Attachment 2.8

Upper Georges River Flood Study

Prepared By

Department of Land & Water Conservation

In conjunction with

Liverpool City Council

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Upper Georges River Flood Study

Foreword

The State Government's Flood Policy aims to reduce the impacts of flooding and flood liability on individual owners and occupiers. The policy encourages the development of solutions to existing flood problems in developed areas, and strategies for ensuring that new development is compatible with the flood hazard and does not create additional flooding problems in other areas.

Under the policy, local government has responsibility for managing flood liable land. Liverpool City Council's floodplain management committee has assisted Council in this task. The committee membership comprises a wide range of technical and community based skills.

The policy provides for technical and financial support by the State Government for a number of activities that include:

1. Preparation of a flood study to determine the nature and extent of the flood problem.
2. Preparation of a floodplain management study to evaluate management options in respect of both existing and future development.
3. Preparation of a floodplain management plan that involves formal adoption by Council. The plan may include provision for structural and non-structural options.
4. Implementation of the plan.

The Upper Georges River Flood Study constitutes the first stage of the floodplain management process for the Upper Georges River. The study has been prepared by the Department of Land and Water Conservation in conjunction with Liverpool City Council. It provides the basis for future management of flood liable land within the study area with regard to flooding.

Upper Georges River Flood Study

Table of Contents

Page

Foreword 1

1.0 Introduction 4

2.0 Background Information 5
- 2.1 Study Area 5
- 2.2 Previous Studies 6
- 2.3 Historical Flood Data 6
- 2.4 Topographic and Survey Information 7

3.0 Methodology 10

4.0 Flood Flow Estimates 11
- 4.1 1988 Flood Flows 11
- 4.2 1986 Flood Flows 11
- 4.3 Design Flood Flows 14

5.0 Hydraulic Analysis of Flood Levels 16
- 5.1 Mike-11 Model Description 16
- 5.2 1988 Model Calibration 16
- 5.3 1986 Model Verification 17
- 5.4 Design Flood Level Estimation 17
- 5.5 Sensitivity Analysis 19

6.0 Existing Flood Behaviour 20

7.0 References 22

Appendix 1

Surveyed River Cross Sections

Table of Contents (cont.)

List of Photos

Cover	Flooding across golf course towards old Power House
Photo 1	Flooding under railway bridge at Woodbrook Rd (1986 or 1988 flood)
Photo 2	Flooding across Casula Golf Course (1986 or 1988 flood)
Photo 3	Flooding at Cambridge Avenue (peak of 1986 flood)
Photo 4	Flooding of west bank, downstream of Cambridge Avenue (1986 Flood)

List of Tables

Table 1	Flow Hydrograph for 1988 Flood
Table 2	Flow Hydrograph for 1986 Flood
Table 3	Design Flow Hydrographs
Table 4	Adopted Roughness Coefficients for MIKE-11
Table 5	Sensitivity Tests to variations in Manning's Roughness Coefficients
Table 6	Design Flood Levels

List of Figures

Figure 1	Georges River Catchment Plan
Figure 2	Study Area
Figure 3	Historical Flood Data Recorded at Liverpool
Figure 4	WBNM model representation of the Upper Georges River
Figure 5	Location of Model Cross Sections
Figure 6	Liverpool Weir Rating Curve
Figure 7	Calibration at Cambridge Avenue - 1988 Flood Event
Figure 8	Calibration at Cambridge Avenue - 1988 Flows increased by 15%
Figure 9	Verification at Cambridge Avenue - 1986 Flood Event
Figure 10	Longitudinal Flood Profiles
Figure 11	1 in 100 year Design Flow Hydrographs
Figure 12	1 in 100 year Design Stage Hydrographs

1.0 INTRODUCTION

Numerous studies have been undertaken on the Georges River. Almost all of these studies have been confined to the area downstream of Liverpool. These have ranged from flood frequency analysis, to various mathematical and physical model studies. The most comprehensive and up-to-date study is the Georges River Flood Study [PWD 1991], completed by the Water Research Laboratory for the Public Works Department.

The Georges River Flood Study used a physical model of the Georges River to determine design flood levels, between Liverpool and Picnic Point. Flow hydrographs were determined using hydrologic computer modelling, in order to represent major inflows to the physical model. Flow hydrographs were input at Liverpool weir, Cabramatta Creek, Prospect Creek, and Harris and Williams Creeks. Whilst the entire catchment was considered for the hydrologic modelling, flood levels could only be defined throughout the extent of the physical model, which was limited to the area between Picnic Point and Liverpool.

Although there is limited flood liable development in the area upstream of Liverpool, there have nevertheless been various requests for flood advice. This has mainly been in relation to new development immediately upstream of the Liverpool bridge, the design of the sewerage treatment works at Glenfield, and in connection with the construction of bridges over the Georges River at the M5 Motorway and the East Hills Railway line. Recently there have been requests for flood level information in connection with the possible replacement of the Cambridge Avenue causeway, and other proposals that could affect flood behavior elsewhere in the catchment.

Previous design flood level estimates have been provided by various simplistic methods. These methods have relied on establishing a likely flood gradient in the upstream reach, usually on the basis of historical flood records, and using this as a basis to extrapolate design flood levels upstream of Liverpool.

In 1997 Liverpool City Council sought the assistance of the Department of Land and Water Conservation to better define the flood behavior upstream of Liverpool. Following this request the Department, in conjunction with Liverpool City Council and Council's Floodplain Management Committee, undertook the Upper Georges River Flood Study. The study determines design flood levels between Liverpool weir and the confluence with the Bunburry Curran Creek.

2.0 BACKGROUND INFORMATION

2.1 Study Area

The Georges River has a catchment area of 360 km^2 upstream of Liverpool. This compares with a total catchment area of 890 km^2 near its mouth at the Como Bridge. A catchment plan is shown on Figure 1.

The study area for hydraulic modelling is the Upper Georges River, between the Liverpool weir and the confluence with the Bunburry Curran tributary, which drains the urban area of Campbelltown. This section of the river, shown on Figure 2, is 6.5 km long. The river is deeply incised with little or no floodplain.

Most development that adjoins the river is confined to the downstream end, around Liverpool. This mainly consists of residential units, houses and small industrial premises on the western side of the river. Larger scale commercial and industrial premises occupy the eastern side. Further upstream, the Casula Golf Course, Powerhouse Museum and Glenfield tip, occupy the western side. The army, and the school of military engineering, occupies the remainder of the eastern side of the river.

A number of structures cross the river, including the Liverpool weir, Newbridge Road bridge, the M5 motorway, the East Hills Railway line, and the Cambridge Avenue Causeway. The main southern railway also runs parallel to the river on the western side.

Liverpool weir was constructed in 1836 for water supply purposes. It also provided the only causeway crossing of the river at this location. The weir is of some historical significance and has been recognised as such by the National Trust and the Australian Heritage Commission. The crest of the weir is at a level of 2.78m AHD. A detailed rating curve of flow versus level has been developed for the weir through gauging exercises and other physical model studies [PWD, 1991].

The Newbridge Road and M5 motorway bridges are high level structures with bridge decks above design 100 year flood levels. The M5 bridge was constructed prior to 1986, and is currently being duplicated.

An army footbridge used to cross the Georges River further upstream. Army personnel used the footbridge as a link to Casula railway station. It was also purported that the bridge was used as a gauging station by the army, although no flood records were uncovered. The bridge was washed away in the 1986 flood.

The East Hills railway line was extended to cross the Georges River in 1986. Whilst the present bridge does not provide a restriction to floodwaters, its construction in 1986 coincided with the 1986 flood. At this time, most of the river appears to have been dammed off to facilitate construction of the bridge. This would have had an impact on flood behaviour during the August 1986 flood.

The Cambridge Avenue Causeway is one of the more significant structures that cross the river in terms of flood impacts. The structure consists of 4, 10m wide by 1.2m high culverts. It is constructed over a rock shelf which naturally outcrops above water level at this location.

The road over the culvert forms a fairly low level causeway, which would be overtopped on a regular basis.

2.2 Previous Studies

Flood behaviour on the Georges River has been extensively studied since the mid 1960's.

The first major investigation of flooding on the Georges River was undertaken by Scholer in 1966 [Scholer 66]. Scholer investigated flood levels at Liverpool, and proposed a number of minor works and a flood prediction model to assist with flood warning services for Liverpool.

During the late 1960's much research was carried out using flood frequency analyses of the historical records at Liverpool. Munro [Munro 67,68], Stewart [Stewart 68] and Rowe and Ennis [Rowe & Ennis 70] undertook the main investigations. The results of the different analyses varied significantly, mainly as a result of how some of the earlier doubtful records were treated and the length of record incorporated in the analysis.

In 1978 Public Works commissioned consultants Sinclair Knight and Partners to investigate flooding between Liverpool and East Hills. The study [SKP 78] reviewed earlier flood frequency investigations at Liverpool, and adopted Munro's 1968 analysis. The 1956 flood gradient was then used to relate flood levels at Liverpool to flood levels further downstream. Sinclair Knight & Partners undertook a further valley wide assessment of possible flood mitigation works and measures in 1981 [SKP 81].

The Public Works Department constructed a number of physical models to investigate flood behaviour around the Chipping Norton Lakes Scheme, and other for other areas where there were known flood problems. In 1983 Public Works commissioned the University of NSW Water Research Laboratory to undertake an overall flood investigation for the Georges River, between Liverpool and Picnic Point [PWD 91]. The study utilised mathematical hydrologic models to estimate inflows to the floodplain, and a single physical hydraulic model of the Georges River and its main tributaries to determine flood heights.

Available studies on flood behaviour upstream of Liverpool are less common. Some information is available from research and limited investigations undertaken in connection with the construction of the Sewerage treatment works at Glenfield [Rowe & Ennis, 75], and the extension of the East Hills Railway bridge over the Georges River. These have largely been based on a few isolated records of floods reported to have occurred in the late 19th century, and using these levels as benchmarks for the design of works.

2.3 Historical Flood Data

The Georges River has a history of flooding, with a wealth of data available at the Liverpool weir. A histogram of recorded flood heights at Liverpool is presented in Figure 3, along with the current estimate for the 100 year flood event.

The largest recorded flood on the Georges River is believed to have occurred in 1873. On the basis of literature searches, this was probably the greatest flood since about 1800. The 1873

flood level at Liverpool was 1m higher than the current estimate for the design 1% flood. Another large flood, similar to the estimated 1% flood, occurred in 1898. Other similarly large floods were reported to have occurred in 1887 and 1889, although these records are less reliable.

Flooding this century has been considerably less severe, with the largest event occurring in 1956. More recently, significant floods occurred in 1986 and 1988. The Public Works Department collected extensive flood data for both floods. The available data is presented in separate reports for the two events [PWD 87,89], consisting of gauged flows, stage hydrographs, and flood debris marks at numerous locations from Liverpool to Picnic Point.

Whilst there is extensive flood data available for Liverpool, there is less information available further upstream. There are some limited reports [Rowe and Ennis, 1975] of record floods occurring in the late 19th century towards the upstream limit of the study area. These isolated levels are mainly based on the recollections of one or more persons that lived in the area at the time, and subsequent survey of reported levels many years later. In some cases the reported levels have been assumed to be of the 1873 flood, although there were a number of floods which occurred around the same time.

The most reliable flood information in the upstream reach is available for the 1986 and 1988 floods. Several photographs of these floods have been recovered from residents living in the area (Cover and Photos 1 to 4). Whilst there was sometime confusion as to whether the photos were of the 1986 or 1988 floods, both floods were of a similar magnitude. The most complete and reliable flood records exist at the Cambridge Avenue causeway, where the State Emergency Services monitored both flood events. The records consist of regular flood height readings from the flood gauges that are maintained by Campbelltown City Council at this location.

2.4 Topographic and Survey Information

Available topographic maps and aerial photography that was used in the course of this study, is indicated below:

1. 1 : 4,000 scale Orthophotomaps, with 2m contour intervals, reference East Hills U9137 - 1,2,4,5,7.
2. 1 : 10,000 scale Orthophotomap, with 4m contour intervals, reference East Hills U9137.
3. 1 : 25,000 scale Topographic Map, with 10m contour intervals, reference Liverpool 9030-11-S
4. 1 : 10,000 scale aerial photography, especially flown in 1997 by Southern Aerial Surveys Pty Ltd, at an altitude of 3,500 ft and a scale of 1:5,000

River cross sections were derived from photogrammetric analysis of the 1997 aerial photography, and supplemented by hydrographic survey of the river by Liverpool City Council. These sections form the basis for a hydraulic model that has been used to analyse flood behaviour throughout the study area. The location and reference number of each section is indicated in Figure 5. A plot of each section is also included in Appendix 1.

Photo 1 - Flooding under railway bridge at Woodbrook Rd (1986 or 1988 flood)

Photo 2 - Flooding across Casula Golf Course (1986 or 1988 flood)

Photo 3 - Flooding at Cambridge Avenue (peak of 1986 flood)

Photo 4 - Flooding of west bank, downstream of Cambridge Avenue (1986 flood)

3. METHODOLOGY

The adopted modelling approach for this study is to determine estimates of flow hydrographs in the Georges River, and to use these hydrographs as input to a hydraulic model representing the river, which then computes flood levels throughout the study area.

Estimates of flow hydrographs for the Georges River are already available at Liverpool from previous hydrologic analyses undertaken as part of the Georges River Flood Study [PWD,1991]. The estimates were derived using the Watershed Bounded Network Model. The catchment area upstream of Liverpool was divided into 49 separate sub-areas for the analysis. Flow hydrographs were generated for both design floods and recent historic floods. The Public Works Department also undertook extensive gauging exercises to measure flood flows immediately downstream of Liverpool, for both the 1988 and 1986 flood events.

As there are no major tributary inflows between Liverpool and the upstream study limit, at the Bunburry Curran tributary, the flow hydrographs determined from the 1991 study have been used for the current study. No further flow or rainfall analysis has been necessary for this investigation.

The flow hydrographs have been input to a MIKE-11 computer model in order to determine flood levels throughout the study area. MIKE-11 is a dynamic hydraulic model developed by the Danish Hydraulics Institute. It is a widely accepted model that has been used in numerous studies both in Australia and other overseas countries. The MIKE-11 model consists of data describing the river topography, information on structures such as bridges and weirs, and inflow hydrographs to the river for a particular flood.

All models require calibration and verification to be able to confidently predict flood behaviour. This involves modelling historic flood events and comparing computed results with observed flood levels. Model parameters are then adjusted to improve the "fit" between computed and recorded levels.

The best data available for model calibration and verification is for the 1988 and 1986 flood events. Complete stage hydrographs are available at Cambridge Avenue for both events, allowing an ideal comparison between observed and computed results.

The approach taken in this study has been to calibrate the MIKE-11 model to the 1988 flood by adjusting model parameters, principally the Manning's roughness coefficient. The model has then been verified with the 1986 flood, without further adjustment to these parameters.

After calibration and verification, design flow hydrographs have been input to the model to determine estimates for design flood levels throughout the study area. Design flood level estimates have been computed for the 1 in 100 year flood, 1 in 50 year flood and 1 in 20 year flood. An estimate has also been prepared for probable maximum flood.

4.0 FLOOD FLOW ESTIMATES

All estimates of flood flows have been extracted from the Georges River Flood Study [PWD,1991]. These estimates were based on hydrologic modelling of the Georges River using the Watershed Bounded Network Model. The catchment upstream of Liverpool was subdivided into 49 separate sub-areas for the analysis, as represented in Figure 4. A complete description of the modelling technique is available in the 1991 flood study report.

Flood flow estimates are required for both historic and design flood events. The historic estimates are required for calibration and verification of the MIKE-11 hydraulic model. The 1988 flood was selected for calibration, and the 1986 flood selected for verification. The Public Works Department also gauged these two floods at the William Long Bridge, which is just downstream of Liverpool weir.

4.1 1988 Flood Flows

Heavy rain commenced falling over the Georges River catchment on the 28th April 1988. This continued for 3 days, with the heaviest falls occurring on the 30th April. Nine pluviometer stations within the Georges River catchment recorded the temporal pattern for the storm, whilst total rainfall depths were recorded at numerous daily read rain gauges. The heaviest rainfalls were recorded in the upper catchment, with 440mm recorded at Darkes Forest. The rain was less intense over the lower catchment area, with 330 mm recorded at Liverpool.

River flood heights gradually rose over the first 2 days, and then rose more rapidly on the 30th April, coinciding with the heavier rainfall intensities. The peak of the flood occurred around 6pm at Liverpool, which was recorded at 7.3m AHD.

The estimated 1988 flow hydrograph, for the upstream limit of the study area, is represented in Table 1. The hydrograph is based on that given in the 1991 flood study for Liverpool, advanced by 1 hour to allow for time differences over the 6.5 km reach upstream of Liverpool.

4.2 1986 Flood Flows

The 1986 flood was a result of heavy rain falling over the Georges River catchment between the 4th August and 7th August. The rainfall was fairly evenly distributed over a 66 hour period. It was recorded at 5 pluviometers within the Georges River catchment, and numerous daily read stations. The distribution of rainfall over the catchment was fairly similar to that experienced in the 1988 flood, in that the heaviest rainfall was recorded in the upper parts of the catchment. At total rainfall of 565 mm was recorded at Cobbong, reducing to 380 mm at Liverpool.

The flood peaked at a height of 7.4m AHD at Liverpool, at about 10:00am on 6th August.

The estimated 1986 flow hydrograph at the upstream limit of the study area is represented in Table2.

Table 1 - Flow Hydrograph for 1988 Flood [PWD, 1991]

Date	Time (hrs)	Flow (m^3/s)	Date	Time (hrs)	Flow (m^3/s)
29/4/88	0:00	179	30/4/88	6:00	369
	1:00	200		7:00	415
	2:00	199		8:00	484
	3:00	189		9:00	581
	4:00	173		10:00	650
	5:00	156		11:00	706
	6:00	137		12:00	754
	7:00	129		13:00	795
	8:00	128		14:00	849
	9:00	127		15:00	870
	10:00	140		16:00	830
	11:00	159		17:00	839
	12:00	180		18:00	810
	13:00	208		19:00	764
	14:00	230		20:00	723
	15:00	248		21:00	665
	16:00	254		22:00	615
	17:00	263		23:00	572
	18:00	263		24:00	516
	19:00	262	1/5/88	1:00	453
	20:00	261		2:00	381
	21:00	254		3:00	311
	22:00	250		4:00	241
	23:00	257		5:00	181
	24:00	265		6:00	145
30/4/88	1:00	273		7:00	121
	2:00	285		8:00	105
	3:00	296			
	4:00	318			
	5:00	344			

Table 2 - Flow Hydrograph for 1986 Flood [PWD, 1991]

Date	Time (hrs)	Flow (m^3/s)	Date	Time (hrs)	Flow (m^3/s)
5/8/86	4:00	0	6/8/86	10:00	800
	5:00	0		11:00	760
	6:00	0		12:00	695
	7:00	0		13:00	635
	8:00	45		14:00	580
	9:00	50		15:00	550
	10:00	55		16:00	550
	11:00	68		17:00	575
	12:00	95		18:00	595
	13:00	125		19:00	590
	14:00	180		20:00	565
	15:00	235		21:00	530
	16:00	280		22:00	465
	17:00	330		23:00	405
	18:00	375		24:00	340
	19:00	420	7/8/86	1:00	275
	20:00	465		2:00	225
	21:00	510		3:00	185
	22:00	545		4:00	165
	23:00	600		5:00	145
	24:00	670		6:00	131
6/8/86	1:00	730		7:00	118
	2:00	760		8:00	105
	3:00	785			
	4:00	795			
	5:00	815			
	6:00	820			
	7:00	825			
	8:00	840			
	9:00	835			

4.3 Design Flood Flows

Design flow hydrographs were also computed in the 1991 flood study. Storm durations ranging from 12 hours to 72 hours were considered, with the 36 hour storm producing the highest peak flows at Liverpool.

Design flows calculated from the 1991 study are also applicable to the current study. Complete flow hydrographs for the 20 year, 50 year and 100 year flood, along with an estimate for the extreme flood, are represented in Table 3. These are based on the Liverpool hydrographs, advanced by 1 hour to allow for time differences through the study area. The extreme flood is based on estimates of the probable maximum precipitation for the catchment.

Table 3 - Design Flow Hydrographs (m^3/s) [PWD, 1991]

Time (hrs)	20 Year Flood	50 Year Flood	100 Year Flood	Extreme Flood
0	0	0	0	1
1	0	0	0	35
2	0	0	0	116
3	0	0	0	275
4	0	0	0	574
5	0	0	0	1006
6	0	0	0	1503
7	0	0	0	1986
8	0	1	2	2412
9	1	4	7	2749
10	3	9	15	2992
11	6	16	26	3147
12	12	30	49	3243
13	23	56	90	3311
14	43	104	159	3341
15	79	179	262	3367
16	158	309	426	3366
17	295	499	653	3377
18	487	736	928	3391
19	729	1010	1237	3407
20	986	1281	1537	3389
21	1208	1500	1769	3358
22	1339	1614	1877	3349
23	1368	1620	1861	3347
24	1313	1537	1747	3364
25	1197	1393	1567	3342
26	1049	1220	1365	3310
27	901	1052	1172	3237
28	764	898	998	3150
29	643	763	847	3058
30	541	464	717	2976
31	454	547	605	2910
32	381	461	510	2828
33	320	389	429	2718
34	270	327	360	2596
35	227	275	302	2479
36	192	232	253	2307
37	162	195	213	2071
38	138	165	179	1792
39	117	140	152	1506
40				1244
41				1014
42				831
43				679

5.0 HYDRAULIC ANALYSIS OF FLOOD LEVELS

Flood levels in the river are computed by inputting flow hydrographs into a hydraulic model. For this study, the MIKE-11 hydraulic model has been selected as the most appropriate model in which to analyses flood behaviour in the Upper Georges River. MIKE-11 is an unsteady state, dynamic model, which is capable of modelling both the rise and fall of the flood, as well as accounting for any flood storage effects that may occur along the river.

5.1 Mike-11 Model Description

The MIKE-11 model consists of 40 cross sections that describe the topography of the river. These sections are spaced at intervals of approximately 150 to 200m. The location of cross sections is shown on Figure 5. They have been numbered P1 to P42, and have also been assigned a chainage, with the upper cross section (P1) having an arbitrary chainage of 100.000 km and the most downstream section (P42) having a chainage of 106.530 km. These sections have been reproduced in Appendix 1.

Additional information is used to describe any structures, such as bridges, that are likely to have an impact on flood levels. Whilst there are several road and railway bridges that cross the river, only the Cambridge Avenue causeway is likely to have an impact, particularly in smaller floods. The other structures have been ignored for modelling purposes, with the exception of the East Hills railway bridge, where a large part of the river was dammed off to facilitate its construction in 1986. Modelling of the 1986 flood has included this restriction.

The model requires boundary conditions at both the upstream and downstream limits of the study area. The upstream boundary consists of a flow hydrograph, such as presented in Tables 1, 2 and 3. The downstream limit usually consists of a stage hydrograph, but as there is a weir at the downstream limit of the study area, a rating curve of stage versus flow is appropriate. A detailed rating curve of the Liverpool weir is available, and is represented on Figure 6. The rating curve has been developed over many years, through flood gaugings carried out by both the Water Board and the Public Works Department. The highest gauged flows were the 1988 and 1986 floods. Extrapolation beyond this level has been achieved through physical modelling, undertaken as part of the Georges River Flood Study [PWD,1991].

There are a number of parameters that can be adjusted in the MIKE-11 model. The main parameter is the Manning's Roughness coefficient, which allow for river and overbank roughness characteristics to be accounted for. Initial values are usually determined based on experience or reference to standard hydraulic texts. The parameters are fine tuned after comparing observed and calculated results for one or more historic floods.

The adopted approach for this study has been to calibrate the MIKE-11 model to the April 1988 flood. The model has then been verified against the August 1986 flood, without further modification to the calibration parameters.

5.2 1988 Model Calibration

The April 1988 inflow flood hydrograph (Table 1) was input to the MIKE-11 model and

flood levels computed throughout the study area. Computed flood hydrographs were compared with the hydrograph recorded by the State Emergency Services at Cambridge Avenue. Calibration was undertaken by adjusting Manning's roughness coefficients until a reasonable match between computed and observed levels was achieved.

First attempts at calibration produced computed flood levels that were lower than observed levels. Roughness coefficients were increased to improve the comparison, but it was not completely possible to match peak heights without unrealistically high values of roughness coefficients. The hydrographs show remarkably similar shapes, with computed levels slightly higher than observed levels during the rise and fall of the flood, but about 0.4m lower at the peak of the flood. A comparison of the two hydrographs is indicated on Figure 7.

Flow estimates were reviewed by comparison with flows gauged by the Public Works Department for this event, immediately downstream of Liverpool. Whilst there may also be inaccuracies associated with gauging river flows, the maximum flow gauged was some 7% higher than the peak flow estimates provided from the 1991 flood study. Thus estimated peak flows may have been slightly underestimated for this event. An increase in estimated peak flows of 15% would be sufficient to match the observed peak height at Cambridge Avenue, as shown on Figure 8. This adjustment has been made to the 1988 flows only.

After allowing for a possible slight underestimation in peak flows from the 1991 study, the model was considered to be suitable calibrated.

5.3 1986 Model Verification

The August 1986 inflow flood hydrograph was input to the MIKE-11 model and flood levels computed throughout the study area. The computed stage hydrograph at Cambridge Avenue was compared against the levels observed by the State Emergency Services, without further adjustment to calibration coefficients.

The comparison between computed and observed hydrographs is indicated on Figure 9. The overall shape of the two hydrographs is very similar, with peak flood heights again being about 0.3m below the observed level. Possible reasons for the difference is an underestimation of the restriction caused by the construction of the East Hills railway bridge, or an underestimation of peak flows from the 1991 study. However, the comparison is generally good, and the model reasonably well verified.

5.4 Design Flood Level Estimation

Adopted roughness coefficients determined from the calibration and verification are represented in Table 4.

With the model suitably calibrated and verified, design flood flows (Table 3) were input to the model to calculate design flood levels throughout the study area. The sensitivity of the results from the model to possible variations in model parameters, or inaccuracies in estimating flood flows, were tested prior to adopting the design flood profiles.

The sensitivity tests are described in the following Section, with adopted design flood levels presented in Section 6.

Table 4 - Adopted Roughness Coefficients for MIKE-11

Section (Fig. 5)	Chainage (km)	Left Bank	Mid Channel	Right Bank
P1	100.000	0.09	0.04	0.13
P2	100.225	0.09	0.04	0.13
P3	100.450	0.09	0.04	0.13
P4	100.630	0.09	0.04	0.13
P5	100.835	0.10	0.04	0.13
P6	101.005	0.10	0.04	0.13
P6.4	101.057	0.10	0.04	0.13
P6.6	101.072	0.10	0.04	0.13
P7	101.120	0.13	0.04	0.13
P8	101.270	0.13	0.04	0.13
P9	101.440	0.13	0.04	0.13
P10	101.650	0.10	0.04	0.13
P11	101.795	0.10	0.04	0.10
P12	101.990	0.09	0.04	0.09
P13	102.185	0.09	0.04	0.10
P14	102.390	0.13	0.04	0.13
P15	102.535	0.13	0.04	0.10
P16	102.730	0.13	0.04	0.13
P17	102.930	0.13	0.04	0.06
P18	103.125	0.13	0.04	0.06
P19	103.230	0.10	0.04	0.06
P20	103.390	0.08	0.04	0.06
P21	103.555	0.06	0.04	0.13
P22	103.700	0.06	0.04	0.13
P23	103.860	0.06	0.04	0.10
P25	104.000	0.06	0.04	0.09
P26	104.095	0.06	0.04	0.08
P28	104.185	0.06	0.04	0.08
P31	104.355	0.06	0.04	0.08
P32	104.535	0.06	0.04	0.06
P33	104.785	0.06	0.04	0.06
P34	104.960	0.06	0.04	0.06
P35	105.160	0.06	0.04	0.06
P36	105.355	0.06	0.04	0.06
P37	105.560	0.06	0.04	0.08
P38	105.720	0.06	0.04	0.08
P39	105.960	0.06	0.04	0.06
P40	106.160	0.06	0.04	0.08
P41	106.330	0.06	0.04	0.09
P42	106.530	0.06	0.04	0.09

5.5 Sensitivity Analysis

A number of trial runs were undertaken on the 100 year design flood, to test the sensitivity of the model results to possible variations in model parameters.

The time step used for computations in the model is an important parameter that can affect model stability. Too long a time step can produce unstable results, whereas too short a time step will increase computation times and computer storage requirements. The time step adopted for this study was 5 minutes. The effect of reducing the time step to 1 minute was tested for the 100 year flood. This had almost no impact on computed results, with the results varying by no more than 0.01m

Tests were also undertaken to check the effects of possible variations in assumed Manning's roughness coefficients. The roughness throughout the entire model was varied by ± 12 % (representing a variation in the main channel from 0.035 to 0.045). Results of the tests at selected locations throughout the model are represented in Table 5.

