	0.10	5.07		

MIKE11 Chainage [m]	Comments	1974 Flood Event				1955 Flood Event		
		Flood Levels	F.L Left	F.L. Right	Difference	Flood Levels	F.L	Difference
1041700		10.92		10.83	0.08	5.07		
1041960	Yeronga Street Gauge	10.77		10.83	-0.06	4.98	4.95	0.03
1042235		10.57		10.42	0.15	4.89		
1042500		10.53				4.85		
1042500		10.53				4.85		
1042515		10.52		10.43	0.09	4.85		
1042910		10.41	10.16	10.25	0.20	4.71	4.8	-0.09
1043010		10.35				4.67		
1043010		10.35				4.67		
1043080		10.30				4.64		
1043110		10.29				4.63		
1043110		10.29				4.63		
1043725		9.97		9.95	0.02	4.46		
1044060	Sandy Creek Gauge	9.81		9.81	0.00	4.41	4.65	-0.25
1044340		9.67		9.61	0.06	4.34		
1044605		9.66		9.49	0.17	4.31		
1044860		9.67		9.55	0.12	4.30	4.49	-0.19
1045400		9.59		9.31	0.28	4.24		
1045885		9.54	9.15	9.46	0.23	4.20		
1046180		9.55		9.49	0.06	4.23		
1046340	Dutton Park Cemetery Gauge	9.50		9.57	-0.08	4.22	4.12	0.09
1046580		9.46				4.19		
1046900		9.21		9.03	0.18	4.05		
1047350		8.66	8.36	8.61	0.18	3.79		
1047915	Highgate Hill Gauge	8.29		8.36	-0.07	3.62	3.82	-0.20
1048375		8.37	8.36	8.3	0.04	3.63		
1048890	St Lucia Ferry Gauge	8.15		8.09	0.06	3.50		
1049120		8.10	8.27	8.24	-0.15	3.49	3.55	-0.06
1049370		7.89				3.40	3.51	-0.11
1049590		7.86				3.39	3.50	-0.11
1049870		7.71	7.57	7.9	-0.02	3.32		
1050430		7.63		7.75	-0.12	3.24		
1050860		7.47	7.57	7.48	-0.05	3.18	3.19	-0.01
1051360		7.48				3.19		
1051895		7.30	7.14	7.29	0.09	3.09		
1052310		7.49	7.08	7.17	0.36	3.16		
	Merivale Bridge	7.38				3.13		
1052390		7.35		7.23	0.12	3.12		
1052595		7.28				3.11		
	William Jolly Bridge	7.08				3.07		
1052640		6.53	6.35	7.05	-0.17	2.97	2.81	0.16
1052865	Montague Road Gauge	6.46		6.56	-0.10	2.96		
1053320		6.57		6.44	0.13	2.98		
	Victoria Bridge	6.45				2.95		
1053385		6.36		6.44	-0.08	2.93	2.66	0.27
1053900		6.08		6.04	0.04	2.79		
1054640		6.00				2.75		
	Captain Cook Bridge	5.96				2.75		
1054680		5.92	6.26	5.77	-0.10	2.75	2.43	0.32
1054970		5.61		5.59	0.02	2.64		
1055280		5.46				2.58		
1055420		5.40		5.44	-0.04	2.55		
1055960	Port Office Gauge	5.28	4.95	5.44	0.09	2.50	2.28	0.22
1056400		4.99	5.31	5.31	-0.32	2.39		
1056695		4.92				2.37		
1056865		5.16	4.76	5.4	0.08	2.44		
	Story Bridge	5.08				2.41		
1056950		5.04	4.8	5.47	-0.10	2.40	2.15	0.25
1057090		4.86	4.8	5.28	-0.18	2.35		
1057530		4.73		4.86	-0.13	2.31		
1058040		4.46	4.21	4.4	0.15	2.21		
1058230		4.39				2.18		
1058530		4.26	4.49	4.79	-0.38	2.15		
1058735		4.31	4.22	4.58	-0.09	2.16		
1059035		4.02	3.85	4.03	0.07	2.08	1.98	0.10
1059540		3.95	3.91	4.09	-0.05	2.04		

MIKE11 Chainage [m]	Comments	1974 Flood Event				1955 Flood Event		
		Flood Levels	F.L Left	F.L. Right	Difference	Flood Levels	F.L	Difference
1059990		3.68	3.48	4	-0.06	1.95		
1060345		3.35		3.27	0.08	1.86	1.96	-0.10
1060535		3.21	3.21	3.33	-0.06	1.83		
1061015		3.20		3.18	0.02	1.82		
1061530		3.01				1.77		
1062020		2.99	3.06	3.15	-0.12	1.76		
1062535		2.98	2.6	3.15	0.11	1.75	1.82	-0.07
1062940		3.00				1.75		
1063125		2.95				1.74		
1063125		2.95				1.74		
1063310	Newstead Park Gauge	2.88	2.6	3.3	-0.07	1.72	1.75	-0.03
1063645	Cresent Road Gauge	2.61	2.63	2.63	-0.02	1.65		
1064000		2.61		2.78	-0.17	1.65		
1064490		2.47	2.39	2.42	0.07	1.61		
1065010		2.49		2.48	0.01	1.62		
1065503		2.44		2.51	-0.07	1.61		
1065990	Cairncross Dock Gauge	2.47		2.49	-0.02	1.61		
1066505		2.37		2.51	-0.14	1.59		
1067020		2.34	2.42	2.36	-0.05	1.58		
1067485		2.22	2.42	2.36	-0.17	1.55		
1067965		2.10		2.02	0.08	1.52		
1068660		1.94		2.02	-0.08	1.49		
1069045		1.87		1.9	-0.03	1.47		
1069535	Bulimba Power House Gauge	1.83		1.9	-0.07	1.46		
1070025		1.79		1.85	-0.06	1.45		
1070530		1.71				1.43		
1071040		1.65				1.42		
1071520		1.70				1.44		
1072015		1.64				1.41		
1072020		1.64				1.41		
1072020		1.64				1.41		
1072515		1.63				1.40		
1072995		1.62				1.42		
1073485		1.61				1.43		
1074000		1.60				1.45		
1074460		1.60				1.46		
1074985		1.59				1.47		
1075480		1.58				1.49		
1076000		1.57				1.49		
1076495		1.56				1.46		
1077010		1.56				1.44		
1077510		1.55				1.41		
1078040		1.55				1.36		
1078525		1.55				1.30		
1078660	Western Inner Bar Gauge	1.55		1.55	-0.01	1.30	1.3	0.00

Chainage [m]	Discharge [m³/s] 1974 Flood Event	1955 Flood Event
BNE 931575.00	7600	5400
BNE 932625.00	7595	5395
BNE 933970.00	7587	5380
BNE 934445.00	7581	5368
BNE 935345.00	7577	5359
BNE 936445.00	7561	5308
BNE 938295.00	7553	5282
BNE 941045.00	7524	5254
BNE 942945.00	7483	5165
BNE 943845.00	7435	5068
BNE 944845.00	7419	4947
BNE 946370.00	7410	4888
BNE 947720.00	7406	4869
BNE 949270.00	7402	4850
BNE 951295.00	7397	4829
BNE 953095.00	7396	4820
BNE 954395.00	7392	4802
BNE 955445.00	7389	4788
BNE 957370.00	7383	4762
BNE 959470.00	7379	4742
BNE 961120.00	7362	4691
BNE 963120.00	7354	4676
BNE 965390.00	7351	4643
BNE 967010.00	7349	4621
BNE 968600.00	7348	4608
BNE 970475.00	7347	4592
BNE 971710.00	7346	4581
BNE 972760.00	7345	4573
BNE 973920.00	7343	4560
BNE 975300.00	7343	4551
BNE 976385.00	7344	4542
BNE 977515.00	7348	4521
BNE 978893.50	7347	4504
BNE 979510.00	7459	4611
BNE 979521.50	7456	4608
BNE 979930.00	7352	4493
BNE 980995.00	7348	4485
BNE 982060.00	7349	4480
BNE 983310.00	7347	4473
BNE 984710.00	7349	4468
BNE 985870.00	7350	4463
BNE 987220.00	7351	4457
BNE 988060.00	7352	4453
BNE 988165.00	7353	4452
BNE 988265.00	7353	4452
BNE 989030.00	7354	4448
BNE 990200.00	7358	4439
BNE 990730.00	7360	4438
BNE 991235.00	7361	4436
BNE 992065.00	7376	4427
BNE 992435.00	7364	4421
BNE 992460.00	7364	4419
BNE 992570.00	7365	4440
BNE 993215.00	7373	4423

Chainage [m]	Discharge [m^3/s] 1974 Flood Event	1955 Flood Event
BNE 994260.00	7373	4424
BNE 995225.00	7379	4420
BNE 996335.00	7383	4418
BNE 997720.00	7390	4414
BNE 998810.00	7398	4412
BNE 999580.00	7401	4411
BNE 1000142.50	8056	4466
BNE 1000530.00	8054	4465
BNE 1001045.00	8053	4464
BNE 1001590.00	8050	4463
BNE 1002107.50	8048	4462
BNE 1002567.50	8047	4461
BNE 1003030.00	8046	4460
BNE 1003525.00	8044	4459
BNE 1004037.50	8043	4458
BNE 1004555.00	8042	4457
BNE 1005067.50	8041	4455
BNE 1005597.50	8039	4452
BNE 1006035.00	7293	3997
BNE 1006250.00	9971	4691
BNE 1006605.00	10279	4689
BNE 1007160.00	10276	4683
BNE 1007595.00	10273	4678
BNE 1007850.00	10261	4663
BNE 1008182.50	10260	4661
BNE 1008685.00	10258	4658
BNE 1009162.50	10257	4655
BNE 1009560.00	10256	4652
BNE 1010105.00	10253	4646
BNE 1010607.50	10251	4644
BNE 1010852.50	10250	4642
BNE 1011245.00	10249	4640
BNE 1011745.00	10247	4635
BNE 1012227.50	10244	4630
BNE 1012705.00	10218	4608
BNE 1013062.50	10216	4605
BNE 1013317.50	9936	4603
BNE 1013562.50	9934	4601
BNE 1013795.00	9803	4599
BNE 1014110.00	9798	4596
BNE 1014460.00	9794	4591
BNE 1014850.00	9760	4567
BNE 1015325.00	9758	4565
BNE 1015705.00	9756	4564
BNE 1015995.00	9892	4563
BNE 1016390.00	9891	4561
BNE 1016765.00	9888	4559
BNE 1017010.00	10176	4558
BNE 1017370.00	10174	4555
BNE 1017765.00	10171	4553
BNE 1018060.00	10169	4552
BNE 1018462.50	10168	4550
BNE 1018910.00	10166	4548
BNE 1019292.50	10166	4547

Chainage [m]	Discharge [m^3/s]	
	1974 Flood Event	1955 Flood Event
BNE 1019677.50	10162	4545
BNE 1019990.00	10161	4544
BNE 1020320.00	10159	4541
BNE 1020677.50	10157	4539
BNE 1020962.50	10157	4538
BNE 1021317.00	10156	4537
BNE 1021627.00	10155	4536
BNE 1021805.00	10155	4535
BNE 1022000.00	10154	4534
BNE 1022340.00	10154	4533
BNE 1022807.50	10155	4532
BNE 1023305.00	10153	4531
BNE 1023825.00	10152	4529
BNE 1024321.50	10151	4528
BNE 1024816.50	10150	4526
BNE 1025215.00	10148	4524
BNE 1025475.00	10148	4523
BNE 1025880.00	10147	4522
BNE 1026425.00	10145	4521
BNE 1026790.00	10144	4520
BNE 1027030.00	10144	4519
BNE 1027420.00	10142	4518
BNE 1027930.00	10138	4516
BNE 1028430.00	10141	4514
BNE 1028720.00	10051	4513
BNE 1028980.00	10164	4512
BNE 1029440.00	10141	4510
BNE 1029950.00	10127	4508
BNE 1030545.00	10125	4503
BNE 1031065.00	10122	4502
BNE 1031480.00	10121	4500
BNE 1031847.50	10120	4500
BNE 1032112.50	10119	4499
BNE 1032407.50	10117	4497
BNE 1032832.50	10116	4496
BNE 1033225.00	10114	4495
BNE 1033635.00	10113	4494
BNE 1034135.00	10111	4492
BNE 1034630.00	10110	4491
BNE 1035152.00	10107	4489
BNE 1035657.00	10106	4487
BNE 1036180.00	10104	4485
BNE 1036615.00	10102	4484
BNE 1036842.50	10101	4483
BNE 1037002.50	10101	4482
BNE 1037110.00	10101	4482
BNE 1037230.00	10101	4482
BNE 1037455.00	10100	4481
BNE 1037855.00	10098	4479
BNE 1038342.50	10091	4477
BNE 1038850.00	10084	4473
BNE 1039150.00	10080	4470
BNE 1039382.50	9867	4467
BNE 1039617.50	9864	4465

Chainage [m]	Discharge [m^3/s]	
	1974 Flood Event	1955 Flood Event
BNE 1039749.00	9617	4464
BNE 1039959.00	9395	4368
BNE 1040170.00	9396	4368
BNE 1040370.00	9253	4368
BNE 1040750.00	9254	4367
BNE 1041120.00	9254	4367
BNE 1041345.00	9255	4367
BNE 1041580.00	9255	4367
BNE 1041830.00	9255	4367
BNE 1042097.50	9255	4366
BNE 1042367.50	9256	4366
BNE 1042507.50	9399	4366
BNE 1042712.50	9399	4366
BNE 1042960.00	9399	4366
BNE 1043045.00	9692	4366
BNE 1043095.00	9692	4366
BNE 1043417.50	9952	4366
BNE 1043892.50	9953	4366
BNE 1044200.00	9953	4365
BNE 1044472.50	9953	4365
BNE 1044732.50	9954	4365
BNE 1045130.00	9955	4365
BNE 1045642.50	9956	4365
BNE 1046032.50	9957	4365
BNE 1046260.00	9958	4365
BNE 1046460.00	9958	4365
BNE 1046740.00	9958	4365
BNE 1047125.00	9959	4365
BNE 1047632.50	9960	4365
BNE 1048145.00	9961	4364
BNE 1048632.50	9963	4364
BNE 1049005.00	9964	4364
BNE 1049245.00	9964	4364
BNE 1049480.00	9965	4364
BNE 1049730.00	9965	4364
BNE 1050150.00	9966	4364
BNE 1050645.00	9967	4364
BNE 1051110.00	9968	4364
BNE 1051627.50	9970	4364
BNE 1052102.50	9971	4364
BNE 1052350.00	9972	4363
BNE 1052492.50	9972	4362
BNE 1052625.00	9972	4354
BNE 1052752.50	9972	4363
BNE 1053092.50	9973	4364
BNE 1053355.00	9973	4364
BNE 1053642.50	9974	4364
BNE 1054270.00	9976	4364
BNE 1054660.00	9977	4364
BNE 1054825.00	9977	4364
BNE 1055125.00	9978	4364
BNE 1055350.00	9978	4364
BNE 1055690.00	9979	4364
BNE 1056180.00	9981	4364

Chainage [m]	Discharge [m^3/s] 1974 Flood Event	1955 Flood Event
BNE 1056547.50	9982	4364
BNE 1056780.00	9982	4364
BNE 1056920.00	9983	4364
BNE 1057020.00	9983	4364
BNE 1057310.00	9984	4364
BNE 1057785.00	9985	4364
BNE 1058135.00	9986	4364
BNE 1058380.00	9986	4364
BNE 1058632.50	9987	4364
BNE 1058885.00	9988	4364
BNE 1059287.50	9989	4364
BNE 1059765.00	9991	4364
BNE 1060167.50	9993	4364
BNE 1060440.00	9994	4364
BNE 1060775.00	9995	4364
BNE 1061272.50	9998	4364
BNE 1061775.00	10000	4364
BNE 1062277.50	10003	4364
BNE 1062737.50	10009	4364
BNE 1063032.50	10013	4364
BNE 1063217.50	10065	4365
BNE 1063477.50	10068	4365
BNE 1063822.50	10072	4365
BNE 1064245.00	10077	4365
BNE 1064750.00	10083	4365
BNE 1065256.50	10091	4365
BNE 1065746.50	10101	4365
BNE 1066247.50	10113	4365
BNE 1066762.50	10123	4365
BNE 1067252.50	10138	4365
BNE 1067725.00	10153	4365
BNE 1068312.50	10166	4365
BNE 1068852.50	10180	4365
BNE 1069290.00	10192	4365
BNE 1069780.00	10207	4365
BNE 1070277.50	10222	4365
BNE 1070785.00	10239	4365
BNE 1071280.00	10257	4365
BNE 1071767.50	10274	4365
BNE 1072017.50	10284	4365
BNE 1072267.50	10521	4366
BNE 1072755.00	10541	4366
BNE 1073240.00	10561	4366
BNE 1073742.50	10585	4366
BNE 1074230.00	10608	4366
BNE 1074722.50	10633	4366
BNE 1075232.50	10661	4366
BNE 1075740.00	10706	4366
BNE 1076247.50	10765	4366
BNE 1076752.50	10817	4366
BNE 1077260.00	10896	4366
BNE 1077775.00	10953	4366
BNE 1078282.50	10997	4366
BNE 1078592.50	11014	4366

Appendix E DESIGN EVENT Results

1% AEP Design Event	
Chainage [m]	Water Level [m]
BNE 931570.00	44.512
BNE 931580.00	44.5
BNE 933670.00	42.678
BNE 934270.00	42.551
BNE 934620.00	42.309
BNE 936070.00	42.116
BNE 936820.00	42.043
BNE 939770.00	41.435
BNE 942320.00	40.405
BNE 943570.00	40.197
BNE 944120.00	40.168
BNE 945570.00	40.055
BNE 947170.00	39.691
BNE 948270.00	39.336
BNE 950270.00	38.765
BNE 952320.00	37.926
BNE 953870.00	37.503
BNE 954920.00	37.124
BNE 955970.00	36.713
BNE 958770.00	35.479
BNE 960170.00	35.189
BNE 962070.00	34.431
BNE 964170.00	33.322
BNE 966610.00	31.842
BNE 967410.00	31.313
BNE 969790.00	30.09
BNE 971160.00	29.587
BNE 972260.00	29.335
BNE 973260.00	29.311
BNE 974580.00	29.115
BNE 976020.00	29.029
BNE 976750.00	29.024
BNE 978280.00	28.384
BNE 979507.00	26.448
BNE 979513.00	26.385
BNE 979530.00	26.404
BNE 980330.00	26.203
BNE 981660.00	25.76
BNE 982460.00	25.547
BNE 984160.00	25.028
BNE 985260.00	24.579
BNE 986480.00	23.812
BNE 987960.00	22.744
BNE 988160.00	22.429
BNE 988170.00	22.387
BNE 988360.00	22.177
BNE 989700.00	21.355
BNE 990700.00	20.973
BNE 990760.00	20.931
BNE 991710.00	20.676
BNE 992420.00	20.489
BNE 992450.00	20.438
BNE 992470.00	20.398
BNE 992670.00	20.306
BNE 993760.00	19.673
BNE 994760.00	19.314
BNE 995690.00	18.74
BNE 996980.00	17.529
BNE 998460.00	17
BNE 999160.00	16.757
BNE 1000000.00	16.501

Chainage [m]	Water Level [m]
BNE 1000285.00	16.314
BNE 1000775.00	16.033
BNE 1001315.00	15.895
BNE 1001865.00	15.533
BNE 1002350.00	15.401
BNE 1002785.00	15.383
BNE 1003275.00	15.218
BNE 1003775.00	15.099
BNE 1004300.00	14.821
BNE 1004810.00	14.768
BNE 1005325.00	14.637
BNE 1005870.00	14.457
BNE 1005870.00	14.457
BNE 1006200.00	14.397
BNE 1006200.00	14.397
BNE 1006300.00	14.363
BNE 1006300.00	14.363
BNE 1006910.00	14.148
BNE 1007410.00	14.053
BNE 1007780.00	13.882
BNE 1007780.00	13.882
BNE 1007920.00	13.791
BNE 1008445.00	13.764
BNE 1008925.00	13.714
BNE 1009400.00	13.595
BNE 1009720.00	13.523
BNE 1010490.00	13.277
BNE 1010725.00	13.31
BNE 1010980.00	13.275
BNE 1011510.00	13.302
BNE 1011980.00	13.311
BNE 1012475.00	13.289
BNE 1012475.00	13.289
BNE 1012935.00	13.262
BNE 1013190.00	13.244
BNE 1013190.00	13.244
BNE 1013445.00	13.223
BNE 1013680.00	13.215
BNE 1013680.00	13.215
BNE 1013910.00	13.201
BNE 1014310.00	13.129
BNE 1014610.00	13.007
BNE 1014610.00	13.007
BNE 1015090.00	12.869
BNE 1015560.00	12.735
BNE 1015850.00	12.673
BNE 1015850.00	12.673
BNE 1016140.00	12.609
BNE 1016640.00	12.435
BNE 1016890.00	12.313
BNE 1016890.00	12.313
BNE 1017130.00	12.183
BNE 1017610.00	12.052
BNE 1017920.00	11.932
BNE 1018200.00	11.919
BNE 1018725.00	11.73
BNE 1019095.00	11.642
BNE 1019490.00	11.605
BNE 1019490.00	11.605
BNE 1019865.00	11.431
BNE 1020115.00	11.485
BNE 1020525.00	11.459

Chainage [m]	Water Level [m]
BNE 1020830.00	11.351
BNE 1021095.00	11.189
BNE 1021539.00	10.987
BNE 1021715.00	10.971
BNE 1021895.00	10.893
BNE 1022105.00	10.785
BNE 1022575.00	10.67
BNE 1023040.00	10.461
BNE 1023570.00	10.421
BNE 1024080.00	10.371
BNE 1024563.00	10.331
BNE 1025070.00	10.302
BNE 1025360.00	10.219
BNE 1025590.00	10.101
BNE 1026170.00	9.952
BNE 1026680.00	9.838
BNE 1026900.00	9.738
BNE 1027160.00	9.637
BNE 1027680.00	9.626
BNE 1028180.00	9.616
BNE 1028680.00	9.493
BNE 1028760.00	9.423
BNE 1029200.00	9.301
BNE 1029680.00	9.287
BNE 1030220.00	9.297
BNE 1030870.00	9.238
BNE 1031260.00	9.148
BNE 1031700.00	8.977
BNE 1031995.00	9.014
BNE 1032230.00	8.923
BNE 1032585.00	8.713
BNE 1033080.00	8.573
BNE 1033370.00	8.51
BNE 1033900.00	8.342
BNE 1034370.00	8.189
BNE 1034890.00	8.101
BNE 1035414.00	7.986
BNE 1035900.00	7.819
BNE 1036460.00	7.634
BNE 1036770.00	7.561
BNE 1036915.00	7.49
BNE 1037090.00	7.505
BNE 1037175.00	7.246
BNE 1037285.00	7.2
BNE 1037625.00	7.197
BNE 1038085.00	7.175
BNE 1038600.00	7.135
BNE 1039100.00	7.1
BNE 1039200.00	7.099
BNE 1039200.00	7.099
BNE 1039565.00	7.096
BNE 1039670.00	7.099
BNE 1039670.00	7.099
BNE 1039828.00	7.099
BNE 1039828.00	7.099
BNE 1040090.00	7.091
BNE 1040250.00	7.06
BNE 1040250.00	7.06
BNE 1040490.00	6.991
BNE 1041010.00	7.017
BNE 1041230.00	6.989
BNE 1041460.00	6.939

