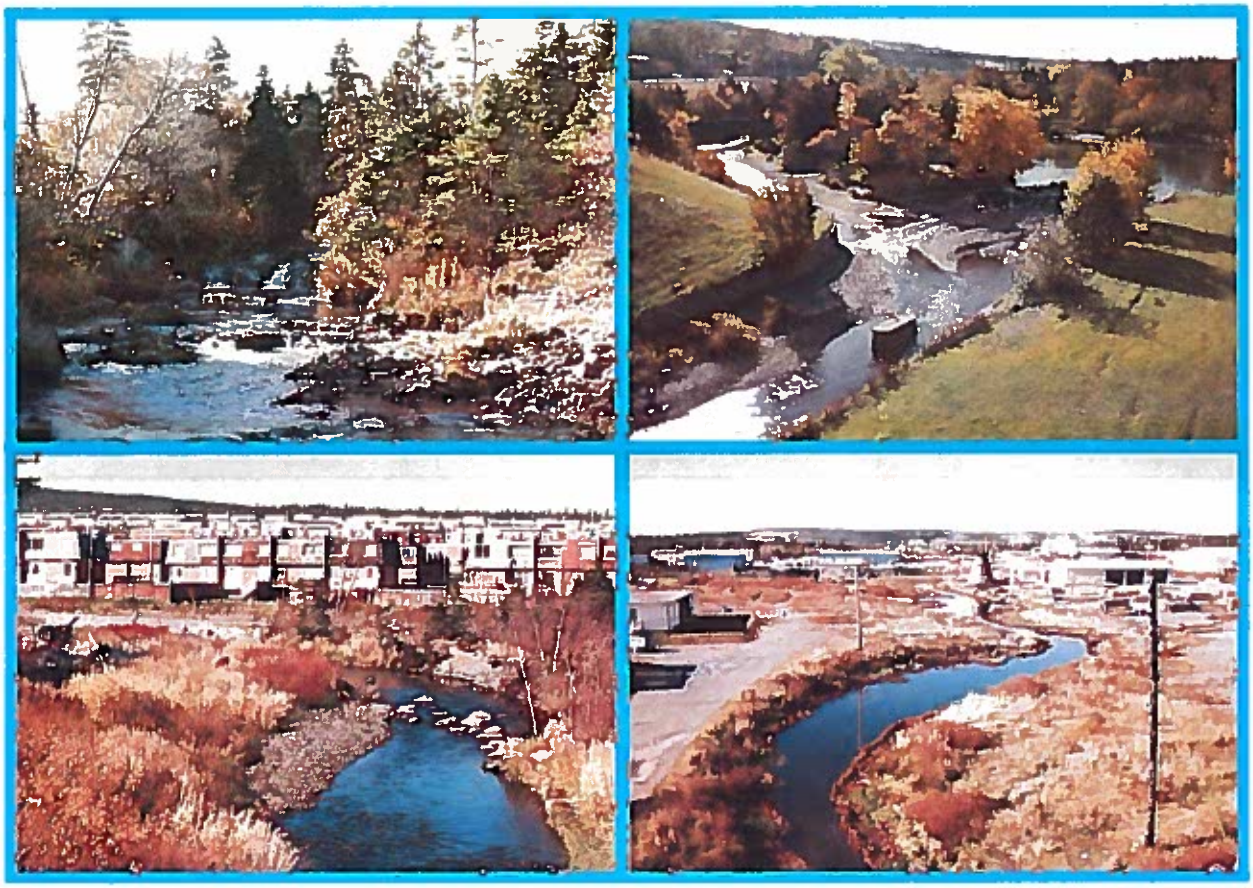
Government of Newfoundland and Labrador
Department of Environment
Water Resources Division
St. John's, Newfoundland

Government of Canada
Environment Canada
Inland Waters Directorate
Dartmouth, Nova Scotia

National Water Research Institute
Burlington, Ontario

FLOOD STUDY
VOL. 2



ban Hydrology Study of the Waterford River Basin

TECHNICAL REPORT No.
UHS-WRB 1.11

WATERFORD RIVER BASIN FLOOD STUDY

by

WATER PLANNING AND MANAGEMENT BRANCH
INLAND WATERS DIRECTORATE
ATLANTIC REGION
ENVIRONMENT CANADA

and

WATER RESOURCES DIVISION
NEWFOUNDLAND DEPARTMENT OF THE ENVIRONMENT

VOLUME 2 OF 2 - APPENDICES

Prepared for the
Waterford River Basin Urban Hydrology Study

December, 1986

Environment Canada | Environnement Canada
Conservation and Protection | Conservation et Protection

Inland Waters/Lands Directorate
Conservation and Protection
Atlantic Region
4th Floor, Queen Square
45 Alderney Drive
Dartmouth, Nova Scotia
B2Y 2N6

Your file / Votre référence

Our file / Notre référence

Dr. Wasi Ullah, Chairman
Technical Committee
Waterford River Basin Urban Hydrology Study
Newfoundland Department of the Environment
P.O. Box 4750
St. John's, Newfoundland
A1C 5T7

Dear Dr. Ullah:

On behalf of those investigating flooding along the Waterford River, I am pleased to submit herewith the final report entitled "Waterford River Basin Flood Study", as our contribution to the Waterford River Basin Urban Hydrology Study.

Yours truly,

E.R. Langley
Flood Studies Engineer
Water Planning & Management Branch

Canada

ABSTRACT

The Governments of Canada and the Province of Newfoundland had agreed to undertake a five-year urban hydrology study of the Waterford River on a work shared basis starting April 1, 1980. This component of the overall study determined the 1:20 and 1:100 year return period open water flood profiles using the HEC-II hydraulic model and identified flood prone areas along the Waterford River. The design flows used as input to this study were determined using the HYMO hydrologic model in another component of the Waterford River Study and the subject of a separate report. The flood prone areas are shown on the maps inserted at the end of the report.

RÉSUMÉ

Le gouvernement fédéral de même que la province de Terre-Neuve avaient décidé d'entreprendre une étude d'hydrologie urbaine de cinq ans pour la rivère Waterford à partir d'une entente de partage du travail débutant le 1er avril 1980. Cette composante de l'étude globale à déterminée les profiles des crues d'eau libre de 20 ans et de 100 ans utilisant le modèle hydraulique HEC-2, de même que l'identification des zones propices aux inondations le long de la rivière Waterford. Les débits utilisés pour cette étude furent déterminés précédemment par le modèle hydrologique HYMO, qui est une autre composante de l'étude de la rivière Waterford et est sujet d'un rapport séparé. Les zones propices aux inondations sont indiquées sur les cartes insérées à la fin du rapport.

PREFACE

The Waterford River Basin Urban Hydrology Study, developed as a co-operative effort between the Governments of Canada and the Province of Newfoundland, was proposed by the Newfoundland Department of Environment in response to watershed management problems that had resulted from urbanization of the Waterford River Basin. Among such problems, negative effects of urbanization on both water quality and quantity were found to be so serious that the Newfoundland Department of Environment identified the Waterford River Basin as a high priority area.

The five-year study began in 1980 was completed in March, 1985. The primary objectives of the study were to develop environmentally acceptable criteria for urban development in Newfoundland and to utilize the study results directly in the urban planning process in the Province. The specific objectives of the study, as outlined in the report "Waterford River Basin - Urban Hydrology Study Plan" were as follows:

(1) To examine the processes leading to changes in the hydrologic regime of the Waterford River watershed. This should include evaluation and monitoring of major hydrologic changes caused by urbanization, the study of precipitation-runoff processes, and the study of various forms of pollution originating in the urban areas of the watershed.

(2) To provide a hierarchy of mathematical models describing hydrologic processes in the watershed. Such models should deal with both water quality and quantity, and should be capable of simulating the impact of urbanization on the water resources in the studied basin.

(3) To recommend solutions to specific water management problems in the studied basin and to develop guidelines for implementation of similar solutions elsewhere in Newfoundland. Furthermore, planning and management criteria should be developed for those aspects of the urban development which related to the environmental protection of the affected water resources.

The complexity of the study called for a comprehensive approach which included hydrometric surveys, hydrological modelling, groundwater studies, biological surveys, water quality assessment, investigations of flooding, and land use and socio-economic analyses.

The study was administered by a Steering Committee appointed by the governments of Canada and Newfoundland. To implement the study plan, a Technical Committee, consisting of representatives of each participating agency, was established. Subsequently, the Technical Committee appointed sub-committees and working groups to prepare and carry out the workplans for the various components of the study.

The report that follows deals with one such component.

ACKNOWLEDGEMENTS

This report would not have been possible if it were not for the contributions of the following individuals:

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K. Taylor, I.W.D.
W. Ullah, W.R.D.

WRD - Water Resources Division, Environment Newfoundland

IWD - Inland Waters Directorate, Environment Canada

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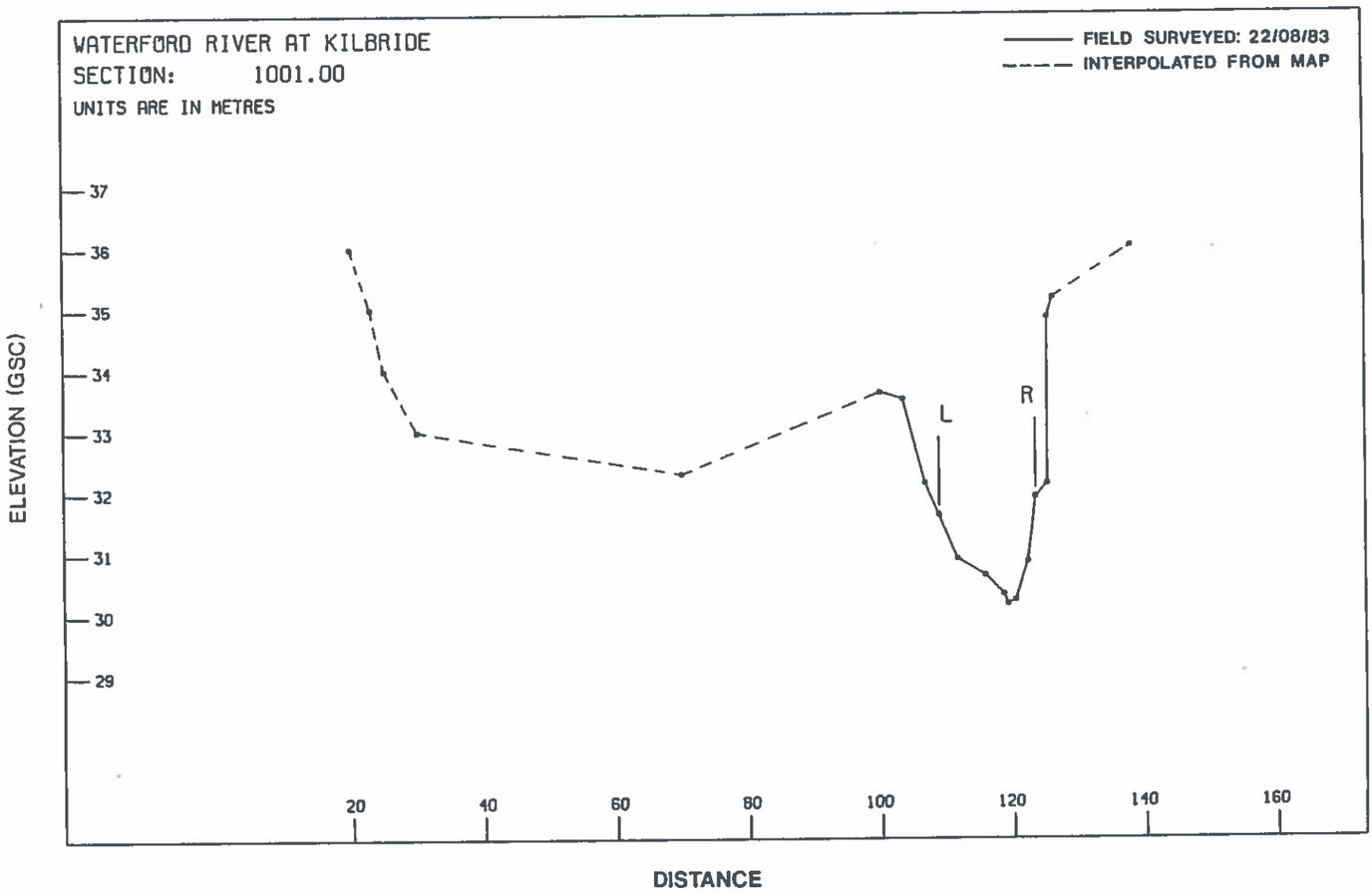
CROSS-SECTIONS OF REACHES AT KILBRIDE, MOUNT PEARL AND DONOVANS

KILBRIDE REACH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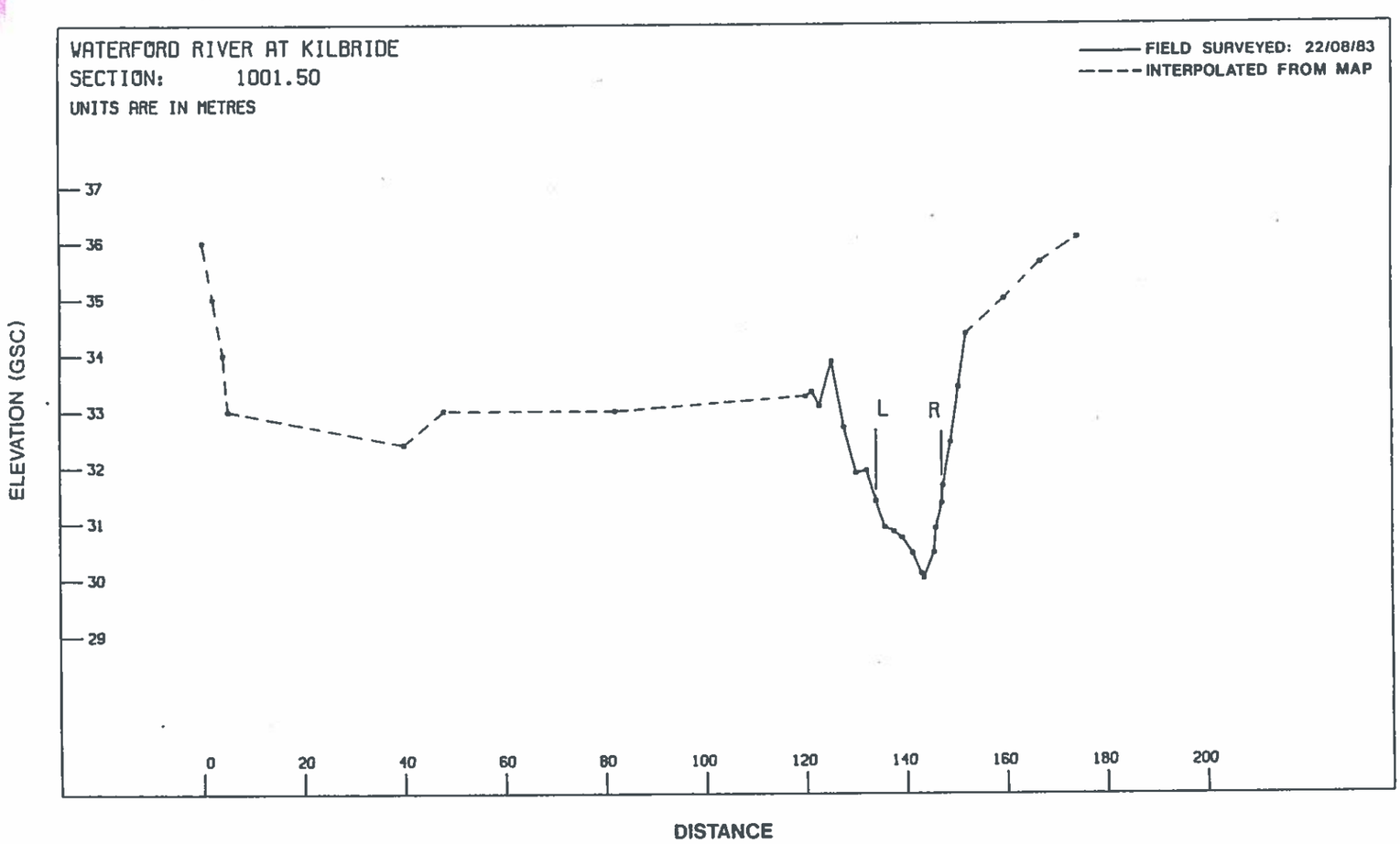
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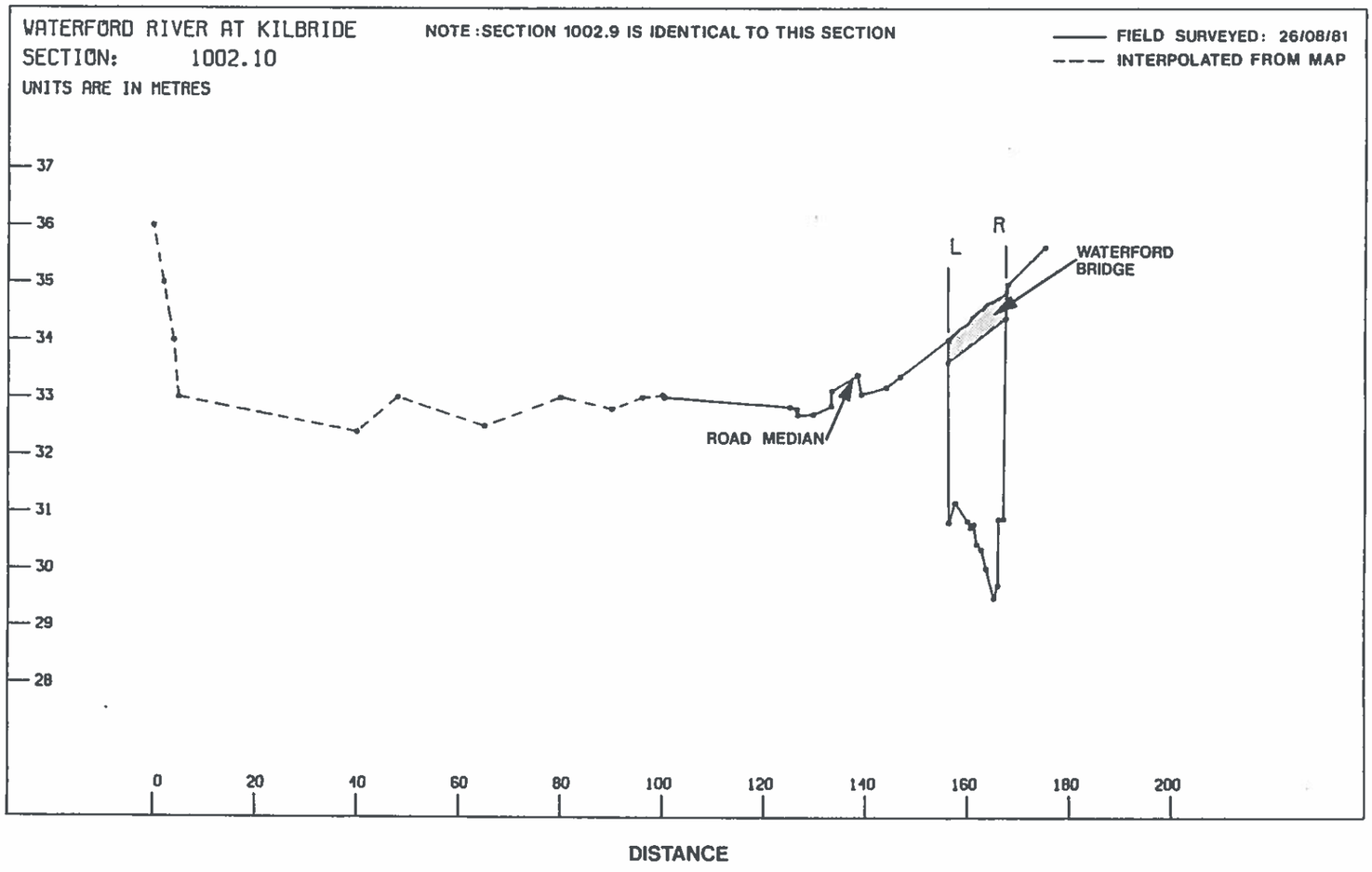
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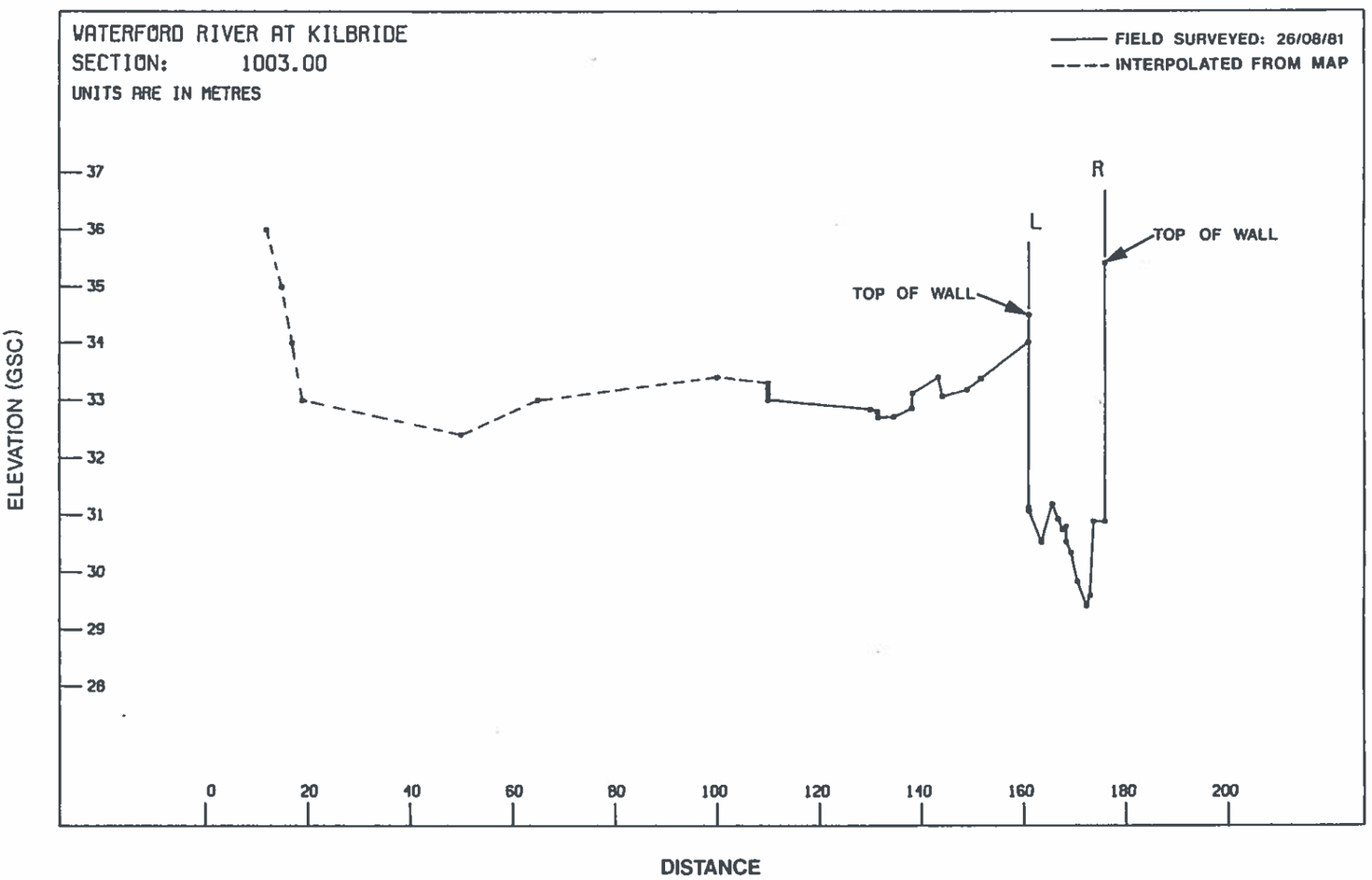
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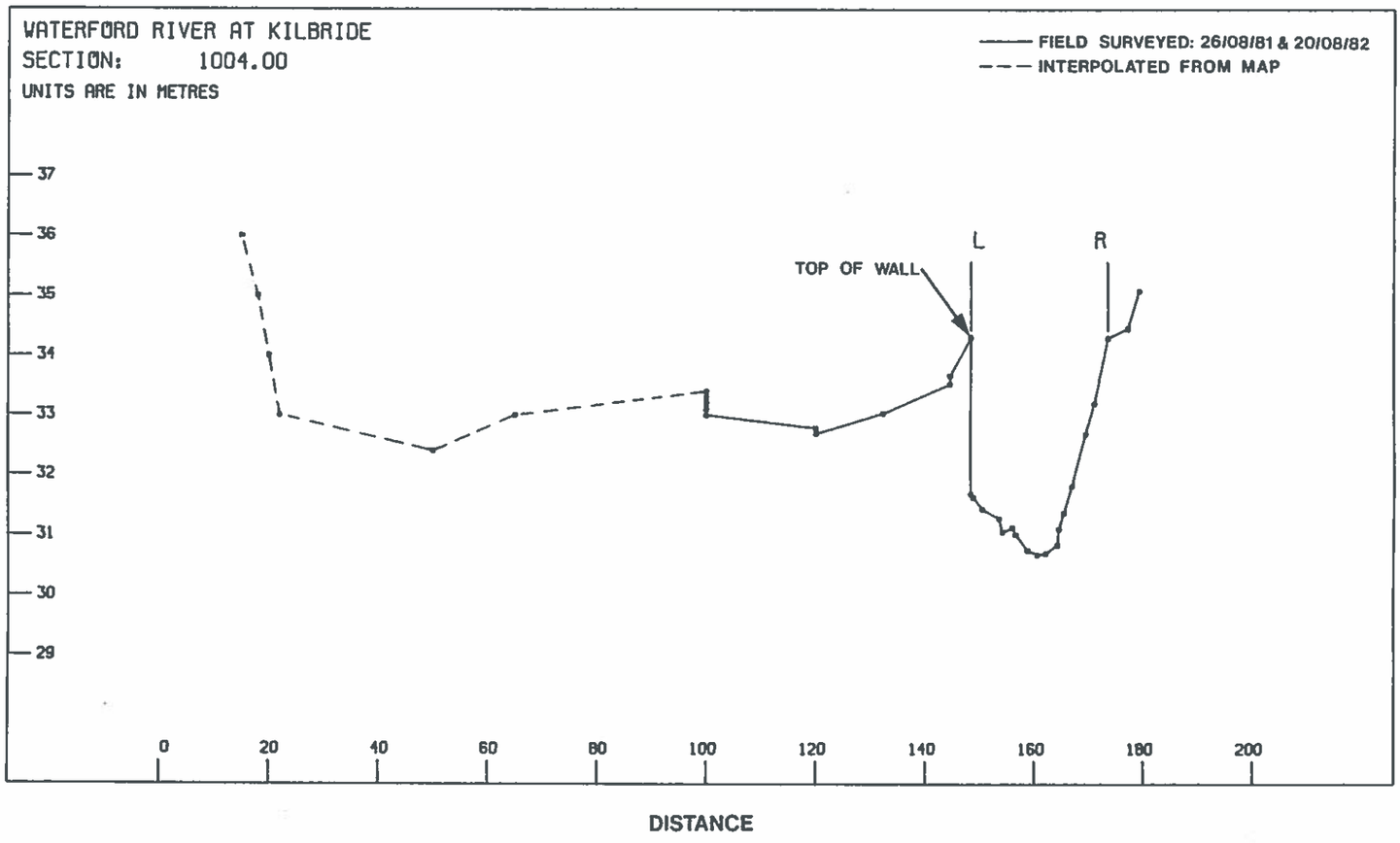
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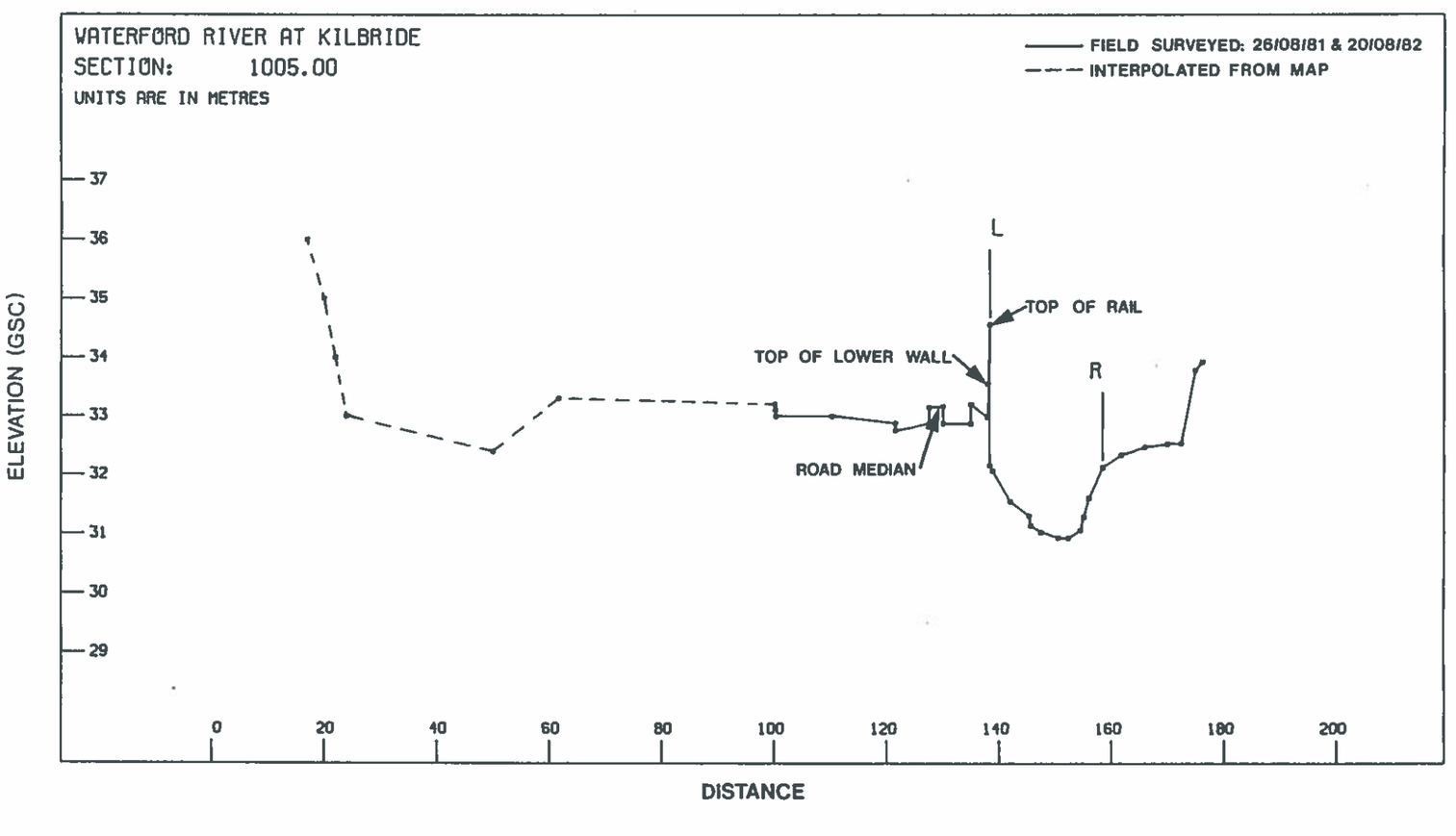
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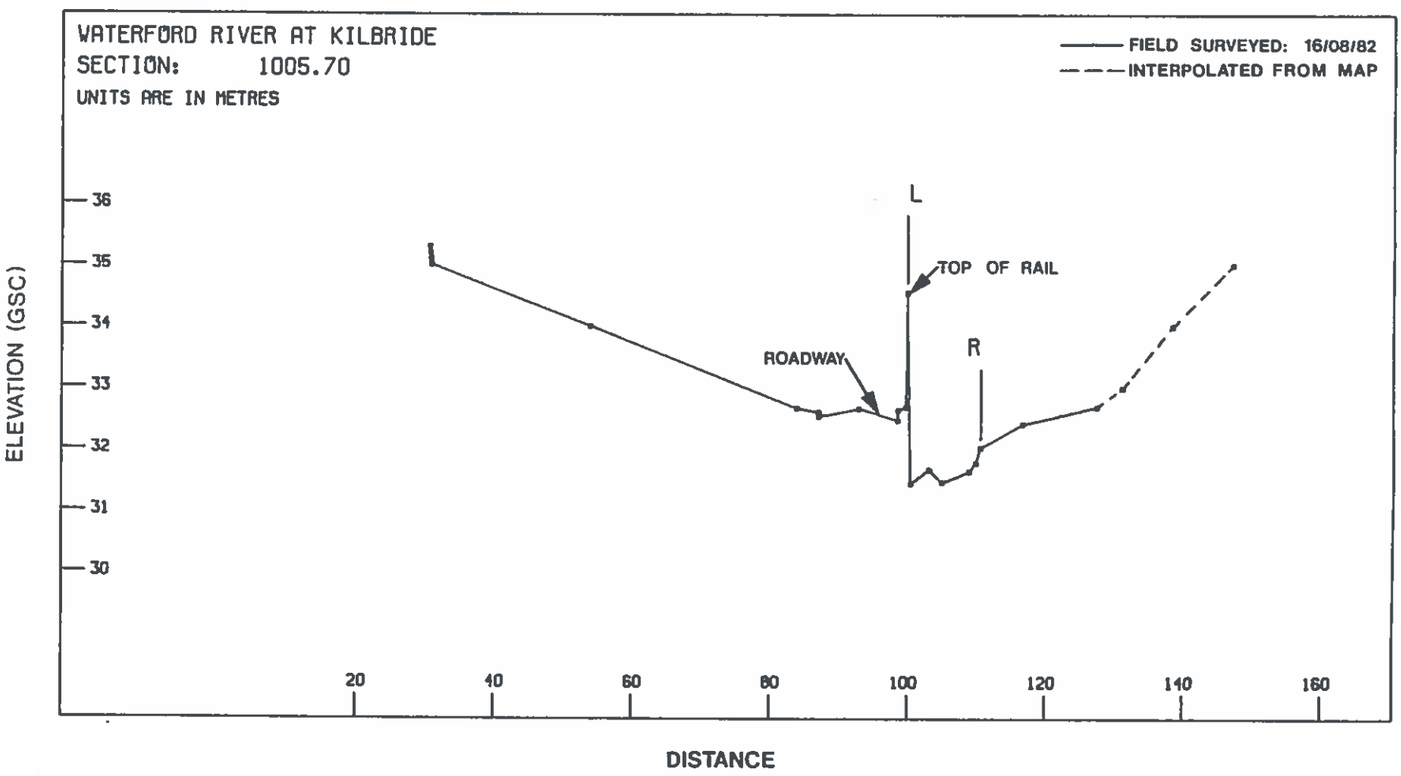
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INTERPOLATED FROM MAP
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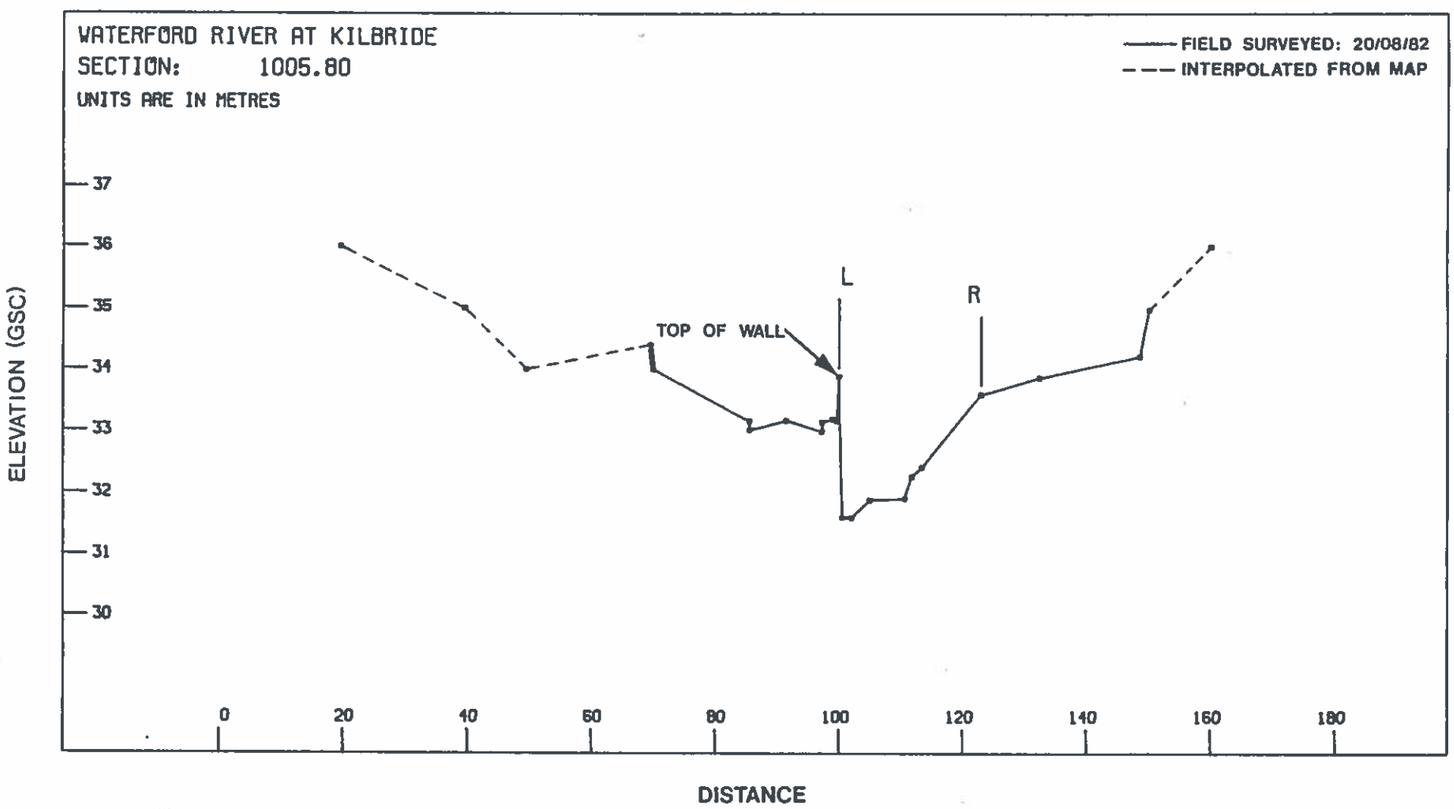
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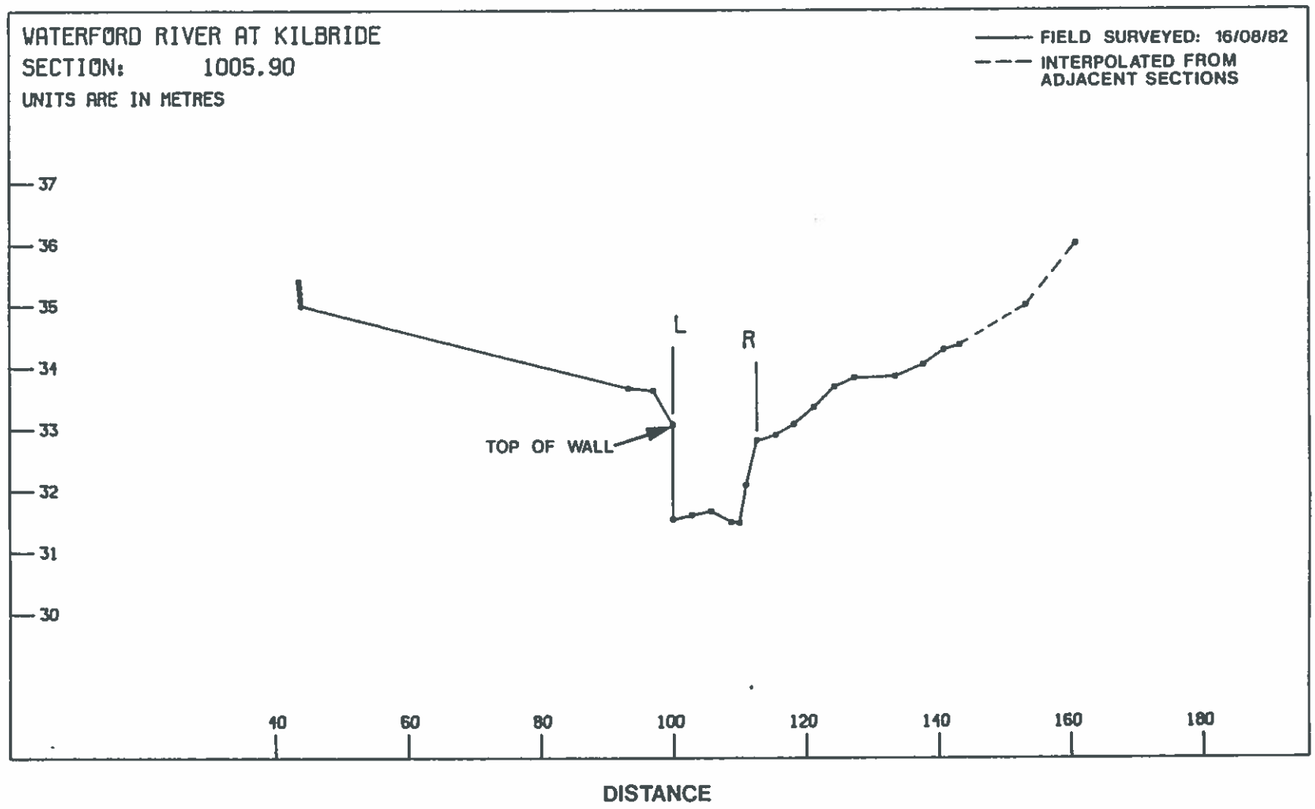
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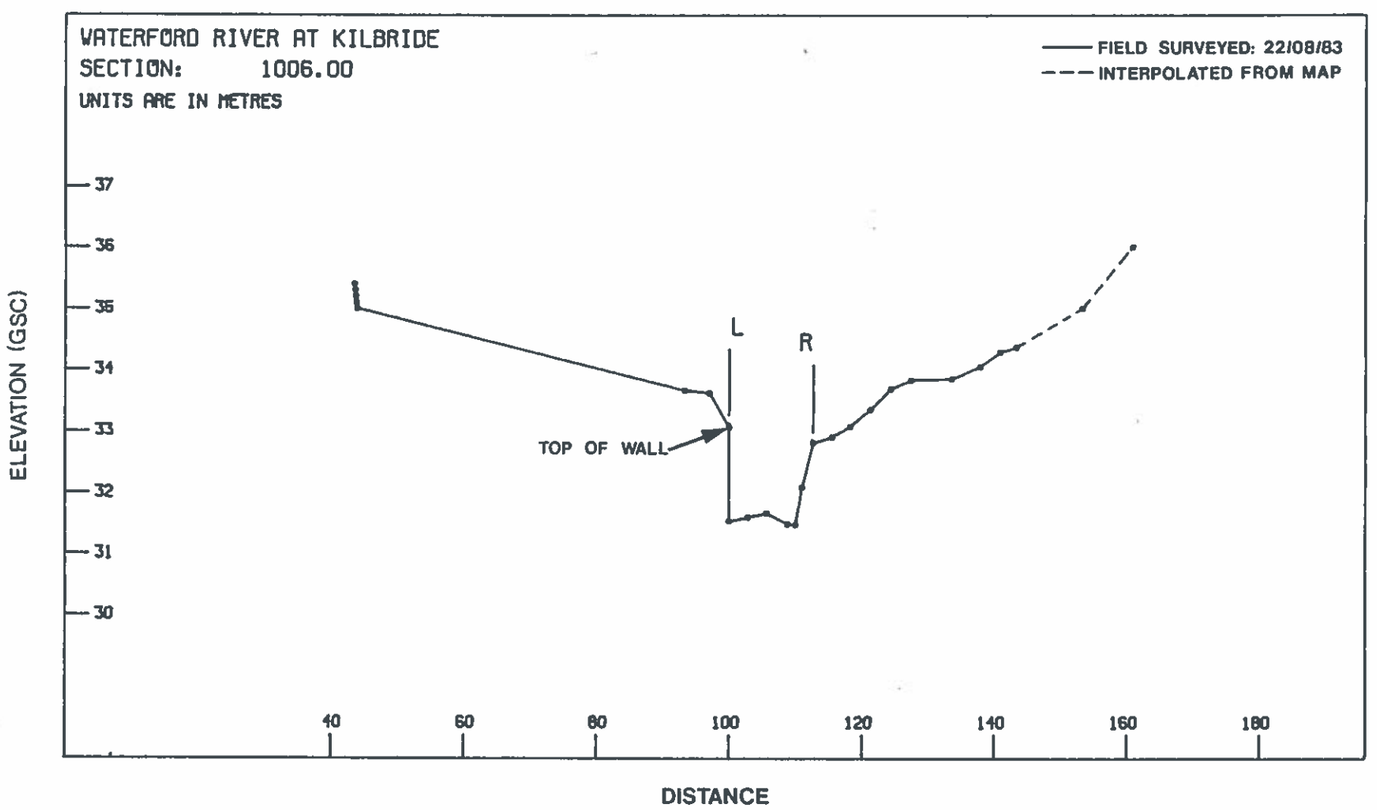
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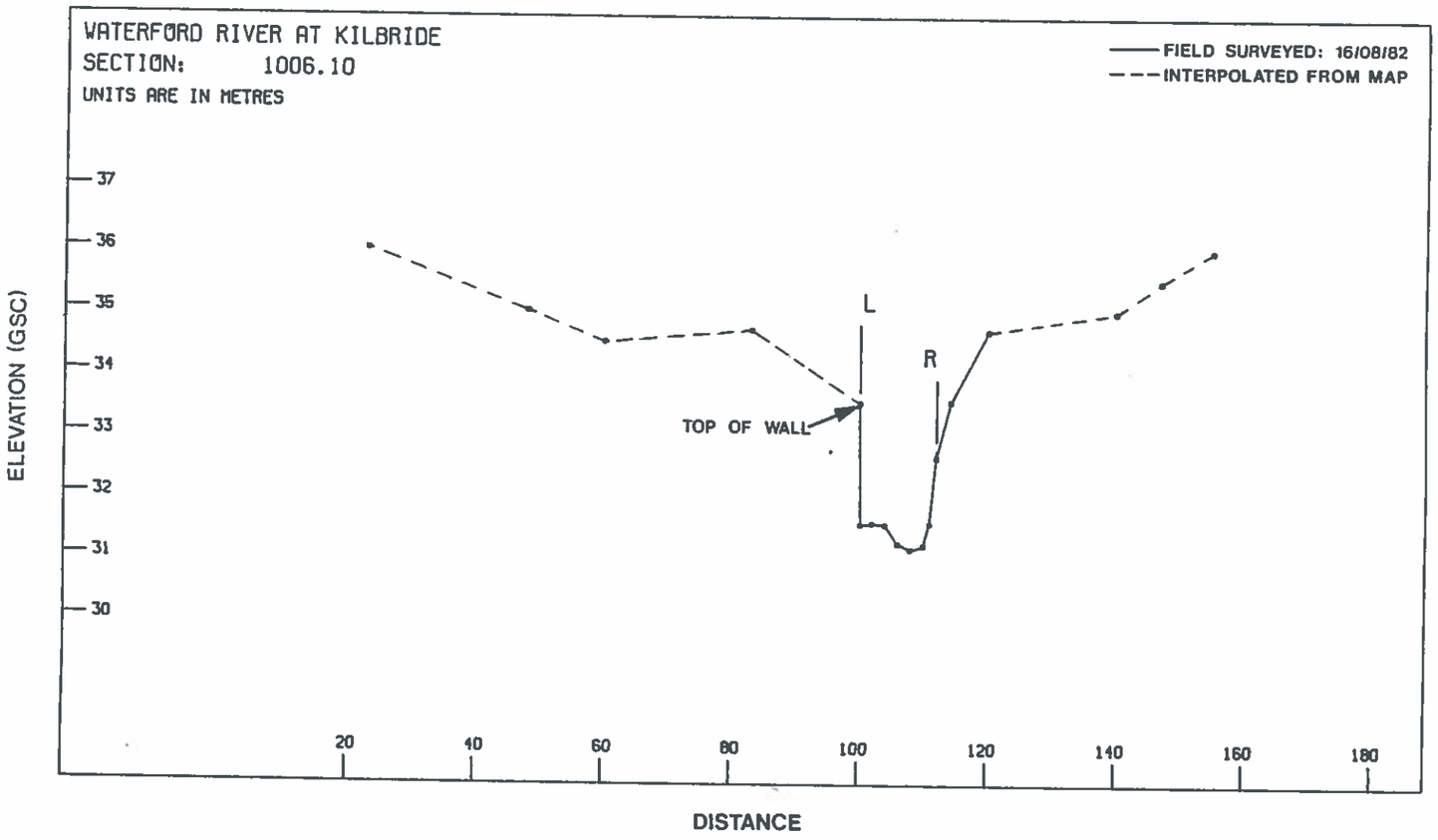
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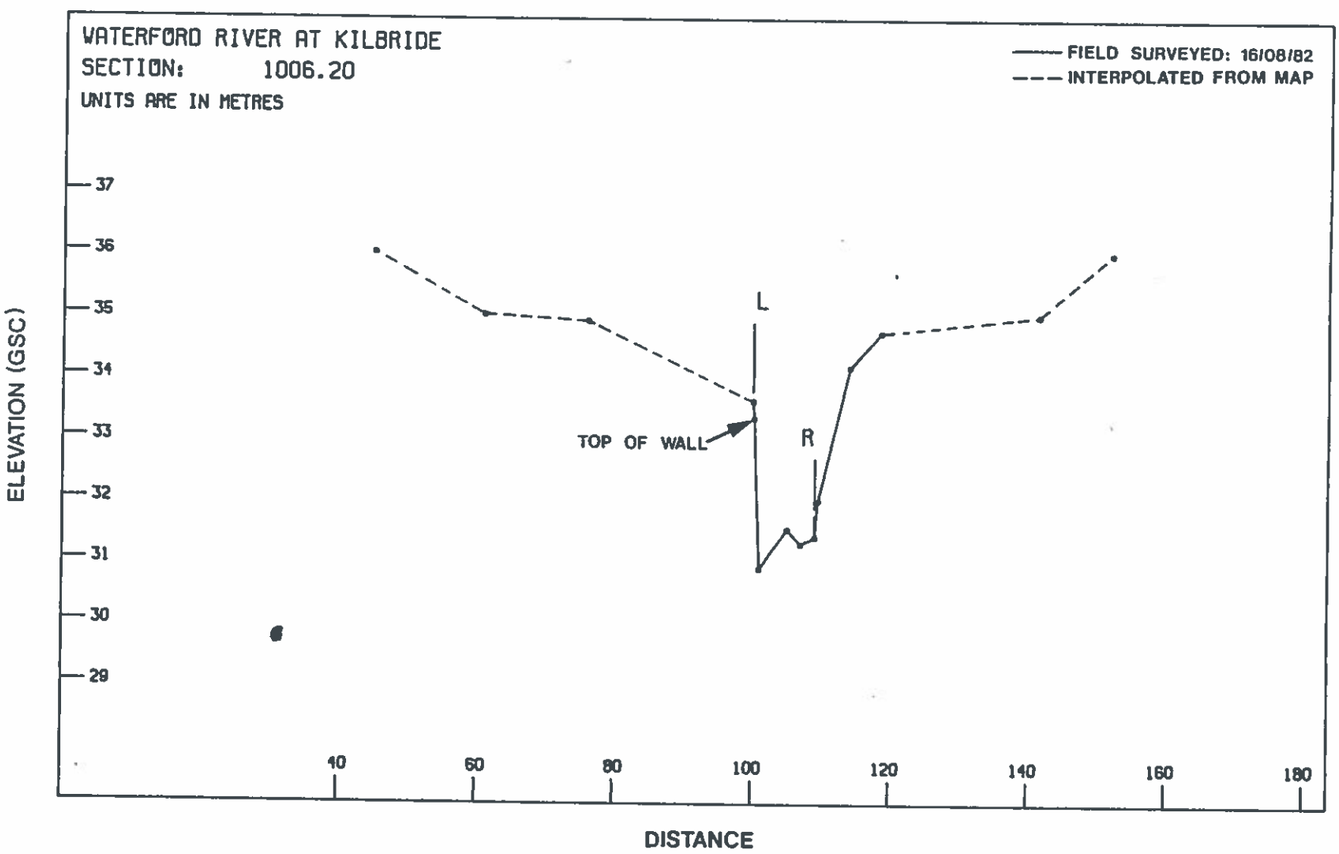
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INTERPOLATED FROM MAP
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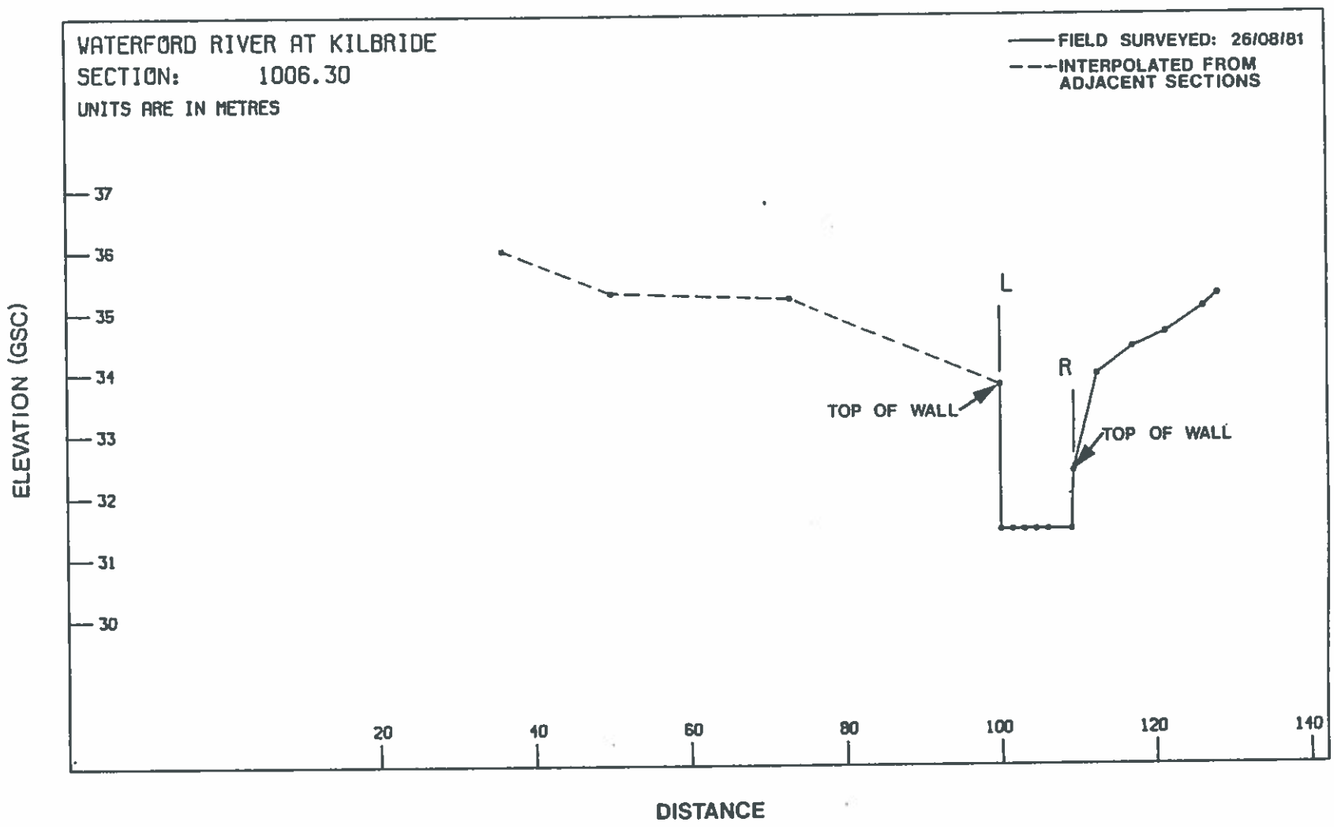
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FIELD SURVEYED: 26/08/81
INTERPOLATED FROM ADJACENT SECTIONS
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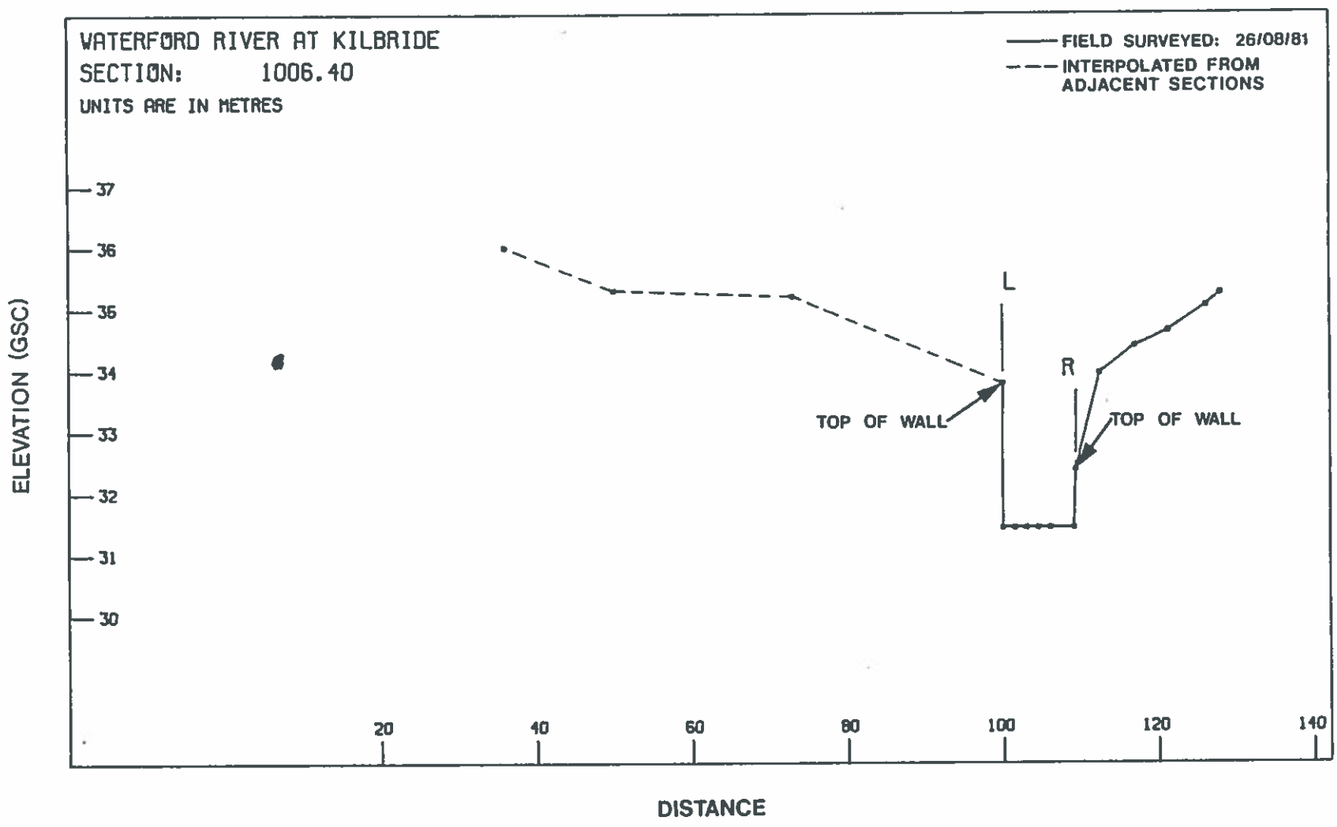
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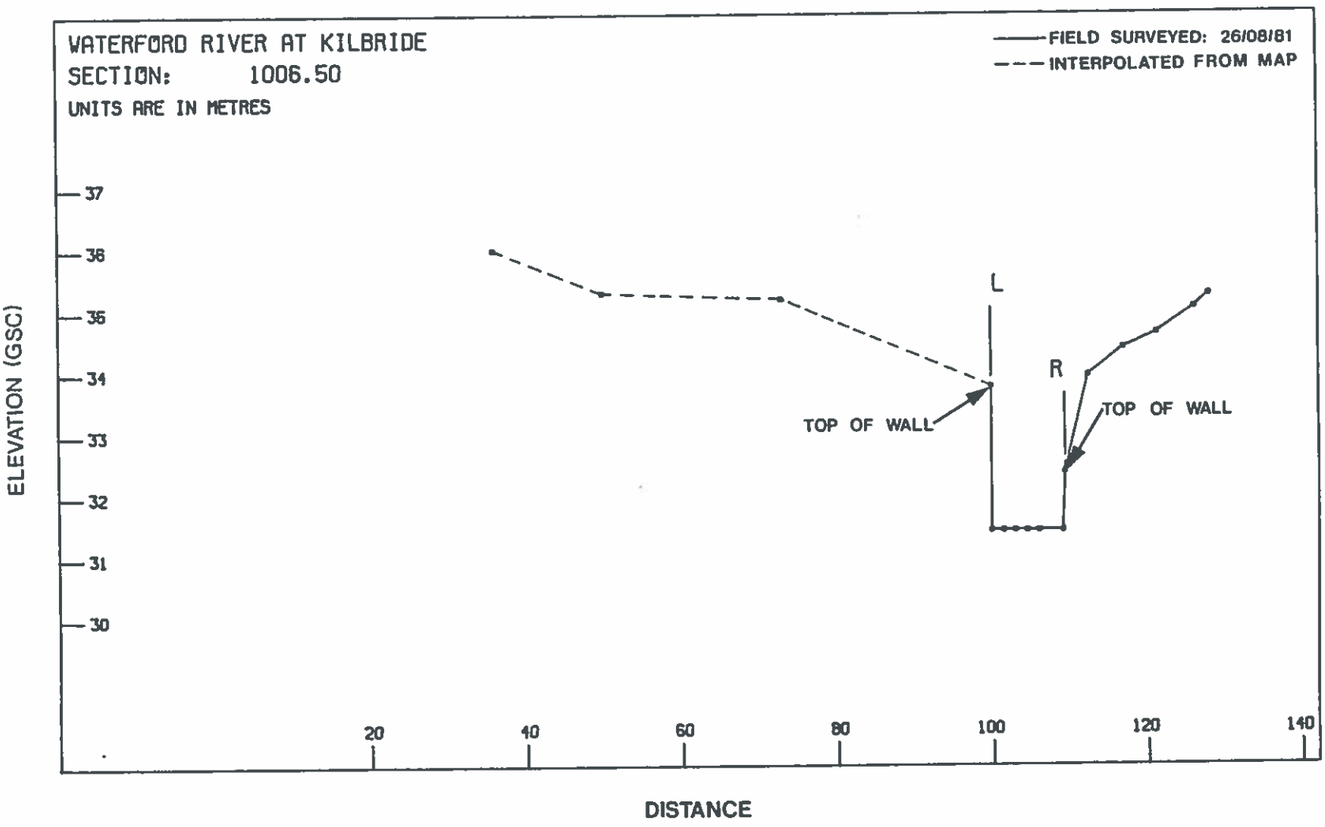
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FIELD SURVEYED: 26/08/81
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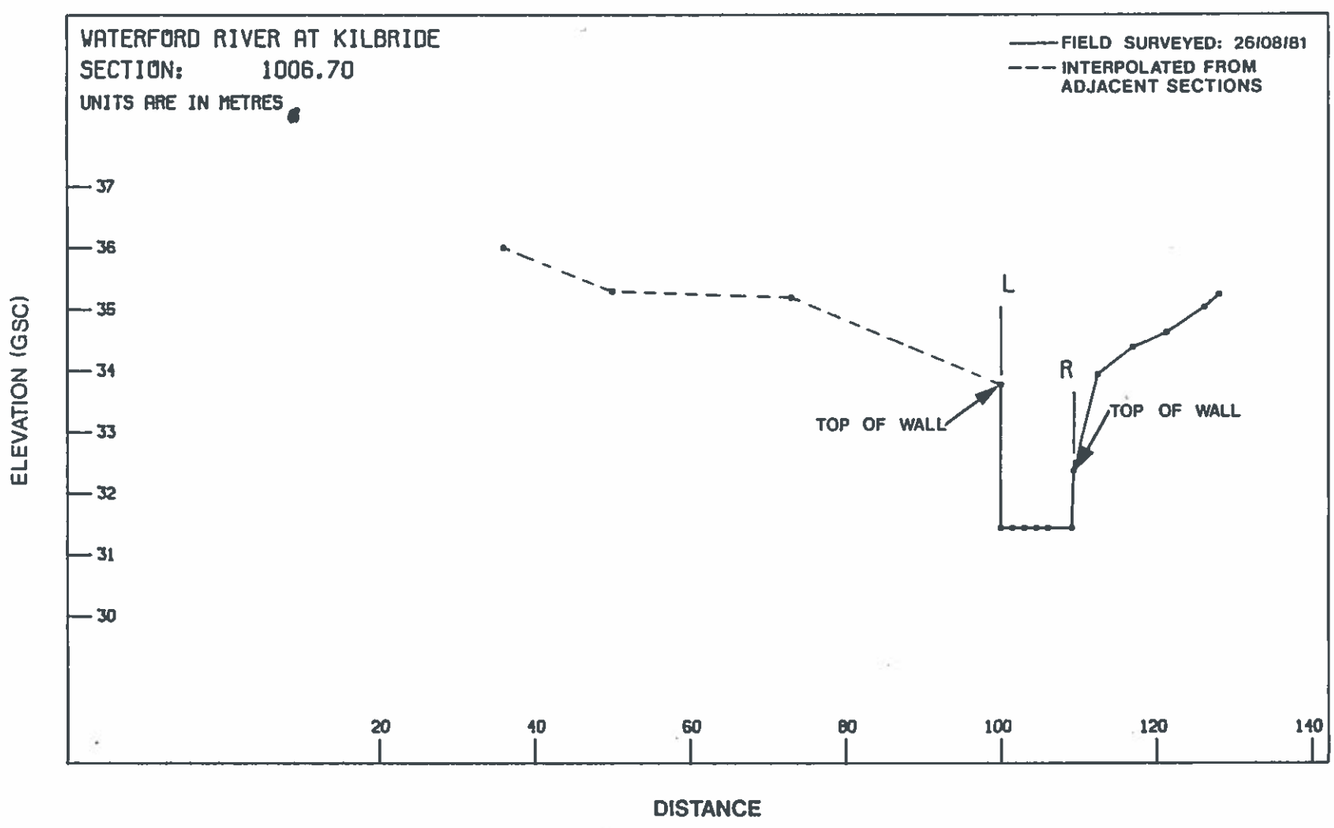
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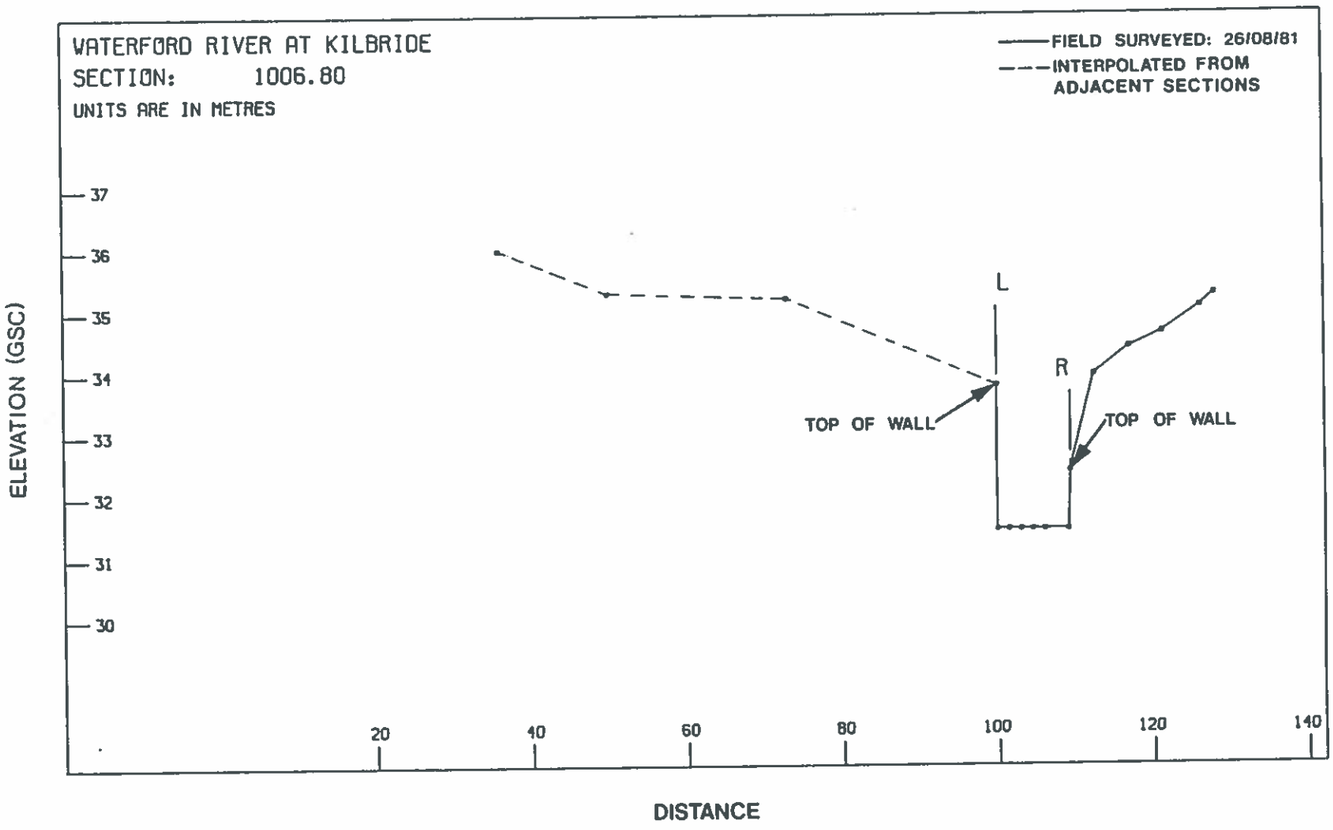
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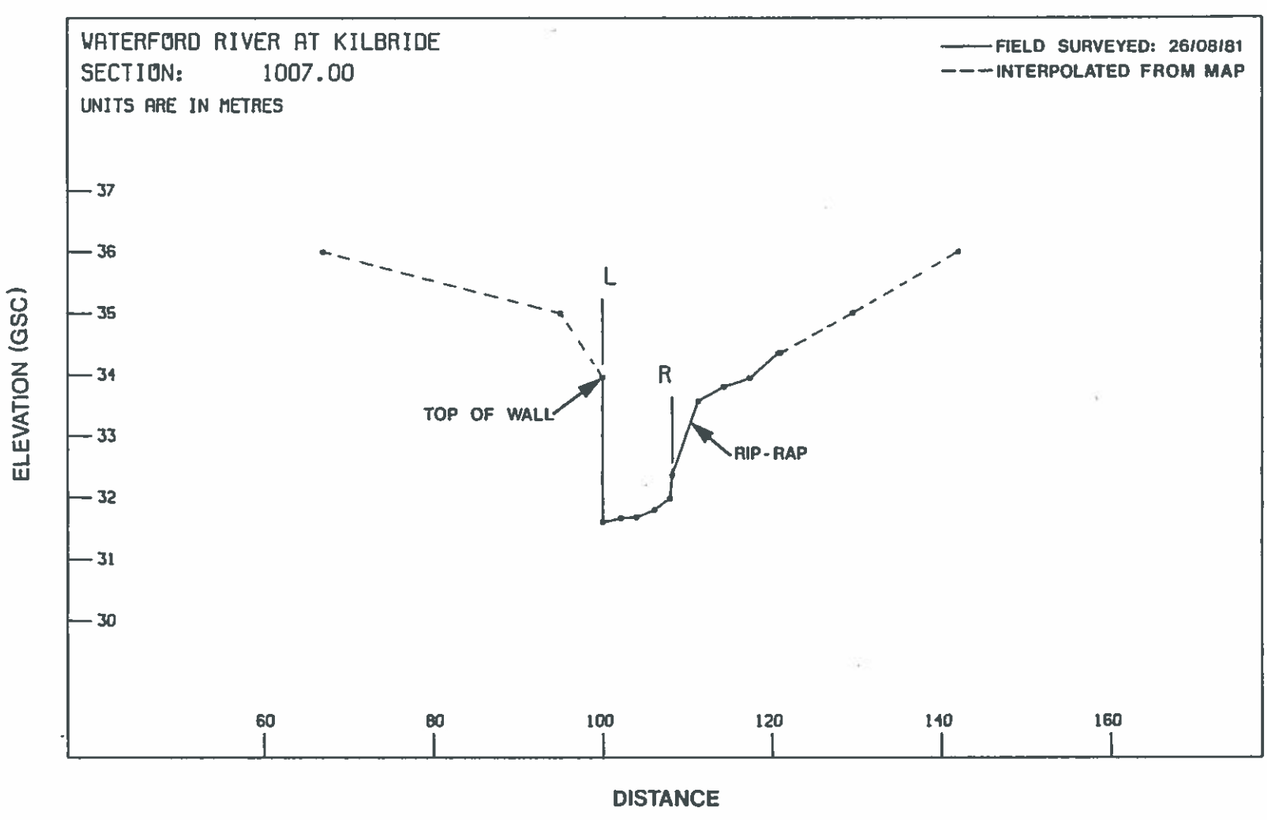
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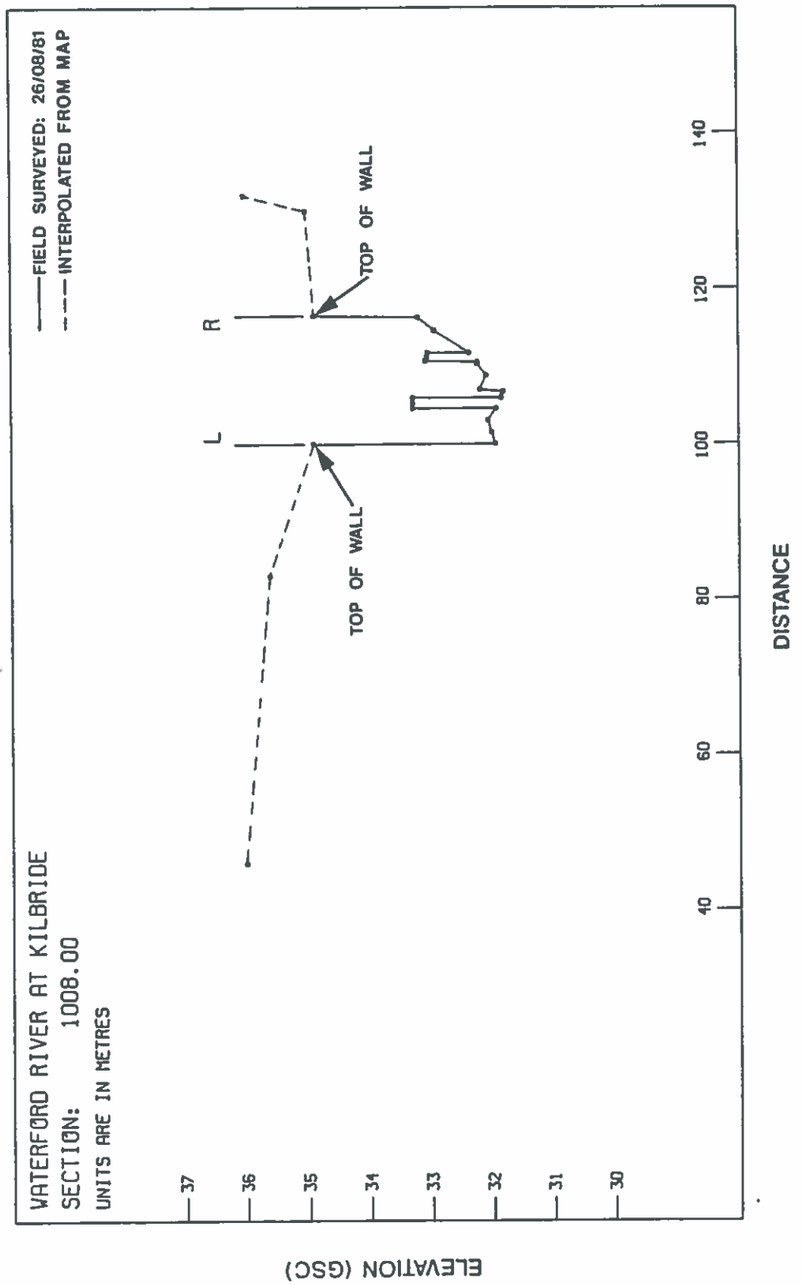
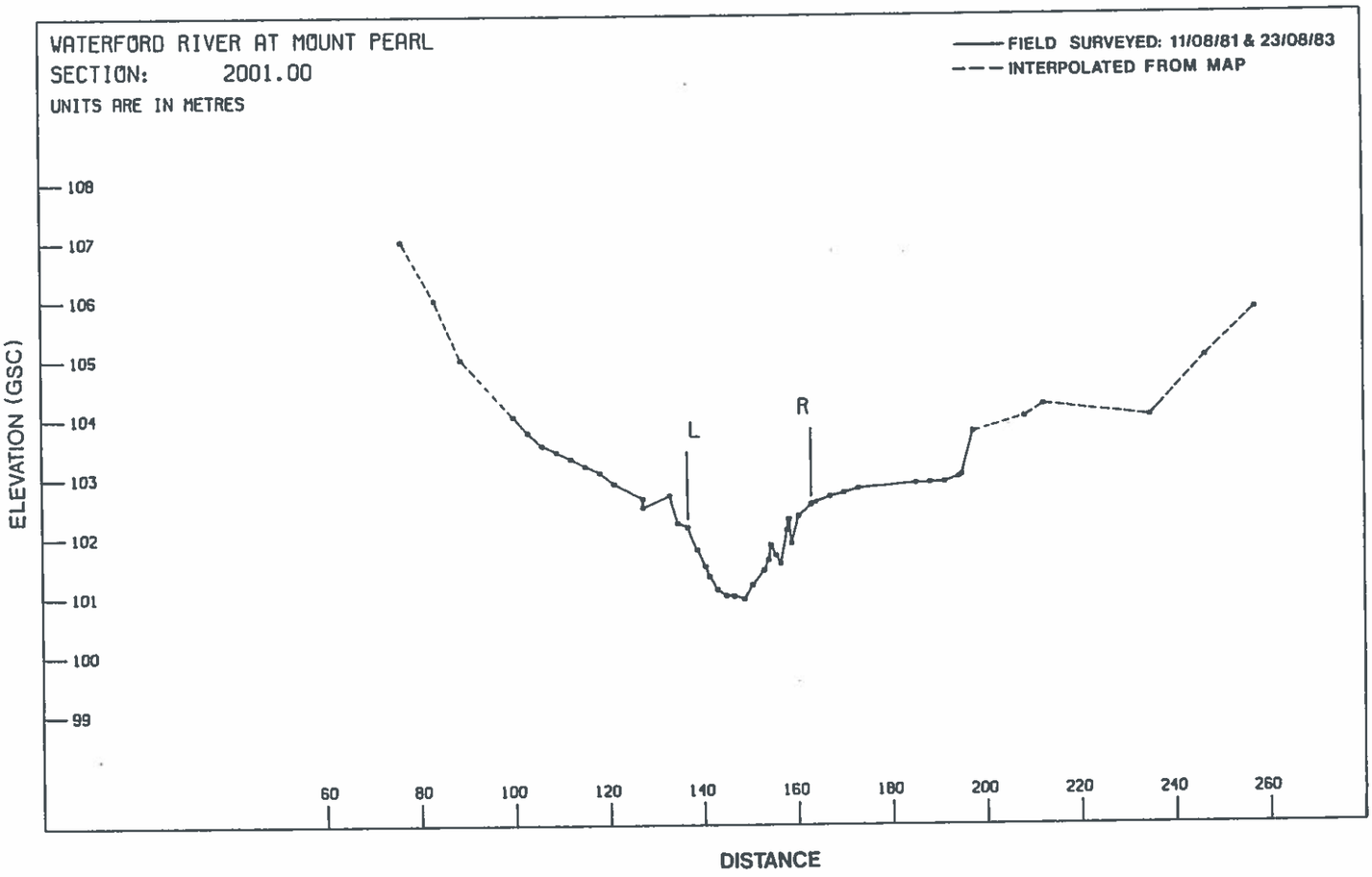


