

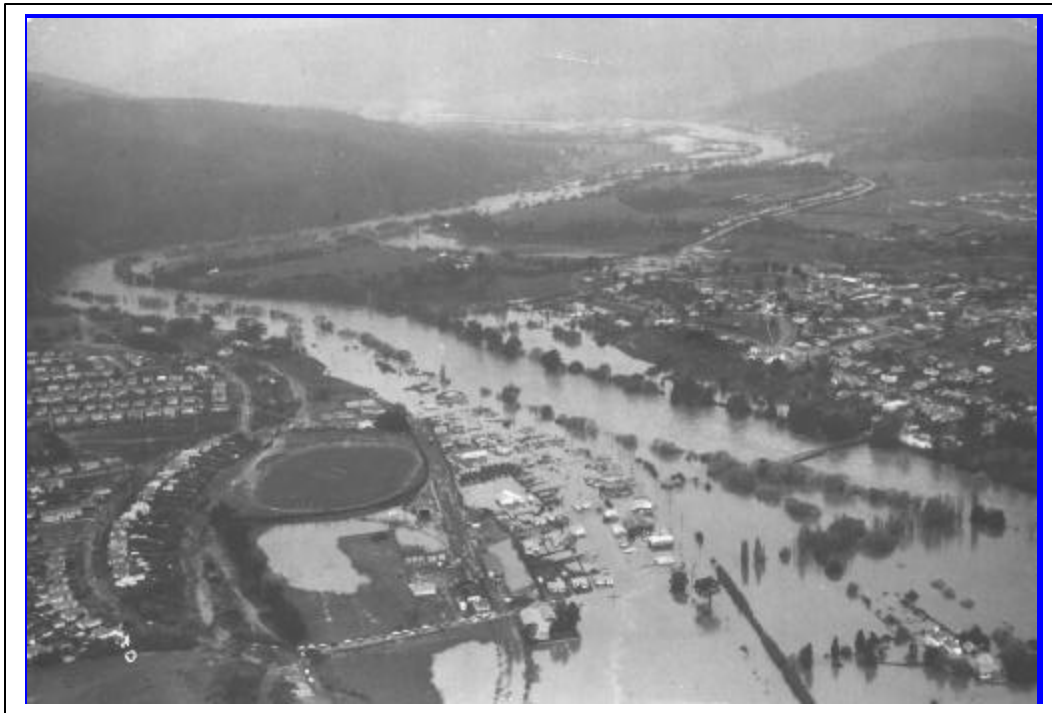


Tasmania

DEPARTMENT of
PRIMARY INDUSTRIES,
WATER and ENVIRONMENT



RIVER DERWENT FLOOD DATA BOOK



Land and Water Management Branch
Resource Management and Conservation Division
May 2000



DEPARTMENT *of*
PRIMARY INDUSTRIES,
WATER *and* ENVIRONMENT



River Derwent Flood Data Book

**This Book Forms a Part of the Requirements for
Emergency Management Australia Reporting**

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GLOSSARY

Annual Exceedance Probability (AEP)

A measure of the likelihood (expressed as a probability) of a flood reaching or exceeding a particular magnitude. For example, a 1% (AEP) flood has a 1% (or 1 in a 100) chance of occurring or being exceeded at a location in any one year.

Australian Height Datum (ADH) Tasmania

The datum surface is the mean sea level for 1972 at the tide gauges at Hobart and Burnie. River level heights are benchmarked (marked point in a line of levels) to mean sea level.

Catchment

The land area that drains into a particular watercourse (river, stream or creek). It can be a natural topographic division of the landscape, although the underlying geological formations may alter the perceived catchment area suggested solely by topography (limestone caves are an example of this).

Cumec

The basic stream flow unit expressed as cubic metres per second (m³/s).

Discharge

The passage of flood flow volume with time. Discharge can be separated into direct runoff (overland flow, interflow and storm flow) and base flow (contributions of ground water spread out over longer periods of time).

Extreme Flood

A rare and unusually severe flood that is greater in magnitude than the 1% AEP event, and possibly approaching the magnitude of the Probable Maximum Flood.

Flood

Inundations of water over land as a result of overflow from rivers or the inflow of tide. Flood runoff results from short duration highly intense rainfall, long duration low intensity rainfall, snowmelt, failure of dam or levee system, or a combination of these conditions.

Flood Plain

Land which is covered by water when a river overflows its banks during flooding. The extent of the flood plain will normally be greater than the area covered in a 1% AEP event.

Hydraulics

The study of water flow in a river and across a flood plain and the evaluation of the river flow characteristics (ie river height and velocity).

Hydrology

A study of the rainfall-runoff process as it relates to the development of flooding and the derivation of hydrographs for given floods.

Inundation

The flooding of an area so that it is submerged or covered with water.

Probable Maximum Flood (PMF)

The flood calculated to be the most severe which is likely to occur at a particular location. Such a flood would result from the most severe combination of critical meteorological and hydrological conditions.

State Datum (SD) Tasmania

The datum surface where the mean sea level at Hobart was determined over a period of thirty years prior to 1905.

ACRONYMS

- BOM - Bureau of Meteorology
- DPIWE - Department of Primary Industries, Water and Environment
- DPIF - Department of Primary Industry and Fisheries (replaced by DPIWE)
- DPI - Department of Primary Industry (replaced by DPIF)
- EMA - Emergency Management Australia
- HEC - Hydro Electric Commission
- IDNDR - International Decade for Natural Disaster Reduction
- RWSC - Rivers and Water Supply Commission
- SES - State Emergency Service

1. Introduction

Flood Data Books

Flood Data Books are an important initiative funded by the International Decade for Natural Disaster Reduction and the Department of Primary Industries, Water and Environment (DPIWE).

Flood Data Books are a new concept in flood plain management in Tasmania. The books are a collation of existing information on rural floods and their extent. The information includes photographs, maps of flood extent, flood profiles, and a tabulation of heights reached by floods (where the information is available). Alternative approaches such as comprehensive but costly floodplain mapping programs are unrealistic for rural areas. Typically the information is not sufficient to undertake these programs, and the areal extent of floods make such projects prohibitively expensive.

Flood Data Books will be located in your local government office and are intended to be living documents updated over time to aid in floodplain planning decisions. If large floods occur, a comprehensive photographic record can provide valuable information for future planning at minimal cost. Community groups such as Landcare and Waterwatch, or various farming groups are encouraged to contribute their own flood information to these books to make them as effective as possible for current and future generations.

Data Sources

Data sources used to compile this Flood Data Book include newspaper articles, media records, official records and reports, internal documents, departmental photographs and anecdotal information. As a number of sources have been used, the accuracy of many of the records cannot be verified and care should be exercised when interpreting the information. In addition, properties identified in this book do not represent a list of areas affected by flooding but are properties where some flood information has been provided to DPIWE. Over time, as additional information is collected and added to this record, the level of accuracy regarding flooding and the locations affected should increase.