Chainage [m]	Water Level [m]
BNE 1041700.00	6.935
BNE 1041960.00	6.82
BNE 1042235.00	6.681
BNE 1042500.00	6.635
BNE 1042500.00	6.635
BNE 1042515.00	6.633
BNE 1042910.00	6.479
BNE 1043010.00	6.426
BNE 1043010.00	6.426
BNE 1043080.00	6.389
BNE 1043110.00	6.376
BNE 1043110.00	6.376
BNE 1043725.00	6.158
BNE 1044060.00	6.075
BNE 1044340.00	5.98
BNE 1044605.00	5.956
BNE 1044860.00	5.942
BNE 1045400.00	5.875
BNE 1045885.00	5.822
BNE 1046180.00	5.848
BNE 1046340.00	5.831
BNE 1046580.00	5.795
BNE 1046900.00	5.611
BNE 1047350.00	5.246
BNE 1047915.00	5.007
BNE 1048375.00	5.03
BNE 1048890.00	4.865
BNE 1049120.00	4.841
BNE 1049370.00	4.715
BNE 1049590.00	4.691
BNE 1049870.00	4.595
BNE 1050430.00	4.499
BNE 1050860.00	4.409
BNE 1051360.00	4.414
BNE 1051895.00	4.28
BNE 1052310.00	4.395
BNE 1052390.00	4.273
BNE 1052595.00	4.243
BNE 1052640.00	3.966
BNE 1052865.00	3.928
BNE 1053320.00	3.97
BNE 1053385.00	3.821
BNE 1053900.00	3.62
BNE 1054640.00	3.553
BNE 1054680.00	3.502
BNE 1054970.00	3.326
BNE 1055280.00	3.244
BNE 1055420.00	3.201
BNE 1055960.00	3.121
BNE 1056400.00	2.954
BNE 1056695.00	2.918
BNE 1056865.00	3.031
BNE 1056950.00	2.969
BNE 1057090.00	2.89
BNE 1057530.00	2.82
BNE 1058040.00	2.665
BNE 1058230.00	2.624
BNE 1058530.00	2.571
BNE 1058735.00	2.582
BNE 1059035.00	2.447
BNE 1059540.00	2.396
BNE 1059990.00	2.245

Chainage [m]	Water Level [m]
BNE 1060345.00	2.103
BNE 1060535.00	2.043
BNE 1061015.00	2.023
BNE 1061530.00	1.937
BNE 1062020.00	1.917
BNE 1062535.00	1.903
BNE 1062940.00	1.907
BNE 1063125.00	1.874
BNE 1063125.00	1.874
BNE 1063310.00	1.845
BNE 1063645.00	1.705
BNE 1064000.00	1.705
BNE 1064490.00	1.636
BNE 1065010.00	1.647
BNE 1065503.00	1.62
BNE 1065990.00	1.636
BNE 1066505.00	1.589
BNE 1067020.00	1.574
BNE 1067485.00	1.51
BNE 1067965.00	1.454
BNE 1068660.00	1.375
BNE 1069045.00	1.343
BNE 1069535.00	1.322
BNE 1070025.00	1.302
BNE 1070530.00	1.26
BNE 1071040.00	1.23
BNE 1071520.00	1.26
BNE 1072015.00	1.208
BNE 1072020.00	1.208
BNE 1072020.00	1.208
BNE 1072515.00	1.187
BNE 1072995.00	1.172
BNE 1073485.00	1.122
BNE 1074000.00	1.09
BNE 1074460.00	1.067
BNE 1074985.00	1.078
BNE 1075480.00	1.089
BNE 1076000.00	1.089
BNE 1076495.00	1.071
BNE 1077010.00	1.045
BNE 1077510.00	1.012
BNE 1078040.00	0.972
BNE 1078525.00	0.921
BNE 1078660.00	0.918

Chainage [m]	Discharge [m3/s]
BNE 931575.00	6144
BNE 932625.00	6141
BNE 933970.00	6125
BNE 934445.00	6114
BNE 935345.00	6107
BNE 936445.00	6074
BNE 938295.00	6057
BNE 941045.00	6028
BNE 942945.00	5963
BNE 943845.00	5886
BNE 944845.00	5821
BNE 946370.00	5787
BNE 947720.00	5779
BNE 949270.00	5770
BNE 951295.00	5758
BNE 953095.00	5752
BNE 954395.00	5739
BNE 955445.00	5732
BNE 957370.00	5716
BNE 959470.00	5704
BNE 961120.00	5640
BNE 963120.00	5617
BNE 965390.00	5595
BNE 967010.00	5582
BNE 968600.00	5575
BNE 970475.00	5567
BNE 971710.00	5560
BNE 972760.00	5555
BNE 973920.00	5548
BNE 975300.00	5544
BNE 976385.00	5539
BNE 977515.00	5527
BNE 978893.50	5524
BNE 979510.00	5447
BNE 979521.50	5446
BNE 979930.00	5514
BNE 980995.00	5508
BNE 982060.00	5505
BNE 983310.00	5502
BNE 984710.00	5499
BNE 985870.00	5497
BNE 987220.00	5494
BNE 988060.00	5492
BNE 988165.00	5492
BNE 988265.00	5492
BNE 989030.00	5490
BNE 990200.00	5487
BNE 990730.00	5486
BNE 991235.00	5485
BNE 992065.00	5491
BNE 992435.00	5516
BNE 992460.00	5519
BNE 992570.00	5506
BNE 993215.00	5486
BNE 994260.00	5478

Chainage [m]	Discharge [m3/s]
BNE 995225.00	5479
BNE 996335.00	5481
BNE 997720.00	5480
BNE 998810.00	5478
BNE 999580.00	5478
BNE 1000142.50	5491
BNE 1000530.00	5491
BNE 1001045.00	5491
BNE 1001590.00	5491
BNE 1002107.50	5490
BNE 1002567.50	5490
BNE 1003030.00	5490
BNE 1003525.00	5490
BNE 1004037.50	5490
BNE 1004555.00	5490
BNE 1005067.50	5490
BNE 1005597.50	5489
BNE 1006035.00	4795
BNE 1006250.00	6011
BNE 1006605.00	6010
BNE 1007160.00	6008
BNE 1007595.00	6005
BNE 1007850.00	5998
BNE 1008182.50	5997
BNE 1008685.00	5995
BNE 1009162.50	5994
BNE 1009560.00	5993
BNE 1010105.00	5990
BNE 1010607.50	5989
BNE 1010852.50	5988
BNE 1011245.00	5987
BNE 1011745.00	5985
BNE 1012227.50	5983
BNE 1012705.00	5971
BNE 1013062.50	5969
BNE 1013317.50	5968
BNE 1013562.50	5967
BNE 1013795.00	5967
BNE 1014110.00	5965
BNE 1014460.00	5964
BNE 1014850.00	5956
BNE 1015325.00	5956
BNE 1015705.00	5955
BNE 1015995.00	5955
BNE 1016390.00	5955
BNE 1016765.00	5953
BNE 1017010.00	5953
BNE 1017370.00	5951
BNE 1017765.00	5949
BNE 1018060.00	5947
BNE 1018462.50	5946
BNE 1018910.00	5946
BNE 1019292.50	5946
BNE 1019677.50	5945
BNE 1019990.00	5945

Chainage [m]	Discharge [m3/s]
BNE 1020320.00	5945
BNE 1020677.50	5945
BNE 1020962.50	5945
BNE 1021317.00	5945
BNE 1021627.00	5945
BNE 1021805.00	5945
BNE 1022000.00	5945
BNE 1022340.00	5945
BNE 1022807.50	5950
BNE 1023305.00	5950
BNE 1023825.00	5951
BNE 1024321.50	5952
BNE 1024816.50	5955
BNE 1025215.00	5958
BNE 1025475.00	5960
BNE 1025880.00	5961
BNE 1026425.00	5957
BNE 1026790.00	5958
BNE 1027030.00	5960
BNE 1027420.00	5963
BNE 1027930.00	5971
BNE 1028430.00	5992
BNE 1028720.00	6048
BNE 1028980.00	6003
BNE 1029440.00	5980
BNE 1029950.00	5971
BNE 1030545.00	5961
BNE 1031065.00	5957
BNE 1031480.00	5955
BNE 1031847.50	5958
BNE 1032112.50	5960
BNE 1032407.50	5961
BNE 1032832.50	5961
BNE 1033225.00	5958
BNE 1033635.00	5956
BNE 1034135.00	5954
BNE 1034630.00	5952
BNE 1035152.00	5949
BNE 1035657.00	5948
BNE 1036180.00	5948
BNE 1036615.00	5949
BNE 1036842.50	5950
BNE 1037002.50	5950
BNE 1037110.00	5950
BNE 1037230.00	5950
BNE 1037455.00	5950
BNE 1037855.00	5950
BNE 1038342.50	5949
BNE 1038850.00	5948
BNE 1039150.00	5947
BNE 1039382.50	5947
BNE 1039617.50	5946
BNE 1039749.00	5946
BNE 1039959.00	5977
BNE 1040170.00	5977

Chainage [m]	Discharge [m3/s]
BNE 1040370.00	5977
BNE 1040750.00	5976
BNE 1041120.00	5976
BNE 1041345.00	5975
BNE 1041580.00	5975
BNE 1041830.00	5974
BNE 1042097.50	5974
BNE 1042367.50	5974
BNE 1042507.50	5974
BNE 1042712.50	5974
BNE 1042960.00	5974
BNE 1043045.00	5974
BNE 1043095.00	5974
BNE 1043417.50	5975
BNE 1043892.50	5975
BNE 1044200.00	5975
BNE 1044472.50	5975
BNE 1044732.50	5975
BNE 1045130.00	5974
BNE 1045642.50	5974
BNE 1046032.50	5973
BNE 1046260.00	5973
BNE 1046460.00	5973
BNE 1046740.00	5973
BNE 1047125.00	5973
BNE 1047632.50	5973
BNE 1048145.00	5973
BNE 1048632.50	5972
BNE 1049005.00	5972
BNE 1049245.00	5972
BNE 1049480.00	5972
BNE 1049730.00	5972
BNE 1050150.00	5972
BNE 1050645.00	5972
BNE 1051110.00	5972
BNE 1051627.50	5972
BNE 1052102.50	5973
BNE 1052370.00	5977
BNE 1052492.50	5978
BNE 1052625.00	5998
BNE 1052752.50	5973
BNE 1053092.50	5971
BNE 1053355.00	5971
BNE 1053642.50	5972
BNE 1054270.00	5972
BNE 1054660.00	5971
BNE 1054825.00	5971
BNE 1055125.00	5971
BNE 1055350.00	5971
BNE 1055690.00	5971
BNE 1056180.00	5971
BNE 1056547.50	5971
BNE 1056780.00	5971
BNE 1056920.00	5971
BNE 1057020.00	5971

Chainage [m]	Discharge [m3/s]
BNE 1057310.00	5971
BNE 1057785.00	5971
BNE 1058135.00	5971
BNE 1058380.00	5971
BNE 1058632.50	5971
BNE 1058885.00	5971
BNE 1059287.50	5971
BNE 1059765.00	5971
BNE 1060167.50	5971
BNE 1060440.00	5971
BNE 1060775.00	5971
BNE 1061272.50	5971
BNE 1061775.00	5971
BNE 1062277.50	5972
BNE 1062737.50	5972
BNE 1063032.50	5972
BNE 1063217.50	6242
BNE 1063477.50	6252
BNE 1063822.50	6253
BNE 1064245.00	6252
BNE 1064750.00	6250
BNE 1065256.50	6244
BNE 1065746.50	6235
BNE 1066247.50	6225
BNE 1066762.50	6223
BNE 1067252.50	6225
BNE 1067725.00	6222
BNE 1068312.50	6221
BNE 1068852.50	6221
BNE 1069290.00	6221
BNE 1069780.00	6225
BNE 1070277.50	6228
BNE 1070785.00	6230
BNE 1071280.00	6236
BNE 1071767.50	6239
BNE 1072017.50	6240
BNE 1072267.50	6497
BNE 1072755.00	6497
BNE 1073240.00	6496
BNE 1073742.50	6495
BNE 1074230.00	6493
BNE 1074722.50	6493
BNE 1075232.50	6495
BNE 1075740.00	6498
BNE 1076247.50	6504
BNE 1076752.50	6509
BNE 1077260.00	6514
BNE 1077775.00	6517
BNE 1078282.50	6518
BNE 1078592.50	6518

SINCLAIR KNIGHT MERZ

SKM

City Design – Flood Modelling Services

CALCULATION OF FLOODS OF VARIOUS RETURN PERIODS ON THE BRISBANE RIVER

- Q10, Q20, Q50 & Q2000 EVENTS
- Final
- 6/07/2004

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CALCULATION OF FLOODS OF VARIOUS RETURN PERIODS ON THE BRISBANE RIVER

- Final
- 6/07/2004

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1. Introduction

Council requires calculation of discharges and flood levels for the Brisbane River for return intervals of 10, 20, 50 and 2000 years. This work follows on from SKM's recent work on developing Q100 flood levels and discharges based on a re-calibrated model.

This report details assumptions, methodology and results for these storm events

2. Assumptions

The assumptions used to predict discharges are as follows.

- Rainfall based on data received from City Design on 11 February 2004
- Rainfall based on CRCFORGE rainfall with Areal Reduction Factors.
- An Initial loss of 10 mm and a Continuing loss of 1 mm/hr used in the RAFTS models
- A tail water level of 0.918m AHD at the Western Inner Bar used for each event

For the Q2000 event

- Storm durations of 24, 48, 96 and 120 hrs were modelled
- PMP temporal pattern 'a' used for all durations

For the Q10, Q20 and Q50 events

- Standard temporal patterns (AR&R 1987) were used for 24, 30, 36, 48 and 72 hr storm durations
- PMP temporal pattern 'a' used for 96 and 120 hr storm durations

3. Methodology

The methodology used to produce results for the Q10, Q20, Q50 and Q2000 events are as follows:

Rainfall

- Rainfall depths for the Q50 and Q200 flood events were based on data provided by Council. Data was produced using CRC FORGE rainfall with Areal Reduction Factors (ARF's) applied.
- Rainfall depths for the Q10 and Q20 flood events were based on depths calculated for the Brisbane River Flood Study (SKM 1998) with ARF's applied.
- There was a conversion process required to link rainfall data from Council to the current RAFTS model. This was because Council data was in the format of the original Brisbane River Flood Study (BRFS) and required updating to the more complex model used in the Ipswich Rivers Flood Study (IRFS)
- Rainfall intensities for each of the subcatchments were then temporally distributed using the program HYDCON.
- HYDCON outputs a *.his file that is compatible with RAFTS. This enables each subcatchment to have a unique 'local' storm depending on its position within the catchment

RAFTS [no dams]

- The RAFTS model was run for the each of the seven durations, Rainfall losses of 10 mm (initial) and 1 mm/hr (continuing) were applied. The RAFTS model was set up so that neither Wivenhoe nor Somerset Dams were active.
- This enables a hydrograph of the Wivenhoe and Somerset catchments to be calculated without contributing any storm water detention as a result of the dam. Dams were modelled separately using NR&M's Program DAMS.
- Hydrographs were extracted from RAFTS for nodes WIV27 (Wivenhoe) Som32 (Somerset) SAV8 (Lockyer) and 1B (Bremer).

DAMS

- The Dams program requires the RAFTS hydrographs be converted to a *.prn file format This was achieved using a combination of spreadsheet tools.
- The Dams program models the Wivenhoe and Somerset Dams using current operating rules for water releases. It required input hydrographs from RAFTS at four locations, namely WIV27 (Wivenhoe) Som32 (Somerset) SAV8 (Lockyer) and 1B (Bremer).
- The hydrograph for Wivenhoe was manipulated so that discharge from Somerset was not included, as this was modelled separately.

SKM

- The DAMS program was run for each of the seven storm durations.
- DAMS outputs hydrograph data for the Wivenhoe Dam release as a *.dat file. To enable compatibility with RAFTS, the *.dat file was converted into a suitable format using a spreadsheet tool. This was done for each storm durations

Rafts [with dams]

- The output from the DAMS model (ie. Wivenhoe Dam releases) was then input into the RAFTS model
- The RAFTS model was truncated so that all nodes above Wivenhoe Dam were removed, this was replaced with the direct inflow hydrograph extracted from DAMS.
- The RAFTS model was re-run for each of the seven storm durations.
- Results were recorded for several key locations and the critical duration was determined.
- Hydrographs were extracted for key locations on the Bremer, Brisbane River and associated tributaries for hydraulic modelling in MIKE11.
- RAFTS hydrographs were converted into a text ASCII format and imported into MIKE11.

MIKE11

- MIKE 11 Simulation, Boundary, and Time Series files were set up.
- Network and Parameter files were taken from the current Brisbane River MIKE 11 model (re-calibrated case).
- The MIKE 11 model was then run for the critical duration using the re-calibrated model
- Results were extracted for discharge and water levels for every cross section in the model. Results at key locations were also noted.

4. Results - RAFTS

Table 1 presents the results of the Rafts modelling with no dams

- **Table 1 Discharges at Port Office Gauge (no dams)**

Storm Duration	Q10	Q20	Q50	Q2000
24	4805.3	5868.4	7069.9	13966
30	**6090.0**	**7062.6**	7897.9	-
36	4828.4	5876.6	7043.7	-
48	4950.2	6107.1	7375.2	**17126**
72	4890.0	6187.9	**8613.6**	17026
96	-	-	7849.8	16417
120	-	-	7983.1	16897

Table 2 presents the results of the Rafts modelling with no dams

- **Table 2 Discharges at Port Office Gauge (with dams)**

Storm Duration	Q10	Q20	Q50	Q2000
24	1655.9	2054.8	2718.6	7202.8
30	**2343.9**	**2774.3**	3337.1	-
36	1691.8	2160.8	2734.5	-
48	1786.2	2323.1	3035.4	10157
72	1940.2	2426.1	**3972.8**	11605
96	-	-	3817.3	12347
120	-	-	3927.2	**12814**

5. Results - MIKE 11

Table 3 presents the results of the MIKE11 modelling with dams

▪ **Table 3 Discharges and WSL at the Port Office Gauge (with dams)**

	Q10	Q20	Q50	Q2000
Storm Duration [hrs]	30	30	72	120
WSL [m AHD]	1.529	1.791	2.416	6.368
Discharge [m^3/s]	2834	3447	4591	11698

It should be noted that differences in discharges in the RAFTS and MIKE11 models are due to river routing affects.

Appendix A Mike11 Results Q10

MIKE 11 RESULTS - BRISBANE RIVER MODEL

Q10 event CRCFORGE rainfall with ARF's

30hr Storm Duration

Chainage [m]	Water Level	Chainage [m]	Discharge	Chainage [m]	Velocity [m/s]	Chainage [m]	Velocity [m/s]
BNE 931570.00	36.154	BNE 931575.00	2000	BNE 931570.00	1.462	BNE 1027420.00	1.355
BNE 931580.00	36.149	BNE 932625.00	1985	BNE 931575.00	1.463	BNE 1027680.00	1.261
BNE 933670.00	35.094	BNE 933970.00	1974	BNE 931580.00	1.463	BNE 1027930.00	1.21
BNE 934270.00	34.958	BNE 934445.00	1964	BNE 932625.00	1.466	BNE 1028180.00	1.163
BNE 934620.00	34.773	BNE 935345.00	1954	BNE 933670.00	1.472	BNE 1028430.00	1.286
BNE 936070.00	34.525	BNE 936445.00	1922	BNE 933970.00	1.032	BNE 1028680.00	1.44
BNE 936820.00	34.496	BNE 938295.00	1903	BNE 934270.00	1.649	BNE 1028720.00	1.816
BNE 939770.00	34.214	BNE 941045.00	1899	BNE 934445.00	1.891	BNE 1028760.00	1.454
BNE 942320.00	33.125	BNE 942945.00	1899	BNE 934620.00	2.524	BNE 1028980.00	1.516
BNE 943570.00	32.702	BNE 943845.00	1899	BNE 935345.00	0.801	BNE 1029200.00	1.584
BNE 944120.00	32.488	BNE 944845.00	1898	BNE 936070.00	0.516	BNE 1029440.00	1.476
BNE 945570.00	31.992	BNE 946370.00	1898	BNE 936445.00	0.495	BNE 1029680.00	1.382
BNE 947170.00	31.488	BNE 947720.00	1898	BNE 936820.00	3.612	BNE 1029950.00	1.361
BNE 948270.00	31.04	BNE 949270.00	1898	BNE 938295.00	0.664	BNE 1030220.00	1.34
BNE 950270.00	30.454	BNE 951295.00	1897	BNE 939770.00	1.409	BNE 1030545.00	1.337
BNE 952320.00	29.85	BNE 953095.00	1897	BNE 941045.00	1.186	BNE 1030870.00	1.334
BNE 953870.00	29.444	BNE 954395.00	1897	BNE 942320.00	1.298	BNE 1031065.00	1.397
BNE 954920.00	29.058	BNE 955445.00	1897	BNE 942945.00	1.004	BNE 1031260.00	1.467
BNE 955970.00	28.544	BNE 957370.00	1896	BNE 943570.00	0.816	BNE 1031480.00	1.562
BNE 958770.00	27.377	BNE 959470.00	1896	BNE 943845.00	0.944	BNE 1031700.00	1.669
BNE 960170.00	26.944	BNE 961120.00	1896	BNE 944120.00	1.141	BNE 1031847.50	1.464
BNE 962070.00	25.979	BNE 963120.00	1895	BNE 944845.00	0.92	BNE 1031995.00	1.303
BNE 964170.00	24.494	BNE 965390.00	1895	BNE 945570.00	1.286	BNE 1032112.50	1.273
BNE 966610.00	22.823	BNE 967010.00	1894	BNE 946370.00	0.995	BNE 1032230.00	1.245
BNE 967410.00	22.449	BNE 968600.00	1894	BNE 947170.00	1.15	BNE 1032407.50	1.279
BNE 969790.00	21.635	BNE 970475.00	1894	BNE 947720.00	1.187	BNE 1032585.00	1.315
BNE 971160.00	21.278	BNE 971710.00	1893	BNE 948270.00	1.228	BNE 1032832.50	1.295
BNE 972260.00	21.059	BNE 972760.00	1893	BNE 949270.00	0.99	BNE 1033080.00	1.276
BNE 973260.00	21.017	BNE 973920.00	1893	BNE 950270.00	0.829	BNE 1033225.00	1.315
BNE 974580.00	20.918	BNE 975300.00	1893	BNE 951295.00	0.978	BNE 1033370.00	1.357
BNE 976020.00	20.834	BNE 976385.00	1892	BNE 952320.00	1.191	BNE 1033635.00	1.394
BNE 976750.00	20.749	BNE 977515.00	1892	BNE 953095.00	1.001	BNE 1033900.00	1.434
BNE 978280.00	19.79	BNE 978893.50	1892	BNE 953870.00	0.862	BNE 1034135.00	1.435
BNE 979507.00	17.837	BNE 979510.00	1914	BNE 954395.00	1.001	BNE 1034370.00	1.437
BNE 979513.00	17.807	BNE 979521.50	1912	BNE 954920.00	1.492	BNE 1034630.00	1.378
BNE 979530.00	17.777	BNE 979930.00	1894	BNE 955445.00	1.241	BNE 1034890.00	1.324
BNE 980330.00	17.485	BNE 980995.00	1891	BNE 955970.00	1.291	BNE 1035152.00	1.359
BNE 981660.00	17.111	BNE 982060.00	1891	BNE 957370.00	1.206	BNE 1035414.00	1.396
BNE 982460.00	16.953	BNE 983310.00	1890	BNE 958770.00	1.134	BNE 1035657.00	1.432
BNE 984160.00	16.559	BNE 984710.00	1890	BNE 959470.00	0.917	BNE 1035900.00	1.47
BNE 985260.00	16.167	BNE 985870.00	1890	BNE 960170.00	0.785	BNE 1036180.00	1.444
BNE 986480.00	15.533	BNE 987220.00	1890	BNE 961120.00	1.01	BNE 1036460.00	1.419
BNE 987960.00	14.619	BNE 988060.00	1890	BNE 962070.00	1.483	BNE 1036615.00	1.375
BNE 988160.00	14.355	BNE 988165.00	1890	BNE 963120.00	1.159	BNE 1036770.00	1.333
BNE 988170.00	14.315	BNE 988265.00	1890	BNE 964170.00	0.996	BNE 1036842.50	1.333
BNE 988360.00	14.057	BNE 989030.00	1890	BNE 965390.00	1.146	BNE 1036915.00	1.334
BNE 989700.00	13.047	BNE 990200.00	1889	BNE 966610.00	1.466	BNE 1037002.50	1.255
BNE 990700.00	12.692	BNE 990730.00	1889	BNE 967010.00	1.185	BNE 1037090.00	1.184
BNE 990760.00	12.664	BNE 991235.00	1889	BNE 967410.00	0.995	BNE 1037110.00	1.502
BNE 991710.00	12.393	BNE 992065.00	1889	BNE 968600.00	1.102	BNE 1037175.00	1.188
BNE 992420.00	12.201	BNE 992435.00	1889	BNE 969790.00	1.235	BNE 1037230.00	1.271
BNE 992450.00	12.175	BNE 992460.00	1889	BNE 970475.00	1.217	BNE 1037285.00	1.365
BNE 992470.00	12.163	BNE 992570.00	1889	BNE 971160.00	1.2	BNE 1037455.00	1.303
BNE 992670.00	12.07	BNE 993215.00	1888	BNE 971710.00	1.182	BNE 1037625.00	1.246
BNE 993760.00	11.491	BNE 994260.00	1888	BNE 972260.00	1.819	BNE 1037855.00	1.153
BNE 994760.00	11.023	BNE 995225.00	1888	BNE 972760.00	0.904	BNE 1038085.00	1.072
BNE 995690.00	10.459	BNE 996335.00	1888	BNE 973260.00	0.738	BNE 1038342.50	1.149
BNE 996980.00	9.619	BNE 997720.00	1887	BNE 973920.00	0.942	BNE 1038600.00	1.236
BNE 998460.00	9.407	BNE 998810.00	1887	BNE 974580.00	1.301	BNE 1038850.00	1.237
BNE 999160.00	9.348	BNE 999580.00	1887	BNE 975300.00	1.159	BNE 1039100.00	1.238
BNE 1000000.00	9.268	BNE 1000142.50	1887	BNE 976020.00	1.045	BNE 1039150.00	1.222
BNE 1000285.00	9.203	BNE 1000530.00	1887	BNE 976385.00	0.911	BNE 1039200.00	1.207
BNE 1000775.00	9.114	BNE 1001045.00	1887	BNE 976750.00	1.034	BNE 1039200.00	1.207
BNE 1001315.00	9.049	BNE 1001590.00	1886	BNE 977515.00	0.979	BNE 1039382.50	1.157
BNE 1001865.00	8.949	BNE 1002107.50	1886	BNE 978280.00	1.242	BNE 1039565.00	1.111
BNE 1002350.00	8.872	BNE 1002567.50	1886	BNE 978893.50	1.187	BNE 1039617.50	1.083
BNE 1002785.00	8.852	BNE 1003030.00	1886	BNE 979507.00	1.148	BNE 1039670.00	1.056
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BNE 1003775.00	8.735	BNE 1004037.50	1886	BNE 979513.00	1.189	BNE 1039749.00	1.025
BNE 1004300.00	8.629	BNE 1004555.00	1886	BNE 979521.50	1.252	BNE 1039828.00	0.995
BNE 1004810.00	8.587	BNE 1005067.50	1886	BNE 979530.00	1.314	BNE 1039828.00	0.989
BNE 1005325.00	8.526	BNE 1005597.50	1885	BNE 979930.00	1.249	BNE 1039959.00	0.96
BNE 1005870.00	8.449	BNE 1006035.00	1885	BNE 980330.00	1.251	BNE 1040090.00	0.933
BNE 1005870.00	8.449	BNE 1006250.00	2935	BNE 980995.00	1.187	BNE 1040170.00	0.983
BNE 1006200.00	8.42	BNE 1006605.00	2934	BNE 981660.00	1.175	BNE 1040250.00	1.039
BNE 1006200.00	8.42	BNE 1007160.00	2930	BNE 982060.00	1.152	BNE 1040250.00	1.039
BNE 1006300.00	8.395	BNE 1007595.00	2926	BNE 982460.00	1.13	BNE 1040370.00	1.129
BNE 1006300.00	8.395	BNE 1007850.00	2923	BNE 983310.00	1.087	BNE 1040490.00	1.237
BNE 1006910.00	8.206	BNE 1008182.50	2922	BNE 984160.00	1.047	BNE 1040750.00	1.108
BNE 1007410.00	8.094	BNE 1008685.00	2920	BNE 984710.00	1.099	BNE 1041010.00	1.003
BNE 1007780.00	7.96	BNE 1009162.50	2918	BNE 985260.00	1.157	BNE 1041120.00	1.015
BNE 1007780.00	7.96	BNE 1009560.00	2916	BNE 985870.00	1.206	BNE 1041230.00	1.027
BNE 1007920.00	7.899	BNE 1010105.00	2914	BNE 986480.00	1.26	BNE 1041345.00	1.043
BNE 1008445.00	7.888	BNE 1010607.50	2912	BNE 987220.00	1.116	BNE 1041460.00	1.06
BNE 1008925.00	7.841	BNE 1010852.50	2911	BNE 987960.00	1.002	BNE 1041580.00	0.962
BNE 1009400.00	7.752	BNE 1011245.00	2909	BNE 988060.00	1.225	BNE 1041700.00	0.88
BNE 1009720.00	7.684	BNE 1011745.00	2907	BNE 988160.00	1.577	BNE 1041830.00	1.016
BNE 1010490.00	7.541	BNE 1012227.50	2904	BNE 988165.00	3.452	BNE 1041960.00	1.2
BNE 1010725.00	7.559	BNE 1012705.00	2899	BNE 988170.00	1.585	BNE 1042097.50	1.232
BNE 1010980.00	7.537	BNE 1013062.50	2897	BNE 988265.00	1.307	BNE 1042235.00	1.266
BNE 1011510.00	7.529	BNE 1013317.50	2896	BNE 988360.00	1.112	BNE 1042367.50	1.188
BNE 1011980.00	7.52	BNE 1013562.50	2895	BNE 989030.00	1.047	BNE 1042500.00	1.119
BNE 1012475.00	7.504	BNE 1013795.00	2894	BNE 989700.00	0.989	BNE 1042500.00	1.119