MOUNT PEARL REACH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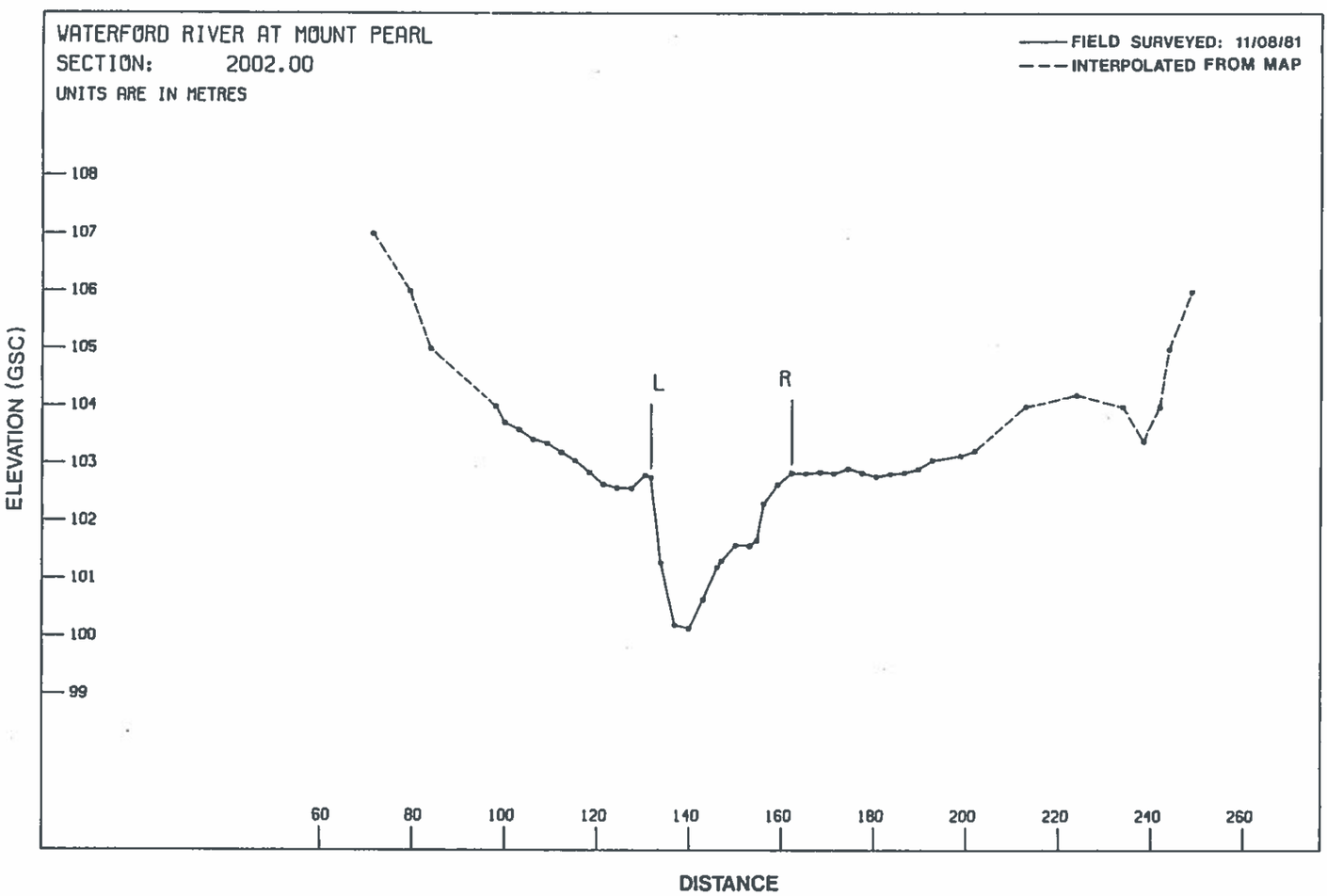
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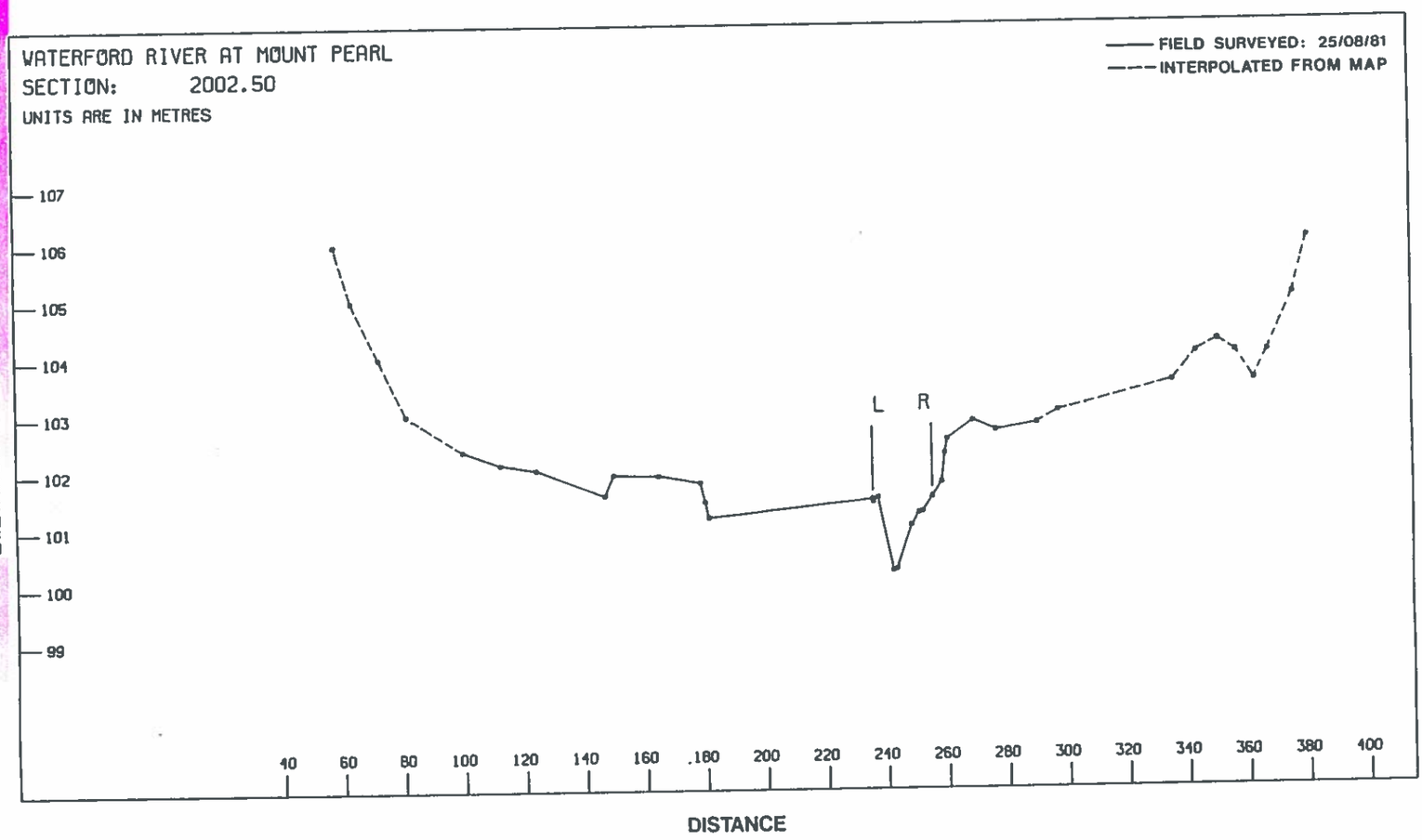
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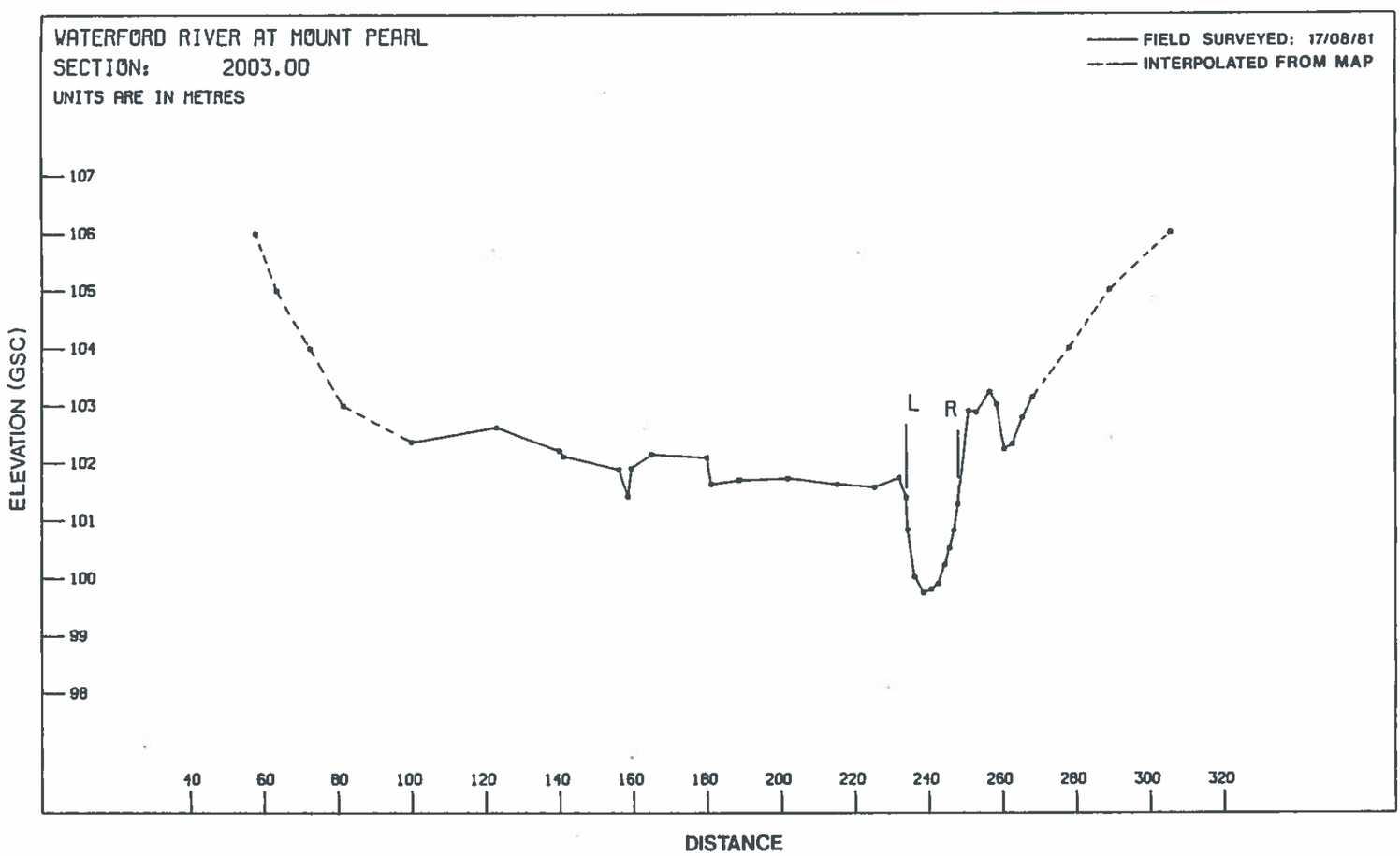
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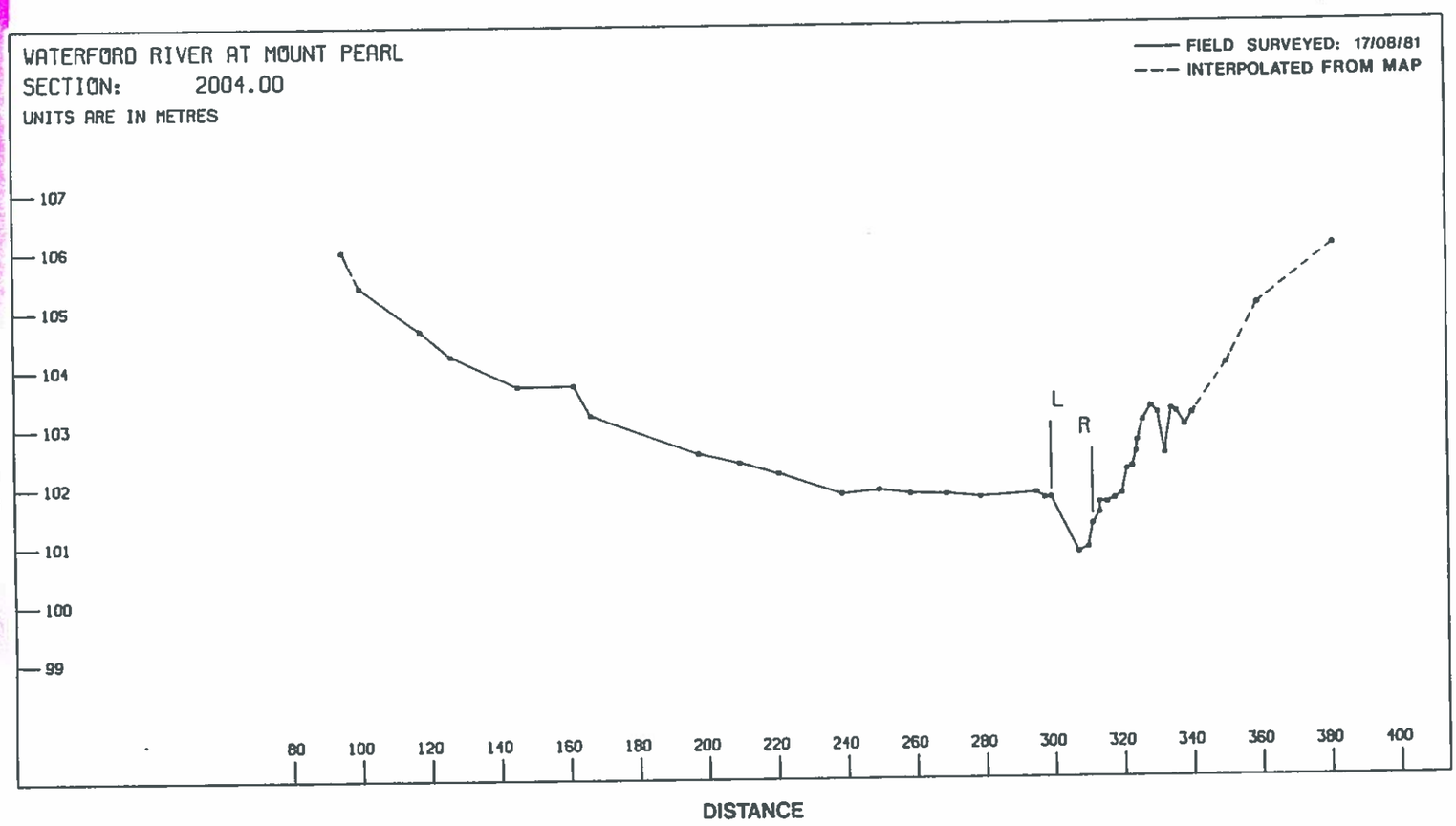
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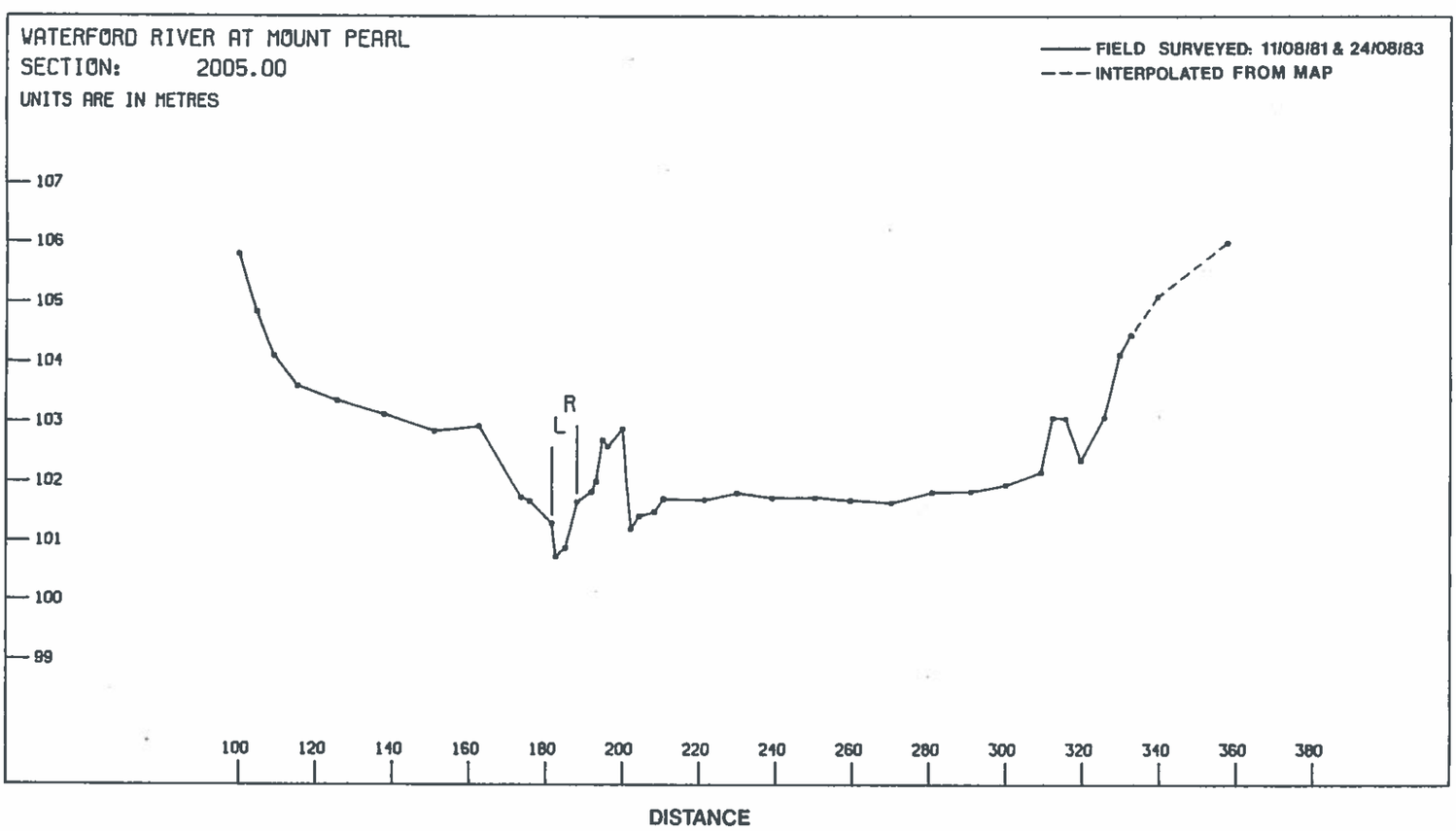
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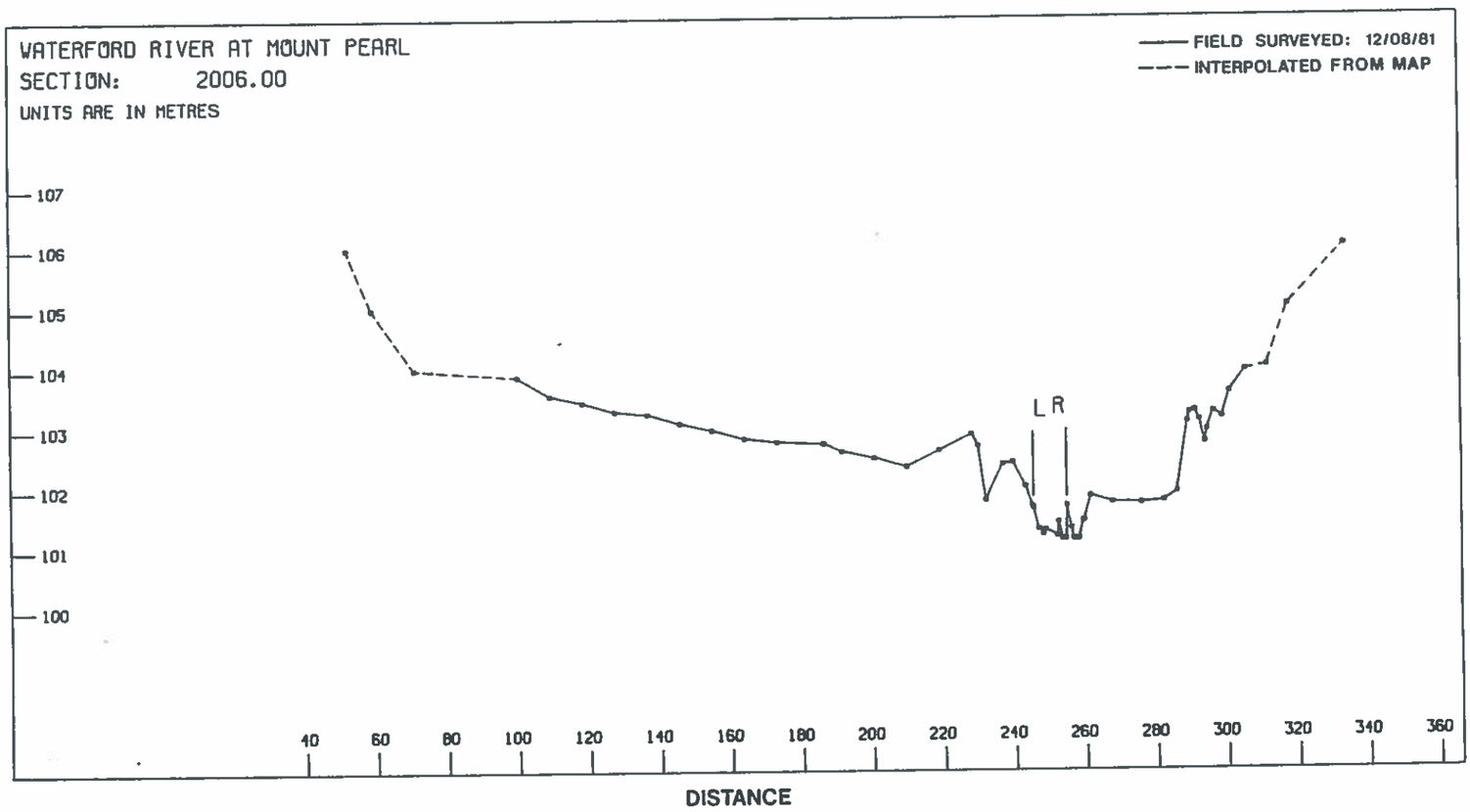
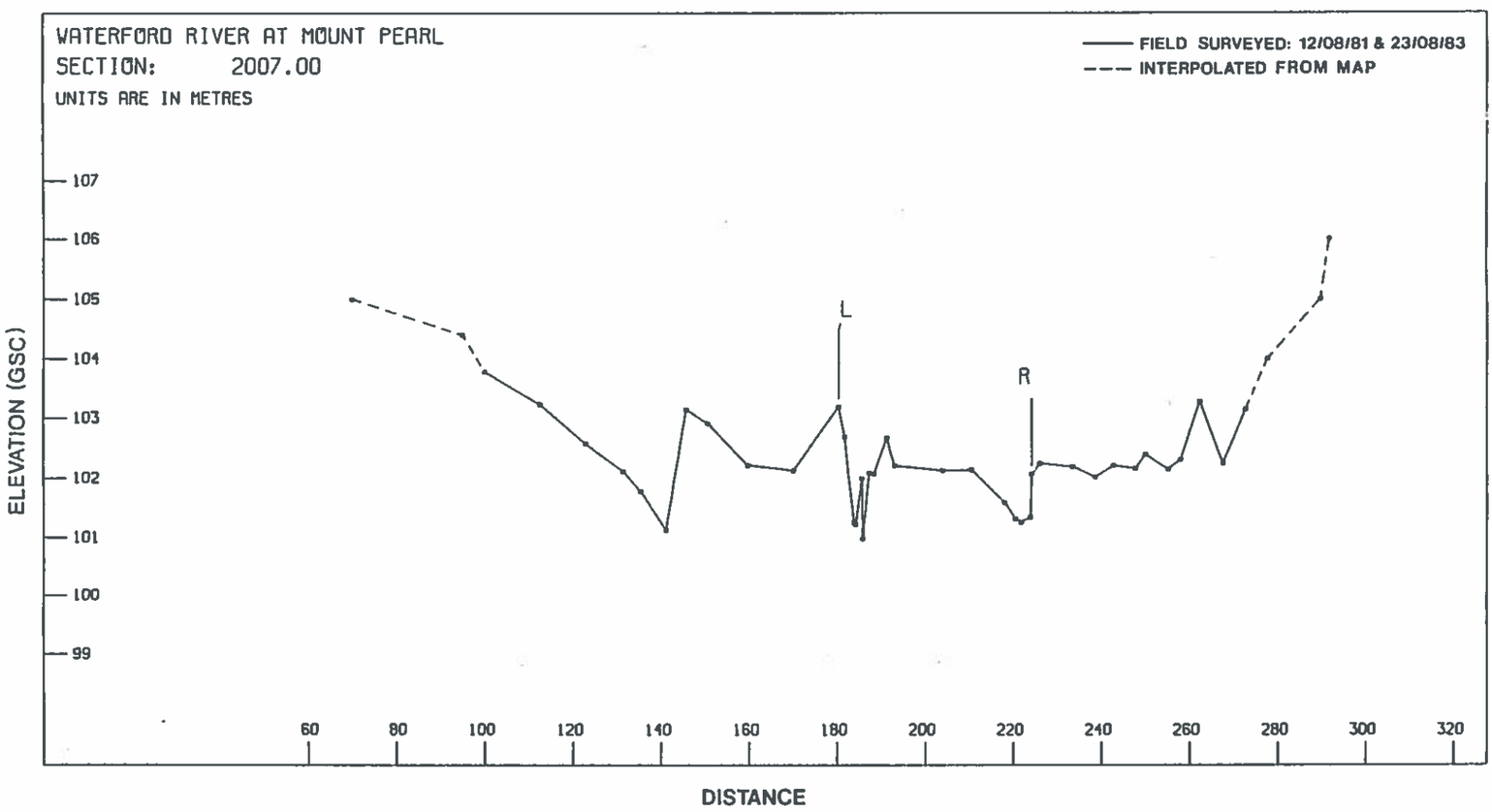
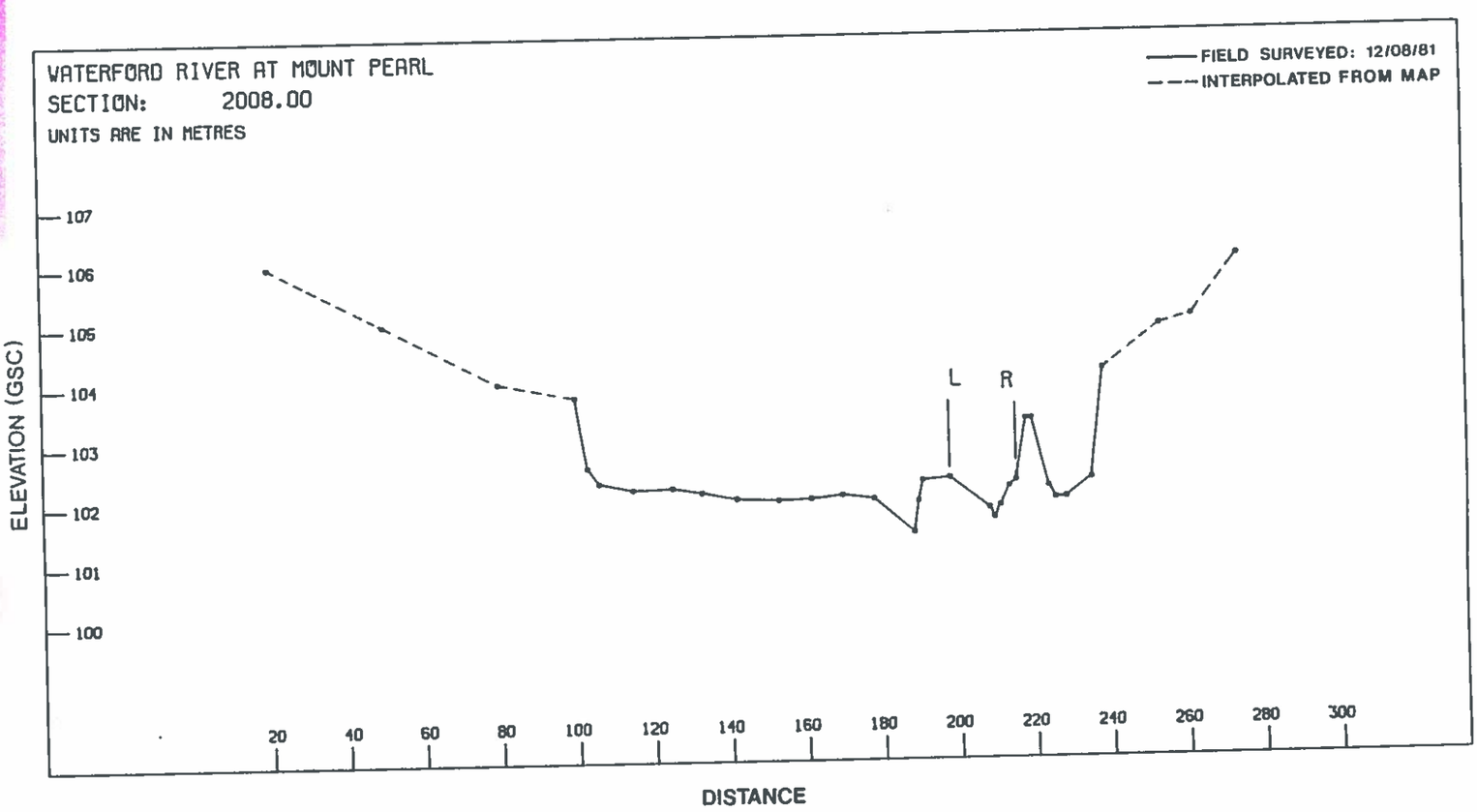
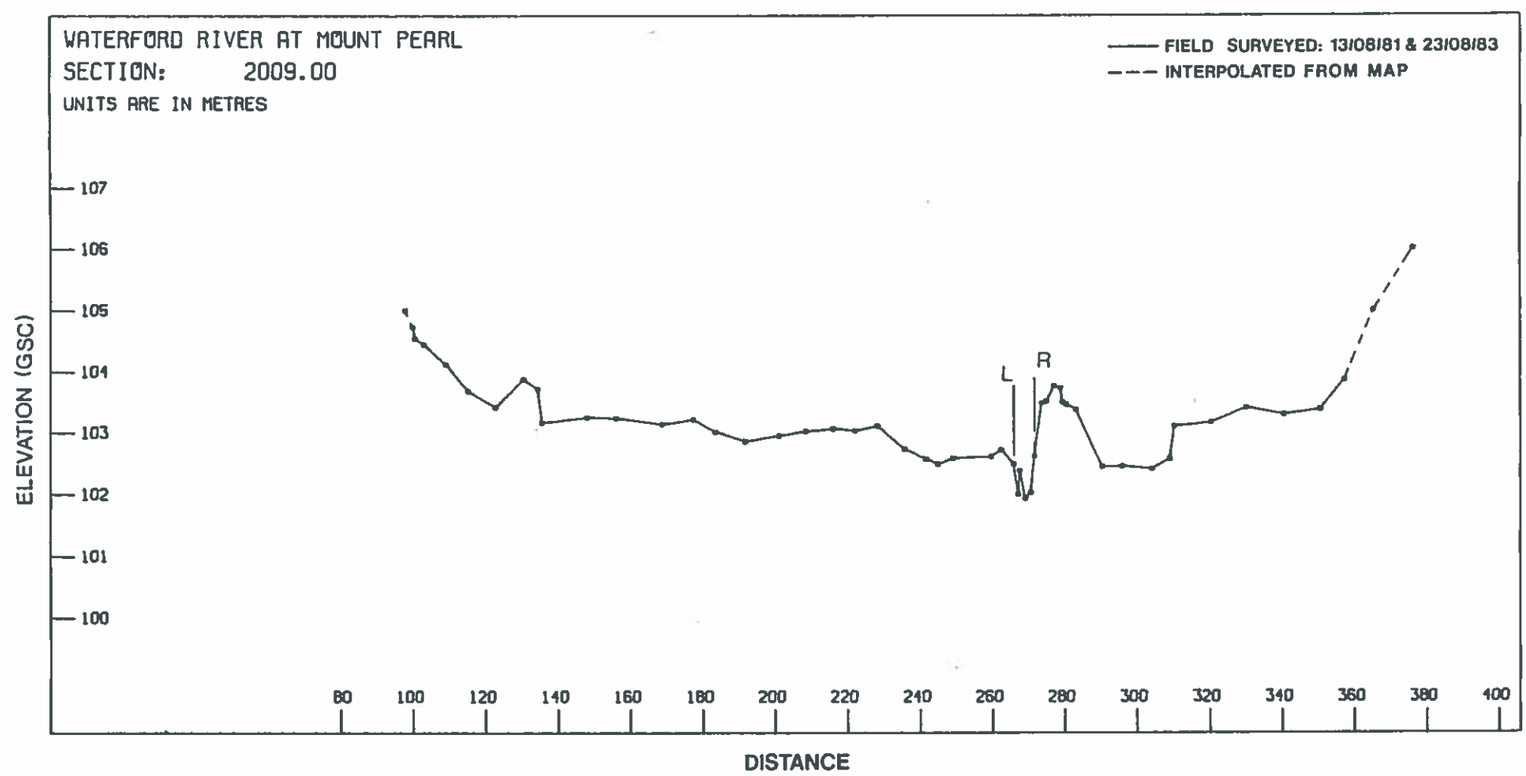
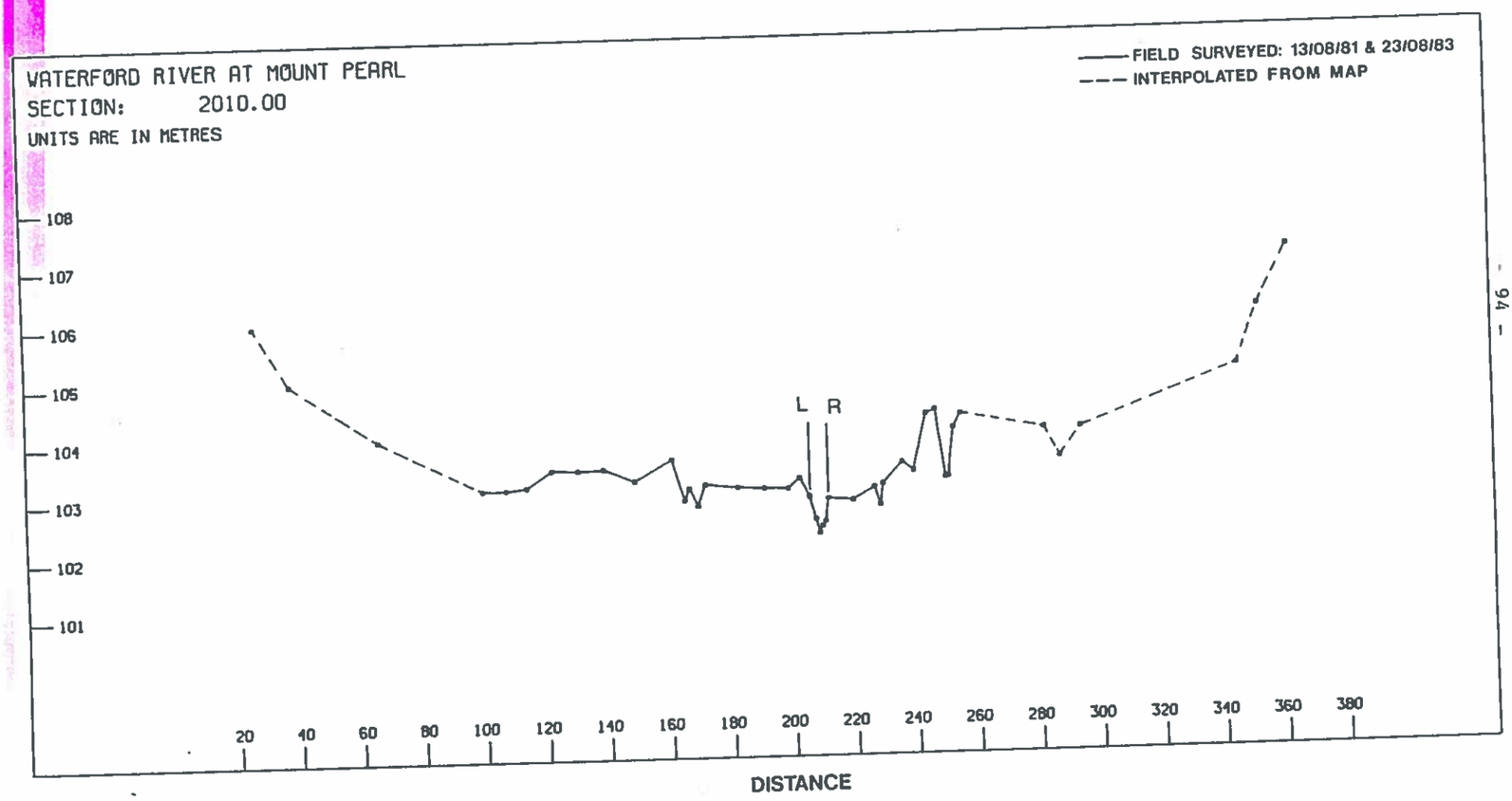
ELEVATION (GSC)
107
106
105
104
103
102
101
100
99
L
R
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
DISTANCE

