



17 FEB 2014

Application for  
licence to take water  
(Water Act 2000)

REC DOC # 2420311

Purpose of this Form

To apply for a water licence to take and use the water on a parcel or contiguous parcels of land owned by the applicant.

PART A Licence Information

Will this licence replace a water licence?  Yes  No If 'yes' please supply licence reference

PART B Applicant Details

Name Specify the full name of all persons applying for this licence

JMB INVESTMENTS PTY LTD AND DABARY INVESTMENTS PTY LTD  
TRADING AS D.J. PASTORAL

If the applicant is a corporation please supply the ACN

009 951 071  
009 981 384

Attention (Optional) (eg. Principal, Secretary, Managing Director, etc)

Street Address

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State

Postcode

Mailing Address All correspondence will be delivered to this address (if same as street address please write 'as above')

PO. BOX 2149  
CAIRNS

State

QLD

Postcode

4870

Country  
if not Australia

Contact Person's Details

(If different from above)

Title  Mr  Mrs  Ms  Miss  Other please specify

Given Name

ROBERT

Last Name

COGAER

Preferred Phone

Alternate Phone

Email Address

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FILE NO. NOR/057851

30 JAN 2014

REC DOC # 2401297

OFFICE USE ONLY	Fee Received \$	109.80	Application	563717
	Receipt No.	2091115	Client	157567
	Registration Date	14/2/14	Initials	613711
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**PART C Description of Land** Specify the Lot and Plan numbers for the land on which the water is to be used. This is the land to which the proposed licence would attach.

Lot	Plan
214	RP 884196

**PART D Source and Location of Water** Specify the type of water and the location from which water is to be taken

**SOURCE OF WATER**

Natural lake or spring  
 Name: ONE MILE DAM - LOCATED TOTALLY WITHIN THE PROPERTY

Underground artesian water  
 Aquifer Name: \_\_\_\_\_ Target depth: \_\_\_\_\_ metres

Underground subartesian water  
 Aquifer Name: \_\_\_\_\_ Target depth: \_\_\_\_\_ metres

Overland Flow water

**LOCATION OF WATER** Describe the parcels on or adjoining the place from which the water is to be taken. If water is to be taken from a point on land within the bed and banks of a watercourse which cannot be properly described in terms of a Lot on Plan, enter the property description of the nearest adjacent land and tick the 'Adjacent to' (✓) box.

Adjacent to (✓)	Lot	Plan	Adjacent to (✓)	Lot	Plan
<input checked="" type="checkbox"/>	214	RP 884196	<input type="checkbox"/>		
<input type="checkbox"/>			<input type="checkbox"/>		
<input type="checkbox"/>			<input type="checkbox"/>		

Sketch a plan showing the source and location where the water is proposed to be taken and used. Include property boundaries, Lot/Plan descriptions, existing water facilities (eg. pump, bore), and location of any watercourse, lake or spring.

**N**

SEE ACCOMPANYING MAP FROM LAKELAND GROUND WATER MGMT PLAN  
 AERIAL PHOTO ATTACHED SHOWS ONE MILE DAM AND CLEARLY SHOWS  
 THE PRESENCE OF SPRINGS ON THE SOUTHERN SIDE OF THE DAM  
 WALL BEFORE THE CROSSOVER OF THE PENINSULA DEVELOPMENT  
 ROAD. IT IS OUR BELIEF THAT THIS LICENCE WOULD NOT  
 INTERFERE WITH THE INFLOWS TO HONEY DAM.

ONE MILE DAM LICENCE IS #19467K. AND IS HELD  
 BY THE APPLICANTS

PLEASE ALSO REFER TO A COPY OF CORRESPONDENCE DATED  
 26 AUGUST 2006 WHICH PREWARNS THE FILING OF THIS APPLICATION.