BNE 1012475.00	7.504	BNE 1014110.00	2891	BNE 990200.00 \	1.07	BNE 1042507.50	1.115
BNE 1012935.00	7.481	BNE 1014460.00	2889	BNE 990700.00 \	1.166	BNE 1042515.00	1.111
BNE 1013190.00	7.471	BNE 1014850.00	2885	BNE 990730.00 \	1.19	BNE 1042712.50	1.172
BNE 1013190.00	7.471	BNE 1015325.00	2884	BNE 990760.00 \	1.216	BNE 1042910.00	1.24
BNE 1013445.00	7.458	BNE 1015705.00	2883	BNE 991235.00 \	0.879	BNE 1042960.00	1.242
BNE 1013680.00	7.445	BNE 1015995.00	2882	BNE 991710.00 \	0.688	BNE 1043010.00	1.244
BNE 1013680.00	7.445	BNE 1016390.00	2882	BNE 992065.00 \	0.714	BNE 1043010.00	1.244
BNE 1013910.00	7.425	BNE 1016765.00	2880	BNE 992420.00 \	0.743	BNE 1043045.00	1.245
BNE 1014310.00	7.351	BNE 1017010.00	2879	BNE 992435.00 \	0.816	BNE 1043080.00	1.246
BNE 1014610.00	7.225	BNE 1017370.00	2878	BNE 992450.00 \	0.907	BNE 1043095.00	1.242
BNE 1014610.00	7.225	BNE 1017765.00	2877	BNE 992460.00 \	1.029	BNE 1043110.00	1.238
BNE 1015090.00	7.142	BNE 1018060.00	2876	BNE 992470.00 \	0.908	BNE 1043110.00	1.238
BNE 1015560.00	7.058	BNE 1018462.50	2875	BNE 992570.00 \	0.991	BNE 1043417.50	1.151
BNE 1015850.00	7.012	BNE 1018910.00	2875	BNE 992670.00 \	1.09	BNE 1043725.00	1.075
BNE 1015850.00	7.012	BNE 1019292.50	2875	BNE 993215.00 \	1.256	BNE 1043892.50	1.044
BNE 1016140.00	6.967	BNE 1019677.50	2874	BNE 993760.00 \	1.482	BNE 1044060.00	1.014
BNE 1016640.00	6.81	BNE 1019990.00	2874	BNE 994260.00 \	1.214	BNE 1044200.00	1.077
BNE 1016890.00	6.697	BNE 1020320.00	2873	BNE 994760.00 \	1.028	BNE 1044340.00	1.149
BNE 1016890.00	6.697	BNE 1020677.50	2871	BNE 995225.00 \	1.136	BNE 1044472.50	1.098
BNE 1017130.00	6.585	BNE 1020962.50	2870	BNE 995690.00 \	1.269	BNE 1044605.00	1.052
BNE 1017610.00	6.468	BNE 1021317.00	2870	BNE 996335.00 \	1.333	BNE 1044732.50	1.015
BNE 1017920.00	6.378	BNE 1021627.00	2869	BNE 996980.00 \	1.403	BNE 1044860.00	0.981
BNE 1018200.00	6.37	BNE 1021805.00	2869	BNE 997720.00 \	0.974	BNE 1045130.00	0.981
BNE 1018725.00	6.257	BNE 1022000.00	2868	BNE 998460.00 \	0.745	BNE 1045400.00	0.98
BNE 1019095.00	6.195	BNE 1022340.00	2868	BNE 998810.00 \	0.991	BNE 1045642.50	1.009
BNE 1019490.00	6.151	BNE 1022807.50	2873	BNE 999160.00 \	1.478	BNE 1045885.00	1.04
BNE 1019490.00	6.151	BNE 1023305.00	2873	BNE 999580.00 \	1.2	BNE 1046032.50	0.886
BNE 1019865.00	6.053	BNE 1023825.00	2872	BNE 1000000.00	1.01	BNE 1046180.00	0.771
BNE 1020115.00	6.049	BNE 1024321.50	2872	BNE 1000142.50	1.145	BNE 1046260.00	0.781
BNE 1020525.00	6.01	BNE 1024816.50	2871	BNE 1000285.00	1.323	BNE 1046340.00	0.791
BNE 1020830.00	5.948	BNE 1025215.00	2870	BNE 1000530.00	1.328	BNE 1046460.00	0.813
BNE 1021095.00	5.852	BNE 1025475.00	2870	BNE 1000775.00	1.334	BNE 1046580.00	0.837
BNE 1021539.00	5.701	BNE 1025880.00	2869	BNE 1001045.00	1.27	BNE 1046740.00	0.957
BNE 1021715.00	5.666	BNE 1026425.00	2868	BNE 1001315.00	1.212	BNE 1046900.00	1.117
BNE 1021895.00	5.61	BNE 1026790.00	2868	BNE 1001590.00	1.409	BNE 1047125.00	1.181
BNE 1022105.00	5.551	BNE 1027030.00	2867	BNE 1001865.00	1.683	BNE 1047350.00	1.252
BNE 1022575.00	5.457	BNE 1027420.00	2867	BNE 1002107.50	1.685	BNE 1047632.50	1.201
BNE 1023040.00	5.346	BNE 1027930.00	2866	BNE 1002350.00	1.688	BNE 1047915.00	1.155
BNE 1023570.00	5.309	BNE 1028430.00	2864	BNE 1002567.50	1.425	BNE 1048145.00	1.01
BNE 1024080.00	5.26	BNE 1028720.00	2864	BNE 1002785.00	1.233	BNE 1048375.00	0.897
BNE 1024563.00	5.216	BNE 1028980.00	2864	BNE 1003030.00	1.357	BNE 1048632.50	1.055
BNE 1025070.00	5.189	BNE 1029440.00	2863	BNE 1003275.00	1.51	BNE 1048890.00	1.279
BNE 1025360.00	5.142	BNE 1029950.00	2862	BNE 1003525.00	1.423	BNE 1049005.00	1.179
BNE 1025590.00	5.076	BNE 1030545.00	2861	BNE 1003775.00	1.346	BNE 1049120.00	1.093
BNE 1026170.00	4.967	BNE 1031065.00	2860	BNE 1004037.50	1.484	BNE 1049245.00	1.166
BNE 1026680.00	4.878	BNE 1031480.00	2860	BNE 1004300.00	1.654	BNE 1049370.00	1.248
BNE 1026900.00	4.824	BNE 1031847.50	2859	BNE 1004555.00	1.343	BNE 1049480.00	1.193
BNE 1027160.00	4.772	BNE 1032112.50	2859	BNE 1004810.00	1.131	BNE 1049590.00	1.142
BNE 1027680.00	4.735	BNE 1032407.50	2858	BNE 1005067.50	1.195	BNE 1049730.00	1.19
BNE 1028180.00	4.716	BNE 1032832.50	2858	BNE 1005325.00	1.266	BNE 1049870.00	1.243
BNE 1028680.00	4.644	BNE 1033225.00	2857	BNE 1005597.50	1.35	BNE 1050150.00	1.224
BNE 1028760.00	4.567	BNE 1033635.00	2857	BNE 1005870.00	1.446	BNE 1050430.00	1.205
BNE 1029200.00	4.503	BNE 1034135.00	2856	BNE 1005870.00	1.446	BNE 1050645.00	1.237
BNE 1029680.00	4.493	BNE 1034630.00	2856	BNE 1006035.00	1.292	BNE 1050860.00	1.271
BNE 1030220.00	4.476	BNE 1035152.00	2855	BNE 1006200.00	1.168	BNE 1051110.00	1.176
BNE 1030870.00	4.444	BNE 1035657.00	2854	BNE 1006200.00	1.484	BNE 1051360.00	1.094
BNE 1031260.00	4.397	BNE 1036180.00	2854	BNE 1006250.00	1.45	BNE 1051627.50	1.245
BNE 1031700.00	4.319	BNE 1036615.00	2853	BNE 1006300.00	1.418	BNE 1051895.00	1.443
BNE 1031995.00	4.305	BNE 1036842.50	2853	BNE 1006300.00	1.418	BNE 1052102.50	1.24
BNE 1032230.00	4.242	BNE 1037002.50	2853	BNE 1006605.00	1.43	BNE 1052310.00	1.087
BNE 1032585.00	4.133	BNE 1037110.00	2853	BNE 1006910.00	1.441	BNE 1052370.00	1.79
BNE 1033080.00	4.056	BNE 1037230.00	2853	BNE 1007160.00	1.368	BNE 1052390.00	1.271
BNE 1033370.00	4.015	BNE 1037455.00	2853	BNE 1007410.00	1.301	BNE 1052492.50	1.282
BNE 1033900.00	3.925	BNE 1037855.00	2852	BNE 1007595.00	1.448	BNE 1052595.00	1.292
BNE 1034370.00	3.842	BNE 1038342.50	2851	BNE 1007780.00	1.633	BNE 1052625.00	1.613
BNE 1034890.00	3.787	BNE 1038850.00	2850	BNE 1007780.00	1.631	BNE 1052640.00	1.121
BNE 1035414.00	3.717	BNE 1039150.00	2850	BNE 1007850.00	1.717	BNE 1052752.50	1.143
BNE 1035900.00	3.63	BNE 1039382.50	2849	BNE 1007920.00	1.814	BNE 1052865.00	1.165
BNE 1036460.00	3.524	BNE 1039617.50	2848	BNE 1008182.50	1.583	BNE 1053092.50	1.098
BNE 1036770.00	3.459	BNE 1039749.00	2848	BNE 1008445.00	1.405	BNE 1053320.00	1.038
BNE 1036915.00	3.438	BNE 1039959.00	2835	BNE 1008685.00	1.413	BNE 1053355.00	1.364
BNE 1037090.00	3.45	BNE 1040170.00	2834	BNE 1008925.00	1.421	BNE 1053385.00	1.255
BNE 1037175.00	3.322	BNE 1040370.00	2834	BNE 1009162.50	1.419	BNE 1053642.50	1.228
BNE 1037285.00	3.296	BNE 1040750.00	2834	BNE 1009400.00	1.417	BNE 1053900.00	1.203
BNE 1037625.00	3.279	BNE 1041120.00	2834	BNE 1009560.00	1.399	BNE 1054270.00	0.841
BNE 1038085.00	3.264	BNE 1041345.00	2834	BNE 1009720.00	1.382	BNE 1054640.00	0.647
BNE 1038600.00	3.22	BNE 1041580.00	2834	BNE 1010105.00	1.515	BNE 1054660.00	0.983
BNE 1039100.00	3.187	BNE 1041830.00	2834	BNE 1010490.00	1.676	BNE 1054680.00	0.612
BNE 1039200.00	3.187	BNE 1042097.50	2834	BNE 1010607.50	1.548	BNE 1054825.00	0.784
BNE 1039200.00	3.187	BNE 1042367.50	2834	BNE 1010725.00	1.437	BNE 1054970.00	1.093
BNE 1039565.00	3.186	BNE 1042507.50	2834	BNE 1010852.50	1.463	BNE 1055125.00	1.076
BNE 1039670.00	3.189	BNE 1042712.50	2834	BNE 1010980.00	1.49	BNE 1055280.00	1.06
BNE 1039670.00	3.189	BNE 1042960.00	2833	BNE 1011245.00	1.432	BNE 1055350.00	1.07
BNE 1039828.00	3.192	BNE 1043045.00	2833	BNE 1011510.00	1.377	BNE 1055420.00	1.081
BNE 1039828.00	3.192	BNE 1043095.00	2833	BNE 1011745.00	1.358	BNE 1055690.00	1.026
BNE 1040090.00	3.193	BNE 1043417.50	2833	BNE 1011980.00	1.338	BNE 1055960.00	0.976
BNE 1040250.00	3.18	BNE 1043892.50	2833	BNE 1012227.50	1.324	BNE 1056180.00	1.094
BNE 1040250.00	3.18	BNE 1044200.00	2833	BNE 1012475.00	1.309	BNE 1056400.00	1.243
BNE 1040490.00	3.152	BNE 1044472.50	2833	BNE 1012475.00	1.307	BNE 1056547.50	1.179
BNE 1041010.00	3.159	BNE 1044732.50	2833	BNE 1012705.00	1.313	BNE 1056695.00	1.121
BNE 1041230.00	3.141	BNE 1045130.00	2833	BNE 1012935.00	1.32	BNE 1056780.00	0.432
BNE 1041460.00	3.117	BNE 1045642.50	2833	BNE 1013062.50	1.307	BNE 1056865.00	0.268
BNE 1041700.00	3.121	BNE 1046032.50	2833	BNE 1013190.00	1.293	BNE 1056920.00	1.264
BNE 1041960.00	3.071	BNE 1046260.00	2833	BNE 1013190.00	1.293	BNE 1056950.00	0.277
BNE 1042235.00	3.015	BNE 1046460.00	2833	BNE 1013317.50	1.282	BNE 1057020.00	0.413
BNE 1042500.00	2.989	BNE 1046740.00	2833	BNE 1013445.00	1.271	BNE 1057090.00	0.816
BNE 1042500.00	2.989	BNE 1047125.00	2833	BNE 1013562.50	1.252	BNE 1057310.00	0.883
BNE 1042515.00	2.987	BNE 1047632.50	2833	BNE 1013680.00	1.232	BNE 1057530.00	0.961
BNE 1042910.00	2.896	BNE 1048145.00	2833	BNE 1013680.00	1.232	BNE 1057785.00	1.058

BNE 1043010.00	2.868		BNE 1048632.50	2833		BNE 1013795.00	1.223		BNE 1058040.00	1.177
BNE 1043010.00	2.868		BNE 1049005.00	2833		BNE 1013910.00	1.214		BNE 1058135.00	1.175
BNE 1043080.00	2.848		BNE 1049245.00	2833		BNE 1014110.00	1.235		BNE 1058230.00	1.173
BNE 1043110.00	2.841		BNE 1049480.00	2833		BNE 1014310.00	1.257		BNE 1058380.00	1.156
BNE 1043110.00	2.841		BNE 1049730.00	2833		BNE 1014460.00	1.27		BNE 1058530.00	1.14
BNE 1043725.00	2.73		BNE 1050150.00	2833		BNE 1014610.00	1.282		BNE 1058632.50	1.082
BNE 1044060.00	2.697		BNE 1050645.00	2833		BNE 1014610.00	1.28		BNE 1058735.00	1.029
BNE 1044340.00	2.657		BNE 1051110.00	2833		BNE 1014850.00	1.118		BNE 1058885.00	1.095
BNE 1044605.00	2.641		BNE 1051627.50	2833		BNE 1015090.00	0.994		BNE 1059035.00	1.171
BNE 1044860.00	2.627		BNE 1052102.50	2833		BNE 1015325.00	1.119		BNE 1059287.50	1.025
BNE 1045400.00	2.593		BNE 1052370.00	2833		BNE 1015560.00	1.281		BNE 1059540.00	0.912
BNE 1045885.00	2.564		BNE 1052492.50	2833		BNE 1015705.00	1.266		BNE 1059765.00	0.926
BNE 1046180.00	2.581		BNE 1052625.00	2833		BNE 1015850.00	1.251		BNE 1059990.00	0.941
BNE 1046340.00	2.576		BNE 1052752.50	2833		BNE 1015850.00	1.251		BNE 1060167.50	0.981
BNE 1046580.00	2.559		BNE 1053092.50	2833		BNE 1015995.00	1.235		BNE 1060345.00	1.026
BNE 1046900.00	2.476		BNE 1053355.00	2833		BNE 1016140.00	1.219		BNE 1060440.00	1.067
BNE 1047350.00	2.321		BNE 1053642.50	2833		BNE 1016390.00	1.33		BNE 1060535.00	1.111
BNE 1047915.00	2.228		BNE 1054270.00	2833		BNE 1016640.00	1.465		BNE 1060775.00	1.064
BNE 1048375.00	2.227		BNE 1054660.00	2833		BNE 1016765.00	1.502		BNE 1061015.00	1.021
BNE 1048890.00	2.149		BNE 1054825.00	2833		BNE 1016890.00	1.541		BNE 1061272.50	1.048
BNE 1049120.00	2.142		BNE 1055125.00	2833		BNE 1016890.00	1.541		BNE 1061530.00	1.076
BNE 1049370.00	2.097		BNE 1055350.00	2834		BNE 1017010.00	1.6		BNE 1061775.00	1.02
BNE 1049590.00	2.088		BNE 1055690.00	2834		BNE 1017130.00	1.664		BNE 1062020.00	0.97
BNE 1049870.00	2.049		BNE 1056180.00	2834		BNE 1017370.00	1.574		BNE 1062277.50	0.906
BNE 1050430.00	1.999		BNE 1056547.50	2834		BNE 1017610.00	1.493		BNE 1062535.00	0.851
BNE 1050860.00	1.966		BNE 1056780.00	2834		BNE 1017765.00	1.545		BNE 1062737.50	0.765
BNE 1051360.00	1.971		BNE 1056920.00	2834		BNE 1017920.00	1.599		BNE 1062940.00	0.695
BNE 1051895.00	1.914		BNE 1057020.00	2834		BNE 1018060.00	1.402		BNE 1063032.50	0.704
BNE 1052310.00	1.952		BNE 1057310.00	2834		BNE 1018200.00	1.248		BNE 1063125.00	0.713
BNE 1052390.00	1.912		BNE 1057785.00	2834		BNE 1018462.50	1.325		BNE 1063125.00	0.713
BNE 1052595.00	1.908		BNE 1058135.00	2834		BNE 1018725.00	1.413		BNE 1063217.50	0.729
BNE 1052640.00	1.853		BNE 1058380.00	2834		BNE 1018910.00	1.396		BNE 1063310.00	0.745
BNE 1052865.00	1.846		BNE 1058632.50	2834		BNE 1019095.00	1.38		BNE 1063477.50	0.863
BNE 1053320.00	1.853		BNE 1058885.00	2834		BNE 1019292.50	1.291		BNE 1063645.00	1.023
BNE 1053385.00	1.789		BNE 1059287.50	2834		BNE 1019490.00	1.213		BNE 1063822.50	0.99
BNE 1053900.00	1.711		BNE 1059765.00	2834		BNE 1019490.00	1.213		BNE 1064000.00	0.958
BNE 1054640.00	1.681		BNE 1060167.50	2834		BNE 1019677.50	1.312		BNE 1064245.00	0.969
BNE 1054680.00	1.664		BNE 1060440.00	2834		BNE 1019865.00	1.428		BNE 1064490.00	0.98
BNE 1054970.00	1.607		BNE 1060775.00	2834		BNE 1019990.00	1.219		BNE 1064750.00	0.867
BNE 1055280.00	1.579		BNE 1061272.50	2834		BNE 1020115.00	1.063		BNE 1065010.00	0.777
BNE 1055420.00	1.561		BNE 1061775.00	2834		BNE 1020320.00	0.896		BNE 1065256.50	0.744
BNE 1055960.00	1.529		BNE 1062277.50	2834		BNE 1020525.00	0.775		BNE 1065503.00	0.714
BNE 1056400.00	1.471		BNE 1062737.50	2834		BNE 1020677.50	0.88		BNE 1065746.50	0.625
BNE 1056695.00	1.459		BNE 1063032.50	2834		BNE 1020830.00	1.018		BNE 1065990.00	0.555
BNE 1056865.00	1.493		BNE 1063217.50	2834		BNE 1020962.50	1.167		BNE 1066247.50	0.596
BNE 1056950.00	1.474		BNE 1063477.50	2834		BNE 1021095.00	1.366		BNE 1066505.00	0.644
BNE 1057090.00	1.451		BNE 1063822.50	2834		BNE 1021317.00	1.349		BNE 1066762.50	0.628
BNE 1057530.00	1.428		BNE 1064245.00	2835		BNE 1021539.00	1.332		BNE 1067020.00	0.613
BNE 1058040.00	1.375		BNE 1064750.00	2835		BNE 1021627.00	1.236		BNE 1067252.50	0.67
BNE 1058230.00	1.362		BNE 1065256.50	2835		BNE 1021715.00	1.153		BNE 1067485.00	0.738
BNE 1058530.00	1.348		BNE 1065746.50	2835		BNE 1021805.00	1.15		BNE 1067725.00	0.761
BNE 1058735.00	1.349		BNE 1066247.50	2835		BNE 1021895.00	1.146		BNE 1067965.00	0.786
BNE 1059035.00	1.311		BNE 1066762.50	2835		BNE 1022000.00	1.17		BNE 1068312.50	0.814
BNE 1059540.00	1.292		BNE 1067252.50	2835		BNE 1022105.00	1.194		BNE 1068660.00	0.844
BNE 1059990.00	1.241		BNE 1067725.00	2835		BNE 1022340.00	1.232		BNE 1068852.50	0.832
BNE 1060345.00	1.2		BNE 1068312.50	2835		BNE 1022575.00	1.274		BNE 1069045.00	0.821
BNE 1060535.00	1.188		BNE 1068852.50	2835		BNE 1022807.50	1.418		BNE 1069290.00	0.787
BNE 1061015.00	1.182		BNE 1069290.00	2835		BNE 1023040.00	1.596		BNE 1069535.00	0.756
BNE 1061530.00	1.17		BNE 1069780.00	2835		BNE 1023305.00	1.534		BNE 1069780.00	0.731
BNE 1062020.00	1.167		BNE 1070277.50	2836		BNE 1023570.00	1.477		BNE 1070025.00	0.707
BNE 1062535.00	1.166		BNE 1070785.00	2836		BNE 1023825.00	1.455		BNE 1070277.50	0.716
BNE 1062940.00	1.168		BNE 1071280.00	2836		BNE 1024080.00	1.433		BNE 1070530.00	0.724
BNE 1063125.00	1.177		BNE 1071767.50	2836		BNE 1024321.50	1.401		BNE 1070785.00	0.713
BNE 1063125.00	1.177		BNE 1072017.50	2836		BNE 1024563.00	1.37		BNE 1071040.00	0.702
BNE 1063310.00	1.156		BNE 1072267.50	3030		BNE 1024816.50	1.296		BNE 1071280.00	0.592
BNE 1063645.00	1.127		BNE 1072755.00	3040		BNE 1025070.00	1.23		BNE 1071520.00	0.511
BNE 1064000.00	1.128		BNE 1073240.00	3050		BNE 1025215.00	1.308		BNE 1071767.50	0.57
BNE 1064490.00	1.114		BNE 1073742.50	3060		BNE 1025360.00	1.397		BNE 1072015.00	0.644
BNE 1065010.00	1.116		BNE 1074230.00	3068		BNE 1025475.00	1.49		BNE 1072017.50	0.644
BNE 1065503.00	1.11		BNE 1074722.50	3073		BNE 1025590.00	1.596		BNE 1072020.00	0.644
BNE 1065990.00	1.112		BNE 1075232.50	3076		BNE 1025880.00	1.493		BNE 1072020.00	0.686
BNE 1066505.00	1.102		BNE 1075740.00	3076		BNE 1026170.00	1.402		BNE 1072267.50	0.673
BNE 1067020.00	1.098		BNE 1076247.50	3073		BNE 1026425.00	1.38		BNE 1072515.00	0.659
BNE 1067485.00	1.084		BNE 1076752.50	3069		BNE 1026680.00	1.359		BNE 1072755.00	0.643
BNE 1067965.00	1.072		BNE 1077260.00	3063		BNE 1026790.00	1.402		BNE 1072995.00	0.626
BNE 1068660.00	1.054		BNE 1077775.00	3060		BNE 1026900.00	1.448		BNE 1073240.00	0.659
BNE 1069045.00	1.046		BNE 1078282.50	3058		BNE 1027030.00	1.456		BNE 1073485.00	0.694
BNE 1069535.00	1.039		BNE 1078592.50	3058		BNE 1027160.00	1.464		BNE 1073742.50	0.684
BNE 1070025.00	1.031								BNE 1074000.00	0.674
BNE 1070530.00	1.018								BNE 1074230.00	0.67
BNE 1071040.00	1.007								BNE 1074460.00	0.665
BNE 1071520.00	1.009								BNE 1074722.50	0.7
BNE 1072015.00	0.994								BNE 1074985.00	0.738
BNE 1072020.00	0.994								BNE 1075232.50	0.67
BNE 1072020.00	0.994								BNE 1075480.00	0.613
BNE 1072515.00	0.989								BNE 1075740.00	0.514
BNE 1072995.00	1.005								BNE 1076000.00	0.443
BNE 1073485.00	1.019								BNE 1076247.50	0.501
BNE 1074000.00	1.038								BNE 1076495.00	0.578
BNE 1074460.00	1.053								BNE 1076752.50	0.475
BNE 1074985.00	1.066								BNE 1077010.00	0.404
BNE 1075480.00	1.079								BNE 1077260.00	0.346
BNE 1076000.00	1.081								BNE 1077510.00	0.303
BNE 1076495.00	1.065								BNE 1077775.00	0.311
BNE 1077010.00	1.041								BNE 1078040.00	0.32
BNE 1077510.00	1.009								BNE 1078282.50	0.384
BNE 1078040.00	0.97								BNE 1078525.00	0.482
BNE 1078525.00	0.92								BNE 1078592.50	0.107
BNE 1078660.00	0.918								BNE 1078660.00	0.06