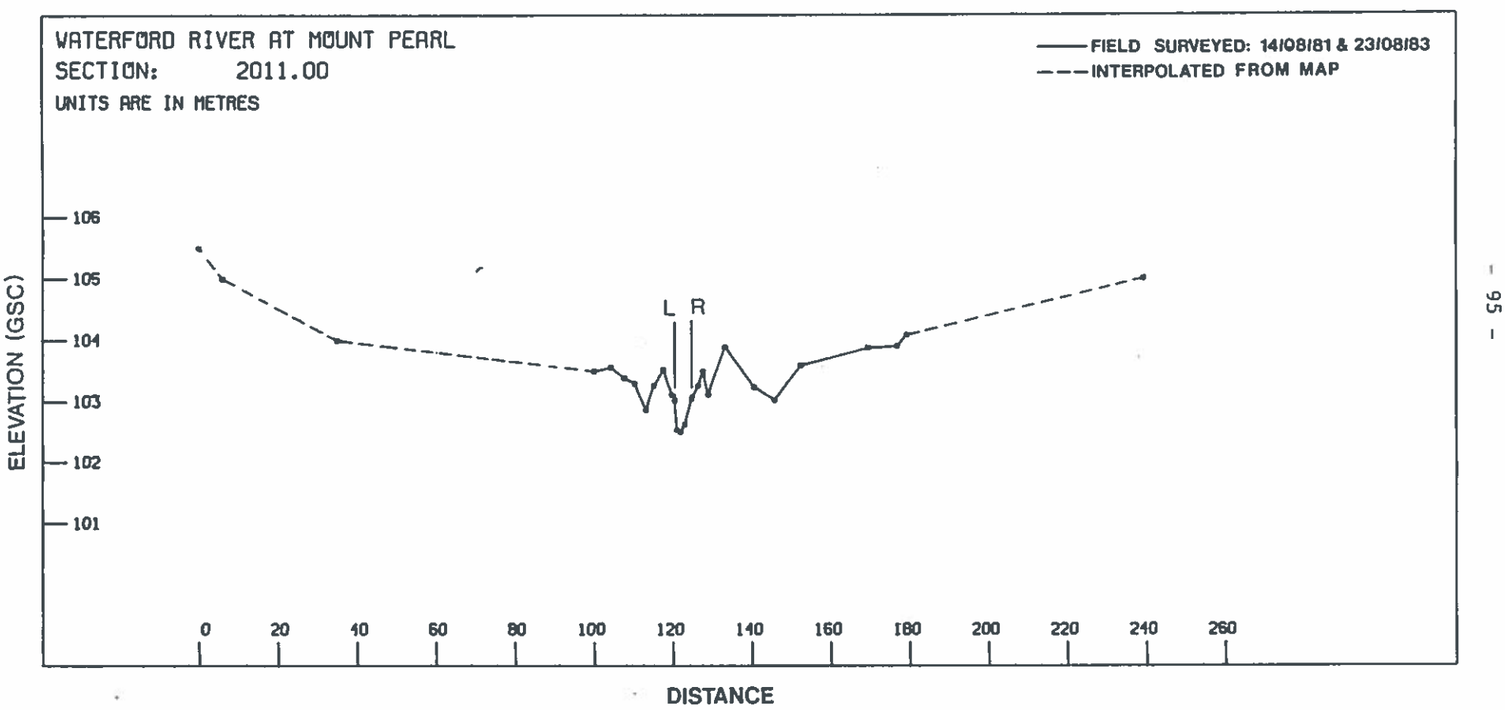

WATERFORD RIVER AT MOUNT PEARL
SECTION: 2006.00
UNITS ARE IN METRES
FIELD SURVEYED: 12/08/81
INTERPOLATED FROM MAP
ELEVATION (GSC)
107
106
105
104
103
102
101
100
L R
40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360
DISTANCE

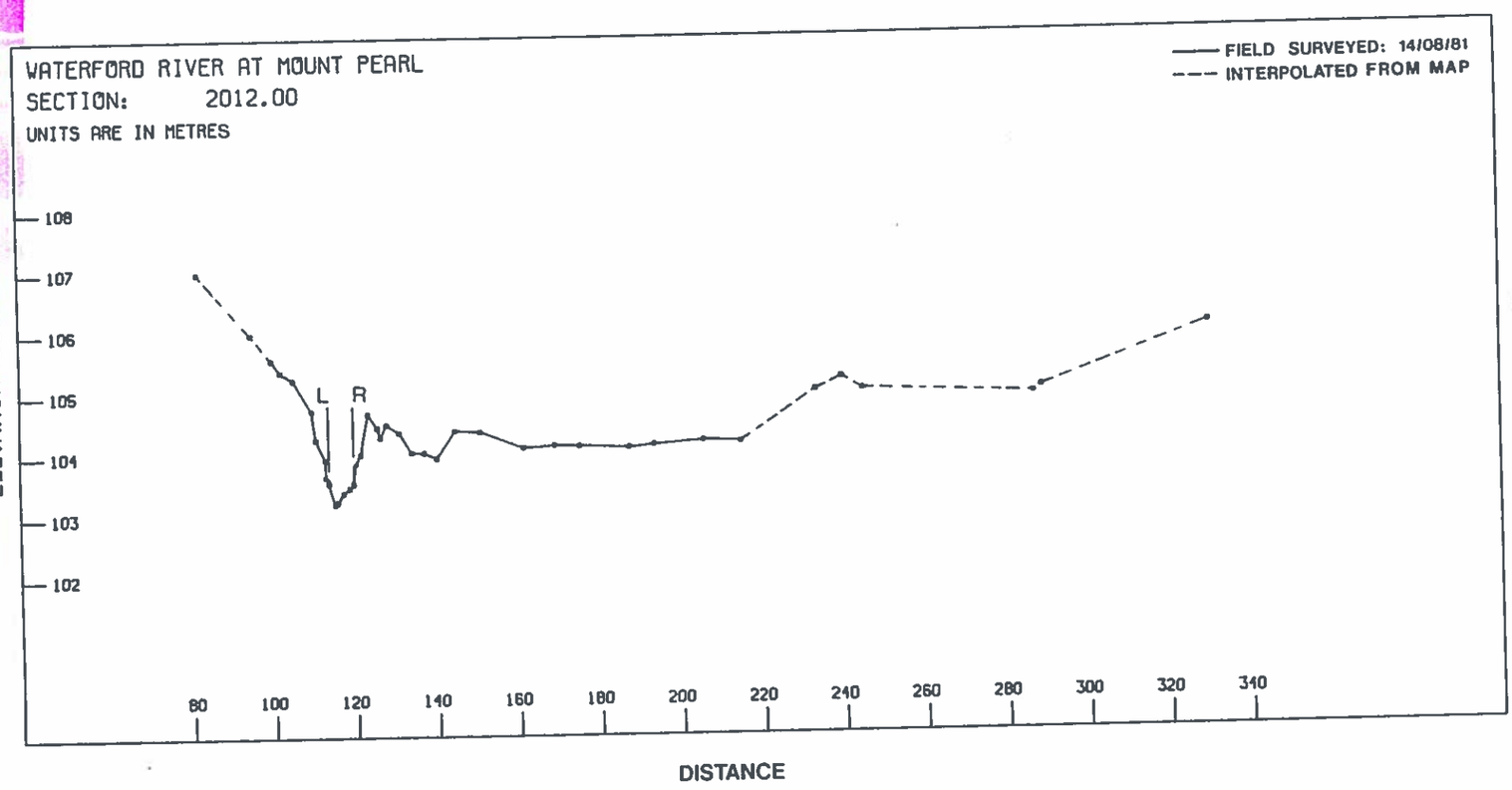

WATERFORD RIVER AT MOUNT PEARL
SECTION: 2007.00
UNITS ARE IN METRES
FIELD SURVEYED: 12/08/81 & 23/08/83
INTERPOLATED FROM MAP
ELEVATION (GSC)
107
106
105
104
103
102
101
100
99
L
R
60 80 100 120 140 160 180 200 220 240 260 280 300 320
DISTANCE

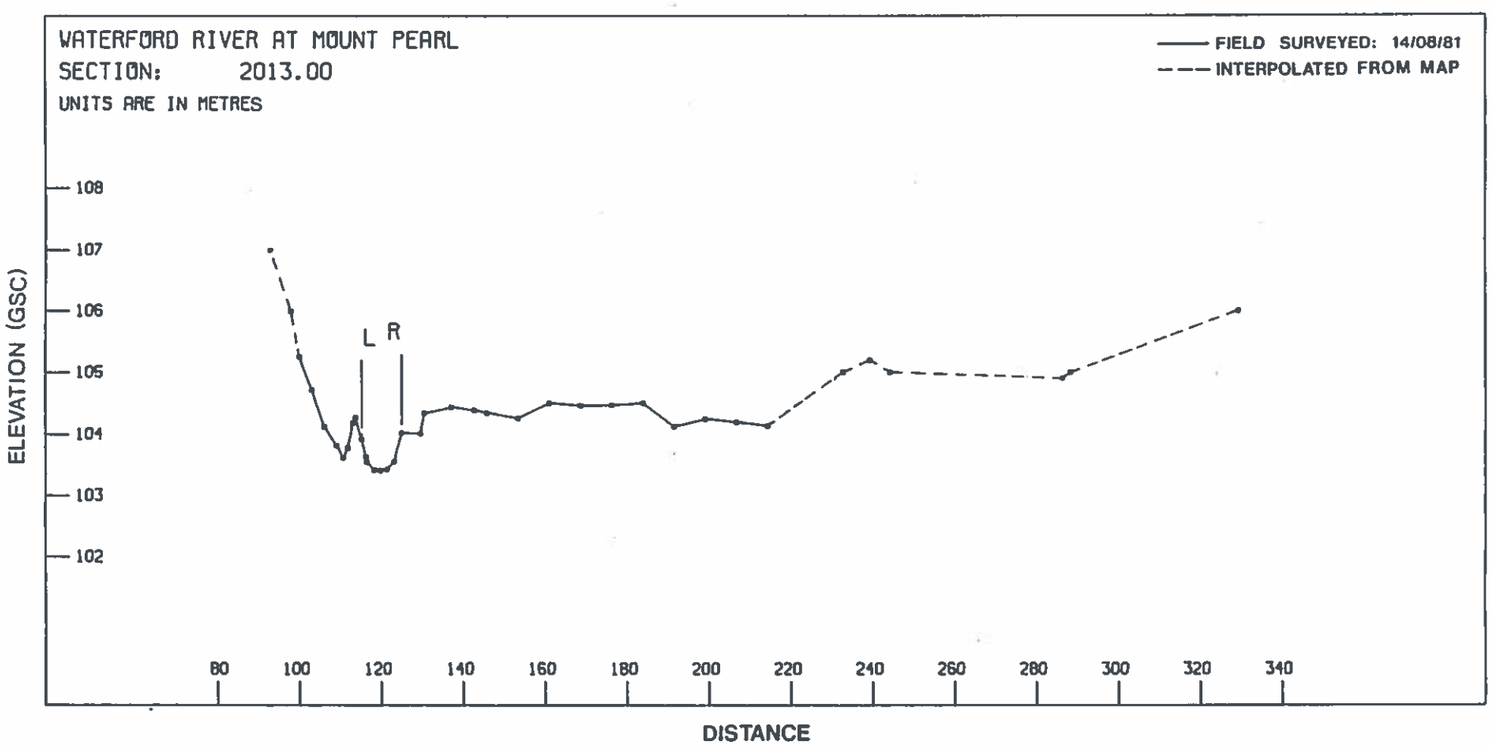

WATERFORD RIVER AT MOUNT PEARL
SECTION: 2008.00
UNITS ARE IN METRES
FIELD SURVEYED: 12/08/81
INTERPOLATED FROM MAP
ELEVATION (GSC)
107
106
105
104
103
102
101
100
L
R
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
DISTANCE


WATERFORD RIVER AT MOUNT PEARL
SECTION: 2009.00
UNITS ARE IN METRES
FIELD SURVEYED: 13/08/81 & 23/08/83
INTERPOLATED FROM MAP
ELEVATION (GSC)
107
106
105
104
103
102
101
100
L
R
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
400
DISTANCE

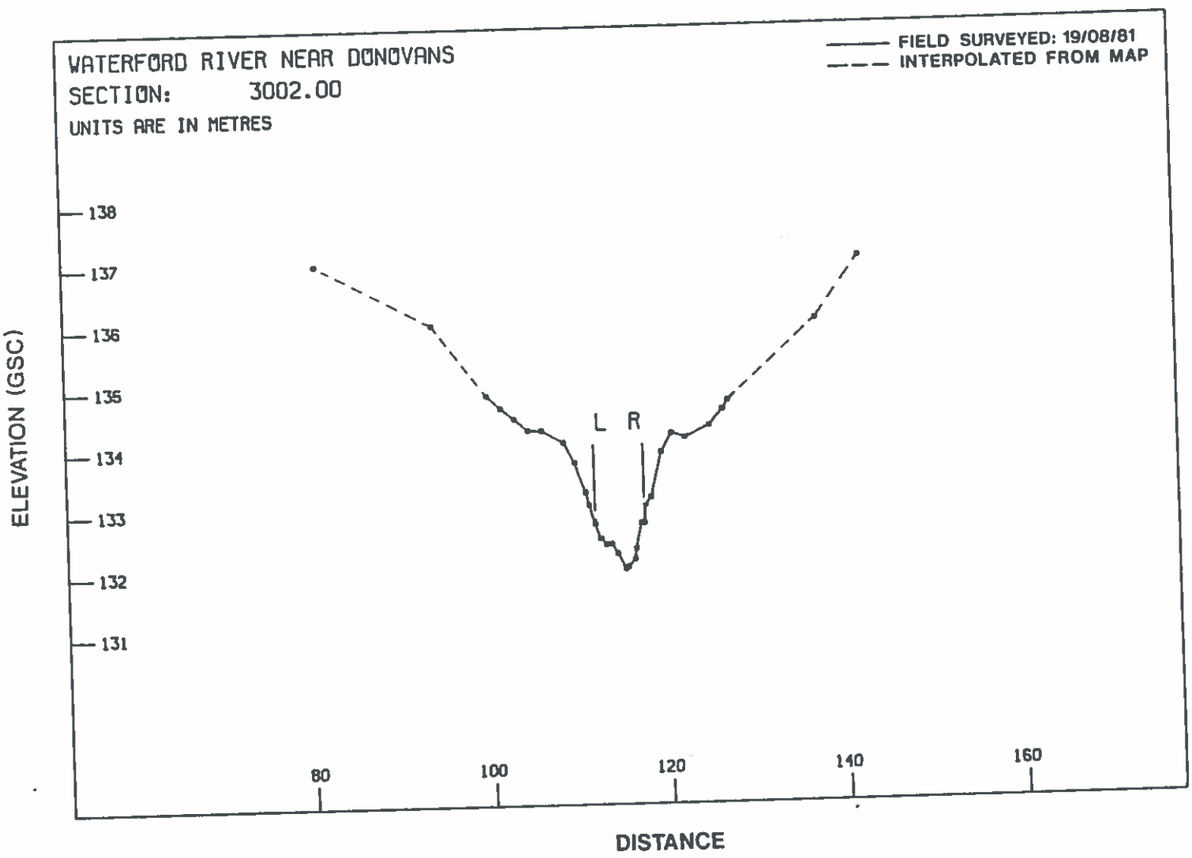

WATERFORD RIVER AT MOUNT PEARL
SECTION: 2010.00
UNITS ARE IN METRES
FIELD SURVEYED: 13/08/81 & 23/08/83
INTERPOLATED FROM MAP
108
107
106
105
104
103
102
101
L
R
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
DISTANCE

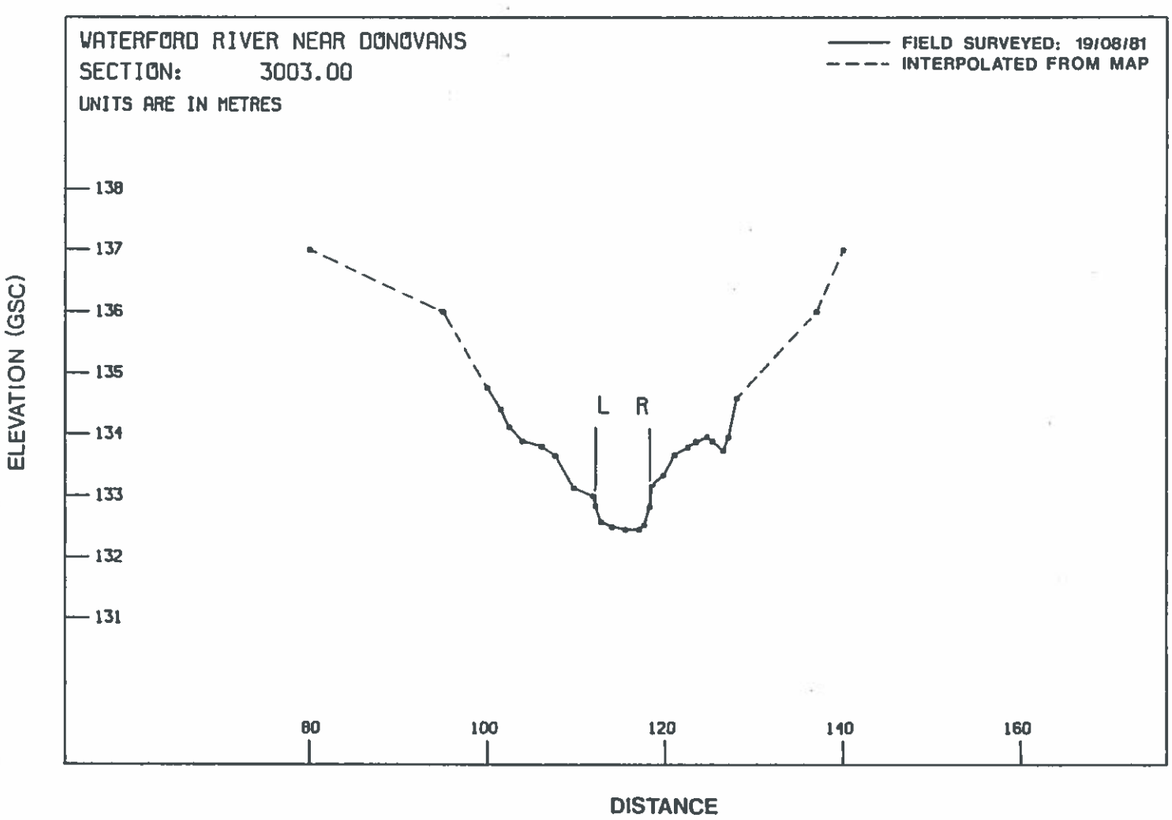

WATERFORD RIVER AT MOUNT PEARL
SECTION: 2011.00
UNITS ARE IN METRES
FIELD SURVEYED: 14/08/81 & 23/08/83
INTERPOLATED FROM MAP
ELEVATION (GSC)
106
105
104
103
102
101
L
R
0
20
40
60
80
100
120
140
160
180
200
220
240
260
DISTANCE

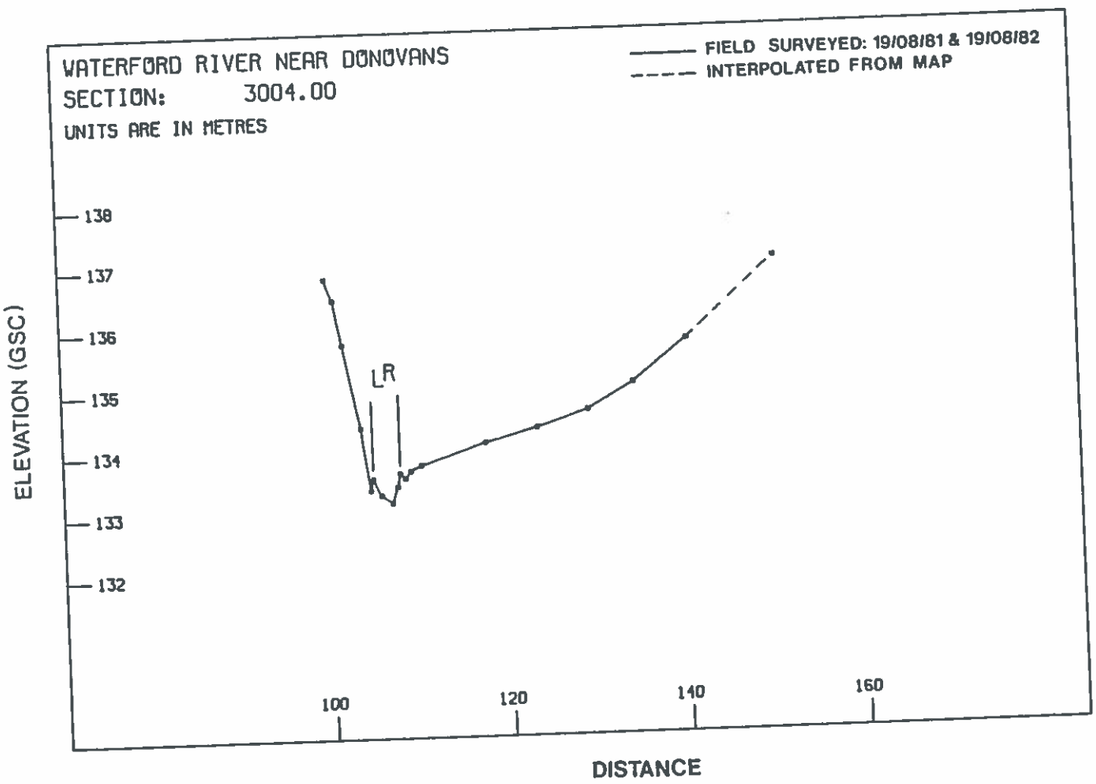

WATERFORD RIVER AT MOUNT PEARL
SECTION: 2012.00
UNITS ARE IN METRES
FIELD SURVEYED: 14/08/81
INTERPOLATED FROM MAP
ELEVATION (GSC)
108
107
106
105
104
103
102
L
R
80
100
120
140
160
180
200
220
240
260
280
300
320
340
DISTANCE

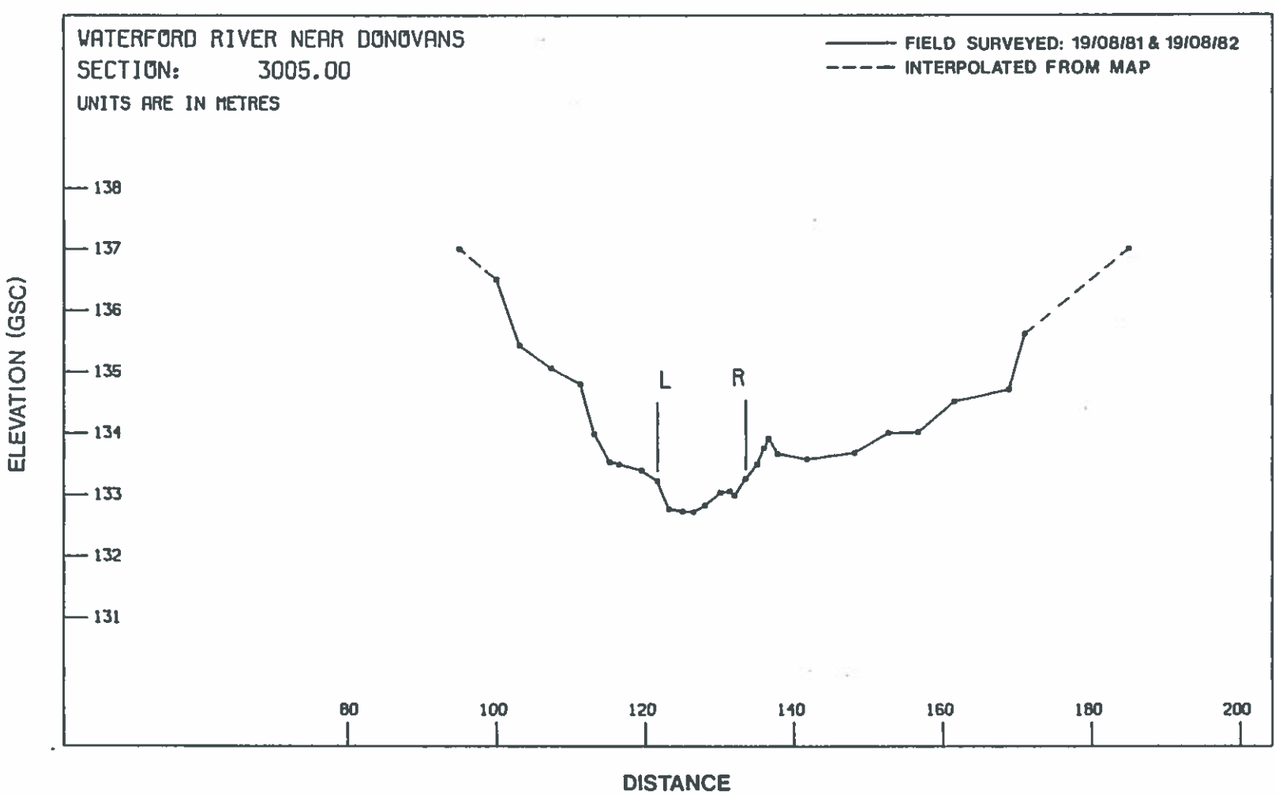

WATERFORD RIVER AT MOUNT PEARL
SECTION: 2013.00
UNITS ARE IN METRES
FIELD SURVEYED: 14/08/81
INTERPOLATED FROM MAP
ELEVATION (GSC)
108
107
106
105
104
103
102
L
R
80
100
120
140
160
180
200
220
240
260
280
300
320
340
DISTANCE

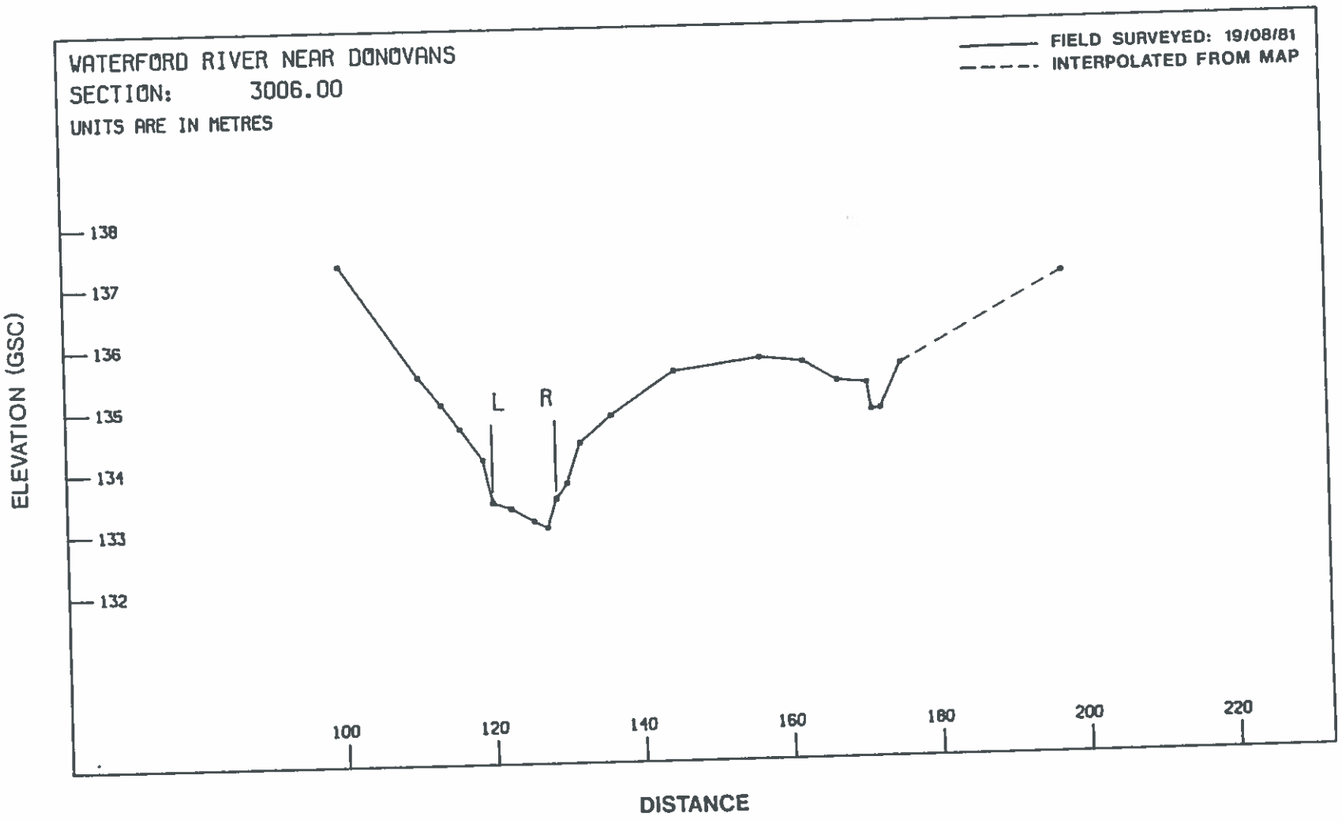
DONOVANS REACH

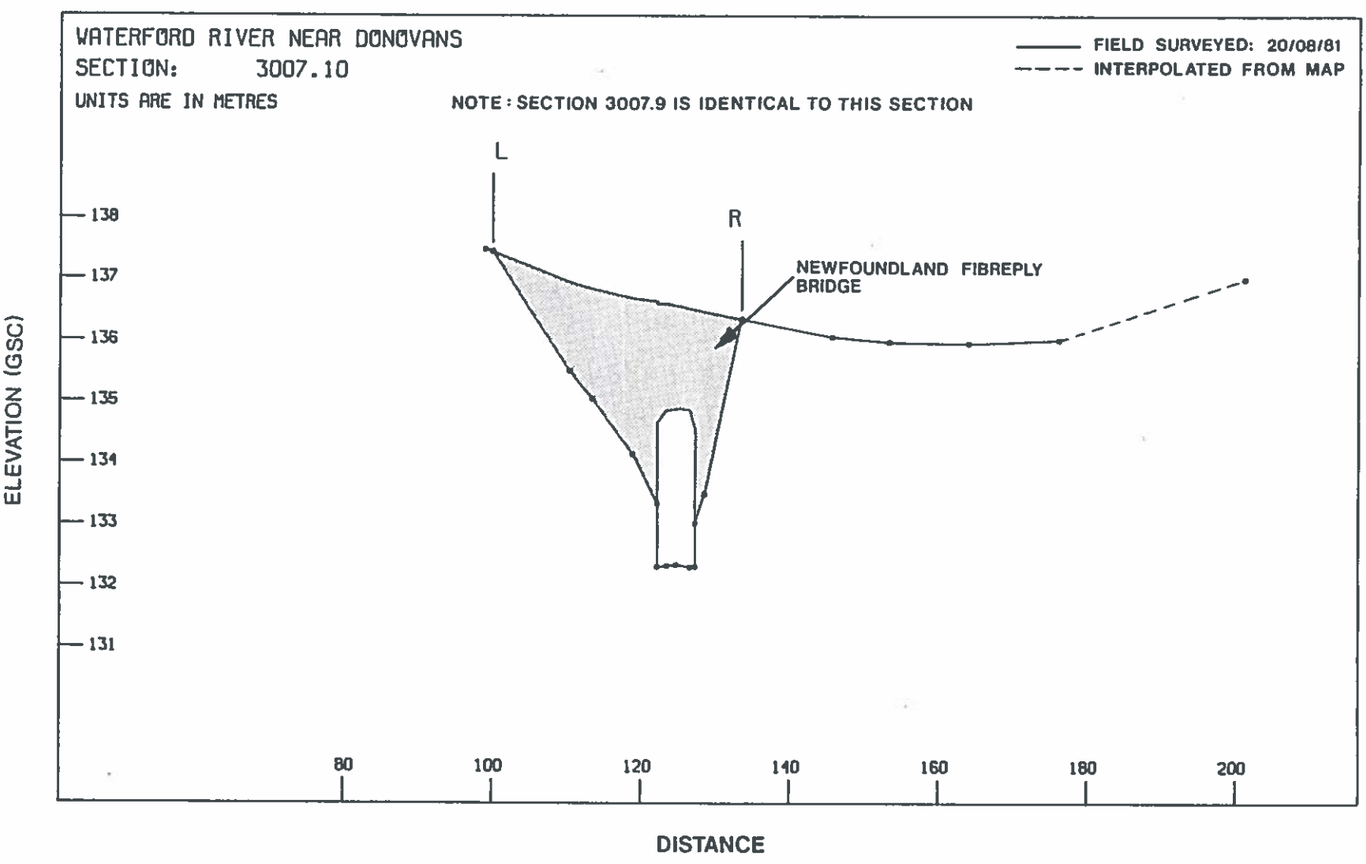

WATERFORD RIVER NEAR DONOVANS
SECTION: 3002.00
UNITS ARE IN METRES
FIELD SURVEYED: 19/08/81
INTERPOLATED FROM MAP
ELEVATION (GSC)
138
137
136
135
134
133
132
131
L
R
80
100
120
140
160
DISTANCE

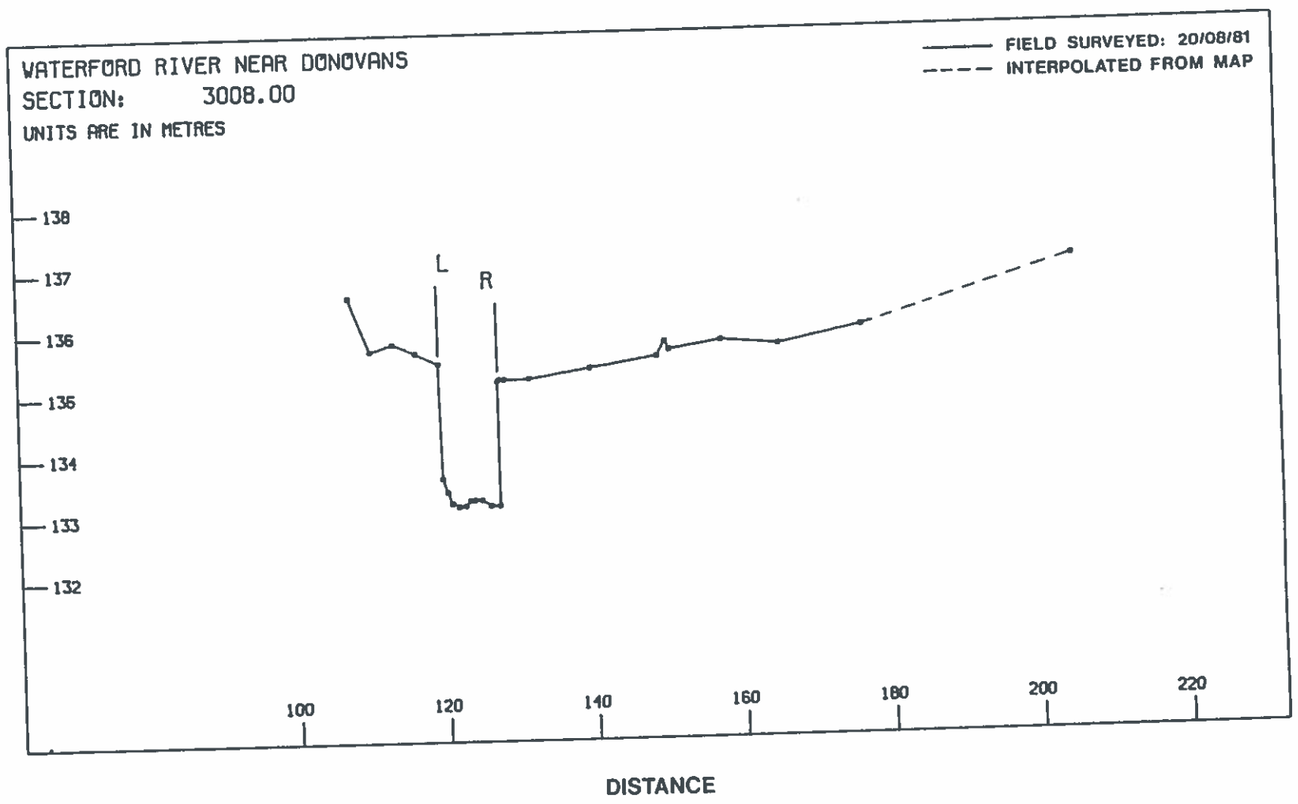

WATERFORD RIVER NEAR DONOVANS
SECTION: 3003.00
UNITS ARE IN METRES
FIELD SURVEYED: 19/08/81
INTERPOLATED FROM MAP
ELEVATION (GSC)
138
137
136
135
134
133
132
131
L
R
80
100
120
140
160
DISTANCE

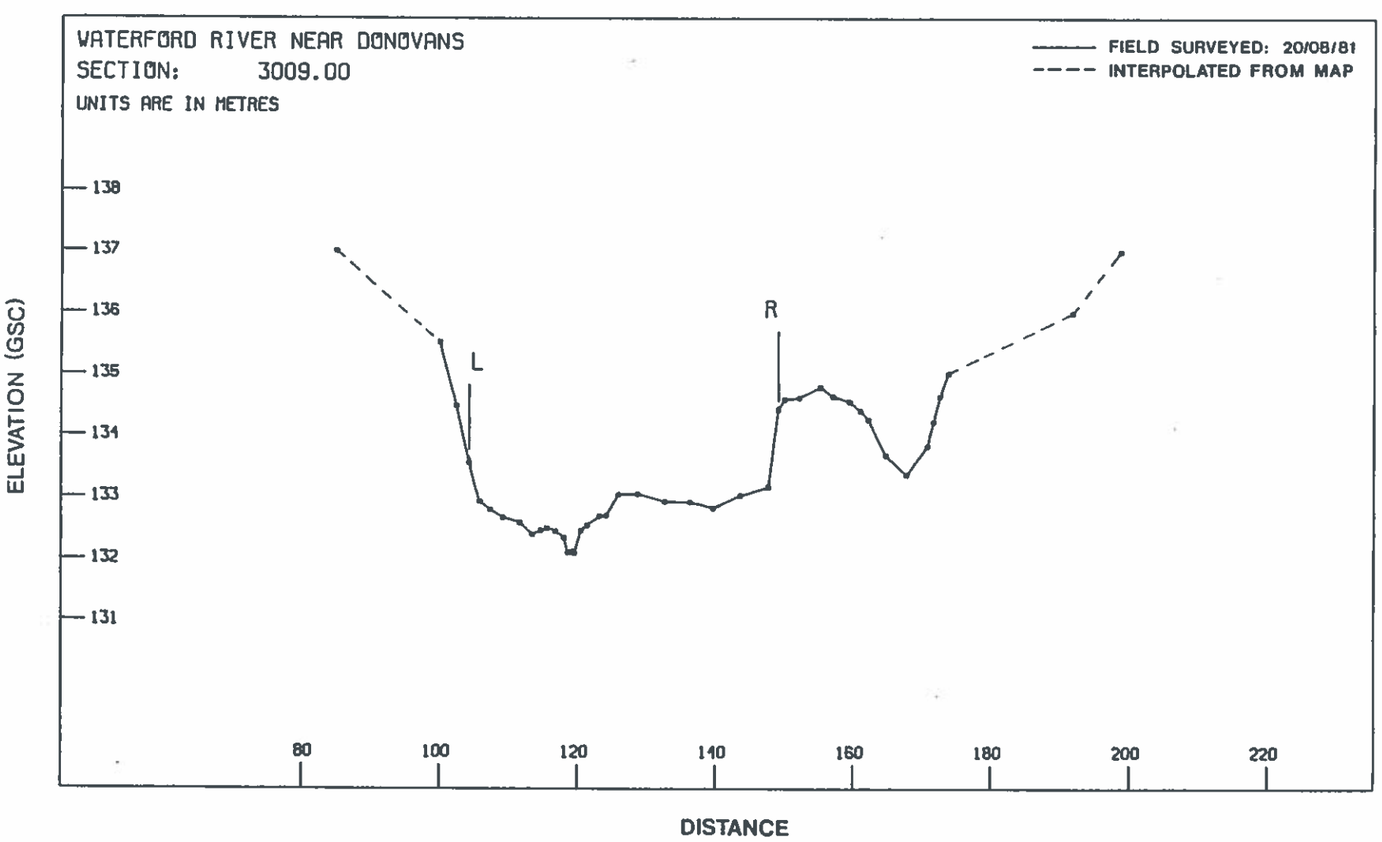

WATERFORD RIVER NEAR DONOVANS
SECTION: 3004.00
UNITS ARE IN METRES
FIELD SURVEYED: 19/08/81 & 19/08/82
INTERPOLATED FROM MAP
ELEVATION (GSC)
138
137
136
135
134
133
132
L R
100
120
140
160
DISTANCE

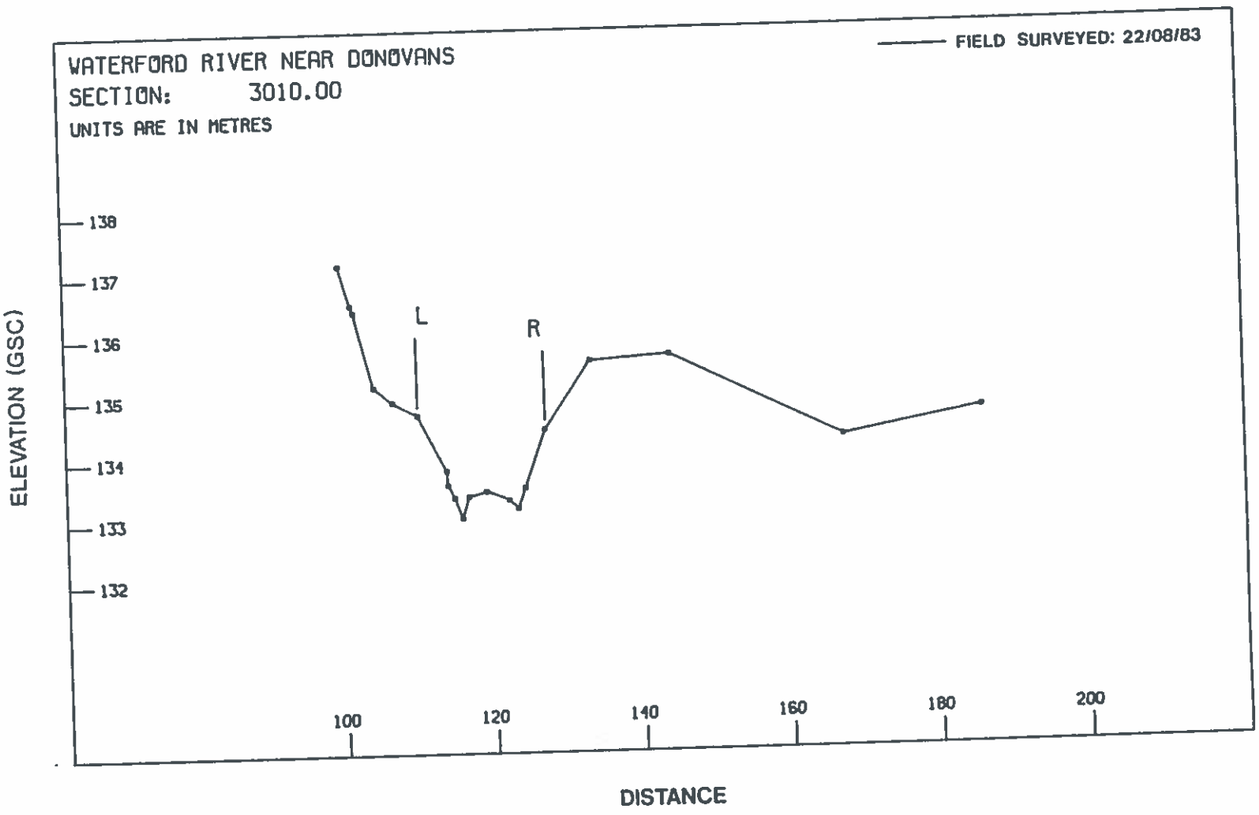

WATERFORD RIVER NEAR DONOVANS
SECTION: 3005.00
UNITS ARE IN METRES
FIELD SURVEYED: 19/08/81 & 19/08/82
INTERPOLATED FROM MAP
ELEVATION (GSC)
138
137
136
135
134
133
132
131
L R
80
100
120
140
160
180
200
DISTANCE

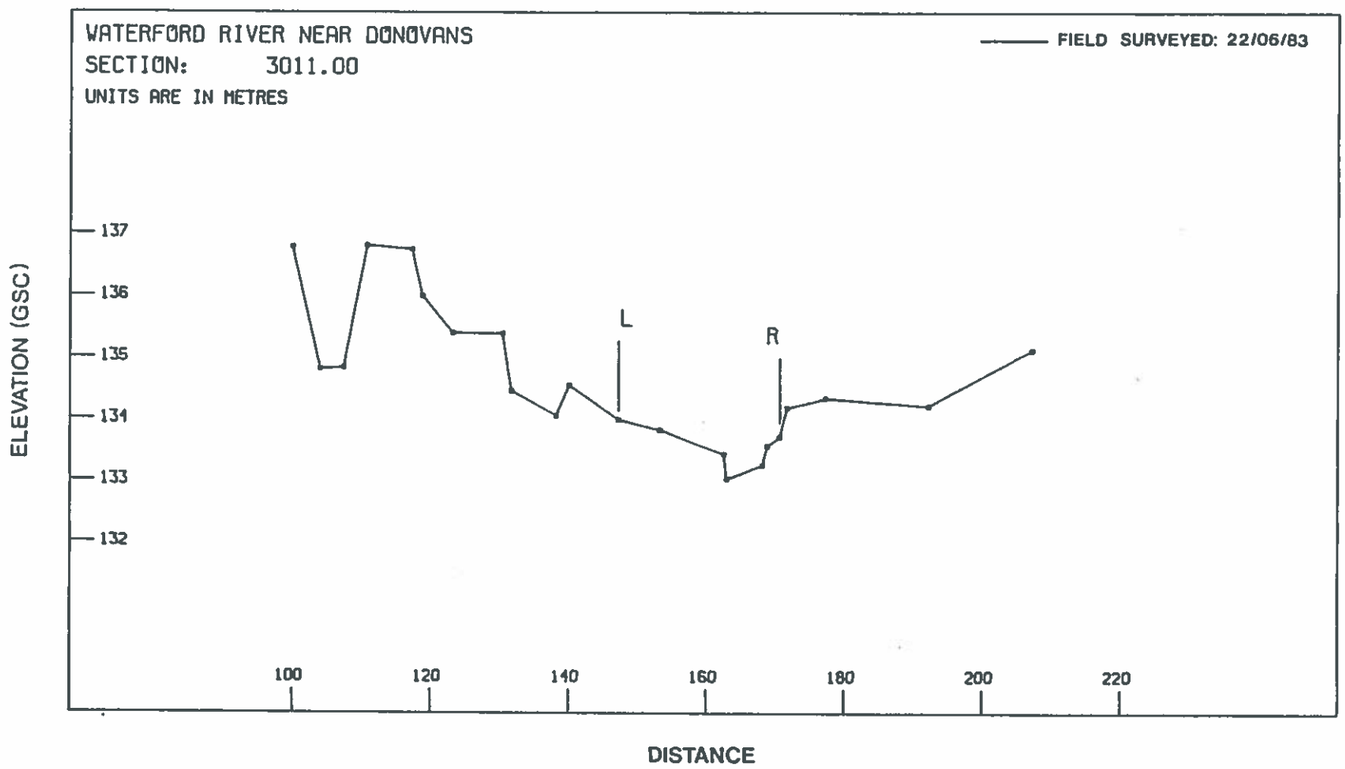

WATERFORD RIVER NEAR DONOVANS
SECTION: 3006.00
UNITS ARE IN METRES
FIELD SURVEYED: 19/08/81
INTERPOLATED FROM MAP
ELEVATION (GSC)
138
137
136
135
134
133
132
L
R
100
120
140
160
180
200
220
DISTANCE

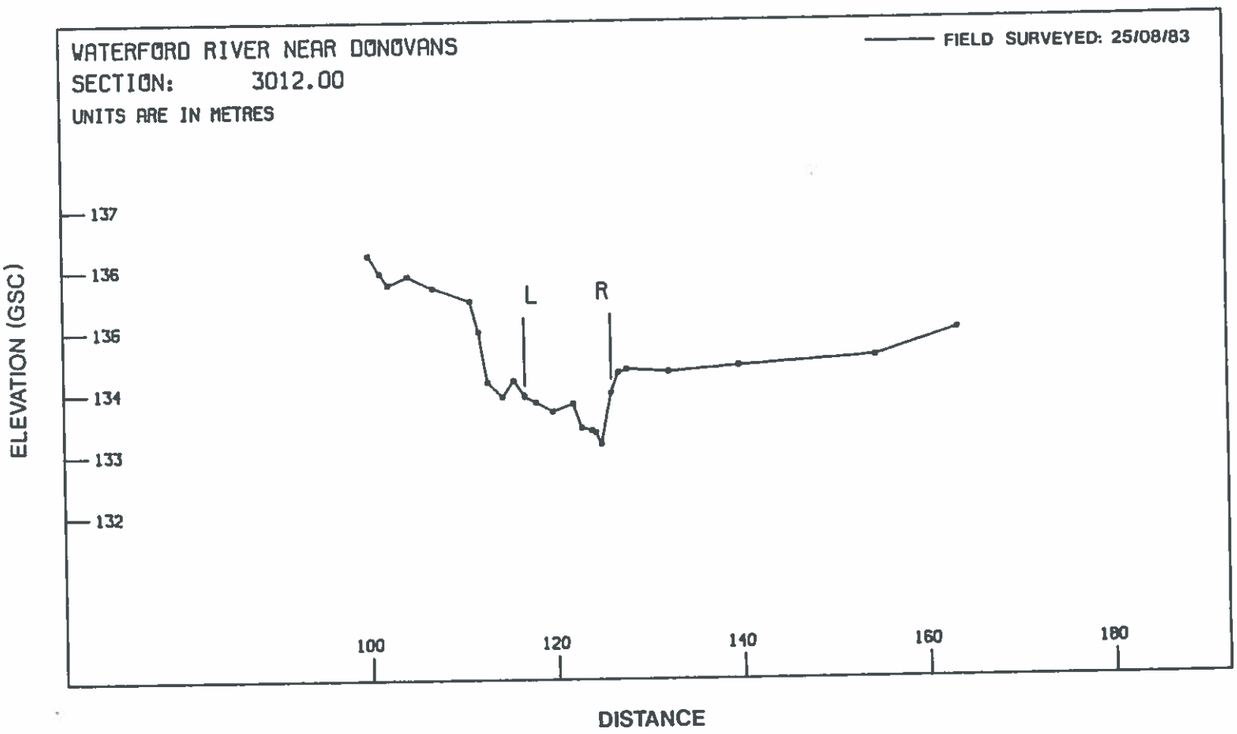

WATERFORD RIVER NEAR DONOVANS
SECTION: 3007.10
UNITS ARE IN METRES
NOTE: SECTION 3007.9 IS IDENTICAL TO THIS SECTION
FIELD SURVEYED: 20/08/81
INTERPOLATED FROM MAP
ELEVATION (GSC)
138
137
136
135
134
133
132
131
L
R
NEWFOUNDLAND FIBREPLY
BRIDGE
80
100
120
140
160
180
200
DISTANCE