**PART E Water Use** Specify which of the purposes below apply to the proposed taking of water

Domestic  
 Irrigation (Complete Irrigation Requirement Table)  
 Stockwatering sch4p3(3) Prejudice the protection of an individuals right to privacy Stock Type No. of Stock  
 Waterharvesting  Stock Intensive (eg Feedlot; Piggery; Dairy)  
 Aquaculture (Attach Proposal)  
 Other (Specify) **DRIP IRRIGATION**  
 Industrial (Attach Proposal)

**PART F Water Requirement** Describe the proposed water scheme

Irrigation Requirements	Proposed Area (Hectares)	Maximum Weekly Application (mm)	Maximum Monthly Volume (Megalitres)	Time of Year Required (Months)
Crop 1 Crop Type: <b>TEAK/SANDALWOOD</b>	<b>400</b>		<b>40</b>	<b>9</b>
Crop 2				
Crop 3				

Requirements for other purposes Tick the appropriate box

megalitres per  day  week  month

**PART G Amount of Water** Specify the amount of water being applied for

Maximum annual volume of water required **360** megalitres  
 Maximum rate at which water is to be taken **46.29** litres per second  
 Maximum area to be irrigated **400** hectares  
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**PART H Comments** Provide any further comments or information that may be of assistance in assessing this application

TRICKLE/DRIP IRRIGATION OVER THE DRY MONTHS - MAX 1 MGL/HA/9 MONTHS  
 USING MOISTURE METERS IN GROUND TO ENSURE OPTIMUM TIME FOR IRRIGATION  
 THIS HAS PROVEN TO REDUCE WATER USAGE TO ONE QUARTER OF THAT PREVIOUSLY  
 REQUIRED. LONGER WATERING PERIODS WITH GREATER INTERVALS BETWEEN WATERING

46.20 LITRES/SECOND IS BASED ON PUMPING 400 MGLTRS OVER 100 DAYS

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**PART I Declaration**

All parties to complete and sign the declaration below

Being the owners of all the land referred to in Part B of this application, I/we do hereby apply for a licence to take water and declare that the information contained in this application is true and correct. I/We also acknowledge that materials submitted in support of this application are part of the application and can be copied and made available to the public as required under section 208(4)(b) of the Water Act 2000. I/We hereby provide consent for any supplied information considered to be commercial-in-confidence or copyright to be copied and made available only for the purposes of the licence application, including notification to and consultation with the public and other relevant government agencies.

**INDIVIDUAL** Attach separate sheet (or photocopy) if more than 2 signatures required

Name		Name	
Signature		Signature	
Position/Title (if applicable)		Position/Title (if applicable)	
Date		Date	