Table 5 - Sensitivity Tests to variations in Manning's Roughness Coefficients, 100 year flood (m AHD)

Section	Location	- 12 %	Adopted	+ 12 %
P1	Upstream Limit	12.71	13.21	13.68
P6.4	Cambridge Ave	12.05	12.47	12.87
P20	Old Powerhouse	10.65	10.93	11.21
P32	M5 Bridge	10.20	10.43	10.65
P42	Liverpool Weir	9.24	9.24	9.23

Design flood levels are sensitive to assumed roughness coefficients. A variation in roughness of ± 12 % can result in flood level differences of up to 0.5m. The maximum difference is at the upstream end of the model, and reduces towards the Liverpool weir.

Sensitivity to possible variations in the estimates of flood flows was investigated in the calibration phase of modelling. A 15% increase in the estimate of the peak flow was sufficient to elevate the 1988 flood by approximately 0.3m at Cambridge Ave. Thus model results are also reasonably sensitive to possible errors in the estimation of flood flows.

The main reason that the model is sensitive to roughness coefficients and flood flow estimates is that the river is deeply incised, with floodwaters largely confined within the banks of the river. Even a small change in flood volume results in a significant change in flood levels.

6.0 EXISTING FLOOD BEHAVIOUR

Design Flood levels for existing catchment and river conditions is given in Table 6. Flood levels are provided for design flood events with a probability of occurrence of 1 in 20 years, 1 in 50 years and 1 in 100 years. Also included is an estimate for an extreme flood event. The extreme flood is based on estimates of the probable maximum precipitation for the catchment.

Longitudinal flood profiles for design floods are provided on Figure 10. Flow and stage hydrographs for the 1 in 100 year flood are represented in Figures 11 and 12.

Model results are very sensitive to possible variations in assumed channel roughness and flood flow estimates, particularly in the upper reaches of the study area. A minimum freeboard of at least 0.5m is recommended to be added to these levels when applied to minimum floor level controls.

Table 6 - Design Flood Levels (m AHD)

Section	Chainage	Location	1 in 20 yr	1 in 50 yr	1 in 100 yr	Extreme
P1	100.000	B.C tributary	11.7	12.5	13.2	16.4
P2	100.225		11.5	12.3	13.0	15.9
P3	100.450		11.5	12.3	12.9	15.9
P4	100.630		11.4	12.1	12.7	15.5
P5	100.835		11.2	11.9	12.6	15.5
P6	101.005		11.1	11.9	12.5	15.2
P6.4	101.057	Cambridge Av	11.1	11.9	12.5	15.2
P6.6	101.072		10.7	11.4	12.1	14.7
P7	101.120		10.7	11.4	12.0	14.7
P8	101.270		10.7	11.4	12.0	14.7
P9	101.440		10.5	11.4	11.7	14.2
P10	101.650	EH Railway	10.4	11.2	11.6	14.1
P11	101.795		10.2	11.1	11.5	13.9
P12	101.990		10.2	10.9	11.4	13.9
P13	102.185		10.2	10.9	11.3	13.8
P14	102.390		10.1	10.8	11.2	13.5
P15	102.535	Army Stand	10.0	10.7	11.1	13.4
P16	102.730		9.8	10.6	11.0	13.2
P17	102.930		9.8	10.5	11.0	13.2
P18	103.125		9.8	10.5	11.0	13.2
P19	103.230		9.8	10.5	11.0	13.2
P20	103.390	Powerhouse	9.7	10.4	10.9	13.1
P21	103.555		9.6	10.3	10.8	12.9
P22	103.700		9.6	10.3	10.8	12.9
P23	103.860		9.6	10.3	10.8	12.9
P25	104.000		9.5	10.2	10.7	12.8
P26	104.095		9.5	10.2	10.7	12.7
P28	104.185		9.5	10.1	10.6	12.7
P31	104.355		9.4	10.0	10.5	12.5
P32	104.535	u/s M5 bridge	9.3	9.9	10.4	12.5
P33	104.785		9.2	9.8	10.3	12.3
P34	104.960		9.1	9.7	10.2	12.1
P35	105.160		9.0	9.6	10.1	12.0
P36	105.355		8.8	9.4	9.8	11.9
P37	105.560		8.7	9.3	9.8	11.8
P38	105.720		8.6	9.2	9.7	11.8
P39	105.960		8.5	9.1	9.6	11.7
P40	106.160		8.4	9.0	9.5	11.5
P41	106.330		8.4	9.0	9.4	11.3
P42	106.530	Liverpool weir	8.3	8.9	9.2	10.8

7. References

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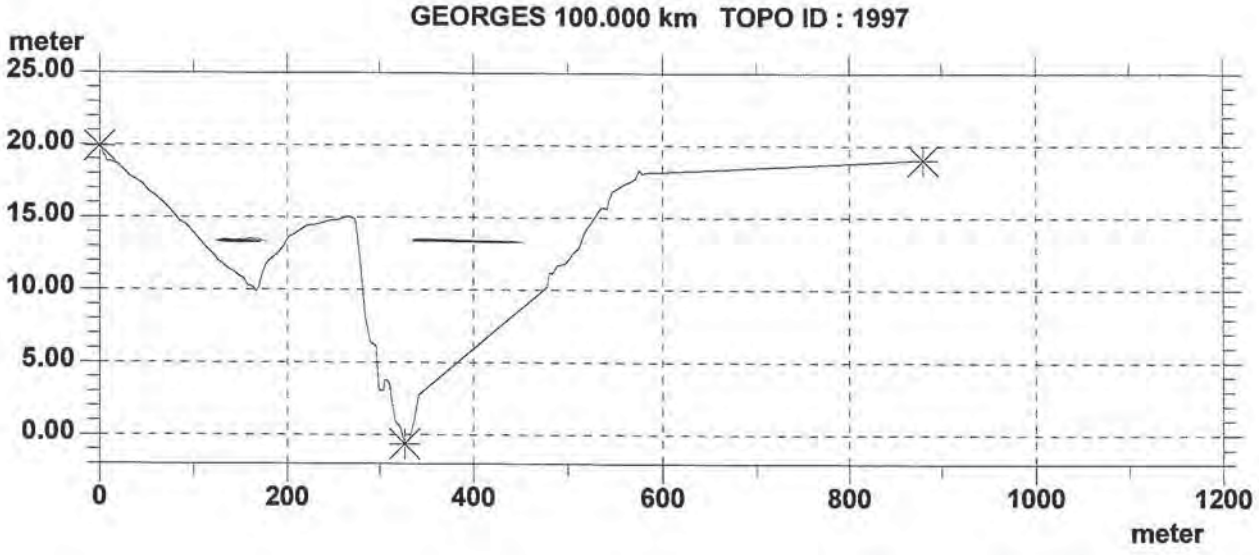
Appendix 1

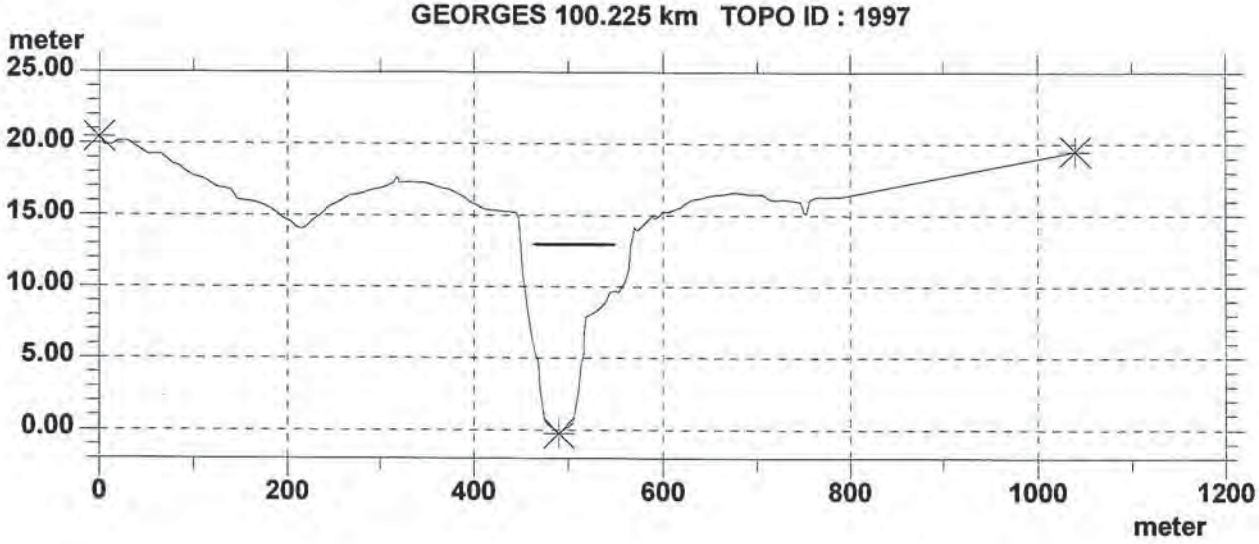
Cross Sections used in MIKE-11 Model

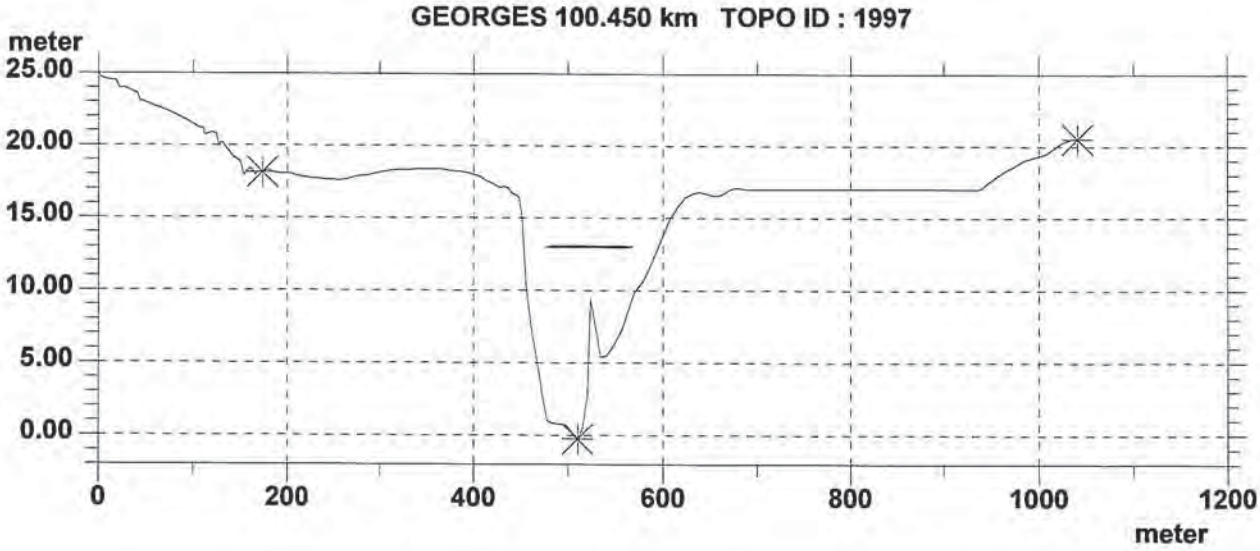
The following plots illustrate the cross sections that have been used in the MIKE-11 model. The sections start at Chainage 100.000 km. at the upstream end of the model and proceed in a downstream direction to Liverpool weir, at Chainage 106.530 km. Section names are available from Table 6, and locations are also represented on Figure 5.

The Sections are based on photogrammetric analysis of 1:5,000 scale aerial photography flown by Southern Aerial Surveys Pty Ltd in 1997, and hydrographic survey carried out by Liverpool City Council.

A short horizontal line has been placed on each Section, to represent the height of the design 100 year flood relative to the Section.







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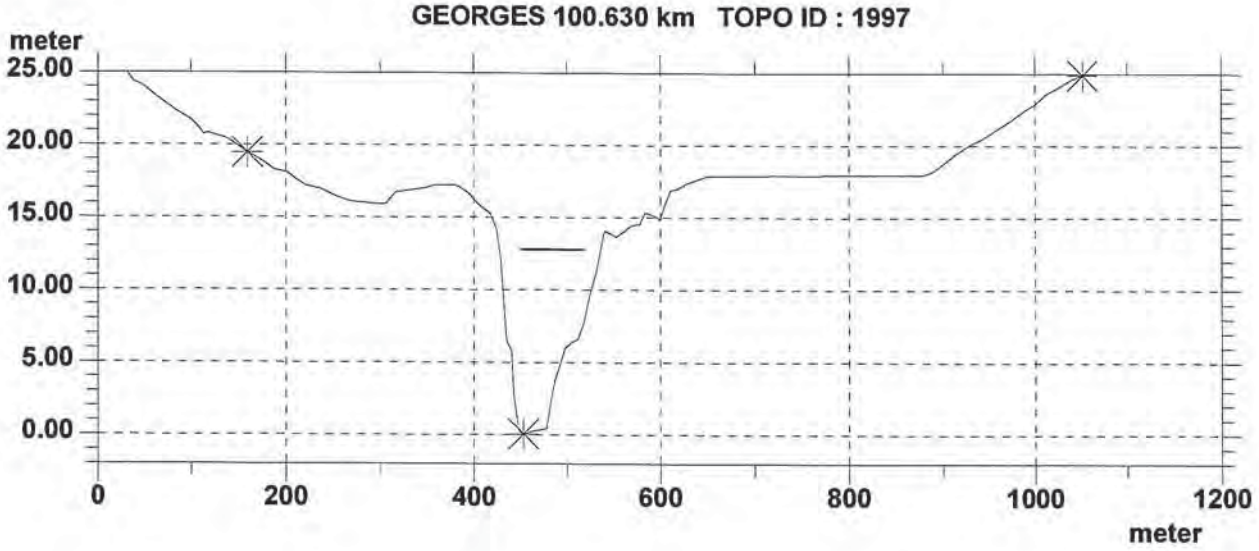

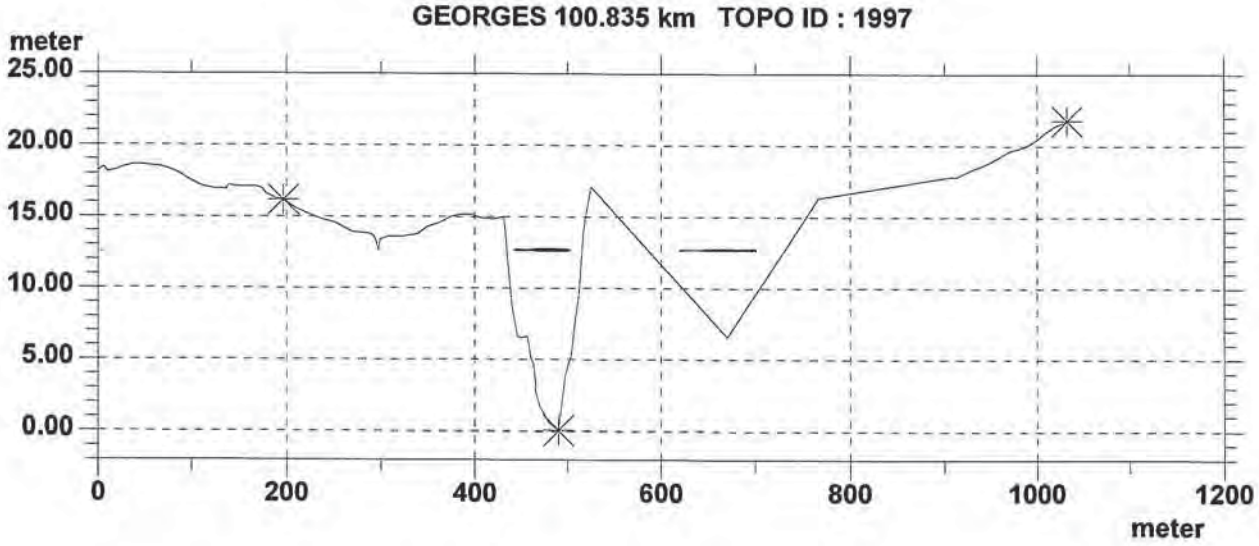

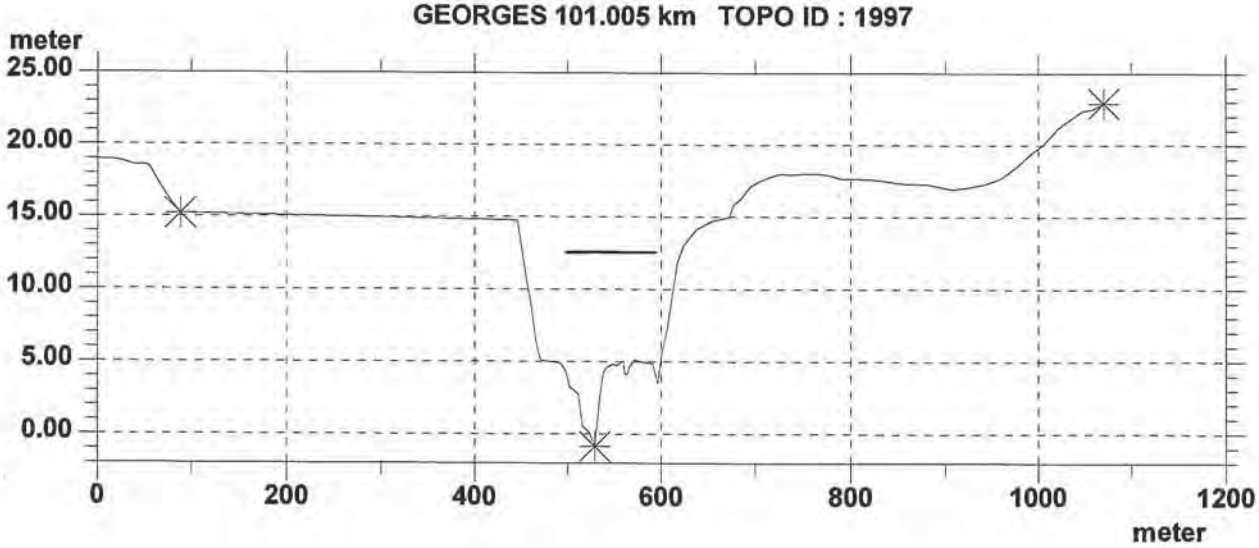

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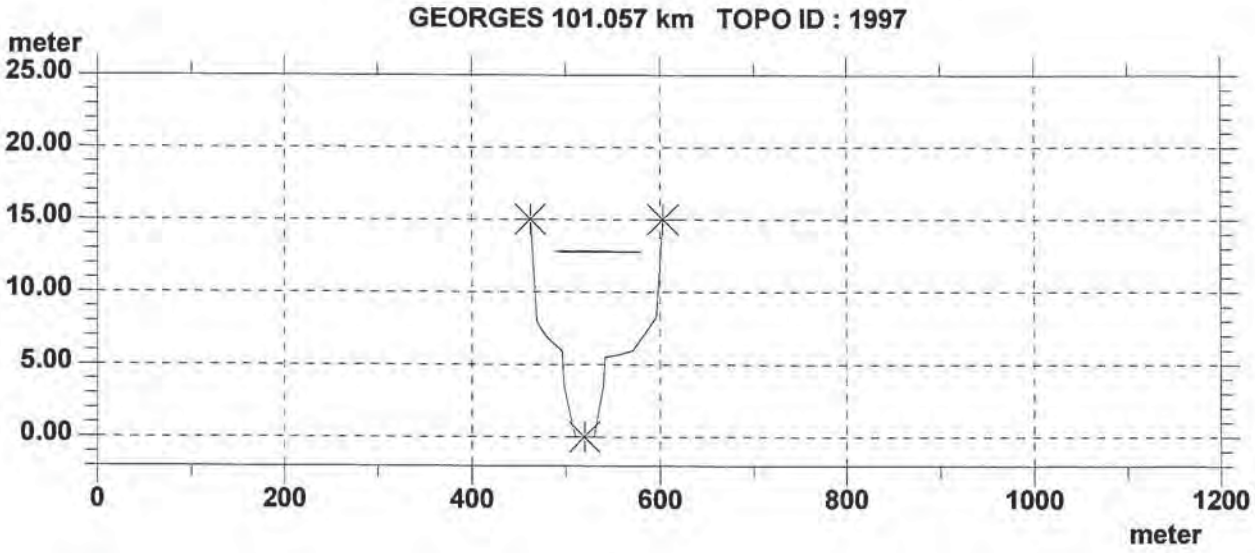

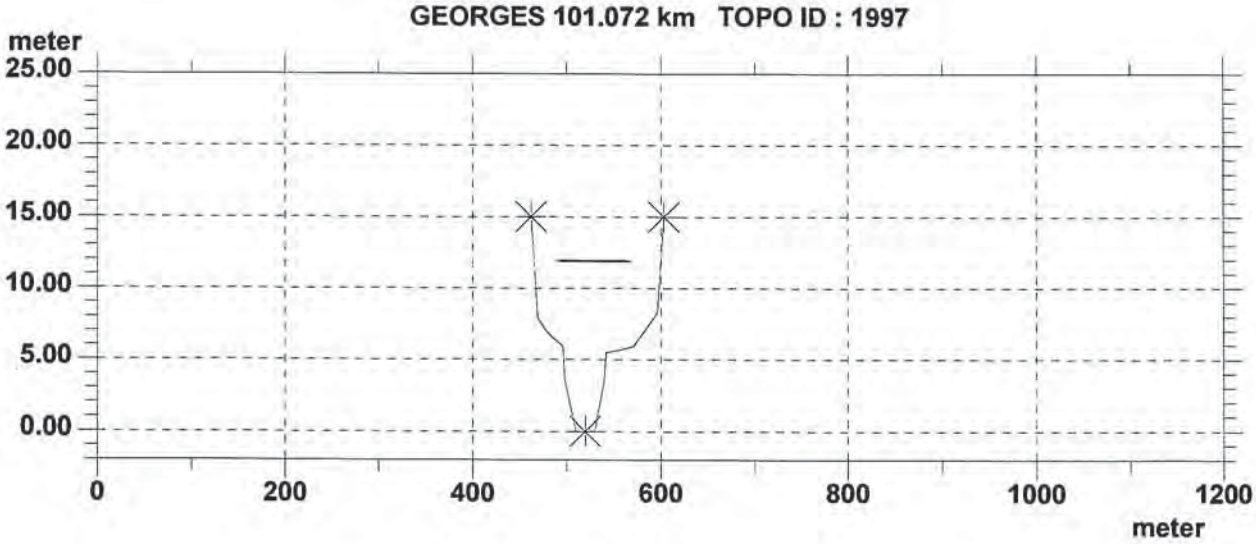

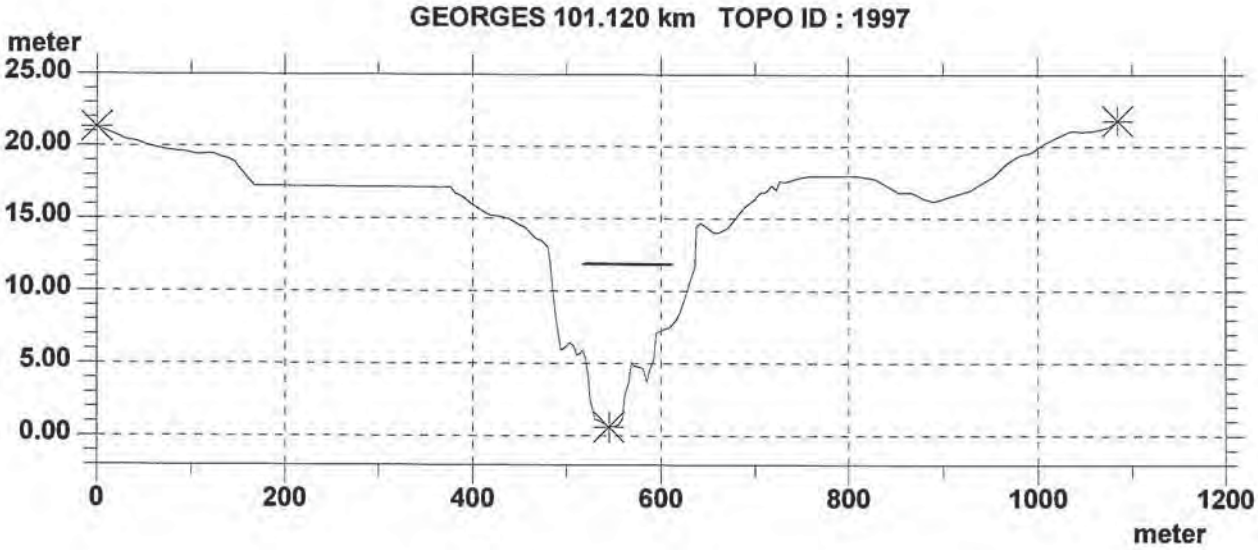

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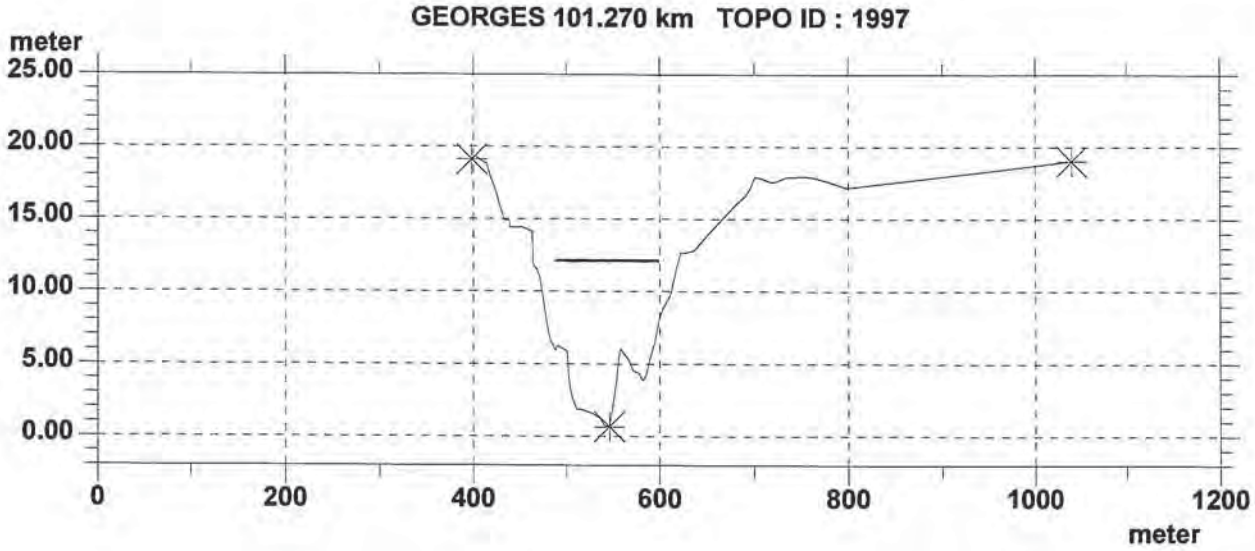