River level heights are benchmarked (marked point in a line of levels) to mean sea level. In Tasmania, mean sea level was established prior to 1905 and again during 1972. In response to these calculations there have been a number of statewide datum shifts, and two level adjustments were applied in 1979 and 1983. Heights computed in the 1979 adjustment are known as Australian Height Datum (AHD) 79 heights and heights computed in the 1983 adjustment are known as AHD 83 heights (Bowden and Prichard, 1992). As a result, to convert data from the State Datum (SD) system used prior to 1972 to the current AHD system, a conversion factor needs to be applied. In the Hobart region, an approximate conversion of minus 0.165 should be applied to SD data.

It is unknown if river level heights in the historical record have been reported as SD or AHD data. As this information has been collated from reports prepared *some time ago* (often the date can not be verified) it can only be assumed that the SD system applies. River level data used here, in the flood analysis and water surface profile is AHD data.

2. The Environment

Catchment and Drainage System

The River Derwent flows through mountainous country from the central highlands to the ocean. The catchment is approximately 10,200km², refer Figure 1. In the upper reaches, the Florentine, Ouse, Tyenna, Styx, Plenty and Clyde Rivers largely supply stream flow to the River Derwent. This river is interrupted by seven major dams and hydro-electric regulation from its headwaters at Cradle Mountain to its discharge into the Derwent Estuary.

The River Derwent is the major freshwater inflow to the Derwent Estuary, a highly stratified, drowned river system. The Estuary extends over 52kms from the Iron Pot in Storm Bay inland to New Norfolk. Tidal influences are notable past New Norfolk up to *The Rocks* just downstream from Lawitta. The effect of tidal activity on flood levels larger than the 1:20 Annual Exceedance Probability (AEP) event is considered to be minor at New Norfolk (Hydro-Electric Commission, 1992).



Figure 1: The Derwent Catchment (Coughanowr, 1995).

Climate and Rainfall

Precipitation contributes fresh water into the Derwent catchment and in the Hobart region the annual rainfall ranges from approximately 600mm/year in the Derwent Estuary to over 1200mm/year or more in mountainous areas including Cradle Mountain.

3. Flooding in the Derwent Catchment

Historic Floods

Historic flooding throughout Tasmania was first reported in September 1828 when widespread flooding was recorded. On the 20th March 1846, significant flooding resulted in damage to the New Norfolk Bridge, and the bridges between Hamilton and New Norfolk were washed away or rendered impassable. *Atherfield House* near New Norfolk recorded this flood as the second highest since settlement at 7.5 metres (Hydro-Electric Commission, 1992). In February 1854, the River Derwent rose to approximately 3.6 metres and severe flooding following a southerly gale was reported for the 14th December 1863, when extensive damage was reported at New Norfolk. On the 14th June 1889, flooding caused damage in the upper Derwent Valley and at Bushy Park (considered the highest in 25 years).

During 1916 on the 14th December, record flooding was reported throughout the Derwent Valley including the tributaries of the Ouse and Clyde Rivers. Serious flooding occurred on the 1st June 1923 when floodwaters were 1.0 metre deep over the Bridgewater main road and many families were evacuated at New Norfolk. Flooding is reported again in the River Derwent and tributaries during September 1928 and it is recorded that water rose 1.5 metres over Glenora Road. During 1929, a most extreme flood was experienced throughout Tasmania and during this event the Clyde River rose to over 5.0 metres at Hamilton, floodwaters from the Styx River submerged the highway at Bushy Park and Sorell Creek flooded the Lyell Highway (State Emergency Service, 1990). This region once again flooded in 1931 on the 3rd March, when the Styx River was reported as being the highest for 20 years.

The Ouse River was reported to be highest since 1916 on the 17th April 1935 and on the 18th May 1935, a significant flood washed away the Road Bridge at Macquarie Plains. The highest recorded flood in 15 years was then reported on the 16th June 1935. Severe thunderstorms and heavy rains in the New Norfolk – Granton area resulted in flooding on 14th January 1938. Flooding is noted near Boyer in 1940 and again in the Derwent Valley on the 3rd December 1941. In 1944 on the 5th July, the Ouse Bridge was damaged and closed indefinitely when the Ouse River rose to 5.2 metres and the River Derwent rose to 3.4 metres at Macquarie Plains. Heavy flooding occurred again on the 24th July 1946 and many houses at New Norfolk were evacuated for the first time since 1916. Flooding is again reported in June 1947, May 1948 and April 1951.



Plate 1: Flooding during 1940 near the Boyer Mill looking from the Molesworth Road across Sorell Creek. The Lyell Highway is in the middle distance.

Heavy rains, aggravated by snowmelt on the Central Plateau, resulted in widespread flooding on the 23rd June 1952, and at this time the Lyell Highway at Plenty was blocked by debris. On the 14th July of the same year, renewed flooding was reported for the Styx, Derwent and Jordan Rivers and during June 1953, severe flooding once again affected the region. In 1958 on the 24th May, flooding was the highest since the 1952 event and some families were evacuated from Ouse and Bushy Park (State Emergency Service, 1990). During the same year it is reported that an exceptionally high tide caused extensive flooding in the lower reaches of the River Derwent on the 17th August 1958.



Plate 2: June 1952 – Flooding at No 5 and No 10 Ferry Street, New Norfolk.



Plate 3: August 1954 – Flooding outside the York Hotel at Granton.



Plate 4: May 1958 – Flooding between the Styx River and River Derwent at Bushy Park, looking towards the Derwent Church of England with the *Kentdale Estate* hop fields to the left. Floodwaters rose to the top of the Church's sandstone foundations.

Extreme flooding on the 23rd April 1960 resulted in widespread and severe flooding on all Tasmanian rivers. The Derwent and Styx Rivers were in high flood again on the 13th May 1960 and in July of the same year, the Ouse and Clyde Rivers flooded. Flooding is reported in June 1962, August 1962, August 1964, and August 1968. During February 1969 extensive damage to hop fields in the Derwent Valley occurred. Serious flooding resulted in roads being cut at Bushy Park and floodwaters rising to within approximately 0.6 metre of its 1960 peak in the Ouse River on the 24th August 1970. Substantial flooding is noted on the 29th October 1971 when the River Derwent at Macquarie Plains rose to 4.9 metres. Extensive flooding in Southern Tasmania is reported on the 21st July 1974, the 18th May 1975 and again on the 3rd November when Bushy Park was marooned by floodwaters from the Styx River. In the Macquarie Plains – New Norfolk area, significant flooding is reported for September 1980, October 1988, October 1991 and May 1994.