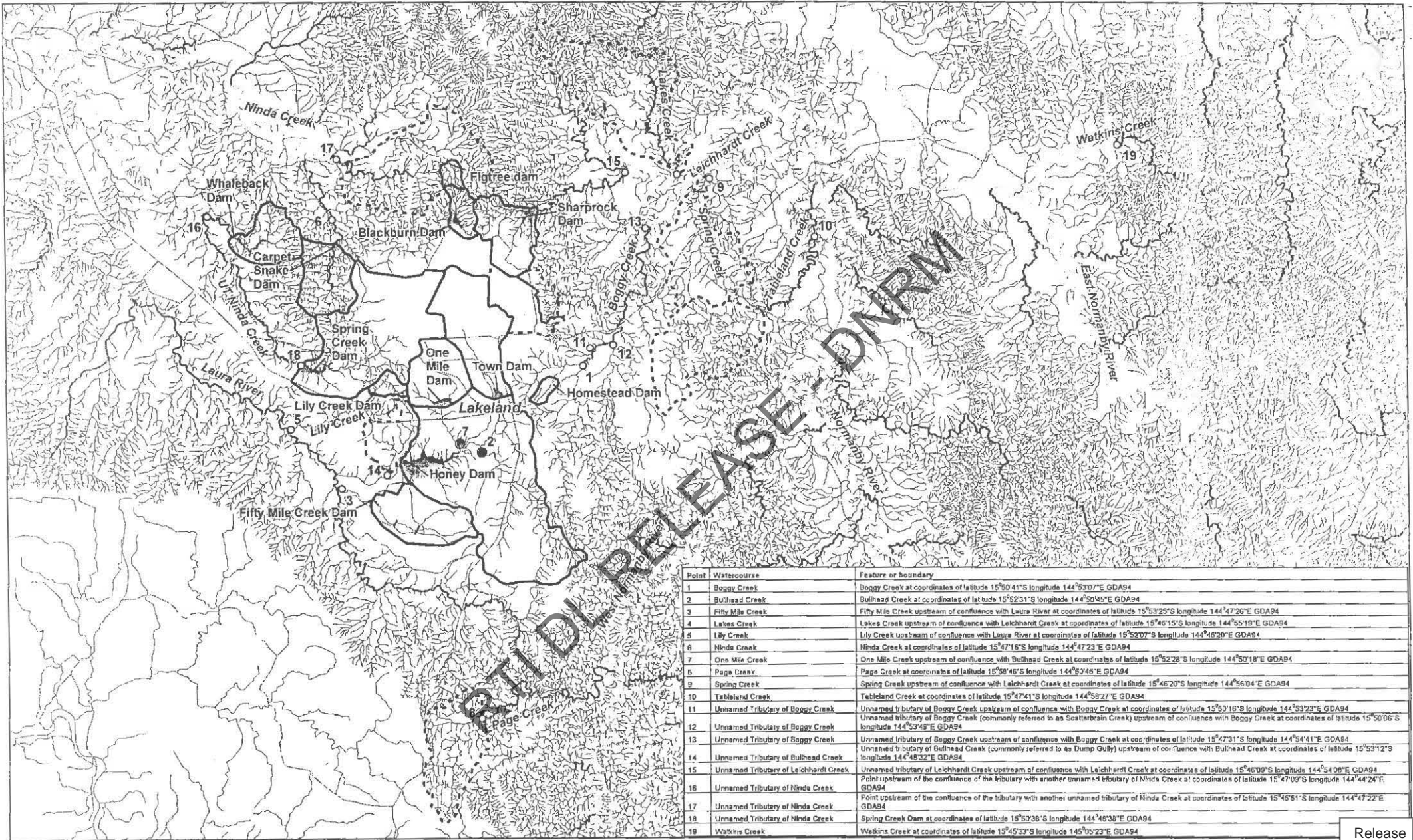
**CORPORATION** Executed for and on behalf of (Corporation)

JMB INVESTMENTS PVT LTD AND BARRY INVESTMENTS PVT LTD AND DS PASTORAL

By (Name)	DAVID R. BARRY	By (Name)	FRANK BARRY
Position	DIRECTOR	Position	DIRECTOR
Signature		Signature	
Date	28/1/2014	Date	28/1/2014
Witnessed By	PAUL JAMES BARRY	Witnessed By	PAUL JAMES BARRY
Witness Signature		Witness Signature	
Date	28/1/2014	Date	28/1/2014