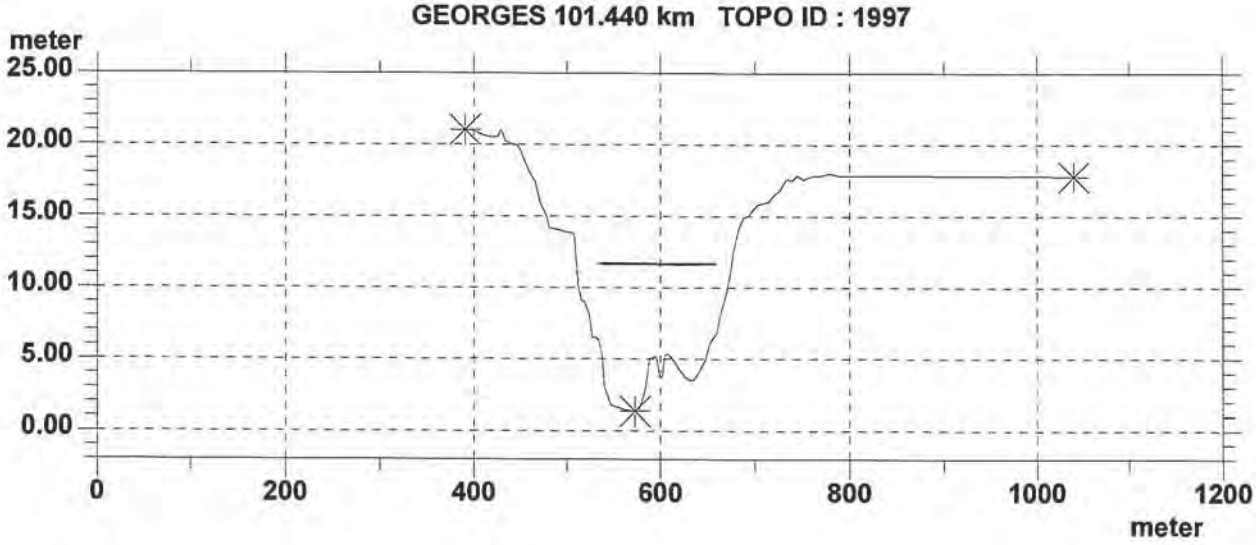

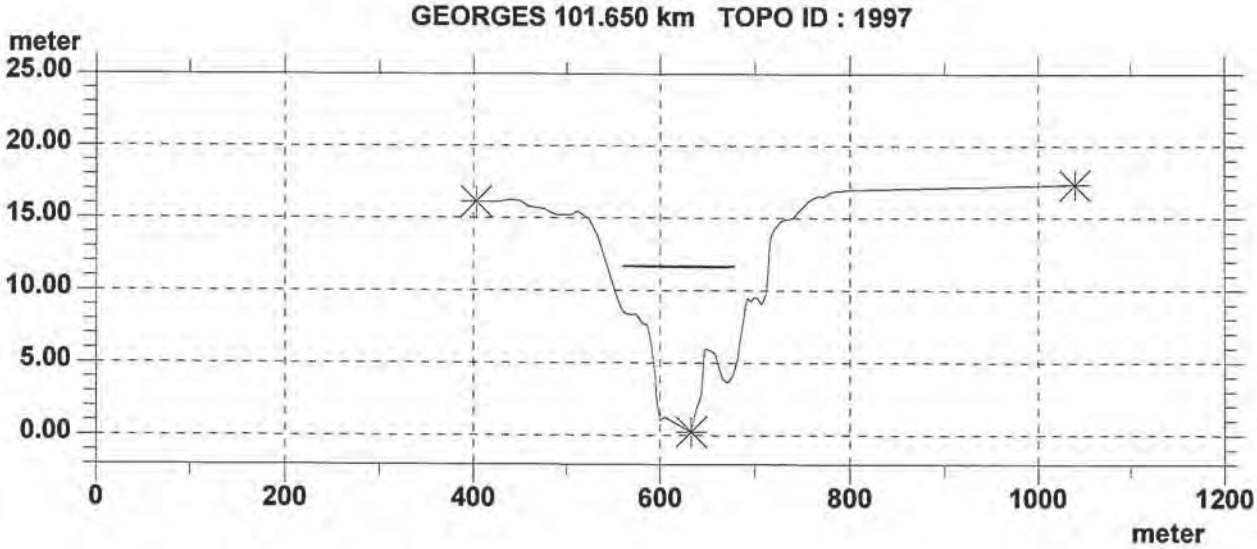

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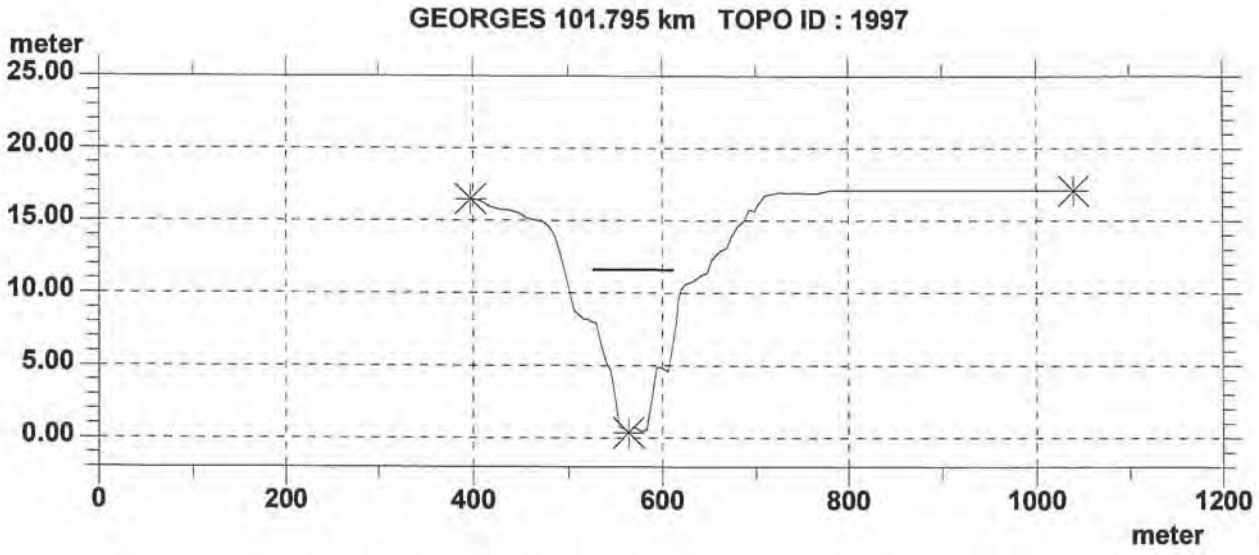

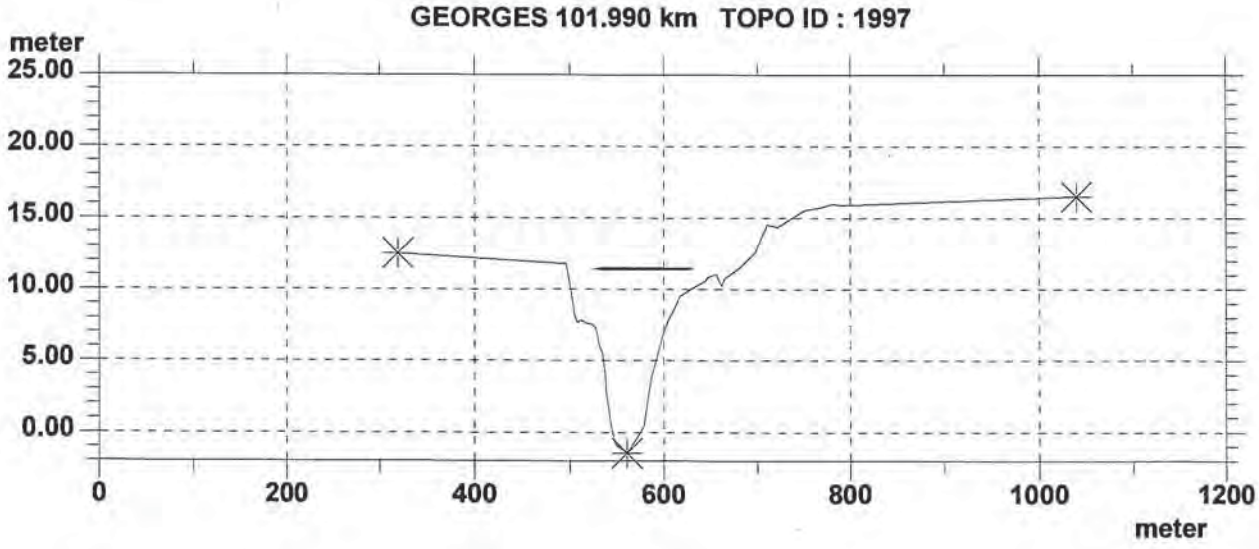

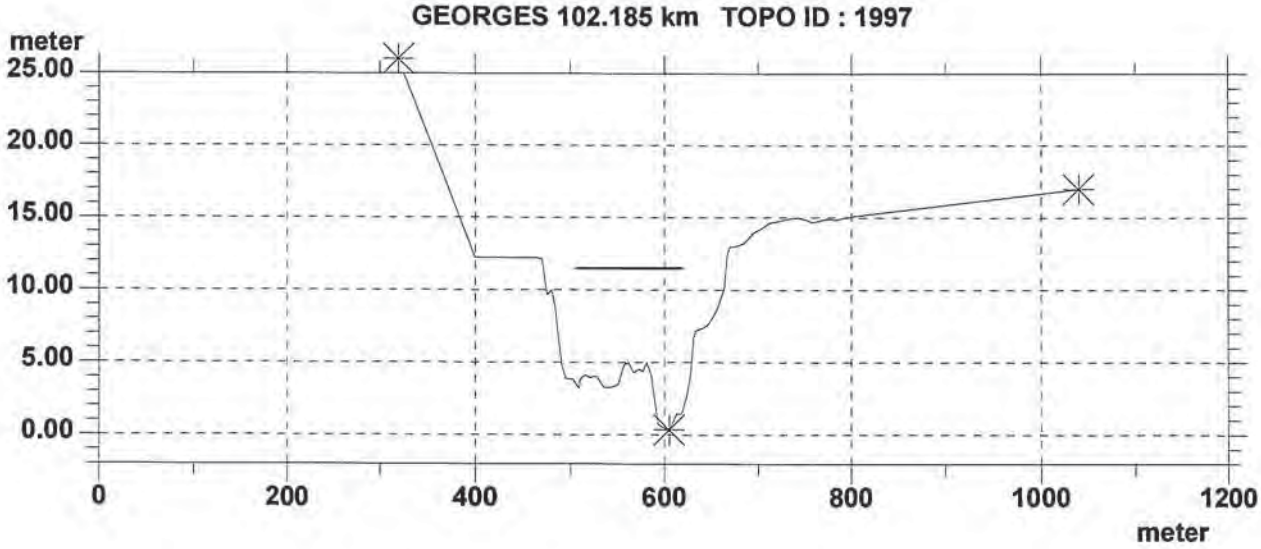

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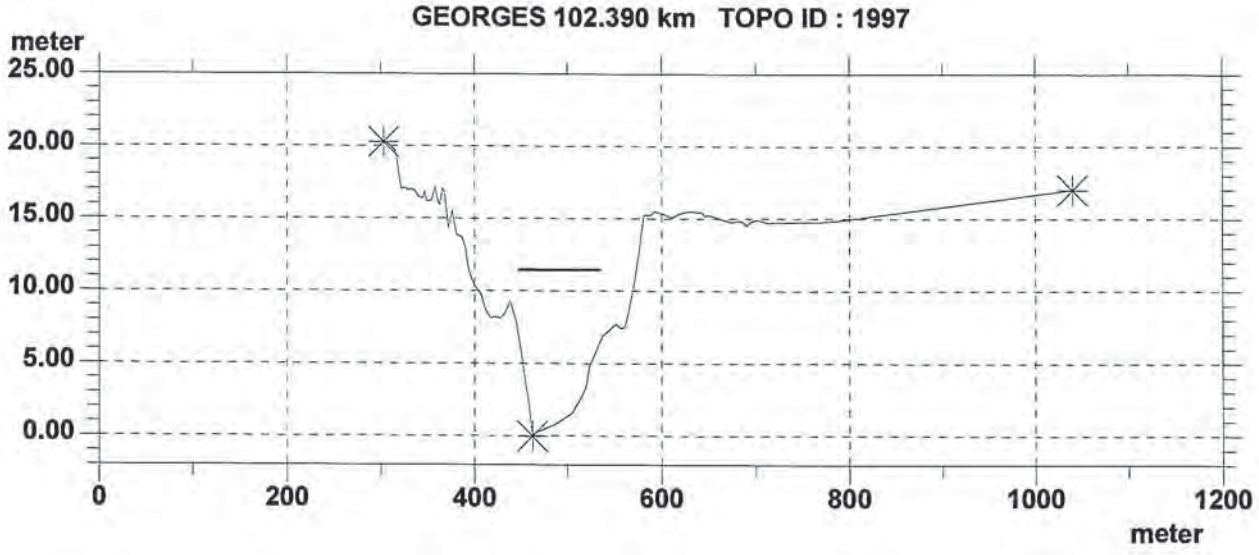

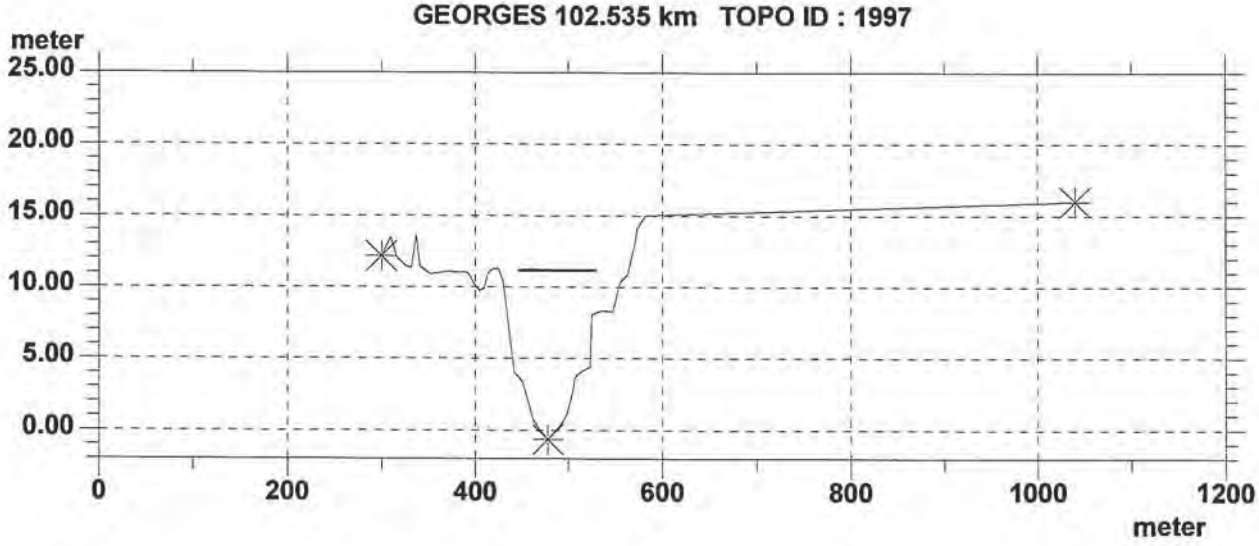

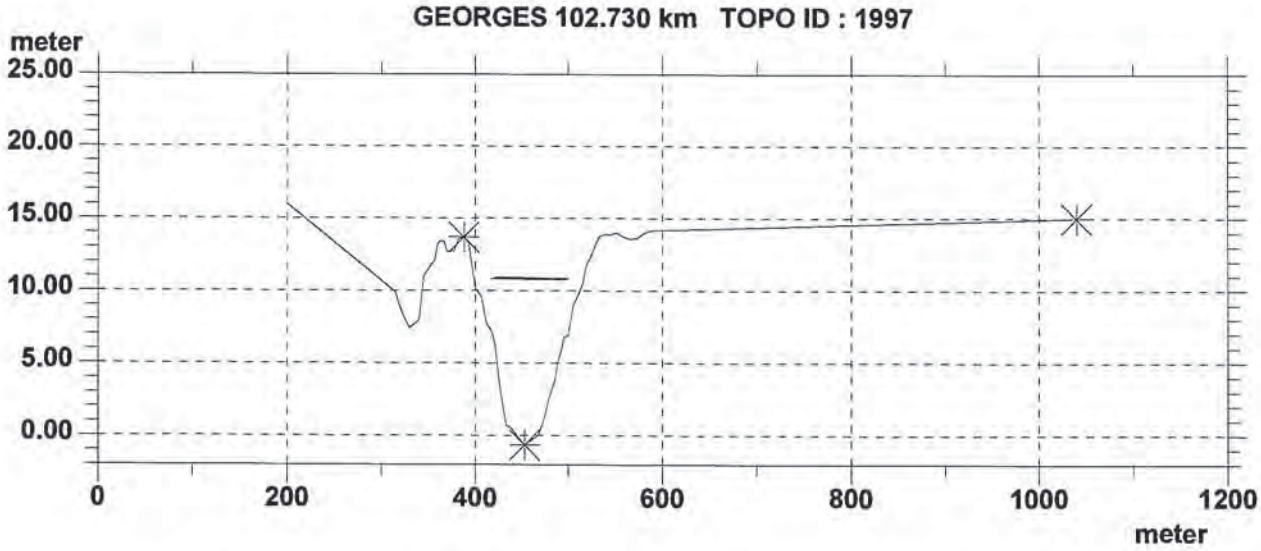

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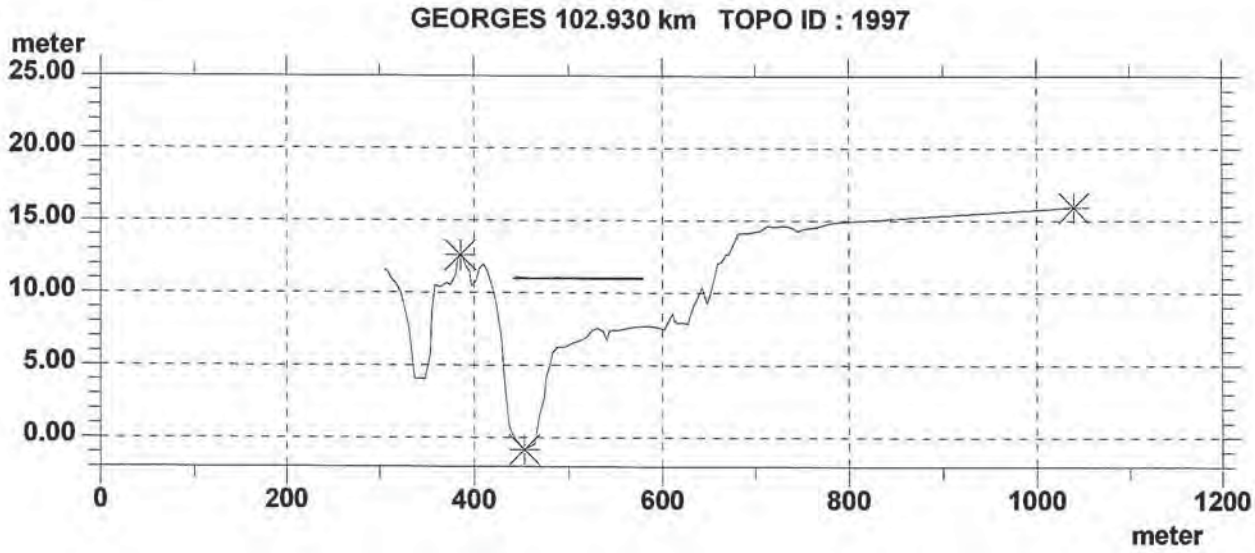

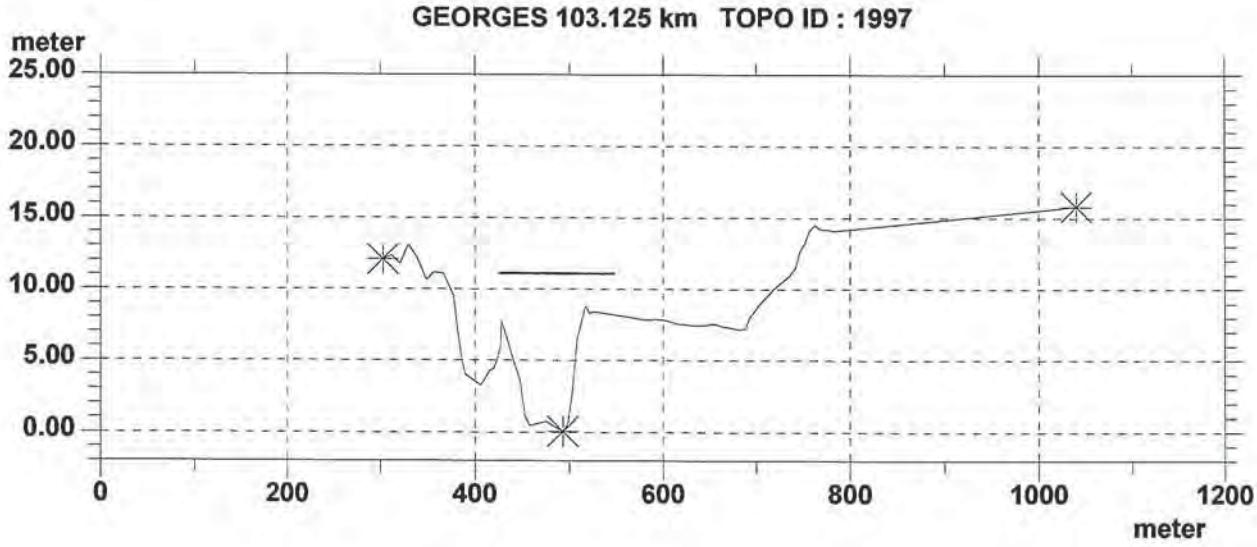

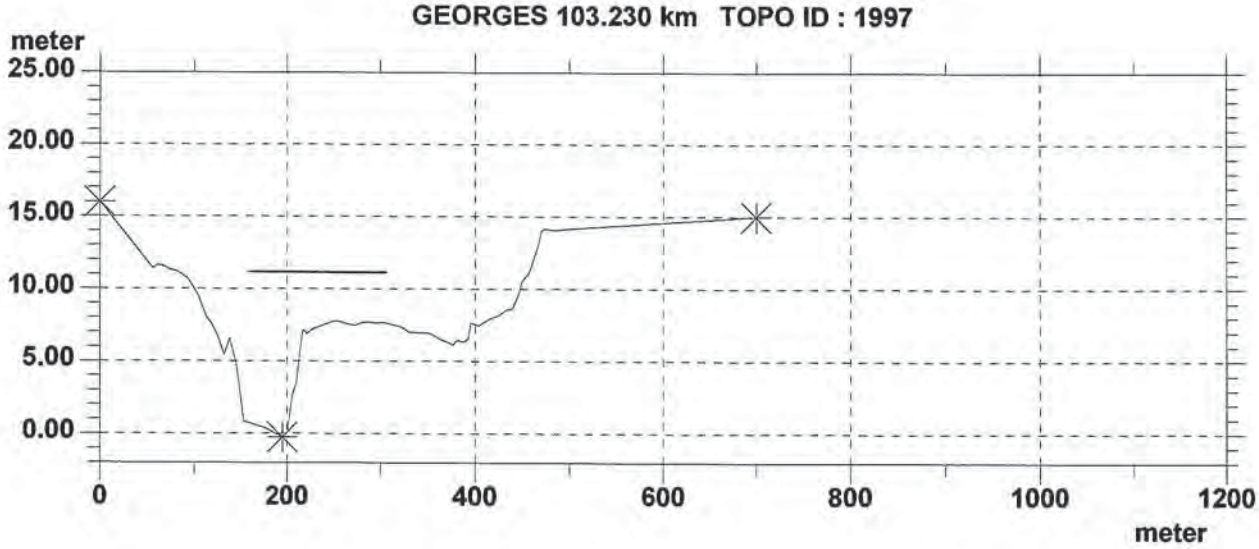

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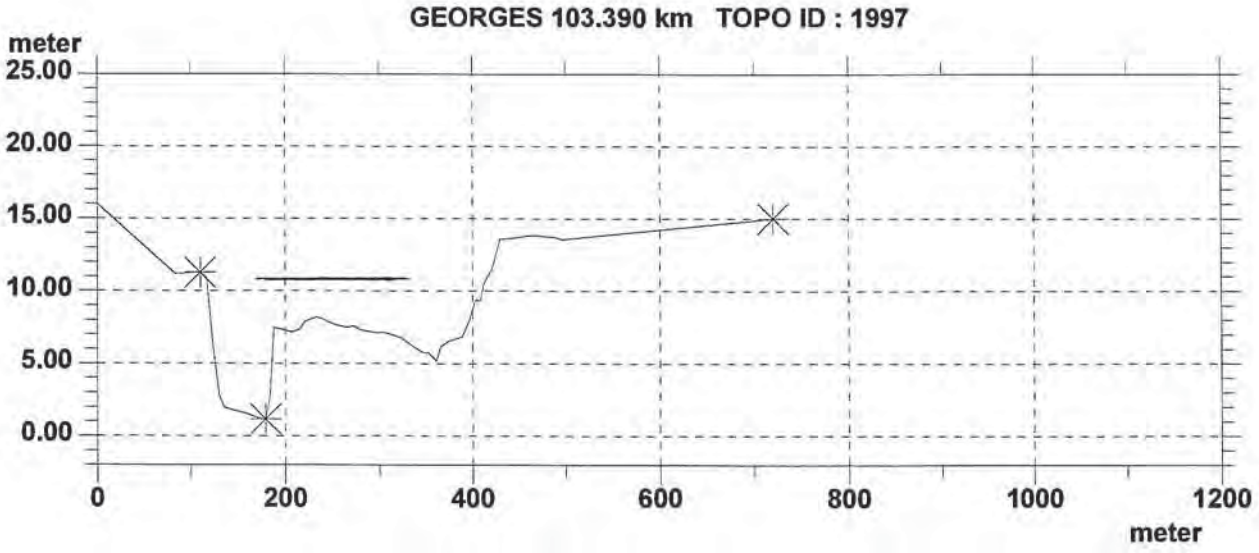

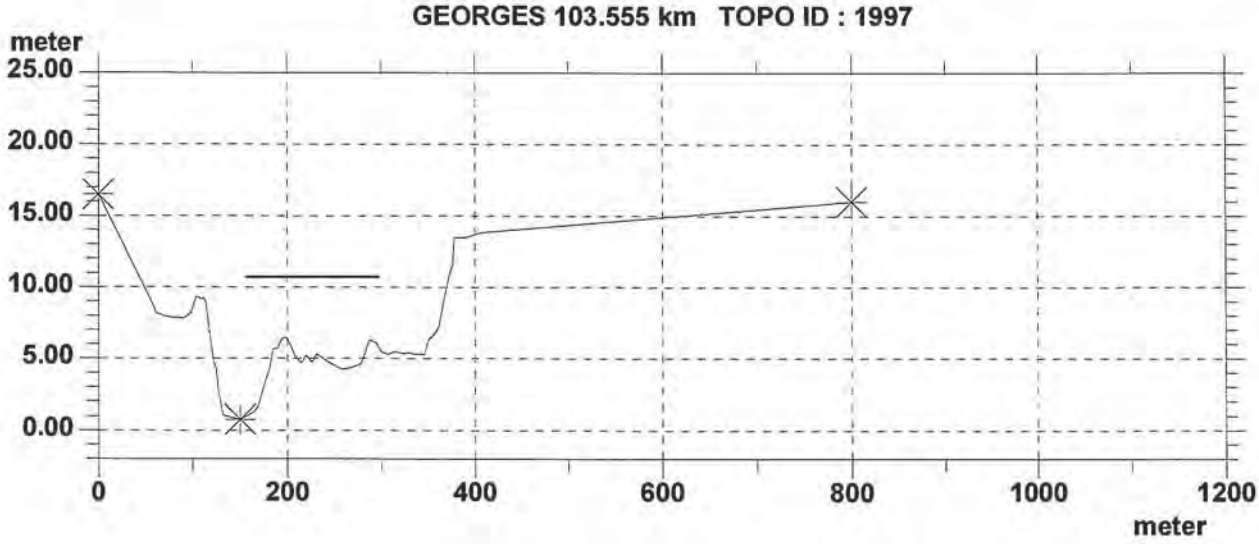

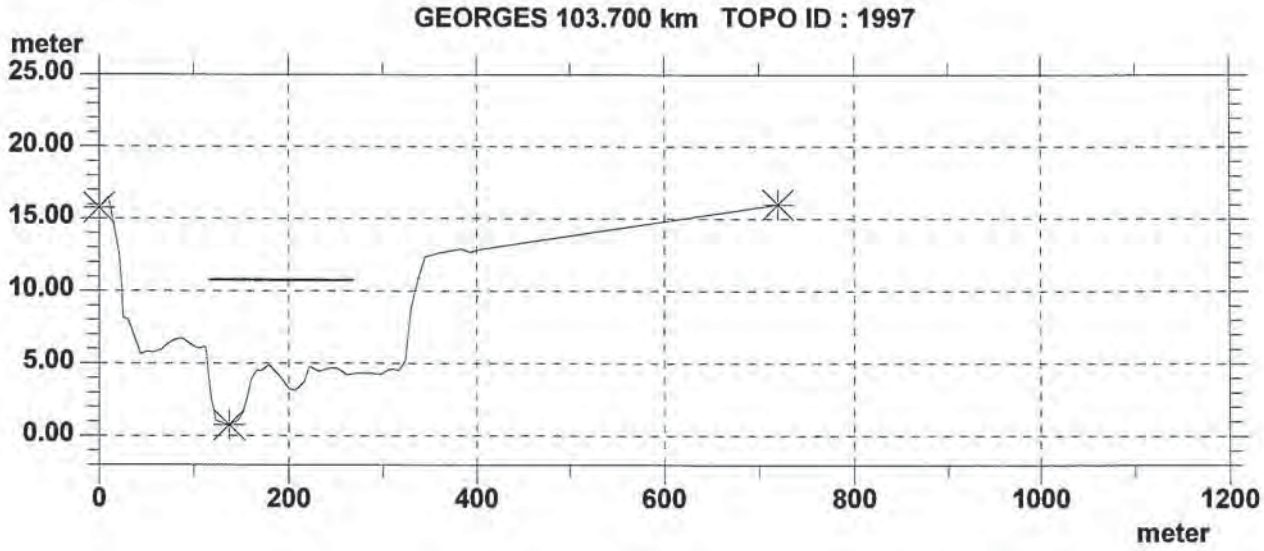

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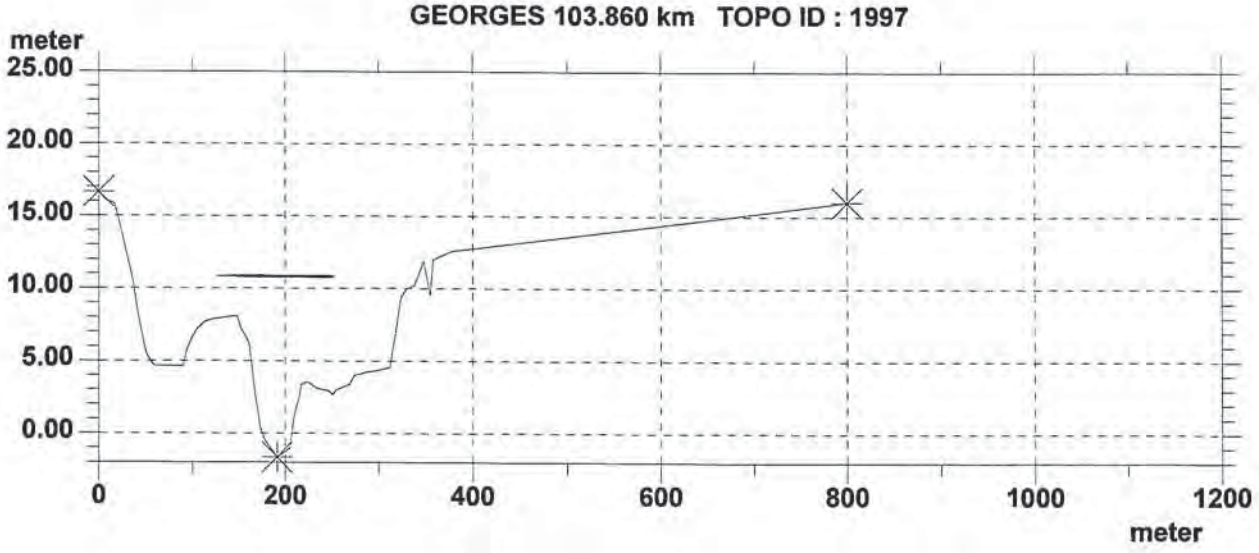