Appendix B Mike11 Results Q20

MIKE 11 RESULTS - BRISBANE RIVER MODEL

Q20 event CRCFORGE rainfall with ARF's

30hr Storm Duration

Chainage [m]	Water Level	Chainage [m]	Discharge	Chainage [m]	Velocity [m/s]	Chainage [m]	Velocity [m/s]
BNE 931570.00	36.092	BNE 931575.00	1900	BNE 931570.00 \	1.43	BNE 1031995.00 \	1.466
BNE 931580.00	36.086	BNE 932625.00	1900	BNE 931575.00 \	1.431	BNE 1032112.50 \	1.434
BNE 933670.00	35.012	BNE 933970.00	1899	BNE 931580.00 \	1.43	BNE 1032230.00 \	1.403
BNE 934270.00	34.872	BNE 934445.00	1898	BNE 932625.00 \	1.434	BNE 1032407.50 \	1.453
BNE 934620.00	34.682	BNE 935345.00	1897	BNE 933670.00 \	1.443	BNE 1032585.00 \	1.507
BNE 936070.00	34.425	BNE 936445.00	1892	BNE 933970.00 \	1.036	BNE 1032832.50 \	1.485
BNE 936820.00	34.396	BNE 938295.00	1888	BNE 934270.00 \	1.587	BNE 1033080.00 \	1.463
BNE 939770.00	34.112	BNE 941045.00	1884	BNE 934445.00 \	1.981	BNE 1033225.00 \	1.501
BNE 942320.00	33.011	BNE 942945.00	1882	BNE 934620.00 \	2.748	BNE 1033370.00 \	1.54
BNE 943570.00	32.583	BNE 943845.00	1879	BNE 935345.00 \	1.021	BNE 1033635.00 \	1.588
BNE 944120.00	32.358	BNE 944845.00	1875	BNE 936070.00 \	0.512	BNE 1033900.00 \	1.639
BNE 945570.00	31.847	BNE 946370.00	1870	BNE 936445.00 \	0.491	BNE 1034135.00 \	1.643
BNE 947170.00	31.331	BNE 947720.00	1867	BNE 936820.00 \	1.532	BNE 1034370.00 \	1.646
BNE 948270.00	30.878	BNE 949270.00	1863	BNE 938295.00 \	0.656	BNE 1034630.00 \	1.581
BNE 950270.00	30.291	BNE 951295.00	1859	BNE 939770.00 \	1.551	BNE 1034890.00 \	1.521
BNE 952320.00	29.686	BNE 953095.00	1858	BNE 941045.00 \	1.172	BNE 1035152.00 \	1.554
BNE 953870.00	29.278	BNE 954395.00	1855	BNE 942320.00 \	1.282	BNE 1035414.00 \	1.589
BNE 954920.00	28.889	BNE 955445.00	1853	BNE 942945.00 \	0.992	BNE 1035657.00 \	1.635
BNE 955970.00	28.37	BNE 957370.00	1852	BNE 943570.00 \	0.883	BNE 1035900.00 \	1.684
BNE 958770.00	27.199	BNE 959470.00	1849	BNE 943845.00 \	0.935	BNE 1036180.00 \	1.655
BNE 960170.00	26.762	BNE 961120.00	1846	BNE 944120.00 \	1.123	BNE 1036460.00 \	1.627
BNE 962070.00	25.787	BNE 963120.00	1844	BNE 944845.00 \	0.973	BNE 1036615.00 \	1.564
BNE 964170.00	24.273	BNE 965390.00	1839	BNE 945570.00 \	1.283	BNE 1036770.00 \	1.507
BNE 966610.00	22.579	BNE 967010.00	1837	BNE 946370.00 \	1.029	BNE 1036842.50 \	1.525
BNE 967410.00	22.209	BNE 968600.00	1834	BNE 947170.00 \	1.142	BNE 1036915.00 \	1.543
BNE 969790.00	21.405	BNE 970475.00	1832	BNE 947720.00 \	1.181	BNE 1037002.50 \	1.459
BNE 971160.00	21.052	BNE 971710.00	1831	BNE 948270.00 \	1.222	BNE 1037090.00 \	1.384
BNE 972260.00	20.835	BNE 972760.00	1829	BNE 949270.00 \	0.984	BNE 1037110.00 \	1.729
BNE 973260.00	20.792	BNE 973920.00	1827	BNE 950270.00 \	0.828	BNE 1037175.00 \	1.391
BNE 974580.00	20.696	BNE 975300.00	1826	BNE 951295.00 \	0.976	BNE 1037230.00 \	1.478
BNE 976020.00	20.612	BNE 976385.00	1824	BNE 952320.00 \	1.189	BNE 1037285.00 \	1.578
BNE 976750.00	20.525	BNE 977515.00	1823	BNE 953095.00 \	0.997	BNE 1037455.00 \	1.498
BNE 978280.00	19.563	BNE 978893.50	1823	BNE 953870.00 \	0.858	BNE 1037625.00 \	1.426
BNE 979507.00	17.623	BNE 979510.00	1845	BNE 954395.00 \	0.998	BNE 1037855.00 \	1.323
BNE 979513.00	17.594	BNE 979521.50	1843	BNE 954920.00 \	1.435	BNE 1038085.00 \	1.233
BNE 979530.00	17.561	BNE 979930.00	1822	BNE 955445.00 \	1.236	BNE 1038342.50 \	1.305
BNE 980330.00	17.275	BNE 980995.00	1820	BNE 955970.00 \	1.285	BNE 1038600.00 \	1.387
BNE 981660.00	16.907	BNE 982060.00	1819	BNE 957370.00 \	1.202	BNE 1038850.00 \	1.384
BNE 982460.00	16.754	BNE 983310.00	1819	BNE 958770.00 \	1.131	BNE 1039100.00 \	1.381
BNE 984160.00	16.369	BNE 984710.00	1818	BNE 959470.00 \	0.914	BNE 1039150.00 \	1.364
BNE 985260.00	15.984	BNE 985870.00	1818	BNE 960170.00 \	0.793	BNE 1039200.00 \	1.347
BNE 986480.00	15.366	BNE 987220.00	1818	BNE 961120.00 \	1.008	BNE 1039200.00 \	1.347
BNE 987960.00	14.481	BNE 988060.00	1818	BNE 962070.00 \	1.479	BNE 1039382.50 \	1.295
BNE 988160.00	14.227	BNE 988165.00	1818	BNE 963120.00 \	1.169	BNE 1039565.00 \	1.247
BNE 988170.00	14.188	BNE 988265.00	1818	BNE 964170.00 \	1.002	BNE 1039617.50 \	1.219
BNE 988360.00	13.939	BNE 989030.00	1818	BNE 965390.00 \	1.156	BNE 1039670.00 \	1.193
BNE 989700.00	12.966	BNE 990200.00	1818	BNE 966610.00 \	1.459	BNE 1039670.00 \	1.193
BNE 990700.00	12.738	BNE 990730.00	1818	BNE 967010.00 \	1.177	BNE 1039749.00 \	1.162
BNE 990760.00	12.721	BNE 991235.00	1819	BNE 967410.00 \	0.987	BNE 1039828.00 \	1.132
BNE 991710.00	12.557	BNE 992065.00	1819	BNE 968600.00 \	1.092	BNE 1039828.00 \	1.117
BNE 992420.00	12.444	BNE 992435.00	1820	BNE 969790.00 \	1.225	BNE 1039959.00 \	1.091
BNE 992450.00	12.429	BNE 992460.00	1820	BNE 970475.00 \	1.206	BNE 1040090.00 \	1.066
BNE 992470.00	12.419	BNE 992570.00	1820	BNE 971160.00 \	1.189	BNE 1040170.00 \	1.124
BNE 992670.00	12.365	BNE 993215.00	1821	BNE 971710.00 \	1.174	BNE 1040250.00 \	1.188
BNE 993760.00	12.047	BNE 994260.00	1821	BNE 972260.00 \	1.931	BNE 1040250.00 \	1.188
BNE 994760.00	11.824	BNE 995225.00	1823	BNE 972760.00 \	0.908	BNE 1040370.00 \	1.293
BNE 995690.00	11.569	BNE 996335.00	1825	BNE 973260.00 \	0.73	BNE 1040490.00 \	1.418
BNE 996980.00	11.111	BNE 997720.00	1828	BNE 973920.00 \	0.931	BNE 1040750.00 \	1.268
BNE 998460.00	10.919	BNE 998810.00	1833	BNE 974580.00 \	1.285	BNE 1041010.00 \	1.147
BNE 999160.00	10.86	BNE 999580.00	1835	BNE 975300.00 \	1.144	BNE 1041120.00 \	1.158
BNE 1000000.00	10.773	BNE 1000142.50	1939	BNE 976020.00 \	1.03	BNE 1041230.00 \	1.17
BNE 1000285.00	10.699	BNE 1000530.00	1937	BNE 976385.00 \	0.907	BNE 1041345.00 \	1.189
BNE 1000775.00	10.602	BNE 1001045.00	1935	BNE 976750.00 \	1.023	BNE 1041460.00 \	1.209
BNE 1001315.00	10.536	BNE 1001590.00	1931	BNE 977515.00 \	0.973	BNE 1041580.00 \	1.11
BNE 1001865.00	10.42	BNE 1002107.50	1929	BNE 978280.00 \	1.222	BNE 1041700.00 \	1.025
BNE 1002350.00	10.339	BNE 1002567.50	1927	BNE 978893.50 \	1.173	BNE 1041830.00 \	1.178
BNE 1002785.00	10.32	BNE 1003030.00	1924	BNE 979507.00 \	1.138	BNE 1041960.00 \	1.386
BNE 1003275.00	10.249	BNE 1003525.00	1922	BNE 979510.00 \	1.355	BNE 1042097.50 \	1.426
BNE 1003775.00	10.192	BNE 1004037.50	1920	BNE 979513.00 \	1.178	BNE 1042235.00 \	1.468
BNE 1004300.00	10.071	BNE 1004555.00	1918	BNE 979521.50 \	1.24	BNE 1042367.50 \	1.377
BNE 1004810.00	10.032	BNE 1005067.50	1915	BNE 979530.00 \	1.309	BNE 1042500.00 \	1.297
BNE 1005325.00	9.967	BNE 1005577.50	1910	BNE 979930.00 \	1.236	BNE 1042500.00 \	1.297
BNE 1005870.00	9.885	BNE 1006035.00	2104	BNE 980330.00 \	1.305	BNE 1042507.50 \	1.292
BNE 1005870.00	9.885	BNE 1006250.00	3606	BNE 980995.00 \	1.167	BNE 1042515.00 \	1.287
BNE 1006200.00	9.849	BNE 1006605.00	3604	BNE 981660.00 \	1.151	BNE 1042712.50 \	1.348
BNE 1006200.00	9.849	BNE 1007160.00	3599	BNE 982060.00 \	1.128	BNE 1042910.00 \	1.415
BNE 1006300.00	9.82	BNE 1007595.00	3595	BNE 982460.00 \	1.107	BNE 1042960.00 \	1.418
BNE 1006300.00	9.82	BNE 1007850.00	3588	BNE 983310.00 \	1.066	BNE 1043010.00 \	1.42
BNE 1006910.00	9.618	BNE 1008182.50	3587	BNE 984160.00 \	1.027	BNE 1043010.00 \	1.42
BNE 1007410.00	9.509	BNE 1008685.00	3584	BNE 984710.00 \	1.078	BNE 1043045.00 \	1.422
BNE 1007780.00	9.364	BNE 1009162.50	3582	BNE 985260.00 \	1.134	BNE 1043080.00 \	1.423
BNE 1007780.00	9.364	BNE 1009560.00	3581	BNE 985870.00 \	1.181	BNE 1043095.00 \	1.419
BNE 1007920.00	9.295	BNE 1010105.00	3577	BNE 986480.00 \	1.231	BNE 1043110.00 \	1.414
BNE 1008445.00	9.282	BNE 1010607.50	3575	BNE 987220.00 \	1.09	BNE 1043110.00 \	1.414
BNE 1008925.00	9.232	BNE 1010852.50	3574	BNE 987960.00 \	0.978	BNE 1043417.50 \	1.319
BNE 1009400.00	9.133	BNE 1011245.00	3572	BNE 988060.00 \	1.197	BNE 1043725.00 \	1.236
BNE 1009720.00	9.058	BNE 1011745.00	3568	BNE 988160.00 \	1.542	BNE 1043892.50 \	1.209
BNE 1010490.00	8.892	BNE 1012227.50	3564	BNE 988165.00 \	3.447	BNE 1044060.00 \	1.182
BNE 1010725.00	8.915	BNE 1012705.00	3555	BNE 988170.00 \	1.55	BNE 1044200.00 \	1.254
BNE 1010980.00	8.889	BNE 1013062.50	3552	BNE 988265.00 \	1.276	BNE 1044340.00 \	1.335
BNE 1011510.00	8.887	BNE 1013317.50	3551	BNE 988360.00 \	1.084	BNE 1044472.50 \	1.274
BNE 1011980.00	8.881	BNE 1013562.50	3549	BNE 989030.00 \	1.019	BNE 1044605.00 \	1.219
BNE 1012475.00	8.864	BNE 1013795.00	3547	BNE 989700.00 \	0.962	BNE 1044732.50 \	1.172