Plate 5: November 1974 – Flooding at the Derwent Church of England at Bushy Park. Floodwaters rose to the base of the doorstep and the top of the sandstone foundations.

Flooding on the 23rd April 1960

The 1960 flood is considered the largest event in Tasmania since European settlement. Widespread and extreme flooding was reported throughout the State and in particular, the Macquarie, Elizabeth, Lake and Liffey Rivers were most seriously affected. During this flood, families were evacuated from Ross and Liffey and Longford was isolated. It has been estimated that over 250mm of rainfall fell in less than 48 hours over the headwaters of the Clyde River and the flow at Bothwell was comparable to that of 1916 (State Emergency Service, 1990). Floodwaters rose to only 0.3 metre below the Ouse River Bridge, and the Lyell Highway and Lachlan River Bridges were washed away at Hamilton and New Norfolk respectively. The greatest damage occurred in the Macquarie Plains – New Norfolk area and at the time it was reported that over 650 people were made homeless with many being rescued from rooftops.

A peak discharge of over 3,100 cumecs was recorded at Macquarie Plains (Hydro-Electric Commission, 1992). This equates to approximately a 1:150 AEP flood event. Large flows in the River Derwent were due to combined floodwaters from the Ouse and Clyde Rivers and at Macquarie Plains, water rose to 10.2 metres (2.0 metres higher than flooding in 1952). Downstream at New Norfolk, the river was considered 3.0 metres higher than in 1952 and water rose 1.0 metre above the Lyell Highway Bridge to cut off the township. At the junction of Church Street and the Lyell Highway at New Norfolk, the tips of the guideposts could be seen above *the swirling waters* of the Lachlan River (*The Mercury*, 1960). The New Norfolk Esplanade was well under water and floodwaters rose 1.2 metres over the road at Sorell Creek.



Plates 6 and 7: April 1960 – Flooding was extensive at New Norfolk. The corner of Ferry Street and Montagu Street is pictured with No 2 and No 4 Ferry Street above, and the New Norfolk Esplanade and No 1 Ferry Street below.

4. Flood Analysis

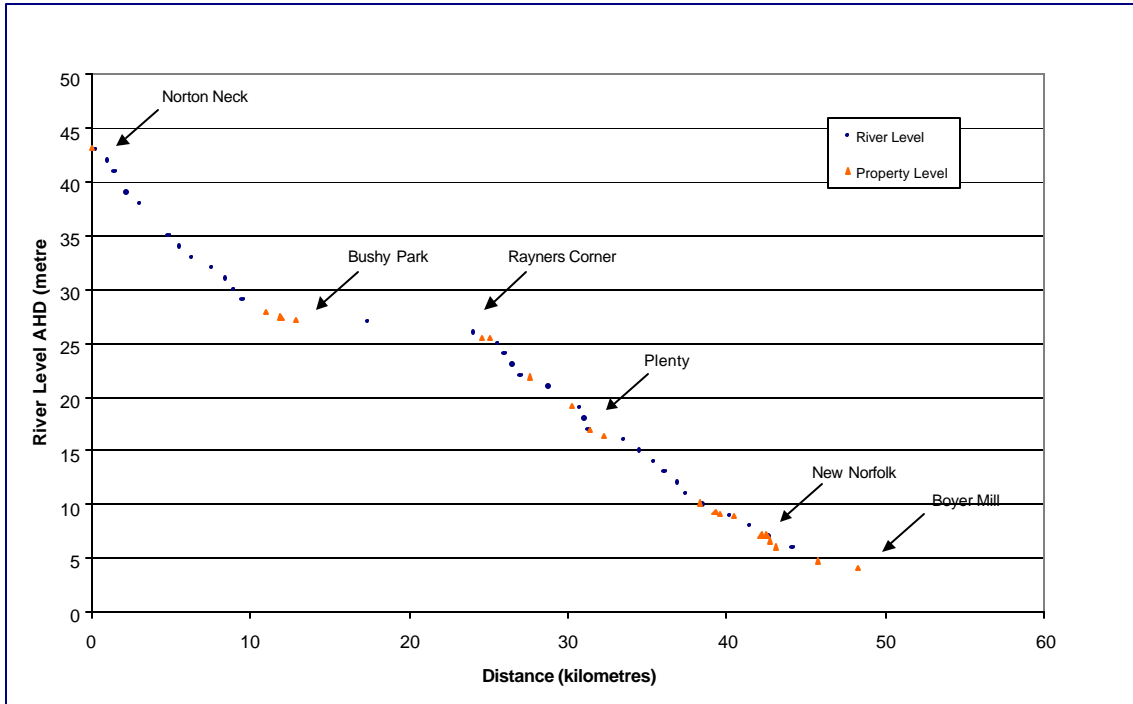
Analysis of flooding in the New Norfolk township was completed by the Hydro-Electric Commission, Water Resources Department in the report titled, *New Norfolk Flood Plain Study* (Hydro-Electric Commission, 1992). With reference to this report, a full flood plain map is available. The following analysis extends this information to the rural areas of the Derwent Valley.

The extent of major flooding for the 23rd April 1960 event along the reaches of the River Derwent from the Bushy Park – New Norfolk area is detailed in Figure 2. Flooding in this region during April 1960 generally resulted in inundation near the entry of tributary rivers and creeks into the River Derwent. Flooding is noted in the Norton Neck area downstream of the Tyenna River, and the Triffitts Neck area near Allenvale Rivulet and Askrigg Creek. Bushy Park was significantly inundated and here, the Styx River enters the River Derwent at this location. *Frog Lodge* and the *Yates* property near Rayners Corner were flooded as was the lower lying areas at Plenty, including land along the lower reaches of the Plenty River. During this flood, New Norfolk was inundated (particularly on the northern bank) as was the lower reaches of the River Derwent from the Boyer Mill though to Granton. The Lachlan River and Sorell Creek enter the River Derwent past New Norfolk and during April 1960 the Lyell Highway became inundated to cut off the township, and properties along the lower section of Molesworth Road and Sorell Creek were threatened.

The following water surface profile for the River Derwent has been constructed using river level (AHD) calculated in metres for the April 1960 flood. This information was collected from the photographic flooding record for the River Derwent Catchment held by the DPIWE. River level data recorded at a number of holdings along the River Derwent from Bushy Park to the Boyer Mill at New Norfolk, are displayed in Graph 1 and Table 1 and they include the following properties.

- Norton Neck: The *Glenora* property north of Fenton Forest.
- Bushy Park: The *Clover Lea* property, the Gretna Nun's Residence and the Bushy Park Shop/PO (Hutton's Shop).
- Rayners Corner: *Frog Lodge* and the *Yates* property.
- Plenty: The *Tyrone*, *Glenleith* and *Valleyfield* properties.
- New Norfolk: The Derwent Regional Pump Station and the Lawitta Pump Station just prior to the New Norfolk township. Mr Garrett's House, the New Norfolk Rowing Club, houses on Montagu Street and the Boyer Mill.