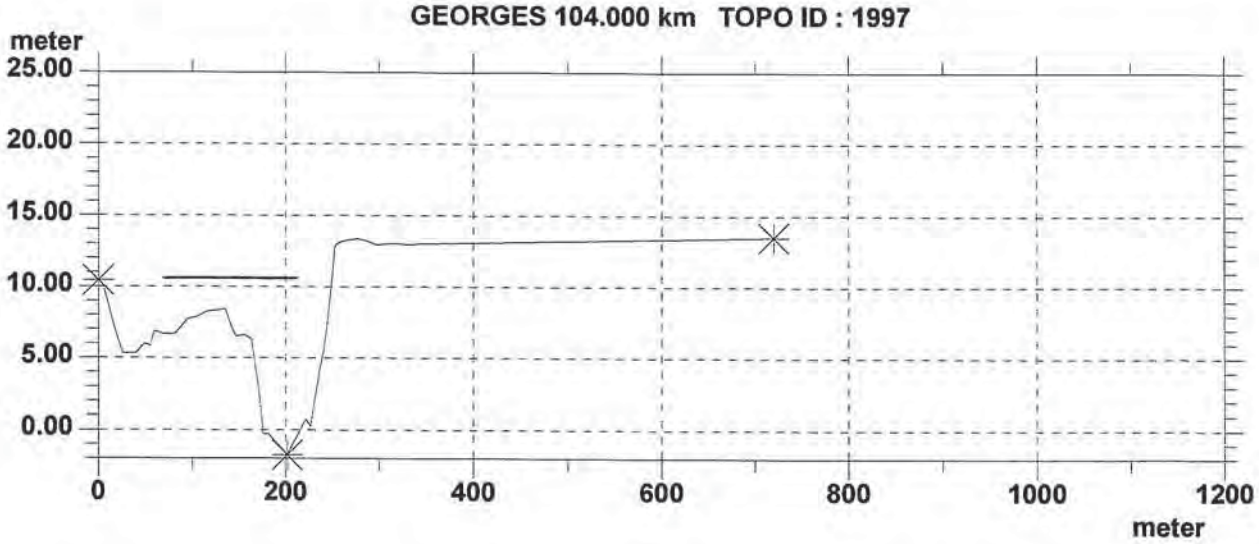

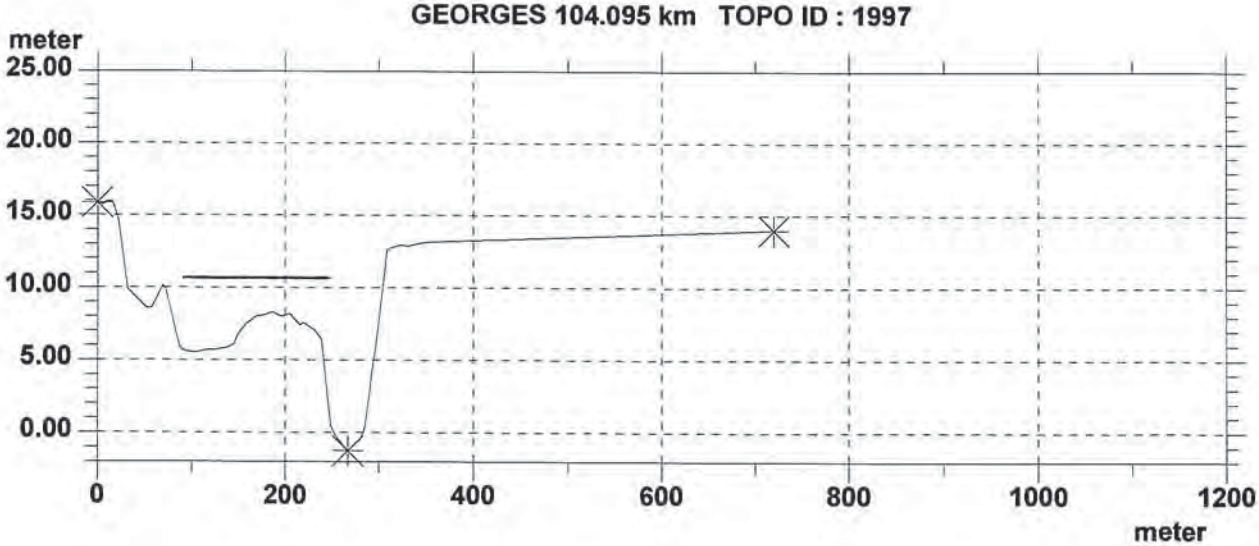

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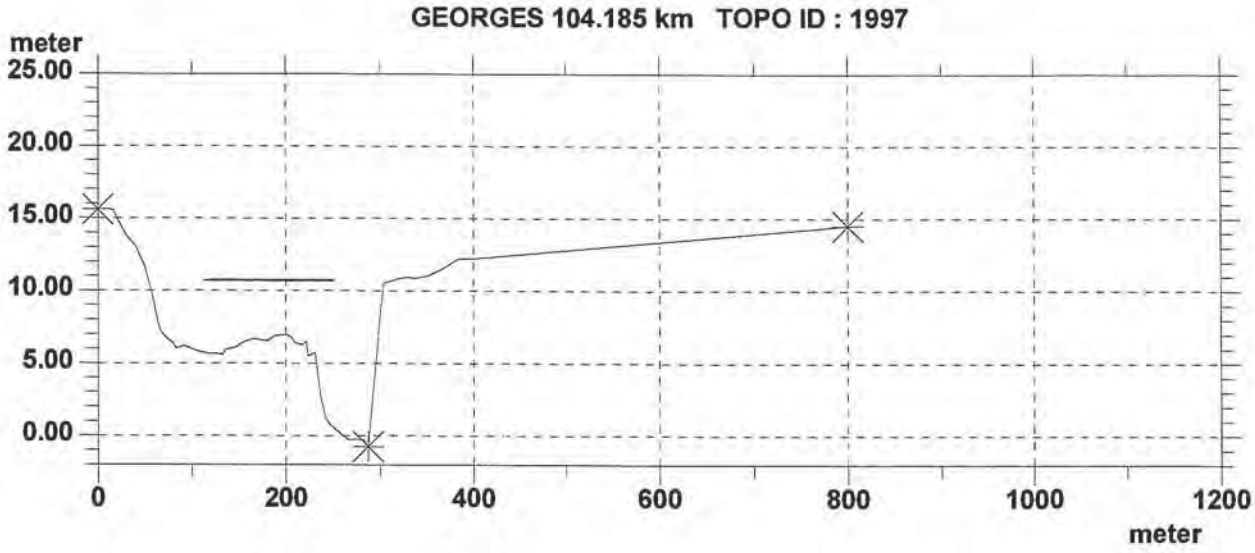

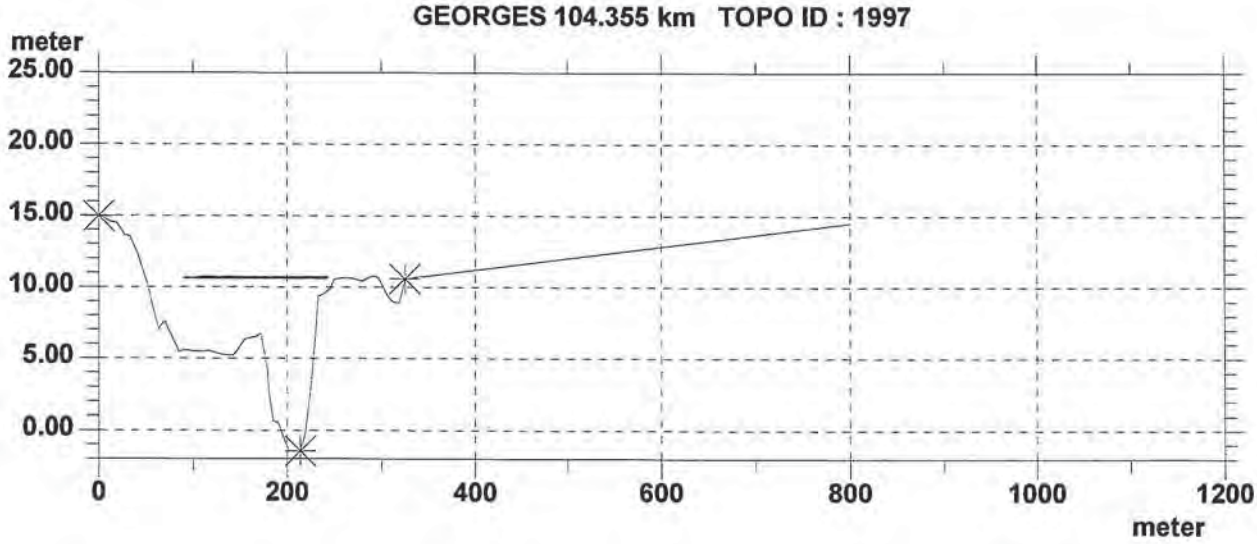

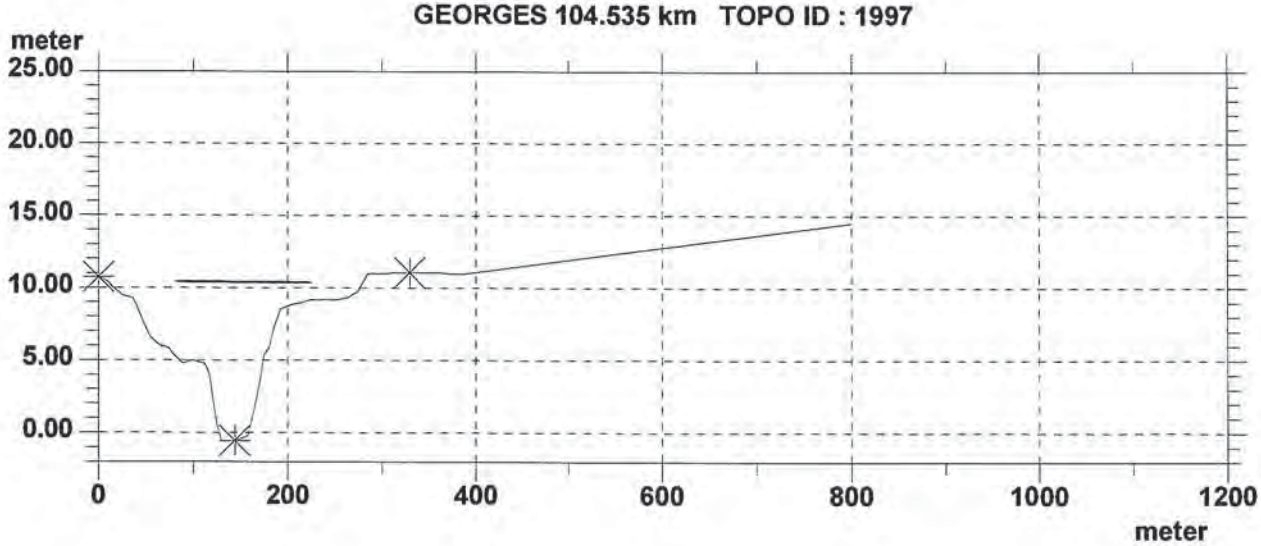

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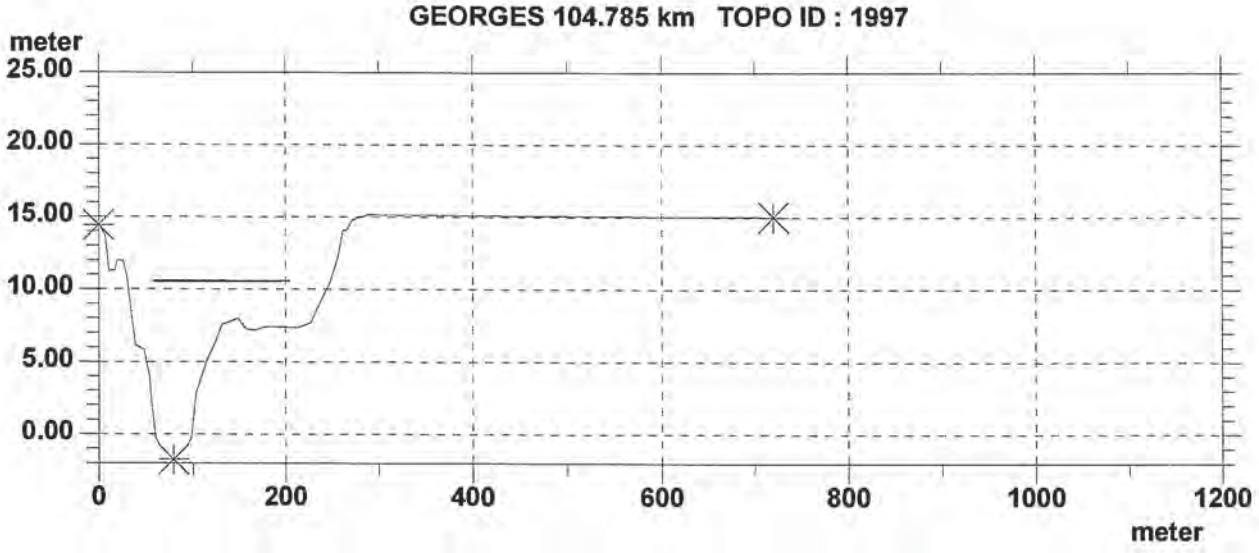

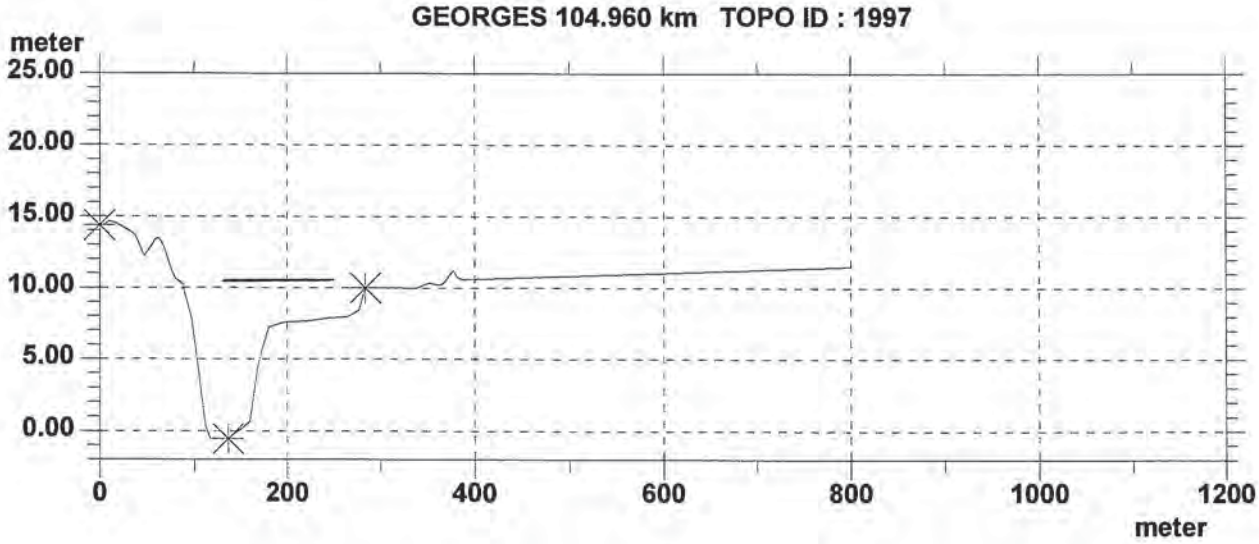

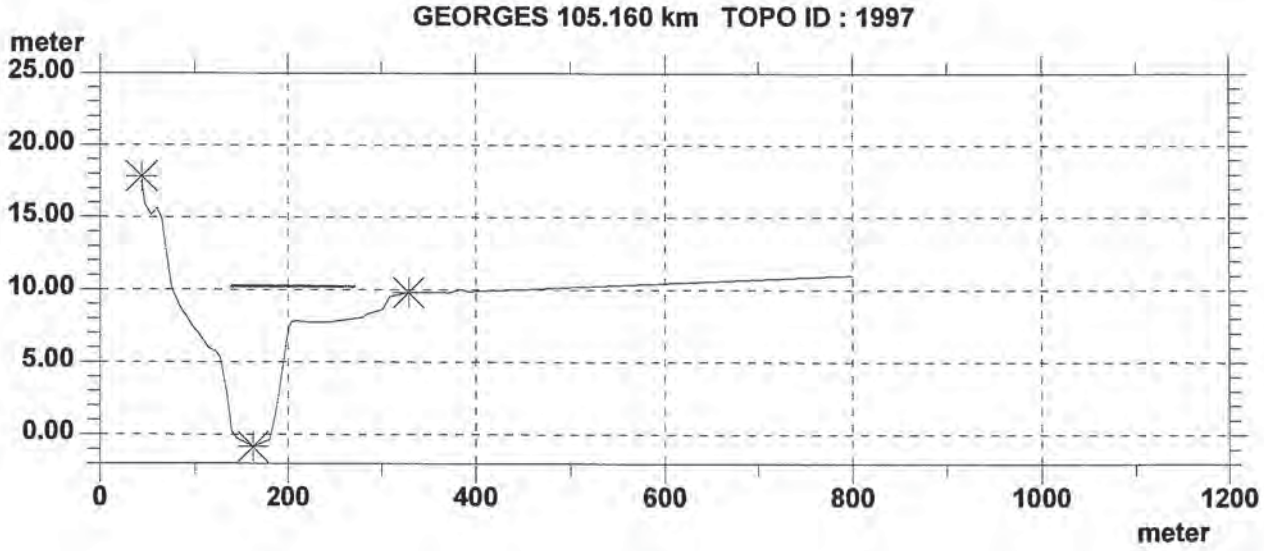

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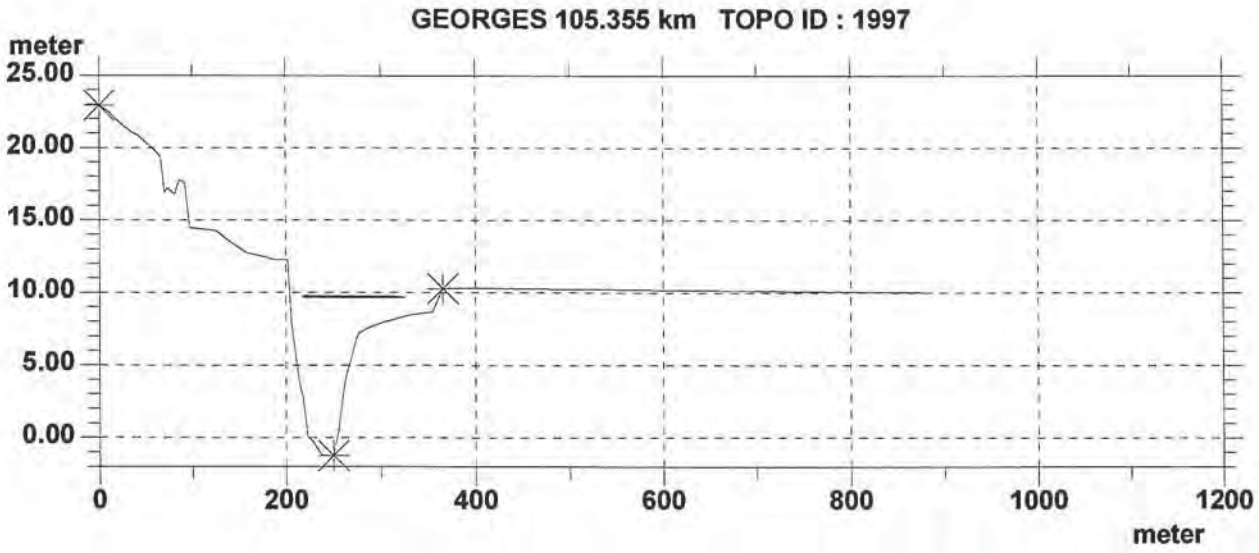