BNE 1012475.00	8.864		BNE 1014110.00	3544	BNE 990200.00 \	1.039	BNE 1044860.00 \	1.129
BNE 1012935.00	8.838		BNE 1014460.00	3542	BNE 990700.00 \	1.129	BNE 1045130.00 \	1.128
BNE 1013190.00	8.826		BNE 1014850.00	3532	BNE 990730.00 \	1.153	BNE 1045400.00 \	1.126
BNE 1013190.00	8.826		BNE 1015325.00	3530	BNE 990760.00 \	1.178	BNE 1045642.50 \	1.159
BNE 1013445.00	8.812		BNE 1015705.00	3530	BNE 991235.00 \	0.851	BNE 1045885.00 \	1.195
BNE 1013680.00	8.8		BNE 1015995.00	3529	BNE 991710.00 \	0.667	BNE 1046032.50 \	1.029
BNE 1013680.00	8.8		BNE 1016390.00	3528	BNE 992065.00 \	0.692	BNE 1046180.00 \	0.904
BNE 1013910.00	8.782		BNE 1016765.00	3527	BNE 992420.00 \	0.72	BNE 1046260.00 \	0.917
BNE 1014310.00	8.704		BNE 1017010.00	3526	BNE 992435.00 \	0.791	BNE 1046340.00 \	0.931
BNE 1014610.00	8.574		BNE 1017370.00	3524	BNE 992450.00 \	0.878	BNE 1046460.00 \	0.952
BNE 1014610.00	8.574		BNE 1017765.00	3523	BNE 992460.00 \	1.136	BNE 1046580.00 \	0.975
BNE 1015090.00	8.479		BNE 1018060.00	3522	BNE 992470.00 \	0.879	BNE 1046740.00 \	1.11
BNE 1015560.00	8.381		BNE 1018462.50	3520	BNE 992570.00 \	0.959	BNE 1046900.00 \	1.29
BNE 1015850.00	8.331		BNE 1018910.00	3519	BNE 992670.00 \	1.055	BNE 1047125.00 \	1.372
BNE 1015850.00	8.331		BNE 1019292.50	3519	BNE 993215.00 \	1.214	BNE 1047350.00 \	1.464
BNE 1016140.00	8.279		BNE 1019677.50	3518	BNE 993760.00 \	1.429	BNE 1047632.50 \	1.411
BNE 1016640.00	8.112		BNE 1019990.00	3518	BNE 994260.00 \	1.169	BNE 1047915.00 \	1.362
BNE 1016890.00	7.995		BNE 1020320.00	3516	BNE 994760.00 \	0.99	BNE 1048145.00 \	1.186
BNE 1016890.00	7.995		BNE 1020677.50	3514	BNE 995225.00 \	1.092	BNE 1048375.00 \	1.05
BNE 1017130.00	7.876		BNE 1020962.50	3514	BNE 995690.00 \	1.218	BNE 1048632.50 \	1.225
BNE 1017610.00	7.749		BNE 1021317.00	3513	BNE 996335.00 \	1.271	BNE 1048890.00 \	1.47
BNE 1017920.00	7.649		BNE 1021627.00	3512	BNE 996980.00 \	1.33	BNE 1049005.00 \	1.366
BNE 1018200.00	7.642		BNE 1021805.00	3512	BNE 997720.00 \	0.919	BNE 1049120.00 \	1.275
BNE 1018725.00	7.51		BNE 1022000.00	3511	BNE 998460.00 \	0.704	BNE 1049245.00 \	1.363
BNE 1019095.00	7.44		BNE 1022340.00	3510	BNE 998810.00 \	0.936	BNE 1049370.00 \	1.463
BNE 1019490.00	7.395		BNE 1022807.50	3518	BNE 999160.00 \	1.396	BNE 1049480.00 \	1.401
BNE 1019490.00	7.395		BNE 1023305.00	3517	BNE 999580.00 \	1.135	BNE 1049590.00 \	1.344
BNE 1019865.00	7.278		BNE 1023825.00	3516	BNE 1000000.00	0.959	BNE 1049730.00 \	1.398
BNE 1020115.00	7.285		BNE 1024321.50	3515	BNE 1000142.50	1.088	BNE 1049870.00 \	1.456
BNE 1020525.00	7.248		BNE 1024816.50	3514	BNE 1000285.00	1.254	BNE 1050150.00 \	1.429
BNE 1020830.00	7.174		BNE 1025215.00	3513	BNE 1000530.00	1.259	BNE 1050430.00 \	1.403
BNE 1021095.00	7.061		BNE 1025475.00	3512	BNE 1000775.00	1.264	BNE 1050645.00 \	1.444
BNE 1021539.00	6.892		BNE 1025880.00	3512	BNE 1001045.00	1.2	BNE 1050860.00 \	1.488
BNE 1021715.00	6.859		BNE 1026425.00	3511	BNE 1001315.00	1.142	BNE 1051110.00 \	1.382
BNE 1021895.00	6.797		BNE 1026790.00	3510	BNE 1001590.00	1.33	BNE 1051360.00 \	1.29
BNE 1022105.00	6.726		BNE 1027030.00	3510	BNE 1001865.00	1.592	BNE 1051627.50 \	1.461
BNE 1022575.00	6.622		BNE 1027420.00	3509	BNE 1002107.50	1.591	BNE 1051895.00 \	1.685
BNE 1023040.00	6.487		BNE 1027930.00	3508	BNE 1002350.00	1.59	BNE 1052102.50 \	1.445
BNE 1023570.00	6.449		BNE 1028430.00	3506	BNE 1002567.50	1.341	BNE 1052310.00 \	1.264
BNE 1024080.00	6.397		BNE 1028720.00	3506	BNE 1002785.00	1.159	BNE 1052370.00 \	2.083
BNE 1024563.00	6.351		BNE 1028980.00	3505	BNE 1003030.00	1.277	BNE 1052390.00 \	1.486
BNE 1025070.00	6.323		BNE 1029440.00	3504	BNE 1003275.00	1.422	BNE 1052492.50 \	1.503
BNE 1025360.00	6.265		BNE 1029950.00	3503	BNE 1003525.00	1.339	BNE 1052595.00 \	1.52
BNE 1025590.00	6.186		BNE 1030545.00	3500	BNE 1003775.00	1.265	BNE 1052625.00 \	1.921
BNE 1026170.00	6.062		BNE 1031065.00	3499	BNE 1004037.50	1.395	BNE 1052640.00 \	1.324
BNE 1026680.00	5.962		BNE 1031480.00	3499	BNE 1004300.00	1.555	BNE 1052752.50 \	1.353
BNE 1026900.00	5.897		BNE 1031847.50	3498	BNE 1004555.00	1.258	BNE 1052865.00 \	1.384
BNE 1027160.00	5.834		BNE 1032112.50	3498	BNE 1004810.00	1.057	BNE 1053092.50 \	1.298
BNE 1027680.00	5.797		BNE 1032407.50	3497	BNE 1005067.50	1.112	BNE 1053320.00 \	1.222
BNE 1028180.00	5.78		BNE 1032832.50	3497	BNE 1005325.00	1.173	BNE 1053355.00 \	1.592
BNE 1028680.00	5.694		BNE 1033225.00	3496	BNE 1005597.50	1.25	BNE 1053385.00 \	1.463
BNE 1028760.00	5.605		BNE 1033635.00	3495	BNE 1005870.00	1.338	BNE 1053642.50 \	1.438
BNE 1029200.00	5.526		BNE 1034135.00	3495	BNE 1005870.00	1.338	BNE 1053900.00 \	1.414
BNE 1029680.00	5.516		BNE 1034630.00	3494	BNE 1006035.00	1.201	BNE 1054270.00 \	0.992
BNE 1030220.00	5.503		BNE 1035152.00	3493	BNE 1006200.00	1.09	BNE 1054640.00 \	0.764
BNE 1030870.00	5.465		BNE 1035657.00	3492	BNE 1006200.00	1.636	BNE 1054660.00 \	1.153
BNE 1031260.00	5.406		BNE 1036180.00	3491	BNE 1006250.00	1.604	BNE 1054680.00 \	0.727
BNE 1031700.00	5.308		BNE 1036615.00	3490	BNE 1006300.00	1.573	BNE 1054825.00 \	0.931
BNE 1031995.00	5.3		BNE 1036842.50	3490	BNE 1006300.00	1.573	BNE 1054970.00 \	1.295
BNE 1032230.00	5.227		BNE 1037002.50	3490	BNE 1006605.00	1.575	BNE 1055125.00 \	1.276
BNE 1032585.00	5.094		BNE 1037110.00	3490	BNE 1006910.00	1.578	BNE 1055280.00 \	1.257
BNE 1033080.00	4.999		BNE 1037230.00	3490	BNE 1007160.00	1.477	BNE 1055350.00 \	1.268
BNE 1033370.00	4.951		BNE 1037455.00	3489	BNE 1007410.00	1.388	BNE 1055420.00 \	1.278
BNE 1033900.00	4.841		BNE 1037855.00	3488	BNE 1007595.00	1.555	BNE 1055690.00 \	1.214
BNE 1034370.00	4.74		BNE 1038342.50	3487	BNE 1007780.00	1.768	BNE 1055960.00 \	1.156
BNE 1034890.00	4.674		BNE 1038850.00	3485	BNE 1007780.00	1.764	BNE 1056180.00 \	1.295
BNE 1035414.00	4.591		BNE 1039150.00	3483	BNE 1007850.00	1.864	BNE 1056400.00 \	1.474
BNE 1035900.00	4.483		BNE 1039382.50	3482	BNE 1007920.00	1.977	BNE 1056547.50 \	1.4
BNE 1036460.00	4.354		BNE 1039617.50	3482	BNE 1008182.50	1.752	BNE 1056695.00 \	1.333
BNE 1036770.00	4.282		BNE 1039749.00	3481	BNE 1008445.00	1.574	BNE 1056780.00 \	0.518
BNE 1036915.00	4.252		BNE 1039959.00	3450	BNE 1008685.00	1.575	BNE 1056865.00 \	0.321
BNE 1037090.00	4.266		BNE 1040170.00	3450	BNE 1008925.00	1.575	BNE 1056920.00 \	1.504
BNE 1037175.00	4.106		BNE 1040370.00	3449	BNE 1009162.50	1.579	BNE 1056950.00 \	0.332
BNE 1037285.00	4.075		BNE 1040750.00	3449	BNE 1009400.00	1.583	BNE 1057020.00 \	0.496
BNE 1037625.00	4.058		BNE 1041120.00	3449	BNE 1009560.00	1.56	BNE 1057090.00 \	0.977
BNE 1038085.00	4.04		BNE 1041345.00	3449	BNE 1009720.00	1.537	BNE 1057310.00 \	1.055
BNE 1038600.00	3.99		BNE 1041580.00	3449	BNE 1010105.00	1.688	BNE 1057530.00 \	1.147
BNE 1039100.00	3.954		BNE 1041830.00	3448	BNE 1010490.00	1.874	BNE 1057785.00 \	1.261
BNE 1039200.00	3.954		BNE 1042097.50	3448	BNE 1010607.50	1.738	BNE 1058040.00 \	1.401
BNE 1039200.00	3.954		BNE 1042367.50	3448	BNE 1010725.00	1.62	BNE 1058135.00 \	1.399
BNE 1039565.00	3.952		BNE 1042507.50	3448	BNE 1010852.50	1.648	BNE 1058230.00 \	1.398
BNE 1039670.00	3.956		BNE 1042712.50	3448	BNE 1010980.00	1.676	BNE 1058380.00 \	1.381
BNE 1039670.00	3.956		BNE 1042960.00	3448	BNE 1011245.00	1.597	BNE 1058530.00 \	1.365
BNE 1039828.00	3.959		BNE 1043045.00	3448	BNE 1011510.00	1.523	BNE 1058632.50 \	1.294
BNE 1039828.00	3.959		BNE 1043095.00	3448	BNE 1011745.00	1.49	BNE 1058735.00 \	1.23
BNE 1040090.00	3.96		BNE 1043417.50	3448	BNE 1011980.00	1.458	BNE 1058885.00 \	1.311
BNE 1040250.00	3.943		BNE 1043892.50	3448	BNE 1012227.50	1.441	BNE 1059035.00 \	1.404
BNE 1040250.00	3.943		BNE 1044200.00	3448	BNE 1012475.00	1.424	BNE 1059287.50 \	1.228
BNE 1040490.00	3.906		BNE 1044472.50	3447	BNE 1012475.00	1.419	BNE 1059540.00 \	1.092
BNE 1041010.00	3.917		BNE 1044732.50	3447	BNE 1012705.00	1.432	BNE 1059765.00 \	1.108
BNE 1041230.00	3.895		BNE 1045130.00	3447	BNE 1012935.00	1.445	BNE 1059990.00 \	1.126
BNE 1041460.00	3.865		BNE 1045642.50	3447	BNE 1013062.50	1.434	BNE 1060167.50 \	1.178
BNE 1041700.00	3.868		BNE 1046032.50	3447	BNE 1013190.00	1.422	BNE 1060345.00 \	1.235
BNE 1041960.00	3.804		BNE 1046260.00	3447	BNE 1013190.00	1.422	BNE 1060440.00 \	1.285
BNE 1042235.00	3.731		BNE 1046460.00	3447	BNE 1013317.50	1.41	BNE 1060535.00 \	1.339
BNE 1042500.00	3.698		BNE 1046740.00	3447	BNE 1013445.00	1.398	BNE 1060775.00 \	1.281
BNE 1042500.00	3.698		BNE 1047125.00	3447	BNE 1013562.50	1.371	BNE 1061015.00 \	1.227
BNE 1042515.00	3.697		BNE 1047632.50	3447	BNE 1013680.00	1.344	BNE 1061272.50 \	1.26
BNE 1042910.00	3.584		BNE 1048145.00	3447	BNE 1013680.00	1.344	BNE 1061530.00 \	1.295

BNE 1043010.00	3.549			BNE 1048632.50	3446		BNE 1013795.00	1.328		BNE 1061775.00 \	1.228
BNE 1043010.00	3.549			BNE 1049005.00	3446		BNE 1013910.00	1.311		BNE 1062020.00 \	1.167
BNE 1043080.00	3.524			BNE 1049245.00	3446		BNE 1014110.00	1.337		BNE 1062277.50 \	1.089
BNE 1043110.00	3.516			BNE 1049480.00	3446		BNE 1014310.00	1.364		BNE 1062535.00 \	1.021
BNE 1043110.00	3.516			BNE 1049730.00	3446		BNE 1014460.00	1.367		BNE 1062737.50 \	0.919
BNE 1043725.00	3.379			BNE 1050150.00	3446		BNE 1014610.00	1.371		BNE 1062940.00 \	0.835
BNE 1044060.00	3.337			BNE 1050645.00	3446		BNE 1014610.00	1.365		BNE 1063032.50 \	0.846
BNE 1044340.00	3.284			BNE 1051110.00	3447		BNE 1014850.00	1.23		BNE 1063125.00 \	0.858
BNE 1044605.00	3.265			BNE 1051627.50	3447		BNE 1015090.00	1.121		BNE 1063125.00 \	0.858
BNE 1044860.00	3.248			BNE 1052102.50	3447		BNE 1015325.00	1.257		BNE 1063217.50 \	0.877
BNE 1045400.00	3.206			BNE 1052370.00	3447		BNE 1015560.00	1.43		BNE 1063310.00 \	0.898
BNE 1045885.00	3.17			BNE 1052492.50	3447		BNE 1015705.00	1.412		BNE 1063477.50 \	1.039
BNE 1046180.00	3.19			BNE 1052625.00	3447		BNE 1015850.00	1.394		BNE 1063645.00 \	1.234
BNE 1046340.00	3.184			BNE 1052752.50	3447		BNE 1015850.00	1.394		BNE 1063822.50 \	1.194
BNE 1046580.00	3.162			BNE 1053092.50	3447		BNE 1015995.00	1.377		BNE 1064000.00 \	1.156
BNE 1046900.00	3.055			BNE 1053355.00	3447		BNE 1016140.00	1.361		BNE 1064245.00 \	1.17
BNE 1047350.00	2.853			BNE 1053642.50	3447		BNE 1016390.00	1.462		BNE 1064490.00 \	1.183
BNE 1047915.00	2.729			BNE 1054270.00	3447		BNE 1016640.00	1.58		BNE 1064750.00 \	1.047
BNE 1048375.00	2.73			BNE 1054660.00	3447		BNE 1016765.00	1.623		BNE 1065010.00 \	0.939
BNE 1048890.00	2.631			BNE 1054825.00	3447		BNE 1016890.00	1.668		BNE 1065256.50 \	0.9
BNE 1049120.00	2.621			BNE 1055125.00	3447		BNE 1016890.00	1.668		BNE 1065503.00 \	0.863
BNE 1049370.00	2.56			BNE 1055350.00	3447		BNE 1017010.00	1.732		BNE 1065746.50 \	0.755
BNE 1049590.00	2.548			BNE 1055690.00	3447		BNE 1017130.00	1.802		BNE 1065990.00 \	0.671
BNE 1049870.00	2.496			BNE 1056180.00	3447		BNE 1017370.00	1.719		BNE 1066247.50 \	0.721
BNE 1050430.00	2.433			BNE 1056547.50	3447		BNE 1017610.00	1.643		BNE 1066505.00 \	0.779
BNE 1050860.00	2.387			BNE 1056780.00	3447		BNE 1017765.00	1.698		BNE 1066762.50 \	0.759
BNE 1051360.00	2.393			BNE 1056920.00	3447		BNE 1017920.00	1.756		BNE 1067020.00 \	0.741
BNE 1051895.00	2.319			BNE 1057020.00	3447		BNE 1018060.00	1.546		BNE 1067252.50 \	0.809
BNE 1052310.00	2.371			BNE 1057310.00	3447		BNE 1018200.00	1.382		BNE 1067485.00 \	0.892
BNE 1052390.00	2.315			BNE 1057785.00	3447		BNE 1018462.50	1.475		BNE 1067725.00 \	0.921
BNE 1052595.00	2.309			BNE 1058135.00	3447		BNE 1018725.00	1.582		BNE 1067965.00 \	0.951
BNE 1052640.00	2.226			BNE 1058380.00	3447		BNE 1018910.00	1.565		BNE 1068312.50 \	0.985
BNE 1052865.00	2.215			BNE 1058632.50	3447		BNE 1019095.00	1.548		BNE 1068660.00 \	1.021
BNE 1053320.00	2.226			BNE 1058885.00	3447		BNE 1019292.50	1.438		BNE 1068852.50 \	1.007
BNE 1053385.00	2.144			BNE 1059287.50	3447		BNE 1019490.00	1.342		BNE 1069045.00 \	0.994
BNE 1053900.00	2.038			BNE 1059765.00	3447		BNE 1019490.00	1.342		BNE 1069290.00 \	0.953
BNE 1054640.00	1.999			BNE 1060167.50	3447		BNE 1019677.50	1.461		BNE 1069535.00 \	0.915
BNE 1054680.00	1.976			BNE 1060440.00	3447		BNE 1019865.00	1.604		BNE 1069780.00 \	0.885
BNE 1054970.00	1.897			BNE 1060775.00	3447		BNE 1019990.00	1.343		BNE 1070025.00 \	0.857
BNE 1055280.00	1.858			BNE 1061272.50	3447		BNE 1020115.00	1.154		BNE 1070277.50 \	0.867
BNE 1055420.00	1.834			BNE 1061775.00	3447		BNE 1020320.00	0.973		BNE 1070530.00 \	0.877
BNE 1055960.00	1.791			BNE 1062277.50	3447		BNE 1020525.00	0.841		BNE 1070785.00 \	0.864
BNE 1056400.00	1.71			BNE 1062737.50	3447		BNE 1020677.50	0.969		BNE 1071040.00 \	0.851
BNE 1056695.00	1.693			BNE 1063032.50	3447		BNE 1020830.00	1.143		BNE 1071280.00 \	0.717
BNE 1056865.00	1.742			BNE 1063217.50	3449		BNE 1020962.50	1.306		BNE 1071520.00 \	0.62
BNE 1056950.00	1.715			BNE 1063477.50	3449		BNE 1021095.00	1.523		BNE 1071767.50 \	0.691
BNE 1057090.00	1.681			BNE 1063822.50	3449		BNE 1021317.00	1.501		BNE 1072015.00 \	0.781
BNE 1057530.00	1.65			BNE 1064245.00	3449		BNE 1021539.00	1.479		BNE 1072017.50 \	0.781
BNE 1058040.00	1.576			BNE 1064750.00	3449		BNE 1021627.00	1.363		BNE 1072020.00 \	0.781
BNE 1058230.00	1.557			BNE 1065256.50	3449		BNE 1021715.00	1.263		BNE 1072020.00 \	0.795
BNE 1058530.00	1.537			BNE 1065746.50	3449		BNE 1021805.00	1.267		BNE 1072267.50 \	0.781
BNE 1058735.00	1.539			BNE 1066247.50	3449		BNE 1021895.00	1.271		BNE 1072515.00 \	0.765
BNE 1059035.00	1.484			BNE 1066762.50	3449		BNE 1022000.00	1.309		BNE 1072755.00 \	0.747
BNE 1059540.00	1.458			BNE 1067252.50	3450		BNE 1022105.00	1.35		BNE 1072995.00 \	0.728
BNE 1059990.00	1.387			BNE 1067725.00	3450		BNE 1022340.00	1.374		BNE 1073240.00 \	0.766
BNE 1060345.00	1.327			BNE 1068312.50	3450		BNE 1022575.00	1.402		BNE 1073485.00 \	0.807
BNE 1060535.00	1.302			BNE 1068852.50	3449		BNE 1022807.50	1.579		BNE 1073742.50 \	0.797
BNE 1061015.00	1.291			BNE 1069290.00	3449		BNE 1023040.00	1.805		BNE 1074000.00 \	0.786
BNE 1061530.00	1.269			BNE 1069780.00	3449		BNE 1023305.00	1.727		BNE 1074230.00 \	0.782
BNE 1062020.00	1.261			BNE 1070277.50	3449		BNE 1023570.00	1.656		BNE 1074460.00 \	0.777
BNE 1062535.00	1.254			BNE 1070785.00	3449		BNE 1023825.00	1.622		BNE 1074722.50 \	0.818
BNE 1062940.00	1.252			BNE 1071280.00	3449		BNE 1024080.00	1.589		BNE 1074985.00 \	0.863
BNE 1063125.00	1.232			BNE 1071767.50	3449		BNE 1024321.50	1.55		BNE 1075232.50 \	0.784
BNE 1063125.00	1.232			BNE 1072017.50	3450		BNE 1024563.00	1.512		BNE 1075480.00 \	0.718
BNE 1063310.00	1.232			BNE 1072267.50	3535		BNE 1024816.50	1.436		BNE 1075740.00 \	0.603
BNE 1063645.00	1.189			BNE 1072755.00	3548		BNE 1025070.00	1.366		BNE 1076000.00 \	0.52
BNE 1064000.00	1.188			BNE 1073240.00	3563		BNE 1025215.00	1.459		BNE 1076247.50 \	0.591
BNE 1064490.00	1.165			BNE 1073742.50	3578		BNE 1025360.00	1.566		BNE 1076495.00 \	0.682
BNE 1065010.00	1.166			BNE 1074230.00	3591		BNE 1025475.00	1.671		BNE 1076752.50 \	0.563
BNE 1065503.00	1.156			BNE 1074722.50	3602		BNE 1025590.00	1.791		BNE 1077010.00 \	0.479
BNE 1065990.00	1.158			BNE 1075232.50	3609		BNE 1025880.00	1.674		BNE 1077260.00 \	0.412
BNE 1066505.00	1.144			BNE 1075740.00	3618		BNE 1026170.00	1.572		BNE 1077510.00 \	0.361
BNE 1067020.00	1.139			BNE 1076247.50	3629		BNE 1026425.00	1.545		BNE 1077775.00 \	0.372
BNE 1067485.00	1.12			BNE 1076752.50	3639		BNE 1026680.00	1.519		BNE 1078040.00 \	0.382
BNE 1067965.00	1.104			BNE 1077260.00	3654		BNE 1026790.00	1.574		BNE 1078282.50 \	0.46
BNE 1068660.00	1.082			BNE 1077775.00	3662		BNE 1026900.00	1.632		BNE 1078525.00 \	0.577
BNE 1069045.00	1.073			BNE 1078282.50	3665		BNE 1027030.00	1.646		BNE 1078592.50 \	0.128
BNE 1069535.00	1.067			BNE 1078592.50	3666		BNE 1027160.00	1.661		BNE 1078660.00 \	0.072
BNE 1070025.00	1.061						BNE 1027420.00	1.519			
BNE 1070530.00	1.049						BNE 1027680.00	1.4			
BNE 1071040.00	1.039						BNE 1027930.00	1.338			
BNE 1071520.00	1.046						BNE 1028180.00	1.28			
BNE 1072015.00	1.03						BNE 1028430.00	1.425			
BNE 1072020.00	1.03						BNE 1028680.00	1.608			
BNE 1072020.00	1.03						BNE 1028720.00	2.009			
BNE 1072515.00	1.02						BNE 1028760.00	1.616			
BNE 1072995.00	1.012						BNE 1028980.00	1.695			
BNE 1073485.00	1.023						BNE 1029200.00	1.782			
BNE 1074000.00	1.041						BNE 1029440.00	1.667			
BNE 1074460.00	1.055						BNE 1029680.00	1.565			
BNE 1074985.00	1.068						BNE 1029950.00	1.518			
BNE 1075480.00	1.08						BNE 1030220.00	1.473			
BNE 1076000.00	1.082						BNE 1030545.00	1.476			
BNE 1076495.00	1.065						BNE 1030870.00	1.479			
BNE 1077010.00	1.041						BNE 1031065.00	1.56			
BNE 1077510.00	1.009						BNE 1031260.00	1.651			
BNE 1078040.00	0.97						BNE 1031480.00	1.768			
BNE 1078525.00	0.92						BNE 1031700.00	1.904			
BNE 1078660.00	0.918						BNE 1031847.50	1.657			