RTI DL RELEASED





Point	Watercourse	Feature or boundary
1	Bogy Creek	Bogy Creek at coordinates of latitude 15°50'41"S longitude 144°53'07"E GDA94
2	Bullhead Creek	Bullhead Creek at coordinates of latitude 15°52'31"S longitude 144°50'45"E GDA94
3	Fifty Mile Creek	Fifty Mile Creek upstream of confluence with Laura River at coordinates of latitude 15°53'25"S longitude 144°47'26"E GDA94
4	Lakes Creek	Lakes Creek upstream of confluence with Leichhardt Creek at coordinates of latitude 15°46'15"S longitude 144°55'18"E GDA94
5	Lily Creek	Lily Creek upstream of confluence with Laura River at coordinates of latitude 15°52'07"S longitude 144°46'20"E GDA94
6	Ninda Creek	Ninda Creek at coordinates of latitude 15°47'16"S longitude 144°47'23"E GDA94
7	One Mile Creek	One Mile Creek upstream of confluence with Bullhead Creek at coordinates of latitude 15°52'28"S longitude 144°50'18"E GDA94
8	Page Creek	Page Creek at coordinates of latitude 15°50'46"S longitude 144°50'45"E GDA94
9	Spring Creek	Spring Creek upstream of confluence with Leichhardt Creek at coordinates of latitude 15°46'20"S longitude 144°58'04"E GDA94
10	Tableland Creek	Tableland Creek at coordinates of latitude 15°47'41"S longitude 144°58'27"E GDA94
11	Unnamed Tributary of Bogy Creek	Unnamed tributary of Bogy Creek upstream of confluence with Bogy Creek at coordinates of latitude 15°50'16"S longitude 144°53'23"E GDA94
12	Unnamed Tributary of Bogy Creek	Unnamed tributary of Bogy Creek (commonly referred to as Scatterbrain Creek) upstream of confluence with Bogy Creek at coordinates of latitude 15°50'06"S longitude 144°53'45"E GDA94
13	Unnamed Tributary of Bogy Creek	Unnamed tributary of Bogy Creek upstream of confluence with Bogy Creek at coordinates of latitude 15°47'31"S longitude 144°54'41"E GDA94
14	Unnamed Tributary of Bullhead Creek	Unnamed tributary of Bullhead Creek (commonly referred to as Dump Gully) upstream of confluence with Bullhead Creek at coordinates of latitude 15°53'12"S longitude 144°49'32"E GDA94
15	Unnamed Tributary of Leichhardt Creek	Unnamed tributary of Leichhardt Creek upstream of confluence with Leichhardt Creek at coordinates of latitude 15°46'09"S longitude 144°54'08"E GDA94
16	Unnamed Tributary of Ninda Creek	Point upstream of the confluence of the tributary with another unnamed tributary of Ninda Creek at coordinates of latitude 15°47'09"S longitude 144°44'24"E GDA94
17	Unnamed Tributary of Ninda Creek	Point upstream of the confluence of the tributary with another unnamed tributary of Ninda Creek at coordinates of latitude 15°45'51"S longitude 144°47'22"E GDA94
18	Unnamed Tributary of Ninda Creek	Spring Creek Dam at coordinates of latitude 15°50'36"S longitude 144°46'38"E GDA94
19	Watkins Creek	Watkins Creek at coordinates of latitude 15°45'33"S longitude 145°05'23"E GDA94

- Legend**
- Upstream limit under consideration
  - Declared upstream limit
  - Stream order 1-4
  - Stream order 5
  - Stream order 6
  - Road
  - Proposed dam (approx location)
  - ▭ Catchment for existing dam
  - ▭ Catchment for proposed dam