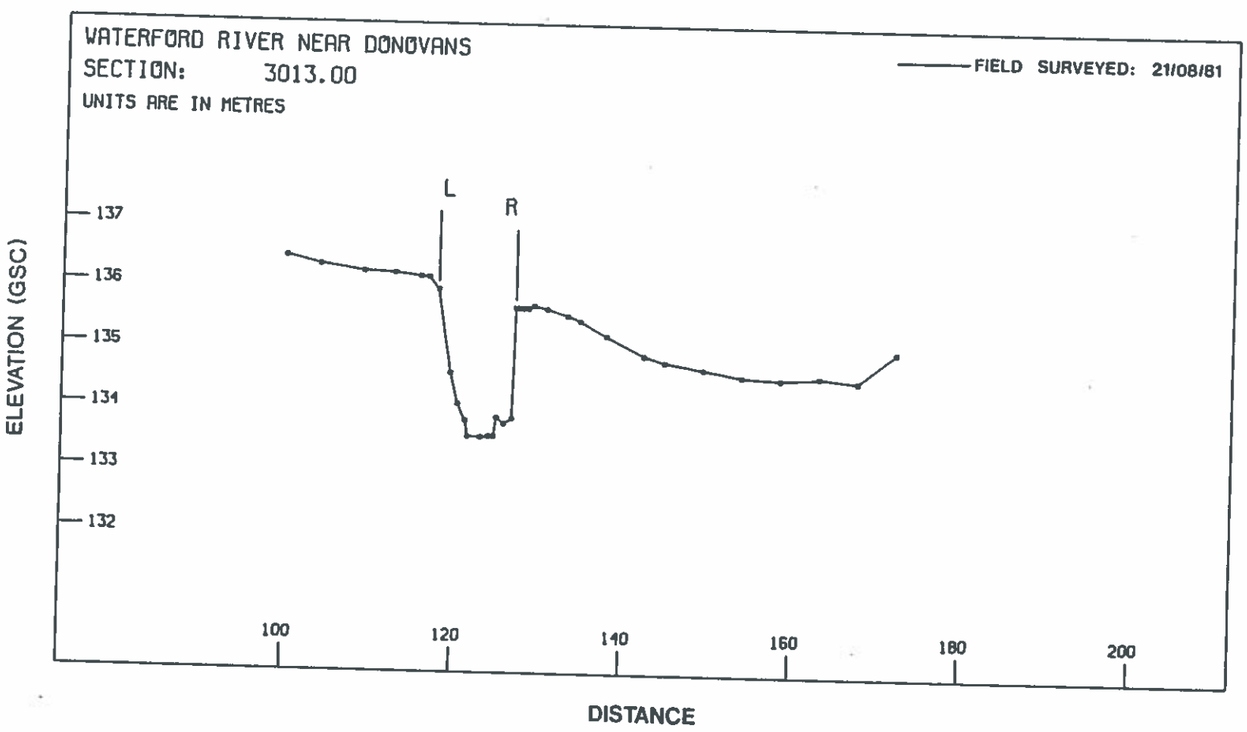

WATERFORD RIVER NEAR DONOVANS
SECTION: 3008.00
UNITS ARE IN METRES
FIELD SURVEYED: 20/08/81
INTERPOLATED FROM MAP
ELEVATION (GSC)
138
137
136
136
134
133
132
L
R
100
120
140
160
180
200
220
DISTANCE

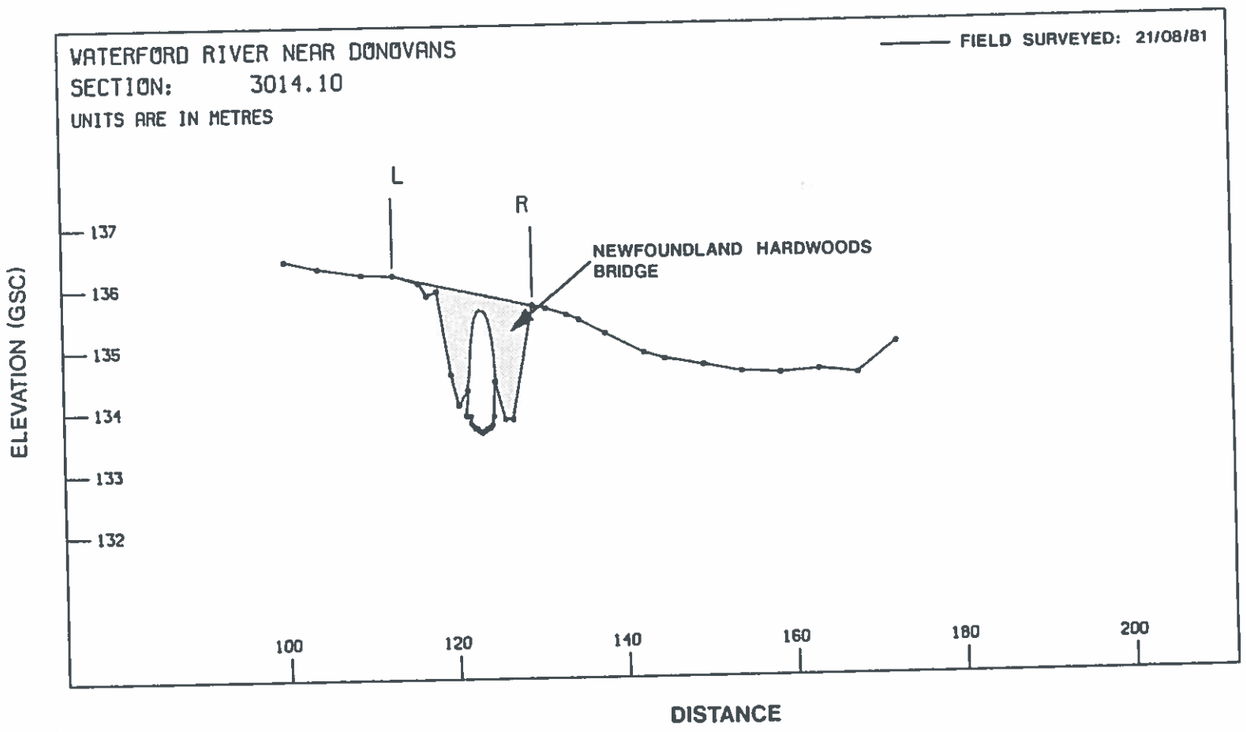

WATERFORD RIVER NEAR DONOVANS
SECTION: 3009.00
UNITS ARE IN METRES
FIELD SURVEYED: 20/08/81
INTERPOLATED FROM MAP
ELEVATION (GSC)
138
137
136
135
134
133
132
131
L
R
80
100
120
140
160
180
200
220
DISTANCE

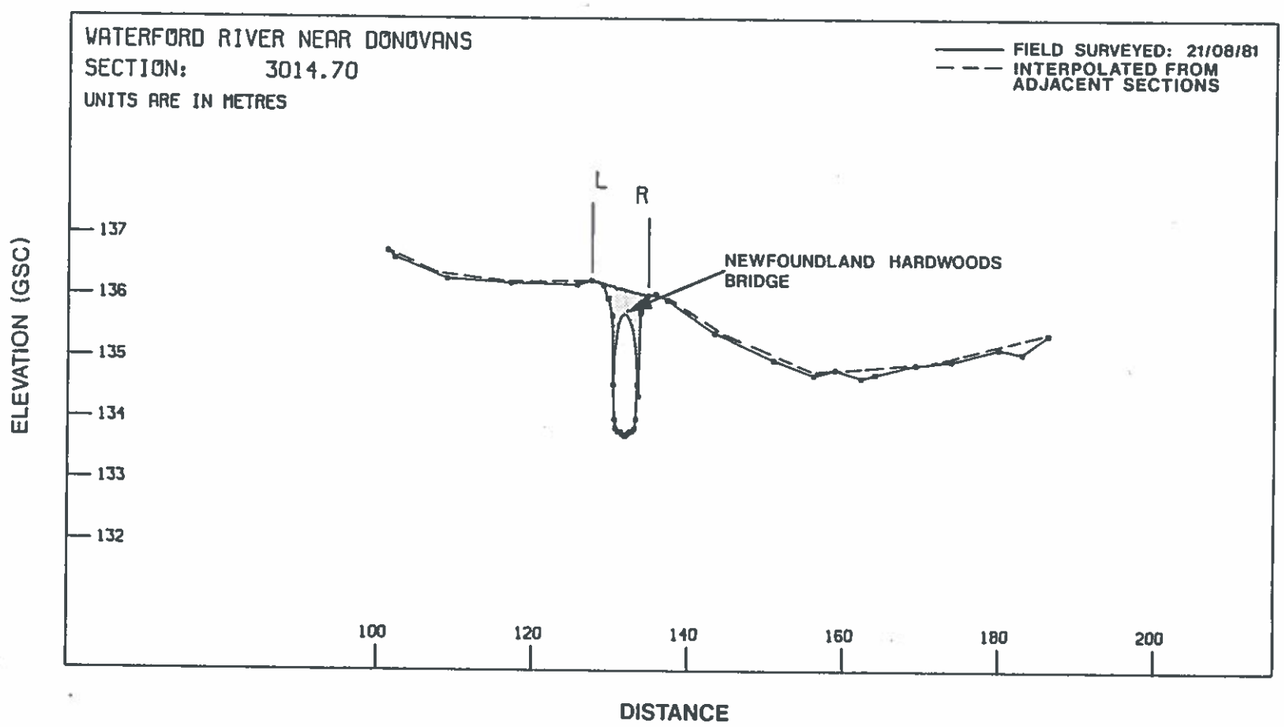

WATERFORD RIVER NEAR DONOVANS
SECTION: 3010.00
UNITS ARE IN METRES
FIELD SURVEYED: 22/08/83
ELEVATION (GSC)
138
137
136
135
134
133
132
L
R
100
120
140
160
180
200
DISTANCE

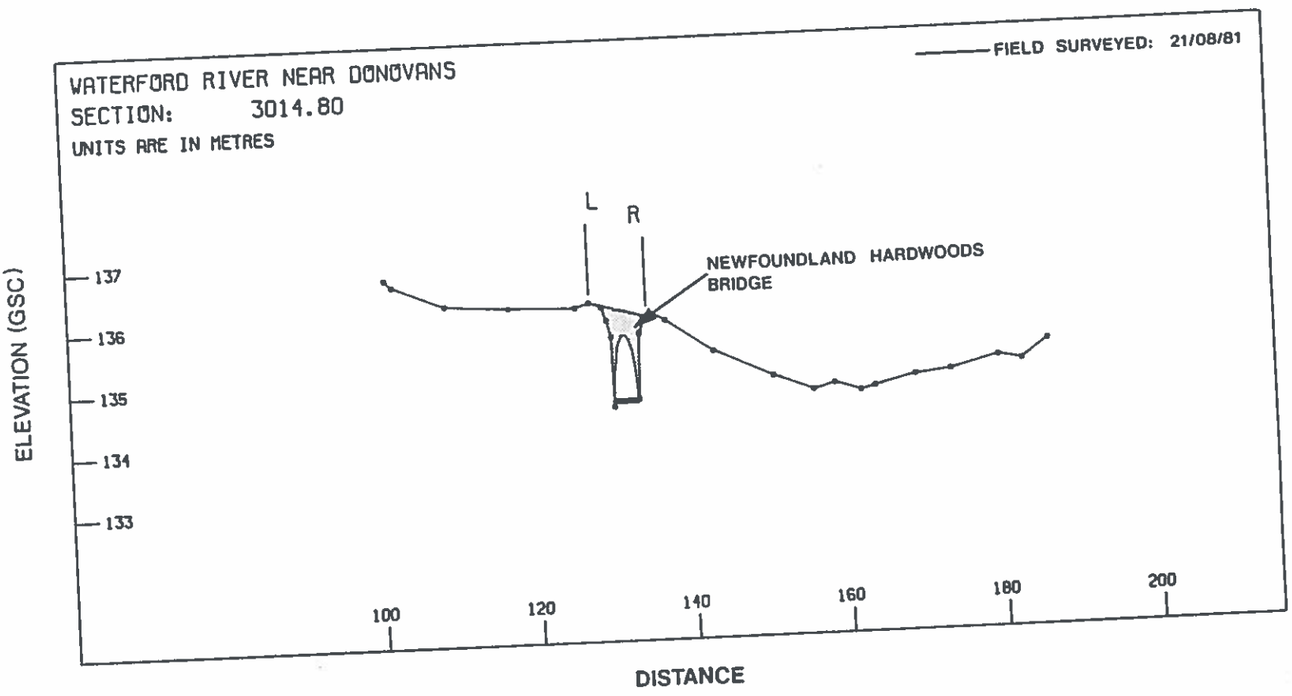

WATERFORD RIVER NEAR DONOVANS
SECTION: 3011.00
UNITS ARE IN METRES
FIELD SURVEYED: 22/06/83
ELEVATION (GSC)
137
136
135
134
133
132
L
R
100
120
140
160
180
200
220
DISTANCE

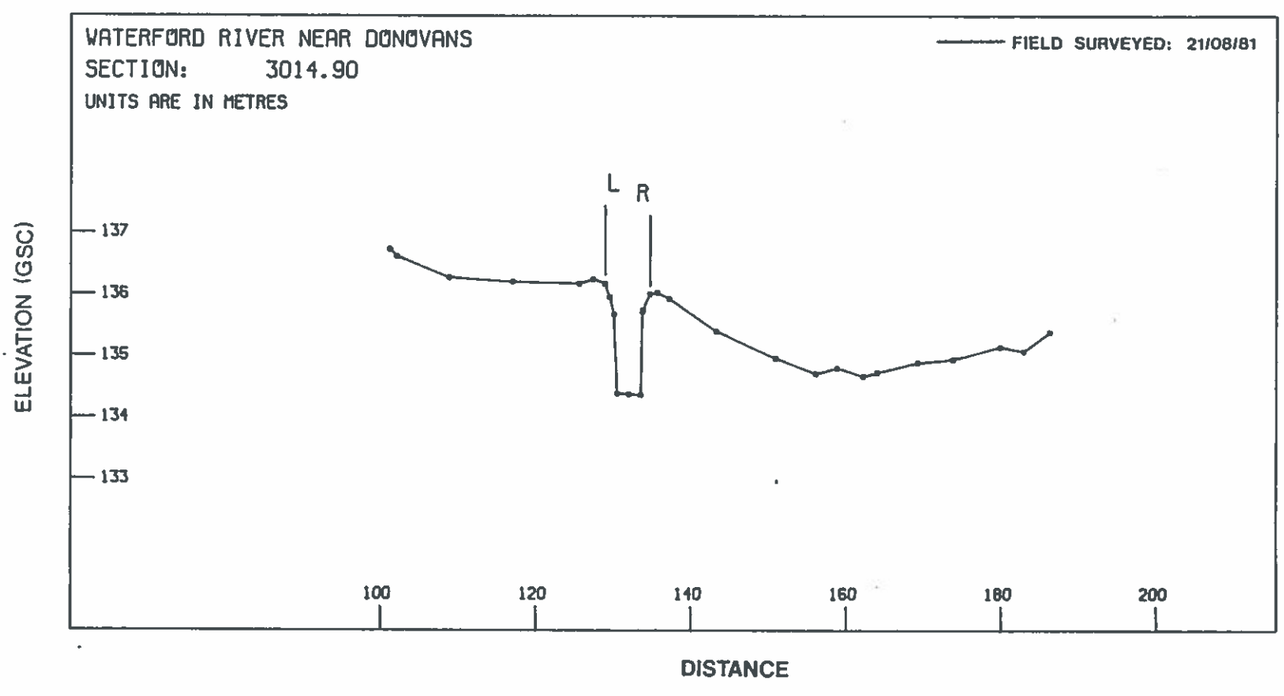

WATERFORD RIVER NEAR DONOVANS
SECTION: 3012.00
UNITS ARE IN METRES
FIELD SURVEYED: 25/08/83
ELEVATION (GSC)
137
136
136
134
133
132
L
R
100
120
140
160
180
DISTANCE

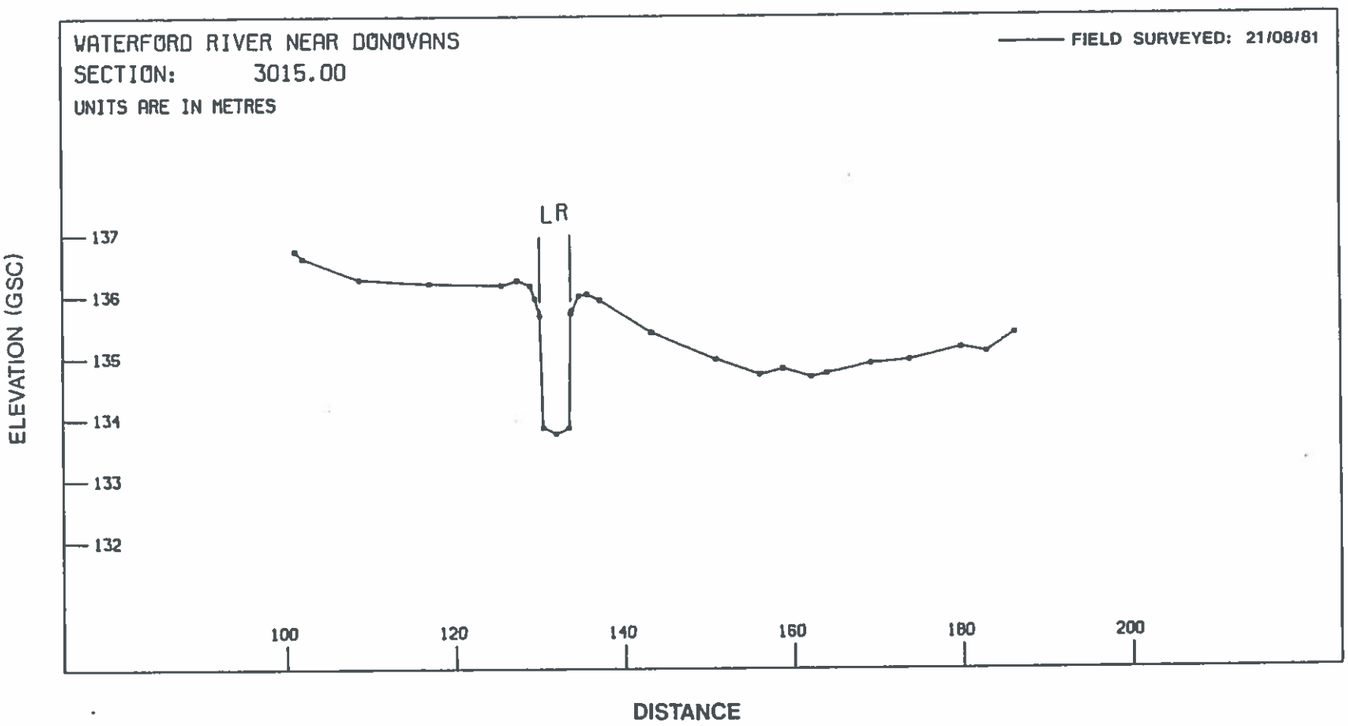

WATERFORD RIVER NEAR DONOVANS
SECTION: 3013.00
UNITS ARE IN METRES
FIELD SURVEYED: 21/08/81
ELEVATION (GSC)
137
136
135
134
133
132
L
R
100
120
140
160
180
200
DISTANCE

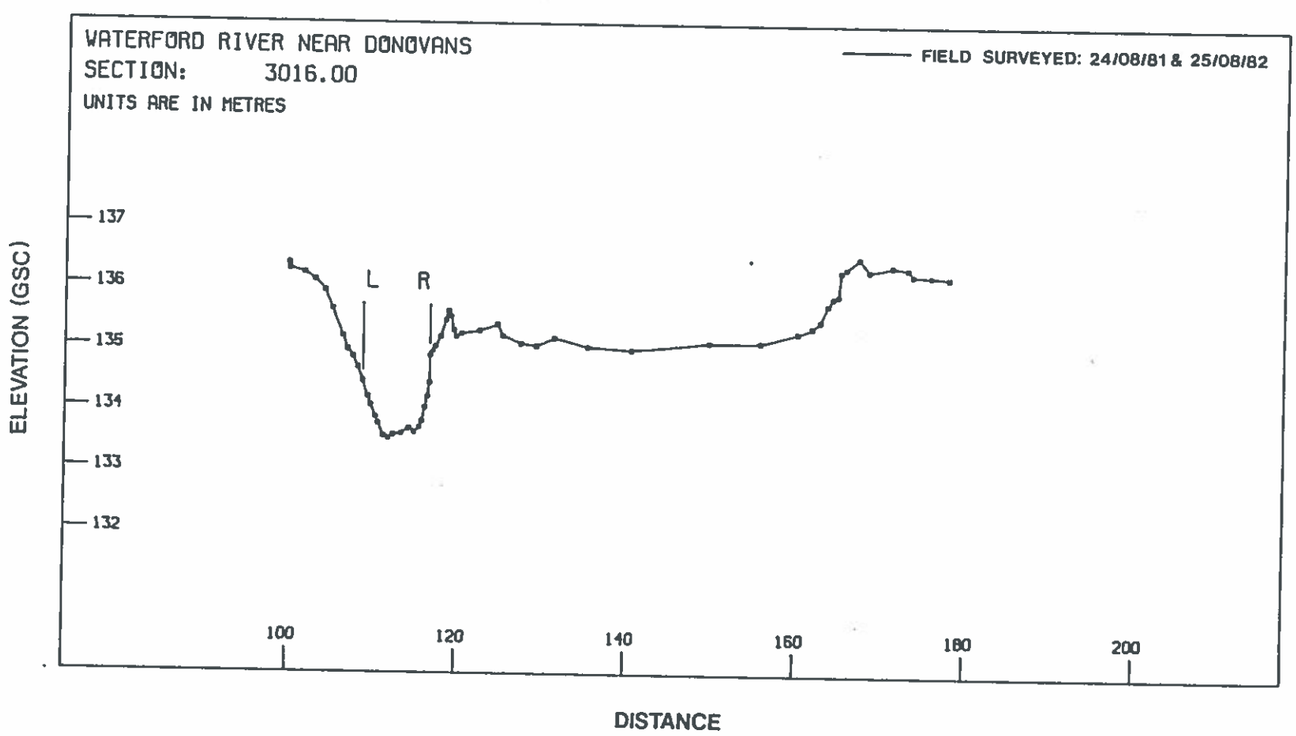

WATERFORD RIVER NEAR DONOVANS
SECTION: 3014.10
UNITS ARE IN METRES
FIELD SURVEYED: 21/08/81
L
R
NEWFOUNDLAND HARDWOODS BRIDGE
ELEVATION (GSC)
137
136
135
134
133
132
100
120
140
160
180
200
DISTANCE

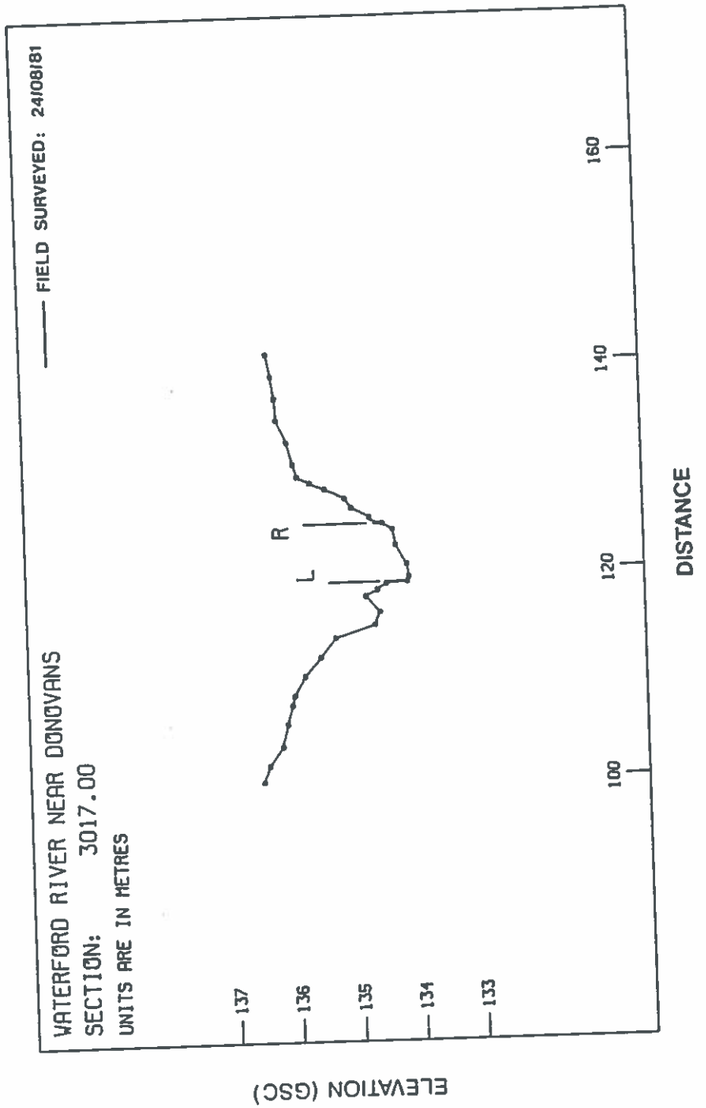

WATERFORD RIVER NEAR DONOVANS
SECTION: 3014.70
UNITS ARE IN METRES
FIELD SURVEYED: 21/08/81
INTERPOLATED FROM ADJACENT SECTIONS
L
R
NEWFOUNDLAND HARDWOODS BRIDGE
ELEVATION (GSC)
137
136
135
134
133
132
100
120
140
160
180
200
DISTANCE


WATERFORD RIVER NEAR DONOVANS
SECTION: 3014.80
UNITS ARE IN METRES
FIELD SURVEYED: 21/08/81
L
R
NEWFOUNDLAND HARDWOODS
BRIDGE
ELEVATION (GSC)
137
136
135
134
133
100
120
140
160
180
200
DISTANCE


WATERFORD RIVER NEAR DONOVANS
SECTION: 3014.90
UNITS ARE IN METRES
FIELD SURVEYED: 21/08/81
L
R
ELEVATION (GSC)
137
136
135
134
133
100
120
140
160
180
200
DISTANCE


WATERFORD RIVER NEAR DONOVANS
SECTION: 3015.00
UNITS ARE IN METRES
FIELD SURVEYED: 21/08/81
LR
137
136
135
134
133
132
100
120
140
160
180
200
ELEVATION (GSC)
DISTANCE

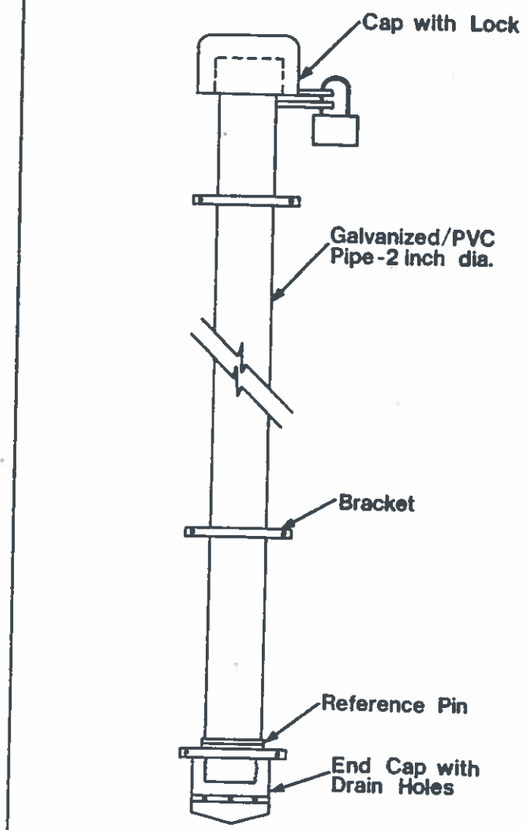

WATERFORD RIVER NEAR DONOVANS
SECTION: 3016.00
UNITS ARE IN METRES
FIELD SURVEYED: 24/08/81 & 25/08/82
L
R
137
136
135
134
133
132
100
120
140
160
180
200
ELEVATION (GSC)
DISTANCE



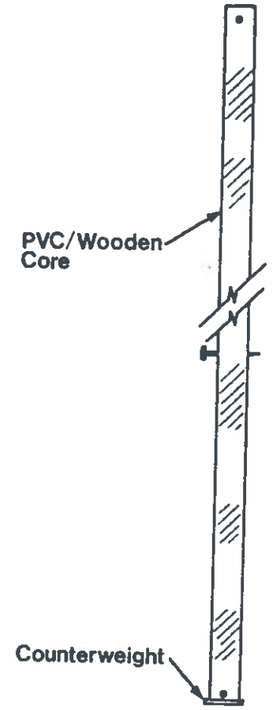
APPENDIX B

CREST GAUGES

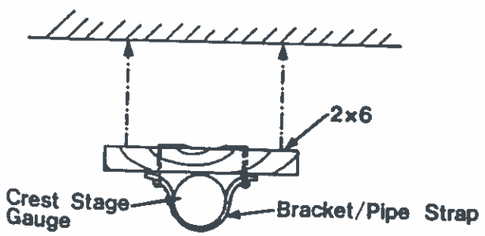
CREST-STAGE GAUGE



ELEVATION
CREST GAUGE

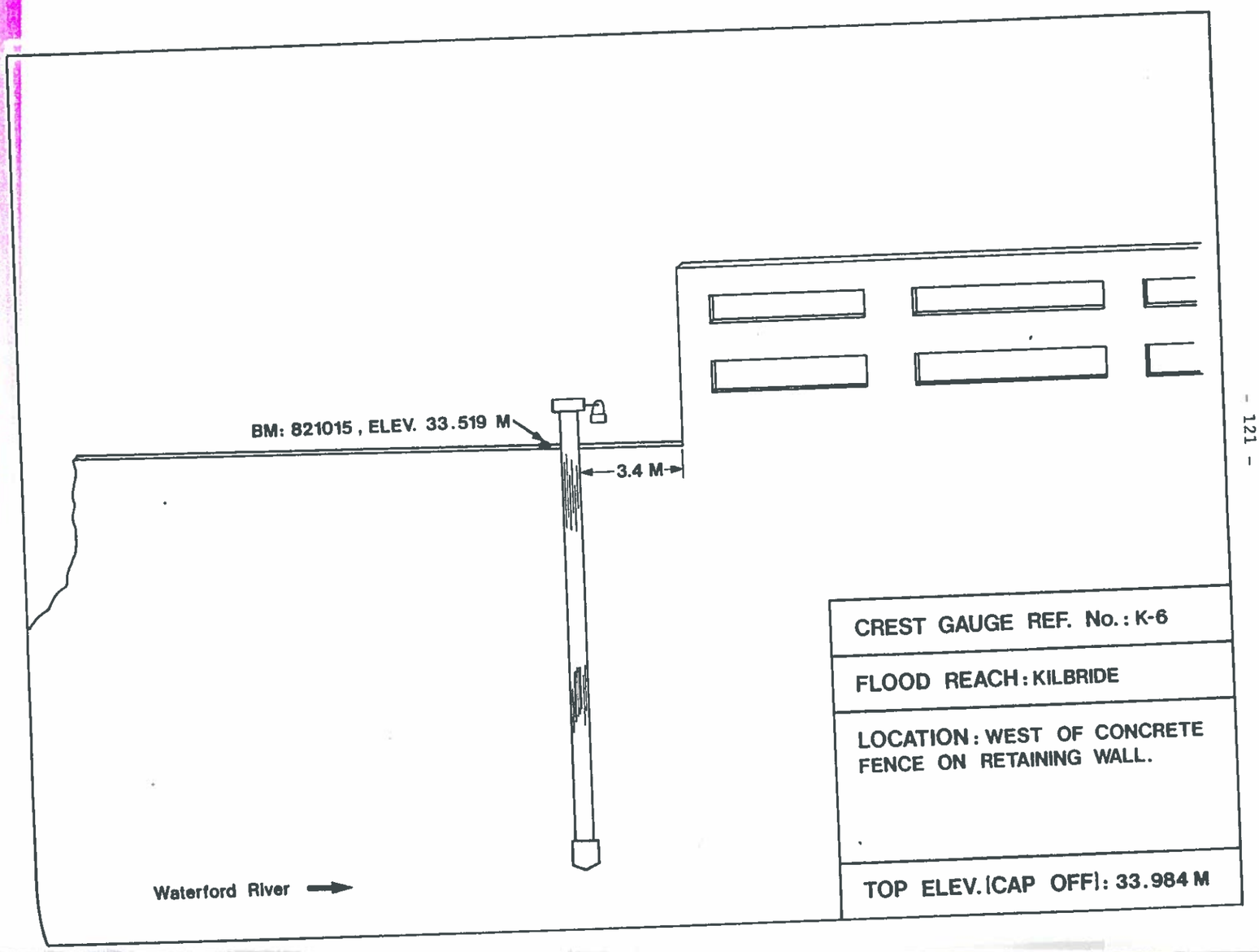


ELEVATION
INNER CORE

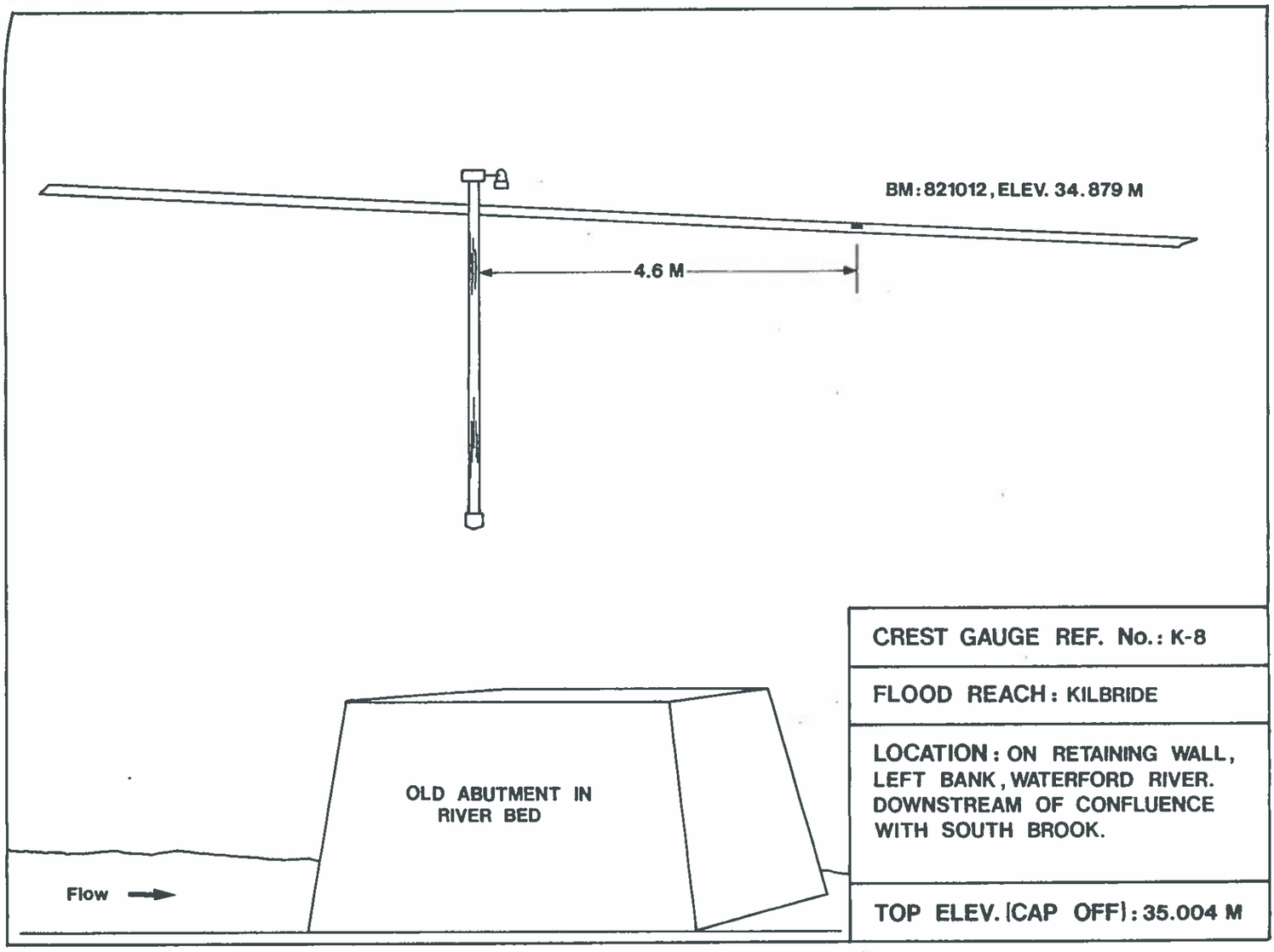


PLAN VIEW
FASTENING METHOD

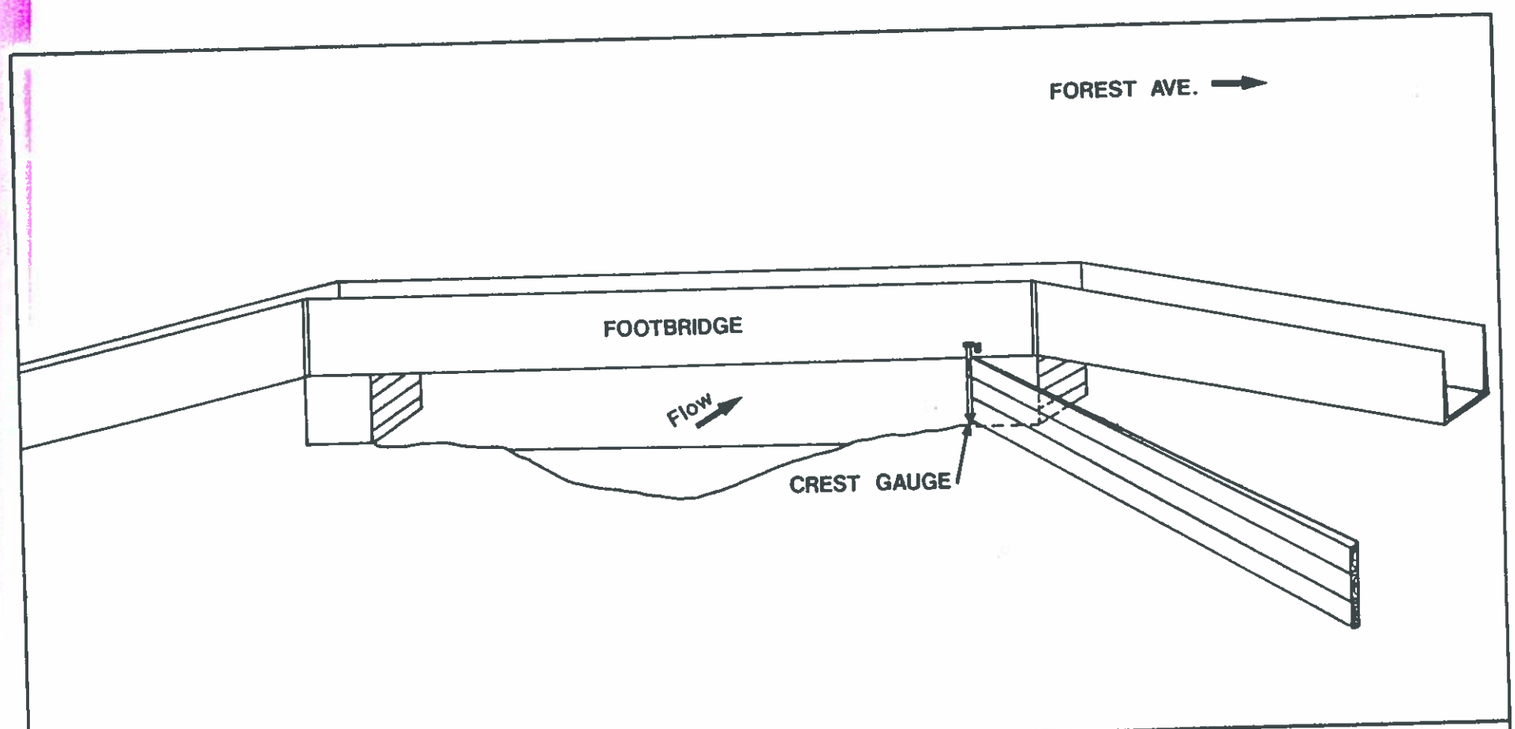
PLAN VIEW
INNER CORE



CREST GAUGE REF. No.: K-6
FLOOD REACH: KILBRIDE
LOCATION: WEST OF CONCRETE FENCE ON RETAINING WALL.
TOP ELEV. (CAP OFF): 33.984 M

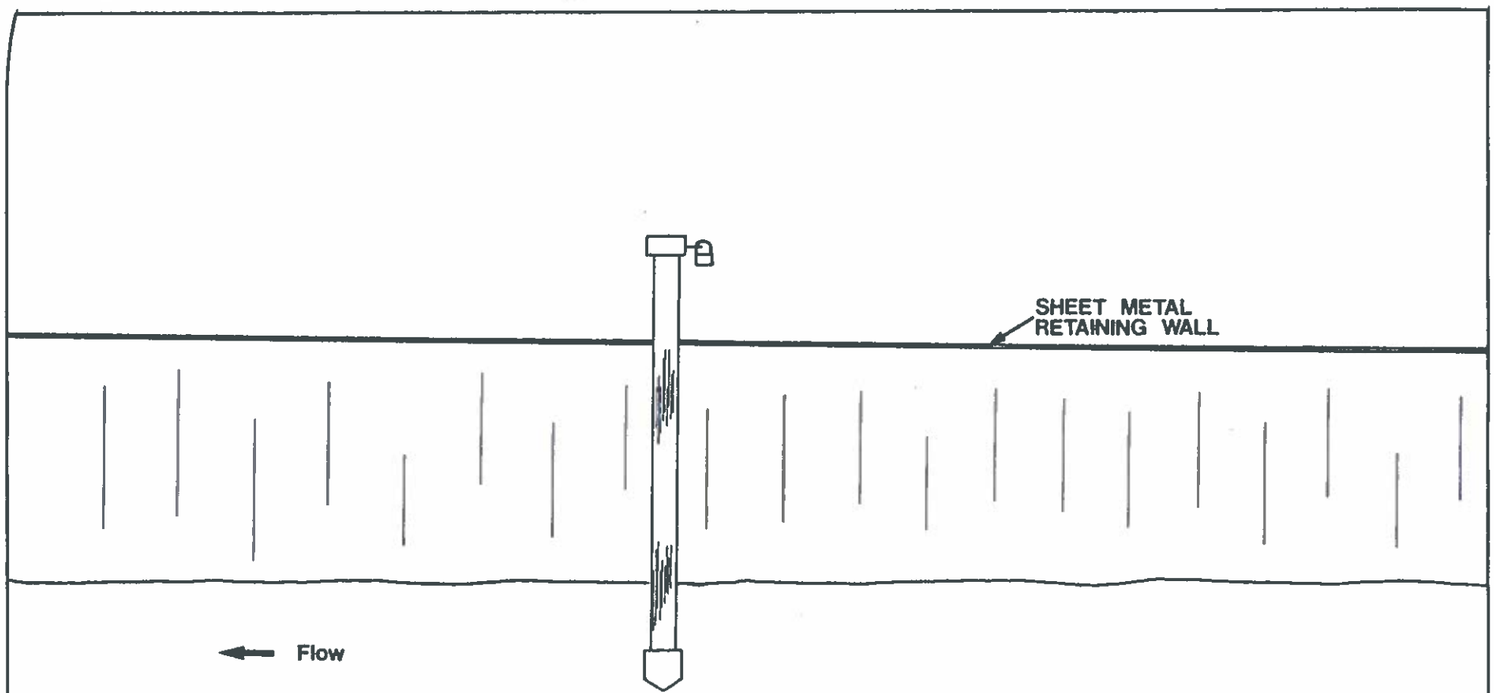


CREST GAUGE REF. No.: K-8
FLOOD REACH: KILBRIDE
LOCATION: ON RETAINING WALL, LEFT BANK, WATERFORD RIVER. DOWNSTREAM OF CONFLUENCE WITH SOUTH BROOK.
TOP ELEV. (CAP OFF): 35.004 M



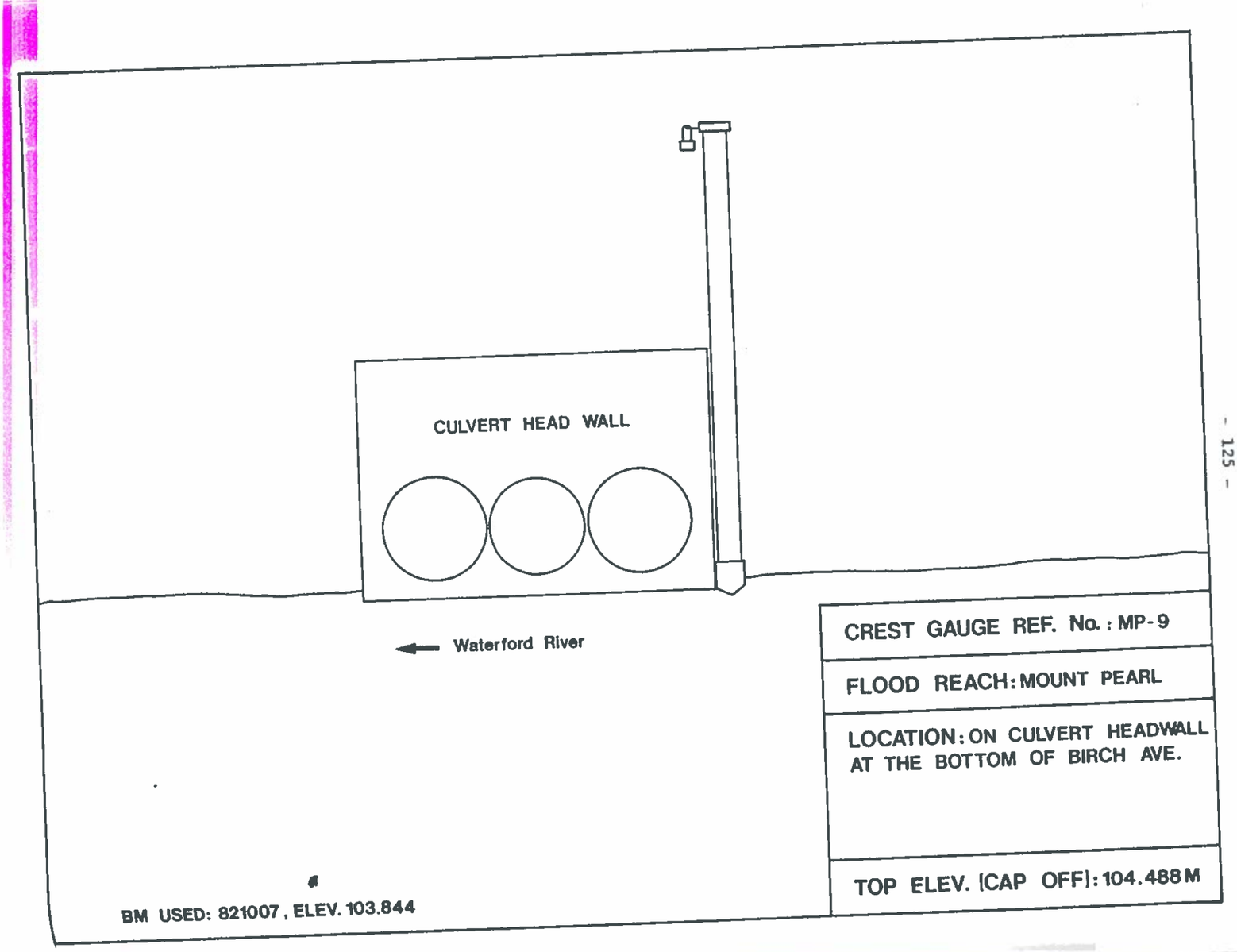
CREST GAUGE REF. No.: MP-1
FLOOD REACH: MOUNT PEARL
LOCATION: ON RIGHT HAND ABUTMENT LOOKING DOWNSTREAM ON UPSTREAM SIDE OF FOOTBRIDGE.
TOP ELEV. (CAP OFF): 103.368 M

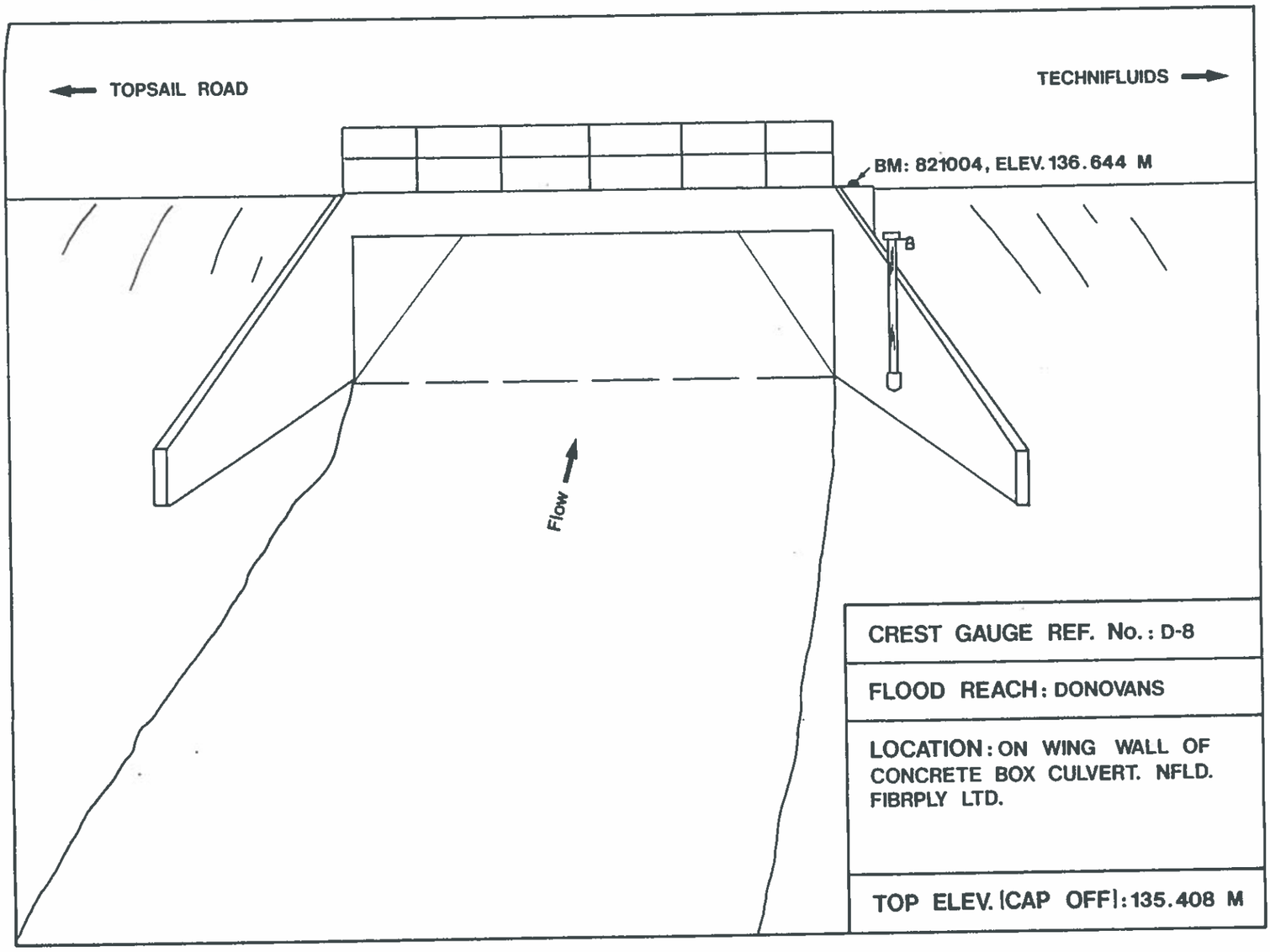
BM USED: 821011, ELEV. 103.748 M



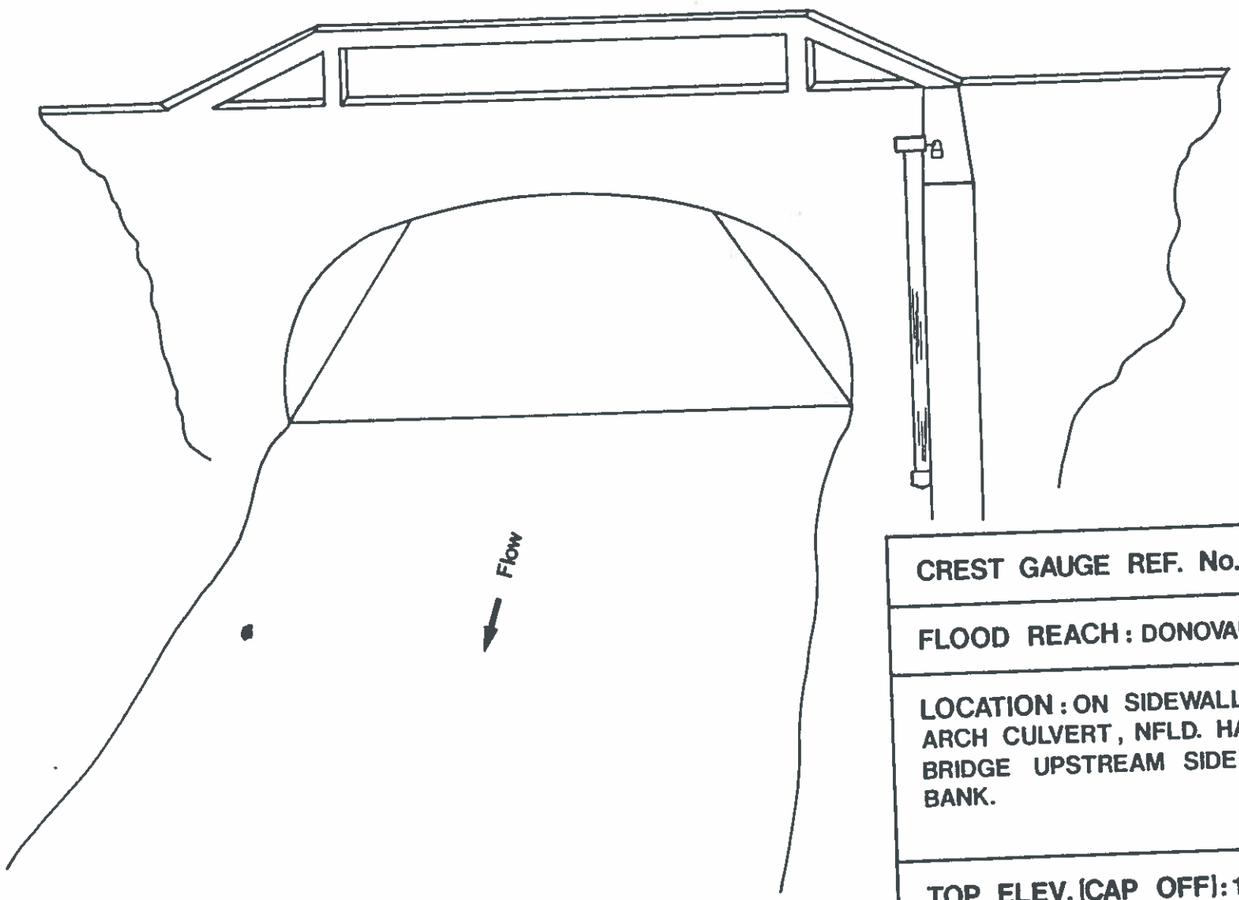
CREST GAUGE REF. No.: MP-8
FLOOD REACH: MOUNT PEARL
LOCATION: ON SHEET METAL RETAINING WALL WHICH RUNS PARALLEL TO RAILWAY TRACKS NEAR THE END OF DELANEY ST.
TOP ELEV. (CAP OFF): 103.651 M

BM USED: 821007, ELEV. 103.844 M


CULVERT HEAD WALL
Waterford River
BM USED: 821007, ELEV. 103.844
CREST GAUGE REF. No.: MP-9
FLOOD REACH: MOUNT PEARL
LOCATION: ON CULVERT HEADWALL AT THE BOTTOM OF BIRCH AVE.
TOP ELEV. (CAP OFF): 104.488 M


TOPSAIL ROAD
TECHNIFLUIDS
BM: 821004, ELEV. 136.644 M
Flow
CREST GAUGE REF. No.: D-8
FLOOD REACH: DONOVANS
LOCATION: ON WING WALL OF CONCRETE BOX CULVERT. NFLD. FIBRPLY LTD.
TOP ELEV. (CAP OFF): 135.408 M

NOTE: SAME BRIDGE AS SHOWN FOR FIGURE D-13



CREST GAUGE REF. No.: D-15

FLOOD REACH: DONOVANS

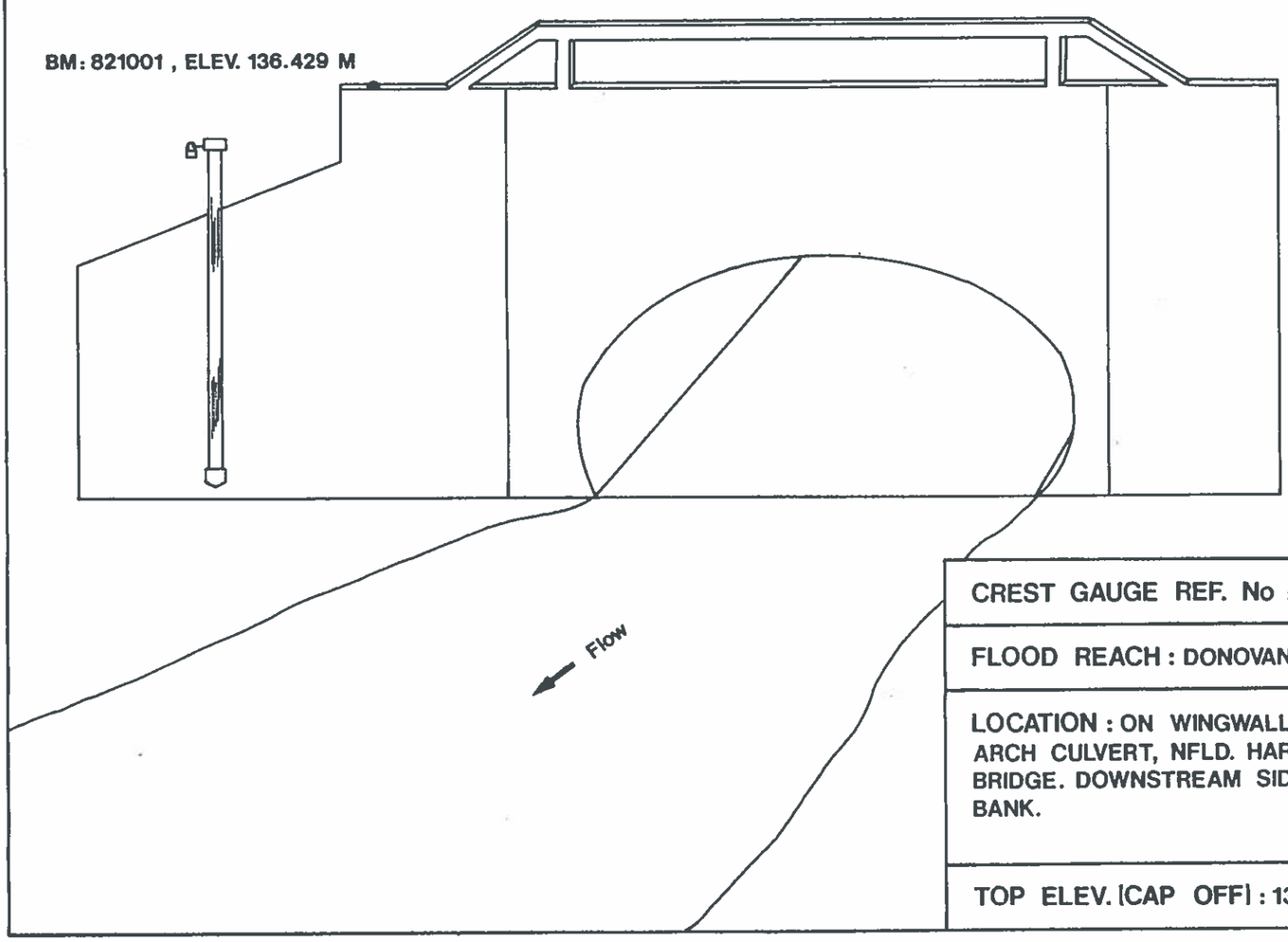
LOCATION: ON SIDEWALL OF ARCH CULVERT, NFLD. HARDWOODS BRIDGE UPSTREAM SIDE, RIGHT BANK.