Appendix C Mike11 Results Q50

MIKE 11 RESULTS - BRISBANE RIVER MODEL

Q50 event CRCFORGE rainfall with ARF's

72hr Storm Duration

Chainage [m]	Water Level	Chainage [m]	Discharge	Chainage [m]	Velocity [m/s]	Chainage [m]	Velocity [m/s]
BNE 931570.00	40.156	BNE 931575.00	3400	BNE 931570.00 \	1.897	BNE 1031995.00	1.631
BNE 931580.00	40.149	BNE 932625.00	3400	BNE 931575.00 \	1.898	BNE 1032112.50	1.598
BNE 933670.00	38.746	BNE 933970.00	3400	BNE 931580.00 \	1.898	BNE 1032230.00	1.565
BNE 934270.00	38.621	BNE 934445.00	3400	BNE 932625.00 \	1.859	BNE 1032407.50	1.636
BNE 934620.00	38.409	BNE 935345.00	3400	BNE 933670.00 \	1.83	BNE 1032585.00	1.713
BNE 936070.00	38.206	BNE 936445.00	3400	BNE 933970.00 \	1.236	BNE 1032832.50	1.688
BNE 936820.00	38.159	BNE 938295.00	3399	BNE 934270.00 \	1.693	BNE 1033080.00	1.663
BNE 939770.00	37.757	BNE 941045.00	3399	BNE 934445.00 \	2.258	BNE 1033225.00	1.695
BNE 942320.00	36.598	BNE 942945.00	3399	BNE 934620.00 \	3.422	BNE 1033370.00	1.729
BNE 943570.00	36.195	BNE 943845.00	3398	BNE 935345.00 \	0.982	BNE 1033635.00	1.79
BNE 944120.00	36.12	BNE 944845.00	3397	BNE 936070.00 \	0.5	BNE 1033900.00	1.855
BNE 945570.00	35.879	BNE 946370.00	3396	BNE 936445.00 \	0.583	BNE 1034135.00	1.861
BNE 947170.00	35.467	BNE 947720.00	3396	BNE 936820.00 \	2.481	BNE 1034370.00	1.866
BNE 948270.00	35.105	BNE 949270.00	3396	BNE 938295.00 \	0.878	BNE 1034630.00	1.795
BNE 950270.00	34.566	BNE 951295.00	3396	BNE 939770.00 \	1.358	BNE 1034890.00	1.728
BNE 952320.00	33.9	BNE 953095.00	3396	BNE 941045.00 \	1.384	BNE 1035152.00	1.756
BNE 953870.00	33.495	BNE 954395.00	3395	BNE 942320.00 \	1.429	BNE 1035414.00	1.784
BNE 954920.00	33.101	BNE 955445.00	3395	BNE 942945.00 \	1.107	BNE 1035657.00	1.843
BNE 955970.00	32.626	BNE 957370.00	3395	BNE 943570.00 \	0.901	BNE 1035900.00	1.905
BNE 958770.00	31.381	BNE 959470.00	3394	BNE 943845.00 \	0.874	BNE 1036180.00	1.871
BNE 960170.00	30.971	BNE 961120.00	3394	BNE 944120.00 \	1.046	BNE 1036460.00	1.838
BNE 962070.00	30.034	BNE 963120.00	3394	BNE 944845.00 \	0.998	BNE 1036615.00	1.751
BNE 964170.00	28.816	BNE 965390.00	3393	BNE 945570.00 \	1.33	BNE 1036770.00	1.671
BNE 966610.00	27.278	BNE 967010.00	3393	BNE 946370.00 \	1.006	BNE 1036842.50	1.715
BNE 967410.00	26.85	BNE 968600.00	3392	BNE 947170.00 \	1.159	BNE 1036915.00	1.775
BNE 969790.00	25.826	BNE 970475.00	3392	BNE 947720.00 \	1.194	BNE 1037002.50	1.708
BNE 971160.00	25.399	BNE 971710.00	3392	BNE 948270.00 \	1.233	BNE 1037090.00	1.633
BNE 972260.00	25.171	BNE 972760.00	3392	BNE 949270.00 \	1.088	BNE 1037110.00	1.989
BNE 973260.00	25.137	BNE 973920.00	3391	BNE 950270.00 \	0.995	BNE 1037175.00	1.643
BNE 974580.00	24.995	BNE 975300.00	3391	BNE 951295.00 \	1.194	BNE 1037230.00	1.732
BNE 976020.00	24.908	BNE 976385.00	3391	BNE 952320.00 \	1.494	BNE 1037285.00	1.831
BNE 976750.00	24.861	BNE 977515.00	3390	BNE 953095.00 \	1.172	BNE 1037455.00	1.724
BNE 978280.00	24.056	BNE 978893.50	3391	BNE 953870.00 \	0.965	BNE 1037625.00	1.628
BNE 979507.00	22.053	BNE 979510.00	3427	BNE 954395.00 \	1.145	BNE 1037855.00	1.516
BNE 979513.00	22.021	BNE 979521.50	3424	BNE 954920.00 \	1.844	BNE 1038085.00	1.418
BNE 979530.00	22	BNE 979930.00	3390	BNE 955445.00 \	1.381	BNE 1038342.50	1.47
BNE 980330.00	21.759	BNE 980995.00	3389	BNE 955970.00 \	1.366	BNE 1038600.00	1.526
BNE 981660.00	21.352	BNE 982060.00	3389	BNE 957370.00 \	1.359	BNE 1038850.00	1.517
BNE 982460.00	21.157	BNE 983310.00	3389	BNE 958770.00 \	1.408	BNE 1039100.00	1.507
BNE 984160.00	20.699	BNE 984710.00	3389	BNE 959470.00 \	1.077	BNE 1039150.00	1.489
BNE 985260.00	20.281	BNE 985870.00	3388	BNE 960170.00 \	0.872	BNE 1039200.00	1.47
BNE 986480.00	19.574	BNE 987220.00	3388	BNE 961120.00 \	1.153	BNE 1039200.00	1.47
BNE 987960.00	18.547	BNE 988060.00	3388	BNE 962070.00 \	1.701	BNE 1039382.50	1.423
BNE 988160.00	18.248	BNE 988165.00	3388	BNE 963120.00 \	1.265	BNE 1039565.00	1.378
BNE 988170.00	18.207	BNE 988265.00	3388	BNE 964170.00 \	1.006	BNE 1039617.50	1.352
BNE 988360.00	17.978	BNE 989030.00	3388	BNE 965390.00 \	1.291	BNE 1039670.00	1.327
BNE 989700.00	17.084	BNE 990200.00	3388	BNE 966610.00 \	1.809	BNE 1039670.00	1.327
BNE 990700.00	16.725	BNE 990730.00	3388	BNE 967010.00 \	1.492	BNE 1039749.00	1.297
BNE 990760.00	16.691	BNE 991235.00	3388	BNE 967410.00 \	1.27	BNE 1039828.00	1.268
BNE 991710.00	16.421	BNE 992065.00	3391	BNE 968600.00 \	1.409	BNE 1039828.00	1.285
BNE 992420.00	16.234	BNE 992435.00	3397	BNE 969790.00 \	1.582	BNE 1039959.00	1.268
BNE 992450.00	16.196	BNE 992460.00	3397	BNE 970475.00 \	1.556	BNE 1040090.00	1.251
BNE 992470.00	16.175	BNE 992570.00	3397	BNE 971160.00 \	1.53	BNE 1040170.00	1.322
BNE 992670.00	16.074	BNE 993215.00	3387	BNE 971710.00 \	1.465	BNE 1040250.00	1.4
BNE 993760.00	15.442	BNE 994260.00	3387	BNE 972260.00 \	2.512	BNE 1040250.00	1.4
BNE 994760.00	15.025	BNE 995225.00	3386	BNE 972760.00 \	1.173	BNE 1040370.00	1.528
BNE 995690.00	14.461	BNE 996335.00	3386	BNE 973260.00 \	0.949	BNE 1040490.00	1.681
BNE 996980.00	13.519	BNE 997720.00	3386	BNE 973920.00 \	1.209	BNE 1040750.00	1.503
BNE 998460.00	13.234	BNE 998810.00	3385	BNE 974580.00 \	1.667	BNE 1041010.00	1.359
BNE 999160.00	13.129	BNE 999580.00	3385	BNE 975300.00 \	1.485	BNE 1041120.00	1.366
BNE 1000000.00	12.99	BNE 1000142.50	3386	BNE 976020.00 \	1.339	BNE 1041230.00	1.373
BNE 1000285.00	12.877	BNE 1000530.00	3386	BNE 976385.00 \	0.992	BNE 1041345.00	1.401
BNE 1000775.00	12.724	BNE 1001045.00	3386	BNE 976750.00 \	1.02	BNE 1041460.00	1.429
BNE 1001315.00	12.631	BNE 1001590.00	3386	BNE 977515.00 \	1.029	BNE 1041580.00	1.337
BNE 1001865.00	12.438	BNE 1002107.50	3386	BNE 978280.00 \	1.457	BNE 1041700.00	1.256
BNE 1002350.00	12.317	BNE 1002567.50	3386	BNE 978893.50 \	1.384	BNE 1041830.00	1.434
BNE 1002785.00	12.293	BNE 1003030.00	3386	BNE 979507.00 \	1.325	BNE 1041960.00	1.671
BNE 1003275.00	12.172	BNE 1003525.00	3386	BNE 979510.00 \	1.366	BNE 1042097.50	1.727
BNE 1003775.00	12.079	BNE 1004037.50	3386	BNE 979513.00 \	1.372	BNE 1042235.00	1.786
BNE 1004300.00	11.866	BNE 1004555.00	3386	BNE 979521.50 \	1.417	BNE 1042367.50	1.674
BNE 1004810.00	11.811	BNE 1005067.50	3385	BNE 979530.00 \	1.422	BNE 1042500.00	1.576
BNE 1005325.00	11.703	BNE 1005557.50	3385	BNE 979930.00 \	1.35	BNE 1042500.00	1.576
BNE 1005870.00	11.563	BNE 1006035.00	3181	BNE 980330.00 \	1.803	BNE 1042507.50	1.57
BNE 1005870.00	11.563	BNE 1006250.00	4395	BNE 980995.00 \	1.397	BNE 1042515.00	1.565
BNE 1006200.00	11.511	BNE 1006605.00	4394	BNE 981660.00 \	1.52	BNE 1042712.50	1.605
BNE 1006200.00	11.511	BNE 1007160.00	4390	BNE 982060.00 \	1.48	BNE 1042910.00	1.648
BNE 1006300.00	11.482	BNE 1007595.00	4385	BNE 982460.00 \	1.442	BNE 1042960.00	1.652
BNE 1006300.00	11.482	BNE 1007850.00	4379	BNE 983310.00 \	1.371	BNE 1043010.00	1.655
BNE 1006910.00	11.281	BNE 1008182.50	4378	BNE 984160.00 \	1.307	BNE 1043010.00	1.655
BNE 1007410.00	11.181	BNE 1008685.00	4375	BNE 984710.00 \	1.367	BNE 1043045.00	1.658
BNE 1007780.00	11.033	BNE 1009162.50	4374	BNE 985260.00 \	1.433	BNE 1043080.00	1.661
BNE 1007780.00	11.033	BNE 1009560.00	4372	BNE 985870.00 \	1.509	BNE 1043095.00	1.655
BNE 1007920.00	10.963	BNE 1010105.00	4368	BNE 986480.00 \	1.594	BNE 1043110.00	1.65
BNE 1008445.00	10.949	BNE 1010607.50	4366	BNE 987220.00 \	1.366	BNE 1043110.00	1.65
BNE 1008925.00	10.902	BNE 1010852.50	4365	BNE 987960.00 \	1.195	BNE 1043417.50	1.559
BNE 1009400.00	10.806	BNE 1011245.00	4363	BNE 988060.00 \	1.442	BNE 1043725.00	1.478
BNE 1009720.00	10.74	BNE 1011745.00	4359	BNE 988160.00 \	1.82	BNE 1043892.50	1.463
BNE 1010490.00	10.566	BNE 1012227.50	4355	BNE 988165.00 \	3.606	BNE 1044060.00	1.449
BNE 1010725.00	10.59	BNE 1012705.00	4342	BNE 988170.00 \	1.827	BNE 1044200.00	1.533
BNE 1010980.00	10.564	BNE 1013062.50	4339	BNE 988265.00 \	1.541	BNE 1044340.00	1.627
BNE 1011510.00	10.57	BNE 1013317.50	4337	BNE 988360.00 \	1.333	BNE 1044472.50	1.548
BNE 1011980.00	10.569	BNE 1013562.50	4337	BNE 989030.00 \	1.215	BNE 1044605.00	1.477
BNE 1012475.00	10.553	BNE 1013795.00	4335	BNE 989700.00 \	1.117	BNE 1044732.50	1.409

BNE 1012475.00	10.553	BNE 1014110.00	4332	BNE 990200.00 \	1.268	BNE 1044860.00	1.347
BNE 1012935.00	10.529	BNE 1014460.00	4329	BNE 990700.00 \	1.467	BNE 1045130.00	1.346
BNE 1013190.00	10.516	BNE 1014850.00	4323	BNE 990730.00 \	1.5	BNE 1045400.00	1.344
BNE 1013190.00	10.516	BNE 1015325.00	4321	BNE 990760.00 \	1.535	BNE 1045642.50	1.384
BNE 1013445.00	10.5	BNE 1015705.00	4320	BNE 991235.00 \	1.088	BNE 1045885.00	1.425
BNE 1013680.00	10.491	BNE 1015995.00	4319	BNE 991710.00 \	0.843	BNE 1046032.50	1.253
BNE 1013680.00	10.491	BNE 1016390.00	4317	BNE 992065.00 \	0.861	BNE 1046180.00	1.118
BNE 1013910.00	10.476	BNE 1016765.00	4315	BNE 992420.00 \	0.88	BNE 1046260.00	1.138
BNE 1014310.00	10.406	BNE 1017010.00	4313	BNE 992435.00 \	0.987	BNE 1046340.00	1.159
BNE 1014610.00	10.292	BNE 1017370.00	4311	BNE 992450.00 \	1.122	BNE 1046460.00	1.176
BNE 1014610.00	10.292	BNE 1017765.00	4308	BNE 992460.00 \	1.227	BNE 1046580.00	1.193
BNE 1015090.00	10.19	BNE 1018060.00	4306	BNE 992470.00 \	1.123	BNE 1046740.00	1.349
BNE 1015560.00	10.085	BNE 1018462.50	4304	BNE 992570.00 \	1.209	BNE 1046900.00	1.553
BNE 1015850.00	10.034	BNE 1018910.00	4303	BNE 992670.00 \	1.304	BNE 1047125.00	1.669
BNE 1015850.00	10.034	BNE 1019292.50	4329	BNE 993215.00 \	1.512	BNE 1047350.00	1.803
BNE 1016140.00	9.981	BNE 1019677.50	4336	BNE 993760.00 \	1.8	BNE 1047632.50	1.751
BNE 1016640.00	9.822	BNE 1019990.00	4335	BNE 994260.00 \	1.407	BNE 1047915.00	1.701
BNE 1016890.00	9.711	BNE 1020320.00	4333	BNE 994760.00 \	1.154	BNE 1048145.00	1.467
BNE 1016890.00	9.711	BNE 1020677.50	4331	BNE 995225.00 \	1.34	BNE 1048375.00	1.29
BNE 1017130.00	9.598	BNE 1020962.50	4330	BNE 995690.00 \	1.597	BNE 1048632.50	1.484
BNE 1017610.00	9.476	BNE 1021317.00	4329	BNE 996335.00 \	1.614	BNE 1048890.00	1.749
BNE 1017920.00	9.375	BNE 1021627.00	4328	BNE 996980.00 \	1.631	BNE 1049005.00	1.647
BNE 1018200.00	9.368	BNE 1021805.00	4327	BNE 997720.00 \	1.157	BNE 1049120.00	1.557
BNE 1018725.00	9.226	BNE 1022000.00	4327	BNE 998460.00 \	0.896	BNE 1049245.00	1.672
BNE 1019095.00	9.15	BNE 1022340.00	4326	BNE 998810.00 \	1.192	BNE 1049370.00	1.806
BNE 1019490.00	9.109	BNE 1022807.50	4396	BNE 999160.00 \	1.783	BNE 1049480.00	1.736
BNE 1019490.00	9.109	BNE 1023305.00	4396	BNE 999580.00 \	1.518	BNE 1049590.00	1.671
BNE 1019865.00	8.978	BNE 1023825.00	4395	BNE 1000000.00	1.323	BNE 1049730.00	1.73
BNE 1020115.00	9.001	BNE 1024321.50	4394	BNE 1000142.50	1.481	BNE 1049870.00	1.794
BNE 1020525.00	8.97	BNE 1024816.50	4393	BNE 1000285.00	1.682	BNE 1050150.00	1.749
BNE 1020830.00	8.887	BNE 1025215.00	4392	BNE 1000530.00	1.711	BNE 1050430.00	1.706
BNE 1021095.00	8.763	BNE 1025475.00	4392	BNE 1000775.00	1.74	BNE 1050645.00	1.765
BNE 1021539.00	8.591	BNE 1025880.00	4391	BNE 1001045.00	1.608	BNE 1050860.00	1.829
BNE 1021715.00	8.566	BNE 1026425.00	4390	BNE 1001315.00	1.494	BNE 1051110.00	1.714
BNE 1021895.00	8.502	BNE 1026790.00	4390	BNE 1001590.00	1.78	BNE 1051360.00	1.611
BNE 1022105.00	8.421	BNE 1027030.00	4390	BNE 1001865.00	2.201	BNE 1051627.50	1.809
BNE 1022575.00	8.315	BNE 1027420.00	4389	BNE 1002107.50	2.162	BNE 1051895.00	2.061
BNE 1023040.00	8.148	BNE 1027930.00	4388	BNE 1002350.00	2.124	BNE 1052102.50	1.76
BNE 1023570.00	8.112	BNE 1028430.00	4386	BNE 1002567.50	1.798	BNE 1052310.00	1.535
BNE 1024080.00	8.062	BNE 1028720.00	4386	BNE 1002785.00	1.558	BNE 1052370.00	2.52
BNE 1024563.00	8.018	BNE 1028980.00	4385	BNE 1003030.00	1.732	BNE 1052390.00	1.822
BNE 1025070.00	7.991	BNE 1029440.00	4384	BNE 1003275.00	1.95	BNE 1052492.50	1.857
BNE 1025360.00	7.924	BNE 1029950.00	4382	BNE 1003525.00	1.839	BNE 1052595.00	1.886
BNE 1025590.00	7.833	BNE 1030545.00	4379	BNE 1003775.00	1.74	BNE 1052625.00	2.441
BNE 1026170.00	7.703	BNE 1031065.00	4378	BNE 1004037.50	1.939	BNE 1052640.00	1.659
BNE 1026680.00	7.599	BNE 1031480.00	4377	BNE 1004300.00	2.189	BNE 1052752.50	1.707
BNE 1026900.00	7.522	BNE 1031847.50	4376	BNE 1004555.00	1.733	BNE 1052865.00	1.752
BNE 1027160.00	7.447	BNE 1032112.50	4375	BNE 1004810.00	1.435	BNE 1053092.50	1.629
BNE 1027680.00	7.42	BNE 1032407.50	4375	BNE 1005067.50	1.484	BNE 1053320.00	1.521
BNE 1028180.00	7.407	BNE 1032832.50	4374	BNE 1005325.00	1.536	BNE 1053355.00	1.951
BNE 1028680.00	7.308	BNE 1033225.00	4373	BNE 1005597.50	1.654	BNE 1053385.00	1.787
BNE 1028760.00	7.22	BNE 1033635.00	4372	BNE 1005870.00	1.792	BNE 1053642.50	1.769
BNE 1029200.00	7.132	BNE 1034135.00	4371	BNE 1005870.00	1.686	BNE 1053900.00	1.752
BNE 1029680.00	7.122	BNE 1034630.00	4370	BNE 1006035.00	1.557	BNE 1054270.00	1.237
BNE 1030220.00	7.12	BNE 1035152.00	4369	BNE 1006200.00	1.446	BNE 1054640.00	0.956
BNE 1030870.00	7.077	BNE 1035657.00	4368	BNE 1006200.00	1.775	BNE 1054660.00	1.424
BNE 1031260.00	7.007	BNE 1036180.00	4367	BNE 1006250.00	1.745	BNE 1054680.00	0.921
BNE 1031700.00	6.887	BNE 1036615.00	4367	BNE 1006300.00	1.716	BNE 1054825.00	1.176
BNE 1031995.00	6.895	BNE 1036842.50	4366	BNE 1006300.00	1.716	BNE 1054970.00	1.628
BNE 1032230.00	6.817	BNE 1037002.50	4438	BNE 1006605.00	1.704	BNE 1055125.00	1.607
BNE 1032585.00	6.663	BNE 1037110.00	4438	BNE 1006910.00	1.692	BNE 1055280.00	1.587
BNE 1033080.00	6.555	BNE 1037230.00	4438	BNE 1007160.00	1.568	BNE 1055350.00	1.595
BNE 1033370.00	6.504	BNE 1037455.00	4437	BNE 1007410.00	1.461	BNE 1055420.00	1.604
BNE 1033900.00	6.379	BNE 1037855.00	4436	BNE 1007595.00	1.645	BNE 1055690.00	1.523
BNE 1034370.00	6.266	BNE 1038342.50	4434	BNE 1007780.00	1.884	BNE 1055960.00	1.45
BNE 1034890.00	6.194	BNE 1038850.00	4430	BNE 1007780.00	1.879	BNE 1056180.00	1.627
BNE 1035414.00	6.105	BNE 1039150.00	4427	BNE 1007850.00	1.992	BNE 1056400.00	1.853
BNE 1035900.00	5.982	BNE 1039382.50	4425	BNE 1007920.00	2.119	BNE 1056547.50	1.767
BNE 1036460.00	5.841	BNE 1039617.50	4423	BNE 1008182.50	1.909	BNE 1056695.00	1.689
BNE 1036770.00	5.774	BNE 1039749.00	4421	BNE 1008445.00	1.739	BNE 1056780.00	0.667
BNE 1036915.00	5.73	BNE 1039959.00	4576	BNE 1008685.00	1.731	BNE 1056865.00	0.416
BNE 1037090.00	5.743	BNE 1040170.00	4576	BNE 1008925.00	1.723	BNE 1056920.00	1.906
BNE 1037175.00	5.551	BNE 1040370.00	4576	BNE 1009162.50	1.733	BNE 1056950.00	0.43
BNE 1037285.00	5.515	BNE 1040750.00	4576	BNE 1009400.00	1.743	BNE 1057020.00	0.64
BNE 1037625.00	5.504	BNE 1041120.00	4576	BNE 1009560.00	1.702	BNE 1057090.00	1.256
BNE 1038085.00	5.486	BNE 1041345.00	4576	BNE 1009720.00	1.663	BNE 1057310.00	1.352
BNE 1038600.00	5.441	BNE 1041580.00	4576	BNE 1010105.00	1.841	BNE 1057530.00	1.464
BNE 1039100.00	5.408	BNE 1041830.00	4576	BNE 1010490.00	2.066	BNE 1057785.00	1.606
BNE 1039200.00	5.408	BNE 1042097.50	4576	BNE 1010607.50	1.925	BNE 1058040.00	1.778
BNE 1039200.00	5.408	BNE 1042367.50	4576	BNE 1010725.00	1.802	BNE 1058135.00	1.778
BNE 1039565.00	5.405	BNE 1042507.50	4576	BNE 1010852.50	1.831	BNE 1058230.00	1.778
BNE 1039670.00	5.408	BNE 1042712.50	4576	BNE 1010980.00	1.861	BNE 1058380.00	1.769
BNE 1039670.00	5.408	BNE 1042960.00	4576	BNE 1011245.00	1.752	BNE 1058530.00	1.757
BNE 1039828.00	5.411	BNE 1043045.00	4576	BNE 1011510.00	1.655	BNE 1058632.50	1.661
BNE 1039828.00	5.411	BNE 1043095.00	4577	BNE 1011745.00	1.606	BNE 1058735.00	1.575
BNE 1040090.00	5.409	BNE 1043417.50	4577	BNE 1011980.00	1.559	BNE 1058885.00	1.686
BNE 1040250.00	5.386	BNE 1043892.50	4577	BNE 1012227.50	1.543	BNE 1059035.00	1.814
BNE 1040250.00	5.386	BNE 1044200.00	4577	BNE 1012475.00	1.527	BNE 1059287.50	1.582
BNE 1040490.00	5.334	BNE 1044472.50	4577	BNE 1012475.00	1.521	BNE 1059540.00	1.403
BNE 1041010.00	5.351	BNE 1044732.50	4577	BNE 1012705.00	1.533	BNE 1059765.00	1.423
BNE 1041230.00	5.325	BNE 1045130.00	4577	BNE 1012935.00	1.545	BNE 1059990.00	1.444
BNE 1041460.00	5.286	BNE 1045642.50	4577	BNE 1013062.50	1.541	BNE 1060167.50	1.521
BNE 1041700.00	5.286	BNE 1046032.50	4577	BNE 1013190.00	1.538	BNE 1060345.00	1.606
BNE 1041960.00	5.197	BNE 1046260.00	4577	BNE 1013190.00	1.538	BNE 1060440.00	1.673
BNE 1042235.00	5.095	BNE 1046460.00	4577	BNE 1013317.50	1.53	BNE 1060535.00	1.745
BNE 1042500.00	5.054	BNE 1046740.00	4577	BNE 1013445.00	1.523	BNE 1060775.00	1.665
BNE 1042500.00	5.054	BNE 1047125.00	4578	BNE 1013562.50	1.488	BNE 1061015.00	1.592
BNE 1042515.00	5.052	BNE 1047632.50	4578	BNE 1013680.00	1.454	BNE 1061272.50	1.638
BNE 1042910.00	4.914	BNE 1048145.00	4578	BNE 1013680.00	1.454	BNE 1061530.00	1.686