**Lakeland - declared upstream limits under consideration**

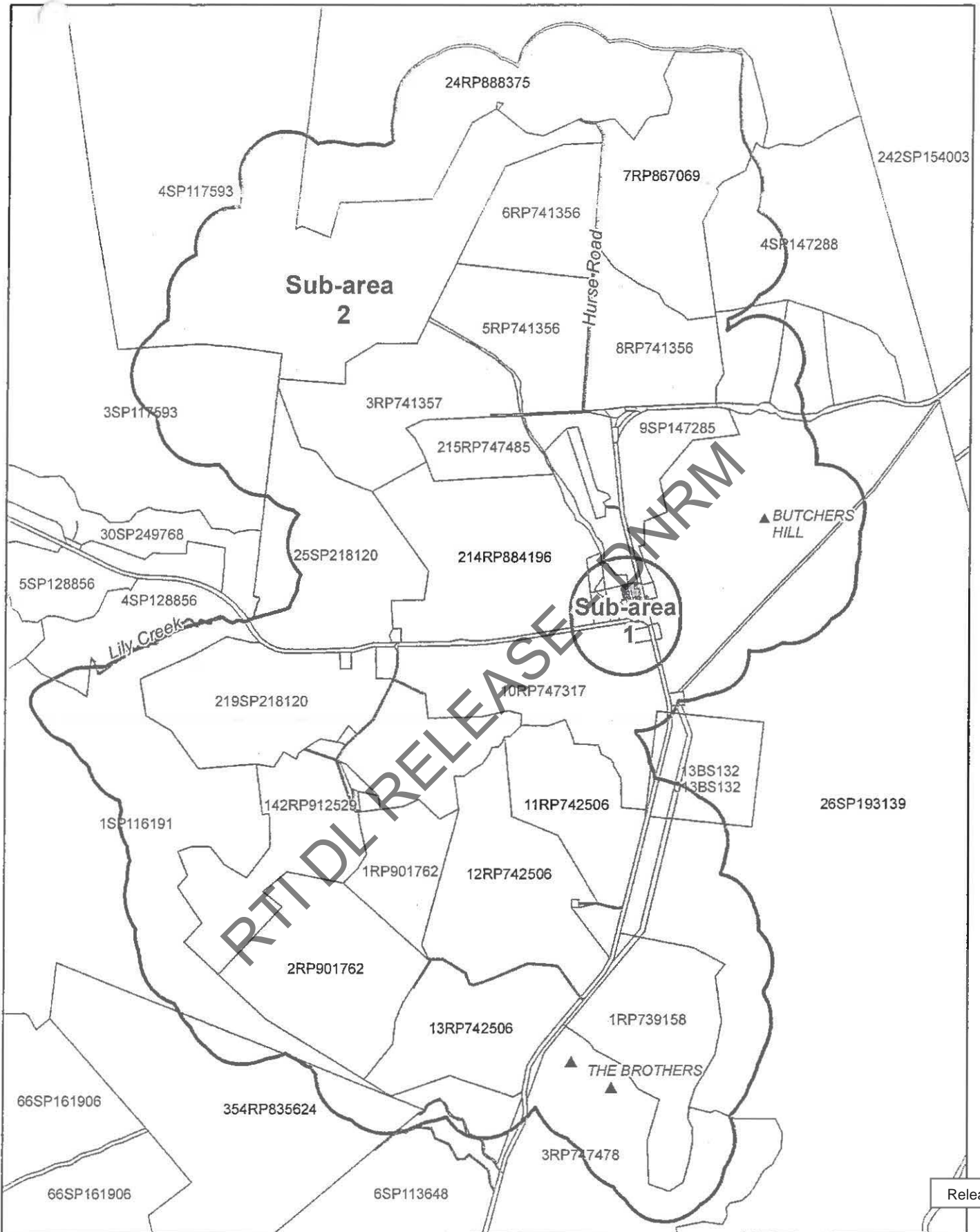


Coordinates are in Geographics GDA94  
Scale 1:145,000 File A

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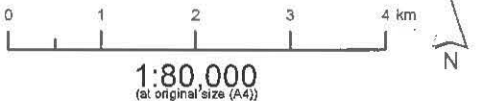




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**Lakeland  
Groundwater Management Area**  
Draft Management Area

- Legend**
- Digital Cadastral Data Base (DCDB)
  - Lot on Plan
  - Management Area (GMA) including sub-areas