Graph 1: River Derwent Water Surface Profile – Flood Event April 1960.

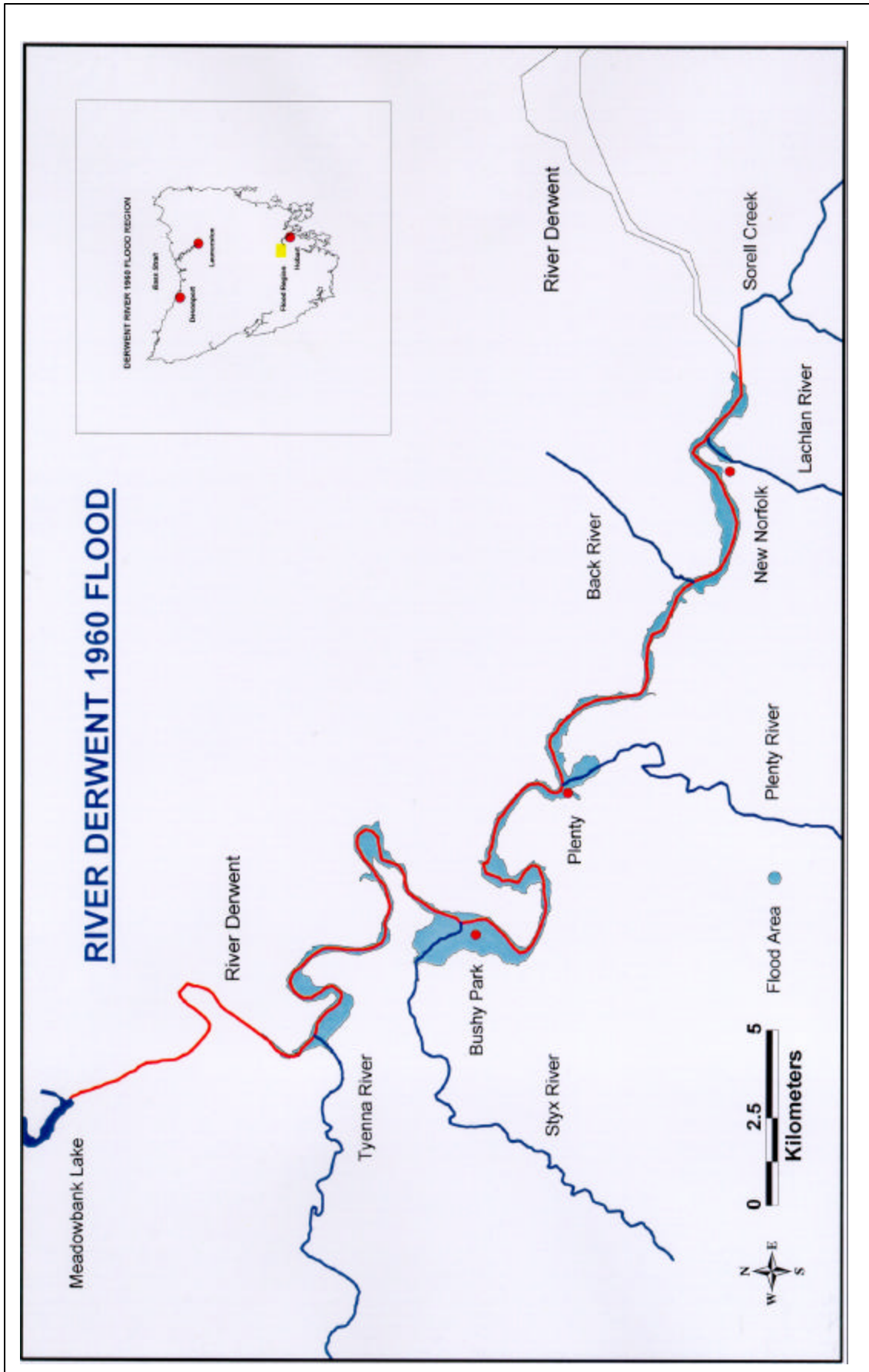


The following table (Table 1) details the grid reference and river level (AHD) in metres for those properties included in Graph 1, the River Derwent Water Surface Profile – Flood Event April 1960.

Table 1: Properties and locations included in Graph 1.

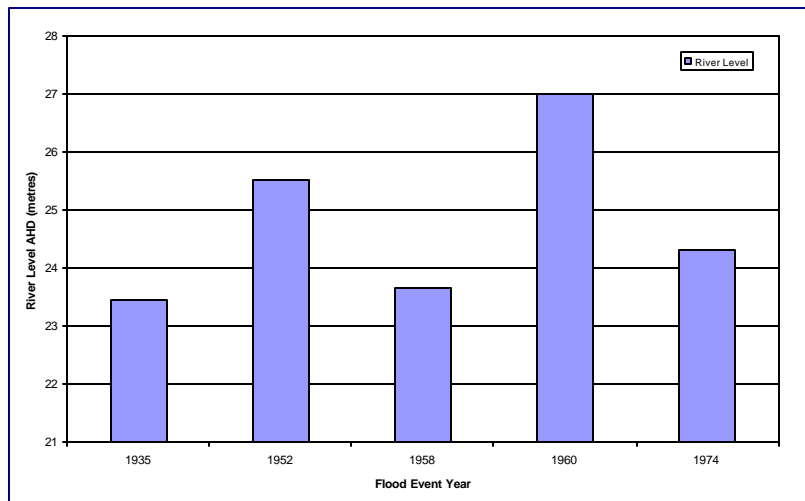
Property	Northing	Easting	River Level (AHD – metres)
<i>Glenora</i>	5275200	488800	43.20
<i>Clover Lea</i>	5271700	491500	27.90
Gretna Nun's Residence	5270550	491600	27.50
Bushy Park Shop/PO (Hutton's Shop)	5271300	492550	27.20
<i>Frog Lodge</i>	5268580	492750	25.55
<i>Frog Lodge</i>	5268600	493350	25.55
<i>Yates</i>	5269800	493500	21.90
<i>Cluan</i>	5268500	495900	19.20
<i>Tyrone</i>	5268400	496100	17.00
<i>Glenleith</i>	5267300	496300	16.45
<i>Valleyfield</i>	5265200	501500	10.20
Derwent Regional Pump Station	5264900	502200	9.35
Lawitta Pump Station	5264700	501900	9.15
<i>Atherfield</i>	5263700	502350	8.95
Derwent Bridge	5263725	504400	7.20
Mr Garrett's House	5263950	504800	7.20
New Norfolk Rowing Club	5263900	504900	6.60
Montagu Street	5263750	505300	6.10
Risdon Prison gates	5266310	507000	4.80
Boyer Wharf	5263250	508100	4.16

Figure 2: The extent of flooding on the 23rd April 1960 for the River Derwent.