BNE 1043010.00	4.87	BNE 1048632.50	4578	BNE 1013795.00	1.429	BNE 1061775.00	1.597
BNE 1043010.00	4.87	BNE 1049005.00	4578	BNE 1013910.00	1.406	BNE 1062020.00	1.518
BNE 1043080.00	4.839	BNE 1049245.00	4578	BNE 1014110.00	1.43	BNE 1062277.50	1.413
BNE 1043110.00	4.828	BNE 1049480.00	4579	BNE 1014310.00	1.456	BNE 1062535.00	1.322
BNE 1043110.00	4.828	BNE 1049730.00	4579	BNE 1014460.00	1.447	BNE 1062737.50	1.191
BNE 1043725.00	4.652	BNE 1050150.00	4579	BNE 1014610.00	1.438	BNE 1062940.00	1.086
BNE 1044060.00	4.592	BNE 1050645.00	4579	BNE 1014610.00	1.43	BNE 1063032.50	1.108
BNE 1044340.00	4.519	BNE 1051110.00	4589	BNE 1014850.00	1.334	BNE 1063125.00	1.122
BNE 1044605.00	4.496	BNE 1051627.50	4589	BNE 1015090.00	1.255	BNE 1063125.00	1.178
BNE 1044860.00	4.478	BNE 1052102.50	4590	BNE 1015325.00	1.396	BNE 1063217.50	1.204
BNE 1045400.00	4.423	BNE 1052370.00	4591	BNE 1015560.00	1.574	BNE 1063310.00	1.236
BNE 1045885.00	4.377	BNE 1052492.50	4592	BNE 1015705.00	1.555	BNE 1063477.50	1.434
BNE 1046180.00	4.403	BNE 1052625.00	4602	BNE 1015850.00	1.536	BNE 1063645.00	1.708
BNE 1046340.00	4.392	BNE 1052752.50	4590	BNE 1015850.00	1.536	BNE 1063822.50	1.654
BNE 1046580.00	4.363	BNE 1053092.50	4589	BNE 1015995.00	1.519	BNE 1064000.00	1.604
BNE 1046900.00	4.217	BNE 1053355.00	4589	BNE 1016140.00	1.501	BNE 1064245.00	1.623
BNE 1047350.00	3.939	BNE 1053642.50	4590	BNE 1016390.00	1.589	BNE 1064490.00	1.643
BNE 1047915.00	3.759	BNE 1054270.00	4590	BNE 1016640.00	1.687	BNE 1064750.00	1.456
BNE 1048375.00	3.768	BNE 1054660.00	4590	BNE 1016765.00	1.735	BNE 1065010.00	1.307
BNE 1048890.00	3.637	BNE 1054825.00	4590	BNE 1016890.00	1.786	BNE 1065256.50	1.254
BNE 1049120.00	3.621	BNE 1055125.00	4590	BNE 1016890.00	1.786	BNE 1065503.00	1.206
BNE 1049370.00	3.532	BNE 1055350.00	4591	BNE 1017010.00	1.853	BNE 1065746.50	1.055
BNE 1049590.00	3.515	BNE 1055690.00	4591	BNE 1017130.00	1.926	BNE 1065990.00	0.937
BNE 1049870.00	3.442	BNE 1056180.00	4591	BNE 1017370.00	1.844	BNE 1066247.50	1.009
BNE 1050430.00	3.361	BNE 1056547.50	4591	BNE 1017610.00	1.768	BNE 1066505.00	1.092
BNE 1050860.00	3.295	BNE 1056780.00	4591	BNE 1017765.00	1.825	BNE 1066762.50	1.065
BNE 1051360.00	3.301	BNE 1056920.00	4591	BNE 1017920.00	1.886	BNE 1067020.00	1.04
BNE 1051895.00	3.198	BNE 1057020.00	4591	BNE 1018060.00	1.678	BNE 1067252.50	1.137
BNE 1052310.00	3.276	BNE 1057310.00	4592	BNE 1018200.00	1.511	BNE 1067485.00	1.252
BNE 1052390.00	3.192	BNE 1057785.00	4592	BNE 1018462.50	1.622	BNE 1067725.00	1.297
BNE 1052595.00	3.176	BNE 1058135.00	4592	BNE 1018725.00	1.752	BNE 1067965.00	1.343
BNE 1052640.00	3.033	BNE 1058380.00	4602	BNE 1018910.00	1.734	BNE 1068312.50	1.394
BNE 1052865.00	3.012	BNE 1058632.50	4602	BNE 1019095.00	1.718	BNE 1068660.00	1.447
BNE 1053320.00	3.034	BNE 1058885.00	4602	BNE 1019292.50	1.587	BNE 1068852.50	1.429
BNE 1053385.00	2.921	BNE 1059287.50	4602	BNE 1019490.00	1.472	BNE 1069045.00	1.411
BNE 1053900.00	2.774	BNE 1059765.00	4602	BNE 1019490.00	1.472	BNE 1069290.00	1.353
BNE 1054640.00	2.723	BNE 1060167.50	4603	BNE 1019677.50	1.613	BNE 1069535.00	1.3
BNE 1054680.00	2.688	BNE 1060440.00	4603	BNE 1019865.00	1.783	BNE 1069780.00	1.257
BNE 1054970.00	2.57	BNE 1060775.00	4603	BNE 1019990.00	1.465	BNE 1070025.00	1.218
BNE 1055280.00	2.511	BNE 1061272.50	4603	BNE 1020115.00	1.243	BNE 1070277.50	1.231
BNE 1055420.00	2.477	BNE 1061775.00	4603	BNE 1020320.00	1.047	BNE 1070530.00	1.245
BNE 1055960.00	2.416	BNE 1062277.50	4608	BNE 1020525.00	0.904	BNE 1070785.00	1.224
BNE 1056400.00	2.297	BNE 1062737.50	4615	BNE 1020677.50	1.056	BNE 1071040.00	1.205
BNE 1056695.00	2.271	BNE 1063032.50	4647	BNE 1020830.00	1.27	BNE 1071280.00	1.017
BNE 1056865.00	2.347	BNE 1063217.50	4901	BNE 1020962.50	1.447	BNE 1071520.00	0.88
BNE 1056950.00	2.305	BNE 1063477.50	4911	BNE 1021095.00	1.68	BNE 1071767.50	0.979
BNE 1057090.00	2.253	BNE 1063822.50	4912	BNE 1021317.00	1.653	BNE 1072015.00	1.103
BNE 1057530.00	2.204	BNE 1064245.00	4914	BNE 1021539.00	1.626	BNE 1072017.50	1.103
BNE 1058040.00	2.095	BNE 1064750.00	4917	BNE 1021627.00	1.487	BNE 1072020.00	1.103
BNE 1058230.00	2.067	BNE 1065256.50	4922	BNE 1021715.00	1.37	BNE 1072020.00	1.141
BNE 1058530.00	2.034	BNE 1065746.50	4929	BNE 1021805.00	1.382	BNE 1072267.50	1.118
BNE 1058735.00	2.039	BNE 1066247.50	4938	BNE 1021895.00	1.394	BNE 1072515.00	1.097
BNE 1059035.00	1.951	BNE 1066762.50	4946	BNE 1022000.00	1.449	BNE 1072755.00	1.067
BNE 1059540.00	1.914	BNE 1067252.50	4959	BNE 1022105.00	1.509	BNE 1072995.00	1.04
BNE 1059990.00	1.808	BNE 1067725.00	4970	BNE 1022340.00	1.516	BNE 1073240.00	1.092
BNE 1060345.00	1.713	BNE 1068312.50	4978	BNE 1022575.00	1.528	BNE 1073485.00	1.15
BNE 1060535.00	1.673	BNE 1068852.50	4980	BNE 1022807.50	1.747	BNE 1073742.50	1.133
BNE 1061015.00	1.657	BNE 1069290.00	4979	BNE 1023040.00	2.03	BNE 1074000.00	1.117
BNE 1061530.00	1.601	BNE 1069780.00	4974	BNE 1023305.00	1.933	BNE 1074230.00	1.109
BNE 1062020.00	1.586	BNE 1070277.50	4966	BNE 1023570.00	1.844	BNE 1074460.00	1.103
BNE 1062535.00	1.575	BNE 1070785.00	4956	BNE 1023825.00	1.796	BNE 1074722.50	1.16
BNE 1062940.00	1.578	BNE 1071280.00	4948	BNE 1024080.00	1.75	BNE 1074985.00	1.224
BNE 1063125.00	1.553	BNE 1071767.50	4939	BNE 1024321.50	1.702	BNE 1075232.50	1.111
BNE 1063125.00	1.553	BNE 1072017.50	4935	BNE 1024563.00	1.657	BNE 1075480.00	1.017
BNE 1063310.00	1.535	BNE 1072267.50	5089	BNE 1024816.50	1.578	BNE 1075740.00	0.854
BNE 1063645.00	1.442	BNE 1072755.00	5095	BNE 1025070.00	1.507	BNE 1076000.00	0.736
BNE 1064000.00	1.441	BNE 1073240.00	5101	BNE 1025215.00	1.615	BNE 1076247.50	0.835
BNE 1064490.00	1.393	BNE 1073742.50	5107	BNE 1025360.00	1.739	BNE 1076495.00	0.964
BNE 1065010.00	1.399	BNE 1074230.00	5111	BNE 1025475.00	1.857	BNE 1076752.50	0.794
BNE 1065503.00	1.379	BNE 1074722.50	5115	BNE 1025590.00	1.992	BNE 1077010.00	0.675
BNE 1065990.00	1.387	BNE 1075232.50	5119	BNE 1025880.00	1.863	BNE 1077260.00	0.58
BNE 1066505.00	1.355	BNE 1075740.00	5124	BNE 1026170.00	1.75	BNE 1077510.00	0.508
BNE 1067020.00	1.342	BNE 1076247.50	5130	BNE 1026425.00	1.716	BNE 1077775.00	0.522
BNE 1067485.00	1.297	BNE 1076752.50	5134	BNE 1026680.00	1.683	BNE 1078040.00	0.537
BNE 1067965.00	1.259	BNE 1077260.00	5140	BNE 1026790.00	1.752	BNE 1078282.50	0.646
BNE 1068660.00	1.205	BNE 1077775.00	5142	BNE 1026900.00	1.827	BNE 1078525.00	0.811
BNE 1069045.00	1.184	BNE 1078282.50	5144	BNE 1027030.00	1.85	BNE 1078592.50	0.18
BNE 1069535.00	1.172	BNE 1078592.50	5144	BNE 1027160.00	1.873	BNE 1078660.00	0.101
BNE 1070025.00	1.161			BNE 1027420.00	1.689		
BNE 1070530.00	1.136			BNE 1027680.00	1.538		
BNE 1071040.00	1.119			BNE 1027930.00	1.463		
BNE 1071520.00	1.141			BNE 1028180.00	1.395		
BNE 1072015.00	1.109			BNE 1028430.00	1.563		
BNE 1072020.00	1.109			BNE 1028680.00	1.779		
BNE 1072020.00	1.109			BNE 1028720.00	2.177		
BNE 1072515.00	1.095			BNE 1028760.00	1.776		
BNE 1072995.00	1.084			BNE 1028980.00	1.872		
BNE 1073485.00	1.053			BNE 1029200.00	1.977		
BNE 1074000.00	1.046			BNE 1029440.00	1.855		
BNE 1074460.00	1.06			BNE 1029680.00	1.746		
BNE 1074985.00	1.073			BNE 1029950.00	1.665		
BNE 1075480.00	1.085			BNE 1030220.00	1.59		
BNE 1076000.00	1.086			BNE 1030545.00	1.605		
BNE 1076495.00	1.069			BNE 1030870.00	1.621		
BNE 1077010.00	1.044			BNE 1031065.00	1.723		
BNE 1077510.00	1.011			BNE 1031260.00	1.837		
BNE 1078040.00	0.971			BNE 1031480.00	1.984		
BNE 1078525.00	0.92			BNE 1031700.00	2.155		
BNE 1078660.00	0.918			BNE 1031847.50	1.857		

Appendix D Mike11 Results Q2000

MIKE 11 RESULTS - BRISBANE RIVER MODEL

Q2000 event CRCFORGE rainfall with ARF's

120hr Storm Duration

Chainage [m]	Water Level	Chainage [m]	Discharge	Chainage [m]	Velocity [m/s]	Chainage [m]	Velocity [m/s]
BNE 931570.00	50.124	BNE 931575.00	12000	BNE 931570.00 \	2.529	BNE 1031995.00 \	2.547
BNE 931580.00	50.117	BNE 932625.00	11975	BNE 931575.00 \	2.531	BNE 1032112.50 \	2.52
BNE 933670.00	48.898	BNE 933970.00	11957	BNE 931580.00 \	2.532	BNE 1032230.00 \	2.495
BNE 934270.00	48.859	BNE 934445.00	11944	BNE 932625.00 \	2.359	BNE 1032407.50 \	2.709
BNE 934620.00	48.707	BNE 935345.00	11915	BNE 933670.00 \	2.2	BNE 1032585.00 \	2.963
BNE 936070.00	48.483	BNE 936445.00	11878	BNE 933970.00 \	1.423	BNE 1032832.50 \	2.833
BNE 936820.00	48.357	BNE 938295.00	11862	BNE 934270.00 \	1.533	BNE 1033080.00 \	2.714
BNE 939770.00	47.74	BNE 941045.00	11786	BNE 934445.00 \	1.878	BNE 1033225.00 \	2.767
BNE 942320.00	47.246	BNE 942945.00	11696	BNE 934620.00 \	2.491	BNE 1033370.00 \	2.823
BNE 943570.00	47.194	BNE 943845.00	11582	BNE 935345.00 \	0.918	BNE 1033635.00 \	2.975
BNE 944120.00	47.184	BNE 944845.00	11491	BNE 936070.00 \	0.632	BNE 1033900.00 \	3.146
BNE 945570.00	47.12	BNE 946370.00	11469	BNE 936445.00 \	0.865	BNE 1034135.00 \	3.184
BNE 947170.00	46.775	BNE 947720.00	11460	BNE 936820.00 \	3.394	BNE 1034370.00 \	3.224
BNE 948270.00	46.371	BNE 949270.00	11447	BNE 938295.00 \	1.419	BNE 1034630.00 \	3.011
BNE 950270.00	45.744	BNE 951295.00	11413	BNE 939770.00 \	1.775	BNE 1034890.00 \	2.825
BNE 952320.00	44.758	BNE 953095.00	11384	BNE 941045.00 \	1.387	BNE 1035152.00 \	2.904
BNE 953870.00	44.268	BNE 954395.00	11359	BNE 942320.00 \	1.334	BNE 1035414.00 \	2.988
BNE 954920.00	43.921	BNE 955445.00	11341	BNE 942945.00 \	1.007	BNE 1035657.00 \	3.089
BNE 955970.00	43.608	BNE 957370.00	11318	BNE 943570.00 \	0.8	BNE 1035900.00 \	3.198
BNE 958770.00	42.448	BNE 959470.00	11238	BNE 943845.00 \	0.769	BNE 1036180.00 \	3.155
BNE 960170.00	42.322	BNE 961120.00	11151	BNE 944120.00 \	0.971	BNE 1036460.00 \	3.112
BNE 962070.00	42.056	BNE 963120.00	11105	BNE 944845.00 \	0.878	BNE 1036615.00 \	2.872
BNE 964170.00	41.26	BNE 965390.00	11102	BNE 945570.00 \	1.183	BNE 1036770.00 \	2.667
BNE 966610.00	40.017	BNE 967010.00	11088	BNE 946370.00 \	1.027	BNE 1036842.50 \	2.878
BNE 967410.00	39.454	BNE 968600.00	11077	BNE 947170.00 \	1.647	BNE 1036915.00 \	3.127
BNE 969790.00	37.99	BNE 970475.00	11074	BNE 947720.00 \	1.667	BNE 1037002.50 \	3.076
BNE 971160.00	37.546	BNE 971710.00	11067	BNE 948270.00 \	1.689	BNE 1037090.00 \	3.027
BNE 972260.00	37.22	BNE 972760.00	11063	BNE 949270.00 \	1.59	BNE 1037110.00 \	3.235
BNE 973260.00	37.212	BNE 973920.00	11057	BNE 950270.00 \	1.501	BNE 1037175.00 \	3.104
BNE 974580.00	36.971	BNE 975300.00	11054	BNE 951295.00 \	1.846	BNE 1037230.00 \	3.176
BNE 976020.00	36.934	BNE 976385.00	11055	BNE 952320.00 \	2.429	BNE 1037285.00 \	3.251
BNE 976750.00	36.948	BNE 977515.00	11059	BNE 953095.00 \	1.71	BNE 1037455.00 \	2.963
BNE 978280.00	36.475	BNE 978893.50	11079	BNE 953870.00 \	1.341	BNE 1037625.00 \	2.721
BNE 979507.00	34.654	BNE 979510.00	11380	BNE 954395.00 \	1.45	BNE 1037855.00 \	2.29
BNE 979513.00	34.529	BNE 979521.50	11378	BNE 954920.00 \	1.96	BNE 1038085.00 \	1.978
BNE 979530.00	34.649	BNE 979930.00	11072	BNE 955445.00 \	1.448	BNE 1038342.50 \	1.955
BNE 980330.00	34.459	BNE 980995.00	11051	BNE 955970.00 \	1.351	BNE 1038600.00 \	1.932
BNE 981660.00	34.001	BNE 982060.00	11050	BNE 957370.00 \	1.652	BNE 1038850.00 \	1.896
BNE 982460.00	33.839	BNE 983310.00	11052	BNE 958770.00 \	2.143	BNE 1039100.00 \	1.861
BNE 984160.00	33.198	BNE 984710.00	11052	BNE 959470.00 \	1.111	BNE 1039150.00 \	1.852
BNE 985260.00	32.735	BNE 985870.00	11053	BNE 960170.00 \	0.886	BNE 1039200.00 \	1.843
BNE 986480.00	31.874	BNE 987220.00	11054	BNE 961120.00 \	1.172	BNE 1039200.00 \	1.758
BNE 987960.00	30.827	BNE 988060.00	11055	BNE 962070.00 \	1.868	BNE 1039382.50 \	1.725
BNE 988160.00	30.565	BNE 988165.00	11055	BNE 963120.00 \	1.376	BNE 1039565.00 \	1.694
BNE 988170.00	30.531	BNE 988265.00	11055	BNE 964170.00 \	1.304	BNE 1039617.50 \	1.697
BNE 988360.00	30.329	BNE 989030.00	11058	BNE 965390.00 \	1.55	BNE 1039670.00 \	1.701
BNE 989700.00	29.57	BNE 990200.00	11064	BNE 966610.00 \	1.96	BNE 1039670.00 \	1.652
BNE 990700.00	29.172	BNE 990730.00	11058	BNE 967010.00 \	1.916	BNE 1039749.00 \	1.665
BNE 990760.00	29.089	BNE 991235.00	11059	BNE 967410.00 \	1.923	BNE 1039828.00 \	1.678
BNE 991710.00	28.876	BNE 992065.00	11096	BNE 968600.00 \	2.127	BNE 1039828.00 \	1.624
BNE 992420.00	28.684	BNE 992435.00	11114	BNE 969790.00 \	2.38	BNE 1039959.00 \	1.67
BNE 992450.00	28.578	BNE 992460.00	11114	BNE 970475.00 \	2.155	BNE 1040090.00 \	1.72
BNE 992470.00	28.533	BNE 992570.00	11157	BNE 971160.00 \	1.986	BNE 1040170.00 \	1.821
BNE 992670.00	28.451	BNE 993215.00	11071	BNE 971710.00 \	2.044	BNE 1040250.00 \	1.934
BNE 993760.00	27.842	BNE 994260.00	11066	BNE 972260.00 \	2.128	BNE 1040250.00 \	1.902
BNE 994760.00	27.58	BNE 995225.00	11069	BNE 972760.00 \	1.8	BNE 1040370.00 \	2.089
BNE 995690.00	26.959	BNE 996335.00	11068	BNE 973260.00 \	1.559	BNE 1040490.00 \	2.318
BNE 996980.00	25.807	BNE 997720.00	11070	BNE 973920.00 \	1.907	BNE 1040750.00 \	2.023
BNE 998460.00	25.351	BNE 998810.00	11071	BNE 974580.00 \	2.502	BNE 1041010.00 \	1.794
BNE 999160.00	25.06	BNE 999580.00	11072	BNE 975300.00 \	2.13	BNE 1041120.00 \	1.76
BNE 1000000.00	24.756	BNE 1000142.50	11159	BNE 976020.00 \	1.88	BNE 1041230.00 \	1.728
BNE 1000285.00	24.514	BNE 1000530.00	11160	BNE 976385.00 \	1.098	BNE 1041345.00 \	1.829
BNE 1000775.00	24.142	BNE 1001045.00	11160	BNE 976750.00 \	0.994	BNE 1041460.00 \	1.945
BNE 1001315.00	24.04	BNE 1001590.00	11161	BNE 977515.00 \	1.023	BNE 1041580.00 \	1.898
BNE 1001865.00	23.515	BNE 1002107.50	11161	BNE 978280.00 \	1.56	BNE 1041700.00 \	1.854
BNE 1002350.00	23.382	BNE 1002567.50	11162	BNE 978893.50 \	1.801	BNE 1041830.00 \	2.06
BNE 1002785.00	23.392	BNE 1003030.00	11162	BNE 979507.00 \	2.138	BNE 1041960.00 \	2.319
BNE 1003275.00	23.101	BNE 1003525.00	11163	BNE 979510.00 \	2.163	BNE 1042097.50 \	2.453
BNE 1003775.00	22.866	BNE 1004037.50	11163	BNE 979513.00 \	2.219	BNE 1042235.00 \	2.604
BNE 1004300.00	22.371	BNE 1004555.00	11164	BNE 979521.50 \	1.798	BNE 1042367.50 \	2.426
BNE 1004810.00	22.351	BNE 1005067.50	11165	BNE 979530.00 \	1.461	BNE 1042500.00 \	2.271
BNE 1005325.00	22.133	BNE 1005597.50	11165	BNE 979930.00 \	1.516	BNE 1042500.00 \	2.312
BNE 1005870.00	21.804	BNE 1006035.00	9594	BNE 980330.00 \	1.577	BNE 1042507.50 \	2.303
BNE 1005870.00	21.804	BNE 1006250.00	11272	BNE 980995.00 \	1.815	BNE 1042515.00 \	2.295
BNE 1006200.00	21.701	BNE 1006605.00	11876	BNE 981660.00 \	2.14	BNE 1042712.50 \	2.122
BNE 1006200.00	21.701	BNE 1007160.00	11874	BNE 982060.00 \	1.886	BNE 1042910.00 \	2.003
BNE 1006300.00	21.659	BNE 1007595.00	11872	BNE 982460.00 \	1.706	BNE 1042960.00 \	2.008
BNE 1006300.00	21.659	BNE 1007850.00	11861	BNE 983310.00 \	1.848	BNE 1043010.00 \	2.014
BNE 1006910.00	21.436	BNE 1008182.50	11859	BNE 984160.00 \	2.098	BNE 1043010.00 \	2.05
BNE 1007410.00	21.365	BNE 1008685.00	11857	BNE 984710.00 \	2.074	BNE 1043045.00 \	2.055
BNE 1007780.00	21.148	BNE 1009162.50	11857	BNE 985260.00 \	2.051	BNE 1043080.00 \	2.059
BNE 1007780.00	21.148	BNE 1009560.00	11856	BNE 985870.00 \	2.192	BNE 1043095.00 \	2.057
BNE 1007920.00	21.027	BNE 1010105.00	11853	BNE 986480.00 \	2.353	BNE 1043110.00 \	2.055
BNE 1008445.00	20.935	BNE 1010607.50	11852	BNE 987220.00 \	1.908	BNE 1043110.00 \	2.125
BNE 1008925.00	20.874	BNE 1010852.50	11851	BNE 987960.00 \	1.605	BNE 1043417.50 \	2.175
BNE 1009400.00	20.742	BNE 1011245.00	11851	BNE 988060.00 \	1.784	BNE 1043725.00 \	2.241
BNE 1009720.00	20.682	BNE 1011745.00	11849	BNE 988160.00 \	2.007	BNE 1043892.50 \	2.395
BNE 1010490.00	20.261	BNE 1012227.50	11847	BNE 988165.00 \	3.537	BNE 1044060.00 \	2.572
BNE 1010725.00	20.326	BNE 1012705.00	11834	BNE 988170.00 \	2.014	BNE 1044200.00 \	2.68
BNE 1010980.00	20.265	BNE 1013062.50	11833	BNE 988265.00 \	1.88	BNE 1044340.00 \	2.798
BNE 1011510.00	20.36	BNE 1013317.50	10847	BNE 988360.00 \	1.763	BNE 1044472.50 \	2.601
BNE 1011980.00	20.403	BNE 1013562.50	10845	BNE 989030.00 \	1.616	BNE 1044605.00 \	2.431
BNE 1012475.00	20.407	BNE 1013795.00	10244	BNE 989700.00 \	1.491	BNE 1044732.50 \	2.234