TOP ELEV. (CAP OFF): 136.145 M

BM USED: 821001, ELEV. 136.429 M

NOTE: SAME BRIDGE AS SHOWN FOR FIGURE D-15

BM: 821001, ELEV. 136.429 M



CREST GAUGE REF. No : D-13

FLOOD REACH: DONOVANS

LOCATION: ON WINGWALL OF ARCH CULVERT, NFLD. HARDWOODS BRIDGE. DOWNSTREAM SIDE, RIGHT BANK.

TOP ELEV. (CAP OFF): 135.890 M

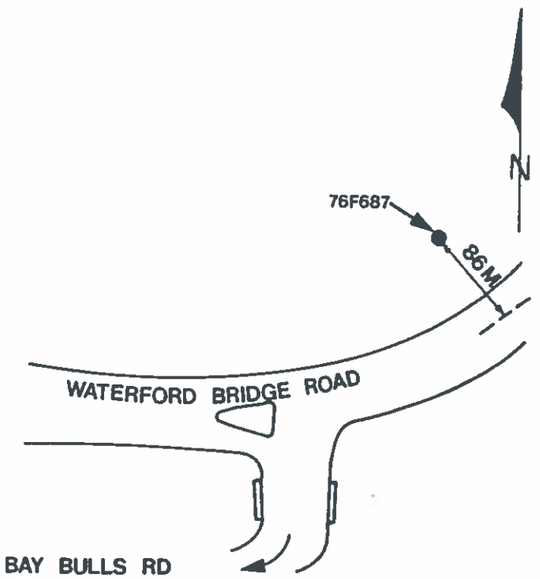
APPENDIX C

VERTICAL CONTROL SURVEY

VERTICAL CONTROL SURVEY

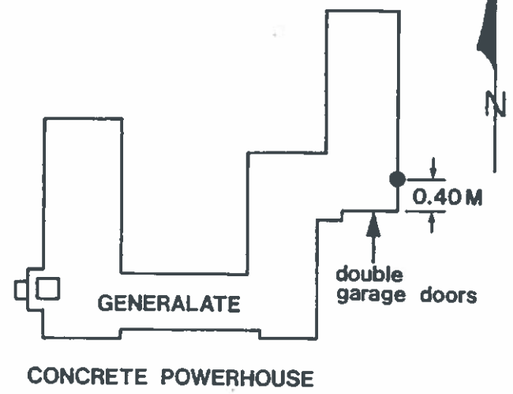
76F687

KEY PLAN



REFERENCES

LITTLEDALE CONVENT & SCHOOL



VICINITY : WATERFORD BRIDGE	VERTICAL : CONCRETE WALL 0.40 M 0.20 M GROUND
INSPECTION DATES :	
INSTALLATION DATE : JANUARY 1977	TYPE : Brass tablet in side
CONTRACTOR : Geodetic Survey of Canada	CONTRACT NO.

DESCRIPTION :

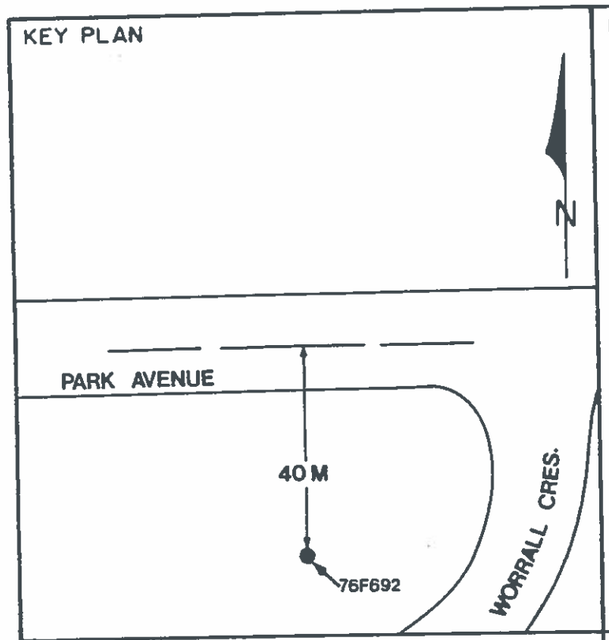
Littledale Convent and School, Waterford Bridge Road east of Bay Bulls Road, tablet in east concrete foundation of building housing generalate and power house, 86 m northwest of centre line of Waterford Bridge Road, 40 cm from southeast corner of building at east side of double garage door, 20 cm above ground level. Used to establish vertical control for the Kilbride Flood Study Reach.

Elevation - 39.164

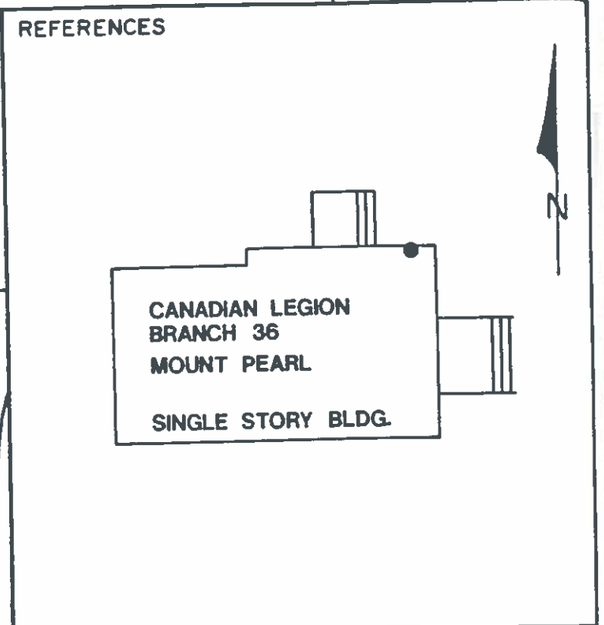
VERTICAL CONTROL SURVEY

76F692

KEY PLAN



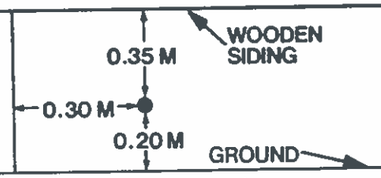
REFERENCES



VICINITY : ROYAL CANADIAN LEGION BRANCH 36, MOUNT PEARL

INSPECTION DATES :

VERTICAL :



INSTALLATION DATE : JANUARY 1977

TYPE : Brass tablet in side

CONTRACTOR : Geodetic Survey of Canada

CONTRACT NO.

DESCRIPTION :

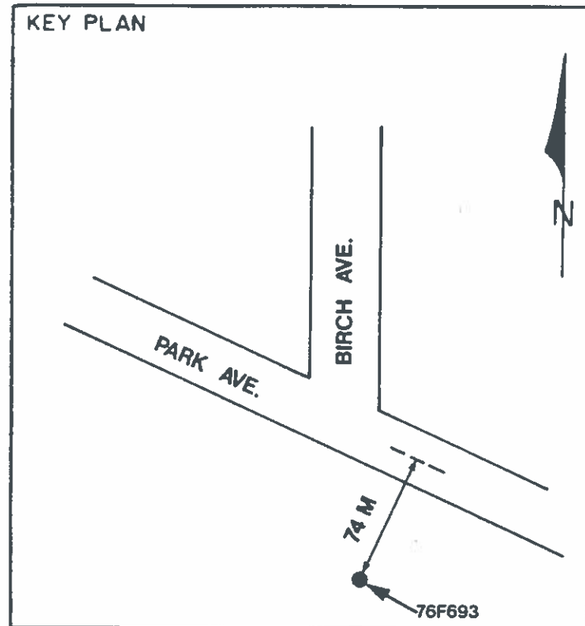
Canadian Legion Branch No. 36, Mount Pearl, a one-storey building along south of Park Avenue west of Worrall Crescent, tablet in north concrete foundation, 30 cm from northeast corner, 35 cm below wooden siding. Used to establish vertical control Mount Pearl Flood Study Reach.

Elevation - 99.805 m

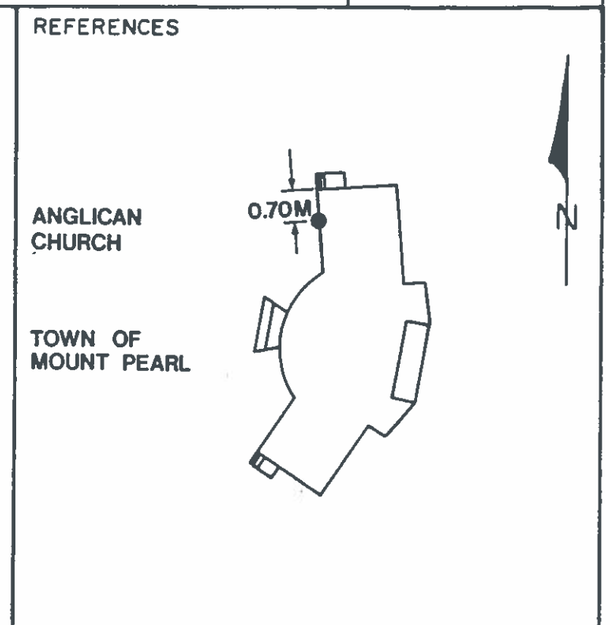
VERTICAL CONTROL SURVEY

76F693

KEY PLAN



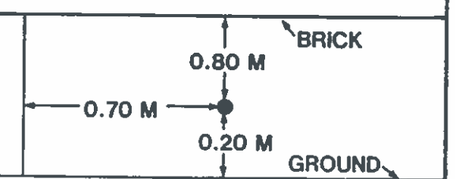
REFERENCES



VICINITY : ANGLICAN CHURCH, PARK AVENUE MOUNT PEARL

INSPECTION DATES :

VERTICAL :



INSTALLATION DATE : JANUARY 1977

TYPE : Brass tablet in side

CONTRACTOR : Geodetic Survey of Canada

CONTRACT NO.

DESCRIPTION :

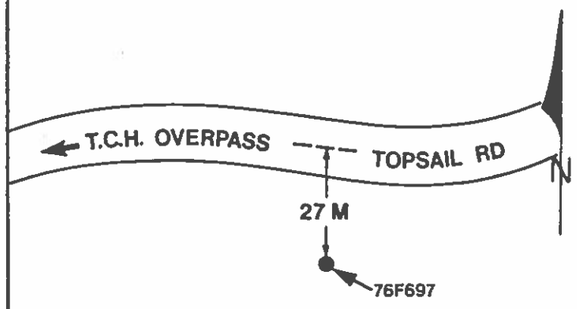
Anglican Church, along south side of Park Avenue at Birch Avenue, tablet in west concrete foundation, 70 cm from northwest corner, 80 cm below brick siding. Used to establish vertical control Mount Pearl Flood Study Reach.

Elevation - 115.436 m

VERTICAL CONTROL SURVEY

76F697

KEY PLAN



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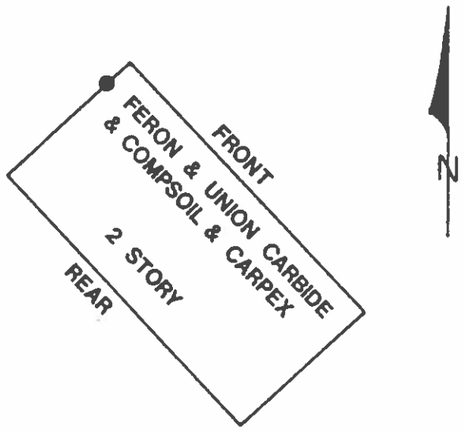
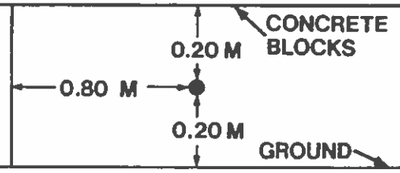


VICINITY : **FERON BLDG., TOPSAIL ROAD**

INSPECTION DATES :

VERTICAL :



INSTALLATION DATE : **JANUARY 1977**

TYPE : Brass tablet in side

CONTRACTOR : Geodetic Survey of Canada

CONTRACT NO.

DESCRIPTION :

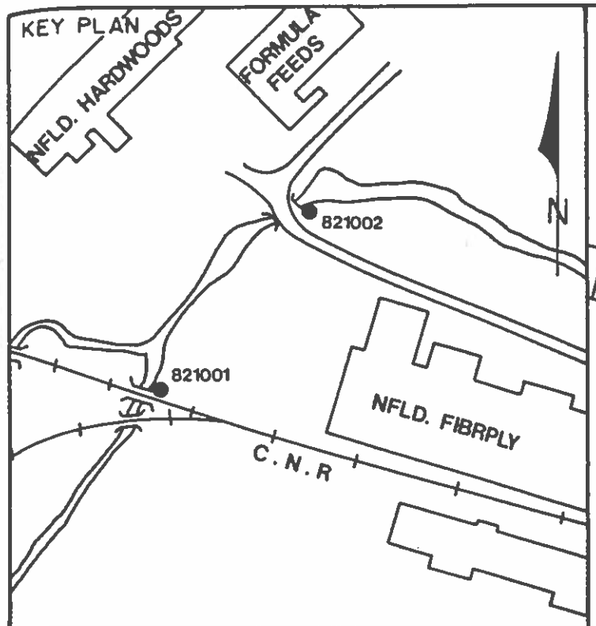
Feron Building, a two-storey Industrial building along southwest side of Topsail Road, 1.0 km southeast of Kenmount Road underpass, tablet in northwest concrete foundation, 80 cm from north or front corner, 20 cm below concrete block siding. Used to establish Dorovans Flood Study Reach vertical control.

Elevation - 144.654 m

VERTICAL CONTROL SURVEY

821001

KEY PLAN



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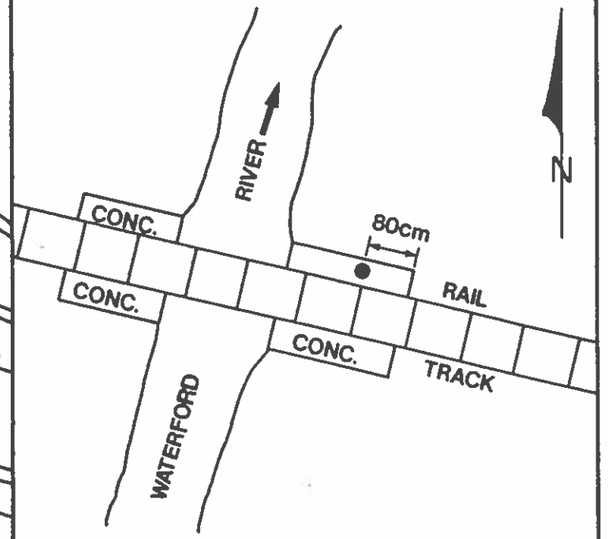


VICINITY : **NFLD. HARDWOODS ON RAILWAY BRIDGE**

INSPECTION DATES :

VERTICAL :

INSTALLATION DATE : **MAY 26/81**

TYPE : Brass tablet set horizontally

CONTRACTOR Water Resources Division Newfoundland Dept. of the Environment

CONTRACT NO.

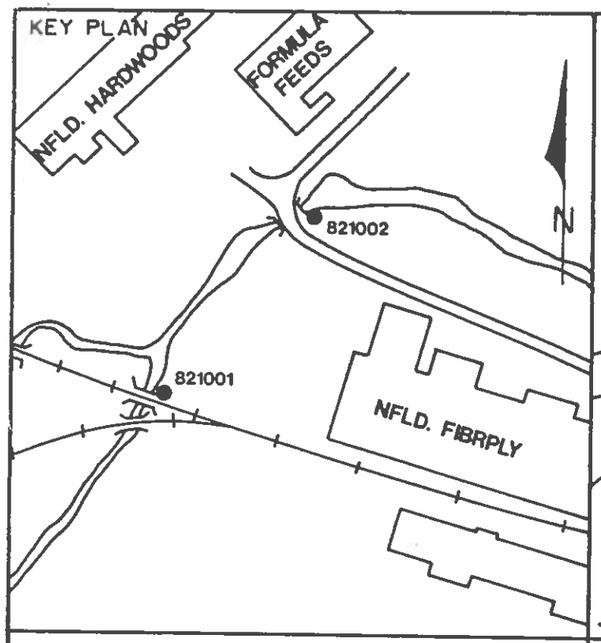
DESCRIPTION :

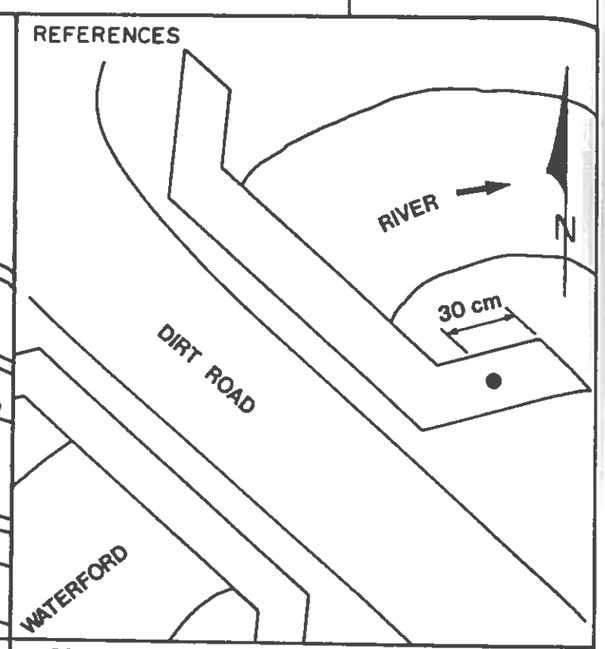
The bench mark is set horizontally on the downstream side of the railway bridge, on the right bank of the Waterford River. Used for Section 3017.0

Elevation - 136.702 m

VERTICAL CONTROL SURVEY

821002





VICINITY : **NFLD. HARDWOODS BRIDGE**

VERTICAL :

INSPECTION DATES :

INSTALLATION DATE : **MAY 26/81**

TYPE : Brass tablet set horizontally

CONTRACTOR Water Resources Division
Newfoundland Dept. of the Environment

CONTRACT NO.

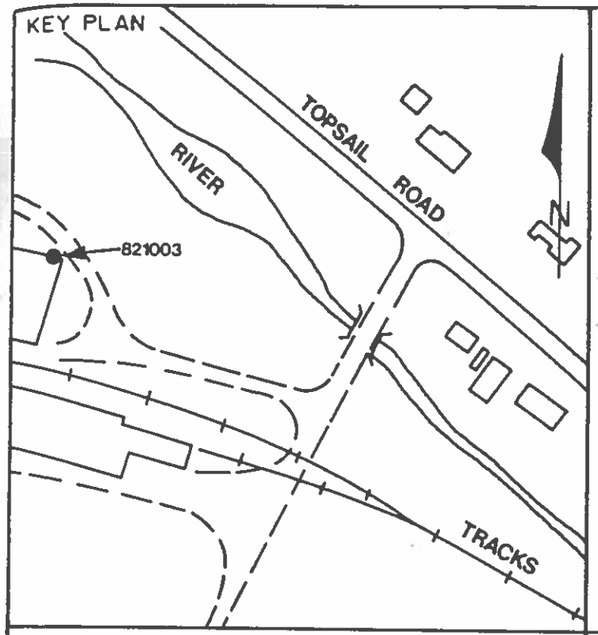
DESCRIPTION :

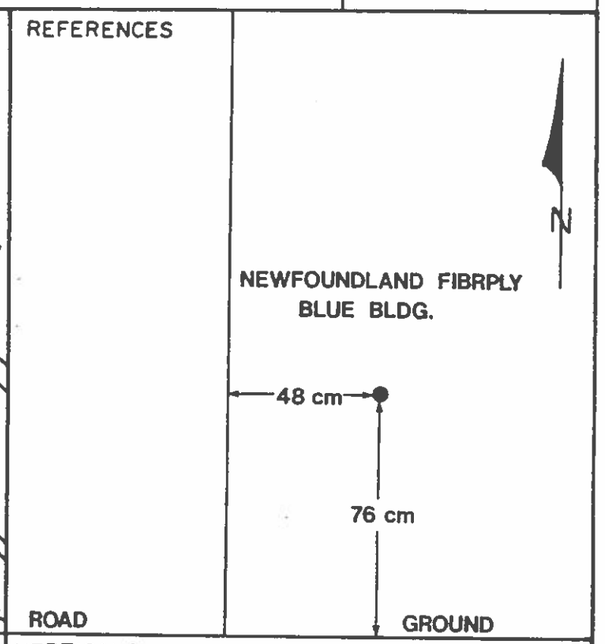
The bench mark is set horizontally on the downstream side of the Newfoundland Hardwoods Bridge, on the right bank of the Waterford River. Used for Sections 3012.0 through 3016.0.

Elevation - 136.429 m

VERTICAL CONTROL SURVEY

821003





VICINITY : **NFLD. FIBRPLY BUILDING**

VERTICAL :

INSPECTION DATES :

INSTALLATION DATE : **MAY 26/81**

TYPE : Brass tablet set vertically

CONTRACTOR Water Resources Division
Newfoundland Dept. of the Environment

CONTRACT NO.

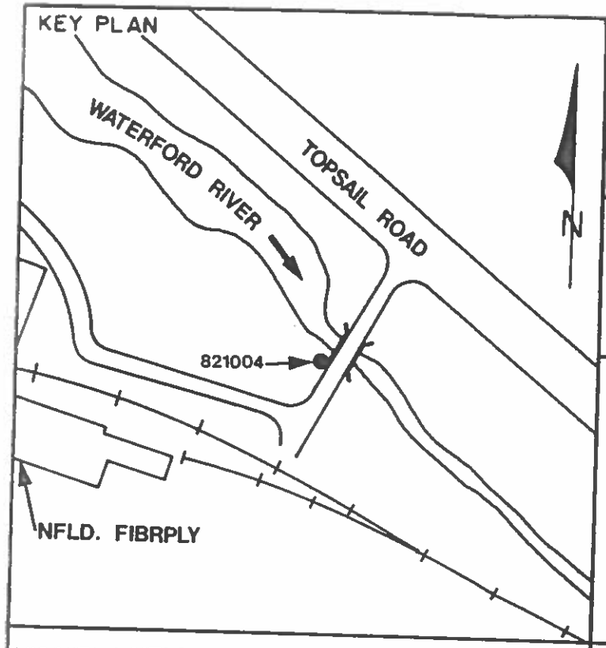
DESCRIPTION :

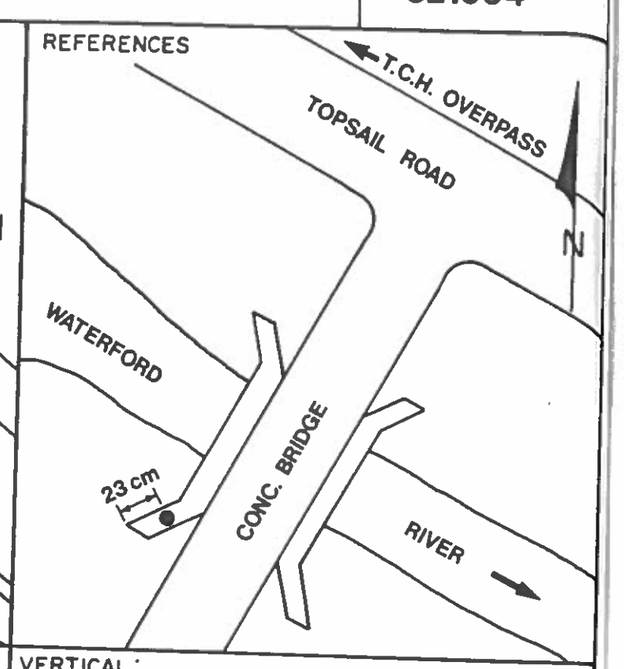
The bench mark is set vertically in the northeast corner of the Newfoundland Fibrply Building. Used for Sections 3010.0 and 3011.0.

Elevation - 135.425 m

VERTICAL CONTROL SURVEY

821004





VICINITY : **NFLD. FIBRPLY BRIDGE**

VERTICAL :

INSPECTION DATES :

INSTALLATION DATE : **MAY 26/81**

TYPE : Brass tablet set horizontally

CONTRACTOR Water Resources Division
Newfoundland Dept. of the Environment

CONTRACT NO.

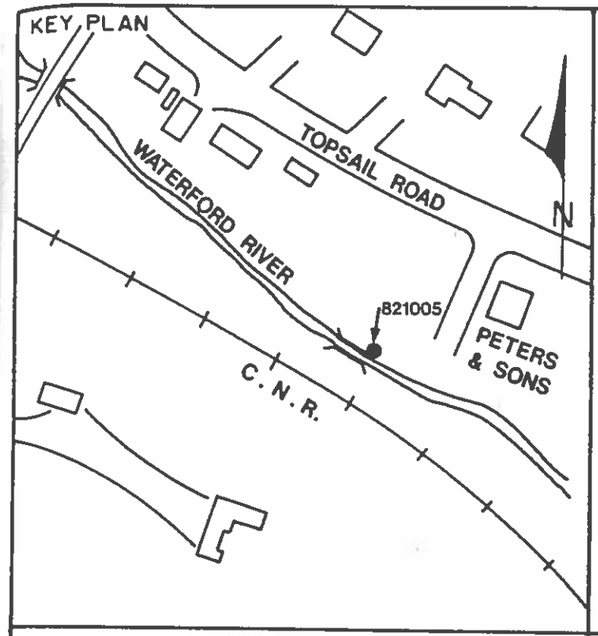
DESCRIPTION :

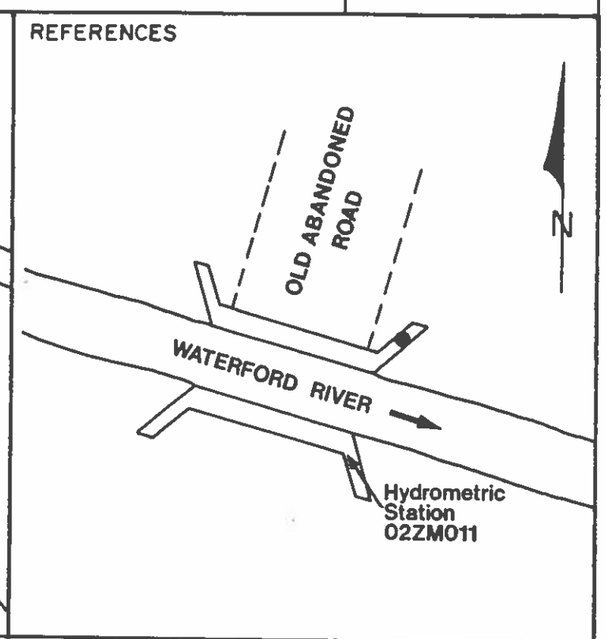
The Bench mark is set horizontally on the upstream side of the Newfoundland Fibrply bridge on the right bank of the Waterford River. Used for Sections 3004.0 through 3009.0.

Elevation - 136.644 m

VERTICAL CONTROL SURVEY

821005





VICINITY : **NEAR HYDROMETRIC STATION No. 02ZM011 , DONOVANS**

VERTICAL :

INSPECTION DATES :

INSTALLATION DATE : **MAY 26/81**

TYPE : Brass tablet set horizontally

CONTRACTOR Water Resources Division
Newfoundland Dept. of the Environment

CONTRACT NO.

DESCRIPTION :

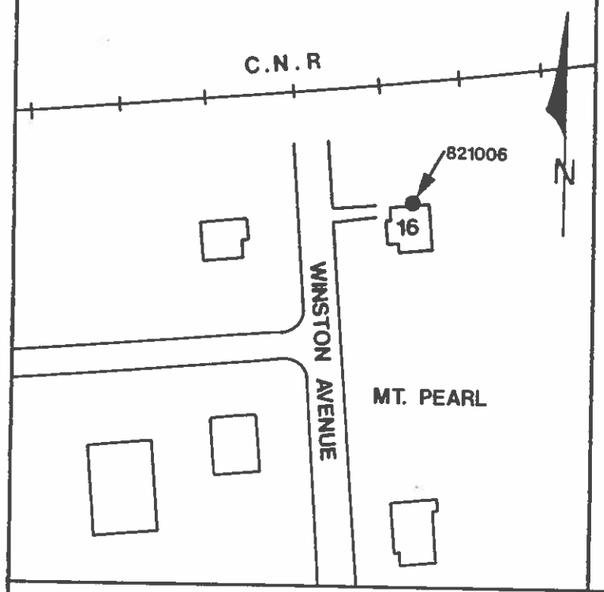
The bench mark is set horizontally on the left bank of the Waterford River, opposite the hydrometric station 02ZM011. Used for Sections 3001.0 through 3003.0.

Elevation - 135.100

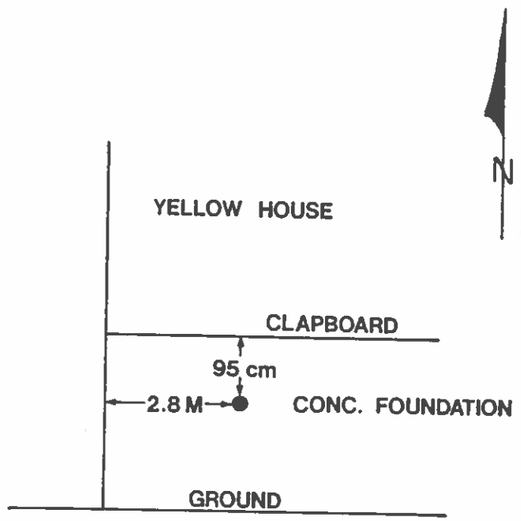
VERTICAL CONTROL SURVEY

821006

KEY PLAN



REFERENCES



VICINITY : **16 WINSTON AVE., MOUNT PEARL**

VERTICAL :

INSPECTION DATES :

INSTALLATION DATE : **JUNE 19/81**

TYPE : Brass tablet set vertically

CONTRACTOR : Water Resources Division, Newfoundland Dept. of the Environment

CONTRACT NO.

DESCRIPTION :

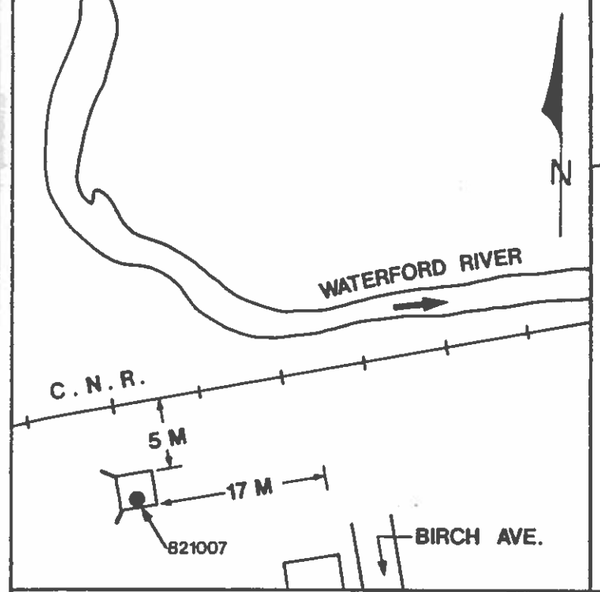
The bench mark is set vertically in the concrete foundation of 16 Winston Avenue, on the north side of the building. Used for Sections 2011.0 through 2013.0.

Elevation - 104.889 m

VERTICAL CONTROL SURVEY

821007

KEY PLAN



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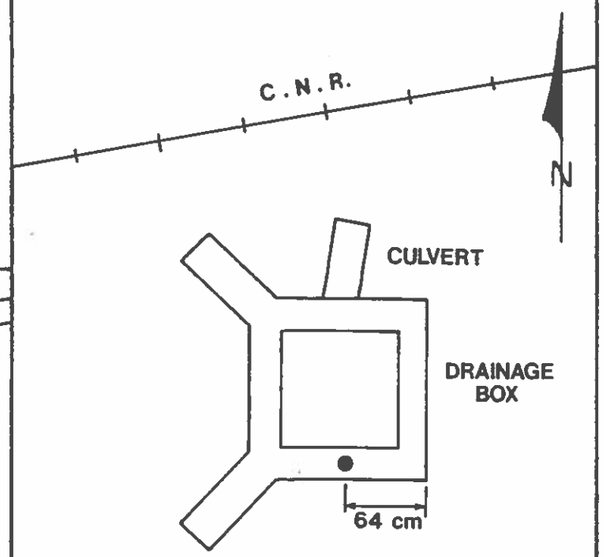


VICINITY : **BIRCH AVE., MOUNT PEARL**

VERTICAL :

INSPECTION DATES :

INSTALLATION DATE : **MAY 26/81**

TYPE : Brass tablet set horizontally

CONTRACTOR : Water Resources Division, Newfoundland Dept. of the Environment

CONTRACT NO.

DESCRIPTION :

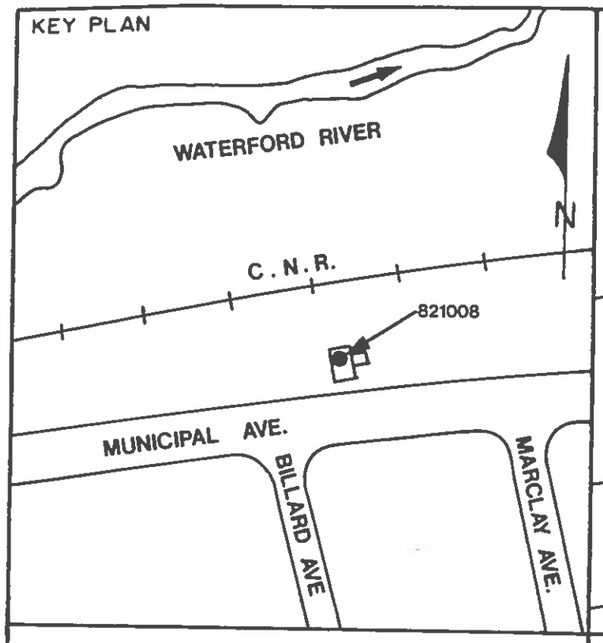
The bench mark is set horizontally in the southeast edge of a concrete drainage box, northwest of Birch Avenue, Mount Pearl. Used for Sections 2009.0 and 2010.0.

Elevation - 103.844 m

VERTICAL CONTROL SURVEY

821008

KEY PLAN



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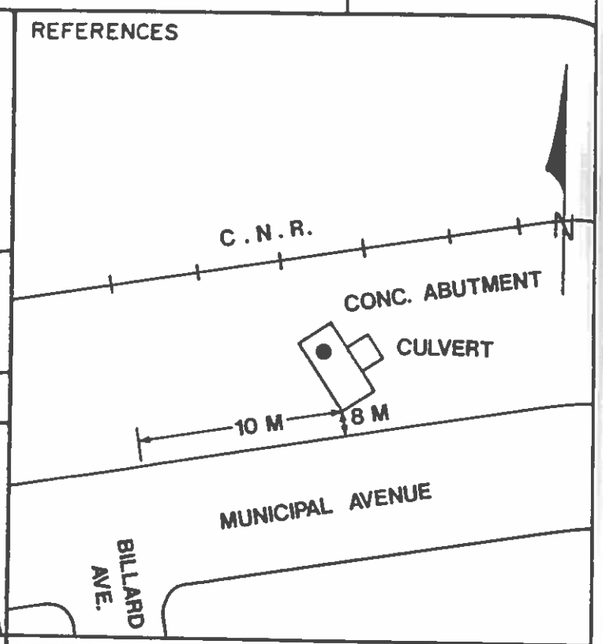


VICINITY : MUNICIPAL AVE. MOUNT PEARL

VERTICAL :

INSPECTION DATES :

INSTALLATION DATE : MAY 26/81

TYPE : Brass tablet set horizontally

CONTRACTOR Water Resources Division
Newfoundland Dept. of the Environment

CONTRACT NO.

DESCRIPTION :

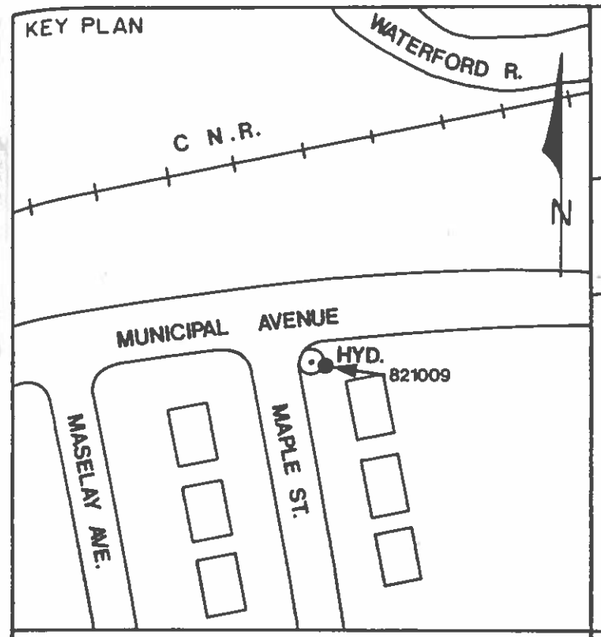
The bench mark is set horizontally in the top of a concrete culvert headwall located northeast of the intersection of Municipal and Billard Avenues. Used for Section 2006.0.

Elevation - 103.374 m

VERTICAL CONTROL SURVEY

821009

KEY PLAN



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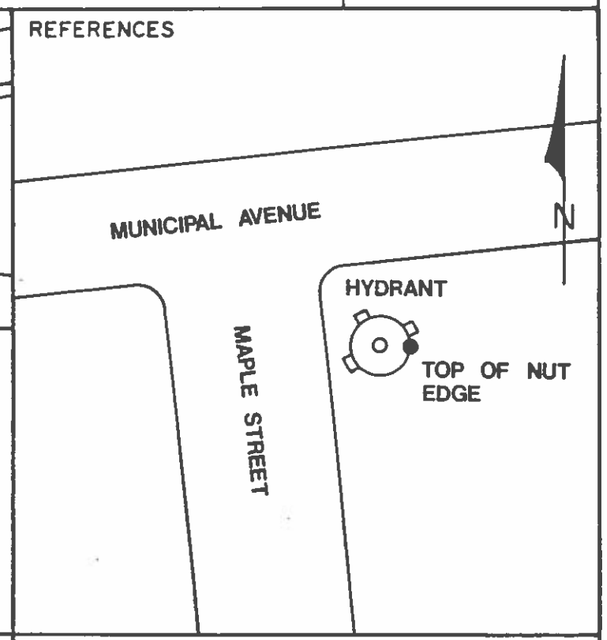


VICINITY : MAPLE ST., MOUNT PEARL

VERTICAL :

INSPECTION DATES :

INSTALLATION DATE : MAY 26/81

TYPE : Fire Hydrant

CONTRACTOR Water Resources Division
Newfoundland Dept. of the Environment

CONTRACT NO.

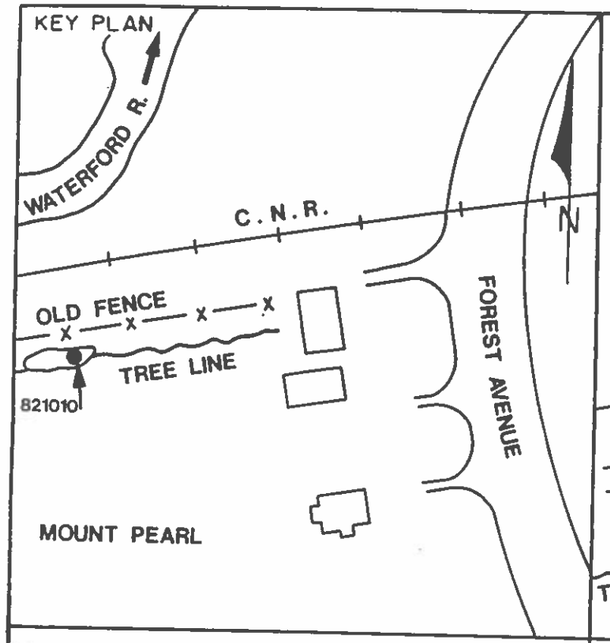
DESCRIPTION :

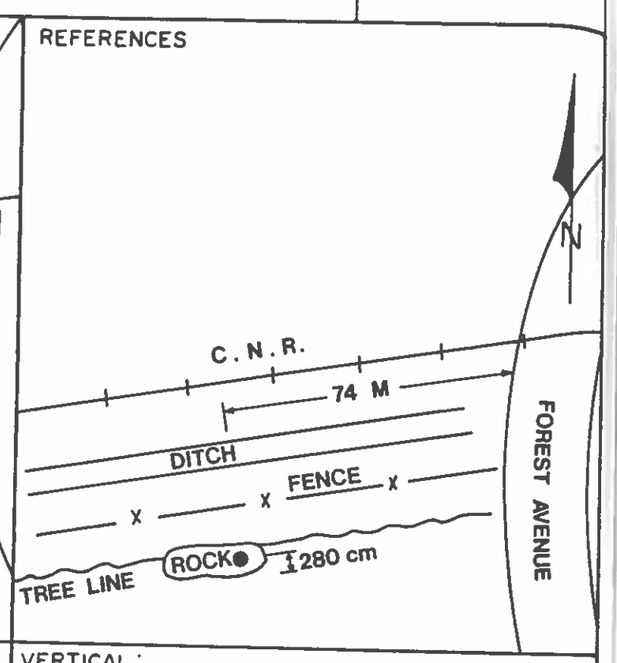
The bench mark is a nut located on the top of a fire hydrant located at the corner of Municipal Avenue and Maple Street. Used for Sections 2004.0 and 2005.0.

Elevation - 105.808 m

VERTICAL CONTROL SURVEY

821010





VICINITY : FOREST AVE., MOUNT PEARL

VERTICAL :

INSPECTION DATES :

INSTALLATION DATE : MAY 26/81

TYPE : Brass tablet set horizontally

CONTRACTOR Water Resources Division
Newfoundland Dept. of the Environment

CONTRACT NO.

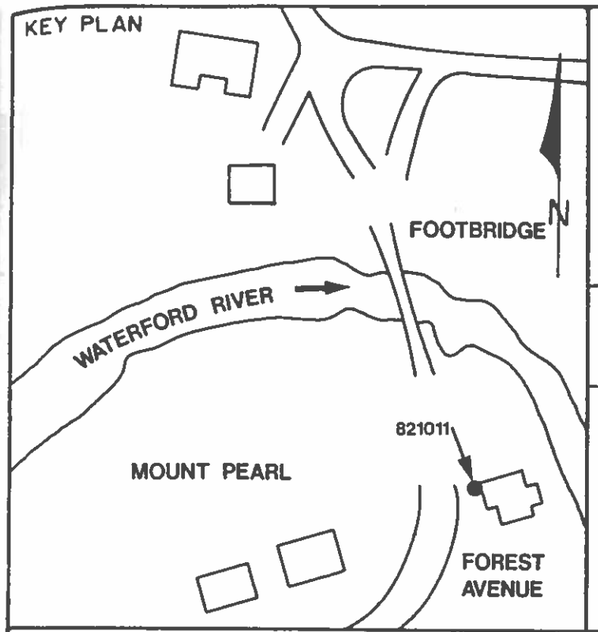
DESCRIPTION :

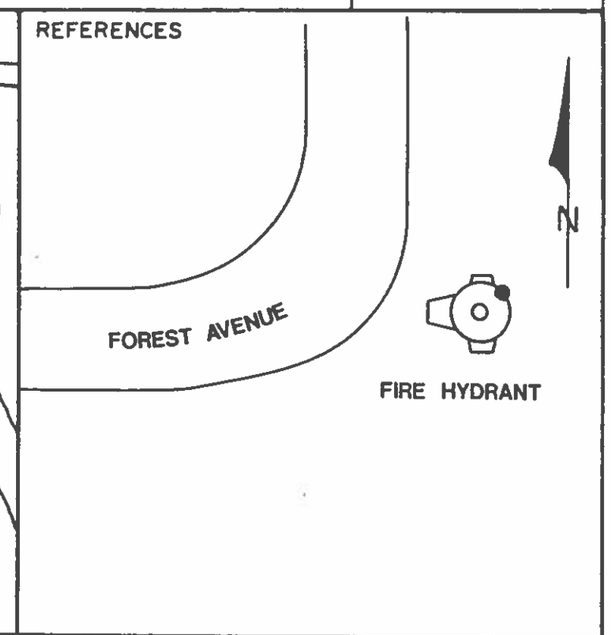
The bench mark is set horizontally in a large bedrock outcrop located southwest of Forest Avenue and north of the railway line. Used for Section 2003.0.

Elevation - 103.594 m

VERTICAL CONTROL SURVEY

821011





VICINITY : FOREST AVENUE, MOUNT PEARL

VERTICAL :

INSPECTION DATES :

INSTALLATION DATE : MAY 1981

TYPE : Fire Hydrant

CONTRACTOR Water Resources Division
Newfoundland Dept. of the Environment

CONTRACT NO.

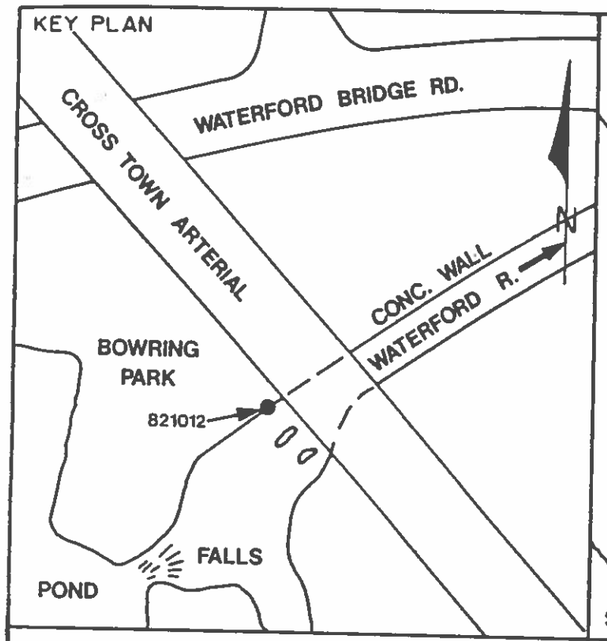
DESCRIPTION :

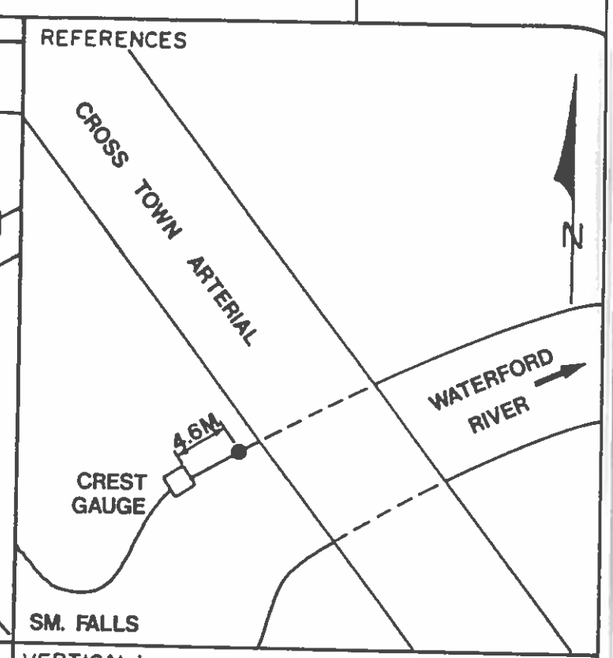
The bench mark is on the base of a fire hydrant on Forest Avenue, 35 m southeast of the footbridge over the Waterford River. Used for Sections 2001.0 through 2002.5.

Elevation - 103.748 m

VERTICAL CONTROL SURVEY

821012





VICINITY : **BOWRING PARK**

INSPECTION DATES :

VERTICAL :

CONC. RETAINING WALL

RIVER

INSTALLATION DATE : **MAY 26/84**

TYPE : Brass tablet set horizontally

CONTRACTOR Water Resources Division
Newfoundland Dept. of the Environment

CONTRACT NO.

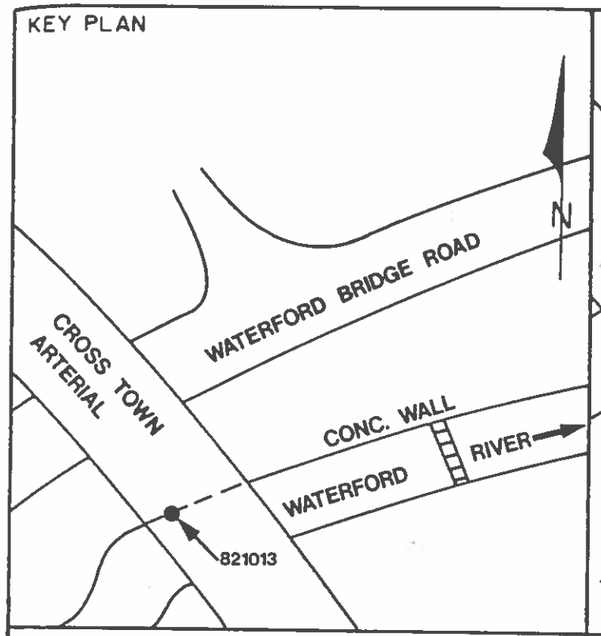
DESCRIPTION :

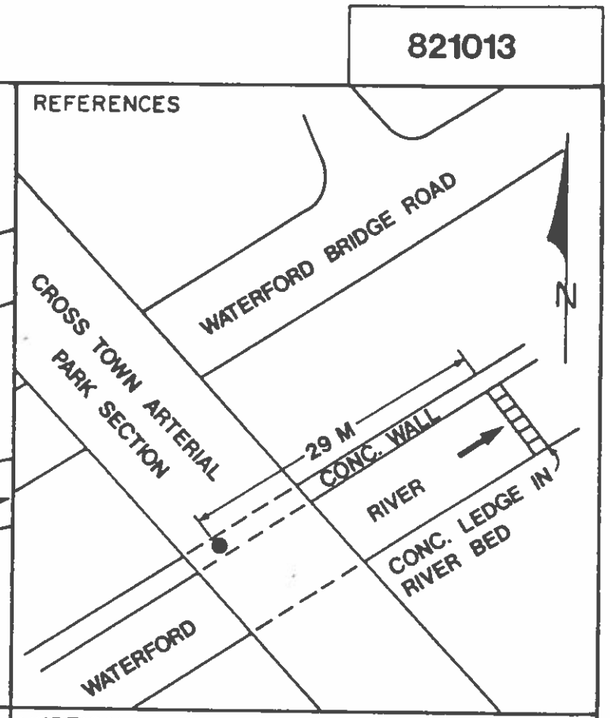
The bench mark is set horizontally in the top of the concrete retaining wall, on the left bank of the Waterford River, 4.6 m downstream from the crest gauge. Used for Section 1008.0.

Elevation - 34.879 m

VERTICAL CONTROL SURVEY

821013





VICINITY : **BOWRING PARK**

INSPECTION DATES :

VERTICAL :

INSTALLATION DATE : **MAY 26/81**

TYPE : Brass tablet set horizontally

CONTRACTOR Water Resources Division
Newfoundland Dept. of the Environment

CONTRACT NO.

DESCRIPTION :

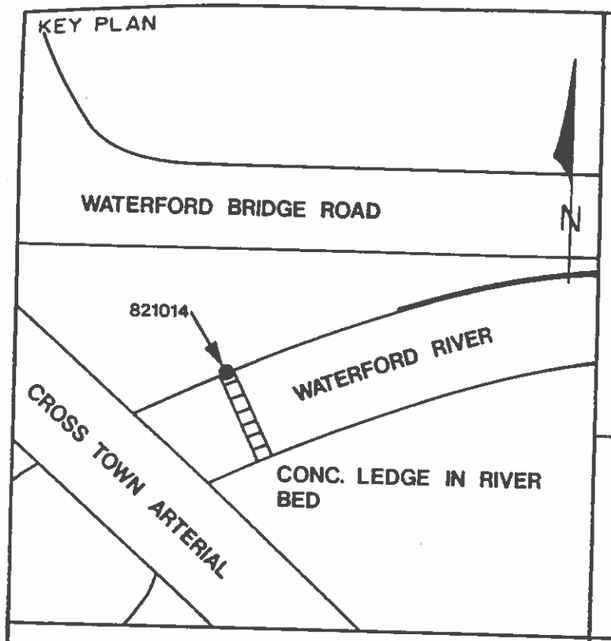
The bench mark is set horizontally in the top of a concrete retaining wall, on the left bank of the Waterford River, 29 m upstream from a concrete ledge in the stream bed. Used for Section 1007.0.