The following graph (Graph 2) provides a visual representation of the river level (AHD) at Bushy Park for the major flood events between the period 1935 to 1974. This graph visually indicates the sheer magnitude of the 1960 event when compared to other floods.

Graph 2: River levels recorded at Bushy Park from the Derwent Church of England (Saint Augustins Church) area.



5. Records of Flooding

The following table (Table 2) lists photographs and flood levels that detail flooding in the River Derwent catchment area. All photographs listed in this table are held by the Water Assessment and Planning Branch, DPIWE. The photographs detail a number of flood events at various locations and properties along the River Derwent and associated tributaries. The table includes the grid reference of each location photographed, comments, an estimate of the flood frequency (AEP) and the river level (AHD) in metres for the event. Each record also includes identifying photographic numbers to enable electronic access of the prints and associated information. Alternatively, the Water Assessment Section holds hardcopies of this Flood Data Book if required.

These records cover the period from 1935 to 1984. Individuals living in the Derwent Valley at the time of the flood events took the photographs and provided a copy of the frames, along with relevant information, to the Land and Water Management Branch. The locations and properties detailed in the table are located on the River Derwent from near Fenton Forest, and at Norton Neck down through Bushy Park, Rayners Corner, Plenty, Lawitta, New Norfolk, and past the Boyer Mill to Bridgewater and Granton on the Derwent Estuary.

Flooding is detailed in this photographic list during 1935 and again in 1938 at Bushy Park, when flooding of the Derwent Church of England (or St Augustins Church), the River Derwent Bridge and the Lyell Highway is recorded. In 1940, flooding was recorded at the Boyer Mill and along the Lyell Highway. Major flooding was photographed at Bushy Park (including the *Kentdale* property, Derwent Church of England, Bushy Park Shop/PO and the River Derwent Bridge), the Lawitta Pump Station, and Ferry Street at New Norfolk in June 1952. In June 1954, flooding was photographed at Granton at the York Hotel and in May 1958, Bushy Park and the *Kentdale* property was once again inundated.

The April 1960 flood event has been well recorded photographically. The photographic record extends from Cluny Street at Ouse through Norton Neck, Bushy Park, Rayners Corner, Gretna, Plenty, Lawitta, New Norfolk and down to the lower reaches of the River Derwent at Bridgewater and Granton. In July 1974 and November 1975, flooding at Bushy Park was photographed once again at the *Kentdale* property, the Derwent Church of England and the *Bushy Park Estate*. Photographs taken at New Norfolk in September 1980 and in June 1984 detail flooding in Ferry Street, at the New Norfolk Sports Field and the mouth of the Lachlan River.

Records of Flooding in the Derwent Catchment

Flood Event	Flood Frequency (AEP)	Location	Region and Property	Comments	Grid Reference	River Level (AHD - metres)	Photo No
1935	1:7	River Derwent @ Bushy Park	Derwent Church of England	This photograph details the existing bitumen road opposite the Derwent Church of England (Augustins Church) tower, looking toward Bushy Park. Floodwaters rose to the centreline of the road.	E492300 N5271425	23.45	247
1935	1:7	River Derwent @ Bushy Park	River Derwent Bridge	These photographs were taken from the River Derwent Bridge over the River Derwent. The river level was observed at 25.35 metres to the bottom of the steel beam and to approximately 23.65 metres in the photograph.	E492450 N5271400	25.35	244 245
1935	1:7	River Derwent @ Bushy Park	R.W.S.C. Recorder Site	Here, the recorder site on the left bank of the River Derwent is photographed.	E492500 N5271400	23.55	243
1935	1:7	River Derwent @ Bushy Park	Railway Bridge	This photograph details the Railway Bridge over the River Derwent. Floodwaters came to approximately 4.40 metres below the base of the steel beam and to the top of the piers.	E492800 N5271900	23.8	246
1938	Missing record although not considered a significant flood.	River Derwent @ Bushy Park	Lyell Highway	Floodwaters were approximately 1.83 metres over the road and water rose to 25.35 metres to the bottom of the bridge steel beam. The cottage to the left of the photograph burnt down in 1942.	E492450 N5271400	25.35	306

Flood Event	Flood Frequency (AEP)	Location	Region and Property	Comments	Grid Reference	River Level (AHD - metres)	Photo No
1940	Missing record although not considered a significant flood.	River Derwent @ New Norfolk	Lyell Highway Boyer	These photographs were taken looking across Sorell Creek at Boyer, with the Lyell Highway in the middle distance and the Hobart water supply pipeline in the foreground.	E509000 N5263150	3.40 3.90	42 46
Jun-52	1:45	River Derwent @ Bushy Park	Derwent Church of England	This photograph was taken looking from the River Derwent to the Styx River Bridge. The gauge height was recorded at the Derwent Church of England (Augustins Church) under the pine trees.	E492350 N5271400	25.50	225
Jun-52	1:45	River Derwent @ Bushy Park	Bushy Park Shop/PO	This photograph was taken from the western end of the River Derwent Bridge looking east towards the Bushy Park Shop/PO (or Hutton's Shop).	E492400 N5271400	25.35	226
Jun-52	1:45	River Derwent @ Bushy Park	River Derwent Bridge	This photograph details flooding at the River Derwent Bridge over the River Derwent. The flood height came to the base of the concrete skirt on the bridge.	E492450 N5271400	26.25	224
Jun-52	1:45	River Derwent @ Bushy Park	Bushy Park Shop/PO River Derwent Bridge	This photograph records the house (no longer exists) next to the Bushy Park Shop/PO (or Hutton's Shop) with the River Derwent Bridge on the right. Floodwaters rose to the bottom of the steel beam of the bridge.	E492550 N5271300	25.35	236
Jun-52	1:45	River Derwent @ Bushy Park	Bushy Park Shop/PO River Derwent Bridge	This photograph was taken from the eastern end of the River Derwent Bridge looking down the main road near the Bushy Park Shop/PO (or Hutton's Shop). Derwent Floodwaters rose to the top of the sandstone foundations at the rear of the building.	E492550 N5271300	25.75	239