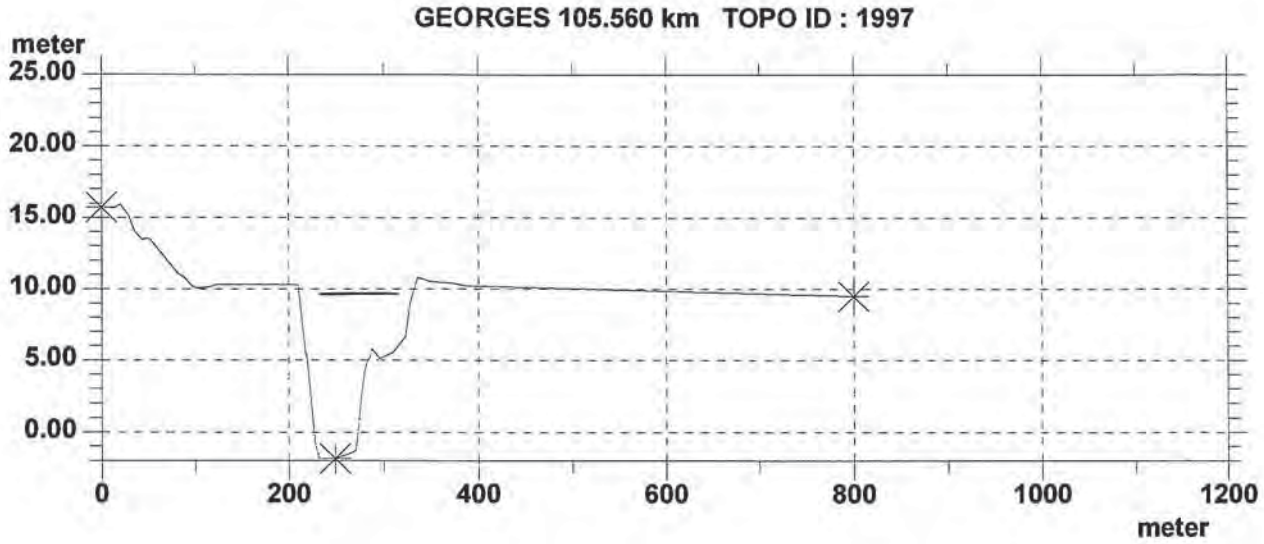

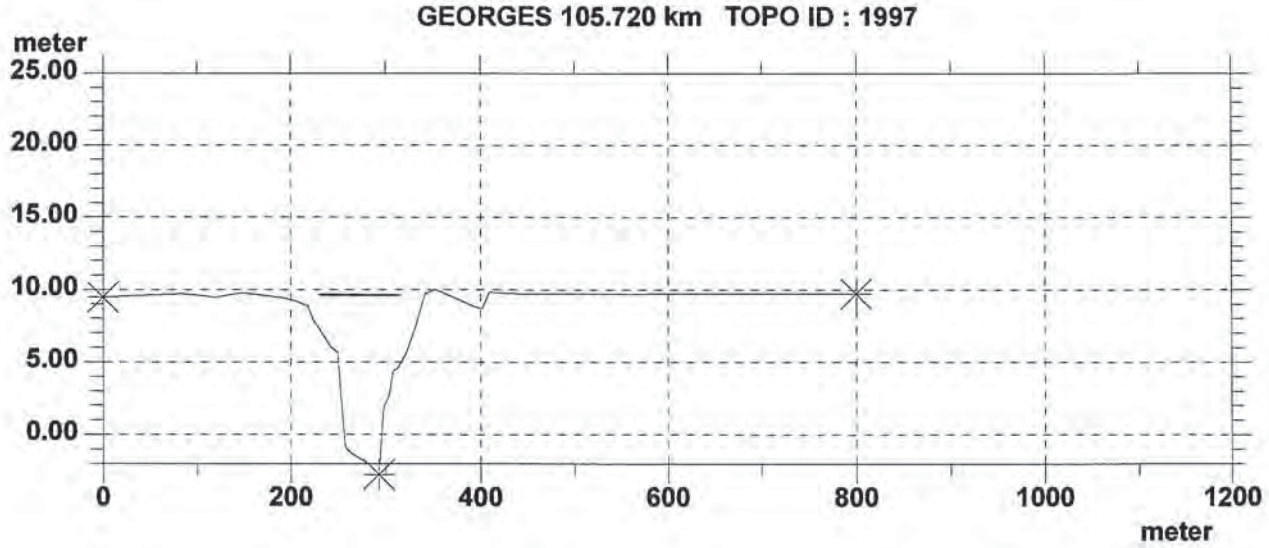

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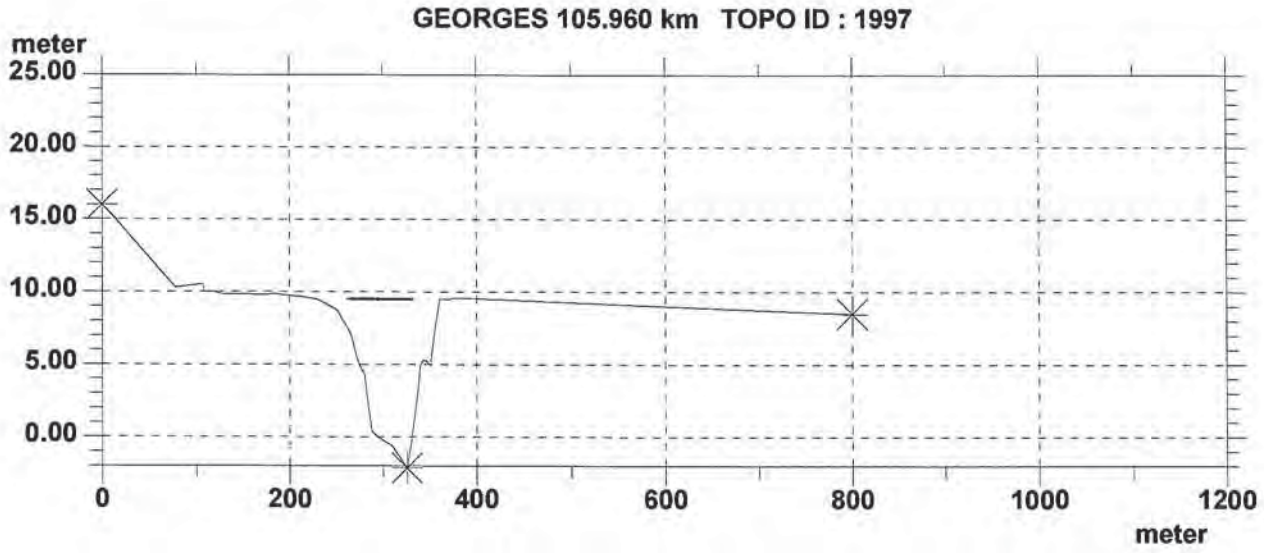
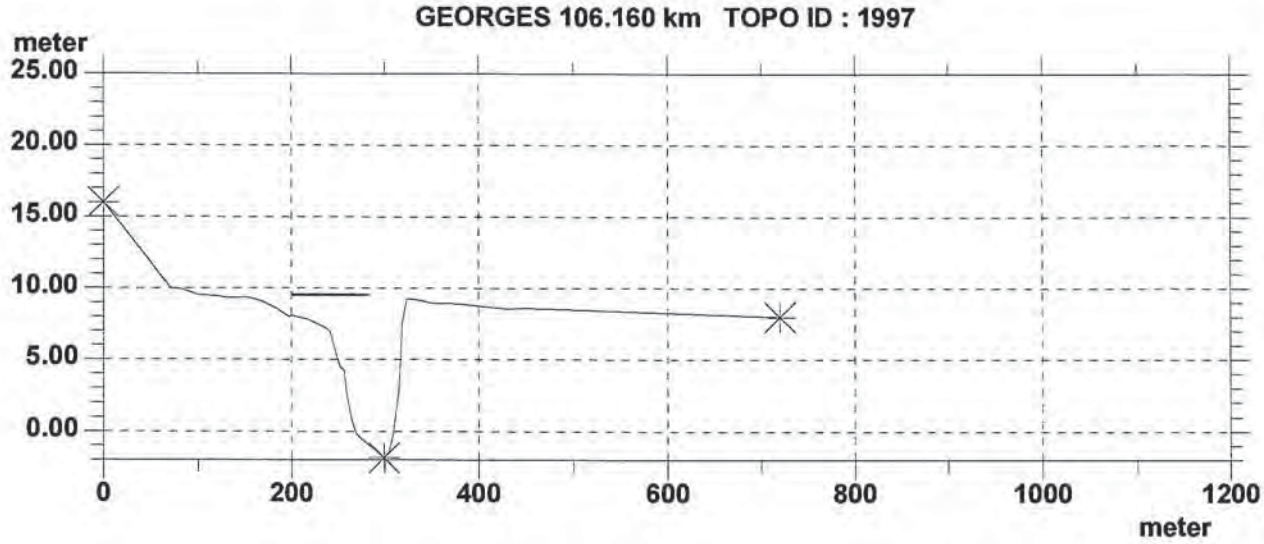
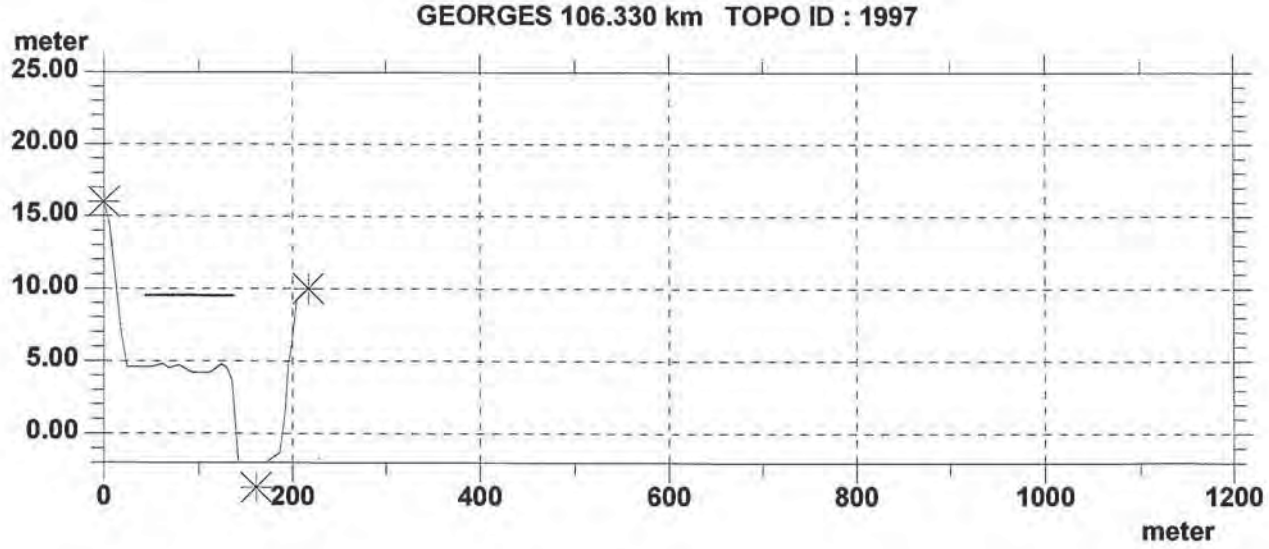
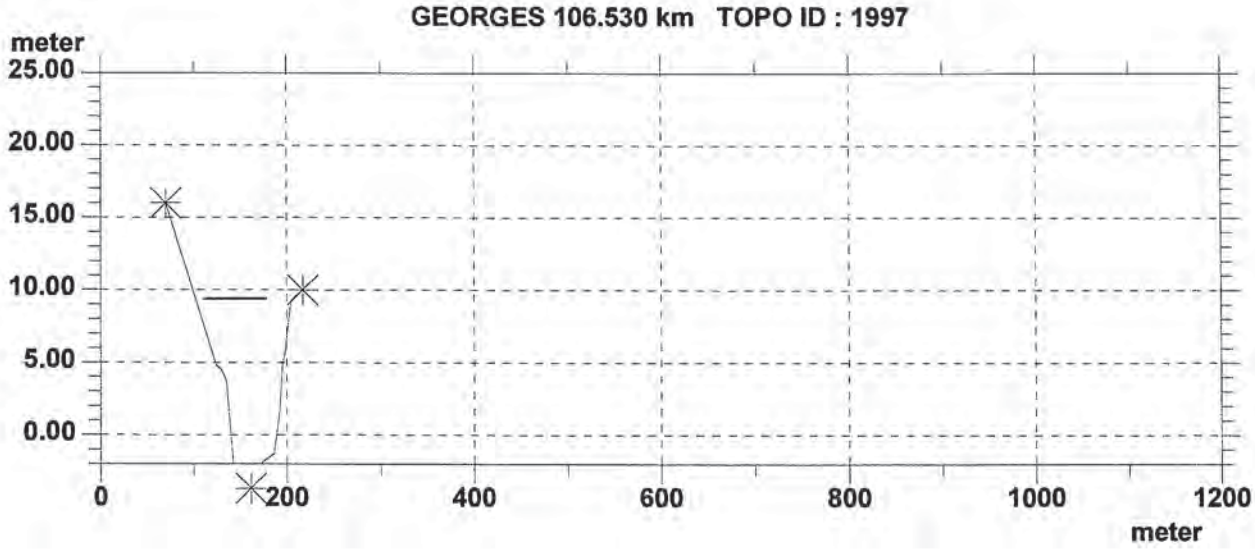




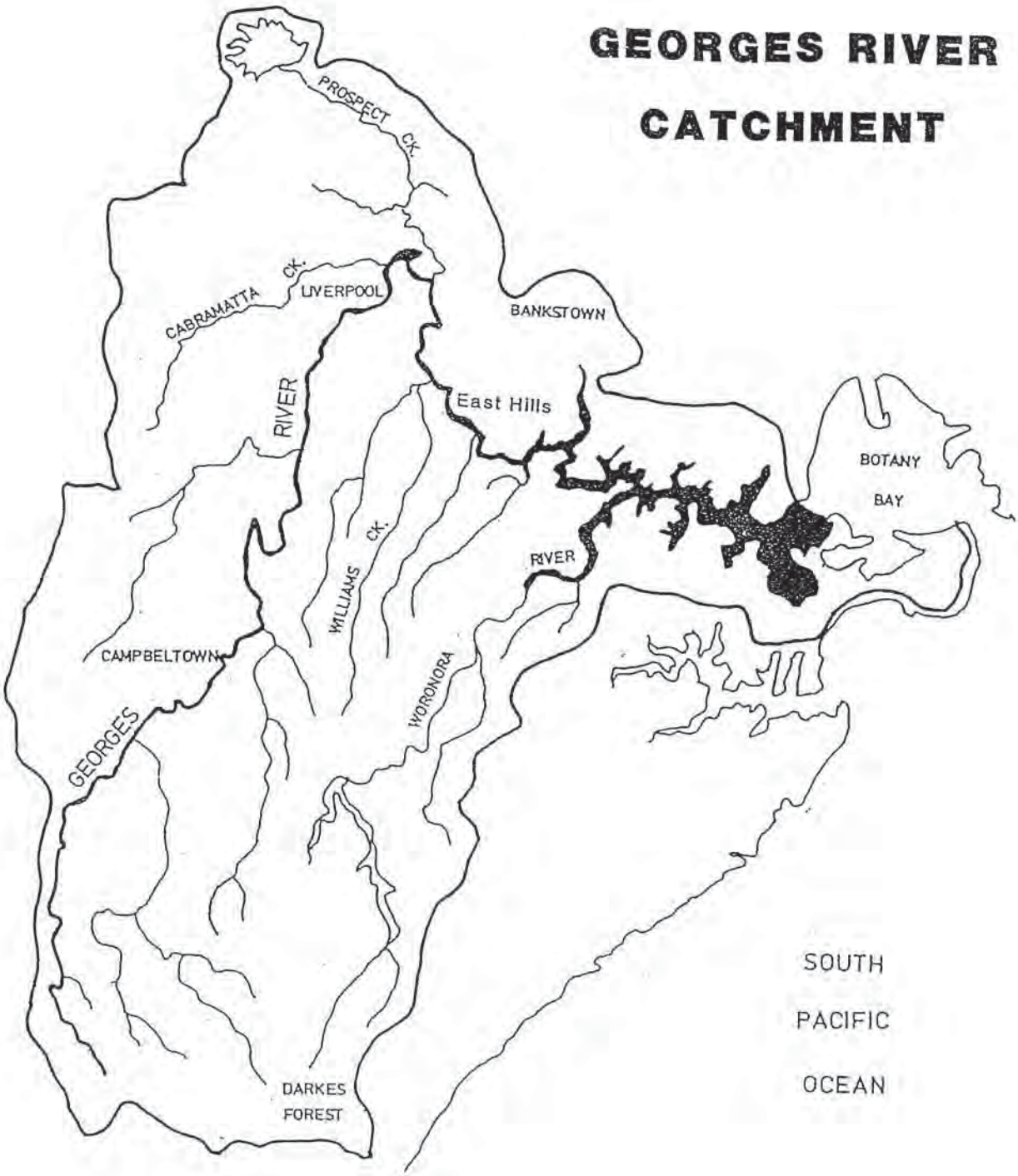


	Upper Georges River Flood Study **Model Cross Sections**
DATA BASE : GEORGES	**MIKE 11**



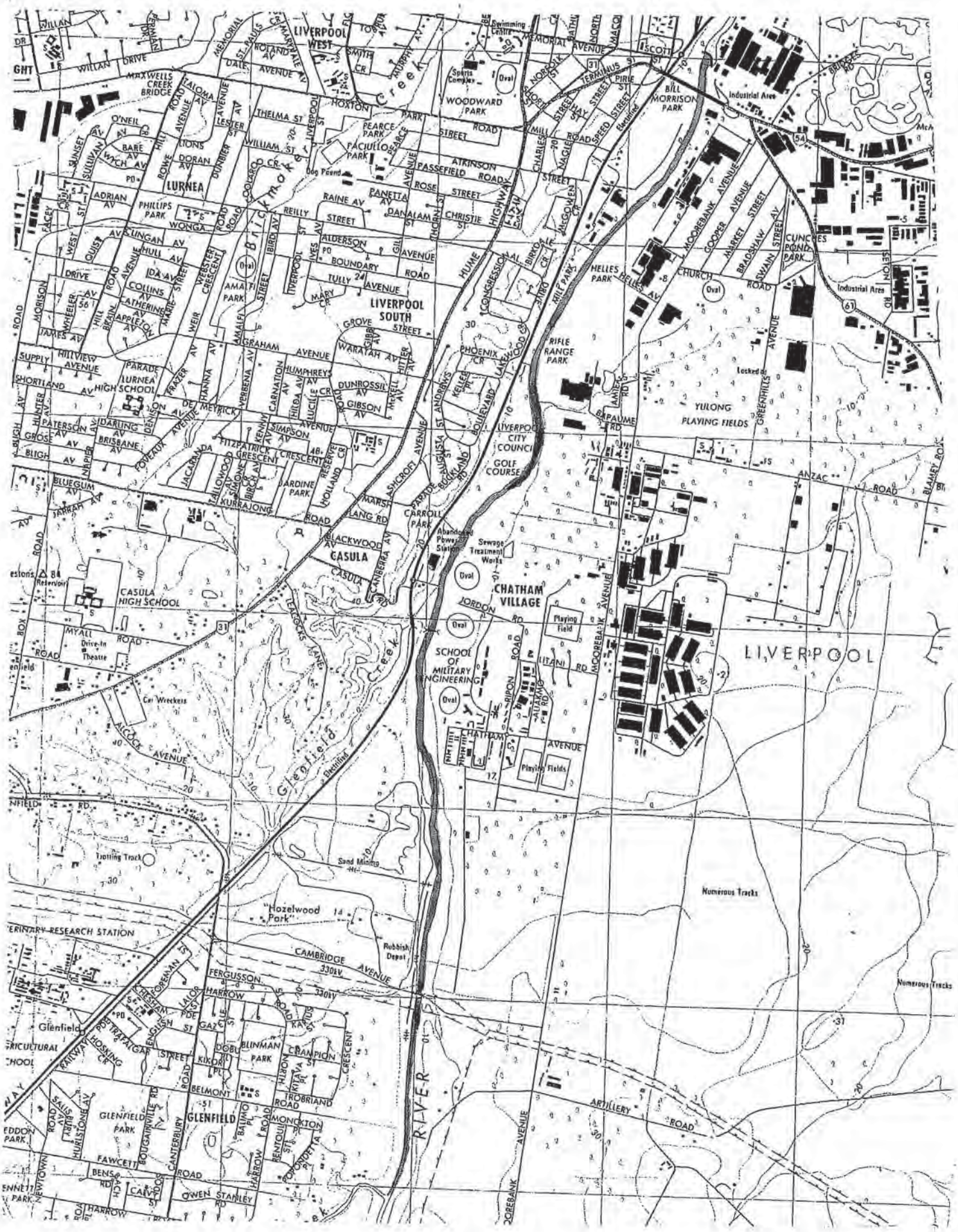
	Upper Georges River Flood Study Model Cross Sections
DATA BASE : GEORGES	MIKE 11

FIGURES



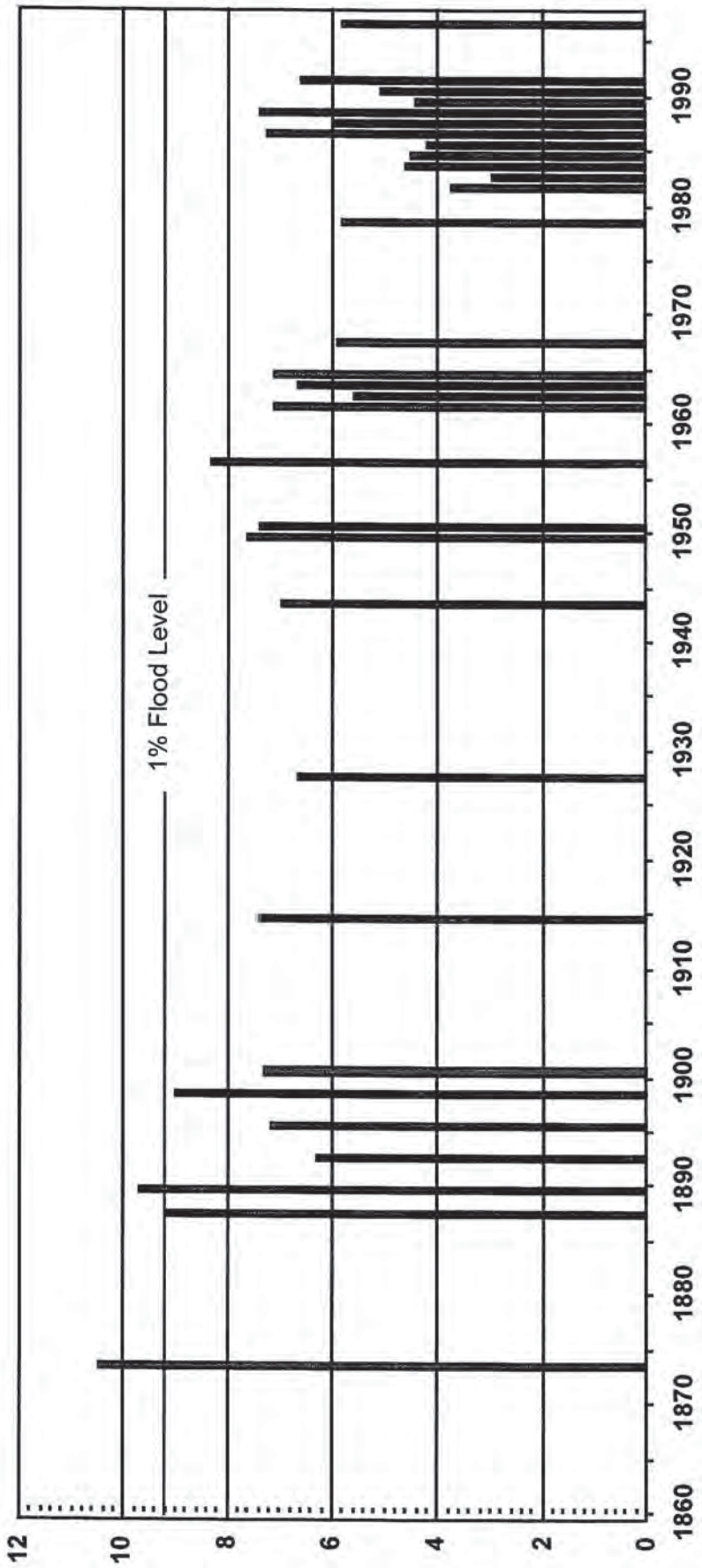
Georges River Catchment Plan

Figure 1



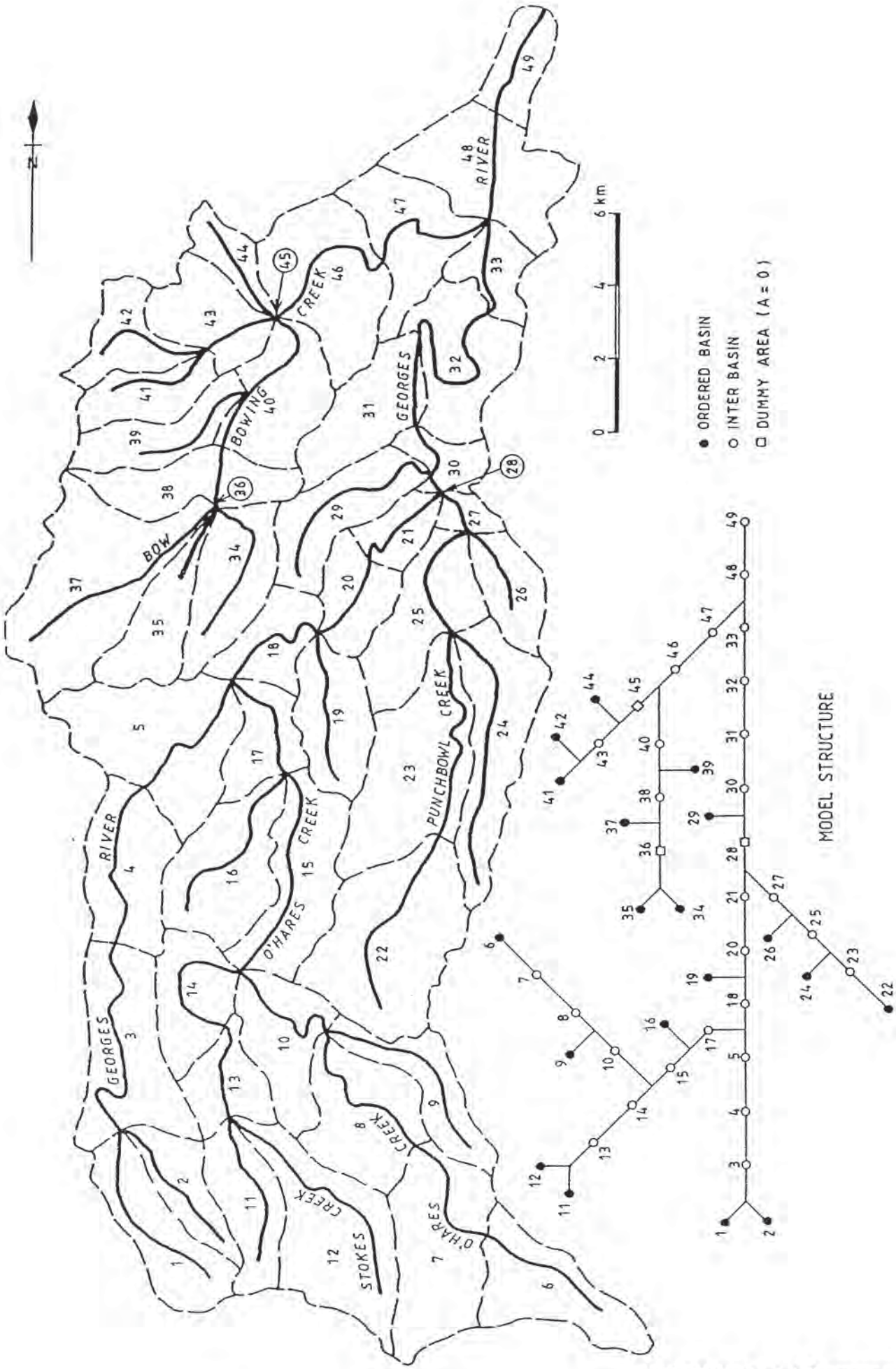
Study Area

Figure 2



Historical Flood Data at Liverpool

Figure 3



WBNM - LIVERPOOL MODEL

WBNM Model Representation of the Upper Georges River

Figure 4

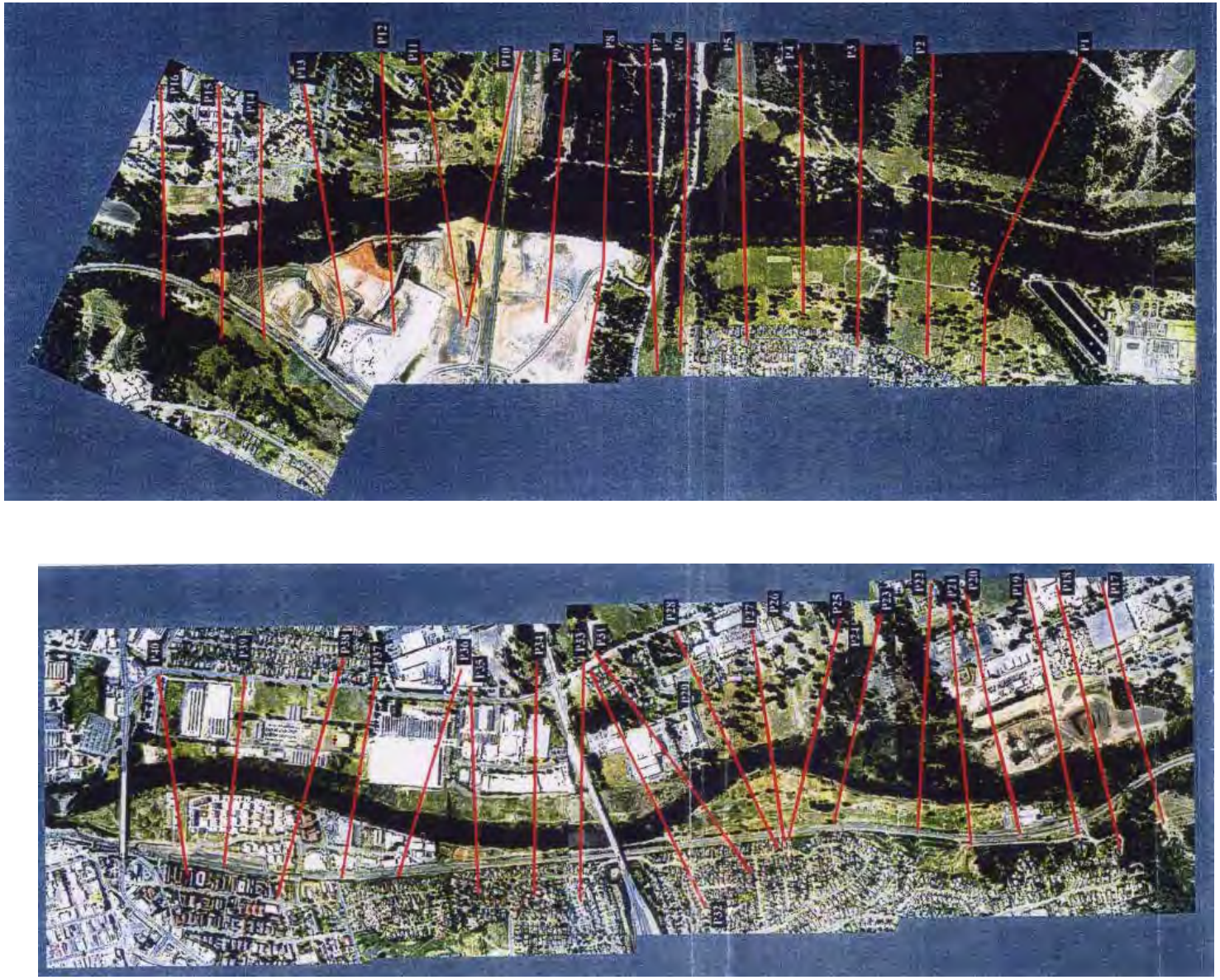
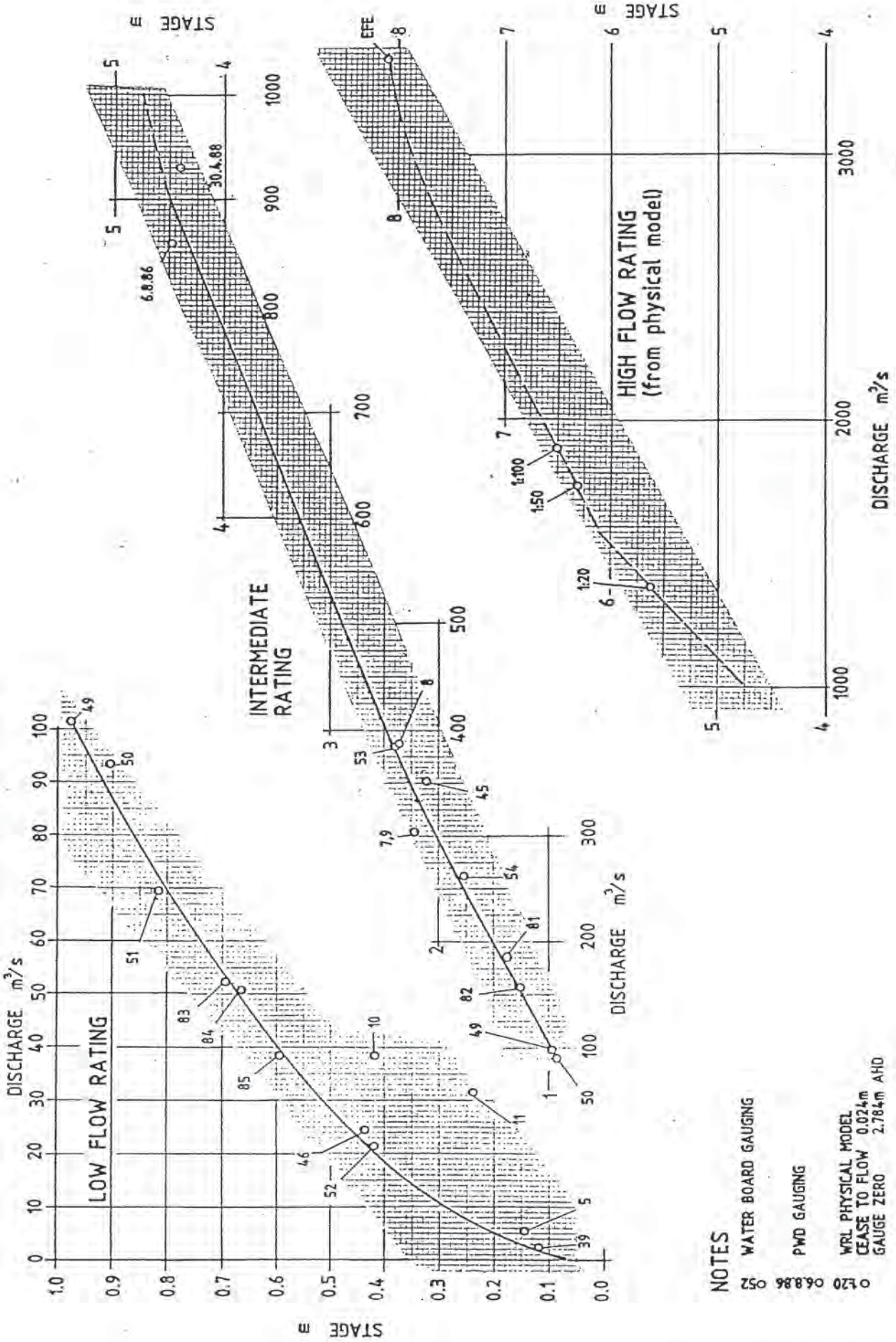