Elevation - 33.964 m

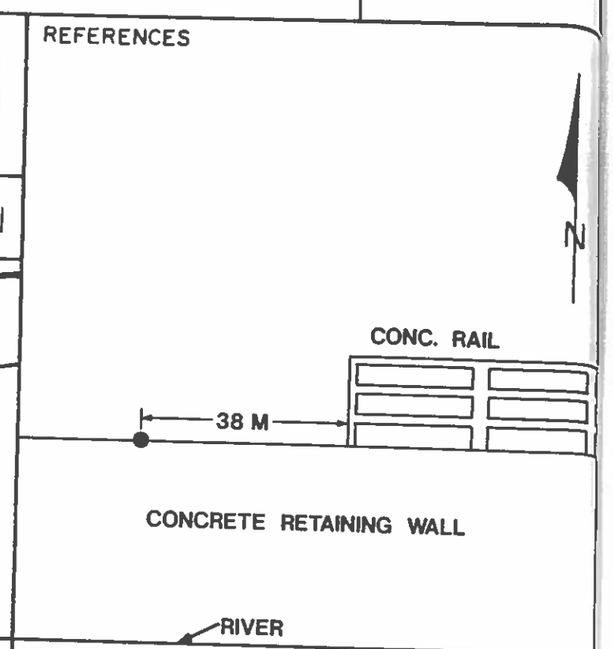
VERTICAL CONTROL SURVEY

821014

KEY PLAN



REFERENCES



VICINITY : CROSS TOWN ARTERIAL (PARK)

VERTICAL :

INSPECTION DATES :

INSTALLATION DATE : **MAY 26/81**

TYPE : Brass tablet set horizontally

CONTRACTOR : Water Resources Division
Newfoundland Dept. of the Environment

CONTRACT NO.

DESCRIPTION :

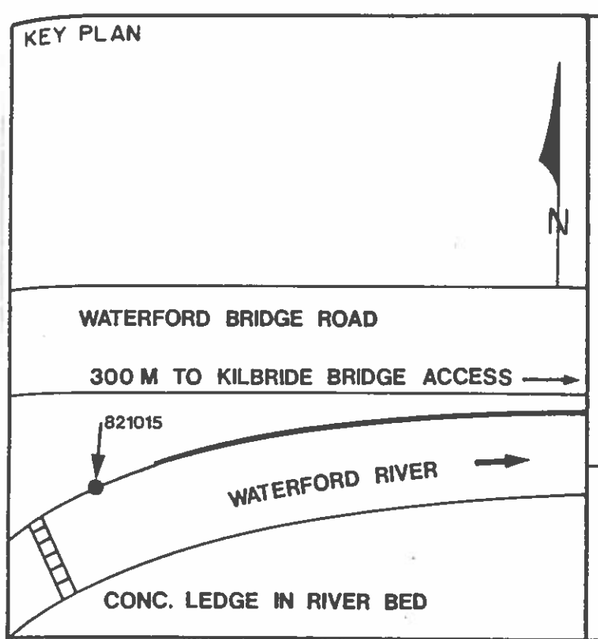
The bench mark is set horizontally in the top of a concrete retaining wall, on the left bank of the Waterford River, 38 m upstream of the concrete rail. Used for Section 1006.3 through 1006.8.

Elevation - 33.777 m

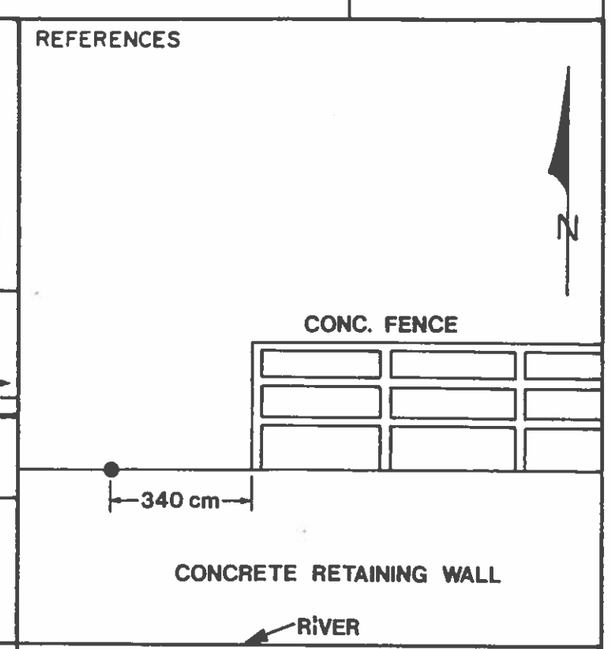
VERTICAL CONTROL SURVEY

821015

KEY PLAN



REFERENCES



VICINITY : CORPUS CHRISTIE CHURCH

VERTICAL :

INSPECTION DATES :

INSTALLATION DATE : **MAY 26/81**

TYPE : Brass tablet set horizontally

CONTRACTOR : Water Resources Division
Newfoundland Dept. of the Environment

CONTRACT NO.

DESCRIPTION :

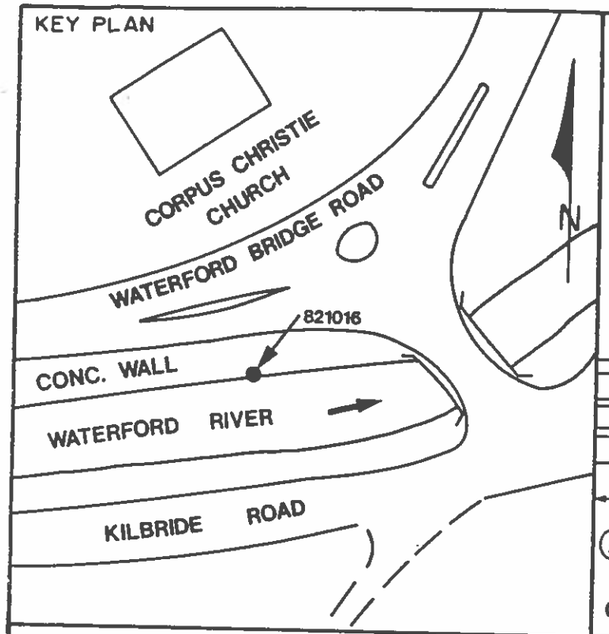
The bench mark is set horizontally on the top of the concrete retaining wall on the left bank of the Waterford River 340 cm from the western end of the concrete rail. Used for Sections 1005.9 and 1006.0.

Elevation - 33.519 m

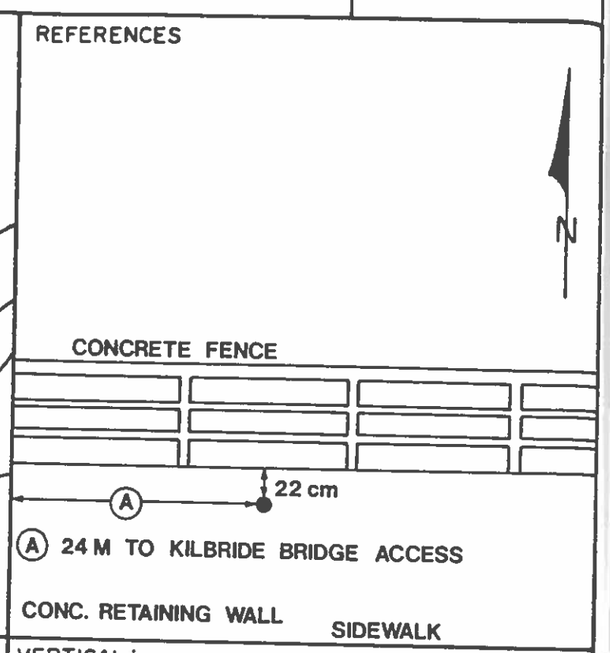
VERTICAL CONTROL SURVEY

821016

KEY PLAN



REFERENCES



VICINITY : CORPUS CHRISTIE CHURCH

INSPECTION DATES :

VERTICAL :

INSTALLATION DATE : JUNE 19/81

TYPE : Brass tablet set vertically

CONTRACTOR Water Resources Division
Newfoundland Dept. of the Environment

CONTRACT NO.

DESCRIPTION :

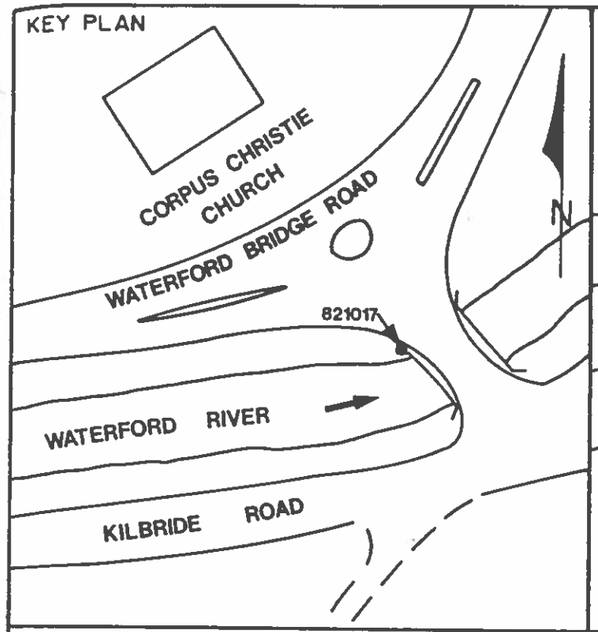
The bench mark is located 24 m from the upstream side of the bridge, on the left bank of the waterford River and is set vertically in a concrete rail next to the sidewalk. Used for Sections 1005.0 through 1005.8

Elevation - 33.579 m

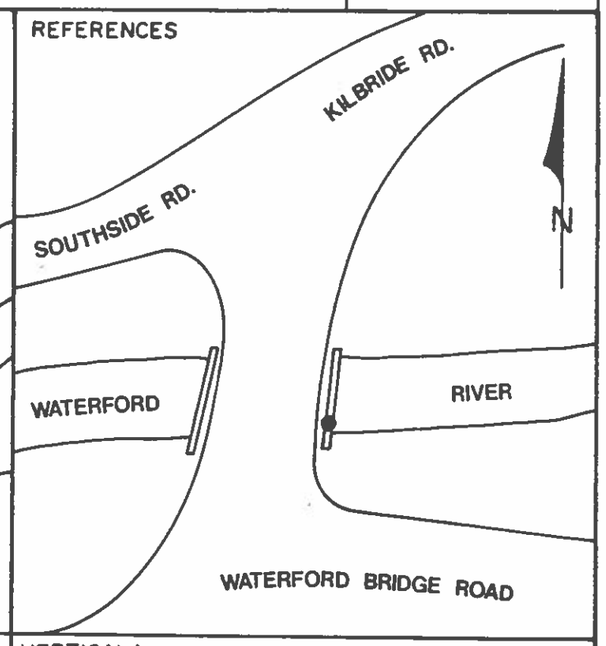
VERTICAL CONTROL SURVEY

821017

KEY PLAN



REFERENCES



VICINITY : CORPUS CHRISTIE CHURCH

INSPECTION DATES :

VERTICAL :

INSTALLATION DATE : JUNE 19/81

TYPE : Brass tablet set horizontally

CONTRACTOR Water Resources Division
Newfoundland Dept. of the Environment

CONTRACT NO.

DESCRIPTION :

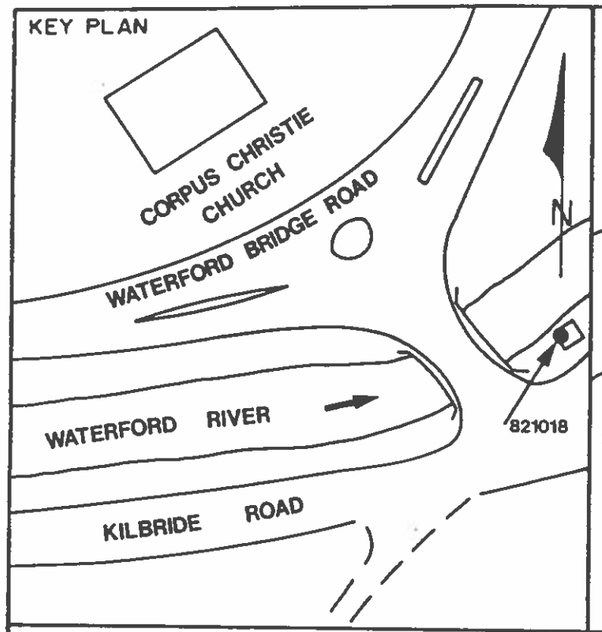
The bench mark is set horizontally in a post which forms the end of the bridge rail, on the upstream side of the bridge on the left bank of the Waterford River. Used for Sections 1002.0 through 1004.0.

Elevation - 35.673 m

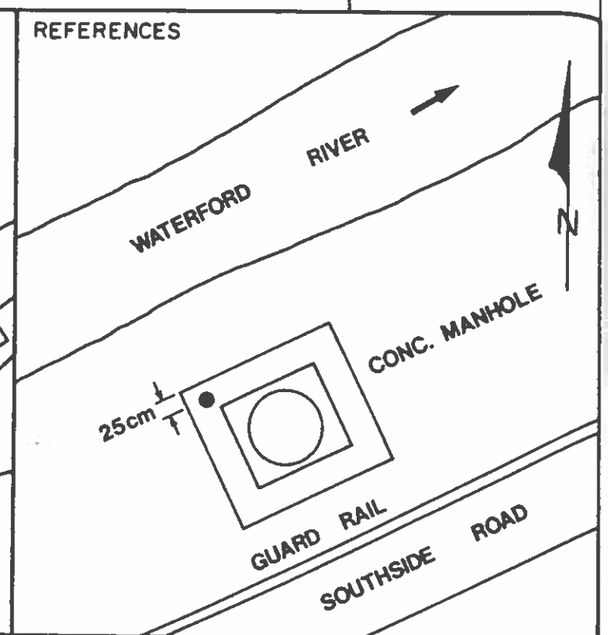
VERTICAL CONTROL SURVEY

821018

KEY PLAN



REFERENCES



VICINITY: CORPUS CHRISTIE CHURCH

INSPECTION DATES:

VERTICAL:

RIVER

ROAD BANK

INSTALLATION DATE: MAY 26/81

TYPE: Brass tablet set horizontally

CONTRACTOR: Water Resources Division, Newfoundland Dept. of the Environment

CONTRACT NO.

DESCRIPTION:

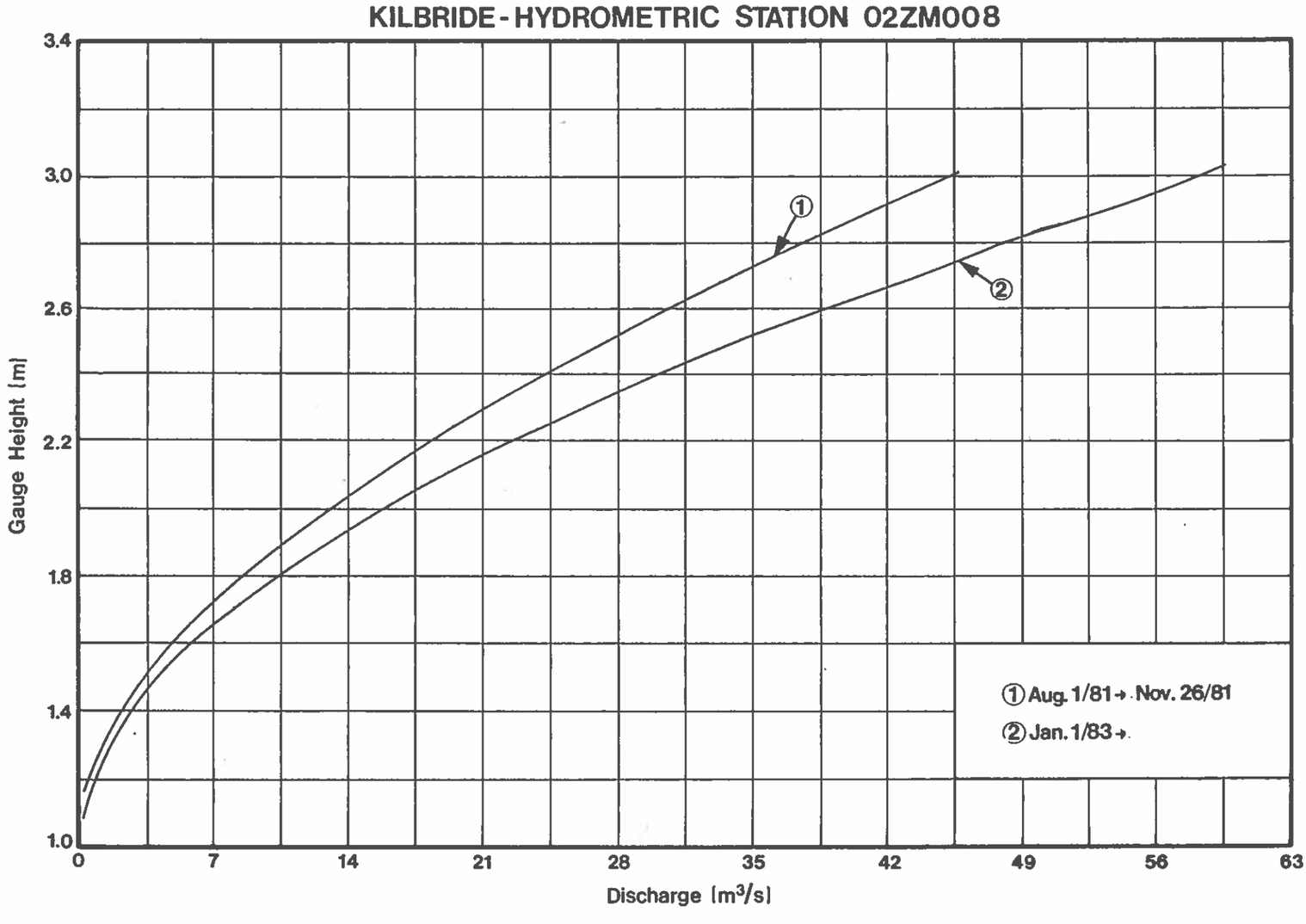
The bench mark is located 18 m from the downstream side of the bridge on the right bank of the Waterford River and is set horizontally in a manhole structure. Used for sections 1001.0 through 1001.5.

Elevation - 31.825 m

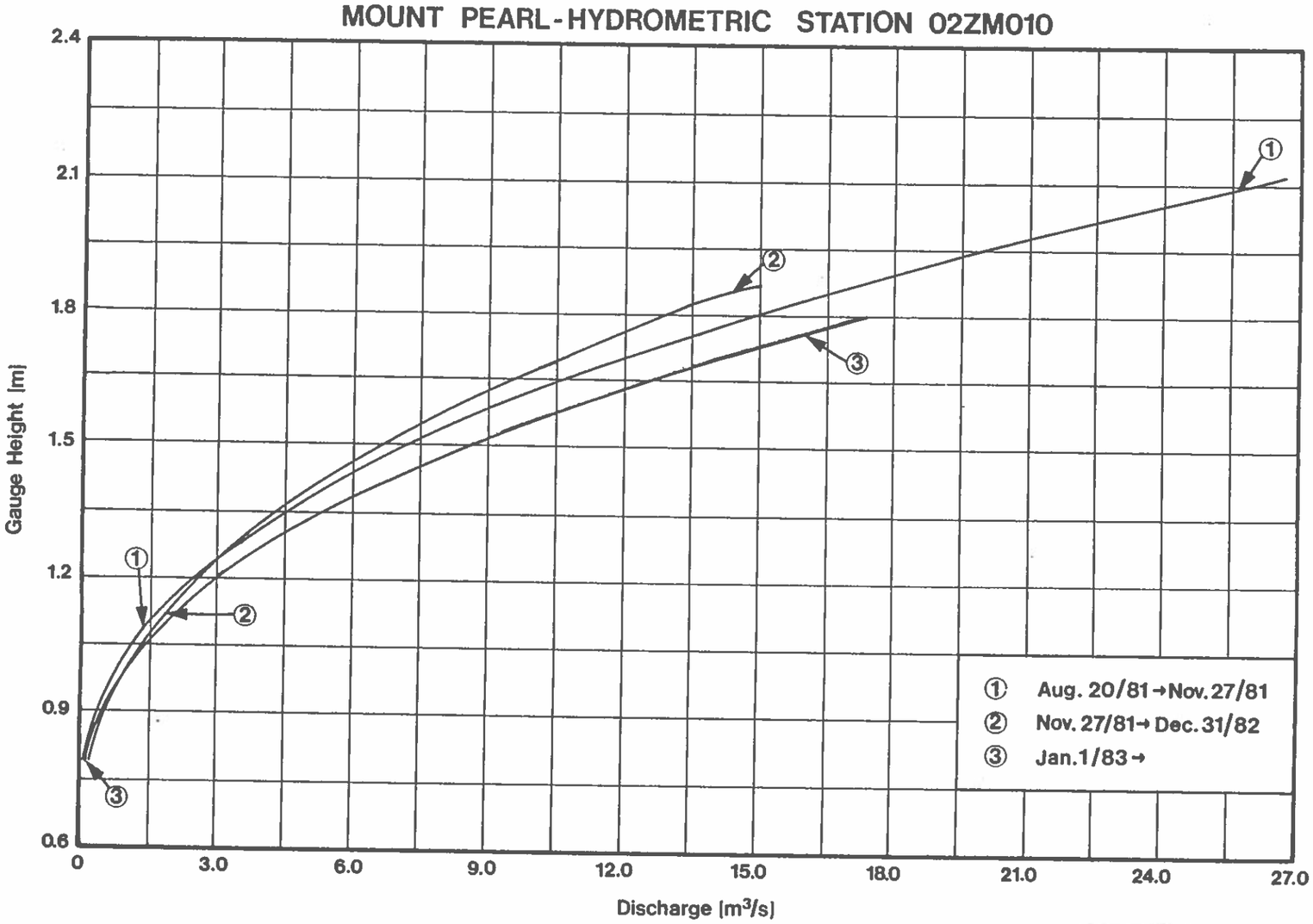
APPENDIX D

RATING CURVES FOR THE KILBRIDE, MOUNT PEARL AND DONOVANS HYDROMETRIC STATIONS

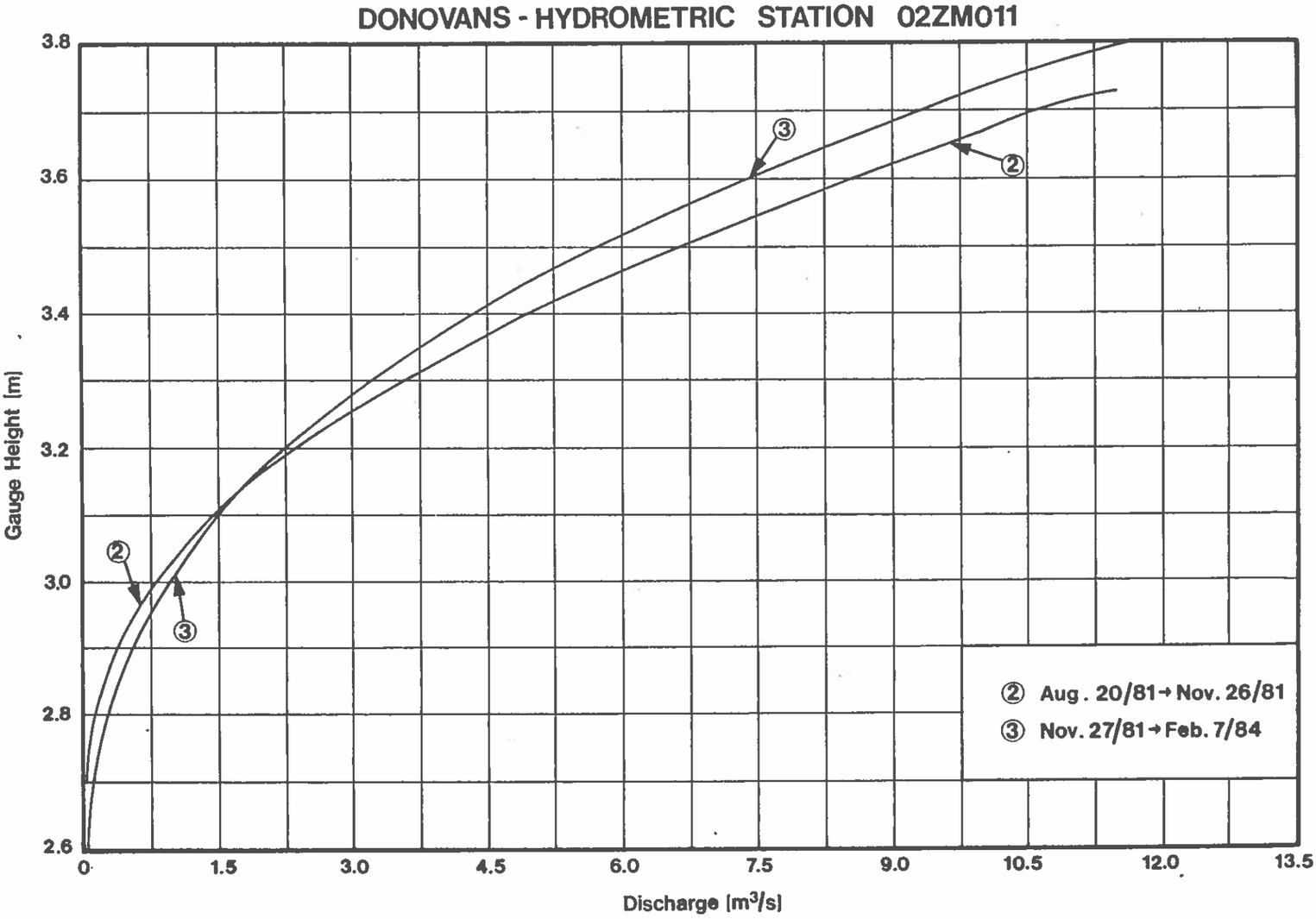
RATING CURVE FOR WATERFORD RIVER AT KILBRIDE - HYDROMETRIC STATION 02ZM008



RATING CURVE FOR WATERFORD RIVER AT MOUNT PEARL - HYDROMETRIC STATION 02ZM010



RATING CURVE FOR WATERFORD RIVER AT DONOVANS - HYDROMETRIC STATION 02ZM011



APPENDIX E

VALUES FOR THE COMPUTATION OF THE ROUGHNESS COEFFICIENT

VALUES FOR THE COMPUTATION OF THE ROUGHNESS COEFFICIENT*

Channel Conditions		Values	
Material involved	Earth	n_0	0.020
	Rock cut		0.025
	Fine gravel		0.024
	Coarse gravel		0.028
Degree of irregularity	Smooth	n_1	0.000
	Minor		0.005
	Moderate		0.010
	Severe		0.020
Variations of channel cross section	Gradual	n_2	0.000
	Alternating occasionally		0.005
	Alternating frequently		0.010–0.015
Relative effect of obstructions	Negligible	n_3	0.000
	Minor		0.010–0.015
	Appreciable		0.020–0.030
	Severe		0.040–0.060
Vegetation	Low	n_4	0.005–0.010
	Medium		0.010–0.025
	High		0.025–0.050
	Very high		0.050–0.100
Degree of meandering	Minor	n_5	1.000
	Appreciable		1.150
	Severe		1.300

*Source: Reference (1)

APPENDIX F

HEC-2 COMPUTER MODEL SET-UP FOR THE KILBRIDE, MOUNT PEARL AND DONOVANS REACHES

KILBRIDE REACH

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  HEC2 RELEASE DATED NOV 76 UPDATED MARC 1982
  ERROR CORR -  01,02,03,04,05
  MODIFICATION -  50,51,52,53,54,55
**************************************************

C
T1      URBAN HYDROLOGY STUDY OF THE WATERFORD RIVER, ST.JOHN'S NFLD.
T2      BACKWATER PROFILES FOR FLOOD HAZARD AREAS
T3      WATERFORD R. AT KILBRID
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J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	0.	0.	0.	.000000	1.00	.4	101.	33.830	.000
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1.000	.000	-1.000	.750	.000	.000	-.300	.000	.000	.000

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

150.000	.000	38.000	9.000	1.000	52.000	16.000	17.000	18.000	19.000
33.000	8.000	.000	.000	.000	.000	.000	.000	.000	.000

NC	.030	.030	.015	.300	.500	.000	.000	.000	.000	.000
	WSC GAUGE 02ZM008 "WATERFORD RIVER AT KILBRIDE"									
X1	1001.000	15.000	148.890	163.460	.000	.000	.000	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	36.000	.000	33.000	8.000	32.139	146.760	31.610	148.890	30.900	151.620
GR	30.628	155.860	30.325	158.660	30.165	159.300	30.230	160.430	30.856	162.260
GR	31.906	163.460	32.129	165.260	34.842	165.290	35.153	166.180	36.000	178.000
NC	.030	.030	.015	.300	.500	.000	.000	.000	.000	.000
X1	1001.500	26.000	134.040	147.140	6.000	6.000	6.000	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	36.000	.000	35.000	2.000	34.000	4.000	33.000	5.000	32.400	40.000
GR	31.910	125.182	31.900	127.620	31.885	130.058	31.931	132.140	31.379	134.040
GR	30.915	135.740	30.833	137.540	30.728	139.140	30.455	141.242	30.096	142.970
GR	30.011	143.470	30.463	145.500	30.889	145.830	31.339	147.140	31.652	147.432
GR	32.430	148.956	33.413	150.480	34.358	152.004	34.982	159.624	35.628	166.924
GR	36.067	174.231	.000	.000	.000	.000	.000	.000	.000	.000

SB	.000	1.600	2.600	.000	11.350	.000	39.730	.000	.000	.000
X1	1002.100	42.000	155.940	167.290	.300	.300	.300	.000	.000	.000
X2	.000	.000	1.000	34.388	34.010	.000	.000	.000	.000	.000
X3	10.000	.000	.000	155.940	34.010	.000	.000	.000	.000	.000
BT	14.000	155.940	34.010	33.615	156.220	34.050	33.634	157.440	34.150	33.717
BT	159.880	34.300	33.883	160.490	34.400	33.924	161.100	34.450	33.966	161.710
BT	34.500	34.007	162.620	34.550	34.070	163.540	34.650	34.131	165.060	34.700
BT	34.235	165.820	34.750	34.290	165.970	34.750	34.296	166.940	34.800	34.360
BT	167.290	34.860	34.388	.000	.000	.000	.000	.000	.000	.000
GR	36.000	.000	35.000	2.000	34.000	4.000	33.000	5.000	32.400	40.000
GR	33.000	48.000	32.500	65.000	33.000	80.000	32.800	90.000	33.000	96.000
GR	33.040	100.000	33.030	100.100	33.020	100.200	33.010	100.300	33.000	100.400
GR	32.836	125.000	32.796	126.372	32.697	126.524	32.707	129.572	32.851	133.077
GR	33.117	133.230	33.396	138.259	33.062	139.021	33.182	143.898	33.373	146.641
GR	34.010	155.940	33.615	155.940	30.821	156.220	31.165	157.440	30.850	159.880
GR	30.735	160.490	30.792	161.100	30.442	161.710	30.348	162.620	30.014	163.540
GR	29.497	165.060	29.717	165.820	30.877	165.970	30.886	166.940	34.388	167.290
GR	34.982	167.720	35.629	175.035	.000	.000	.000	.000	.000	.000
X1	1002.900	.000	.000	.000	10.000	10.000	10.000	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	155.940	34.010	.000	.000	.000	.000	.000
BT	14.000	155.940	34.010	33.615	156.220	34.050	33.634	157.440	34.150	33.717
BT	159.880	34.300	33.883	160.490	34.400	33.924	161.100	34.450	33.966	161.710
	34.500	34.007	162.620	34.550	34.070	163.540	34.650	34.131	165.060	34.700
BT	34.235	165.820	34.750	34.290	165.970	34.750	34.296	166.940	34.800	34.360
BT	167.290	34.860	34.388	.000	.000	.000	.000	.000	.000	.000
NC	.030	.030	.015	.100	.300	.000	.000	.000	.000	.000
	1 FT. UPSTREAM OF BRIDGE OPENING									
X1	1003.000	38.000	160.980	175.916	.300	.300	.300	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	160.980	34.490	.000	.000	.000	.000	.000
GR	36.000	12.000	35.000	15.000	34.000	17.000	33.000	19.000	32.400	50.000
GR	32.600	65.000	33.000	100.000	33.100	110.010	33.100	110.020	33.100	110.030
GR	33.000	110.040	32.836	130.040	32.796	131.412	32.697	131.564	32.707	134.612
GR	32.851	138.117	33.117	138.270	33.396	143.299	33.062	144.061	33.182	148.938
GR	33.373	151.681	34.010	160.880	34.495	160.980	31.124	160.990	31.065	161.058
GR	30.524	163.468	31.187	165.618	30.922	166.748	30.735	167.686	30.792	168.295
GR	30.529	168.318	30.337	169.278	29.833	170.458	29.409	172.258	29.587	172.968
GR	30.881	173.709	30.881	175.915	35.407	175.916	.000	.000	.000	.000
NC	.030	.030	.020	.100	.300	.000	.000	.000	.000	.000
X1	1004.000	37.000	160.340	185.334	4.000	15.000	11.000	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	148.340	34.290	.000	.000	.000	.000	.000
GR	36.000	12.000	35.000	15.000	32.000	19.000	32.400	50.000	32.600	65.000
GR	32.800	85.000	33.000	112.000	33.100	112.010	33.100	112.020	33.100	112.030
GR	33.000	112.040	32.782	132.040	32.691	132.140	33.030	144.340	33.519	156.520
GR	33.662	156.540	34.297	160.340	31.681	160.350	31.630	160.797	31.432	162.474
GR	31.277	165.522	31.052	166.131	31.124	167.960	31.008	168.570	30.752	170.703
GR	30.675	172.532	30.698	174.056	30.837	176.190	31.097	176.494	31.368	177.409
GR	31.812	178.933	32.678	181.371	33.194	182.895	34.292	185.334	34.464	188.991

GR	34.447	188.991	35.081	191.125	.000	.000	.000	.000	.000	.000
NC	.030	.030	.020	.100	.300	.000	.000	.000	.000	.000
X1	1005.000	40.000	160.300	180.417	36.200	36.200	36.200	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	138.300	34.548	.000	.000	.000	.000	.000
GR	36.000	12.000	35.000	15.000	32.000	19.000	32.400	50.000	32.600	65.000
GR	32.800	85.000	33.000	122.100	33.000	122.200	33.000	122.300	33.000	132.300
GR	32.883	143.550	32.759	143.600	32.881	149.550	33.146	149.600	33.161	152.050
GR	32.874	152.100	32.871	156.950	33.196	157.000	32.979	159.950	33.546	160.000
GR	34.548	160.300	32.167	160.300	32.072	160.757	31.548	163.958	31.310	167.310
GR	31.140	167.615	31.029	169.444	30.934	172.492	30.929	174.321	31.060	176.454
GR	31.288	177.069	31.599	177.978	32.126	180.417	32.341	183.790	32.477	188.037
GR	32.526	191.999	32.536	194.438	33.774	196.876	33.915	198.095	35.000	200.095
NC	.030	.030	.020	.100	.300	.000	.000	.000	.000	.000
X1	1005.700	24.000	100.000	110.700	74.500	77.000	75.000	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	100.000	34.539	.000	.000	.000	.000	.000
GR	35.300	30.700	35.200	30.800	35.100	30.900	35.000	31.000	34.000	54.000
GR	32.670	84.000	32.607	87.150	32.542	87.200	32.662	93.000	32.475	98.650
GR	32.640	98.700	32.686	99.800	34.539	100.000	31.443	100.500	31.673	103.200
GR	31.468	105.100	31.641	109.000	31.778	110.000	32.028	110.700	32.418	116.800
GR	32.695	127.500	33.000	131.250	34.000	138.500	35.000	147.250	.000	.000
NC	.035	.035	.030	.100	.300	.000	.000	.000	.000	.000
X1	1005.800	27.000	100.000	123.000	50.300	44.000	49.000	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	100.000	33.885	.000	.000	.000	.000	.000
GR	36.000	19.600	35.000	39.600	34.000	49.600	34.400	69.600	34.300	69.700
GR	34.200	69.800	34.100	69.900	34.000	70.000	33.150	85.550	33.013	85.600
GR	33.164	91.500	32.988	97.250	33.140	97.300	33.191	99.000	33.155	99.700
GR	33.885	100.000	31.588	100.500	31.583	102.000	31.878	105.000	31.898	110.600
GR	32.258	111.800	32.411	113.400	33.593	123.000	33.866	132.400	34.213	148.500
GR	34.978	150.000	36.000	160.000	.000	.000	.000	.000	.000	.000
NC	.035	.035	.030	.100	.300	.000	.000	.000	.000	.000
X1	1005.900	26.000	100.000	112.690	31.900	31.900	31.900	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	100.000	33.057	.000	.000	.000	.000	.000
GR	35.400	43.600	35.300	43.700	35.200	43.800	35.100	43.900	35.000	44.000
GR	33.656	93.300	33.617	97.000	33.427	100.000	31.527	100.000	31.595	102.850
GR	31.663	105.700	31.480	108.800	31.473	110.030	32.085	111.060	32.807	112.690
GR	32.901	115.545	33.074	118.288	33.349	121.336	33.686	124.384	33.828	127.432
GR	33.851	133.528	34.048	137.795	34.281	140.843	34.364	143.282	35.000	153.282
GR	36.000	160.782	.000	.000	.000	.000	.000	.000	.000	.000

END OF HIGHER PORTION OF CONCRETE RETAINING WALL
AND RAILING FROM BRIDGE

X1	1006.000	26.000	100.000	112.690	.100	.100	.100	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	35.400	43.600	35.300	43.700	35.200	43.800	35.100	43.900	35.000	44.000
GR	33.656	93.300	33.617	97.000	33.057	100.000	31.527	100.000	31.595	102.850

GR	31.663	105.700	31.480	108.800	31.473	110.030	32.085	111.060	32.807	112.690
GR	32.901	115.545	33.074	118.288	33.349	121.336	33.686	124.384	33.828	127.432
GR	33.851	133.528	34.048	137.795	34.281	140.843	34.364	143.282	35.000	153.282
GR	36.000	160.782	.000	.000	.000	.000	.000	.000	.000	.000
NC	.035	.050	.040	.100	.300	.000	.000	.000	.000	.000
X1	1006.100	18.000	100.000	112.000	19.000	15.000	17.000	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	36.000	23.000	35.000	48.000	34.500	60.000	34.700	03.000	33.516	100.000
GR	31.544	100.200	31.566	102.000	31.546	104.000	31.236	106.000	31.141	108.000
GR	31.201	110.000	31.561	111.000	32.629	12.000	33.546	114.200	34.691	120.000
112.000	33.546	114.200	34.691	120.000						
GR	35.000	140.000	35.500	147.000	36.000	155.000	.000	.000	.000	.000
NC	.030	.050	.040	.100	.300	.000	.000	.000	.000	.000
X1	1006.200	14.000	100.000	109.000	12.600	11.000	12.000	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	36.000	45.000	35.000	61.000	34.900	76.000	33.605	100.000	33.333	100.300
GR	30.883	101.000	31.523	105.000	31.283	107.000	31.398	109.000	31.993	109.500
GR	34.158	114.000	34.718	118.500	35.000	141.500	36.000	152.000	.000	.000
NC	.030	.050	.040	.100	.300	.000	.000	.000	.000	.000
X1	1006.300	16.000	100.000	109.449	12.500	12.500	12.500	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	36.000	36.000	35.300	50.000	35.200	73.000	33.777	100.000	31.438	100.000
GR	31.438	101.524	31.438	103.048	31.438	104.572	31.438	106.096	31.438	109.144
GR	32.378	109.449	33.948	112.497	34.393	117.069	34.631	121.336	35.045	126.213
GR	35.249	128.042	.000	.000	.000	.000	.000	.000	.000	.000
X1	1006.400	16.000	100.000	109.449	.100	.100	.100	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	36.000	36.000	35.300	50.000	35.200	73.000	33.777	100.000	31.438	100.000
GR	31.438	101.524	31.438	103.048	31.438	104.572	31.438	106.096	31.438	109.144
GR	32.378	109.449	33.948	112.497	34.393	117.069	34.631	121.336	35.045	126.213
GR	35.249	128.042	.000	.000	.000	.000	.000	.000	.000	.000
NC	.035	.050	.040	.100	.300	.000	.000	.000	.000	.000

SUBMERGED CONCRETE LEDGE (SEWER LINE)

X1	1006.500	16.000	100.000	109.449	.600	.600	.600	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	36.000	36.000	35.300	50.000	35.200	73.000	33.777	100.000	31.438	100.000
GR	31.438	101.524	31.438	103.048	31.438	104.572	31.438	106.096	31.438	109.144
GR	32.378	109.449	33.948	112.497	34.393	117.069	34.631	121.336	35.045	126.213
GR	35.249	128.042	.000	.000	.000	.000	.000	.000	.000	.000

NC	.060	.050	.040	.100	.300	.000	.000	.000	.000	.000
X1	1006.700	16.000	100.000	103.449	1.500	1.500	1.500	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	36.000	36.000	35.300	50.000	35.200	73.000	33.777	100.000	31.438	100.000
GR	31.438	101.524	31.438	103.048	31.438	104.572	31.438	106.096	31.438	109.144
GR	32.378	109.449	33.948	112.497	34.393	117.069	34.631	121.336	35.045	126.213
GR	35.249	128.042	.000	.000	.000	.000	.000	.000	.000	.000
X1	1006.800	16.000	100.000	103.449	.100	.100	.100	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	36.000	36.000	35.300	50.000	35.200	73.000	33.777	100.000	31.438	100.000
GR	31.438	101.524	31.438	103.048	31.438	104.572	31.438	106.096	31.438	109.144
GR	32.378	109.449	33.948	112.497	34.393	117.069	34.631	121.336	35.045	126.213
GR	35.249	128.042	.000	.000	.000	.000	.000	.000	.000	.000
NC	.045	.045	.040	.100	.300	.000	.000	.000	.000	.000
X1	1007.000	16.000	100.000	108.230	39.900	37.400	38.400	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	36.000	67.000	35.000	95.000	33.965	100.000	31.599	100.000	31.662	102.134
GR	31.678	103.962	31.796	106.096	31.982	107.925	32.360	108.230	33.568	111.278
GR	33.805	114.326	33.945	117.374	34.348	120.726	34.352	121.031	35.000	129.531
GR	36.000	142.031	.000	.000	.000	.000	.000	.000	.000	.000
NC	.045	.045	.040	.100	.300	.000	.000	.000	.000	.000
	RUINS OF PIERS FROM OLD BOATLAKE STOPLOG DAM									
X1	1008.000	25.000	100.000	116.495	27.500	23.500	25.500	.000	.000	.000
X2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	36.000	46.000	35.600	83.000	34.879	100.000	31.923	100.000	31.984	101.524
GR	32.043	103.048	31.909	104.572	33.271	104.572	33.271	105.182	33.271	105.944
GR	31.827	105.944	31.794	106.706	32.165	107.010	32.068	108.839	32.215	110.363
GR	32.215	110.516	33.065	110.668	33.042	111.125	33.024	111.735	32.346	111.735
GR	32.919	114.630	33.180	116.307	34.871	116.495	35.000	129.995	36.000	131.995
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

MOUNT PEARL REACH

85/01/15. 18.37.49.

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HEC2 RELEASE DATED NOV 76 UPDATED MARC 1982
ERROR CORR - 01,02,03,04,05
MODIFICATION - 50,51,52,53,54,55

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T1 URBAN HYDROLOGY STUDY OF THE WATERFORD RIVER STO.JOHN'S NFLD
T2 BACKWATER PROFILES FOR FLOOD HAZATRD AREAS
T3 MOUNT PEARL FLOODPLAIN

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	0.	0.	0.	.000000	1.00	.0	12.	102.180	.000
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1.000	.000	-1.000	2.000	.000	.000	-1.000	.000	.000	.000

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

150.000	38.000	2.000	9.000	1.000	16.000	17.000	18.000	19.000	33.000
8.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

NC	.090	.090	.080	.300	.500	.000	.000	.000	.000	.000
X1	2001.000	50.000	136.858	163.088	.000	.000	.000	.000	50.000	.000
X3	10.000	51.099	.000	.000	.000	.000	.000	.000	.000	.000
GR	57.000	76.500	56.000	83.500	55.000	89.000	54.027	100.000	53.757	103.048
GR	53.537	106.096	53.427	109.144	53.312	112.192	53.184	115.240	53.077	118.288
GR	52.887	121.336	52.637	127.384	52.492	127.432	52.686	133.088	52.224	134.747
GR	52.157	136.858	51.782	138.788	51.497	140.558	51.329	141.368	51.107	143.058
GR	51.005	144.958	50.995	146.618	50.949	148.768	51.179	150.508	51.434	152.968
GR	51.607	153.950	51.855	154.438	51.687	155.474	51.546	156.488	52.107	157.910
GR	52.287	158.217	52.290	158.392	51.884	158.868	52.344	160.398	52.533	163.088
GR	52.577	164.008	52.670	167.056	52.730	170.104	52.800	173.152	52.879	185.344
GR	52.893	188.392	52.900	191.440	52.988	194.488	53.022	195.098	53.747	197.536
GR	54.000	208.536	54.200	212.536	54.000	235.036	55.000	246.736	55.800	257.336

NC	.090	.090	.080	.100	.300	.000	.000	.000	.000	.000
X1	2002.000	48.000	131.698	162.179	12.000	17.000	15.000	.000	50.000	.000
X3	10.000	50.297	.000	.000	.000	.000	.000	.000	.000	.000
GR	57.000	71.450	57.000	71.500	56.000	79.500	55.000	84.000	54.000	98.000
GR	53.717	100.000	53.587	103.048	53.417	106.096	53.352	109.144	53.197	112.192
GR	53.052	115.240	52.859	118.288	52.647	121.336	52.587	124.384	52.582	127.432
GR	52.807	130.480	52.767	131.698	51.287	133.833	50.207	136.881	50.147	139.929
GR	50.647	142.977	51.207	146.025	51.317	146.939	51.592	149.987	51.582	153.035
GR	51.676	154.559	52.310	156.083	52.644	159.131	52.844	162.179	52.842	165.227
GR	52.862	168.276	52.842	171.323	52.922	174.371	52.847	177.419	52.782	180.467
GR	52.832	183.515	52.852	186.563	52.917	189.611	53.062	192.659	53.142	198.755
GR	53.227	201.803	54.000	212.803	54.200	223.803	54.000	233.803	53.400	238.303

GR	54.000	241.803	55.000	243.803	56.000	248.803	.000	.000	.000	.000
NC	.100	.100	.090	.100	.300	.000	.000	.000	.000	.000
X1	2002.500	38.000	235.642	255.442	78.000	63.000	61.000	.000	50.000	.000
X3	10.000	50.400	.000	.000	.000	350.500	54.200	.000	.000	.000
GR	56.000	57.900	56.000	58.000	55.000	63.500	54.000	72.500	53.000	81.500
GR	52.367	100.000	52.127	112.497	52.028	124.384	51.573	146.940	51.935	149.988
GR	51.915	164.923	51.790	178.639	51.449	180.163	51.173	181.382	51.473	235.642
GR	51.424	235.941	51.500	237.442	50.228	242.342	50.250	243.542	51.012	248.442
GR	51.232	250.942	51.254	252.142	51.505	255.442	51.768	258.542	52.268	259.716
GR	52.517	260.630	52.836	269.164	52.667	276.784	52.788	290.500	53.000	297.500
GR	53.500	335.500	54.000	343.500	54.200	350.500	54.000	356.500	53.500	362.500
GR	54.000	367.000	55.000	375.500	56.000	380.500	.000	.000	.000	.000
NC	.100	.100	.090	.100	.300	.000	.000	.000	.000	.000
X1	2003.000	41.000	233.960	247.981	82.000	100.000	101.000	.000	50.000	.000
X3	10.000	49.894	.000	.000	.000	256.515	53.234	.000	.000	.000
GR	56.000	57.900	56.000	58.000	55.000	63.500	54.000	72.500	53.000	81.500
GR	52.367	100.000	52.621	122.860	52.208	139.929	52.108	141.148	51.886	156.083
GR	51.425	158.522	51.905	159.436	52.148	164.922	52.088	179.858	51.630	181.077
GR	51.696	188.697	51.725	201.803	51.626	215.214	51.578	225.273	51.736	231.978
GR	51.393	233.960	50.831	234.265	50.022	236.094	49.744	238.532	49.804	240.666
GR	49.901	242.494	50.229	244.323	50.513	245.542	50.824	246.762	51.284	247.981
GR	52.904	250.726	52.882	252.858	53.234	256.515	53.016	258.344	52.235	260.478
GR	52.325	262.611	52.787	265.354	53.140	268.098	54.000	278.098	55.000	289.098
GR	56.000	305.598	.000	.000	.000	.000	.000	.000	.000	.000
NC	.120	.120	.110	.100	.300	.000	.000	.000	.000	.000
X1	2004.000	41.000	299.339	311.226	98.000	113.000	100.000	.000	50.000	.000
X3	10.000	50.972	.000	.000	.000	328.295	53.278	.000	.000	.000
GR	56.000	95.000	55.395	100.000	54.658	117.373	54.224	126.213	53.701	145.415
GR	53.716	161.569	53.206	166.446	52.543	197.536	52.383	209.423	52.199	220.701
GR	51.849	238.989	51.908	249.657	51.843	258.801	51.828	269.164	51.773	278.917
GR	51.838	295.139	51.743	297.510	51.748	299.339	50.822	307.264	50.903	310.007
GR	51.291	311.226	51.483	313.360	51.663	313.360	51.657	315.493	51.720	317.627
GR	51.800	319.760	52.211	321.284	52.258	322.808	52.507	323.875	52.698	324.332
GR	53.044	325.856	53.278	328.295	53.169	330.124	52.484	332.257	53.227	334.086
GR	53.183	335.610	52.955	338.048	53.155	340.182	54.000	350.182	55.000	359.182
GR	56.000	381.182	.000	.000	.000	.000	.000	.000	.000	.000
NC	.120	.120	.110	.100	.300	.000	.000	.000	.000	.000
X1	2005.000	41.000	181.520	188.120	135.000	125.000	132.000	.000	50.000	.000
X3	10.000	50.891	.000	.000	.000	312.140	53.072	.000	.000	.000
GR	55.802	100.000	54.842	104.572	54.102	109.144	53.597	115.240	53.352	125.603
GR	53.122	137.795	52.842	150.901	52.922	162.484	51.741	173.550	51.671	175.770
GR	51.301	181.520	50.741	182.600	50.886	185.090	51.661	188.120	51.831	191.870
GR	52.006	193.050	52.696	194.670	52.586	196.120	52.881	199.960	51.207	202.108
GR	51.422	204.2[illegible]	51.492	208.204	51.712	210.642	51.697	221.310	51.812	229.844
GR	51.732	238.988	51.737	250.266	51.692	259.410	51.652	270.078	51.827	280.746
GR	51.842	290.804	51.952	299.948	52.167	309.092	53.072	312.140	53.062	315.493
GR	52.362	319.456	53.077	325.552	54.132	329.514	54.462	332.562	55.100	339.562
GR	56.000	357.562	.000	.000	.000	.000	.000	.000	.000	.000

NC	.175	.175	.150	.100	.300	.000	.000	.000	.000	.000
X1	2006.000	57.000	245.390	254.838	114.000	176.000	144.000	.000	50.000	.000
X3	10.000	51.281	.000	.000	.000	291.110	53.261	.000	.000	.000
GR	56.000	52.000	55.000	59.000	54.000	71.000	53.876	100.000	53.561	109.144
GR	53.446	118.280	53.296	127.432	53.251	136.576	53.096	145.270	52.976	154.864
GR	52.836	164.000	52.776	173.152	52.746	186.296	52.611	191.440	52.501	200.584
GR	52.351	209.728	52.261	218.872	52.886	228.016	52.696	229.845	51.791	231.978
GR	52.391	236.855	52.416	239.592	52.011	243.256	51.691	245.085	51.646	245.390
GR	51.306	246.914	51.216	248.133	51.286	248.742	51.186	252.095	51.416	252.406
GR	51.131	253.619	51.141	254.534	51.691	254.838	51.321	256.058	51.146	256.667
GR	51.139	256.972	51.141	258.191	51.436	259.410	51.441	259.715	51.846	261.544
GR	51.741	267.640	51.729	275.870	51.761	282.270	51.906	285.928	53.081	288.976
GR	53.231	289.586	53.261	291.110	53.109	292.329	52.741	293.853	52.941	294.462
GR	53.241	296.291	53.154	298.730	53.570	300.863	53.933	305.435	54.000	311.435
GR	55.000	317.435	56.000	333.435	.000	.000	.000	.000	.000	.000
NC	.275	.275	.250	.100	.300	.000	.000	.000	.000	.000
X1	2007.000	43.000	180.391	224.211	95.000	106.000	105.000	.000	50.000	.000
X2	13.500	.000	.000	.000	.000	.000	.000	.000	.000	.000
X3	10.000	51.119	.000	.000	.000	262.431	53.273	.000	.000	.000
GR	55.000	70.000	54.400	95.000	53.783	100.000	53.233	112.497	52.573	122.860
GR	52.113	131.394	51.763	135.357	51.113	141.148	53.140	145.720	52.906	150.597
GR	52.208	159.741	52.123	170.104	53.189	180.391	52.684	181.771	51.240	183.820
GR	51.209	184.201	51.980	185.649	50.969	185.801	52.079	187.311	52.065	188.392
GR	52.664	191.311	52.199	193.071	52.119	204.001	52.131	210.551	51.574	218.001
GR	51.304	220.401	51.244	221.781	51.326	223.841	52.054	224.211	52.234	226.101
GR	52.183	233.511	52.006	238.651	52.199	242.801	52.149	247.801	52.383	250.041
GR	52.134	255.211	52.301	258.031	53.273	262.431	52.235	267.651	53.139	272.801
GR	54.000	277.801	55.000	289.801	56.000	291.801	.000	.000	.000	.000
NC	.275	.275	.250	.600	.800	.000	.000	.000	.000	.000
X1	2008.000	33.000	197.841	215.214	70.000	61.000	68.000	.000	50.000	.000
X3	10.000	51.811	.000	.000	.000	217.957	53.298	.000	.000	.000
GR	56.000	20.000	55.000	50.000	54.000	80.000	53.751	100.000	52.571	103.048
GR	52.311	106.096	52.196	114.936	52.216	125.298	52.136	132.918	52.026	142.062
GR	51.996	153.035	52.016	161.569	52.071	169.799	52.001	178.029	51.436	188.392
GR	51.951	189.611	52.296	190.830	52.336	197.841	51.822	208.204	51.661	209.423
GR	51.861	210.947	52.178	213.385	52.278	215.214	53.298	217.957	53.304	219.481
GR	52.177	223.749	51.973	225.577	51.986	228.321	523.060	235.026	54.116	238.379
GR	54.850	253.379	55.000	261.879	56.000	273.779	.000	.000	.000	.000
NC	.275	.275	.250	.100	.300	.000	.000	.000	.000	.000
X1	2009.000	52.000	266.034	271.764	136.000	133.000	133.000	.000	50.000	.000
X3	10.000	52.092	.000	.000	.000	277.089	53.763	.000	.000	.000
GR	55.000	98.000	54.729	100.000	54.543	100.610	54.448	103.048	54.123	109.144
GR	53.688	115.240	53.418	122.860	53.878	130.480	53.723	134.442	53.168	135.662
GR	53.253	148.158	53.238	156.083	53.143	168.885	53.218	177.419	53.018	183.515
GR	52.868	191.745	52.958	201.194	53.028	208.509	53.068	216.129	53.036	222.225
GR	53.113	228.321	52.738	235.941	52.578	241.732	52.501	245.085	52.594	249.352
GR	52.619	259.814	52.727	262.534	52.495	266.034	52.004	267.214	52.393	267.640
GR	51.942	269.164	52.035	270.734	52.623	271.764	53.483	273.674	53.513	274.955
GR	53.763	277.089	53.730	278.918	53.497	279.527	53.465	280.442	53.374	283.185
GR	52.459	290.500	52.464	295.986	52.420	304.216	52.582	309.093	53.108	310.312