Flood Event	Flood Frequency (AEP)	Location	Region and Property	Comments	Grid Reference	River Level (AHD - metres)	Photo No
Jun-52	1:45	River Derwent @ Macquarie Plains	Railway Bridge <i>Kentdale</i>	This photograph was taken at Bushy Park from above Railway Bridge with the <i>Kentdale</i> homestead located in the middle of the frame. Floodwaters rose to approximately 2.30 metres below the base of the steel beam of the bridge.	E493000 N5272000	25.80	233
Jun-52	1:45	River Derwent @ Lawitta	Lawitta Pump Station	This photograph is of the Lawitta Pump Station. Floodwaters rose half way up the pump house walls to under the window sill as indicated.	E502100 N5264650	7.00	114
Jun-52	1:45	River Derwent @ New Norfolk	Ferry Street	This photograph details No 5 (white house) and No 10 (dark house) Ferry Street. Floodwaters rose to the weatherboards at the base of the concrete foundations at No 5 Ferry Street and to just below the side window sill at No 10 Ferry Street.	E505200 N5263800	3.80	291
June-54	1:1.5	River Derwent @ Granton	York Hotel	These photographs detail flooding at the York Hotel and the railway station at Granton.	E518900 N5266450	2.15 1.95	34 37
May-58	1:30	River Derwent @ Bushy Park	Derwent Church of England <i>Kentdale</i>	These photographs detail the Derwent Church of England located between the Styx and River Derwents. i) In photograph No 209 the scene is looking from the hop fields on the <i>Kentdale</i> property. ii) In No 212 and No 213 the <i>Kentdale</i> property is seen on the left hand side of the frame. Floodwaters rose to the top of the Church's sandstone foundation.	E492725 N5270425	23.65	209 212 213

Flood Event	Flood Frequency (AEP)	Location	Region and Property	Comments	Grid Reference	River Level (AHD - metres)	Photo No
Apr-60	1:150	Ouse River @ Ouse	Cluny Street	Floodwaters rose to 4 feet deep (1.20 metres) inside this house on the corner of Cluny Street.	E476200 N5296000	1.20	330 331
Apr-60	1:150	River Derwent @ Bushy Park	<i>Glenora</i>	This photograph details the flooded hop fields at the <i>Glenora</i> property (north of Fenton Forest) where floodwaters rose to the base of the wooden hop pole.	E488800 N5275200	43.20	254
Apr-60	1:150	River Derwent @ Bushy Park	<i>Glenora</i> Mr Rumley's property	These photographs were taken at the <i>Glenora</i> property (north of Fenton Forest) where: i) In No 255 floodwaters rose to the post photographed on Mr George Rumley's property. ii) In No 256 floodwaters rose to the corner of the shed pictured.	E488800 N5275200	43.20	255 256
Apr-60	1:150	River Derwent @ Norton Manderville	<i>Norton Manderville</i>	These photographs detail the debris left from 1960s flood where the floodwaters rose to base of pump house.	E489200 N5276750	44.30	269 270
Apr-60	1:150	River Derwent @ Norton Manderville	<i>Norton Manderville</i>	Floodwaters rose to level of the pump house at the <i>Norton Manderville</i> property.	E489200 N5276750	44.30	257
Apr-60	1:150	River Derwent @ Bushy Park	<i>Clover Lea</i> Police Station	Here, the Police Station is photographed where the floodwaters rose to the top of the concrete step as indicated by the steel rule.	E491500 N5271400	27.85	208

Flood Event	Flood Frequency (AEP)	Location	Region and Property	Comments	Grid Reference	River Level (AHD - metres)	Photo No
Apr-60	1:150	River Derwent @ Bushy Park	<i>Clover Lea</i>	Floodwaters rose to the 19th weather board above ground level on the 'Red Kiln' at the <i>Clover Lea</i> property.	E491550 N5271700	26.10	202
Apr-60	1:150	River Derwent @ Bushy Park	<i>Clover Lea</i>	Floodwaters rose to the 'God is Love' text on the sandstone sign of the face of the brick Kiln situated on the <i>Clover Lea</i> property.	E491550 N5271700	27.95	203 204
Apr-60	1:150	River Derwent @ Bushy Park	<i>Clover Lea</i>	Photograph taken at <i>Clover Lea</i> property where the floodwaters rose up the side of weather board shed.	E491550 N5271700	28.05	207
Apr-60	1:150	River Derwent @ Bushy Park	Greta Nun's Residence	This photograph details the Greta Nun's Residence where floodwaters rose to the level of the chalk mark on the foundations at the rear of the house.	E491600 N5270550	27.50	205
Apr-60	1:150	River Derwent @ Bushy Park	Bushy Park Shop/PO	This photograph is looking towards the back door of the Bushy Park Shop/PO (or Hutton's Shop) - right hand side of the frame. Floodwaters rose to the side of the shop.	E492550 N5271300	27.20	196
Apr-60	1:150	River Derwent @ Bushy Park	Bushy Park Shop/PO	This photograph details the base of the wooden post (at the top of the concrete retaining wall located at the Bushy Park Shop/PO (or Hutton's Shop).	E492550 N5271300	27.00	197
Apr-60	1:150	River Derwent @ Bushy Park	Bushy Park Shop/PO	Here, the main road near the former Bushy Park Post Office/Shop (or Hutton's Shop) is detailed – building is in the centre of the frame. Floodwaters rose to the top of the sandstone foundations at the rear of the building.	E492550 N5271300	27.00	301

Flood Event	Flood Frequency (AEP)	Location	Region and Property	Comments	Grid Reference	River Level (AHD - metres)	Photo No
Apr-60	1:150	River Derwent @ Bushy Park	<i>Arundel</i> Bushy Park Shop/PO	This photograph was taken from the <i>Arundel</i> homestead looking towards the Bushy Park Shop/PO (or Hutton's Shop) located at Bushy Park.	E492725 N5271050	28.15	186
Apr-60	1:150	River Derwent @ Bushy Park	<i>Arundel</i> Bushy Park Shop/PO	Photograph taken from Mr D. Hume's house looking northwest. The <i>Arundel</i> property is detailed in the foreground. Floodwaters rose to the fascia-board at the rear of the Bushy Park Shop/PO (or Hutton's Shop).	E492725 N5271050	28.15	199
Apr-60	1:150	River Derwent @ Rayners Corner	<i>Frog Lodge</i> Oast House	These photographs were taken at <i>Frog Lodge</i> on Rayners Corner, Bushy Park: i) No 152 and No 154 are scenes taken from <i>Frog Lodge</i> looking towards the Oast House. ii) No 154 is a scene looking from <i>Frog Lodge</i> looking towards the Oast House. Floodwaters rose to just below the Oast House. iii) No 155 and 156 detail floodwaters rising to the top of the concrete besser brick foundation.	E492780 N5268600	25.55	152 153 154 155 156
Apr-60	1:150	River Derwent @ Macquarie Plains	<i>Kentdale</i> Railway Bridge	This photograph was taken from the main road above the Railway Bridge at Macquarie Plains, looking across to the <i>Kentdale</i> Kiln (burnt down in 1969/70) and the Oast House (right centre). Floodwaters rose to the base of the steel beam on the bridge.	E493000 N5271950	28.15	183