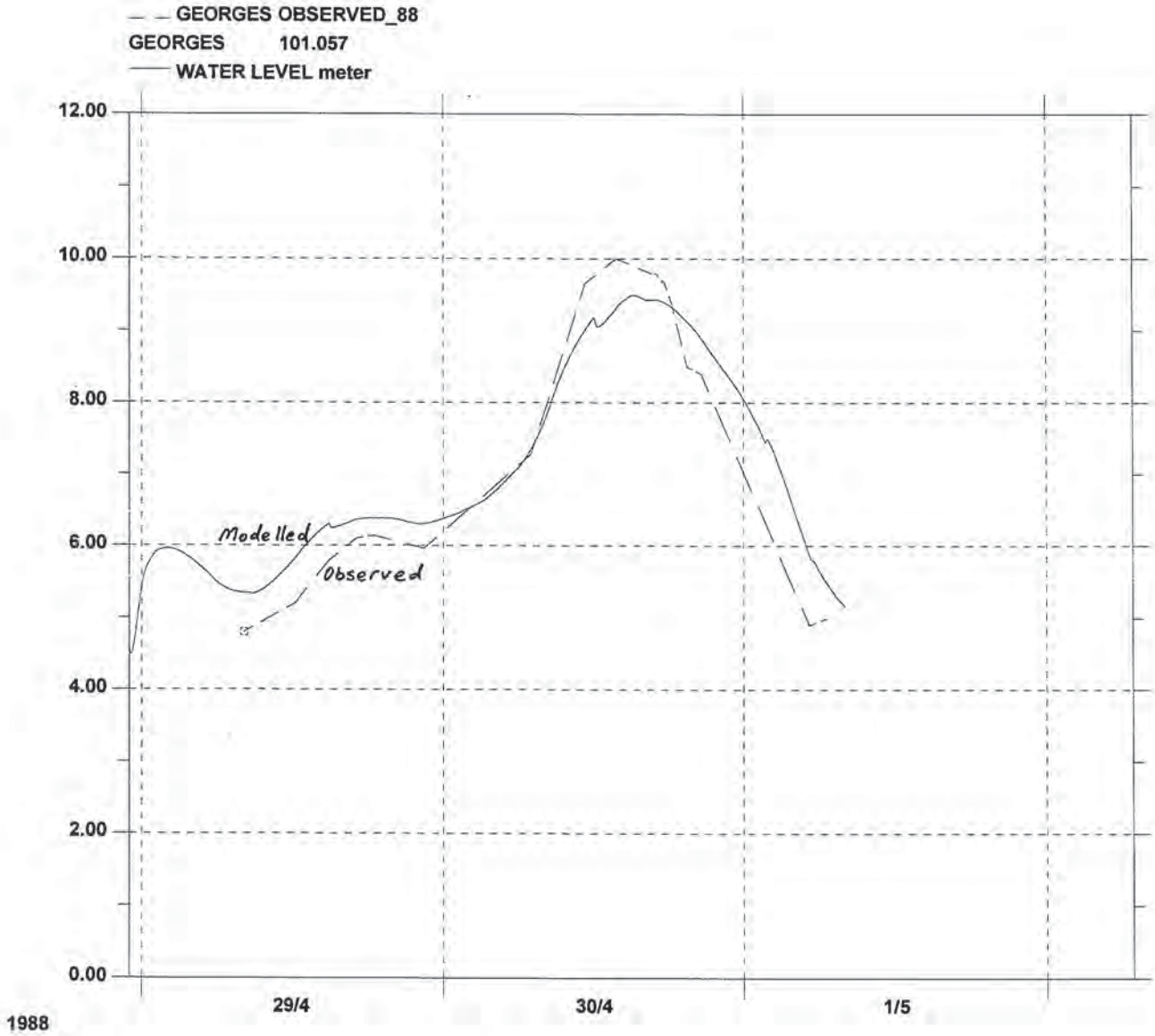
Figure 5
Location of Model Cross Sections



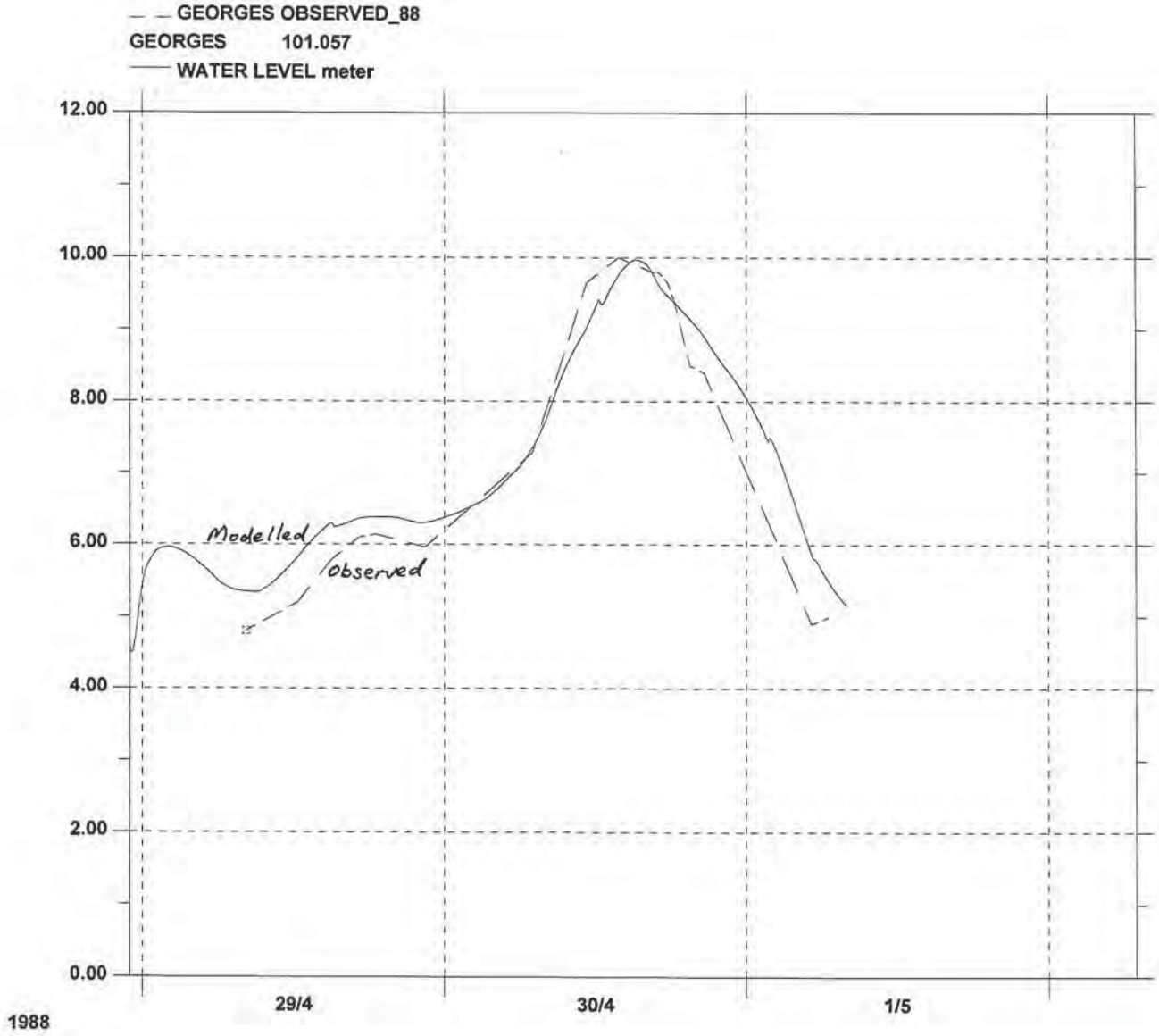
LIVERPOOL WEIR RATING CURVE

Liverpool Weir Rating Curve

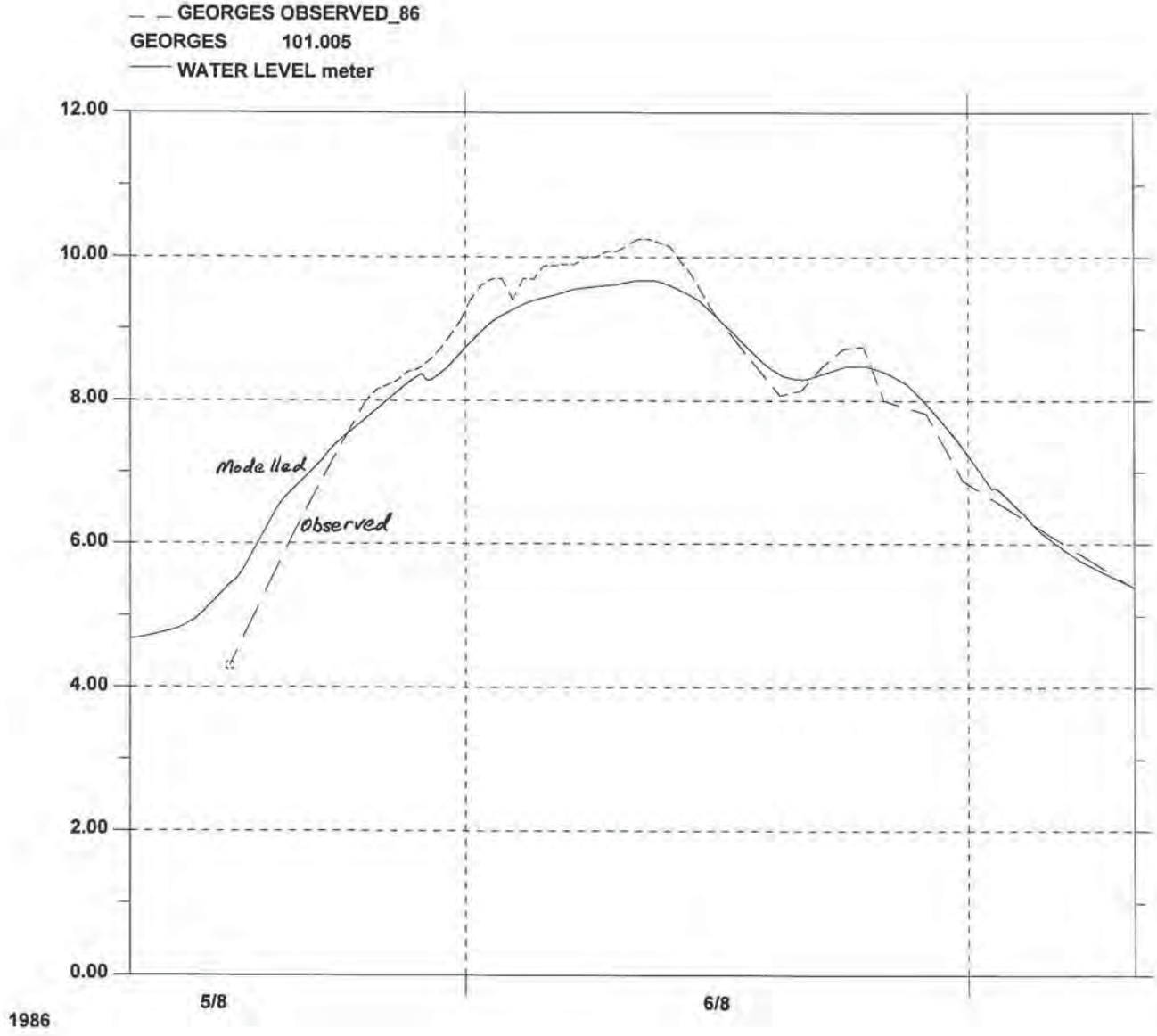
Figure 6



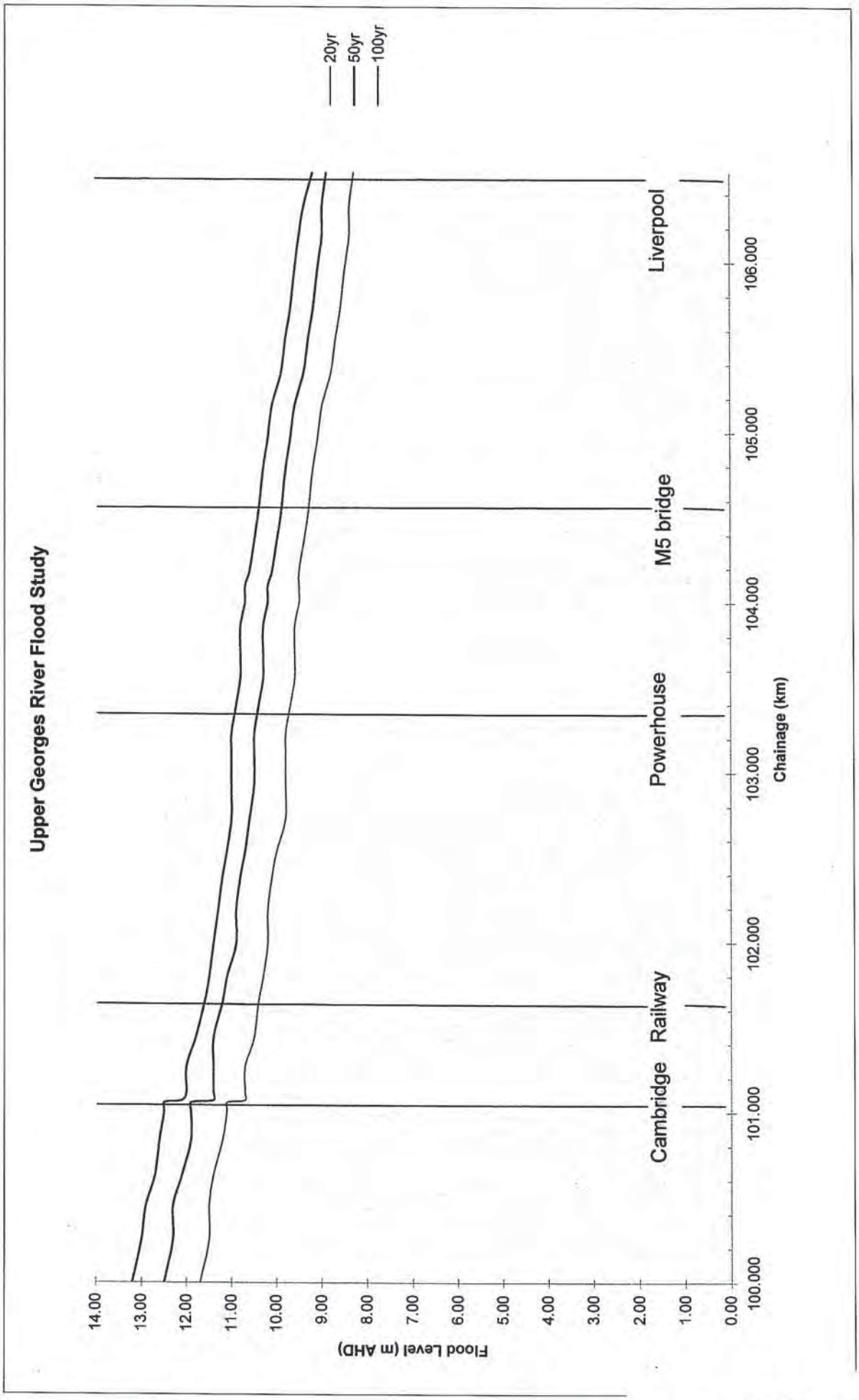
	Calibration at Cambridge Ave **April 1988 Flood Event** **(Flows from Georges RIver RIood Study, 1991)**
DATA FILE : GEORGES.RDF **RESULT FILE : GR_1988.RRF** **BOUNDARY FILE : GR1988.BSF** **CALCULATED : 19-FEB-1998, 17:33**	**MIKE 11** Figure 7



	Calibration at Cambridge Ave **April 1988 Flood Event** **(Flows increased by 15%)**
DATA FILE : GEORGES.RDF **RESULT FILE : GR_1988P.RRF** **BOUNDARY FILE : GR1988PL.BSF** **CALCULATED : 20-FEB-1998, 16:03**	**MIKE 11** Figure 8

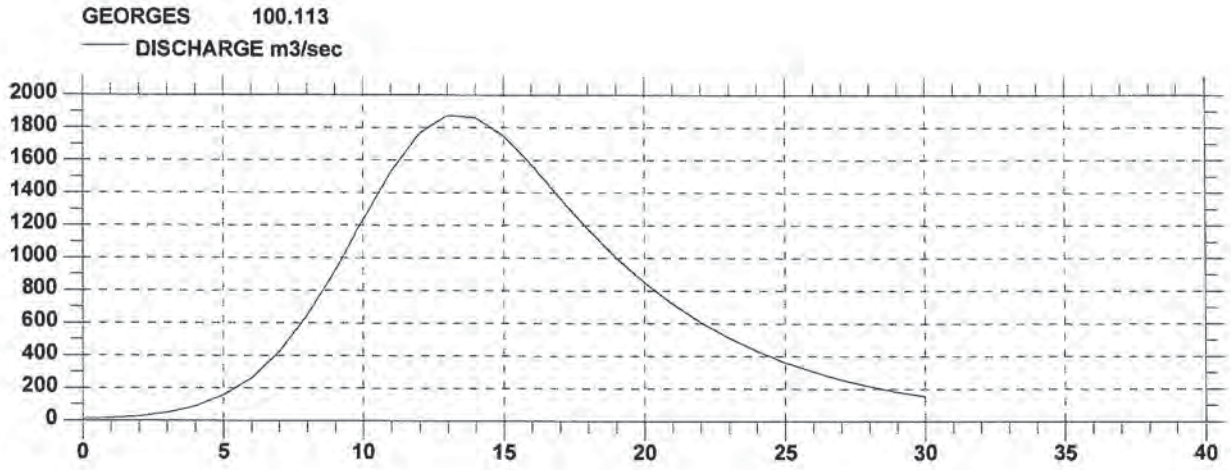


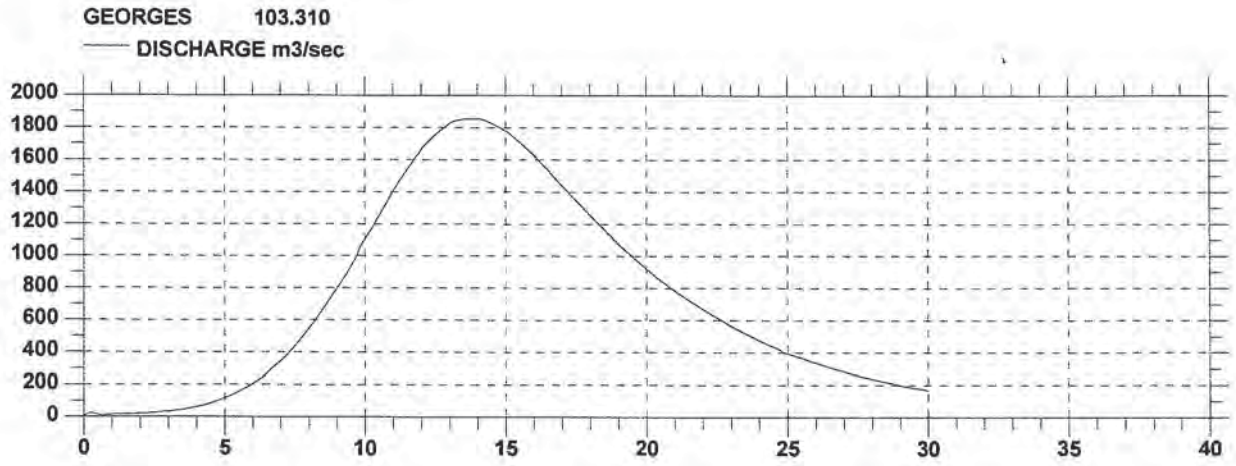
	Verification at Cambridge Ave **August 1986 Flood Event**
DATA FILE : GEORGE86.RDF **RESULT FILE : GR_1986.RRF** **BOUNDARY FILE : GR1986.BSF** **CALCULATED : 20-FEB-1998, 17:35**	**MIKE 11** Figure 9

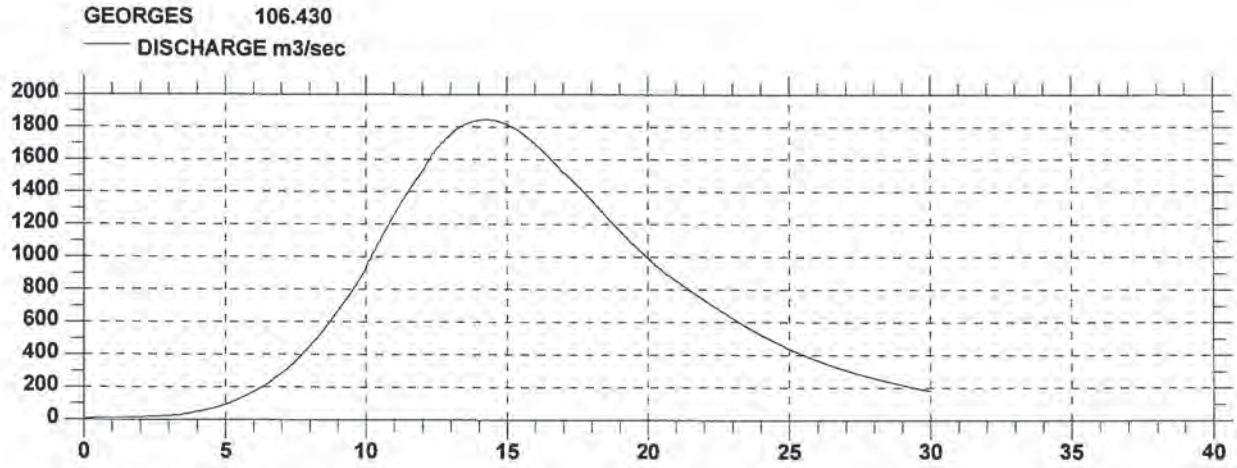


Longitudinal Flood Profiles

Figure 10



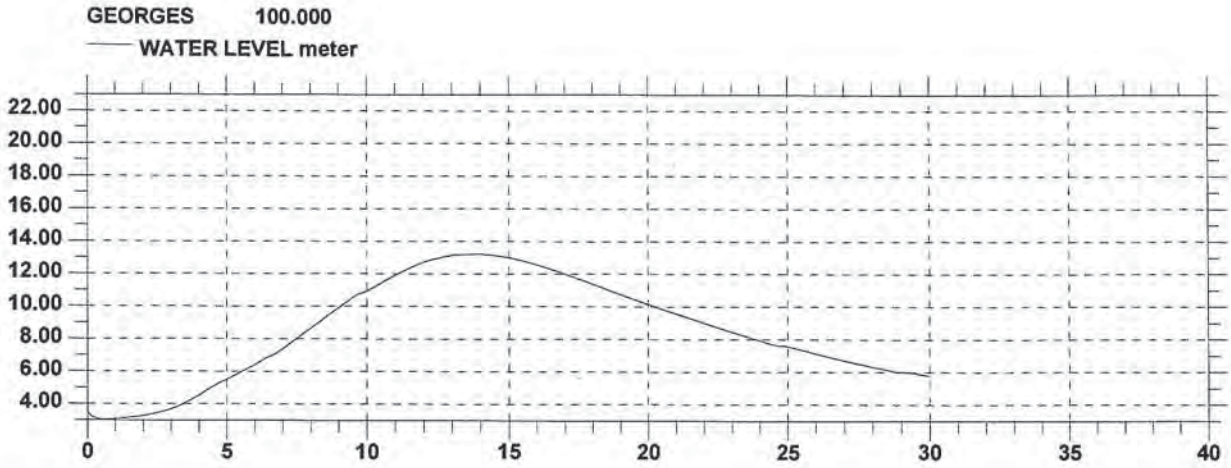


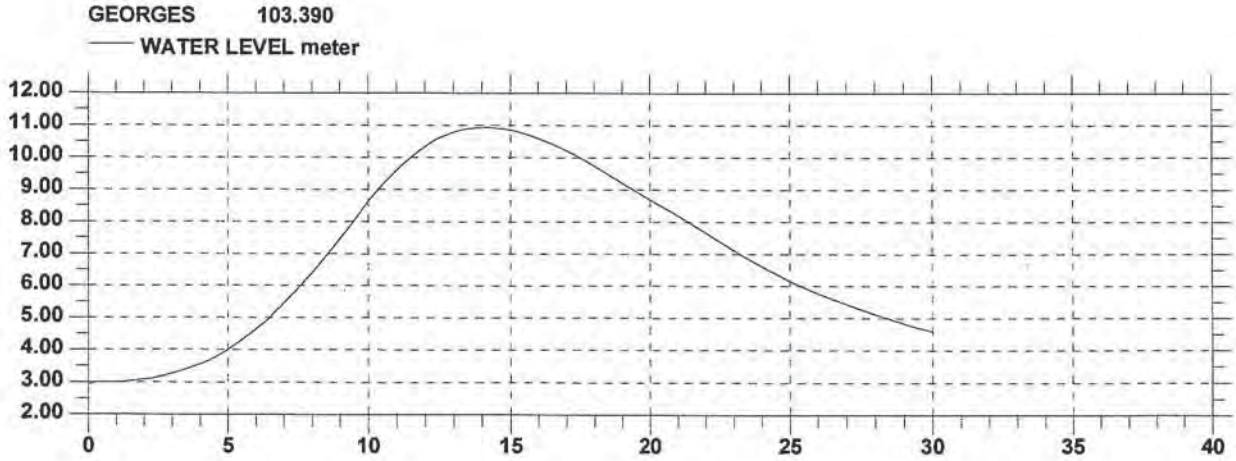


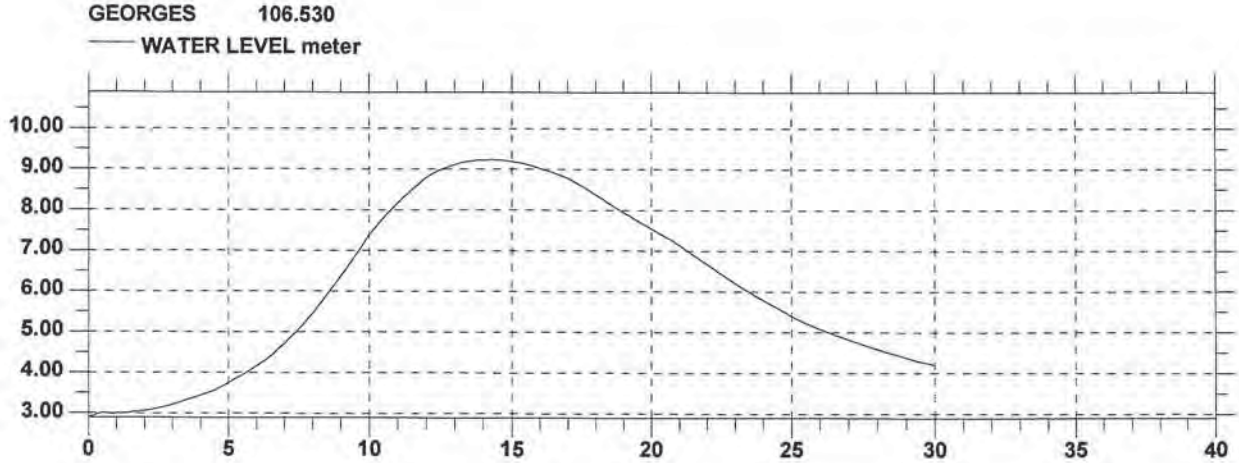
	Design Flow Hydrographs **1 in 100 year Design Storm** **Locations : U/S Boundary, Power Station, D/S Boundary**
DATA FILE : GEORGES.RDF **RESULT FILE : GR_100YR.RRF**	**BOUNDARY FILE : GR_100YR.BSF** **CALCULATED : 23-FEB-1998, 11:58**

MIKE 11

Figure 11







	Design Stage Hydrographs **1 in 100 year Design Storm** **Locations : U/S Boundary, Power Station, D/S Boundary**
DATA FILE : GEORGES.RDF **RESULT FILE : GR_100YR.RRF**	**BOUNDARY FILE : GR_100YR.BSF** **CALCULATED : 23-FEB-1998, 11:58**

MIKE 11

Figure 12

Appendix 25

149 (2) & (5) Certificates

campbelltown
city council

Issue Date: 20 April 2012
Application Number: 201201113
Receipt Number: 1964209

Globalx Information Services
DX 1239
SYDNEY NSW

Your Reference: 570849-11012

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Section 149 Planning Certificate phone enquiries: (02) 4645 4560.

Property Address: Lot 3 Cambridge Avenue
GLENFIELD NSW 2167

Property Description: Lot 3 DP 736881

As at the date of issue, the following matters apply to the land subject of this certificate:

INFORMATION PROVIDED UNDER SECTION 149(2) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 (the Act)

PART 1 – Names of relevant planning instruments and DCPs

Planning Instrument: Campbelltown (Urban Area) LEP 2002
Effect: 1(a) - Rural A Zone

Planning Instrument: Campbelltown (Urban Area) LEP 2002
Effect: 6(b) - Regional Open Space Zone

Planning Instrument: Campbelltown (Urban Area) LEP 2002
Effect: 5(b) - Special Uses Arterial Roads Zone

(1) In addition to the environmental planning instrument(s) named above, the following planning instruments also apply to the carrying out of development on the land subject of this certificate:

Local environmental plans (LEPs) and deemed environmental planning instruments

Campbelltown LEP No.209 – Exempt Development

For further information about these local environmental plans and deemed environmental planning instruments, contact Council's Environmental Planning Section on (02) 4645 4842.

For free Interpreting Service, please bring this document to Council or ring the Telephone Interpreter Service 131 450 and ask that they contact your Council.

GREEK

Για Δωρεάν Υπηρεσία Διερμηνέων, παρακαλούμε να φέρετε αυτό το έγγραφο στη Δημαρχία ή να επικοινωνήσετε με την Τηλεφωνική Υπηρεσία Διερμηνέων στο 131 450 και να ζητήσετε να επικοινωνήσουν με τη Δημαρχία σας.

VIETNAMESE

Để nhận được Dịch vụ Thông dịch miễn phí, xin đem tài liệu này đến Hội đồng Thành phố hoặc gọi đến Dịch vụ Thông dịch qua Điện thoại (TIS) số 131 450 và xin họ liên lạc Hội đồng Thành phố dùm quý vị.