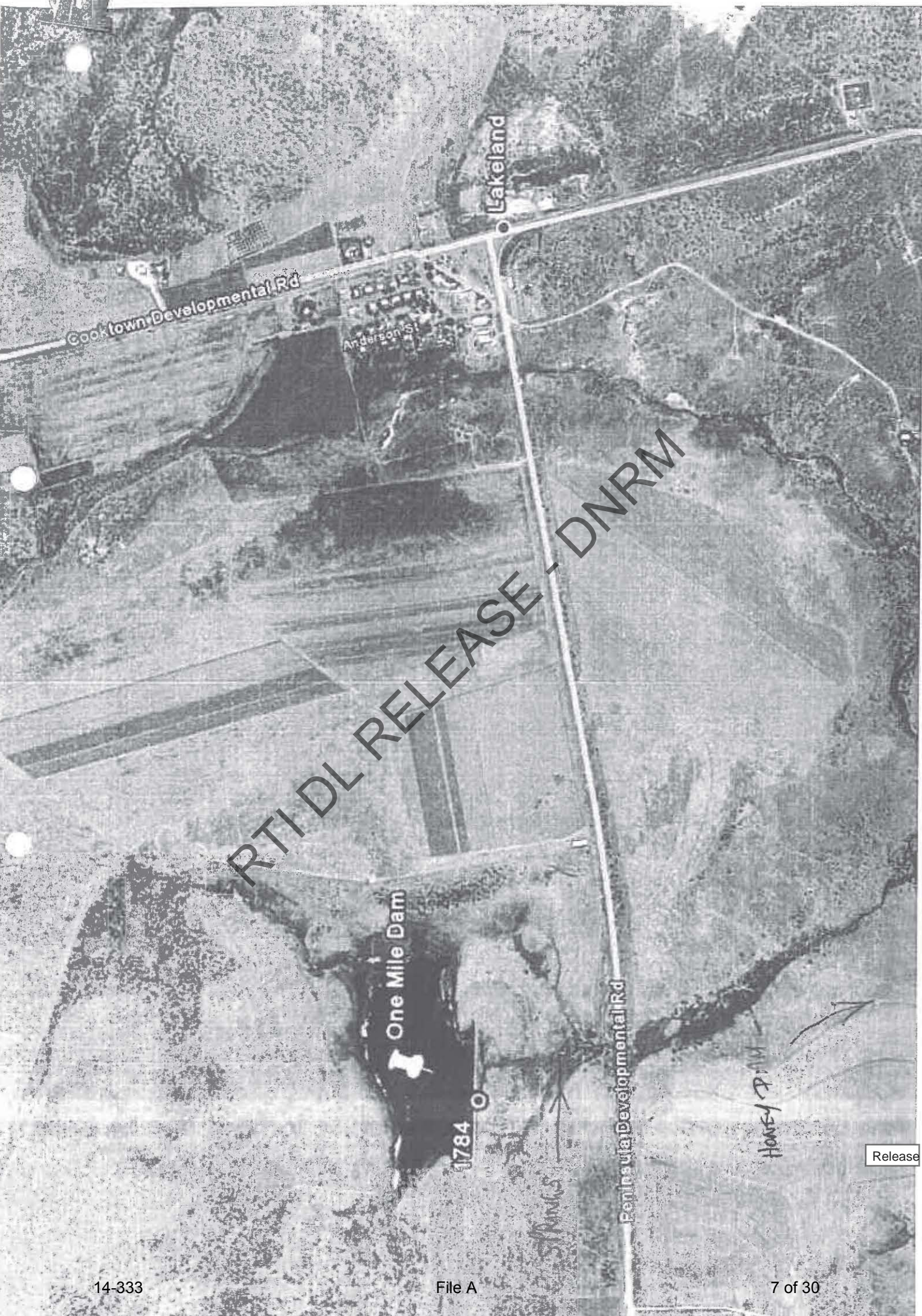
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Horizontal Datum: Geocentric Datum of Australia 1984 (GDA84)  
Cadastral data provided with the permission of the Department of Natural Resources and Mines

Property boundaries shown on this map are provided as best practice only. They do not represent legal cadastral boundaries.  
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Cooktown Developmental Rd

Anderson St

Lakeland

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One Mile Dam

1784

Pennington Developmental Rd

Honey Pond

Stinks

Release



PAYMENT OPTIONS

Application Fee

The prescribed application fee is payable at the time of application.

Please refer to the provided 'fee link' located on the departmental website to obtain the current fee for this form.  
<[www.nrw.qld.gov.au/water/management/application\\_forms.html](http://www.nrw.qld.gov.au/water/management/application_forms.html)>

Payment by Cheque, Cash or EFTPOS

- Cheque - To be made payable to the 'Department of Environment and Resource Management' and marked 'Not Negotiable'. \$ 109.80
- Cash - Cash is only a payment option when paying in person.
- EFTPOS - Payment facilities may vary between offices, please contact your local DERM office in advance.