GR	53.173	320.370	53.408	330.124	53.298	340.487	53.380	350.546	53.868	357.251
GR	55.000	365.251	56.000	376.251	.000	.000	.000	.000	.000	.000
NC	.150	.150	.130	.100	.300	.000	.000	.000	.000	.000
X1	2010.000	43.000	206.098	212.058	63.000	67.000	66.000	.000	50.000	.000
X3	10.000	52.431	.000	.000	.000	247.218	54.351	.000	.000	.000
GR	56.000	26.500	55.000	38.000	54.000	66.500	53.114	100.000	53.116	107.620
GR	53.156	114.326	53.441	122.555	53.426	131.090	53.441	139.319	53.231	149.378
GR	53.591	161.570	52.881	165.532	53.081	167.056	52.786	169.799	53.141	172.238
GR	53.086	182.906	53.061	191.440	53.049	199.059	53.222	202.888	52.894	206.098
GR	52.517	207.958	52.281	209.118	52.399	210.108	52.479	211.078	52.869	212.058
GR	52.831	220.091	53.043	227.102	52.741	228.930	53.096	229.845	53.458	236.246
GR	53.308	239.903	54.276	244.170	54.351	247.218	53.181	250.266	53.201	251.181
GR	54.028	253.010	54.269	255.448	54.000	282.448	53.500	287.448	54.000	294.448
GR	55.000	345.448	56.000	352.448	57.000	362.448	.000	.000	.000	.000
NC	.030	.030	.025	.100	.300	.000	.000	.000	.000	.000
X1	2011.000	27.000	120.456	124.786	45.000	55.000	53.000	.000	50.000	.000
X3	10.000	52.656	.000	.000	.000	.000	.000	.000	.000	.000
GR	55.500	.000	55.000	6.000	54.000	35.000	53.494	100.000	53.553	104.267
GR	53.384	107.620	53.288	110.363	52.869	113.196	53.255	115.156	53.514	117.576
GR	53.112	119.746	53.019	120.456	52.539	121.106	52.506	121.946	52.631	123.076
GR	53.049	124.786	53.255	126.386	53.491	127.596	53.121	128.966	53.889	133.196
GR	53.238	140.538	53.028	145.720	53.588	152.426	53.874	169.494	53.903	176.810
GR	54.088	179.248	55.000	239.248	.000	.000	.000	.000	.000	.000
NC	.045	.045	.035	.100	.300	.000	.000	.000	.000	.000
X1	2012.000	40.000	113.716	119.812	112.000	85.000	91.000	.000	50.000	.000
X3	10.000	53.366	.000	.000	.000	.000	.000	.000	.000	.000
GR	57.000	82.000	56.000	95.000	55.574	100.000	55.378	102.134	55.249	105.182
GR	54.738	109.754	54.264	110.668	53.929	112.954	53.649	113.107	53.551	113.716
GR	53.216	115.240	53.244	115.850	53.389	117.374	53.471	118.898	53.541	119.812
GR	53.873	120.4[illegible]	54.013	121.641	54.686	123.470	54.455	125.750	54.291	126.512
GR	54.506	128.042	54.371	131.090	54.039	134.138	54.031	137.186	53.934	140.234
GR	54.391	144.806	54.372	150.902	54.098	161.570	54.135	169.190	54.119	175.286
GR	54.092	187.476	54.134	193.574	54.192	205.766	54.166	214.910	55.000	233.410
GR	55.200	239.910	55.000	244.910	54.900	286.910	55.000	288.910	56.000	329.910
NC	.030	.030	.025	.100	.300	.000	.000	.000	.000	.000
X1	2013.000	38.000	115.240	124.994	65.000	56.000	59.000	.000	50.000	.000
X3	10.000	53.555	.000	.000	.000	.000	.000	.000	.000	.000
GR	57.000	93.000	56.000	98.000	55.257	100.000	54.717	103.048	54.124	106.096
GR	53.818	109.144	53.617	110.668	53.782	111.887	54.182	113.106	54.269	113.716
GR	53.922	115.240	53.632	116.307	53.537	116.459	53.416	118.288	53.405	119.812
GR	53.424	121.336	53.552	123.165	54.022	124.994	54.017	129.566	54.342	130.480
GR	54.437	137.100	54.389	142.672	54.342	145.720	54.259	153.340	54.502	160.960
GR	54.462	168.580	54.470	176.200	54.502	183.820	54.124	191.440	54.246	199.060
GR	54.192	206.680	54.135	214.300	55.000	232.800	55.200	239.300	55.000	244.300
GR	54.900	286.300	55.000	288.300	56.000	329.300	.000	.000	.000	.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

DONOVANS REACH

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  HEC2 RELEASE DATED NOV 76 UPDATED MARC 1982
  ERROR CORR -  01,02,03,04,05
  MODIFICATION -  50,51,52,53,54,55
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T1     URBAN HYDROLOGY STUDY OF THE WATERFORD RIVER,ST JOHN'S NFLD
T2     BACKWATER PROFIELS FOR FLOOD HAZARD AREAS
T3          WATERFORD R. NEAR DONOVANS

J1   ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0.        2.        0.        0.    .000000      1.00       .1        7.    133.670     .000

J2   NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     -1.000     .000     2.000     2.000      .000     -1.000    -1.000     .000      .000      .000

J3   VARIABLE CODES FOR SUMMARY PRINTOUT

     150.000   38.000    2.000     9.000     1.000    16.000    17.000    18.000    19.000    33.000

       8.000     .000      .000      .000      .000      .000      .000      .000      .000      .000

NC       .090      .090      .085      .300      .500      .000      .000      .000      .000      .000
X1   3001.000    26.000   108.300   114.400      .000      .000      .000      .000   100.000      .000
CI     -1.000   131.639      .085     2.000     2.000     6.100      .000      .000      .000      .000
GR     37.000    87.000    36.000    95.500    34.733   100.000    34.186   101.600    34.249   103.400
GR     33.830   104.900    33.180   107.400    32.962   108.300    32.040   108.900    31.823   109.700
GR     31.789   110.300    31.853   110.800    31.857   111.500    31.939   111.900    32.359   113.200
GR     32.558   113.800    32.893   114.400    33.071   115.900    33.239   117.100    33.533   118.000
GR     33.495   119.600    33.956   121.100    34.209   122.900    34.960   124.700    36.000   148.700
GR     37.000   153.200      .000      .000      .000      .000      .000      .000      .000      .000

X1   3001.900      .000      .000      .000     8.500     8.500     8.500      .000      .000      .000

NC       .090      .090      .085      .100      .300      .000      .000      .000      .000      .000
X1   3002.000    32.000   111.887   117.450      .500      .500      .500      .000   100.000      .000
CI     -1.000   131.859      .085      .000      .000     5.600      .000      .000      .000      .000
GR     37.000    81.000    36.000    94.000    34.850   100.000    34.642   101.524    34.467   103.048
GR     34.271   104.572    34.265   106.096    34.062   108.534    33.732   109.754    33.249   110.897
GR     33.043   111.278    32.736   111.887    32.504   112.497    32.411   113.106    32.413   113.716
GR     32.258   114.326    32.009   115.240    32.040   115.545    32.162   116.307    32.333   116.459
GR     32.744   117.069    32.744   117.450    33.043   117.678    33.158   118.288    33.888   119.507
GR     34.189   120.726    34.119   122.250    34.306   124.994    34.562   126.518    34.708   127.127
GR     36.000   137.127    37.000   142.127      .000      .000      .000      .000      .000      .000
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NC	.090	.090	.085	.100	.300	.000	.000	.000	.000	.000
X1	3003.000	29.000	112.192	118.288	7.000	7.000	7.000	.000	100.000	.000
CI	-1.000	132.293	.085	.000	.000	6.100	.000	.000	.000	.000
GR	37.000	80.000	36.000	95.000	34.754	100.000	34.406	101.524	34.118	102.438
GR	33.884	103.962	33.800	106.096	33.649	107.620	33.125	109.754	32.995	111.887
GR	32.832	112.192	32.566	112.802	32.489	114.021	32.443	115.545	32.445	117.067
GR	32.516	117.678	32.814	118.288	33.185	118.593	33.337	119.812	33.658	121.031
GR	33.785	122.555	33.874	123.470	33.956	124.689	33.885	125.298	33.726	126.518
GR	33.947	127.127	34.586	128.042	36.000	137.042	37.000	140.042	.000	.000
NC	.090	.090	.085	.100	.300	.000	.000	.000	.000	.000
X1	3004.000	19.000	104.876	107.924	98.000	97.000	99.000	.000	100.000	.000
CI	-1.000	133.019	.085	.100	.100	3.100	.000	.000	.000	.000
GR	36.808	100.000	36.460	100.914	35.738	101.828	34.388	103.657	33.381	104.572
GR	33.554	104.876	33.291	105.791	33.169	107.010	33.432	107.620	33.644	107.924
GR	33.564	108.534	33.683	109.144	33.768	110.363	34.113	117.678	34.338	123.469
GR	34.610	129.260	35.029	134.442	35.718	140.538	37.000	150.538	.000	.000
NC	.090	.090	.085	.300	.500	.000	.000	.000	.000	.000
X1	3005.000	30.000	121.640	133.528	46.000	44.000	46.000	.000	100.000	.000
CI	-1.000	132.572	.085	2.000	2.000	11.900	.000	.000	.000	.000
GR	37.000	95.000	36.510	100.000	35.435	103.048	35.061	107.315	34.799	111.277
GR	33.985	113.106	33.530	115.240	33.495	116.459	33.398	119.507	33.225	121.640
GR	32.765	123.164	32.727	124.993	32.722	126.517	32.825	128.041	33.035	130.175
GR	33.059	131.394	32.989	132.004	33.264	133.528	33.495	135.052	33.759	135.966
GR	33.911	136.576	33.665	137.795	33.578	141.757	33.682	148.158	34.001	152.730
GR	34.009	156.692	34.519	161.569	34.712	168.884	35.615	171.018	37.000	185.018
NC	.090	.090	.085	.100	.300	.000	.000	.000	.000	.000
X1	3006.000	22.000	120.117	128.652	7.000	7.000	7.000	.000	100.000	.000
CI	-1.000	132.871	.085	.000	.000	8.600	.000	.000	.000	.000
GR	37.322	100.000	35.501	110.364	35.049	113.412	34.651	115.850	34.141	118.900
GR	33.443	120.117	33.345	122.556	33.134	125.604	33.021	127.432	33.491	128.652
GR	33.743	130.176	34.391	132.004	34.835	136.272	35.523	144.806	35.710	156.388
GR	35.637	162.181	35.314	166.752	35.271	170.714	34.839	171.324	34.858	172.543
GR	35.573	175.286	37.000	197.286	.000	.000	.000	.000	.000	.000
NC	.090	.090	.030	.100	.300	.000	.000	.000	.000	.000
X1	3007.100	19.000	100.000	133.530	.500	.500	.500	.000	.000	.000
BT	13.000	100.000	137.440	137.440	110.364	136.950	135.501	113.412	136.850	135.049
BT	118.900	136.700	134.141	122.250	136.650	133.340	122.250	136.600	134.653	123.500
BT	136.600	134.857	124.750	136.570	134.877	126.600	136.520	134.859	127.330	136.500
BT	134.550	127.330	136.500	133.021	128.652	136.470	133.491	133.530	136.353	136.353
GR	137.480	99.000	137.440	100.000	135.501	110.364	135.049	113.412	134.141	118.900
GR	133.340	122.250	132.320	122.251	132.334	123.500	132.351	124.750	132.306	126.600
GR	132.320	127.329	133.020	127.330	133.491	128.652	136.353	133.530	136.064	145.720
GR	135.980	153.340	135.960	164.008	136.014	176.200	137.000	201.200	.000	.000

NC	.090	.090	.085	.300	.500	.000	.000	.000	.000	.000
X1	3007.900	.000	.000	.000	3.350	3.350	3.350	.000	.000	.000
NC	.090	.090	.085	.100	.300	.000	.000	.000	.000	.000
X1	3008.000	27.0[illegible]	119.442	127.368	.500	.500	.500	.000	100.000	.000
CI	-1.000	132.993	.085	.010	.010	8.000	.000	.000	.000	.000
GR	36.549	107.500	35.669	110.298	35.781	113.346	35.625	116.394	35.447	119.442
GR	33.596	119.747	33.374	120.357	33.186	120.966	33.136	121.881	33.146	122.795
GR	33.231	123.405	33.236	124.014	33.238	124.929	33.143	126.148	33.144	127.367
GR	35.154	127.368	35.179	127.672	35.179	128.282	35.182	131.634	35.339	139.864
GR	35.508	148.874	35.745	150.008	35.613	150.532	35.748	157.542	35.667	165.248
GR	35.943	176.440	37.000	204.940	.000	.000	.000	.000	.000	.000
NC	.090	.090	.085	.300	.500	.000	.000	.000	.000	.000
X1	3009.000	43.000	104.268	149.073	6.000	6.000	6.000	.000	100.000	.000
CI	-1.000	131.951	.085	.000	.000	45.000	.000	.000	.000	.000
GR	37.000	85.000	35.515	100.000	34.480	102.439	33.549	104.268	32.926	105.792
GR	32.798	107.316	32.666	109.144	32.584	111.583	32.394	113.412	32.461	114.631
GR	32.498	115.545	32.446	116.764	32.343	117.984	32.101	118.593	32.125	119.203
GR	32.094	119.508	32.456	120.422	32.544	121.336	32.690	123.165	32.700	124.080
GR	33.044	125.908	33.054	128.652	32.929	132.614	32.919	136.272	32.825	139.624
GR	33.034	143.587	33.166	147.625	34.422	149.073	34.592	149.988	34.618	152.121
GR	34.792	155.169	34.637	156.998	34.553	159.436	34.409	160.960	34.264	162.180
GR	33.681	164.618	33.368	167.666	33.830	170.714	34.228	171.628	34.639	172.543
GR	35.025	173.762	36.000	191.762	37.000	198.762	.000	.000	.000	.000
NC	.090	.090	.085	.100	.300	.000	.000	.000	.000	.000
X1	3010.000	20.000	110.200	127.300	94.000	98.000	96.000	.000	100.000	.000
CI	-1.000	132.870	.085	.500	.500	17.100	.000	.000	.000	.000
GR	37.150	100.000	36.510	101.500	36.390	101.900	35.170	104.400	34.920	106.900
GR	34.700	110.200	33.790	114.000	33.560	114.100	33.350	115.000	33.020	116.000
GR	33.370	116.900	33.450	119.300	33.310	122.300	33.170	123.500	33.500	124.500
GR	34.440	127.300	35.550	133.600	35.630	144.300	34.250	167.500	34.670	186.100
NC	.090	.090	.085	.100	.300	.000	.000	.000	.000	.000
X1	3011.000	22.000	147.200	170.600	88.000	71.000	83.000	.000	100.000	.000
CI	-1.000	132.880	.085	1.000	1.000	23.400	.000	.000	.000	.000
GR	36.780	100.000	34.810	104.000	34.830	107.400	36.800	110.800	36.740	117.300
GR	35.990	118.800	35.390	123.200	35.380	130.400	34.450	131.700	34.050	138.200
GR	34.540	140.100	33.990	147.200	33.820	153.200	33.430	162.500	33.030	162.900
GR	33.250	168.100	33.560	168.800	33.710	170.600	34.180	171.700	34.330	177.200
GR	34.210	192.200	35.120	207.200	.000	.000	.000	.000	.000	.000
NC	.090	.090	.085	.100	.300	.000	.000	.000	.000	.000
X1	3012.000	25.000	116.700	126.000	79.000	64.000	73.000	.000	100.000	.000
CI	-1.000	132.996	.085	.000	.000	10.000	.000	.000	.000	.000
GR	36.232	100.000	35.942	101.200	35.747	102.100	35.887	104.200	35.692	106.900
GR	35.477	110.900	34.977	111.800	34.162	112.700	33.929	114.300	34.187	115.500
GR	33.928	116.700	33.832	117.900	33.682	119.700	33.807	121.900	33.412	122.800
GR	33.367	123.900	33.337	124.300	33.146	124.900	33.979	126.000	34.309	126.800
GR	34.358	127.700	34.317	132.200	34.407	139.800	34.549	154.500	34.972	163.300

NC	.090	.090	.085	.300	.500	.000	.000	.000	.000	.000
X1	3013.000	34.000	117.984	127.128	24.000	9.000	20.000	.000	100.000	.000
CI	-1.000	133.384	.085	.010	.010	9.150	.000	.000	.000	.000
GR	36.444	100.000	36.318	103.963	36.212	109.144	36.192	112.802	36.137	115.850
GR	36.130	116.764	35.926	117.984	34.569	119.508	34.064	120.422	33.792	121.336
GR	33.544	121.641	33.534	123.165	33.550	124.080	33.549	124.689	33.850	124.994
GR	33.753	125.908	33.839	126.823	35.637	127.128	35.637	127.432	35.637	128.042
GR	35.637	128.652	35.678	129.261	35.629	130.785	35.526	133.224	35.443	134.748
GR	35.209	137.796	34.888	142.368	34.787	144.806	34.678	149.378	34.564	153.950
GR	34.530	158.522	34.576	163.094	34.507	167.666	35.002	172.238	.000	.000
NC	.090	.090	.030	.300	.500	.000	.000	.000	.000	.000
X1	3014.100	35.000	112.802	129.261	.100	.100	.100	.000	.000	.000
X4	3.000	133.750	124.380	133.890	124.540	134.450	124.690	.000	.000	.000
BT	23.000	112.802	136.192	136.192	115.850	136.097	136.063	116.764	136.068	135.850
BT	117.980	136.030	135.926	119.508	135.983	134.569	120.422	135.954	134.064	121.336
BT	135.930	134.260	121.640	135.916	134.450	121.790	135.912	134.910	121.950	135.907
BT	135.060	122.250	135.897	135.370	122.560	135.888	135.510	122.860	135.878	135.580
BT	123.170	135.869	135.610	123.470	135.859	135.580	123.780	135.849	135.510	124.080
BT	135.840	135.370	124.380	135.831	135.060	124.540	135.826	134.910	124.690	135.821
BT	134.450	125.908	135.783	133.839	126.823	135.755	133.839	129.261	135.678	135.678
GR	136.440	100.000	136.318	103.963	136.212	109.144	136.192	112.802	136.063	115.850
GR	135.850	116.764	135.926	117.980	134.569	119.508	134.064	120.422	133.792	121.336
GR	133.800	121.640	133.894	121.790	133.754	121.950	133.703	122.250	133.691	122.560
GR	133.650	122.860	133.627	123.170	133.652	123.470	133.691	123.780	133.703	124.080
GR	133.840	125.908	133.839	126.823	135.678	129.261	135.629	130.785	135.526	133.224
GR	135.440	134.748	135.210	137.796	134.888	142.368	134.787	144.806	134.678	149.378
GR	134.560	153.950	134.530	158.522	134.576	163.094	134.507	167.666	135.002	172.238
NC	.090	.090	.030	.300	.500	.000	.000	.000	.000	.000
X1	3014.700	39.000	127.423	134.750	6.230	6.230	6.230	.000	.000	.000
BT	22.000	127.423	136.250	136.250	128.960	136.198	136.167	129.565	136.177	135.591
BT	130.100	136.159	135.672	130.100	136.159	135.672	130.300	136.152	134.550	130.460
BT	136.150	134.391	130.610	136.111	134.450	130.910	136.131	134.970	131.220	136.120
BT	135.090	131.520	136.110	135.541	131.830	136.100	135.641	132.130	136.089	135.724
BT	132.430	136.079	135.560	132.740	136.069	135.160	133.050	136.058	135.040	133.200
BT	136.050	134.841	133.350	136.048	134.668	133.528	136.042	134.368	133.756	136.034
BT	135.710	133.832	136.031	135.741	134.750	136.000	136.000	.000	.000	.000
GR	136.730	101.219	136.613	102.133	136.270	108.839	136.201	117.068	136.173	125.603
GR	136.250	127.423	136.167	128.960	135.951	129.565	135.672	130.100	134.550	130.300
GR	133.740	130.460	133.740	130.610	133.740	130.910	133.740	131.220	133.740	131.520
GR	133.730	131.830	133.730	132.130	133.730	132.430	133.730	132.740	133.730	133.050
GR	133.720	133.200	134.550	133.350	134.368	133.528	135.398	133.756	135.741	133.832
GR	136.000	134.750	136.031	135.661	135.929	137.185	135.398	143.281	134.960	150.901
GR	134.710	156.083	134.802	158.826	134.670	162.179	134.732	164.008	134.890	169.189
GR	134.950	173.761	135.147	179.857	135.074	182.905	135.382	186.258	.000	.000
NC	.090	.090	.085	.100	.300	.000	.000	.000	.000	.000
X1	3014.800	39.000	127.423	134.750	.100	.100	.100	.000	.000	.000
BT	22.000	127.423	136.250	136.250	128.960	136.198	136.167	129.565	136.177	135.951
BT	130.100	136.159	135.672	130.100	136.159	135.672	130.300	136.152	134.550	130.460
BT	136.150	134.391	130.610	136.111	134.450	130.910	136.131	134.970	131.220	136.120
BT	135.090	131.520	136.110	135.541	131.830	136.100	135.641	132.130	136.089	135.724

BT	132.430	136.079	135.560	132.740	136.069	135.160	133.050	136.058	135.040	133.200
BT	136.050	134.841	133.350	136.048	134.668	133.528	136.042	134.368	133.756	136.034
BT	135.710	133.832	136.031	135.741	134.750	136.000	136.000	.000	.000	.000
GR	136.730	101.219	136.613	102.133	136.270	108.839	136.201	117.068	136.173	125.603
GR	136.250	127.423	136.167	128.960	135.951	129.565	135.672	130.100	134.550	130.300
GR	134.390	130.460	134.390	130.610	134.390	130.910	134.390	131.220	134.390	131.520
GR	134.380	131.830	134.380	132.130	134.380	132.430	134.380	132.740	134.380	133.050
GR	134.370	133.200	134.550	133.350	134.368	133.528	135.398	133.756	135.741	133.832
GR	136.000	134.750	136.031	135.661	135.929	137.185	135.398	143.281	134.960	150.901
GR	134.710	156.083	134.802	158.826	134.670	162.179	134.732	164.008	134.890	169.189
GR	134.950	173.761	135.147	179.857	135.074	182.905	135.382	186.258	.000	.000
NC	.090	.090	.085	.100	.300	.000	.000	.000	.000	.000
X1	3014.900	28.000	130.099	133.756	.100	.100	.100	.000	100.000	.000
CI	-1.000	133.600	.085	.000	.000	3.660	.000	.000	.000	.000
XS	-1.000	.500	.000	.000	.000	.000	.000	.000	.000	.000
GR	36.733	101.219	36.613	102.133	36.270	108.839	36.201	117.068	36.173	125.603
GR	36.246	127.423	36.167	128.956	35.951	129.565	35.672	130.099	33.850	130.490
GR	33.750	132.004	33.850	133.528	35.713	133.756	35.741	133.832	36.002	134.747
GR	36.031	135.661	35.929	137.185	35.398	143.281	34.960	150.901	34.713	156.083
GR	34.802	158.826	34.670	162.179	34.732	164.008	34.890	169.189	34.945	173.761
GR	35.147	179.857	35.074	182.905	35.382	186.258	.000	.000	.000	.000
NC	.090	.090	.085	.100	.300	.000	.000	.000	.000	.000
X1	3015.000	28.000	130.099	133.756	.400	.400	.400	.000	100.000	.000
CI	-1.000	133.600	.085	.000	.000	3.660	.000	.000	.000	.000
GR	36.733	101.219	36.613	102.133	36.270	108.839	36.201	117.068	36.173	125.603
GR	36.246	127.423	36.167	128.956	35.951	129.565	35.672	130.099	33.850	130.490
GR	33.750	132.004	33.850	133.528	35.713	133.756	35.741	133.832	36.002	134.747
GR	36.031	135.661	35.929	137.185	35.398	143.281	34.960	150.901	34.713	156.083
GR	34.802	158.826	34.670	162.179	34.732	164.008	34.890	169.189	34.945	173.761
GR	35.147	179.857	35.074	182.905	35.382	186.258	.000	.000	.000	.000
NC	.090	.090	.085	.100	.300	.000	.000	.000	.000	.000
X1	3016.000	61.000	108.839	116.714	6.000	10.000	7.000	.000	100.000	.000
CI	-1.000	133.357	.085	1.000	1.000	8.000	.000	.000	.000	.000
GR	36.354	100.000	36.256	100.061	36.197	101.829	36.084	103.048	35.908	104.267
GR	35.613	105.182	35.173	106.401	34.949	107.011	34.834	107.620	34.658	108.230
GR	34.428	108.839	34.178	109.449	34.046	109.754	33.856	110.363	33.750	110.668
GR	33.543	111.278	33.507	111.887	33.562	112.497	33.583	113.411	33.668	114.326
GR	33.608	114.935	33.683	115.545	33.786	115.850	34.011	116.155	34.185	116.459
GR	34.411	116.714	34.857	116.764	34.945	117.069	35.007	117.374	35.173	117.983
GR	35.436	118.593	35.583	118.899	35.497	119.203	35.277	119.507	35.172	119.812
GR	35.221	120.422	35.269	122.555	35.371	124.689	35.189	125.299	35.060	127.432
GR	35.026	129.261	35.156	131.395	35.016	135.357	34.970	140.539	35.093	149.683
GR	35.099	155.779	35.260	160.146	35.352	161.875	35.456	162.789	35.726	163.703
GR	35.845	164.313	35.884	164.923	36.268	165.227	36.324	165.837	36.489	167.361
GR	36.286	168.580	36.361	171.323	36.323	173.152	36.218	173.762	36.207	175.895
GR	36.182	178.029	.000	.000	.000	.000	.000	.000	.000	.000

NC	.090	.090	.085	.100	.300	.000	.000	.000	.000	.000
XI	3017.000	33.000	119.050	124.689	56.000	50.000	55.000	.000	100.000	.000
CI	-1.000	133.940	.085	2.000	2.000	6.000	.000	.000	.000	.000
GR	36.524	100.000	36.424	101.524	36.205	103.352	36.114	105.486	36.025	107.315
GR	35.989	108.230	35.811	110.058	35.550	111.887	35.305	113.716	34.660	114.935
GR	34.576	116.154	34.799	117.678	34.606	118.288	34.458	118.898	34.114	119.050
GR	34.090	119.507	34.122	120.726	34.293	122.555	34.340	124.079	34.499	124.689
GR	34.708	124.994	34.706	125.298	34.995	126.213	35.099	127.127	35.417	128.042
GR	35.658	128.651	35.861	129.261	35.918	130.480	36.013	132.614	36.164	134.747
GR	36.186	136.881	36.234	139.014	36.302	141.148	.000	.000	.000	.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

APPENDIX G

MEASURED WATER SURFACE PROFILES
VS
COMPUTED WATER SURFACE PROFILES

KILBRIDE REACH

KILBRIDE

Event: Calibration (staked)
Date: September 2, 1983
Flow: 18.5 m^3/s*

Cross Section Number	Computed Water Surface Elevation (m)	Measured Water Surface Elevation (m)	Time	Comments
1001	31.84	31.84	8:10	
1001.5	31.84			
1002.1	31.83	31.74		
1002.9	31.83			
1003	31.88	31.76	8:10	
1004	31.86	31.74		
1005	31.87	32.24	8:20	Suspected datum error
1005.7	32.31	32.20	8:20	14m d/s of 1005.7
1005.8	32.70	32.57	8:22	25m d/s of 1005.8
1005.9	32.85			
1006	32.85	32.85	8:22	
1006.1	32.90			
1006.2	32.90			
1006.3	32.92			
1006.4	32.92			
1006.5	32.92	32.76	8:24	
1006.7	32.92			
1006.8	32.92			
1007	33.00	33.05	8:24	
1008	33.19	33.14	8:25	

* Representative flow for time of profile measurement.

KILBRIDE

Event: Verification (staked)
Date: November 26, 1981
Flow: 47.2 m^3/s*

Cross Section Number	Computed Water Surface Elevation (m)	Measured Water Surface Elevation (m)	Time	Comments
1001	32.40	32.40	20:51	
1001.5	32.51			
1002.1	32.42			
1002.9	32.43			
1003	32.60	32.53	20:55	
1004	32.59	32.49	20:57	
1005	32.60	32.84	20:59	Datum error suspected
1005.7	32.88			
1005.8	33.11			
1005.9	33.39			
1006	33.39	33.30	21:04	
1006.1	33.46			
1006.2	33.45			
1006.3	33.49			
1006.4	33.49			
1006.5	33.50	33.27	21:07	
1006.7	33.51			
1006.8	33.51			
1007	33.67	33.79	21:21	
1008	34.04	33.98	21:23	

* Representative flow for time of profile measurement.

KILBRIDE

Event: Calibration (staked)
Date: October 26, 1983
Flow: 39.3 m^3/s*

Cross Section Number	Computed Water Surface Elevation (m)	Measured Water Surface Elevation (m)	Time	Comments
1001	32.47	32.47	15:00	
1001.5	32.53	32.35	15:03	
1002.1	32.47			
1002.9	32.47			
1003	32.58	32.42	15:05	
1004	32.57			
1005	32.58	32.52	15:06	Datum error suspected
1005.7	32.77	32.94	15:08	
1005.8	33.05			
1005.9	33.26			
1006	33.26	33.36	15:10	
1006.1	33.34			
1006.2	33.33			
1006.3	33.37			
1006.4	33.37			
1006.5	33.37	33.22	15:13	
1006.7	33.38			
1006.8	33.38			
1007	33.51	33.69	15:14	
1008	33.85	33.80	15:15	

* Representative flow for time of profile measurement.

KILBRIDE

Event: Verification (crest gauges)
Date: September 15, 1983
Flow: 10.2 m^3/s

Cross Section Number	Computed Water Surface Elevation (m)	Measured Water Surface Elevation (m)
1001	31.52	31.52
1001.5	31.52	
1002.1	31.51	
1002.9	31.52	
1003	31.54	
1004	31.50	
1005	31.55	
1005.7	32.06	
1005.8	32.45	
1005.9	32.57	
1006	32.57	32.62
1006.1	32.60	
1006.2	32.60	
1006.3	32.62	
1006.4	32.62	
1006.5	32.62	
1006.7	32.62	
1006.8	32.62	
1007	32.67	
1008	32.80	32.82

MOUNT PEARL

MOUNT PEARL

Event: Calibration (staked)
Date: June 20, 1982
Flow: 8.67 m^3/s*

Cross Section Number	Computed Water Surface Elevation (m)	Measured Water Surface Elevation (m)	Time	Comments
2001	101.91	101.91		crest gauge
2002	101.97	101.96	14:22	
2002.5	102.01			
2003	102.03	102.11	14:19	
2004	102.09	102.11	14:39	15 m downstream
2005	102.22			
2006	102.37	102.33	14:15	
2007	102.62	102.57	14:14	
2008	102.75			
2009	103.19	103.10	14:11	
2010	103.47			
2011	103.53	103.56	14:06	
2012	103.96	103.98	14:03	
2013	104.32	104.21	14:01	

* Representative flow for time of profile measurement.

MOUNT PEARL

Event: Calibration (staked)
Date: October 26, 1983
Flow: 12.0 m^3/s*

Cross Section Number	Computed Water Surface Elevation (m)	Measured Water Surface Elevation (m)	Time	Comments
2001	102.18	102.18		
2002	102.23			
2002.5	102.26			
2003	102.27	102.30	16:55	
2004	102.32	102.34	16:52	
2005	102.40			
2006	102.52	102.53	16:46	
2007	102.79	102.68	16:42	
2008	102.93	103.00	16:38	measurement error suspected
2009	103.37	103.63	16:35	
2010	103.61	103.54	16:30	not at section
2011	103.65	103.75	16:24	
2012	104.25	104.07	16:20	
2013	104.41	104.39	16:16	

* Representative flow for time of profile measurement.

MOUNT PEARL

Event: Verification (crest gauges)
Date: June 21, 1982
Flow: 8.54 m^3/s

Cross Section Number	Computed Water Surface Elevation (m)	Measured Water Surface Elevation (m)
2001	102.06	102.06
2002	102.09	
2002.5	102.12	
2003	102.13	
2004	102.17	
2005	102.26	
2006	102.38	
2007	102.62	
2008	102.74	102.84
2009	103.17	
2010	103.47	
2011	103.52	
2012	103.96	
2013	104.3	

* Representative flow for time of profile measurement.

MOUNT PEARL

Event: Verification (crest gauges)
Date: October 4, 1982
Flow: 11.1 m^3/s

Cross Section Number	Computed Water Surface Elevation (m)	Measured Water Surface Elevation (m)
2001	102.20	102.20
2002	102.24	
2002.5	102.26	
2003	102.28	
2004	102.31	
2005	102.39	
2006	102.50	
2007	102.74	
2008	102.86	103.00
2009	103.28	
2010	103.54	
2011	103.59	
2012	104.20	
2013	104.20	

DONOVANS REACH

DONOVANS

Event: Calibration (staked)
Date: September 2, 1983
Flow: 4.45 m^3/s*
Head Loss: At Section 3014.9 = 0.25 m

Cross Section Number	Computed Water Surface Elevation (m)	Measured Water Surface Elevation (m)	Time	Comments
3001	133.52	133.52		
3001.9	133.52			
3002	133.53	133.56	9:52	
3003	133.55	133.54	9:51	
3004	134.07	134.00	9:46	
3005	134.18	134.13	9:39	
3006	134.17			
3007.1	134.17			
3007.9	134.18			
3008	134.17	134.15	9:37	Approximate, wind blowing tape
3009	134.20	134.18	9:35	
3010	134.20	134.31	9:23	
3011	134.30	134.43	9:14	
3012	134.39	134.52	9:10	2.4 m upstream
3013	134.49	134.59	9:05	
3014.1	134.43			
3014.7	134.45			
3014.8	134.92			
3014.9	135.17			
3015	135.17	134.98	9:03	
3016	135.18	134.99	9:00	
3017	135.23			

* Representative flow for time of profile measurement.

DONOVANS

Event: Calibration (staked)
Date: June 20, 1982
Flow: 4.47 m^3/s*
Head Loss: At Section 3014.9 = 0.25 m

Cross Section Number	Computed Water Surface Elevation (m)	Measured Water Surface Elevation (m)	Time	Comments
3001	133.54	133.54		
3001.9	133.55			
3002	133.55	133.58	14:01	
3003	133.56	133.60	14:01	
3004	134.06	134.06	14:36	
3005	134.17			
3006	134.17	134.15	14:30	
3007.1	134.17			
3007.9	134.18			
3008	134.17	134.22	14:29	
3009	134.20			
3010	134.20	134.22	14:20	Stake 5 m. downstream
3011	134.30			
3012	134.39	134.33	14:14	
3013	134.49			
3014.1	134.43			
3014.7	134.46			
3014.8	134.92			
3014.9	135.17			
3015	135.17	135.26	14:10	
3016	135.18	135.26	14:10	
3017	135.23	135.27	14:08	

* Representative flow for time of profile measurement.

DONOVANS

Event: Calibration (staked)
Date: October 26, 1983
Flow: 6.72 m^3/s*
Head Loss: At Section 3014.9 = 0.41 m

Cross Section Number	Computed Water Surface Elevation (m)	Measured Water Surface Elevation (m)	Time	Comments
3001	133.67	133.67	16:01	
3001.9	133.69			
3002	133.68			
3003	133.71	133.77	16:11	2 m upstream
3004	134.26	134.03	16:18	21 m downstream
3005	134.36			
3006	134.35	134.36	16:29	
3007.1	134.36			
3007.9	134.36			
3008	134.35	134.46	16:36	
3009	134.39			
3010	134.39	134.49	16:52	3 m upstream
3011	134.49	134.53	16:57	14 m downstream
3012	134.57	134.64	17:04	
3013	134.65	134.64	17:06	
3014.1	134.76			
3014.7	134.58			
3014.8	134.97			
3014.9	135.38			
3015	135.38	135.39	17:15	4 m upstream
3016	135.38	135.40	17:17	
3017	135.43	135.48	17:24	2 m upstream

* Representative flow for time of profile measurement.

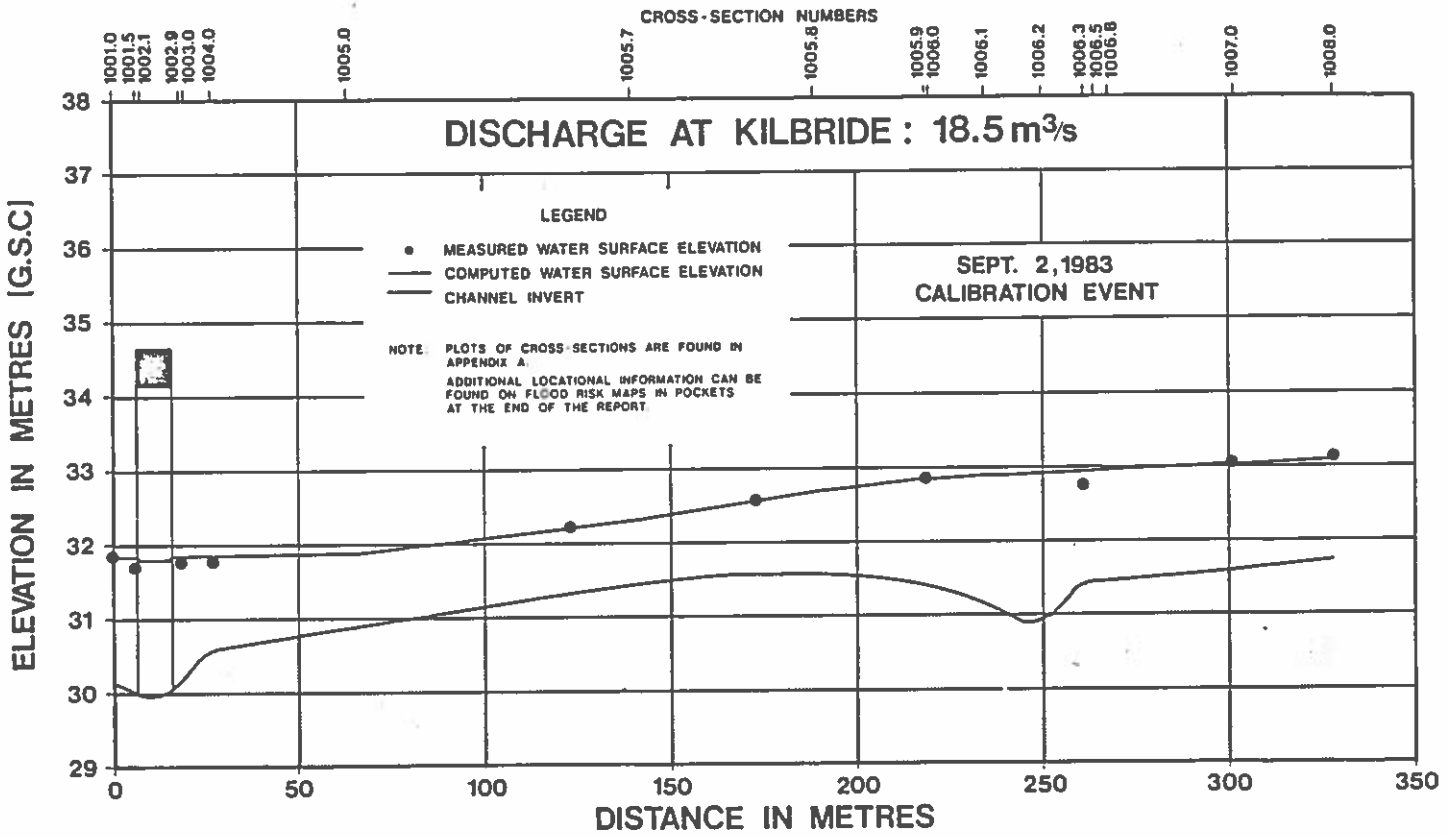
DONOVANS

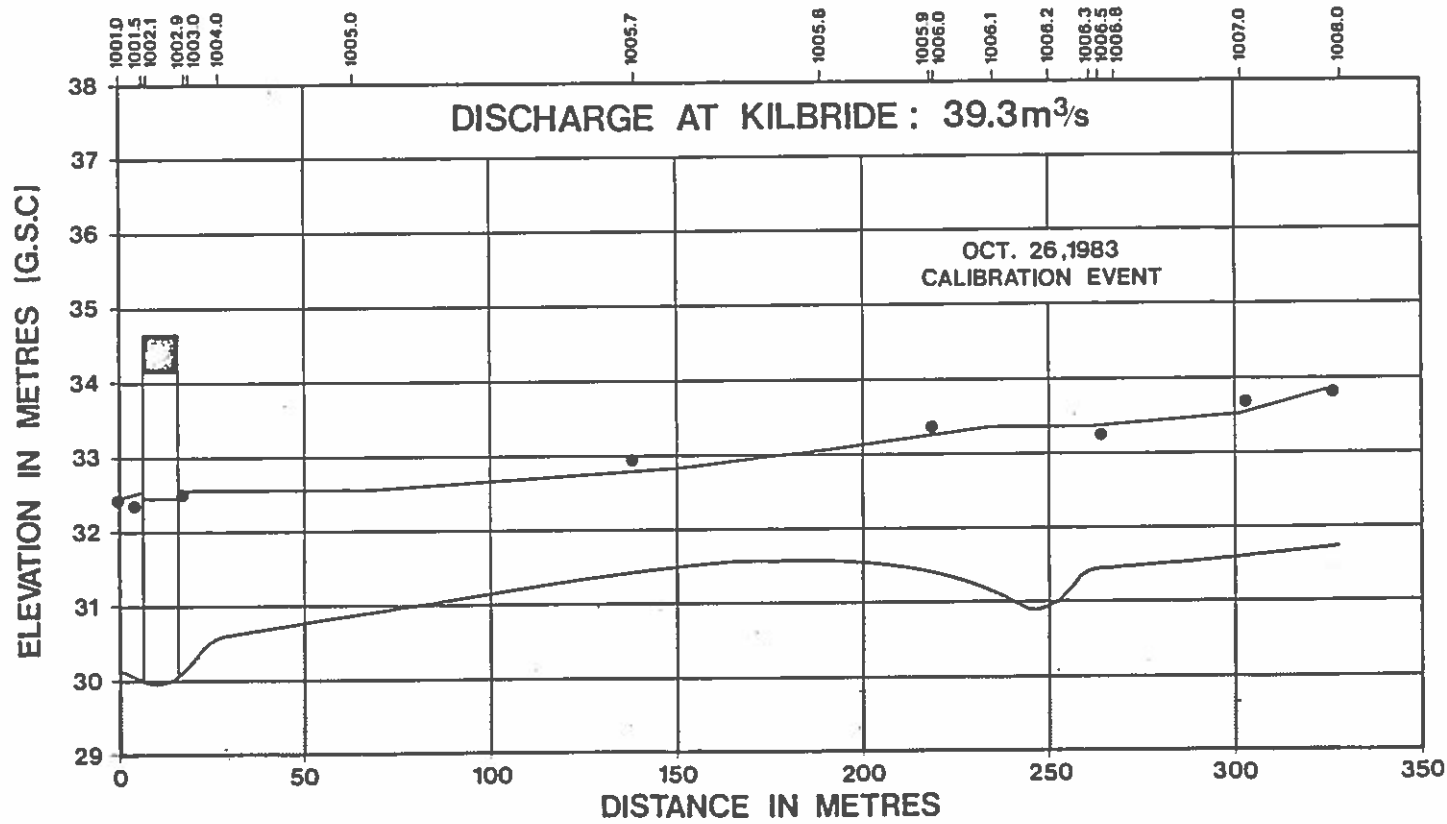
Event: Verification (crest gauges)
Date: October 4, 1982
Peak Flow: 6.89 m^3/s*
Head Loss: At Section 3014.9 = 0.40 m

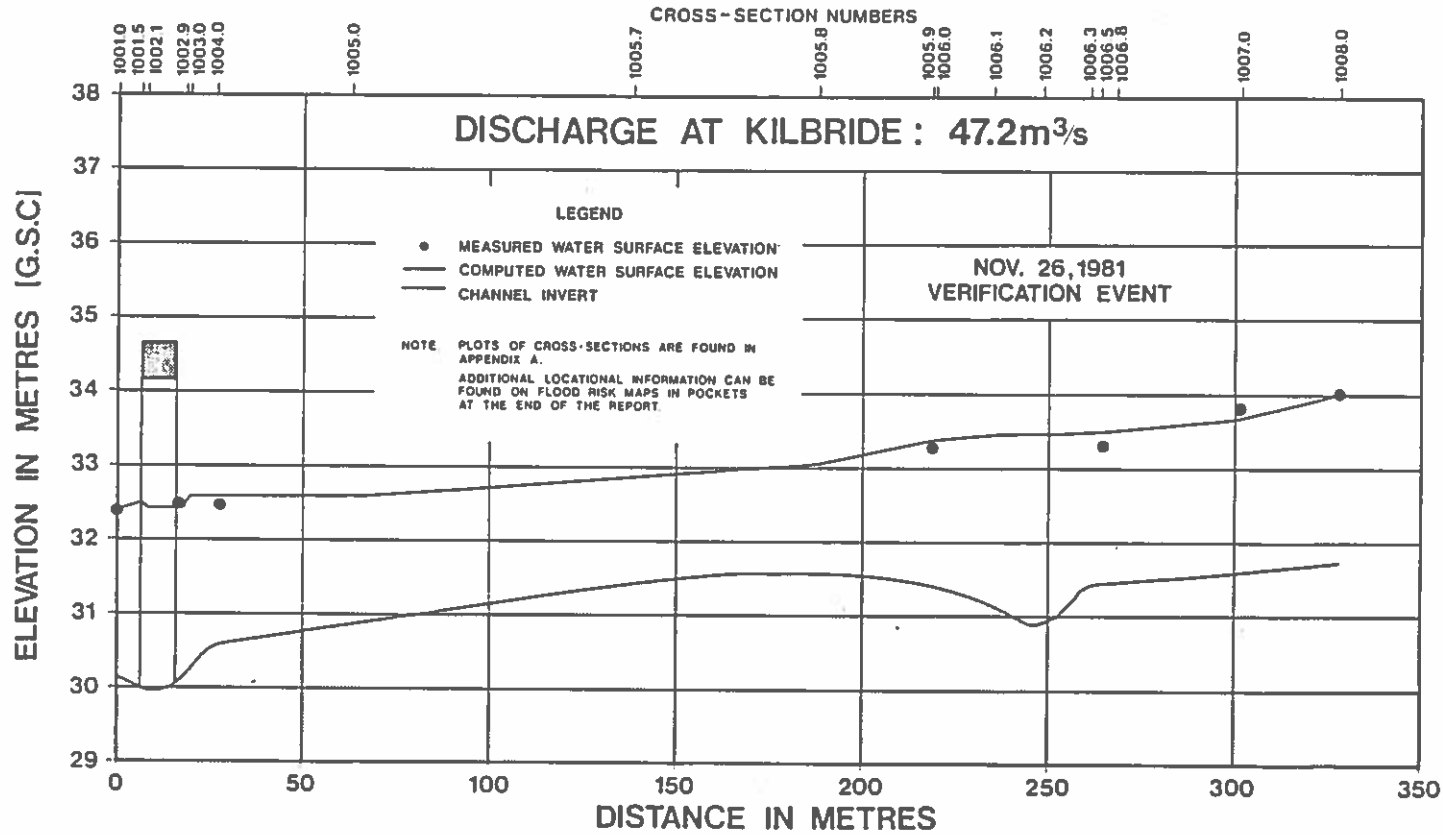
Cross Section Number	Computed Water Surface Elevation	Measured Water Surface Elevation
3001	133.68	133.68
3001.9	133.70	
3002	133.69	
3003	133.72	
3004	134.27	
3005	134.37	
3006	134.36	
3007.1	134.38	134.41
3007.9	134.38	
3008	134.36	
3009	134.40	
3010	134.41	
3011	134.50	
3012	134.58	
3013	134.66	
3014.1	134.78	134.67
3014.7	134.59	
3014.8	134.97	
3014.9	135.37	
3015	135.37	
3016	135.38	
3017	135.43	

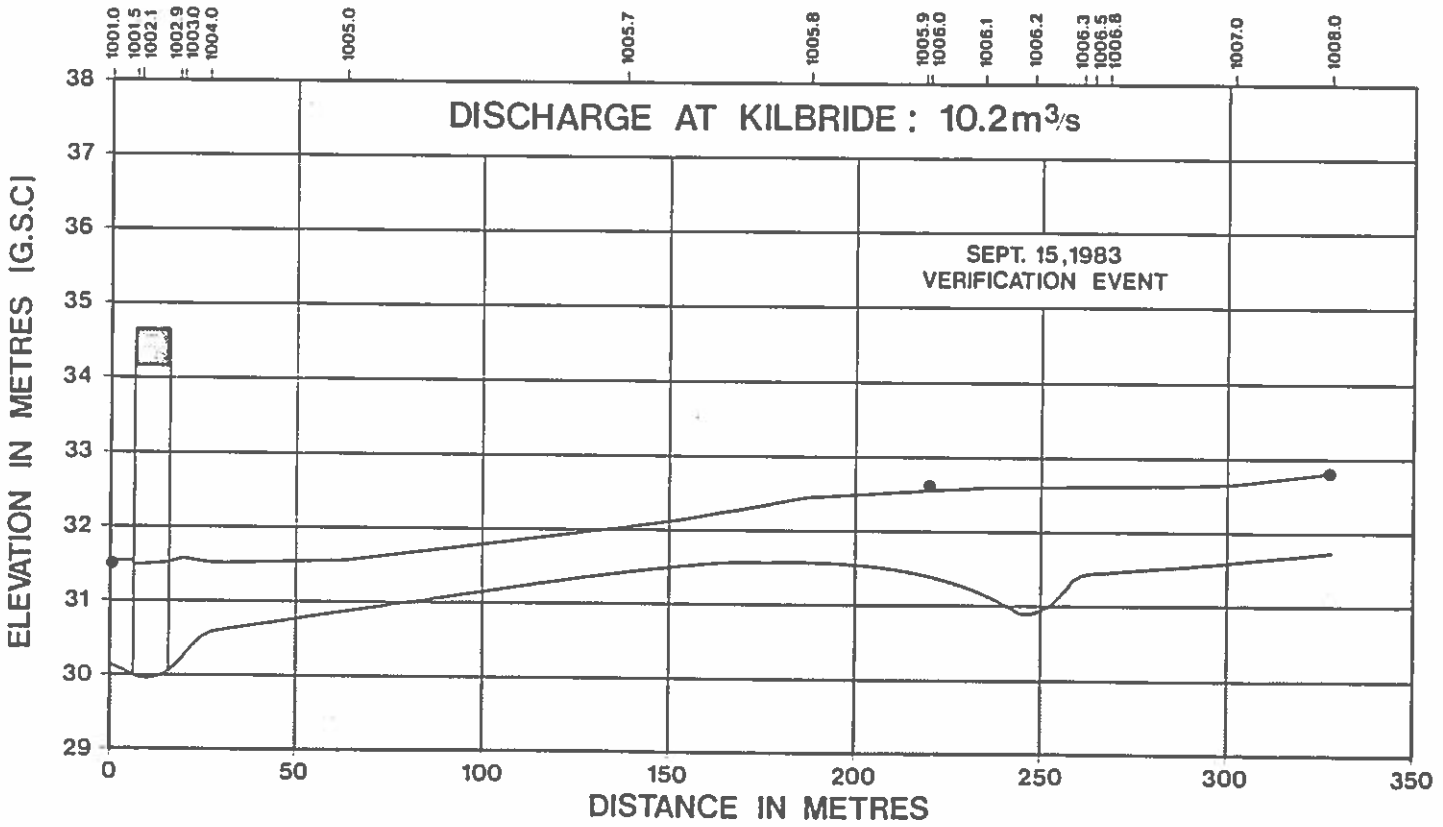
APPENDIX H

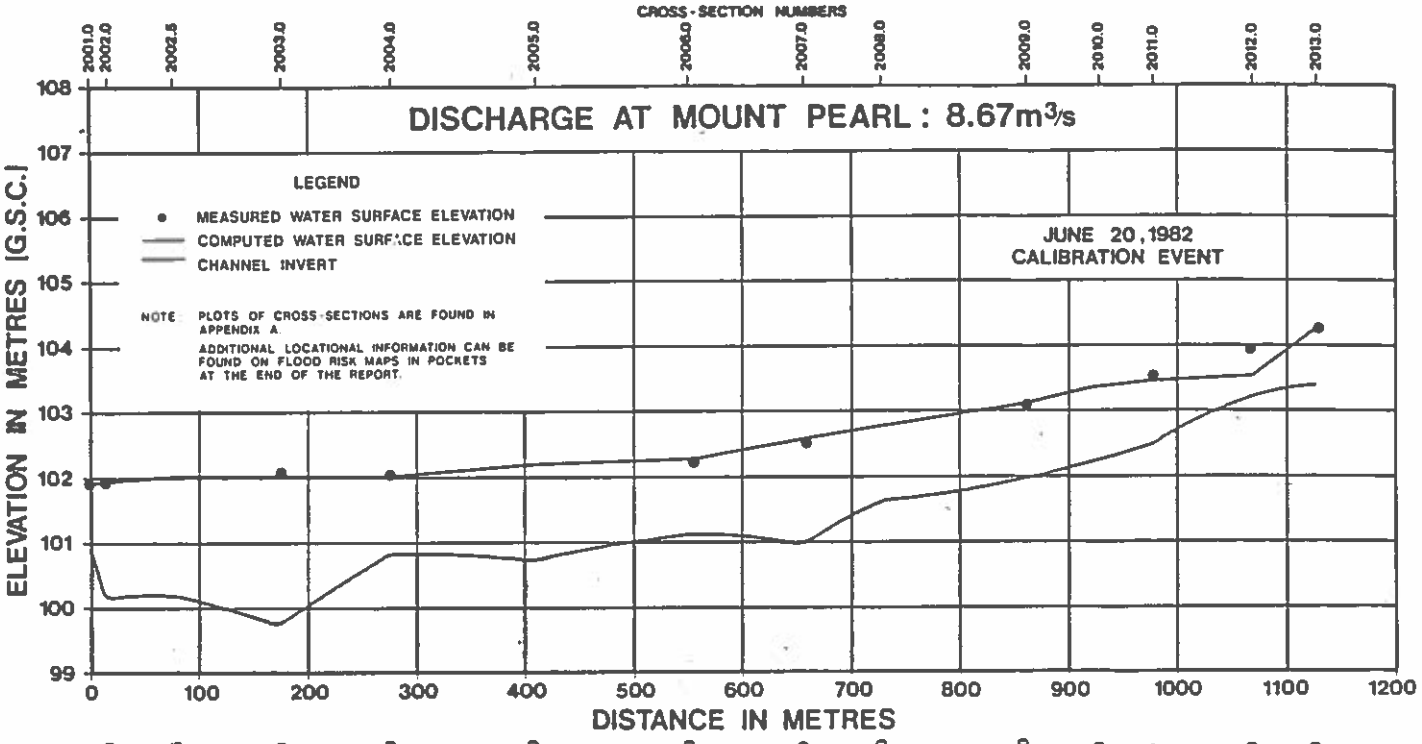
WATER SURFACE PROFILES

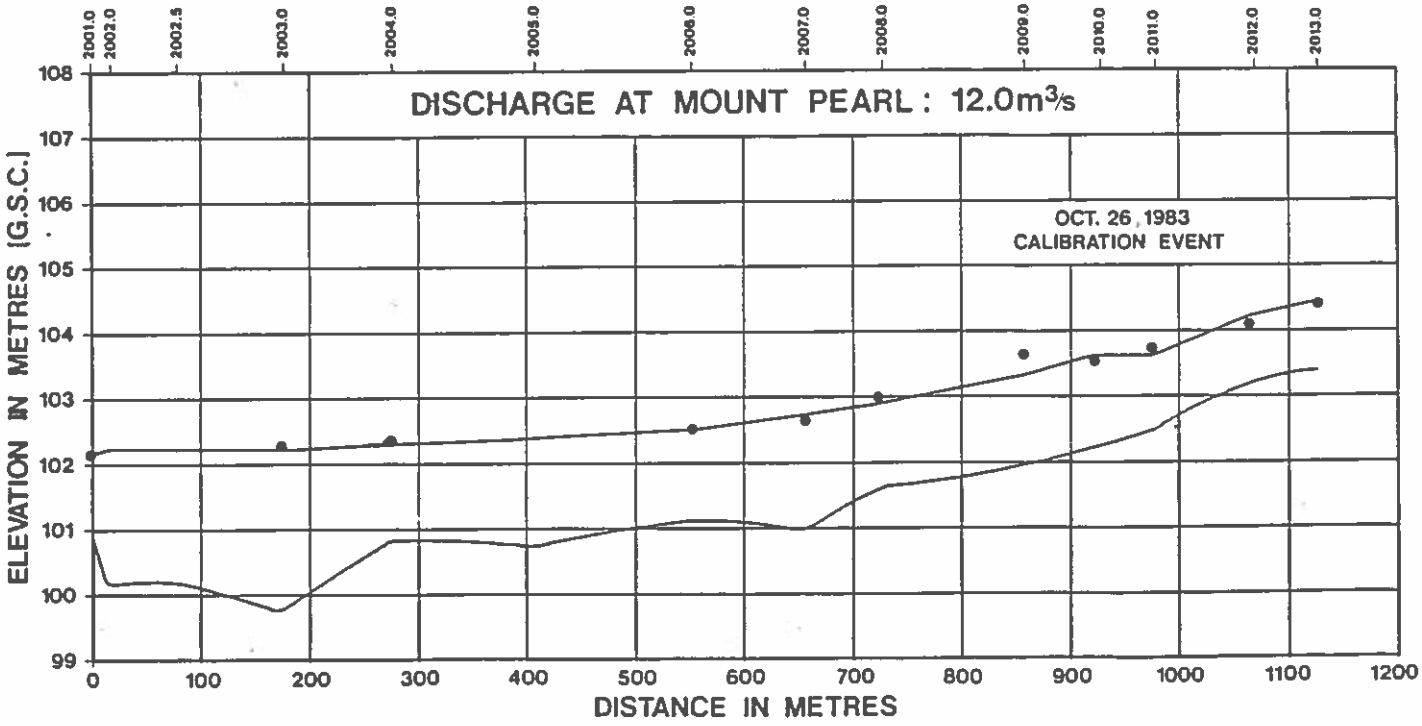

CROSS-SECTION NUMBERS
1001.0
1001.5
1002.1
1002.9
1003.0
1004.0
1005.0
1005.7
1005.8
1005.9
1006.0
1006.1
1006.2
1006.3
1006.5
1006.8
1007.0
1008.0
DISCHARGE AT KILBRIDE : 18.5 m3/s
LEGEND
MEASURED WATER SURFACE ELEVATION
COMPUTED WATER SURFACE ELEVATION
CHANNEL INVERT
NOTE: PLOTS OF CROSS-SECTIONS ARE FOUND IN APPENDIX A.
ADDITIONAL LOCATIONAL INFORMATION CAN BE FOUND ON FLOOD RISK MAPS IN POCKETS AT THE END OF THE REPORT.
SEPT. 2,1983
CALIBRATION EVENT
ELEVATION IN METRES (G.S.C.)
38
37
36
35
34
33
32
31
30
29
0
50
100
150
200
250
300
350
DISTANCE IN METRES