BNE 1012475.00	20.407	BNE 1014110.00	10238	BNE 990200.00 \	1.742	BNE 1044860.00 \	2.066
BNE 1012935.00	20.363	BNE 1014460.00	10232	BNE 990700.00 \	2.093	BNE 1045130.00 \	2.028
BNE 1013190.00	20.356	BNE 1014850.00	10197	BNE 990730.00 \	2.213	BNE 1045400.00 \	1.991
BNE 1013190.00	20.356	BNE 1015325.00	10193	BNE 990760.00 \	2.347	BNE 1045642.50 \	1.994
BNE 1013445.00	20.345	BNE 1015705.00	10191	BNE 991235.00 \	1.585	BNE 1045885.00 \	1.997
BNE 1013680.00	20.336	BNE 1015995.00	10814	BNE 991710.00 \	1.198	BNE 1046032.50 \	1.932
BNE 1013680.00	20.336	BNE 1016390.00	10812	BNE 992065.00 \	1.236	BNE 1046180.00 \	1.871
BNE 1013910.00	20.326	BNE 1016765.00	10810	BNE 992420.00 \	1.271	BNE 1046260.00 \	1.999
BNE 1014310.00	20.271	BNE 1017010.00	11817	BNE 992435.00 \	1.518	BNE 1046340.00 \	2.145
BNE 1014610.00	20.182	BNE 1017370.00	11815	BNE 992450.00 \	1.87	BNE 1046460.00 \	2.086
BNE 1014610.00	20.182	BNE 1017765.00	11814	BNE 992460.00 \	1.969	BNE 1046580.00 \	2.029
BNE 1015090.00	20.025	BNE 1018060.00	11813	BNE 992470.00 \	1.874	BNE 1046740.00 \	2.208
BNE 1015560.00	19.867	BNE 1018462.50	11812	BNE 992570.00 \	1.82	BNE 1046900.00 \	2.422
BNE 1015850.00	19.807	BNE 1018910.00	11811	BNE 992670.00 \	1.743	BNE 1047125.00 \	2.702
BNE 1015850.00	19.807	BNE 1019292.50	11812	BNE 993215.00 \	1.967	BNE 1047350.00 \	3.055
BNE 1016140.00	19.747	BNE 1019677.50	11810	BNE 993760.00 \	2.259	BNE 1047632.50 \	2.981
BNE 1016640.00	19.609	BNE 1019990.00	11810	BNE 994260.00 \	1.736	BNE 1047915.00 \	2.91
BNE 1016890.00	19.498	BNE 1020320.00	11809	BNE 994760.00 \	1.41	BNE 1048145.00 \	2.373
BNE 1016890.00	19.498	BNE 1020677.50	11808	BNE 995225.00 \	1.802	BNE 1048375.00 \	2.003
BNE 1017130.00	19.36	BNE 1020962.50	11807	BNE 995690.00 \	2.494	BNE 1048632.50 \	2.265
BNE 1017610.00	19.293	BNE 1021317.00	11807	BNE 996335.00 \	2.324	BNE 1048890.00 \	2.606
BNE 1017920.00	19.139	BNE 1021627.00	11806	BNE 996980.00 \	2.176	BNE 1049005.00 \	2.577
BNE 1018200.00	19.094	BNE 1021805.00	11806	BNE 997720.00 \	1.666	BNE 1049120.00 \	2.549
BNE 1018725.00	18.793	BNE 1022000.00	11806	BNE 998460.00 \	1.349	BNE 1049245.00 \	2.796
BNE 1019095.00	18.726	BNE 1022340.00	11805	BNE 998810.00 \	1.743	BNE 1049370.00 \	3.095
BNE 1019490.00	18.671	BNE 1022807.50	11813	BNE 999160.00 \	2.46	BNE 1049480.00 \	2.986
BNE 1019490.00	18.671	BNE 1023305.00	11812	BNE 999580.00 \	2.315	BNE 1049590.00 \	2.884
BNE 1019865.00	18.369	BNE 1023825.00	11812	BNE 1000000.00	2.192	BNE 1049730.00 \	2.963
BNE 1020115.00	18.545	BNE 1024321.50	11811	BNE 1000142.50	2.393	BNE 1049870.00 \	3.047
BNE 1020525.00	18.538	BNE 1024816.50	11810	BNE 1000285.00	2.633	BNE 1050150.00 \	2.838
BNE 1020830.00	18.354	BNE 1025215.00	11809	BNE 1000530.00	2.763	BNE 1050430.00 \	2.656
BNE 1021095.00	18.098	BNE 1025475.00	11808	BNE 1000775.00	2.907	BNE 1050645.00 \	2.811
BNE 1021539.00	17.857	BNE 1025880.00	11808	BNE 1001045.00	2.597	BNE 1050860.00 \	2.986
BNE 1021715.00	17.889	BNE 1026425.00	11807	BNE 1001315.00	2.347	BNE 1051110.00 \	2.865
BNE 1021895.00	17.77	BNE 1026790.00	11806	BNE 1001590.00	2.814	BNE 1051360.00 \	2.754
BNE 1022105.00	17.584	BNE 1027030.00	11806	BNE 1001865.00	3.513	BNE 1051627.50 \	2.971
BNE 1022575.00	17.488	BNE 1027420.00	11805	BNE 1002107.50	3.266	BNE 1051895.00 \	3.224
BNE 1023040.00	17.189	BNE 1027930.00	11804	BNE 1002350.00	3.052	BNE 1052102.50 \	2.734
BNE 1023570.00	17.091	BNE 1028430.00	11803	BNE 1002567.50	2.66	BNE 1052310.00 \	2.373
BNE 1024080.00	17.071	BNE 1028720.00	11802	BNE 1002785.00	2.356	BNE 1052370.00 \	3.8
BNE 1024563.00	17.042	BNE 1028980.00	11802	BNE 1003030.00	2.599	BNE 1052390.00 \	3.041
BNE 1025070.00	17.037	BNE 1029440.00	11800	BNE 1003275.00	2.898	BNE 1052492.50 \	3.185
BNE 1025360.00	16.898	BNE 1029950.00	11798	BNE 1003525.00	2.858	BNE 1052595.00 \	3.344
BNE 1025590.00	16.731	BNE 1030545.00	11795	BNE 1003775.00	2.82	BNE 1052625.00 \	5.361
BNE 1026170.00	16.506	BNE 1031065.00	11794	BNE 1004037.50	3.039	BNE 1052640.00 \	3.129
BNE 1026680.00	16.413	BNE 1031480.00	11793	BNE 1004300.00	3.294	BNE 1052752.50 \	3.255
BNE 1026900.00	16.248	BNE 1031847.50	11793	BNE 1004555.00	2.61	BNE 1052865.00 \	3.391
BNE 1027160.00	16.059	BNE 1032112.50	11792	BNE 1004810.00	2.161	BNE 1053092.50 \	3.058
BNE 1027680.00	16.113	BNE 1032407.50	11792	BNE 1005067.50	2.205	BNE 1053320.00 \	2.785
BNE 1028180.00	16.145	BNE 1032832.50	11791	BNE 1005325.00	2.25	BNE 1053355.00 \	3.459
BNE 1028680.00	15.972	BNE 1033225.00	11790	BNE 1005597.50	2.443	BNE 1053385.00 \	2.99
BNE 1028760.00	15.938	BNE 1033635.00	11789	BNE 1005870.00	2.672	BNE 1053642.50 \	2.997
BNE 1029200.00	15.797	BNE 1034135.00	11789	BNE 1005870.00	2.292	BNE 1053900.00 \	3.005
BNE 1029680.00	15.83	BNE 1034630.00	11788	BNE 1006035.00	2.238	BNE 1054270.00 \	2.212
BNE 1030220.00	15.827	BNE 1035152.00	11787	BNE 1006200.00	2.188	BNE 1054640.00 \	1.75
BNE 1030870.00	15.756	BNE 1035657.00	11786	BNE 1006200.00	2.586	BNE 1054660.00 \	2.371
BNE 1031260.00	15.563	BNE 1036180.00	11785	BNE 1006250.00	2.567	BNE 1054680.00 \	1.768
BNE 1031700.00	15.219	BNE 1036615.00	11784	BNE 1006300.00	2.549	BNE 1054825.00 \	2.23
BNE 1031995.00	15.402	BNE 1036842.50	11784	BNE 1006300.00	2.679	BNE 1054970.00 \	3.02
BNE 1032230.00	15.282	BNE 1037002.50	11786	BNE 1006605.00	2.528	BNE 1055125.00 \	3.007
BNE 1032585.00	14.927	BNE 1037110.00	11786	BNE 1006910.00	2.393	BNE 1055280.00 \	2.993
BNE 1033080.00	14.765	BNE 1037230.00	11786	BNE 1007160.00	2.16	BNE 1055350.00 \	2.965
BNE 1033370.00	14.661	BNE 1037455.00	11785	BNE 1007410.00	1.968	BNE 1055420.00 \	2.938
BNE 1033900.00	14.385	BNE 1037855.00	11785	BNE 1007595.00	2.221	BNE 1055690.00 \	2.765
BNE 1034370.00	14.15	BNE 1038342.50	11781	BNE 1007780.00	2.548	BNE 1055960.00 \	2.611
BNE 1034890.00	14.083	BNE 1038850.00	11778	BNE 1007780.00	2.543	BNE 1056180.00 \	2.945
BNE 1035414.00	13.889	BNE 1039150.00	11776	BNE 1007850.00	2.696	BNE 1056400.00 \	3.375
BNE 1035900.00	13.643	BNE 1039382.50	10776	BNE 1007920.00	2.868	BNE 1056547.50 \	3.275
BNE 1036460.00	13.377	BNE 1039617.50	10774	BNE 1008182.50	2.831	BNE 1056695.00 \	3.181
BNE 1036770.00	13.335	BNE 1039749.00	10200	BNE 1008445.00	2.795	BNE 1056780.00 \	1.383
BNE 1036915.00	13.164	BNE 1039959.00	10029	BNE 1008685.00	2.745	BNE 1056865.00 \	0.884
BNE 1037090.00	13.168	BNE 1040170.00	10028	BNE 1008925.00	2.697	BNE 1056920.00 \	3.465
BNE 1037175.00	12.704	BNE 1040370.00	9566	BNE 1009162.50	2.668	BNE 1056950.00 \	0.912
BNE 1037285.00	12.646	BNE 1040750.00	9564	BNE 1009400.00	2.639	BNE 1057020.00 \	1.344
BNE 1037625.00	12.708	BNE 1041120.00	9560	BNE 1009560.00	2.496	BNE 1057090.00 \	2.552
BNE 1038085.00	12.794	BNE 1041345.00	9558	BNE 1009720.00	2.369	BNE 1057310.00 \	2.709
BNE 1038600.00	12.755	BNE 1041580.00	9557	BNE 1010105.00	2.759	BNE 1057530.00 \	2.888
BNE 1039100.00	12.729	BNE 1041830.00	9556	BNE 1010490.00	3.305	BNE 1057785.00 \	3.115
BNE 1039200.00	12.727	BNE 1042097.50	9555	BNE 1010607.50	3.128	BNE 1058040.00 \	3.381
BNE 1039200.00	12.727	BNE 1042367.50	9554	BNE 1010725.00	2.969	BNE 1058135.00 \	3.38
BNE 1039565.00	12.72	BNE 1042507.50	10024	BNE 1010852.50	3.015	BNE 1058230.00 \	3.379
BNE 1039670.00	12.714	BNE 1042712.50	10024	BNE 1010980.00	3.062	BNE 1058380.00 \	3.46
BNE 1039670.00	12.714	BNE 1042960.00	10023	BNE 1011245.00	2.77	BNE 1058530.00 \	3.545
BNE 1039828.00	12.704	BNE 1043045.00	10641	BNE 1011510.00	2.528	BNE 1058632.50 \	3.3
BNE 1039828.00	12.704	BNE 1043095.00	10641	BNE 1011745.00	2.379	BNE 1058735.00 \	3.088
BNE 1040090.00	12.678	BNE 1043417.50	11701	BNE 1011980.00	2.247	BNE 1058885.00 \	3.381
BNE 1040250.00	12.636	BNE 1043892.50	11701	BNE 1012227.50	2.172	BNE 1059035.00 \	3.736
BNE 1040250.00	12.636	BNE 1044200.00	11701	BNE 1012475.00	2.103	BNE 1059287.50 \	3.199
BNE 1040490.00	12.546	BNE 1044472.50	11701	BNE 1012475.00	2.096	BNE 1059540.00 \	2.796
BNE 1041010.00	12.61	BNE 1044732.50	11700	BNE 1012705.00	2.134	BNE 1059765.00 \	2.809
BNE 1041230.00	12.598	BNE 1045130.00	11700	BNE 1012935.00	2.173	BNE 1059990.00 \	2.822
BNE 1041460.00	12.527	BNE 1045642.50	11700	BNE 1013062.50	2.143	BNE 1060167.50 \	3.096
BNE 1041700.00	12.509	BNE 1046032.50	11700	BNE 1013190.00	2.113	BNE 1060345.00 \	3.429
BNE 1041960.00	12.386	BNE 1046260.00	11699	BNE 1013190.00	1.975	BNE 1060440.00 \	3.59
BNE 1042235.00	12.217	BNE 1046460.00	11699	BNE 1013317.50	1.958	BNE 1060535.00 \	3.768
BNE 1042500.00	12.183	BNE 1046740.00	11699	BNE 1013445.00	1.945	BNE 1060775.00 \	3.513
BNE 1042500.00	12.183	BNE 1047125.00	11699	BNE 1013562.50	1.901	BNE 1061015.00 \	3.291
BNE 1042515.00	12.181	BNE 1047632.50	11699	BNE 1013680.00	1.861	BNE 1061272.50 \	3.428
BNE 1042910.00	12.114	BNE 1048145.00	11699	BNE 1013680.00	1.851	BNE 1061530.00 \	3.578

BNE 1043010.00	12.065			BNE 1048632.50	11699		BNE 1013795.00	1.813		BNE 1061775.00 \	3.365
BNE 1043010.00	12.065			BNE 1049005.00	11698		BNE 1013910.00	1.776		BNE 1062020.00 \	3.176
BNE 1043080.00	12.027			BNE 1049245.00	11698		BNE 1014110.00	1.76		BNE 1062277.50 \	2.885
BNE 1043110.00	12.011			BNE 1049480.00	11698		BNE 1014310.00	1.744		BNE 1062535.00 \	2.642
BNE 1043110.00	12.011			BNE 1049730.00	11698		BNE 1014460.00	1.706		BNE 1062737.50 \	2.388
BNE 1043725.00	11.664			BNE 1050150.00	11698		BNE 1014610.00	1.67		BNE 1062940.00 \	2.179
BNE 1044060.00	11.465			BNE 1050645.00	11698		BNE 1014610.00	1.672		BNE 1063032.50 \	2.232
BNE 1044340.00	11.312			BNE 1051110.00	11698		BNE 1014850.00	1.775		BNE 1063125.00 \	2.288
BNE 1044605.00	11.316			BNE 1051627.50	11698		BNE 1015090.00	1.894		BNE 1063125.00 \	2.289
BNE 1044860.00	11.336			BNE 1052102.50	11698		BNE 1015325.00	2.067		BNE 1063217.50 \	2.368
BNE 1045400.00	11.267			BNE 1052370.00	11698		BNE 1015560.00	2.276		BNE 1063310.00 \	2.454
BNE 1045885.00	11.216			BNE 1052492.50	11698		BNE 1015705.00	2.254		BNE 1063477.50 \	2.869
BNE 1046180.00	11.219			BNE 1052625.00	11698		BNE 1015850.00	2.232		BNE 1063645.00 \	3.454
BNE 1046340.00	11.149			BNE 1052752.50	11698		BNE 1015850.00	2.299		BNE 1063822.50 \	3.346
BNE 1046580.00	11.115			BNE 1053092.50	11698		BNE 1015995.00	2.257		BNE 1064000.00 \	3.245
BNE 1046900.00	10.852			BNE 1053355.00	11698		BNE 1016140.00	2.216		BNE 1064245.00 \	3.291
BNE 1047350.00	10.27			BNE 1053642.50	11698		BNE 1016390.00	2.186		BNE 1064490.00 \	3.339
BNE 1047915.00	9.885			BNE 1054270.00	11698		BNE 1016640.00	2.166		BNE 1064750.00 \	2.969
BNE 1048375.00	9.984			BNE 1054660.00	11698		BNE 1016765.00	2.227		BNE 1065010.00 \	2.673
BNE 1048890.00	9.748			BNE 1054825.00	11698		BNE 1016890.00	2.291		BNE 1065256.50 \	2.583
BNE 1049120.00	9.692			BNE 1055125.00	11698		BNE 1016890.00	2.442		BNE 1065503.00 \	2.499
BNE 1049370.00	9.451			BNE 1055350.00	11698		BNE 1017010.00	2.513		BNE 1065746.50 \	2.175
BNE 1049590.00	9.424			BNE 1055690.00	11698		BNE 1017130.00	2.588		BNE 1065990.00 \	1.926
BNE 1049870.00	9.267			BNE 1056180.00	11698		BNE 1017370.00	2.345		BNE 1066247.50 \	2.078
BNE 1050430.00	9.198			BNE 1056547.50	11698		BNE 1017610.00	2.144		BNE 1066505.00 \	2.256
BNE 1050860.00	9.034			BNE 1056780.00	11698		BNE 1017765.00	2.261		BNE 1066762.50 \	2.189
BNE 1051360.00	9.037			BNE 1056920.00	11698		BNE 1017920.00	2.393		BNE 1067020.00 \	2.125
BNE 1051895.00	8.856			BNE 1057020.00	11698		BNE 1018060.00	2.297		BNE 1067252.50 \	2.291
BNE 1052310.00	9.061			BNE 1057310.00	11698		BNE 1018200.00	2.209		BNE 1067485.00 \	2.486
BNE 1052390.00	8.798			BNE 1057785.00	11698		BNE 1018462.50	2.46		BNE 1067725.00 \	2.614
BNE 1052595.00	8.701			BNE 1058135.00	11698		BNE 1018725.00	2.775		BNE 1067965.00 \	2.757
BNE 1052640.00	7.772			BNE 1058380.00	11698		BNE 1018910.00	2.646		BNE 1068312.50 \	2.881
BNE 1052865.00	7.679			BNE 1058632.50	11698		BNE 1019095.00	2.529		BNE 1068660.00 \	3.016
BNE 1053320.00	7.818			BNE 1058885.00	11698		BNE 1019292.50	2.389		BNE 1068852.50 \	2.992
BNE 1053385.00	7.569			BNE 1059287.50	11698		BNE 1019490.00	2.262		BNE 1069045.00 \	2.969
BNE 1053900.00	7.263			BNE 1059765.00	11698		BNE 1019490.00	2.261		BNE 1069290.00 \	2.851
BNE 1054640.00	7.187			BNE 1060167.50	11698		BNE 1019677.50	2.561		BNE 1069535.00 \	2.742
BNE 1054680.00	7.094			BNE 1060440.00	11698		BNE 1019865.00	2.951		BNE 1069780.00 \	2.678
BNE 1054970.00	6.719			BNE 1060775.00	11698		BNE 1019990.00	2.231		BNE 1070025.00 \	2.618
BNE 1055280.00	6.551			BNE 1061272.50	11698		BNE 1020115.00	1.793		BNE 1070277.50 \	2.651
BNE 1055420.00	6.487			BNE 1061775.00	11698		BNE 1020320.00	1.524		BNE 1070530.00 \	2.685
BNE 1055960.00	6.368			BNE 1062277.50	11698		BNE 1020525.00	1.325		BNE 1070785.00 \	2.649
BNE 1056400.00	6.022			BNE 1062737.50	11698		BNE 1020677.50	1.619		BNE 1071040.00 \	2.613
BNE 1056695.00	5.943			BNE 1063032.50	11698		BNE 1020830.00	2.08		BNE 1071280.00 \	2.233
BNE 1056865.00	6.235			BNE 1063217.50	11703		BNE 1020962.50	2.35		BNE 1071520.00 \	1.95
BNE 1056950.00	6.092			BNE 1063477.50	11703		BNE 1021095.00	2.7		BNE 1071767.50 \	2.162
BNE 1057090.00	5.872			BNE 1063822.50	11703		BNE 1021317.00	2.624		BNE 1072015.00 \	2.425
BNE 1057530.00	5.713			BNE 1064245.00	11702		BNE 1021539.00	2.552		BNE 1072017.50 \	2.425
BNE 1058040.00	5.392			BNE 1064750.00	11702		BNE 1021627.00	2.261		BNE 1072020.00 \	2.424
BNE 1058230.00	5.315			BNE 1065256.50	11702		BNE 1021715.00	2.03		BNE 1072020.00 \	2.425
BNE 1058530.00	5.147			BNE 1065746.50	11702		BNE 1021805.00	2.11		BNE 1072267.50 \	2.395
BNE 1058735.00	5.211			BNE 1066247.50	11702		BNE 1021895.00	2.196		BNE 1072515.00 \	2.365
BNE 1059035.00	4.84			BNE 1066762.50	11702		BNE 1022000.00	2.357		BNE 1072755.00 \	2.304
BNE 1059540.00	4.781			BNE 1067252.50	11702		BNE 1022105.00	2.543		BNE 1072995.00 \	2.247
BNE 1059990.00	4.465			BNE 1067725.00	11703		BNE 1022340.00	2.394		BNE 1073240.00 \	2.364
BNE 1060345.00	4.051			BNE 1068312.50	11703		BNE 1022575.00	2.264		BNE 1073485.00 \	2.493
BNE 1060535.00	3.868			BNE 1068852.50	11703		BNE 1022807.50	2.594		BNE 1073742.50 \	2.466
BNE 1061015.00	3.87			BNE 1069290.00	11703		BNE 1023040.00	3.034		BNE 1074000.00 \	2.44
BNE 1061530.00	3.626			BNE 1069780.00	11703		BNE 1023305.00	3.002		BNE 1074230.00 \	2.434
BNE 1062020.00	3.603			BNE 1070277.50	11703		BNE 1023570.00	2.97		BNE 1074460.00 \	2.428
BNE 1062535.00	3.615			BNE 1070785.00	11703		BNE 1023825.00	2.819		BNE 1074722.50 \	2.573
BNE 1062940.00	3.643			BNE 1071280.00	11703		BNE 1024080.00	2.682		BNE 1074985.00 \	2.735
BNE 1063125.00	3.578			BNE 1071767.50	11703		BNE 1024321.50	2.577		BNE 1075232.50 \	2.478
BNE 1063125.00	3.578			BNE 1072017.50	11703		BNE 1024563.00	2.481		BNE 1075480.00 \	2.265
BNE 1063310.00	3.484			BNE 1072267.50	11708		BNE 1024816.50	2.347		BNE 1075740.00 \	1.903
BNE 1063645.00	3.131			BNE 1072755.00	11708		BNE 1025070.00	2.227		BNE 1076000.00 \	1.64
BNE 1064000.00	3.134			BNE 1073240.00	11708		BNE 1025215.00	2.412		BNE 1076247.50 \	1.874
BNE 1064490.00	2.956			BNE 1073742.50	11708		BNE 1025360.00	2.63		BNE 1076495.00 \	2.186
BNE 1065010.00	2.984			BNE 1074230.00	11708		BNE 1025475.00	2.803		BNE 1076752.50 \	1.797
BNE 1065503.00	2.911			BNE 1074722.50	11708		BNE 1025590.00	3		BNE 1077010.00 \	1.525
BNE 1065990.00	2.96			BNE 1075232.50	11708		BNE 1025880.00	2.911		BNE 1077260.00 \	1.311
BNE 1066505.00	2.833			BNE 1075740.00	11708		BNE 1026170.00	2.828		BNE 1077510.00 \	1.15
BNE 1067020.00	2.796			BNE 1076247.50	11708		BNE 1026425.00	2.666		BNE 1077775.00 \	1.183
BNE 1067485.00	2.646			BNE 1076752.50	11708		BNE 1026680.00	2.523		BNE 1078040.00 \	1.219
BNE 1067965.00	2.482			BNE 1077260.00	11708		BNE 1026790.00	2.677		BNE 1078282.50 \	1.47
BNE 1068660.00	2.259			BNE 1077775.00	11708		BNE 1026900.00	2.852		BNE 1078525.00 \	1.853
BNE 1069045.00	2.168			BNE 1078282.50	11708		BNE 1027030.00	2.976		BNE 1078592.50 \	0.41
BNE 1069535.00	2.112			BNE 1078592.50	11708		BNE 1027160.00	3.11		BNE 1078660.00 \	0.231
BNE 1070025.00	2.047						BNE 1027420.00	2.684			
BNE 1070530.00	1.93						BNE 1027680.00	2.36			
BNE 1071040.00	1.845						BNE 1027930.00	2.17			
BNE 1071520.00	1.927						BNE 1028180.00	2.009			
BNE 1072015.00	1.779						BNE 1028430.00	2.254			
BNE 1072020.00	1.778						BNE 1028680.00	2.569			
BNE 1072020.00	1.778						BNE 1028720.00	3.081			
BNE 1072515.00	1.717						BNE 1028760.00	2.47			
BNE 1072995.00	1.675						BNE 1028980.00	2.611			
BNE 1073485.00	1.537						BNE 1029200.00	2.769			
BNE 1074000.00	1.441						BNE 1029440.00	2.551			
BNE 1074460.00	1.348						BNE 1029680.00	2.366			
BNE 1074985.00	1.142						BNE 1029950.00	2.252			
BNE 1075480.00	1.114						BNE 1030220.00	2.161			
BNE 1076000.00	1.137						BNE 1030545.00	2.218			
BNE 1076495.00	1.063						BNE 1030870.00	2.278			
BNE 1077010.00	1.041						BNE 1031065.00	2.544			
BNE 1077510.00	1.009						BNE 1031260.00	2.88			
BNE 1078040.00	0.97						BNE 1031480.00	3.236			
BNE 1078525.00	0.92						BNE 1031700.00	3.692			
BNE 1078660.00	0.918						BNE 1031847.50	3.014			