Payment by Credit Card *Please print clearly*

Please charge this payment to my (tick appropriate box)  Visa  Mastercard  American Express

Amount of Payment \$       .

Card Number

Expiry Date     Phone No.

Cardholder's Name

Cardholder's Signature  Date

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FILE NO .....

30 JAN 2014

REC DOC .....

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WATER LICENCE APPLICATION REFERENCE:  
DEVELOPMENT PERMIT APPLICATION REFERENCE:  
FILE:

143698 - 408668  
143700 408694  
MAR/515/000(3330)

APPLICANT: s78B(2) - Personal Information

**DESCRIPTION OF WORKS APPLIED FOR:**

<b>Activity</b>	The taking of water from One Mile Creek on land described as Lot 10 on Plan RP747317.
<b>Purpose</b>	Irrigation
<b>Attached Land</b>	Lot 10 on Plan RP747317
<b>Nominal Entitlement</b>	40 Megalitres
<b>Extraction Rate</b>	6.5 litres per second.
<b>Subgroup Code</b>	MBN24 - Bullhead Creek at Honey Dam
<b>Watercourse Code</b>	105.03.03.19

**1.0 BACKGROUND**

Water Licence application 143698 seeks to authorise the taking of 40ML of water per annum at a maximum instantaneous extraction rate of 6.5 litres per second, from One Mile Creek within or adjacent to Lot 10 on Plan RP747317, for the irrigation of 30 hectares within the lot.

Development Permit application 143700 seeks to authorise the works necessary to take the water sought by Water Licence application 143698.

It is intended that the water be used to irrigate a plantation of Pongamia pinnata trees for the purpose of producing oil that could be used to produce biodiesel fuel.

One Mile Dam is situated approximately 900 meters above the proposed point of take on One Mile Creek. The creek runs into Honey Dam and eventually into the Laura River. One Mile Creek is within the Normanby basin.

**2.0 HYDROLOGICAL ASSESSMENT**

**2.1 Allocation Strategy for the Lakeland Area:**

The Mareeba Stream Management Unit has adopted the approach that no less than 50% of the monthly flow rate of water is provided for environmental flow in the Lakeland area.

Usually any irrigation in this area is driven by dam storage, where the maximum size of the dam should not exceed three times the expected annual consumptive use. However a communications s78B(2) - Personal Information on the 9<sup>th</sup> of September 2008 revealed that One Mile Creek is a perennial watercourse that is spring fed. It was also stated during the conversation s78B(2) - Personal Information that there would not be any construction works required in order to create a sufficient pool of water to be pumped from. After

inspection it was revealed that an impoundment is required to pool enough water in order for it to be pumped. Application and IDAS forms were sent to the applicant on the 18<sup>th</sup> of September 2008.

Given that the water course is supplied with water derived from springs it would be inaccurate to compare flow rates near by water courses that have gauging stations on them.

Departmental Officers Shane Garozzo and Paul Le'Gear gauged the flow of One Mile Creek on the 17<sup>th</sup> of September 2008. The results indicated that 10.7 litres per second was the flow rate, but it is believed this result was inconclusive. The shallow profile of the creek prohibited the Marsh McBirney Flow metre from operating correctly. It is estimated that the flow rate would be approximately 20 litres a second based on stream observations. It should also be noted that the gauging activity was conducted at a dry time of year and that flow rates had not been influenced by any localised rainfall event.

Given the environmental flow should be no less than 50% of the monthly flow rate, One Mile Creek requires an environmental flow of no less than 10 litres per second in the month of September. This would potentially provide for an allocable volume that could be extracted of 10 litres per second. The applicant seeks to extract water at a rate of 6.5 litres per second, which is not considered to be excessive.