State environmental planning policies (SEPPs)

SEPP No.1 – Development Standards

SEPP No.4 – Development Without Consent and Miscellaneous Complying Development

SEPP No.6 – Number of Storeys in a Building

SEPP No.21 – Caravan Parks

SEPP No.22 – Shops and Commercial Premises

SEPP No.30 – Intensive Agriculture

SEPP No.33 – Hazardous and Offensive Development

SEPP No.44 – Koala Habitat Protection

SEPP No.50 – Canal Estate Development

SEPP No.55 – Remediation of Land

SEPP No.60 – Exempt and Complying Development

SEPP No.64 – Advertising and Signage

SEPP No.65 – Design Quality of Residential Flat Buildings

SEPP No.70 – Affordable Housing (Revised Schemes)

SEPP No.19 - Bushland in Urban Areas

SEPP (Building Sustainability Index: BASIX) 2004

SEPP (Major Development) 2005

SEPP (Mining, Petroleum Production and Extractive Industries) 2007

SEPP (Temporary Structures and Places of Public Entertainment) 2007

SEPP (Infrastructure) 2007

SEPP (Exempt and Complying Development Codes) 2008

SEPP (Affordable Rental Housing) 2009

SEPP (State and Regional Development) 2011

Greater Metropolitan REP No.2 - Georges River Catchment

For further information about these State environmental planning policies, contact the Department of Planning (www.planning.nsw.gov.au).

(2) The following proposed environmental planning instruments, which are or have been the subject of community consultation or on public exhibition under the Act (unless the Director-General has notified Council that the making of the proposed instrument has been deferred indefinately or has not been approved), apply to the carrying out of development on the land subject of this certificate:

Draft local environmental plans (LEPs)

None

For further information about these draft local environmental plans, contact Council's Environmental Planning Section on (02) 4645 4842.

Draft State environmental planning policies (SEPPs)

None

For further information about these draft State environmental planning policies, contact the Department of Planning (www.planning.nsw.gov.au).

(3) The following development control plans (DCPs) apply to the carrying out of development on the land subject of this certificate:

Campbelltown DCP No.82 – Religious Establishment Policy

Campbelltown DCP No.87 – Public Notification & Public Exhibition Policy

Campbelltown DCP No.96 – The Provision of Parenting Facilities

DCP No.99 – Advertising Signs

DCP No.107 – Siting of Communication Facilities (Telecommunication Towers)

Campbelltown DCP No.114 – Trees

Campbelltown DCP No.122 – Restricted Premises

Campbelltown Sex Industry DCP 2003

Campbelltown (Sustainable City) DCP 2009 Volume 2

Campbelltown (Sustainable City) DCP 2009 Volume 1 (Parts 1-8)

Campbelltown DCP No.32 - Retail Plant Propagation Nurseries

DCP No.49 - Rural Environmental Protection Subdivision and Dwelling Policy

Campbelltown DCP No.47 – Amendment to Residential Development Policy – Attached Flats

Campbelltown DCP No.120 - Parking of Commercial Vehicles and Trucks Within Residential, Scenic Protection and Rural Areas

For further information about these development control plans, contact Council's Environmental Planning Section on (02) 4645 4842. Please note that the names of any draft development control plans that apply to the land subject of this certificate, that have been placed on exhibiton by Council but have not yet come into effect, are provided as advice under section 149(5) of the Act.

PART 2 – Zoning and land use under relevant LEPs

a) The following zone(s) apply to the land subject of this certificate:

1(a) - Rural A Zone

6(b) - Regional Open Space Zone

5(b) - Special Uses Arterial Roads Zone

b) The purposes for which the plan or instrument provides that development may be carried out without the need for development consent are detailed in the land use table for each zone. Reference should be made to either Attachment 1 to this certificate or the appropriate section of the attached copy of the plan or instrument.

In addition, SEPP (Exempt and Complying Development Codes) 2008 and Campbelltown LEP No.209 – Exempt Development allow certain types of development to be carried out as exempt development within the Campbelltown City local government area.

c) The purposes for which the plan or instrument provides that development may not be carried out except with development consent are detailed in the land use table for each zone. Reference should be made to either Attachment 1 to this certificate or the appropriate section of the attached copy of the plan or instrument.

In addition, SEPP (Exempt and Complying Development Codes) 2008 and SEPP No.60 – Exempt and Complying Development allow certain types of development to be carried out as complying development within the Campbelltown City local government area after a complying development certificate has been obtained from Council or from an accredited certifier.

d) The purposes for which the plan or instrument provides that development is prohibited are detailed in the land use table for each zone. Reference should be made to either Attachment 1 to this certificate or the appropriate section of the attached copy of the plan or instrument.

e) Any development standards applying to the land subject of this certificate that fix minimum land dimensions for the erection of a dwelling-house and, if so, the minimum land dimensions so fixed are detailed in the relevant section of the plan or instrument. Reference should be made to either Attachment 2 to this certificate or the appropriate section(s) of the attached copy of the plan or instrument. In addition, certain Council development control plans may impose minimum development standards for the creation of allotments and/or minimum site area and dimensions for the erection of a dwelling-house.

For further information about items a), b), c), d) and e) above, contact Council's Environmental Planning Section on (02) 4645 4842.

f) The land subject of this certificate does not include or comprise critical habitat.

g) The land subject of this certificate is not in a conservation area (however described).

h) No item of environmental heritage (however described) is situated on the land subject of this certificate.

PART 2A – Zoning and land use under State Environmental Planning Policy (Sydney Region Growth Centres) 2006

None

PART 3 – Complying development

(1) The land subject of this certificate is land on which complying development may be carried out under the following codes for complying development in accordance with the provisions of clauses 1.17A (c) and (d) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008:

Housing Alterations Code

General Commercial and Industrial Code

Subdivisions Code

General Development Code

Demolition Code

Please note that reference should also be made to the relevant parts of this policy for the general requirements for complying development and to the relevant codes which may also include provisions relating to zoning, lot size etc.

The land subject of this certificate is land on which no complying development may be carried out under the following codes for complying development because of the provisons of clauses 1.17A (c) and (d) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008:

General Housing Code
(unless the development is only a detached outbuilding or swimming pool on land within a heritage conservation area or a draft heritage conservation area and not subject to any other land exemption under clause 1.19 of this policy)

Rural Housing Code
(unless the development is only a detached outbuilding or swimming pool on land within a heritage conservation area or a draft heritage conservation area and not subject to any other land exemption under clause 1.19 of this policy or unless complying development is carried out on the part of the lot to which clause 1.19 or 1.17A of this policy does not apply)

(2) For codes identified above as being those under which no complying development may be carried out under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008, this is because of the following provisions of clauses 1.17A (c) and (d) and 1.19 of this policy:

The land is reserved for a public purpose in an environmental planning instrument.

PART 4 – Coastal protection

The land subject of this certificate is not affected by the operation of section 38 or 39 of the Coastal Protection Act 1979, but only to the extent that Council has been notified by the Department of Public Works.

PART 5 – Mine subsidence

The land subject of this certificate is not within a proclaimed Mine Subsidence District within the meaning of section 15 of the Mine Subsidence Compensation Act 1961.

PART 6 – Road widening and road realignment

The land subject of this certificate is affected by road widening or road realignment under Division 2 of Part 3 of the Roads Act 1993, an environmental planning instrument or a resolution of Council.

PART 7 – Council and other public authority policies on hazard risk restrictions

a) Council has adopted a policy with respect to all land within the Campbelltown City local government area with unusual site conditions. This policy restricts the development of land where extensive earthworks and/or filling has been carried out. Land, the development of

which is restricted by this policy, has a restriction as to user placed on the title of the land stating the details of any restriction. Building lots can be affected by excessive land gradient, filling, reactive or dispersive soils, overland flow and/or mine subsidence. Buildings, structures or site works may require specific structural design to ensure proper building construction. Consequently, some applications may require the submission of structural design details and geotechnical reports. It is suggested that prior to lodging an application, enquiries be made to Council's Planning and Environment Division to ascertain any specific requirements.

b) Council has adopted by resolution the certified Campbelltown LGA Bush Fire Prone Land Map. This map identifies bush fire prone land within the Campbelltown City local government area as defined in section 4(1) of the Act. Where the land subject of this certificate is identified as bush fire prone land, the document entitled "Planning for Bush Fire Protection" prepared by the NSW Rural Fire Service in co-operation with the Department of Planning and dated December 2006 should be consulted with regards to possible restrictions on the development of the land because of the likelihood of bushfire.

c) The land subject of this certificate is not affected by a policy adopted by Council or adopted by any other public authority and notified to Council for reference in a planning certificate that restricts the development of the land because of the likelihood of tidal inundation.

d) The land subject of this certificate is not affected by a policy adopted by Council or adopted by any other public authority and notified to Council for reference in a planning certificate that restricts the development of the land because of the likelihood of acid sulphate soils.

e) Council has adopted by resolution a policy on contaminated land which may restrict the development of the land subject of this certificate. This policy is implemented when zoning or land use changes are proposed on lands which have previously been used for certain purposes. Council records do not have sufficient information about previous use of this land to determine whether the land is contaminated. Consideration of Council's adopted policy and the application of provisions under relevant State legislation is warranted.

PART 7A – Flood related development controls information

(1) Development on all or part of the land subject of this certificate for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is subject to flood related controls.

(2) Development on all or part of the land subject of this certificate for any other purpose is subject to flood related development controls.

(3) Words and expressions in this clause have the same meanings as in the instrument set out in the Schedule to the Standard Instrument (Local Environmental Plans) Order 2006.

Please note that some additional information regarding flooding and flood related development controls may be provided as advice under section 149(5) of the Act.

PART 8 – Land reserved for acquisition

An environmental planning instrument, deemed environmental planning instrument or draft environmental planning instrument applying to the land subject of this certificate provides for the acquisition of all or part of the land by a public authority, as referred to in section 27 of the Act.

PART 9 – Contribution plans

The following contribution plan(s) apply to the land subject of this certificate:

Campbelltown City Council Section 94A Development Contributions Plan

For further information about these contribution plans, contact Council's Environmental Planning Section on (02) 4645 4196.

PART 9A – Biodiversity certified land

The land subject of this certificate is not biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995).

PART 10 – Biobanking agreement

The land subject of this certificate is not land to which a biobanking agreement under Part 7A of the Threatened Species Conservation Act 1995 relates (but only in so far as Council has been notified of the existence of any such agreement by the Director-General of the Department of Environment, Climate Change and Water).

PART 11 – Bush fire prone land

Some of the land subject of this certificate has been identified as bush fire prone land on the Campbelltown LGA Bush Fire Prone Land Map that has been certified by the Commissioner of the New South Wales Rural Fire Service.

Please note that in accordance with section 66 of the Rural Fires Act 1997 and relevant regulations, a Bush Fire Hazard Reduction Notice may have been issued on this land. It is recommended that advice be obtained from the Macarthur Zone Rural Fire Service.

PART 12 – Property vegetation plans

No property vegetation plan applies to the land subject of this certificate as the whole of the Campbelltown City local government area is excluded from the operation of the Native Vegetation Act 2003.

PART 13 – Orders under Trees (Disputes Between Neighbours) Act 2006

No order has been made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land subject of this certificate (but only to the extent that Council has been notified of any such orders).

PART 14 – Directions under Part 3A

No direction, in force under section 75P(2)(c1) of the Act, that a provision of an environmental planning instrument prohibiting or restricting the carrying out of a project or a stage of a project on the land subject of this certificate under Part 4 of the Act does not have effect, has been issued by the Minister.

PART 15 – Site compatibility certificates and conditions for seniors housing

a) No current site compatibility certificate (seniors housing), of which Council is aware, exists in respect of proposed development on the land subject of this certificate.

b) No conditions of consent to a development application, granted after 11 October 2007, of the kind referred to in clause 18(2) of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 have been imposed in respect of proposed development on the land subject of this certificate.

PART 16 – Site compatibility certificates for infrastructure

No valid site compatibitlity certificate (infrastructure), of which Council is aware, exisits in respect of proposed development on the land subject of this certificate.

PART 17 – Site compatibility certificates and conditions for affordable rental housing

(1) No current site compatibitlity certificate (affordable rental housing), of which Council is aware, exists in respect of proposed development on the land subject of this certificate.

(2) No conditions of consent to a development application of the kind referred to in clause 17(1) or 37(1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 have been imposed in respect of proposed development on the land subject of this certificate.

Matters prescribed by section 59(2) of the Contaminated Land Management Act 1997

(a) The land subject of this certificate is not significantly contaminated land within the meaning of the Contaminated Land Management Act 1997.

(b) The land subject of this certificate is not subject to a management order within the meaning of the Contaminated Land Management Act 1997.

(c) The land subject of this certificate is not the subject of an approved voluntary management proposal within the meaning of the Contaminated Land Management Act 1997.

(d) The land subject of this certificate is not subject to an ongoing maintenance order within the meaning of the Contaminated Land Management Act 1997.

(e) The land subject of this certificate is not the subject of a site audit statement within the meaning of the Contaminated Land Management Act 1997 provided to Council.

INFORMATION PROVIDED UNDER SECTION 149(5) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

All properties within the Campbelltown City local government area may be affected by flooding caused by overland flow or local topography. Applicants will need to make their own assessment of the risk associated with these matters. For more information, contact Council's Flood Mitigation and Drainage Section in writing.

Council has received a copy of the map "Salinity Potential in Western Sydney - 2002" from the Department of Infrastructure, Planning and Natural Resources (DIPNR). This map classifies the land within the Campbelltown City local government area as having either known salinity, high salinity potential, moderate salinity potential or low salinity potential. Salinity issues may be of relevance to any development of the land subject of this certificate. For further information, contact the Department of Infrastructure, Planning and Natural Resources (www.dipnr.nsw.gov.au).

It should be noted that the Commonwealth Department of Transport and Regional Development has released a document titled "Preliminary Flight Paths" purporting to provide preliminary information on jet aircraft flight paths and flight zones for each of the design options for the Second Sydney Airport Proposals. Some of the flight paths and flight zones shown in this document may, if implemented, impact upon the environment in the vicinity of the land subject of this certificate. Further enquiries in respect of this document should be directed initially to the Commonwealth Department of Transport and Regional Development.

The land subject of this certificate has a boundary to a controlled access road.

Council has resolved to prepare a comprehensive Local Environmental Plan for the City of Campbelltown in accordance with relevant statutory requirements. For more information, contact Council's Environmental Planning Section on (02) 4645 4563.

The following draft development control plans (DCPs), that have been placed on exhibition by Council but which have not yet come into effect, apply to the land subject of this certificate:

Draft Campbelltown (Sustainable City) DCP 2011 Volume 1 (Stage 4)

Draft DCP No.102 - Non Urban Subdivision and Development Standards

For further information about these draft development control plans, contact Council's Environmental Planning Section on (02) 4645 4842.

Jeff Lawrence, per
Director Planning and Environment

Attachment 1

Campbelltown (Urban Area) Local Environmental Plan 2002

Zone 1 (a)—Rural A Zone

(1) **What land is within Zone 1 (a)?**
Land is within Zone 1 (a) if it is shown coloured buff on the map.

(2) **What is the zone objective and what effect does it have?**
The objective of this zone is to identify land that constraints make unsuitable for urban use so that it can be put to long-term agricultural use.

Except as otherwise provided by this plan, consent must not be granted for development on land within this zone unless the consent authority is of the opinion that carrying out the proposed development would be consistent with the objective of this zone.

A further objective of this zone is to encourage a high quality standard of development which is aesthetically pleasing, functional and relates sympathetically to nearby and adjoining development.

(3) **What development may be carried out without consent?**
Development must not be carried out on land within this zone without consent.

(4) **What development may be carried out only with consent?**
Development may be carried out on land within this zone only with consent for the purpose of:

agriculture; bushfire hazard reduction; drainage; dual occupancies (attached); dwelling houses; forestry; mines; utility installations.

(5) **What development is prohibited?**
Development which is not included in subclause (4) is prohibited on land within this zone.

NOTE: A copy of the complete written instrument for the Campbelltown (Urban Area) Local Environmental Plan 2002 is available on the NSW Legislation website at: www.legislation.nsw.gov.au.

Attachment 1

Campbelltown (Urban Area) Local Environmental Plan 2002

Zone 5 (b)—Special Uses Arterial Roads Zone

(1) **What land is within Zone 5 (b)?**
Land is within Zone 5 (b) if it is shown coloured light grey on the map.

(2) **What are the zone objectives and what effect do they have?**
The objectives of this zone are:

(a) to identify land required for existing or proposed arterial roads (including the widening of existing roads), and

(b) to control vehicular access to and from roads in the zone so as not to inhibit the free flow of traffic on arterial roads, and

(c) to allow for the development of such land prior to its acquisition for road purposes.

Except as otherwise provided by this plan, consent must not be granted for development on land within this zone unless the consent authority is of the opinion that carrying out the proposed development would be consistent with one or more of the objectives of this zone.

A further objective of this zone is to encourage a high quality standard of development which is aesthetically pleasing, functional and relates sympathetically to nearby and adjoining development.

(3) **What development may be carried out without consent?**
Development may be carried out on land within this zone without consent for the purpose of:

drainage; roads; utility installations.

(4) **What development may be carried out only with consent?**
Development may be carried out on land within this zone only with consent for the purpose of:

bushfire hazard reduction (otherwise than in accordance with a bush fire management plan prepared under the *Rural Fires Act 1997*); underground mining.

(5) **What development is prohibited?**
Development is prohibited on land within this zone if it is not included in subclause (3) or (4).

NOTE: A copy of the complete written instrument for the Campbelltown (Urban Area) Local Environmental Plan 2002 is available on the NSW Legislation website at: www.legislation.nsw.gov.au.

Attachment 1

Campbelltown (Urban Area) Local Environmental Plan 2002

Zone 6 (b)—Regional Open Space Zone

(1) **What land is within Zone 6 (b)?**
Land is within Zone 6 (b) if it is shown coloured mid green on the map.

(2) **What are the zone objectives and what effect do they have?**
The objectives of this zone are:

(a) to identify land which has been acquired for, or is to be acquired for, regional open space, and

(b) to preserve and manage regional open space for conservation and recreational purposes for the benefit of the Sydney region.

Except as otherwise provided by this plan, consent must not be granted for development on land within this zone unless the consent authority is of the opinion that carrying out the proposed development would be consistent with one or more of the objectives of this zone.

A further objective of this zone is to encourage a high quality standard of development which is aesthetically pleasing, functional and relates sympathetically to nearby and adjoining development.

(3) **What development may be carried out without consent?**
Development may be carried out on land within this zone without consent for the purpose of:

drainage; utility installations.

(4) **What development may be carried out only with consent?**
Development may be carried out on land within this zone only with consent for the purpose of:

bushfire fighting establishments; bushfire hazard reduction (otherwise than in accordance with a bush fire management plan prepared under the *Rural Fires Act 1997*); car parking; community facilities; recreation areas; recreation facilities; roads; underground mining.

(5) **What development is prohibited?**
Development is prohibited on land within this zone if it is not included in subclause (3) or (4).

NOTE: A copy of the complete written instrument for the Campbelltown (Urban Area) Local Environmental Plan 2002 is available on the NSW Legislation website at: www.legislation.nsw.gov.au.

Attachment 2

Campbelltown (Urban Area) Local Environmental Plan 2002

32 Subdivision generally

(1) Land to which this plan applies may be subdivided only with development consent.

(2) Consent must not be granted to the subdivision of land traversed by a zone boundary unless the boundaries of lots so created correspond generally with the boundaries between the zones as shown on the map.

(3) Where the subdivision of land would result in the opening of a new road, the road must accord with any pattern of proposed roads indicated on the map unless the consent authority is satisfied that the road will provide adequate access to adjoining land and fulfils the objectives of the road pattern indicated on the map.

33 Subdivision in rural and environmental protection zones

(1) Consent must not be granted to the subdivision of land in a zone specified in the following Table unless the area of any lot created is equal to or greater than that shown opposite that zone in that Table.

Table

Zone	Lot
1 (a)	40 hectares
1 (d)	40 hectares
7 (d1)	100 hectares
7 (d4)	2 hectares
7 (d5)	1 hectare
7 (d6)	0.4 hectare

(2) Despite subclause (1), consent may be granted to the subdivision of land in any of the zones specified in the Table so as to create lots with areas less than those set out in that Table if:

(a) the consent authority is satisfied that the purpose of the subdivision is to create a lot or lots to be used for the purpose of a public utility undertaking or public reserve, or

(b) the consent authority is satisfied that the purpose of the subdivision is to align the boundaries of those lots with the boundaries of a zone so specified.

(2) For the purposes of subclause (2), an *existing holding* is the aggregation of all adjacent or adjoining lots or portions held in the same ownership at the relevant date shown in italics on the map for that zone or the part of that zone within which the existing holding is located.

34 Dual occupancies in certain zones

(1) If two dwellings are situated on the same lot within Zone 2 (b):

(a) the separate occupation of the lots illustrated by a proposed strata plan relating to the dwellings is prohibited, and

(b) subdivision of the land under the *Conveyancing Act 1919* or the *Community Land Development Act 1989* is prohibited,

unless the area of each lot that will be the subject of a separate title for a dwelling when the plan is registered is not less than 350 square metres.

(2) If two dwellings are situated on the same lot or an existing holding within Zone 1 (a), 7 (d1), 7 (d4), 7 (d5) or 7 (d6):

(a) the separate occupation of the lots illustrated by a proposed strata plan relating to the dwellings is prohibited, and

(b) subdivision of the land under the *Conveyancing Act 1919* or the *Community Land Development Act 1989* is prohibited,

unless the area of each lot that will be the subject of a separate title for a dwelling when the plan is registered is not less than the area for a lot in the zone shown in the Table in clause 33.

35 Erection of dwelling houses or dual occupancies in certain zones

(1) Consent must not be granted to the erection of a dwelling house or a dual occupancy (attached) on land within Zone 1 (a), 7 (d1), 7 (d4), 7 (d5) or 7 (d6) unless:

(a) the area of the lot on which it is to be erected is equal to or greater than the area shown opposite that zone in the Table in clause 33, and

(b) only one dwelling house or one dual occupancy (attached) is to be erected on the lot.

(2) Despite subclause (1), consent may be granted to the erection of one dwelling house or one dual occupancy (attached) on land within Zone 7 (d4) if:

(a) that land constituted the whole of an existing holding, or

(b) the land is a lot created pursuant to clause 33 (2), but not a lot to be used for the purpose of a public utility undertaking or public reserve.

(3) For the purposes of this clause, an *existing holding* is the aggregation of all adjacent or adjoining lots or portions held in the same ownership at the relevant date shown in italics on the map for the part of that zone within which the existing holding is located.

42C Minto Renewal Project

(1) This clause applies to certain land at Minto, as shown distinctively coloured, edged heavy black and lettered on Sheet 1 of the map marked "Campbelltown (Urban Area) Local Environmental Plan 2002 (Amendment No 14)".

(2) Despite any other provision of this plan, nothing restricts or prohibits the consent authority from granting consent to development of the land to which this clause applies for one or more of the following purposes:

(a) bushfire fighting establishments,

(b) bushfire hazard reduction,

(c) car parking,

(d) community facilities,

(e) recreation areas,

(f) recreation facilities,

(g) roads,

(h) underground mining.

(3) Despite any other provision of this plan, nothing restricts or prohibits the consent authority from granting consent to development of the land to which this clause applies that is within Zone 2 (b) for the purpose of integrated housing development.

(4) If 2 dwellings are situated on the same lot on land that is within Zone 2 (b) on the land to which this clause applies:

(a) the separate occupation of the lots illustrated by a proposed strata plan relating to the dwellings is prohibited, and

(b) subdivision of the land under the *Conveyancing Act 1919* is prohibited,
unless the area of each lot that will be the subject of a separate title for a dwelling when the plan is registered is not less than 300 square metres.

(5) In this clause, *integrated housing development* means development that includes subdivision and that results in:

(a) there being 3 or more dwellings, each on a separate lot, and

(b) the average area of all those separate lots with dwellings is not less than 225 square metres.

Division 2A Edmondson Park Urban Release Area Precinct

51H Density controls

(1) The consent authority must not grant consent to the erection of dwellings on land within the Edmondson Park Urban Release Area Precinct unless the net site density applying in relation to the proposed dwellings on the land is not less than the prescribed net site density applying in relation to the land.

(2) The consent authority must not grant consent to the subdivision of land within the Edmondson Park Urban Release Area Precinct unless the consent authority is of the opinion that the proposal is not inconsistent with the prescribed net site density applying in relation to the land.

(3) Despite subclause (1), the consent authority may consent to the erection of dwellings on land within Zone 2 (c), 3 (a) or 3 (c) even though the net site density applying in relation to the proposed dwellings is less than the prescribed net site density if:

(a) the proposed net site density is not less than the prescribed net site density (if any) that would apply if the boundary of the land was located 60 metres away in at least one direction, and

(b) the consent authority is satisfied that the proposed density is required:

(i) to incorporate an efficient road layout in connection with the proposed development, or

(ii) to achieve the optimum development of the land in a planning and urban design sense.

(4) *State Environmental Planning Policy No 1—Development Standards* does not apply in relation to any prescribed net site density.

(5) In this clause:

net site density, in relation to dwellings, means the ratio that the number of dwellings concerned bears to the area occupied by those dwellings, excluding any public roads, open space or drainage corridors.

prescribed net site density, in relation to land, means the minimum net site density applying in relation to dwellings on the land, as identified on Sheet 2 of the map marked "Campbelltown (Urban Area) Local Environmental Plan 2002 (Amendment No 12)".

NOTE: A copy of the complete written instrument for the Campbelltown (Urban Area) Local Environmental Plan 2002 is available on the NSW Legislation website at: www.legislation.nsw.gov.au.

campbelltown
city council

Issue Date: 20 April 2012
Application Number: 201201114
Receipt Number: 1964209

Globalx Information Services
DX 1239
SYDNEY NSW

Your Reference: 570849-11012

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Section 149 Planning Certificate phone enquiries: (02) 4645 4560.

Property Address: Lot 1 Cambridge Avenue
GLENFIELD NSW 2167

Property Description: Lot 91 DP 1155962

As at the date of issue, the following matters apply to the land subject of this certificate:

INFORMATION PROVIDED UNDER SECTION 149(2) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 (the Act)

PART 1 – Names of relevant planning instruments and DCPs

Planning Instrument: Campbelltown (Urban Area) LEP 2002
Effect: 1(a) - Rural A Zone

Planning Instrument: Campbelltown (Urban Area) LEP 2002
Effect: 6(b) - Regional Open Space Zone

(1) In addition to the environmental planning instrument(s) named above, the following planning instruments also apply to the carrying out of development on the land subject of this certificate:

Local environmental plans (LEPs) and deemed environmental planning instruments

Campbelltown LEP No.209 – Exempt Development

For further information about these local environmental plans and deemed environmental planning instruments, contact Council's Environmental Planning Section on (02) 4645 4842.

State environmental planning policies (SEPPs)

SEPP No.1 – Development Standards

SEPP No.4 – Development Without Consent and Miscellaneous Complying Development

For free Interpreting Service, please bring this document to Council or ring the Telephone Interpreter Service 131 450 and ask them to contact your Council.

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Để nhận được Dịch vụ Thông dịch miễn phí, xin đem tài liệu này đến Hội đồng Thành phố hoặc gọi đến Dịch vụ Thông dịch qua Điện thoại (TIS) số 131 450 và nhờ họ liên lạc Hội đồng Thành phố cho quý vị.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

SEPP No.6 – Number of Storeys in a Building

SEPP No.21 – Caravan Parks

SEPP No.22 – Shops and Commercial Premises

SEPP No.30 – Intensive Agriculture

SEPP No.33 – Hazardous and Offensive Development

SEPP No.44 – Koala Habitat Protection

SEPP No.50 – Canal Estate Development

SEPP No.55 – Remediation of Land

SEPP No.60 – Exempt and Complying Development

SEPP No.64 – Advertising and Signage

SEPP No.65 – Design Quality of Residential Flat Buildings

SEPP No.70 – Affordable Housing (Revised Schemes)

SEPP No.19 - Bushland in Urban Areas

SEPP (Building Sustainability Index: BASIX) 2004

SEPP (Major Development) 2005

SEPP (Mining, Petroleum Production and Extractive Industries) 2007

SEPP (Temporary Structures and Places of Public Entertainment) 2007

SEPP (Infrastructure) 2007

SEPP (Exempt and Complying Development Codes) 2008

SEPP (Affordable Rental Housing) 2009

SEPP (State and Regional Development) 2011

Greater Metropolitan REP No.2 - Georges River Catchment

For further information about these State environmental planning policies, contact the Department of Planning (www.planning.nsw.gov.au).

(2) The following proposed environmental planning instruments, which are or have been the subject of community consultation or on public exhibition under the Act (unless the Director-General has notified Council that the making of the proposed instrument has been deferred indefinately or has not been approved), apply to the carrying out of development on the land subject of this certificate:

Draft local environmental plans (LEPs)

None

For further information about these draft local environmental plans, contact Council's Environmental Planning Section on (02) 4645 4842.

Draft State environmental planning policies (SEPPs)

None

For further information about these draft State environmental planning policies, contact the Department of Planning (www.planning.nsw.gov.au).