Flood Event	Flood Frequency (AEP)	Location	Region and Property	Comments	Grid Reference	River Level (AHD - metres)	Photo No
Apr-60	1:150	River Derwent @ Rayners Corner	<i>Frog Lodge</i>	These photographs are taken at <i>Frog Lodge</i> on Rayners Corner, Bushy Park: i) No 149 is the scene looking towards New Norfolk and the top of the pump house. ii) No 150 is the scene taken from <i>Frog Lodge</i> looking toward New Norfolk. iii) No 151 is the scene looking from <i>Frog Lodge</i> looking towards Rayners Corner.	E493350 N5268600	25.55	149 150 151
Apr-60	1:150	River Derwent @ Rayners Corner	<i>Frog Lodge</i> Glenora Road	This photograph is taken at <i>Frog Lodge</i> on Rayners Corner, Bushy Park - scene taken from the lodge looking toward the pump house and Glenora Road. Floodwaters rose to the floor of the wooden pump house.	E493350 N5268600	19.80	148
Apr-60	1:150	River Derwent @ Rayners Corner	<i>Yates</i> Railway Bridge	These photograph detail the Railway Bridge at the <i>Yates</i> property. Floodwaters rose to the level of 21.90 metres to the centre of the steel beam.	E493500 N5269800	21.90	309 310
Apr-60	1:150	River Derwent @ Gretna	<i>Askrigg</i> Mr Geard's house	Photograph taken of Mr Baden Geard's house opposite the entrance to the <i>Askrigg</i> property. The flood water rose to the verandah rail.	E495075 N5273600	32.10	250 251
Apr-60	1:150	River Derwent @ Plenty	<i>Redlands</i>	This photograph details the <i>Redlands</i> property where floodwaters rose to the base of the fence post gate.	E497550 N5268800	20.70	120
Apr-60	1:150	River Derwent @ Plenty	<i>Cluan</i>	Floodwaters rose to the name plate pictured here at the <i>Cluan</i> property.	E495900 N5268500	19.20	307

Flood Event	Flood Frequency (AEP)	Location	Region and Property	Comments	Grid Reference	River Level (AHD - metres)	Photo No
Apr-60	1:150	River Derwent @ Plenty	<i>Tyrone</i>	Floodwaters rose to 5 to 6 foot (1.8 metres) outside Mrs D. M. Bowerman's kitchen at the <i>Tyrone</i> house.	E496100 N5268400	17.00	124
Apr-60	1:150	River Derwent @ Plenty	<i>Glenleith</i> Mr Shaw's house	Photograph taken of Mr Shaw's house on the <i>Glenleith</i> property. Floodwaters rose up the steps leading to the verandah.	E496150 N5267900	17.75	316
Apr-60	1:150	River Derwent @ Plenty	<i>Glenleith</i>	Photograph of the <i>Glenleith</i> homestead where the floodwaters rose to just over the verandah and into the house.	E496300 N5267300	16.45	126
Apr-60	1:150	River Derwent @ Plenty	<i>Railway Cottage</i>	Photograph taken opposite the <i>Railway Cottage</i> at Plenty, where the floodwaters rose to 3 feet 6 inches (1.3 metres) into the house.	E496560 N526800	17.05	123
Apr-60	1:150	River Derwent @ Plenty	<i>Redlands</i>	Floodwaters rose to the doors of the <i>Redlands</i> homestead and the house was sandbagged.	E497200 N5267050	19.90	128
Apr-60	1:150	River Derwent @ New Norfolk	<i>Linden</i>	These photographs detail the <i>Linden</i> property where floodwaters rose up the river bank as indicated.	E500080 N5265700	5.75	260 261
Apr-60	1:150	River Derwent @ New Norfolk	<i>Linden</i>	Photograph of the <i>Linden</i> property where the floodwaters rose to the edge of the lawn as indicated.	E500150 N5265750	5.75	262

Flood Event	Flood Frequency (AEP)	Location	Region and Property	Comments	Grid Reference	River Level (AHD - metres)	Photo No
Apr-60	1:150	River Derwent @ Plenty	Mr Jim Menzie's house	Photograph taken of Mr Menzie's house where floodwaters rose to 4 foot 10 inches (1.5 metres) up the wall (possibly the inside of the house).	E500700 N5265550	16.35	127
Apr-60	1:150	River Derwent @ Hayes	Hayes Prison Farm	This photograph was taken opposite the Hayes Prison Farm, where the painted white line on the wall of the building indicates the highest flood peak.	E500800 N5267000	14.25	134
Apr-60	1:150	River Derwent @ New Norfolk	<i>Valleyfield</i>	Here, the <i>Valleyfield</i> homestead is detailed where floodwaters rose to the building's eaves (demolished).	E501500 N5265200	10.20	109 110
Apr-60	1:150	River Derwent @ Lawitta	Lawitta Pump Station	Photograph detailing that floodwaters rose to the top of the first pane of glass at the Lawitta Pump Station as indicated.	E502100 N5264700	9.15	112
Apr-60	1:150	River Derwent @ Regional Pump Station	Derwent Regional Pumpstation	Photograph taken of the Derwent Regional Pump Station located opposite the Lawitta Pump Station. Floodwaters rose up to the concrete skirt above the building's window line.	E502200 N5264900	9.35	113
Apr-60	1:150	River Derwent @ Lawitta	Lyell Highway Lawitta Pump Station	This photograph details where the floodwaters crossed the Lyell Highway. Waters rose to the vegetation at the edge of the parking bay behind the vehicle pictured - near the Lawitta Pump Station.	E502200 N5264700	8.70	111

Flood Event	Flood Frequency (AEP)	Location	Region and Property	Comments	Grid Reference	River Level (AHD - metres)	Photo No
Apr-60	1:150	River Derwent @ New Norfolk	<i>Atherfield</i>	Photograph of the <i>Atherfield</i> homestead detailing that the floodwaters rose to the verandah fascia-board.	E502300 N5263700	3.95	266
Apr-60	1:150	River Derwent @ New Norfolk	Lyell Highway Station Street	Photograph taken of the shop at the corner of the Lyell Highway and Station Street where the 1960 floodwaters rose to the shop's verandah. A note attached reads - "At site of present bridge: Peak of flood was at 12:00 noon on 23/4/90 and it reached 7.36 metres A.H.D. (present data system) or 7.19 metres (State Datum 1960)".	E504400 N5263725	7.36	63
Apr-60	1:150	River Derwent @ New Norfolk	Oast Street Rocks Road	This photograph details the Old Bridge just to the right-of-centre in the frame. The principal houses shown are: i) right of centre is No 1 Oast Street. ii) extreme left is No 24 Rocks Road. iii) from the railway line is No 22 Rocks Road.	E504700 N5263800	6.60	76
Apr-60	1:150	River Derwent @ New Norfolk	Third Avenue Rocks Road	This photograph is looking from the railway crossing to Third Avenue where the principal houses are: i) left of centre is No 36 Rocks Road. ii) right centre is No 2 Third Avenue iii) edge is No 4 Third Avenue.	E504800 N5263950	6.2	78
Apr-60	1:150	River Derwent @ New Norfolk	New Norfolk Rowing Club Third Avenue Rocks Road	This photograph details the New Norfolk Rowing Club to the far left of the frame. No 1 Third Avenue is seen from the railway crossing in Third Avenue. The three principal houses beyond No 1 Third Avenue are No 38, No 40 and No 42 Rocks Road.	E504800 N5263950	6.10	79