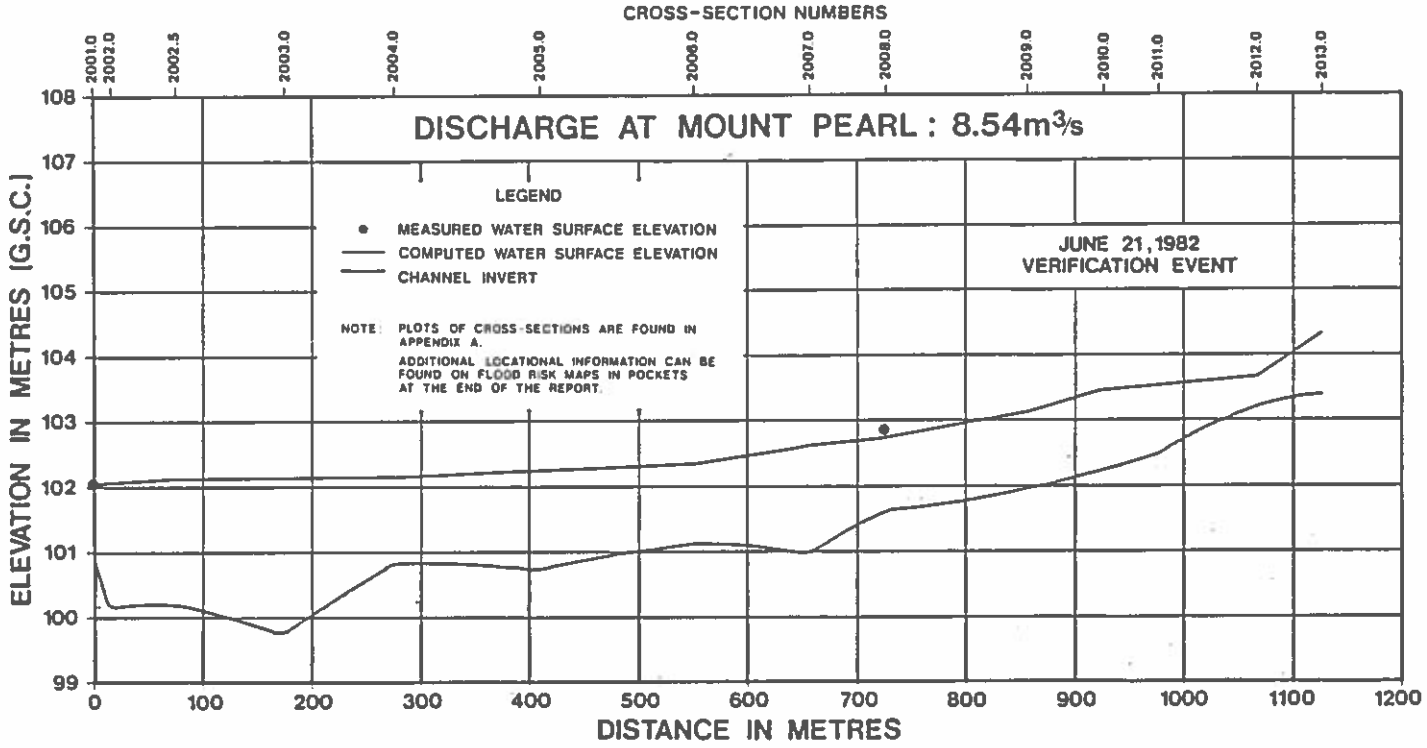

1001.0
1001.5
1002.1
1002.9
1003.0
1004.0
1005.0
1005.7
1005.8
1005.9
1006.0
1006.1
1006.2
1006.3
1006.5
1006.8
1007.0
1008.0
DISCHARGE AT KILBRIDE : 39.3m3/s
OCT. 26,1983
CALIBRATION EVENT
ELEVATION IN METRES (G.S.C.)
38
37
36
35
34
33
32
31
30
29
0
50
100
150
200
250
300
350
DISTANCE IN METRES

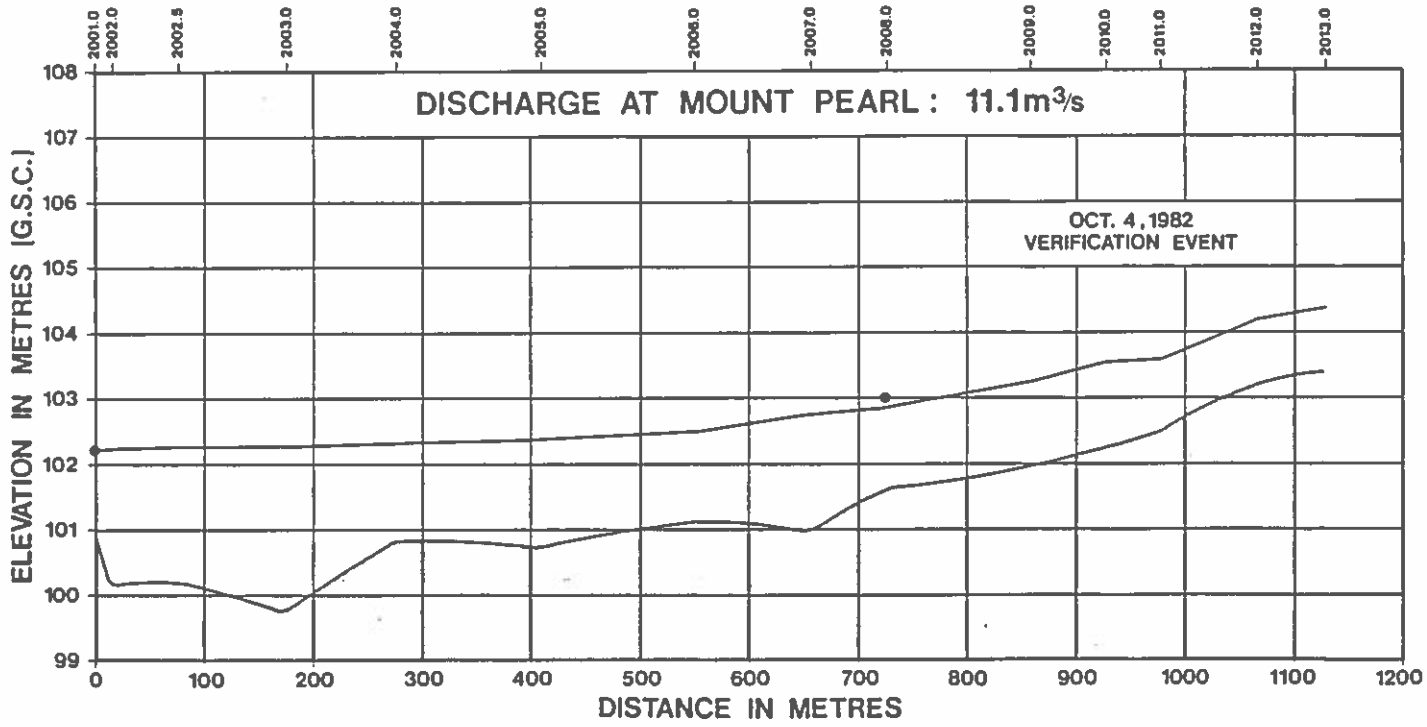

CROSS-SECTION NUMBERS
1001.0
1001.5
1002.1
1002.9
1003.0
1004.0
1005.0
1005.7
1005.8
1005.9
1006.0
1006.1
1006.2
1006.3
1006.5
1006.8
1007.0
1008.0
DISCHARGE AT KILBRIDE : 47.2m³/s
LEGEND
MEASURED WATER SURFACE ELEVATION
COMPUTED WATER SURFACE ELEVATION
CHANNEL INVERT
NOTE PLOTS OF CROSS-SECTIONS ARE FOUND IN APPENDIX A.
ADDITIONAL LOCATIONAL INFORMATION CAN BE FOUND ON FLOOD RISK MAPS IN POCKETS AT THE END OF THE REPORT.
NOV. 26, 1981
VERIFICATION EVENT
ELEVATION IN METRES (G.S.C.)
38
37
36
35
34
33
32
31
30
29
0
50
100
150
200
250
300
350
DISTANCE IN METRES

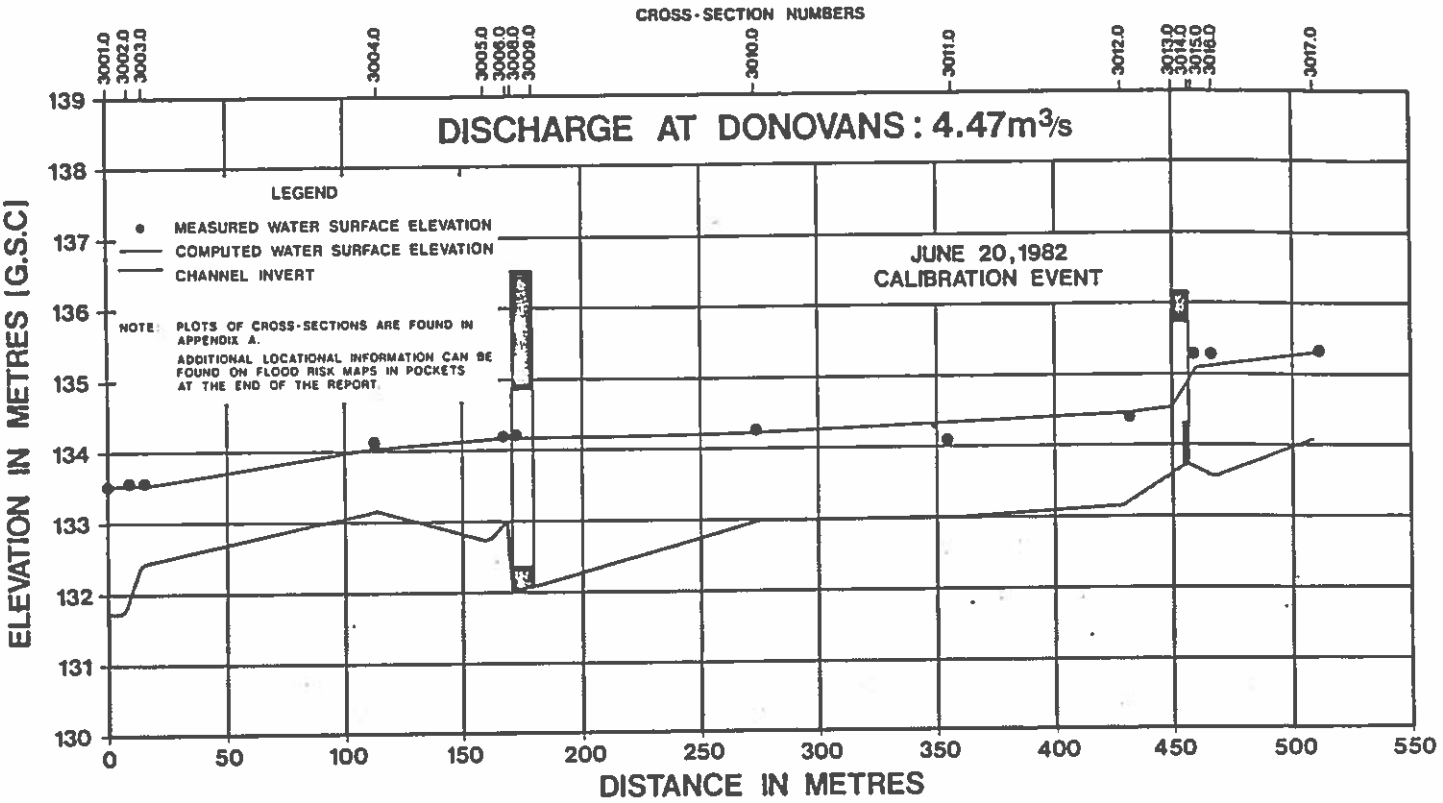

1001.0
1001.5
1002.1
1002.9
1003.0
1004.0
1005.0
1005.7
1005.8
1005.9
1006.0
1006.1
1006.2
1006.3
1006.5
1006.8
1007.0
1008.0
DISCHARGE AT KILBRIDE : 10.2m³/s
SEPT. 15, 1983
VERIFICATION EVENT
ELEVATION IN METRES (G.S.C.)
38
37
36
35
34
33
32
31
30
29
0
50
100
150
200
250
300
350
DISTANCE IN METRES

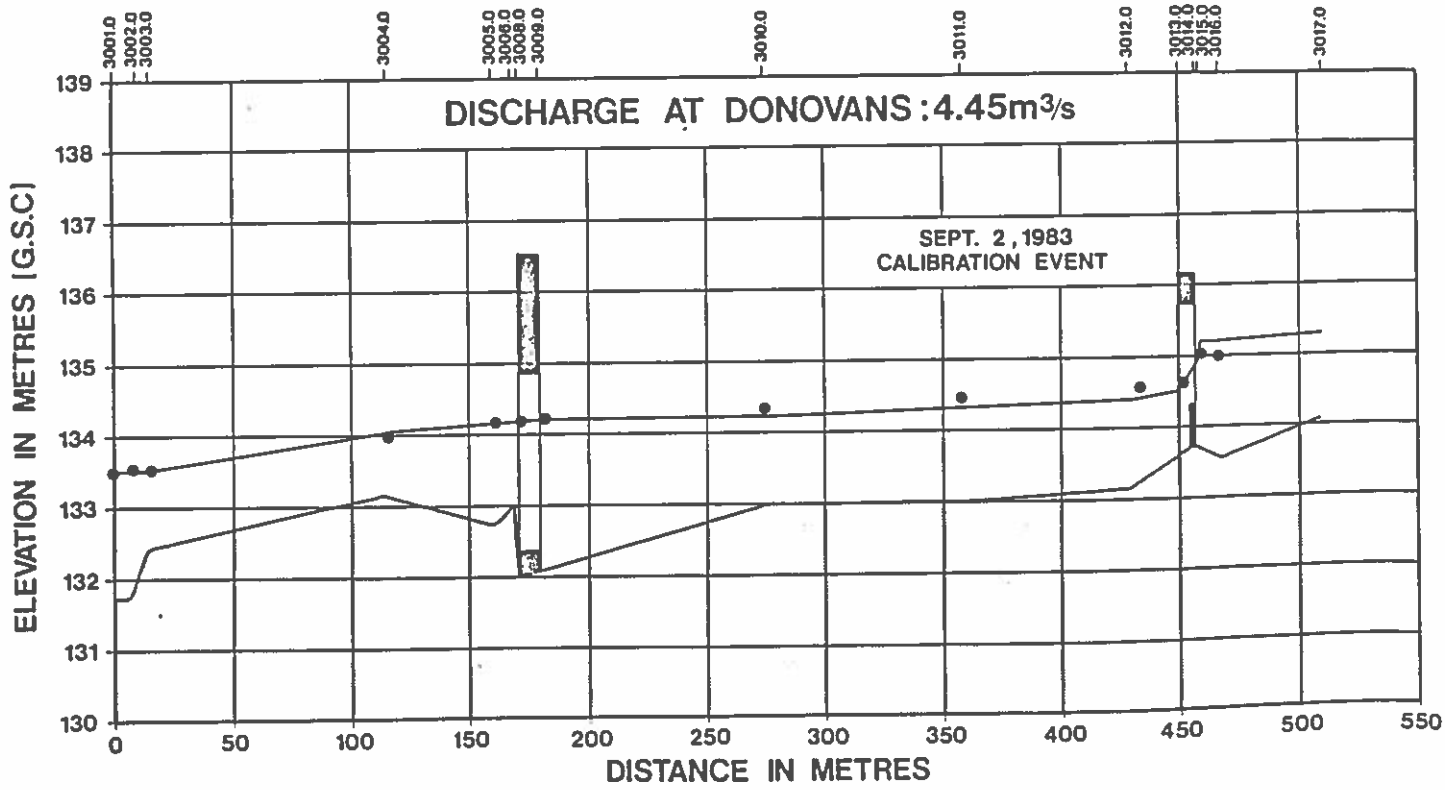

CROSS-SECTION NUMBERS
2001.0
2002.0
2002.5
2003.0
2004.0
2005.0
2006.0
2007.0
2008.0
2009.0
2010.0
2011.0
2012.0
2013.0
DISCHARGE AT MOUNT PEARL : 8.67m³/s
LEGEND
MEASURED WATER SURFACE ELEVATION
COMPUTED WATER SURFACE ELEVATION
CHANNEL INVERT
NOTE PLOTS OF CROSS-SECTIONS ARE FOUND IN APPENDIX A.
ADDITIONAL LOCATIONAL INFORMATION CAN BE FOUND ON FLOOD RISK MAPS IN POCKETS AT THE END OF THE REPORT.
JUNE 20, 1982
CALIBRATION EVENT
ELEVATION IN METRES (G.S.C.)
108
107
106
105
104
103
102
101
100
99
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
DISTANCE IN METRES

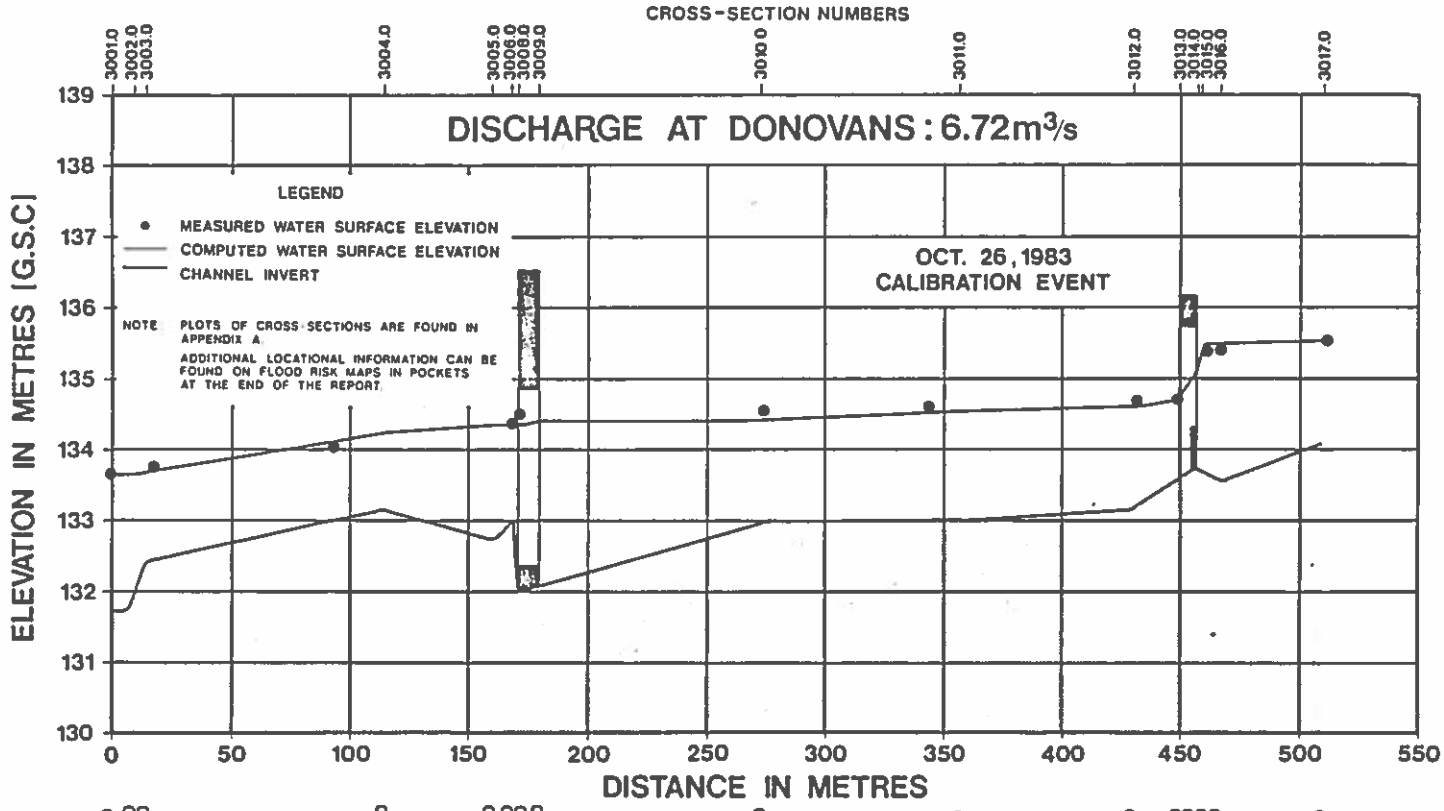

2001.0
2002.0
2002.5
2003.0
2004.0
2005.0
2006.0
2007.0
2008.0
2009.0
2010.0
2011.0
2012.0
2013.0
DISCHARGE AT MOUNT PEARL : 12.0m³/s
OCT. 26, 1983
CALIBRATION EVENT
ELEVATION IN METRES (G.S.C.)
108
107
106
105
104
103
102
101
100
99
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
DISTANCE IN METRES

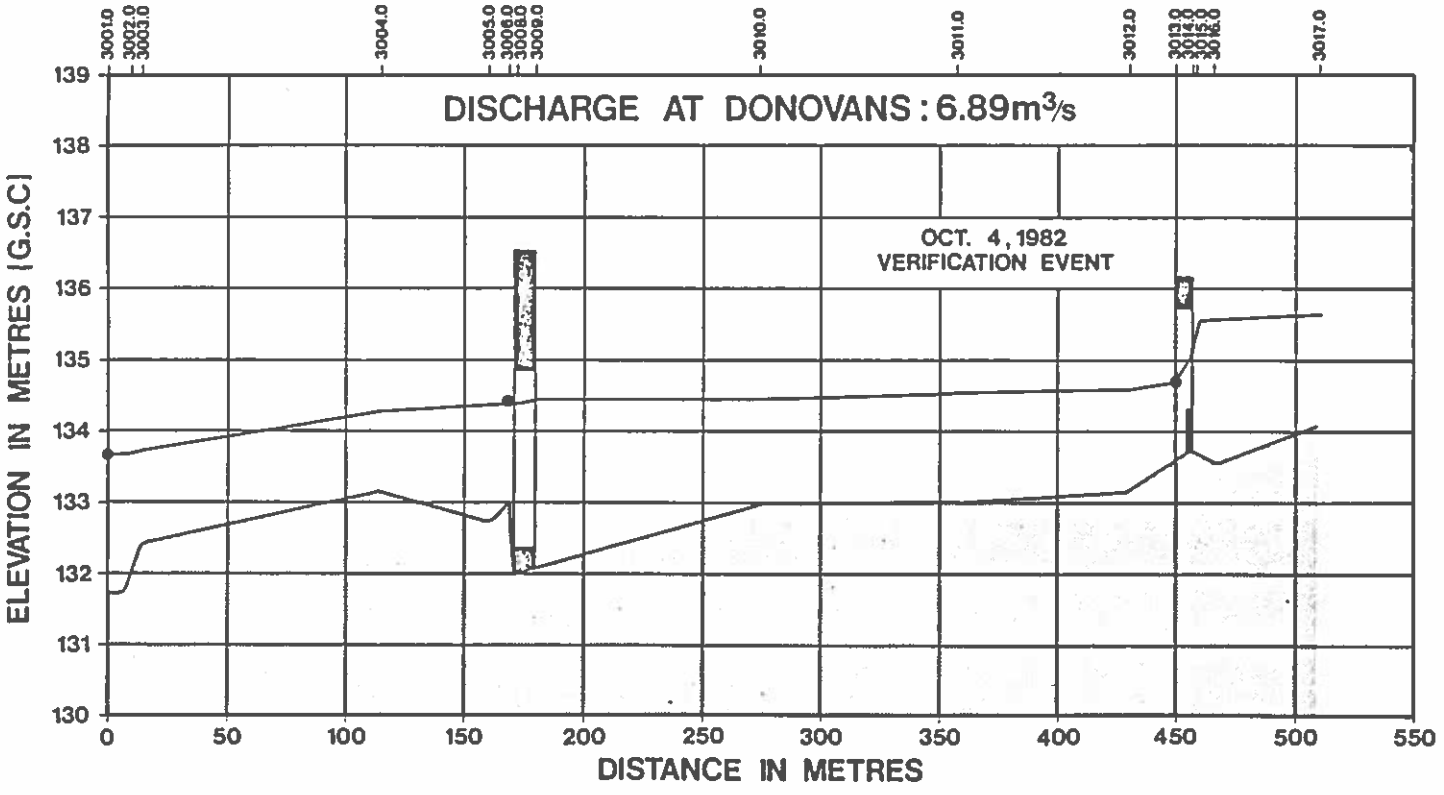

CROSS-SECTION NUMBERS
2001.0
2002.0
2002.5
2003.0
2004.0
2005.0
2006.0
2007.0
2008.0
2009.0
2010.0
2011.0
2012.0
2013.0
DISCHARGE AT MOUNT PEARL : 8.54m3/s
LEGEND
MEASURED WATER SURFACE ELEVATION
COMPUTED WATER SURFACE ELEVATION
CHANNEL INVERT
NOTE: PLOTS OF CROSS-SECTIONS ARE FOUND IN APPENDIX A.
ADDITIONAL LOCATIONAL INFORMATION CAN BE FOUND ON FLOOD RISK MAPS IN POCKETS AT THE END OF THE REPORT.
JUNE 21, 1982
VERIFICATION EVENT
ELEVATION IN METRES (G.S.C.)
108
107
106
105
104
103
102
101
100
99
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
DISTANCE IN METRES


2001.0
2002.0
2002.5
2003.0
2004.0
2005.0
2006.0
2007.0
2008.0
2009.0
2010.0
2011.0
2012.0
2013.0
DISCHARGE AT MOUNT PEARL : 11.1m3/s
OCT. 4, 1982
VERIFICATION EVENT
ELEVATION IN METRES (G.S.C.)
108
107
106
105
104
103
102
101
100
99
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
DISTANCE IN METRES


CROSS-SECTION NUMBERS
3001.0
3002.0
3003.0
3004.0
3005.0
3006.0
3008.0
3009.0
3010.0
3011.0
3012.0
3013.0
3014.0
3015.0
3016.0
3017.0
DISCHARGE AT DONOVANS : 4.47m3/s
LEGEND
MEASURED WATER SURFACE ELEVATION
COMPUTED WATER SURFACE ELEVATION
CHANNEL INVERT
NOTE: PLOTS OF CROSS-SECTIONS ARE FOUND IN APPENDIX A.
ADDITIONAL LOCATIONAL INFORMATION CAN BE FOUND ON FLOOD RISK MAPS IN POCKETS AT THE END OF THE REPORT.
JUNE 20,1982
CALIBRATION EVENT
ELEVATION IN METRES (G.S.C)
139
138
137
136
135
134
133
132
131
130
0
50
100
150
200
250
300
350
400
450
500
550
DISTANCE IN METRES


3001.0
3002.0
3003.0
3004.0
3005.0
3006.0
3008.0
3009.0
3010.0
3011.0
3012.0
3013.0
3014.0
3015.0
3016.0
3017.0
DISCHARGE AT DONOVANS : 4.45m3/s
SEPT. 2,1983
CALIBRATION EVENT
ELEVATION IN METRES (G.S.C)
139
138
137
136
135
134
133
132
131
130
0
50
100
150
200
250
300
350
400
450
500
550
DISTANCE IN METRES


CROSS-SECTION NUMBERS
3001.0
3002.0
3003.0
3004.0
3005.0
3006.0
3008.0
3009.0
3010.0
3011.0
3012.0
3013.0
3014.0
3015.0
3016.0
3017.0
DISCHARGE AT DONOVANS : 6.72m³/s
LEGEND
MEASURED WATER SURFACE ELEVATION
COMPUTED WATER SURFACE ELEVATION
CHANNEL INVERT
NOTE PLOTS OF CROSS-SECTIONS ARE FOUND IN APPENDIX A.
ADDITIONAL LOCATIONAL INFORMATION CAN BE FOUND ON FLOOD RISK MAPS IN POCKETS AT THE END OF THE REPORT.
OCT. 26, 1983
CALIBRATION EVENT
ELEVATION IN METRES (G.S.C.)
DISTANCE IN METRES
139
138
137
136
135
134
133
132
131
130
0
50
100
150
200
250
300
350
400
450
500
550


3001.0
3002.0
3003.0
3004.0
3005.0
3006.0
3008.0
3009.0
3010.0
3011.0
3012.0
3013.0
3014.0
3015.0
3016.0
3017.0
DISCHARGE AT DONOVANS : 6.89m³/s
OCT. 4, 1982
VERIFICATION EVENT
ELEVATION IN METRES (G.S.C.)
DISTANCE IN METRES
139
138
137
136
135
134
133
132
131
130
0
50
100
150
200
250
300
350
400
450
500
550

APPENDIX I

EXAMPLE OF COMPUTER OUTPUT

1:100 YEAR FLOOD

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**************************************************
   HEC2 RELEASE DATED NOV 76 UPDATED MARC 1982
   ERROR CORR -  01,02,03,04,05
   MODIFICATION -  50,51,52,53,54,55
 **************************************************
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

WATERFORD R. AT KILBRID

SUMMARY PRINTOUT

SECNO	WSELK	CWSEL	DIFKWS	K*XNL	K*XNCH	K*XNR	K*WTN	K*CHSL	DEPTH
1001.000	33.11	33.11	.00	30.00	15.00	30.00	.00	.00	2.94
1001.500	.00	33.15	.00	30.00	15.00	30.00	.00	-25.67	3.14
1002.100	.00	33.01	.00	30.00	15.00	30.00	.00	-1713.33	3.52
1002.900	.00	33.02	.00	30.00	15.00	30.00	.00	.00	3.52
1003.000	.00	33.20	.00	30.00	15.00	30.00	.00	-293.33	3.79
1004.000	.00	33.22	.00	30.00	20.00	30.00	.00	115.09	2.54
1005.000	.00	33.25	.00	30.00	20.00	30.00	.00	7.02	2.32
1005.700	.00	33.12	.00	30.00	20.00	30.00	.00	6.85	1.68
1005.800	.00	33.26	.00	35.00	30.00	35.00	.00	2.86	1.68
1005.900	.00	33.65	.00	35.00	30.00	35.00	.00	-3.45	2.18
1006.000	.00	33.66	.00	35.00	30.00	35.00	.00	.00	2.19
1006.100	.00	33.70	.00	35.00	40.00	50.00	.00	-19.53	2.56
1006.200	.00	33.67	.00	30.00	40.00	50.00	.00	-21.50	2.78
1006.300	.00	33.73	.00	30.00	40.00	50.00	.00	44.40	2.30
1006.400	.00	33.73	.00	30.00	40.00	50.00	.00	.00	2.29
1006.500	.00	33.74	.00	35.00	40.00	50.00	.00	.00	2.30
1006.700	.00	33.75	.00	60.00	40.00	50.00	.00	.00	2.31

SECNO	WSELK	CWSEL	DIFKWS	K*XNL	K*XNCH	K*XNR	K*WTN	K*CHSL	DEPTH
1006.800	.00	33.76	.00	60.00	40.00	50.00	.00	.00	2.32
1007.000	.00	33.99	.00	45.00	40.00	45.00	.00	4.19	2.40
1008.000	.00	34.43	.00	45.00	40.00	45.00	.00	7.65	2.63

WATERFORD R. AT KILBRID

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
1001.000	.00	.00	.00	30.17	65.41	33.11	32.04	33.17	1.32	1.31	113.11	56.99
1001.500	6.00	.00	.00	30.01	65.41	33.15	32.24	33.18	.75	1.03	147.33	75.71
1002.100	.30	34.01	34.39	29.50	65.41	33.01	32.09	33.31	6.80	2.42	27.01	25.08
1002.900	10.00	34.01	34.39	29.50	65.41	33.02	32.09	33.32	6.80	2.42	27.01	25.07
1003.000	.30	.00	.00	29.41	65.41	33.20	31.77	33.33	2.53	1.64	39.90	41.15
1004.000	11.00	.00	.00	30.68	65.41	33.22	32.19	33.34	4.74	1.55	42.09	30.06
1005.000	36.20	.00	.00	30.93	65.41	33.25	32.40	33.36	4.29	1.52	50.44	31.60
1005.700	75.00	.00	.00	31.44	65.41	33.12	33.08	33.51	26.44	3.09	28.42	12.72
1005.800	49.00	.00	.00	31.58	65.41	33.26	33.24	33.76	91.80	3.12	20.94	6.83
1005.900	31.90	.00	.00	31.47	65.41	33.65	33.17	33.92	26.24	2.39	30.99	12.77
1006.000	.10	.00	.00	31.47	65.41	33.66	33.18	33.92	24.91	2.37	31.64	13.11
1006.100	17.00	.00	.00	31.14	65.41	33.70	32.91	33.98	39.03	2.38	28.60	10.47
1006.200	12.00	.00	.00	30.88	65.41	33.67	33.10	34.08	60.10	2.93	24.40	8.44
1006.300	12.50	.00	.00	31.44	65.41	33.73	33.17	34.16	65.83	2.93	23.40	8.06
1006.400	.10	.00	.00	31.44	65.41	33.73	33.17	34.16	66.37	2.94	23.33	8.03
1006.500	.60	.00	.00	31.44	65.41	33.74	33.17	34.16	66.47	2.94	23.32	8.02
1006.700	1.50	.00	.00	31.44	65.41	33.75	33.17	34.18	65.57	2.93	23.43	8.08
1006.800	.10	.00	.00	31.44	65.41	33.76	33.16	34.18	64.78	2.92	23.54	8.13
1007.000	38.40	.00	.00	31.60	65.41	33.99	33.64	34.46	77.24	3.15	23.01	7.44
1008.000	25.50	.00	.00	31.79	65.41	34.43	33.59	34.63	42.40	1.98	32.99	10.05

WATERFORD R. AT KILBRID

SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
1001.000	65.41	33.11	.00	.00	.00	157.55	.00
1001.500	65.41	33.15	.00	.04	.00	145.22	6.00
1002.100	65.41	33.01	.00	-.13	.00	11.15	.30
1002.900	65.41	33.02	.00	.01	.00	11.15	10.00
1003.000	65.41	33.20	.00	.18	.00	14.93	.30
1004.000	65.41	33.22	.00	.02	.00	22.60	11.00
1005.000	65.41	33.25	.00	.03	.00	35.55	36.20
1005.700	65.41	33.12	.00	-.13	.00	31.91	75.00
1005.800	65.41	33.26	.00	.14	.00	20.17	49.00
1005.900	65.41	33.65	.00	.39	.00	30.18	31.90
1006.000	65.41	33.66	.00	.01	.00	30.52	.10
1006.100	65.41	33.70	.00	.04	.00	17.56	17.00
1006.200	65.41	33.67	.00	-.03	.00	14.33	12.00
1006.300	65.41	33.73	.00	.07	.00	12.09	12.50
1006.400	65.41	33.73	.00	.00	.00	12.08	.10
1006.500	65.41	33.74	.00	.00	.00	12.08	.60
1006.700	65.41	33.75	.00	.01	.00	12.10	1.50
1006.800	65.41	33.76	.00	.00	.00	12.11	.10
1007.000	65.41	33.99	.00	.24	.00	17.95	38.40
1008.000	65.41	34.43	.00	.43	.00	16.45	25.50

****
HEC2 RELEASE DATED NOV 76 UPDATED MARC 1982
ERROR CORR - 01,02,03,04,05
MODIFICATION - 50,51,52,53,54,55
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

WATERFORD R. AT KILBRID

SUMMARY PRINTOUT

SECNO	WSELK	CWSEL	DIFKWS	K*XNL	K*XNCH	K*XNR	K*WTN	K*CHSL	DEPTH
1001.000	33.47	33.47	.00	30.00	15.00	30.00	.00	.00	3.30
1001.500	.00	33.48	.00	30.00	15.00	30.00	.00	-25.67	3.47
1002.100	.00	33.31	.00	30.00	15.00	30.00	.00	-1713.33	3.81
1002.900	.00	33.31	.00	30.00	15.00	30.00	.00	.00	3.82
1003.000	.00	33.54	.00	30.00	15.00	30.00	.00	-293.33	4.14
1004.000	.00	33.59	.00	30.00	20.00	30.00	.00	115.09	2.91
1005.000	.00	33.64	.00	30.00	20.00	30.00	.00	7.02	2.71
1005.700	.00	33.58	.00	30.00	20.00	30.00	.00	6.85	2.14
1005.800	.00	33.56	.00	35.00	30.00	35.00	.00	2.86	1.97
1005.900	.00	33.87	.00	35.00	30.00	35.00	.00	-3.45	2.40
1006.000	.00	33.88	.00	35.00	30.00	35.00	.00	.00	2.41
1006.100	.00	33.87	.00	35.00	40.00	50.00	.00	-19.53	2.73
1006.200	.00	33.81	.00	30.00	40.00	50.00	.00	-21.50	2.93
1006.300	.00	33.90	.00	30.00	40.00	50.00	.00	44.40	2.46
1006.400	.00	33.90	.00	30.00	40.00	50.00	.00	.00	2.46
1006.500	.00	33.91	.00	35.00	40.00	50.00	.00	.00	2.47
1006.700	.00	33.95	.00	60.00	40.00	50.00	.00	.00	2.51

SECNO	WSELK	CWSEL	DIFKWS	K*XNL	K*XNCH	K*XNR	K*WTN	K*CHSL	DEPTH
1006.800	.00	33.95	.00	60.00	40.00	50.00	.00	.00	2.51
1007.000	.00	34.32	.00	45.00	40.00	45.00	.00	4.19	2.72
1008.000	.00	34.72	.00	45.00	40.00	45.00	.00	7.65	2.92

WATERFORD R. AT KILBRID

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
1001.000	.00	.00	.00	30.17	82.87	33.47	32.44	33.50	.84	1.15	170.01	90.46
1001.500	6.00	.00	.00	30.01	82.87	33.48	32.47	33.51	.57	.98	196.24	109.80
1002.100	.30	34.01	34.39	29.50	82.87	33.31	32.35	33.69	7.79	2.73	30.31	29.68
1002.900	10.00	34.01	34.39	29.50	82.87	33.31	32.35	33.70	7.80	2.74	30.30	29.67
1003.000	.30	.00	.00	29.41	82.87	33.54	31.99	33.72	2.82	1.84	45.11	49.38
1004.000	11.00	.00	.00	30.68	82.87	33.59	32.38	33.72	4.42	1.64	50.52	39.42
1005.000	36.20	.00	.00	30.93	82.87	33.64	32.62	33.74	3.48	1.53	64.25	44.45
1005.700	75.00	.00	.00	31.44	82.87	33.58	33.24	33.83	13.51	2.58	43.98	22.54
1005.800	49.00	.00	.00	31.58	82.87	33.56	33.44	34.02	70.60	3.02	27.40	9.86
1005.900	31.90	.00	.00	31.47	82.87	33.87	33.41	34.17	25.83	2.55	39.56	16.31
1006.000	.10	.00	.00	31.47	82.87	33.88	33.43	34.17	24.80	2.54	39.98	16.64
1006.100	17.00	.00	.00	31.14	82.87	33.87	33.15	34.25	47.45	2.76	32.00	12.03
1006.200	12.00	.00	.00	30.88	82.87	33.81	33.40	34.38	76.95	3.45	26.66	9.45
1006.300	12.50	.00	.00	31.44	82.87	33.90	33.46	34.49	84.86	3.46	25.34	9.00
1006.400	.10	.00	.00	31.44	82.87	33.90	33.46	34.49	83.90	3.45	25.45	9.05
1006.500	.60	.00	.00	31.44	82.87	33.91	33.46	34.49	83.21	3.44	25.53	9.08
1006.700	1.50	.00	.00	31.44	82.87	33.95	33.46	34.51	77.33	3.36	26.31	9.42
1006.800	.10	.00	.00	31.44	82.87	33.95	33.46	34.51	77.37	3.37	26.30	9.42
1007.000	38.40	.00	.00	31.60	82.87	34.32	34.00	34.80	69.85	3.28	29.45	9.92
1008.000	25.50	.00	.00	31.79	82.87	34.72	33.80	34.96	44.95	2.20	37.71	12.36

WATERFORD R. AT KILBRID

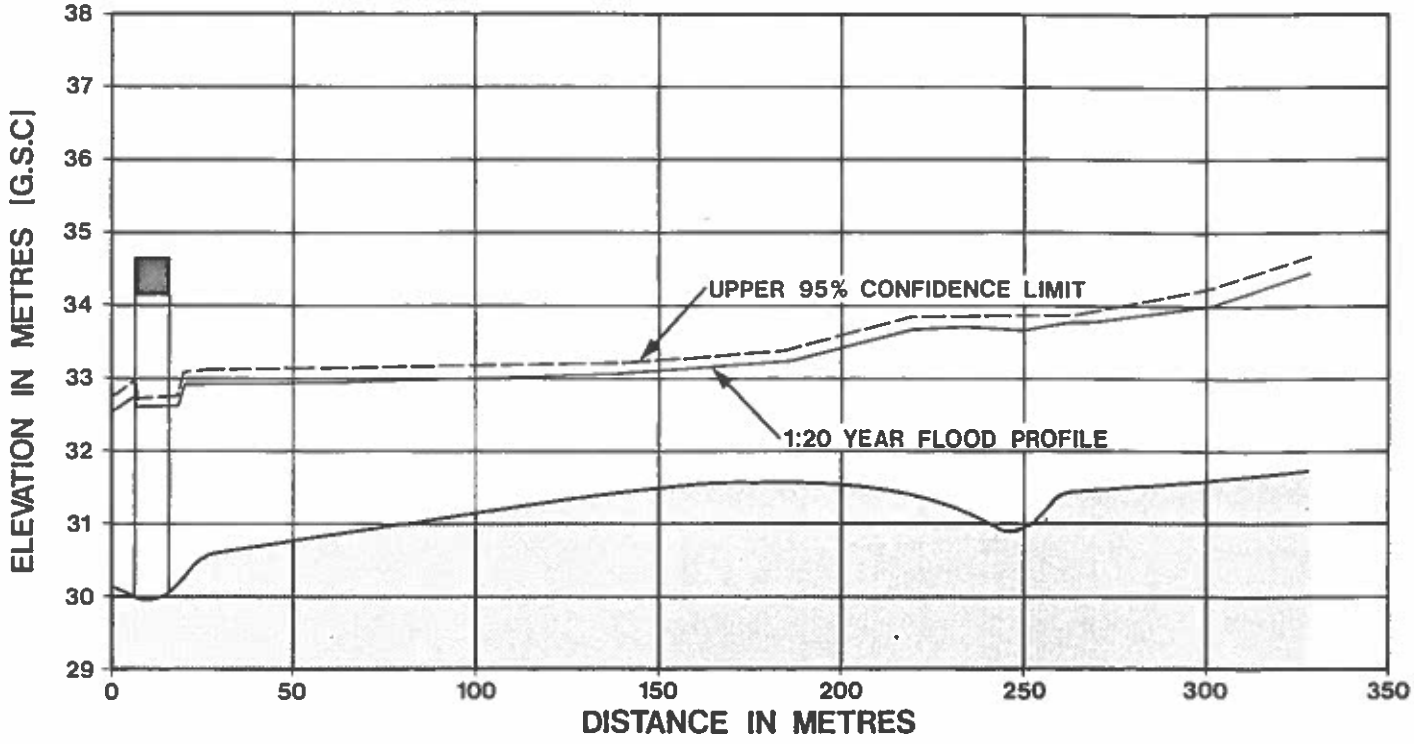
SUMMARY PRINTOUT TABLE 150

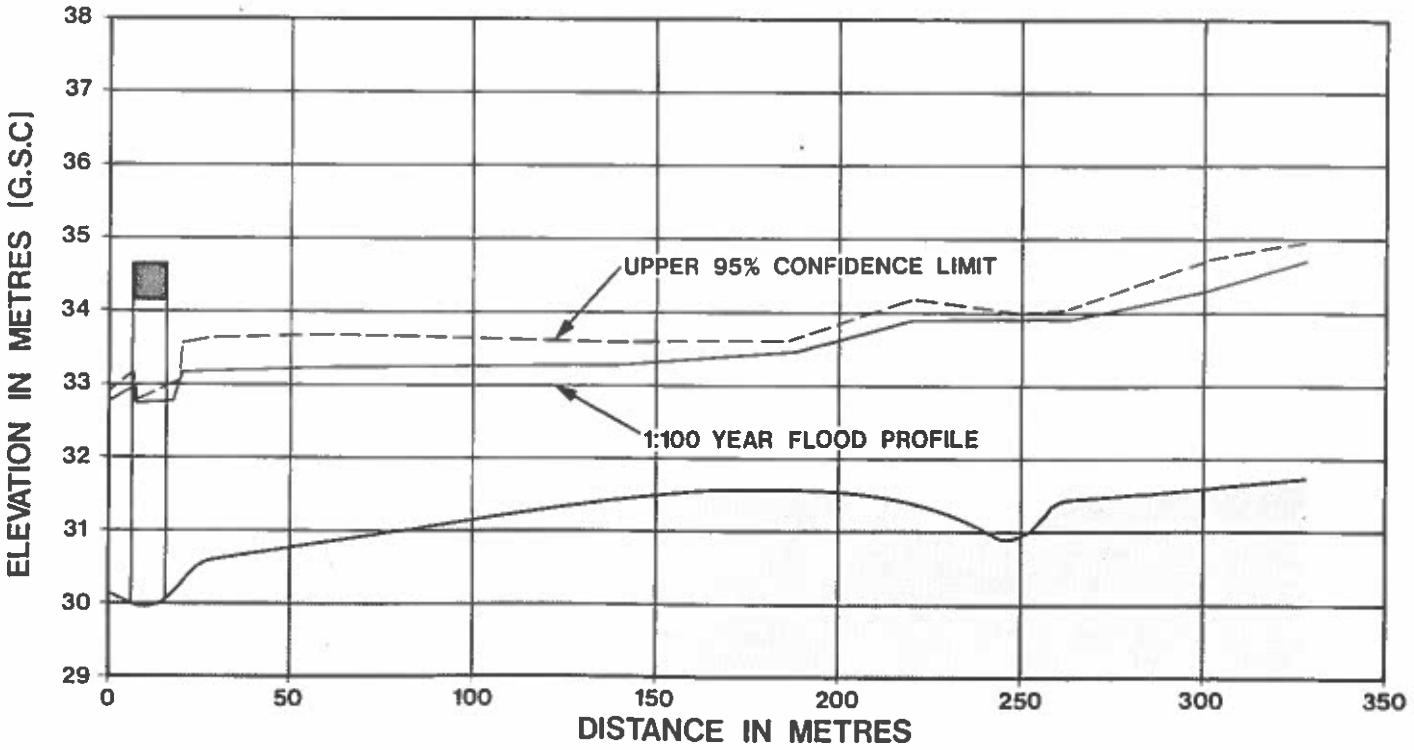
SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
1001.000	82.87	33.47	.00	.00	.00	158.51	.00
1001.500	82.87	33.48	.00	.02	.00	146.08	6.00
1002.100	82.87	33.31	.00	-.18	.00	11.21	.30
1002.900	82.87	33.31	.00	.01	.00	11.21	10.00
1003.000	82.87	33.54	.00	.23	.00	14.93	.30
1004.000	82.87	33.59	.00	.04	.00	23.42	11.00
1005.000	82.87	33.64	.00	.05	.00	36.31	36.20
1005.700	82.87	33.58	.00	-.05	.00	35.34	75.00
1005.800	82.87	33.56	.00	-.03	.00	22.69	49.00
1005.900	82.87	33.87	.00	.32	.00	48.93	31.90
1006.000	82.87	33.88	.00	.01	.00	48.76	.10
1006.100	82.87	33.87	.00	-.01	.00	20.98	17.00
1006.200	82.87	33.81	.00	-.06	.00	17.29	12.00
1006.300	82.87	33.90	.00	.08	.00	14.49	12.50
1006.400	82.87	33.90	.00	.01	.00	14.65	.10
1006.500	82.87	33.91	.00	.01	.00	14.77	.60
1006.700	82.87	33.95	.00	.04	.00	15.86	1.50
1006.800	82.87	33.95	.00	.00	.00	15.85	.10
1007.000	82.87	34.32	.00	.37	.00	22.17	38.40
1008.000	82.87	34.72	.00	.40	.00	16.48	25.50

APPENDIX J

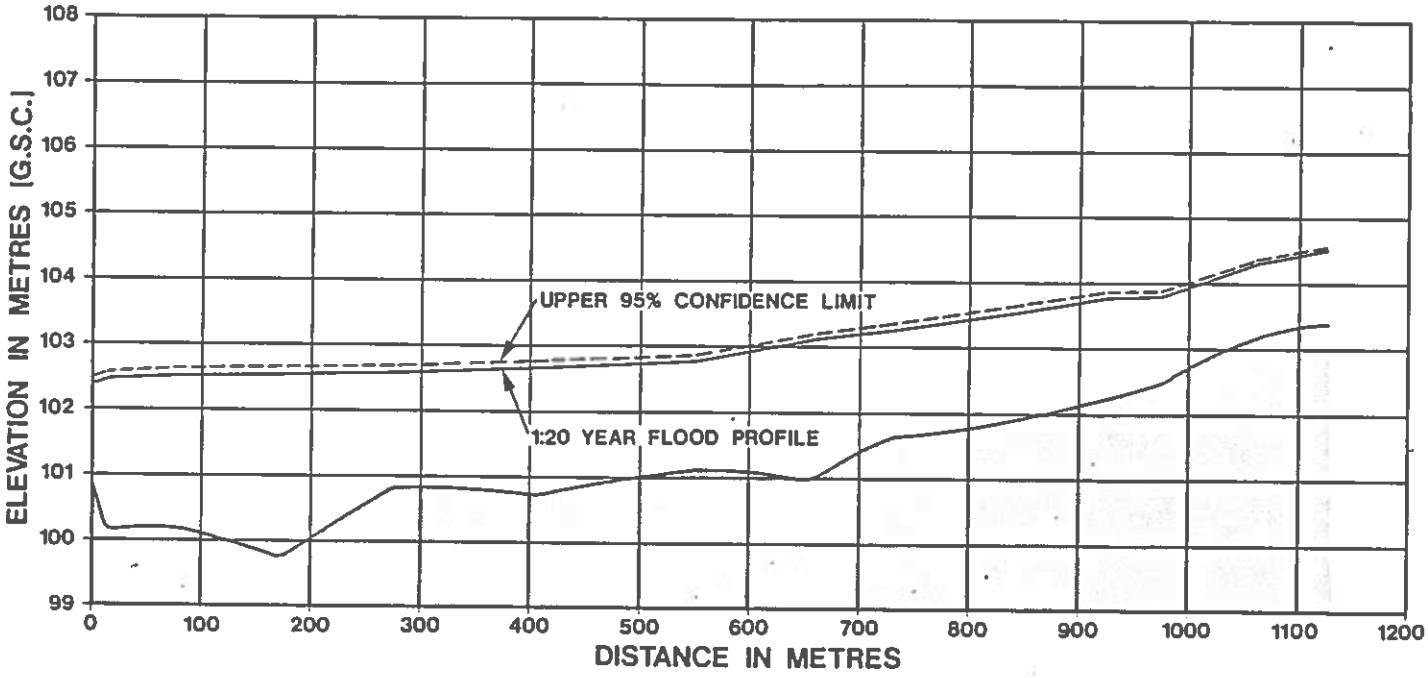
1:20 AND 1:100 YEAR RETURN PERIOD FLOOD PROFILES

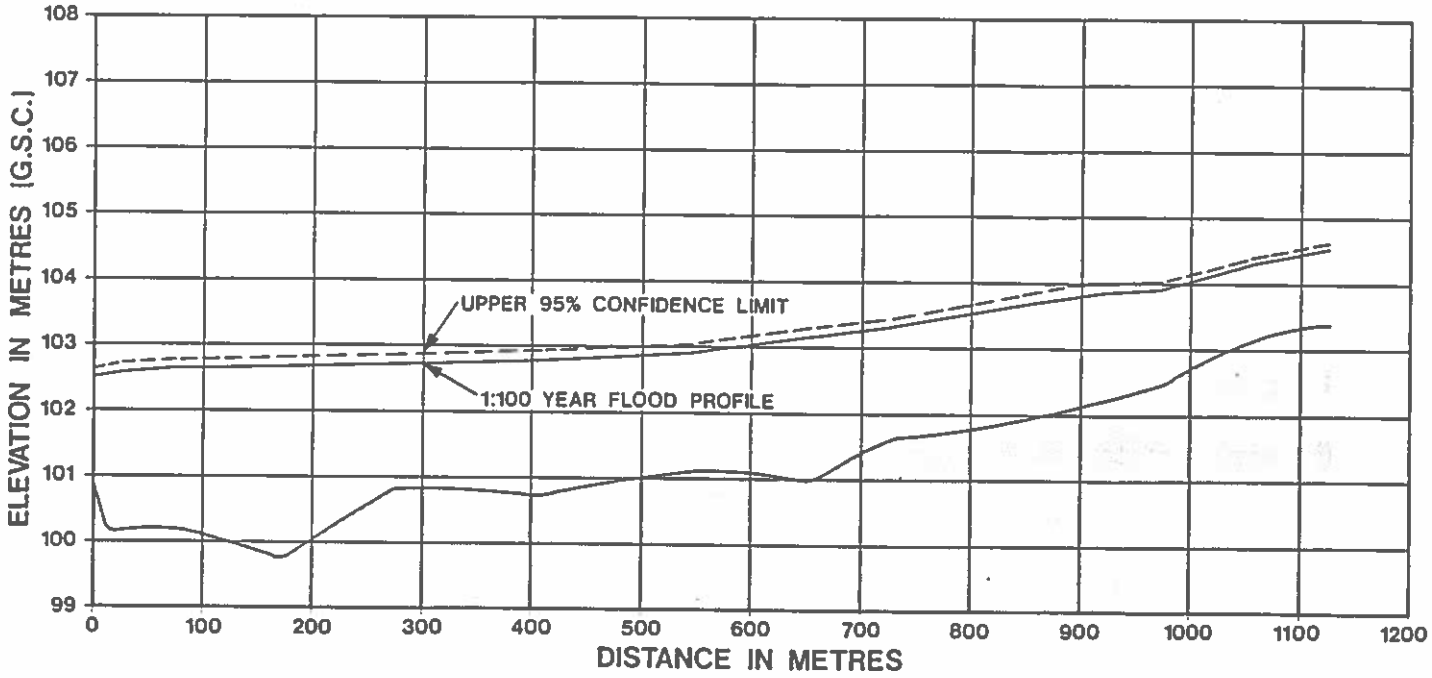
1:20 & 1:100 YEAR RETURN PERIOD FLOOD PROFILE
KILBRIDE





1:20 & 1:100 YEAR RETURN PERIOD FLOOD PROFILE
MOUNT PEARL





1:20 & 1:100 YEAR RETURN PERIOD FLOOD PROFILE
DONOVANS