(3) The following development control plans (DCPs) apply to the carrying out of development on the land subject of this certificate:

Campbelltown DCP No.82 – Religious Establishment Policy

Campbelltown DCP No.87 – Public Notification & Public Exhibition Policy

Campbelltown DCP No.96 – The Provision of Parenting Facilities

DCP No.99 – Advertising Signs

DCP No.107 – Siting of Communication Facilities (Telecommunication Towers)

Campbelltown DCP No.114 – Trees

Campbelltown DCP No.122 – Restricted Premises

Campbelltown Sex Industry DCP 2003

Campbelltown (Sustainable City) DCP 2009 Volume 2

Campbelltown (Sustainable City) DCP 2009 Volume 1 (Parts 1-8)

Campbelltown DCP No.120 - Parking of Commercial Vehicles and Trucks Within Residential, Scenic Protection and Rural Areas

For further information about these development control plans, contact Council's Environmental Planning Section on (02) 4645 4842. Please note that the names of any draft development control plans that apply to the land subject of this certificate, that have been placed on exhibiton by Council but have not yet come into effect, are provided as advice under section 149(5) of the Act.

PART 2 – Zoning and land use under relevant LEPs

a) The following zone(s) apply to the land subject of this certificate:

1(a) - Rural A Zone

6(b) - Regional Open Space Zone

b) The purposes for which the plan or instrument provides that development may be carried out without the need for development consent are detailed in the land use table for each zone. Reference should be made to either Attachment 1 to this certificate or the appropriate section of the attached copy of the plan or instrument.

In addition, SEPP (Exempt and Complying Development Codes) 2008 and Campbelltown LEP No.209 – Exempt Development allow certain types of development to be carried out as exempt development within the Campbelltown City local government area.

c) The purposes for which the plan or instrument provides that development may not be carried out except with development consent are detailed in the land use table for each zone. Reference should be made to either Attachment 1 to this certificate or the appropriate section of the attached copy of the plan or instrument.

In addition, SEPP (Exempt and Complying Development Codes) 2008 and SEPP No.60 – Exempt and Complying Development allow certain types of development to be carried out as complying development within the Campbelltown City local government area after a complying development certificate has been obtained from Council or from an accredited certifier.

d) The purposes for which the plan or instrument provides that development is prohibited are detailed in the land use table for each zone. Reference should be made to either Attachment 1 to this certificate or the appropriate section of the attached copy of the plan or instrument.

e) Any development standards applying to the land subject of this certificate that fix minimum land dimensions for the erection of a dwelling-house and, if so, the minimum land dimensions so fixed are detailed in the relevant section of the plan or instrument. Reference should be made to either Attachment 2 to this certificate or the appropriate section(s) of the attached copy of the plan or instrument. In addition, certain Council development control plans may impose minimum development standards for the creation of allotments and/or minimum site area and dimensions for the erection of a dwelling-house.

For further information about items a), b), c), d) and e) above, contact Council's Environmental Planning Section on (02) 4645 4842.

f) The land subject of this certificate does not include or comprise critical habitat.

g) The land subject of this certificate is not in a conservation area (however described).

h) No item of environmental heritage (however described) is situated on the land subject of this certificate.

PART 2A – Zoning and land use under State Environmental Planning Policy (Sydney Region Growth Centres) 2006

None

PART 3 – Complying development

(1) The land subject of this certificate is land on which complying development may be carried out under the following codes for complying development in accordance with the provisions of clauses 1.17A (c) and (d) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008:

Housing Alterations Code

General Commercial and Industrial Code

Subdivisions Code

General Development Code

Demolition Code

Please note that reference should also be made to the relevant parts of this policy for the general requirements for complying development and to the relevant codes which may also include provisions relating to zoning, lot size etc.

The land subject of this certificate is land on which no complying development may be carried out under the following codes for complying development because of the provisons of clauses 1.17A (c) and (d) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008:

General Housing Code
(unless the development is only a detached outbuilding or swimming pool on land within a heritage conservation area or a draft heritage conservation area and not subject to any other land exemption under clause 1.19 of this policy)

Rural Housing Code
(unless the development is only a detached outbuilding or swimming pool on land within a heritage conservation area or a draft heritage conservation area and not subject to any other land exemption under clause 1.19 of this policy or unless complying development is carried out on the part of the lot to which clause 1.19 or 1.17A of this policy does not apply)

(2) For codes identified above as being those under which no complying development may be carried out under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008, this is because of the following provisions of clauses 1.17A (c) and (d) and 1.19 of this policy:

The land is reserved for a public purpose in an environmental planning instrument.

PART 4 – Coastal protection

The land subject of this certificate is not affected by the operation of section 38 or 39 of the Coastal Protection Act 1979, but only to the extent that Council has been notified by the Department of Public Works.

PART 5 – Mine subsidence

The land subject of this certificate is not within a proclaimed Mine Subsidence District within the meaning of section 15 of the Mine Subsidence Compensation Act 1961.

PART 6 – Road widening and road realignment

The land subject of this certificate is not affected by any road widening or road realignment under Division 2 of Part 3 of the Roads Act 1993, any environmental planning instrument or any resolution of Council.

PART 7 – Council and other public authority policies on hazard risk restrictions

a) Council has adopted a policy with respect to all land within the Campbelltown City local government area with unusual site conditions. This policy restricts the development of land where extensive earthworks and/or filling has been carried out. Land, the development of which is restricted by this policy, has a restriction as to user placed on the title of the land stating the details of any restriction. Building lots can be affected by excessive land gradient, filling, reactive or dispersive soils, overland flow and/or mine subsidence. Buildings, structures or site works may require specific structural design to ensure proper building construction. Consequently, some applications may require the submission of structural design details and geotechnical reports. It is suggested that prior to lodging an application, enquiries be made to Council's Planning and Environment Division to ascertain any specific requirements.

b) Council has adopted by resolution the certified Campbelltown LGA Bush Fire Prone Land Map. This map identifies bush fire prone land within the Campbelltown City local government area as defined in section 4(1) of the Act. Where the land subject of this certificate is identified as bush fire prone land, the document entitled "Planning for Bush Fire Protection" prepared by the NSW Rural Fire Service in co-operation with the Department of Planning and dated December 2006 should be consulted with regards to possible restrictions on the development of the land because of the likelihood of bushfire.

c) The land subject of this certificate is not affected by a policy adopted by Council or adopted by any other public authority and notified to Council for reference in a planning certificate that restricts the development of the land because of the likelihood of tidal inundation.

d) The land subject of this certificate is not affected by a policy adopted by Council or adopted by any other public authority and notified to Council for reference in a planning certificate that restricts the development of the land because of the likelihood of acid sulphate soils.

e) Council has adopted by resolution a policy on contaminated land which may restrict the development of the land subject of this certificate. This policy is implemented when zoning or land use changes are proposed on lands which have previously been used for certain purposes. Consideration of Council's adopted policy and the application of provisions under relevant State legislation is warranted.

PART 7A – Flood related development controls information

(1) Development on all or part of the land subject of this certificate for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is subject to flood related controls.

(2) Development on all or part of the land subject of this certificate for any other purpose is subject to flood related development controls.

(3) Words and expressions in this clause have the same meanings as in the instrument set out in the Schedule to the Standard Instrument (Local Environmental Plans) Order 2006.

Please note that some additional information regarding flooding and flood related development controls may be provided as advice under section 149(5) of the Act.

PART 8 – Land reserved for acquisition

An environmental planning instrument, deemed environmental planning instrument or draft environmental planning instrument applying to the land subject of this certificate provides for the acquisition of all or part of the land by a public authority, as referred to in section 27 of the Act.

PART 9 – Contribution plans

The following contribution plan(s) apply to the land subject of this certificate:

Campbelltown City Council Section 94A Development Contributions Plan

For further information about these contribution plans, contact Council's Environmental Planning Section on (02) 4645 4196.

PART 9A – Biodiversity certified land

The land subject of this certificate is not biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995).

PART 10 – Biobanking agreement

The land subject of this certificate is not land to which a biobanking agreement under Part 7A of the Threatened Species Conservation Act 1995 relates (but only in so far as Council has been notified of the existence of any such agreement by the Director-General of the Department of Environment, Climate Change and Water).

PART 11 – Bush fire prone land

Some of the land subject of this certificate has been identified as bush fire prone land on the Campbelltown LGA Bush Fire Prone Land Map that has been certified by the Commissioner of the New South Wales Rural Fire Service.

Please note that in accordance with section 66 of the Rural Fires Act 1997 and relevant regulations, a Bush Fire Hazard Reduction Notice may have been issued on this land. It is recommended that advice be obtained from the Macarthur Zone Rural Fire Service.

PART 12 – Property vegetation plans

No property vegetation plan applies to the land subject of this certificate as the whole of the Campbelltown City local government area is excluded from the operation of the Native Vegetation Act 2003.

PART 13 – Orders under Trees (Disputes Between Neighbours) Act 2006

No order has been made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land subject of this certificate (but only to the extent that Council has been notified of any such orders).

PART 14 – Directions under Part 3A

No direction, in force under section 75P(2)(c1) of the Act, that a provision of an environmental planning instrument prohibiting or restricting the carrying out of a project or a stage of a project on the land subject of this certificate under Part 4 of the Act does not have effect, has been issued by the Minister.

PART 15 – Site compatibility certificates and conditions for seniors housing

a) No current site compatibility certificate (seniors housing), of which Council is aware, exists in respect of proposed development on the land subject of this certificate.

b) No conditions of consent to a development application, granted after 11 October 2007, of the kind referred to in clause 18(2) of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 have been imposed in respect of proposed development on the land subject of this certificate.

PART 16 – Site compatibility certificates for infrastructure

No valid site compatibitlity certificate (infrastructure), of which Council is aware, exisits in respect of proposed development on the land subject of this certificate.

PART 17 – Site compatibility certificates and conditions for affordable rental housing

(1) No current site compatibitlity certificate (affordable rental housing), of which Council is aware, exists in respect of proposed development on the land subject of this certificate.

(2) No conditions of consent to a development application of the kind referred to in clause 17(1) or 37(1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 have been imposed in respect of proposed development on the land subject of this certificate.

Matters prescribed by section 59(2) of the Contaminated Land Management Act 1997

(a) The land subject of this certificate is not significantly contaminated land within the meaning of the Contaminated Land Management Act 1997.

(b) The land subject of this certificate is not subject to a management order within the meaning of the Contaminated Land Management Act 1997.

(c) The land subject of this certificate is not the subject of an approved voluntary management proposal within the meaning of the Contaminated Land Management Act 1997.

(d) The land subject of this certificate is not subject to an ongoing maintenance order within the meaning of the Contaminated Land Management Act 1997.

(e) The land subject of this certificate is not the subject of a site audit statement within the meaning of the Contaminated Land Management Act 1997 provided to Council.

INFORMATION PROVIDED UNDER SECTION 149(5) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

All properties within the Campbelltown City local government area may be affected by flooding caused by overland flow or local topography. Applicants will need to make their own assessment of the risk associated with these matters. For more information, contact Council's Flood Mitigation and Drainage Section in writing.

Council is currently undertaking a flood study of the Bow Bowing / Bunbury Curran Creek

Catchment, of which this property is a part. The results of this study will improve Council's understanding of flood behaviour in the catchment, and the flood affectation of all properties will be reassessed when this study is finalised. It is anticipated that the Floodplain Risk Management Plan will be finalised by the end of 2012.

Council has received a copy of the map "Salinity Potential in Western Sydney - 2002" from the Department of Infrastructure, Planning and Natural Resources (DIPNR). This map classifies the land within the Campbelltown City local government area as having either known salinity, high salinity potential, moderate salinity potential or low salinity potential. Salinity issues may be of relevance to any development of the land subject of this certificate. For further information, contact the Department of Infrastructure, Planning and Natural Resources (www.dipnr.nsw.gov.au).

It should be noted that the Commonwealth Department of Transport and Regional Development has released a document titled "Preliminary Flight Paths" purporting to provide preliminary information on jet aircraft flight paths and flight zones for each of the design options for the Second Sydney Airport Proposals. Some of the flight paths and flight zones shown in this document may, if implemented, impact upon the environment in the vicinity of the land subject of this certificate. Further enquiries in respect of this document should be directed initially to the Commonwealth Department of Transport and Regional Development.

The land subject of this certificate does not have a boundary to a controlled access road.

Council has resolved to prepare a comprehensive Local Environmental Plan for the City of Campbelltown in accordance with relevant statutory requirements. For more information, contact Council's Environmental Planning Section on (02) 4645 4563.

The following draft development control plans (DCPs), that have been placed on exhibition by Council but which have not yet come into effect, apply to the land subject of this certificate:

Draft Campbelltown (Sustainable City) DCP 2011 Volume 1 (Stage 4)

For further information about these draft development control plans, contact Council's Environmental Planning Section on (02) 4645 4842.

Jeff Lawrence, per
Director Planning and Environment

Attachment 1

Campbelltown (Urban Area) Local Environmental Plan 2002

Zone 1 (a)—Rural A Zone

(1) **What land is within Zone 1 (a)?**
Land is within Zone 1 (a) if it is shown coloured buff on the map.

(2) **What is the zone objective and what effect does it have?**
The objective of this zone is to identify land that constraints make unsuitable for urban use so that it can be put to long-term agricultural use.

Except as otherwise provided by this plan, consent must not be granted for development on land within this zone unless the consent authority is of the opinion that carrying out the proposed development would be consistent with the objective of this zone.

A further objective of this zone is to encourage a high quality standard of development which is aesthetically pleasing, functional and relates sympathetically to nearby and adjoining development.

(3) **What development may be carried out without consent?**
Development must not be carried out on land within this zone without consent.

(4) **What development may be carried out only with consent?**
Development may be carried out on land within this zone only with consent for the purpose of:

agriculture; bushfire hazard reduction; drainage; dual occupancies (attached); dwelling houses; forestry; mines; utility installations.

(5) **What development is prohibited?**
Development which is not included in subclause (4) is prohibited on land within this zone.

NOTE: A copy of the complete written instrument for the Campbelltown (Urban Area) Local Environmental Plan 2002 is available on the NSW Legislation website at: www.legislation.nsw.gov.au.

Attachment 1

Campbelltown (Urban Area) Local Environmental Plan 2002

Zone 6 (b)—Regional Open Space Zone

(1) **What land is within Zone 6 (b)?**
Land is within Zone 6 (b) if it is shown coloured mid green on the map.

(2) **What are the zone objectives and what effect do they have?**
The objectives of this zone are:

(a) to identify land which has been acquired for, or is to be acquired for, regional open space, and

(b) to preserve and manage regional open space for conservation and recreational purposes for the benefit of the Sydney region.

Except as otherwise provided by this plan, consent must not be granted for development on land within this zone unless the consent authority is of the opinion that carrying out the proposed development would be consistent with one or more of the objectives of this zone.

A further objective of this zone is to encourage a high quality standard of development which is aesthetically pleasing, functional and relates sympathetically to nearby and adjoining development.

(3) **What development may be carried out without consent?**
Development may be carried out on land within this zone without consent for the purpose of:

drainage; utility installations.

(4) **What development may be carried out only with consent?**
Development may be carried out on land within this zone only with consent for the purpose of:

bushfire fighting establishments; bushfire hazard reduction (otherwise than in accordance with a bush fire management plan prepared under the *Rural Fires Act 1997*); car parking; community facilities; recreation areas; recreation facilities; roads; underground mining.

(5) **What development is prohibited?**
Development is prohibited on land within this zone if it is not included in subclause (3) or (4).

NOTE: A copy of the complete written instrument for the Campbelltown (Urban Area) Local Environmental Plan 2002 is available on the NSW Legislation website at: www.legislation.nsw.gov.au.

Attachment 2

Campbelltown (Urban Area) Local Environmental Plan 2002

32 Subdivision generally

(1) Land to which this plan applies may be subdivided only with development consent.

(2) Consent must not be granted to the subdivision of land traversed by a zone boundary unless the boundaries of lots so created correspond generally with the boundaries between the zones as shown on the map.

(3) Where the subdivision of land would result in the opening of a new road, the road must accord with any pattern of proposed roads indicated on the map unless the consent authority is satisfied that the road will provide adequate access to adjoining land and fulfils the objectives of the road pattern indicated on the map.

33 Subdivision in rural and environmental protection zones

(1) Consent must not be granted to the subdivision of land in a zone specified in the following Table unless the area of any lot created is equal to or greater than that shown opposite that zone in that Table.

Table

Zone	Lot
1 (a)	40 hectares
1 (d)	40 hectares
7 (d1)	100 hectares
7 (d4)	2 hectares
7 (d5)	1 hectare
7 (d6)	0.4 hectare

(2) Despite subclause (1), consent may be granted to the subdivision of land in any of the zones specified in the Table so as to create lots with areas less than those set out in that Table if:

(a) the consent authority is satisfied that the purpose of the subdivision is to create a lot or lots to be used for the purpose of a public utility undertaking or public reserve, or

(b) the consent authority is satisfied that the purpose of the subdivision is to align the boundaries of those lots with the boundaries of a zone so specified.

(2) For the purposes of subclause (2), an *existing holding* is the aggregation of all adjacent or adjoining lots or portions held in the same ownership at the relevant date shown in italics on the map for that zone or the part of that zone within which the existing holding is located.

34 Dual occupancies in certain zones

(1) If two dwellings are situated on the same lot within Zone 2 (b):

(a) the separate occupation of the lots illustrated by a proposed strata plan relating to the dwellings is prohibited, and

(b) subdivision of the land under the *Conveyancing Act 1919* or the *Community Land Development Act 1989* is prohibited,

unless the area of each lot that will be the subject of a separate title for a dwelling when the plan is registered is not less than 350 square metres.

(2) If two dwellings are situated on the same lot or an existing holding within Zone 1 (a), 7 (d1), 7 (d4), 7 (d5) or 7 (d6):

(a) the separate occupation of the lots illustrated by a proposed strata plan relating to the dwellings is prohibited, and

(b) subdivision of the land under the *Conveyancing Act 1919* or the *Community Land Development Act 1989* is prohibited,

unless the area of each lot that will be the subject of a separate title for a dwelling when the plan is registered is not less than the area for a lot in the zone shown in the Table in clause 33.

35 Erection of dwelling houses or dual occupancies in certain zones

(1) Consent must not be granted to the erection of a dwelling house or a dual occupancy (attached) on land within Zone 1 (a), 7 (d1), 7 (d4), 7 (d5) or 7 (d6) unless:

(a) the area of the lot on which it is to be erected is equal to or greater than the area shown opposite that zone in the Table in clause 33, and

(b) only one dwelling house or one dual occupancy (attached) is to be erected on the lot.

(2) Despite subclause (1), consent may be granted to the erection of one dwelling house or one dual occupancy (attached) on land within Zone 7 (d4) if:

(a) that land constituted the whole of an existing holding, or

(b) the land is a lot created pursuant to clause 33 (2), but not a lot to be used for the purpose of a public utility undertaking or public reserve.

(3) For the purposes of this clause, an *existing holding* is the aggregation of all adjacent or adjoining lots or portions held in the same ownership at the relevant date shown in italics on the map for the part of that zone within which the existing holding is located.

42C Minto Renewal Project

(1) This clause applies to certain land at Minto, as shown distinctively coloured, edged heavy black and lettered on Sheet 1 of the map marked "Campbelltown (Urban Area) Local Environmental Plan 2002 (Amendment No 14)".

(2) Despite any other provision of this plan, nothing restricts or prohibits the consent authority from granting consent to development of the land to which this clause applies for one or more of the following purposes:

(a) bushfire fighting establishments,

(b) bushfire hazard reduction,

(c) car parking,

(d) community facilities,

(e) recreation areas,

(f) recreation facilities,

(g) roads,

(h) underground mining.

(3) Despite any other provision of this plan, nothing restricts or prohibits the consent authority from granting consent to development of the land to which this clause applies that is within Zone 2 (b) for the purpose of integrated housing development.

(4) If 2 dwellings are situated on the same lot on land that is within Zone 2 (b) on the land to which this clause applies:

(a) the separate occupation of the lots illustrated by a proposed strata plan relating to the dwellings is prohibited, and

(b) subdivision of the land under the *Conveyancing Act 1919* is prohibited,
unless the area of each lot that will be the subject of a separate title for a dwelling when the plan is registered is not less than 300 square metres.

(5) In this clause, *integrated housing development* means development that includes subdivision and that results in:

(a) there being 3 or more dwellings, each on a separate lot, and

(b) the average area of all those separate lots with dwellings is not less than 225 square metres.

Division 2A Edmondson Park Urban Release Area Precinct

51H Density controls

(1) The consent authority must not grant consent to the erection of dwellings on land within the Edmondson Park Urban Release Area Precinct unless the net site density applying in relation to the proposed dwellings on the land is not less than the prescribed net site density applying in relation to the land.

(2) The consent authority must not grant consent to the subdivision of land within the Edmondson Park Urban Release Area Precinct unless the consent authority is of the opinion that the proposal is not inconsistent with the prescribed net site density applying in relation to the land.

(3) Despite subclause (1), the consent authority may consent to the erection of dwellings on land within Zone 2 (c), 3 (a) or 3 (c) even though the net site density applying in relation to the proposed dwellings is less than the prescribed net site density if:

(a) the proposed net site density is not less than the prescribed net site density (if any) that would apply if the boundary of the land was located 60 metres away in at least one direction, and

(b) the consent authority is satisfied that the proposed density is required:

(i) to incorporate an efficient road layout in connection with the proposed development, or

(ii) to achieve the optimum development of the land in a planning and urban design sense.

(4) *State Environmental Planning Policy No 1—Development Standards* does not apply in relation to any prescribed net site density.

(5) In this clause:

net site density, in relation to dwellings, means the ratio that the number of dwellings concerned bears to the area occupied by those dwellings, excluding any public roads, open space or drainage corridors.

prescribed net site density, in relation to land, means the minimum net site density applying in relation to dwellings on the land, as identified on Sheet 2 of the map marked "Campbelltown (Urban Area) Local Environmental Plan 2002 (Amendment No 12)".

NOTE: A copy of the complete written instrument for the Campbelltown (Urban Area) Local Environmental Plan 2002 is available on the NSW Legislation website at: www.legislation.nsw.gov.au.

Attachment 2

Campbelltown (Urban Area) Local Environmental Plan 2002

32 Subdivision generally

(1) Land to which this plan applies may be subdivided only with development consent.

(2) Consent must not be granted to the subdivision of land traversed by a zone boundary unless the boundaries of lots so created correspond generally with the boundaries between the zones as shown on the map.

(3) Where the subdivision of land would result in the opening of a new road, the road must accord with any pattern of proposed roads indicated on the map unless the consent authority is satisfied that the road will provide adequate access to adjoining land and fulfils the objectives of the road pattern indicated on the map.

33 Subdivision in rural and environmental protection zones

(1) Consent must not be granted to the subdivision of land in a zone specified in the following Table unless the area of any lot created is equal to or greater than that shown opposite that zone in that Table.

Table

Zone	Lot
1 (a)	40 hectares
1 (d)	40 hectares
7 (d1)	100 hectares
7 (d4)	2 hectares
7 (d5)	1 hectare
7 (d6)	0.4 hectare

(2) Despite subclause (1), consent may be granted to the subdivision of land in any of the zones specified in the Table so as to create lots with areas less than those set out in that Table if:

(a) the consent authority is satisfied that the purpose of the subdivision is to create a lot or lots to be used for the purpose of a public utility undertaking or public reserve, or

(b) the consent authority is satisfied that the purpose of the subdivision is to align the boundaries of those lots with the boundaries of a zone so specified.

(2) For the purposes of subclause (2), an *existing holding* is the aggregation of all adjacent or adjoining lots or portions held in the same ownership at the relevant date shown in italics on the map for that zone or the part of that zone within which the existing holding is located.

34 Dual occupancies in certain zones

(1) If two dwellings are situated on the same lot within Zone 2 (b):

(a) the separate occupation of the lots illustrated by a proposed strata plan relating to the dwellings is prohibited, and

(b) subdivision of the land under the *Conveyancing Act 1919* or the *Community Land Development Act 1989* is prohibited,

unless the area of each lot that will be the subject of a separate title for a dwelling when the plan is registered is not less than 350 square metres.

(2) If two dwellings are situated on the same lot or an existing holding within Zone 1 (a), 7 (d1), 7 (d4), 7 (d5) or 7 (d6):

(a) the separate occupation of the lots illustrated by a proposed strata plan relating to the dwellings is prohibited, and

(b) subdivision of the land under the *Conveyancing Act 1919* or the *Community Land Development Act 1989* is prohibited,

unless the area of each lot that will be the subject of a separate title for a dwelling when the plan is registered is not less than the area for a lot in the zone shown in the Table in clause 33.

35 Erection of dwelling houses or dual occupancies in certain zones

(1) Consent must not be granted to the erection of a dwelling house or a dual occupancy (attached) on land within Zone 1 (a), 7 (d1), 7 (d4), 7 (d5) or 7 (d6) unless:

(a) the area of the lot on which it is to be erected is equal to or greater than the area shown opposite that zone in the Table in clause 33, and

(b) only one dwelling house or one dual occupancy (attached) is to be erected on the lot.

(2) Despite subclause (1), consent may be granted to the erection of one dwelling house or one dual occupancy (attached) on land within Zone 7 (d4) if:

(a) that land constituted the whole of an existing holding, or

(b) the land is a lot created pursuant to clause 33 (2), but not a lot to be used for the purpose of a public utility undertaking or public reserve.

(3) For the purposes of this clause, an *existing holding* is the aggregation of all adjacent or adjoining lots or portions held in the same ownership at the relevant date shown in italics on the map for the part of that zone within which the existing holding is located.

42C Minto Renewal Project

(1) This clause applies to certain land at Minto, as shown distinctively coloured, edged heavy black and lettered on Sheet 1 of the map marked "Campbelltown (Urban Area) Local Environmental Plan 2002 (Amendment No 14)".

(2) Despite any other provision of this plan, nothing restricts or prohibits the consent authority from granting consent to development of the land to which this clause applies for one or more of the following purposes:

(a) bushfire fighting establishments,

(b) bushfire hazard reduction,

(c) car parking,

(d) community facilities,

(e) recreation areas,

(f) recreation facilities,

(g) roads,

(h) underground mining.

(3) Despite any other provision of this plan, nothing restricts or prohibits the consent authority from granting consent to development of the land to which this clause applies that is within Zone 2 (b) for the purpose of integrated housing development.

(4) If 2 dwellings are situated on the same lot on land that is within Zone 2 (b) on the land to which this clause applies:

(a) the separate occupation of the lots illustrated by a proposed strata plan relating to the dwellings is prohibited, and

(b) subdivision of the land under the *Conveyancing Act 1919* is prohibited,
unless the area of each lot that will be the subject of a separate title for a dwelling when the plan is registered is not less than 300 square metres.

(5) In this clause, *integrated housing development* means development that includes subdivision and that results in:

(a) there being 3 or more dwellings, each on a separate lot, and

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(1) The consent authority must not grant consent to the erection of dwellings on land within the Edmondson Park Urban Release Area Precinct unless the net site density applying in relation to the proposed dwellings on the land is not less than the prescribed net site density applying in relation to the land.

(2) The consent authority must not grant consent to the subdivision of land within the Edmondson Park Urban Release Area Precinct unless the consent authority is of the opinion that the proposal is not inconsistent with the prescribed net site density applying in relation to the land.

(3) Despite subclause (1), the consent authority may consent to the erection of dwellings on land within Zone 2 (c), 3 (a) or 3 (c) even though the net site density applying in relation to the proposed dwellings is less than the prescribed net site density if:

(a) the proposed net site density is not less than the prescribed net site density (if any) that would apply if the boundary of the land was located 60 metres away in at least one direction, and

(b) the consent authority is satisfied that the proposed density is required:

(i) to incorporate an efficient road layout in connection with the proposed development, or

(ii) to achieve the optimum development of the land in a planning and urban design sense.

(4) *State Environmental Planning Policy No 1—Development Standards* does not apply in relation to any prescribed net site density.

(5) In this clause:

net site density, in relation to dwellings, means the ratio that the number of dwellings concerned bears to the area occupied by those dwellings, excluding any public roads, open space or drainage corridors.

prescribed net site density, in relation to land, means the minimum net site density applying in relation to dwellings on the land, as identified on Sheet 2 of the map marked "Campbelltown (Urban Area) Local Environmental Plan 2002 (Amendment No 12)".

NOTE: A copy of the complete written instrument for the Campbelltown (Urban Area) Local Environmental Plan 2002 is available on the NSW Legislation website at: www.legislation.nsw.gov.au.

Appendix 26

Visual Amenity Map

Site Address:

Cambridge Avenue, Glenfield NSW

Legend	Visual Amenity from:
01 - 04	Goodenough St and Fergusson St
05 - 06	Residential area between Railway Parade and Canterbury Rd
07 - 08	Glenfield Rd residential development
09 - 10	Slessor Rd residential area in Casula
11 - 12	Leacocks Ln residential area in Casula

Map Title:	Glenfield Waste Services Visual Amenity Map					**Date:**	21 May 2012
Location:	Glenfield, NSW Australia	**Version No:**	V01	**Map/DWG No:**	**1** of **1**	**Job Ref:**	11012

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