Flood Event	Flood Frequency (AEP)	Location	Region and Property	Comments	Grid Reference	River Level (AHD - metres)	Photo No
Apr-60	1:150	River Derwent @ New Norfolk	New Norfolk Rowing Club Rocks Road	Photograph detailing the view from Rocks Road with the New Norfolk Rowing Club on the right above the railway signal. Mr Garrett's house can be seen submerged on the river bank at No 85 Rocks Road.	E504800 N5263950	6.40	80
Apr-60	1:150	River Derwent @ New Norfolk	New Norfolk Rowing Club	These photographs detail the 1960 flood line recorded on the wall of the New Norfolk Rowing Club. At this time, floodwaters rose 3.0 metres above the shed's base.	E504900 N5263900	6.60	64 65
Apr-60	1:150	River Derwent @ New Norfolk	Montagu Street	Here, the Old Colony Inn, No 7 Montagu Street and part of No 5 Montagu Street is detailed.	E505200 N5263700	6.10	86
Apr-60	1:150	River Derwent @ New Norfolk	Montagu Street Ferry Street	Photograph taken near Old Colony Inn detailing the corner of Montagu Street and Ferry Street. The two white gabled houses facing are No 2 Ferry Street (grey roof) and No 4 Ferry Street (red roof).	E505200 N5263700	6.00	87
Apr-60	1:150	River Derwent @ New Norfolk	Montagu Street	Photograph detailing the white house behind the transformer at No 7 Montagu Street. Floodwaters rose to the angle of the sloping bricks forming the window sill of the red brick house next door at No 5 Montagu Street.	E505300 N5263750	6.10	72
Apr-60	1:150	River Derwent @ New Norfolk	Hayes Prison Farm	Floodwaters rose to the Hayes Prison Farm gate (SPM 4662) located just prior to entering New Norfolk on the left hand side.	E505600 N5266310	6.4 5.50	15 16

Flood Event	Flood Frequency (AEP)	Location	Region and Property	Comments	Grid Reference	River Level (AHD - metres)	Photo No
Apr-60	1:150	Lachlan River @ New Norfolk	<i>Roadhouse Cottage</i>	Floodwaters rose to the bottom of the back-paling fence at the <i>Roadhouse Cottage</i> opposite the D.M.R. Depot.	E511600 N5264900	1.80	14
Apr-60	1:150	River Derwent @ Bridgewater	Kilns near Bridgewater Causeway	The kilns photographed are approximately 2 kms from the Bridgewater Causeway. Floodwaters rose to the base of the limestone kilns as indicated.	E515230 N5267500	3.70	27
Apr-60	1:150	River Derwent @ Granton	Granton Shell Service Station	Photograph of the Shell Service Station at Granton, where floodwaters rose to the base of pole as indicated.	E518250 N5206750	2.50	30
July-74	1:5	River Derwent @ Bushy Park	<i>Kentdale</i> River Derwent Bridge	Photograph taken from the western end of the River Derwent Bridge looking northwest, adjacent to the entrance to the <i>Kentdale</i> property.	E491650 N5271300	23.85	178
July-74	1:5	River Derwent @ Bushy Park	Derwent Chuch of England	Photograph taken looking west from near Derwent Chuch of England and the large pine tree photographed is in the church grounds.	E491800 N5271300	24.30	172
July-74	1:5	River Derwent @ Bushy Park	<i>Kentdale</i> Derwent Chuch of England	Photograph taken of the hop grounds at the <i>Kentdale</i> property. The entrance to <i>Kentdale</i> is the pine tree to the rear of the Derwent Chuch of England (on the left edge of the frame). Floodwaters to the centreline of the gravel road.	E492250 N5271400	23.65	173

Flood Event	Flood Frequency (AEP)	Location	Region and Property	Comments	Grid Reference	River Level (AHD - metres)	Photo No
July-74	1:5	River Derwent @ Bushy Park	Derwent Church of England	Photograph detailing the Derwent Church of England just before the Styx River. Floodwaters rose to the base of the door-step and the top of the sandstone foundations.	E492300 N5271425	23.65	168
July-74	1:5	River Derwent @ Bushy Park	Macquarie Plains Shop <i>Arundel</i> River Derwent Bridge	This photograph was taken looking from the end of the River Derwent Bridge and Macquarie Plains, looking towards the Macquarie Plains Shop and Mr Bill Hume's homestead - <i>Arundel</i> . Floodwaters were observed by Mr Hume to reach a point 0.10 metres below the top of the bridge abutments.	E492400 N5271425	24.20	171
Nov-75	1:8	River Derwent @ Bushy Park	<i>Bushy Park Estate</i> River Derwent Bridge	This photograph was taken looking from the end of the River Derwent Bridge looking towards the <i>Bushy Park Estate</i> . Floodwaters rose to the base of the gate post as indicated.	E491700 N5271300	23.60	163
Sep-80	1:10	River Derwent @ New Norfolk	Ferry Street	This photograph was taken looking towards the caravan park in Ferry Street.	E505400 N5263700	1.90	53
Jun-84	1:2	River Derwent @ New Norfolk	<i>Tynwald Park</i> New Norfolk Sports Field	This photograph was taken from near <i>Tynwald Park</i> Oast House looking over the New Norfolk Sports Field and the mouth of the Lachlan River. Note: the top of the treated pine barrier surrounding the oval is almost submerged.	E506175 N5263900	2.15	12

6. New Records of Flooding

The following table (Table 3) has been provided for the entry of new flood events. As this is a living document to be updated over time, if a flood occurs you are encouraged to contribute your own flood information to these books to make them as effective as possible for current and future generations.

Records of Future Flooding in the Derwent Catchment

Flood Event	Flood Frequency (AEP)	Location	Region and Property	Comments	Grid Reference	River Level (AHD - metres)	Photo No

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