## **2.2 Departmental Water Assessments:**

Upon inspection it was revealed that the planting regime adopted thus far, was trees planted in 10m rows spaced 10m apart. This equates to 100 trees per hectare or 3000 trees in total over 30 hectares. With a water entitlement of 40ML each tree would be able to receive 36.5 litres per tree, per day, every day of the week. This equates to 256 litres per tree per week or an entire weekly water use of 769,230 litres to irrigate the total 30 hectares per week. This water application is excessive whilst the trees are young, but it is not considered to be excessive for when the water is applied to fully mature trees. To provide 36.5 litres per day to a full grown Pongamia tree is considered to be an acceptable level of water use for a plantation tree, particularly when considering the natural elements the trees are exposed to on the site. The site is characterised by hot dry winds in the winter and spring months and the vegetation in the Lakeland area experiences a high rate of evapotranspiration.

For the purposes of plantation requirements in a high evaporative area in well drained soils, this is not considered to be an excessive amount of water per tree.

The gauging and observations made of One Mile Creek completed on the 17<sup>th</sup> of September 2008 by Departmental Officers Shane Garozzo and Paul Le'Gear revealed that One Mile Creek had a flow rate of approximately 20 litres per second.

Inspection of the site revealed that the works for the pump had been installed. Upon request from Departmental Officers the pump was started and operational conditions of the pump observed. There was no noticeable affects on the flow of water in One Mile Creek when the pump was extracting at a rate of 6.5 litres per second.

The proposed rate of take of 6.5 litres per second is not considered to be excessive as it is 32.5% of the estimated stream flow when observed on the 17<sup>th</sup> of September 2008.

## **Site Inspection**

### **2.3 Site Inspection:**

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Departmental officers Paul Le'Gear and Shane Garozzo investigated the site of the proposed pump on One Mile Creek on the 17<sup>th</sup> of September 2008. The GPS location of the pump is 15° 52' 06.70" S and 144° 49' 58.97"E.

One Mile Creek is quite narrow in most areas with the widest part observed being approximately two meters across. The creek has rock foundations and there will be a small dam or weir required to impound enough water to be a reliable source in order to maintain water pump operations.

### 3.0 CRITERIA FOR DECIDING THE APPLICATION

The Water Licence application is investigated in accordance with sections 206 to 212 of the *Water Act 2000*.

Section 210 of the *Water Act 2000* requires the Chief Executive to consider certain criteria when deciding an application for a water licence. The criteria and how they were satisfied are set out as follows.

#### 3.1 The application –s210(1)a

The Water Licence application lodged on the 25<sup>th</sup> of June 2008 was:

- Made in the approved form.
- Accompanied by the prescribed fee.
- Supported by sufficient information to decide the application.
- Signed by the owners of the land at the time of application.

#### 3.2 Public notice and submissions – s210(1)b

Notice of the application:

- Was published in the "Cairns Weekend Post" on the 19<sup>th</sup> of July 2008.
- The submission period closed on the 29<sup>th</sup> of August 2008.
- Nil submissions were lodged.

#### 3.3 Water Resource Plan – s210(1)c

Lot 10 on plan RP747317 is within the Normanby basin and there is currently no water resource plan that can be applied to properties in this area.

#### 3.4 Existing water entitlements – s210(1)d

Permit 118743 is the only existing entitlement on One Mile Creek above the point of take and it expires on the 31<sup>st</sup> of December 2010. The permit authorises the Department of Main Roads to extract 2.4ML at a rate of 50 litres per second from One Mile Creek and would only be available in times of moderate to high water flow.

Honey Dam is downstream with a total of 1500ML authorised to be taken for irrigation purposes. With the dam having a capacity of 6000 to 6500ML, it is not expected that the take of 40ML per year will have a serious detrimental impact upon this entitlement.

It is unlikely that the granting of this application will impact upon entitlement holders.

#### 3.5 Ecological integrity of the watercourse – s210(1)e

Approval of the application for irrigation is unlikely to impact upon the ecological integrity of the watercourse.

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**3.6 Physical integrity of the watercourse – s210(1)f**

Approval of the application for irrigation is unlikely to impact upon the physical integrity of the watercourse.

**3.7 Policies for the sustainable management of local water – s210(1)g**

A policy developed in conjunction with the community for the sustainable management of water conveyed by One Mile Creek and its tributaries does not exist.

**3.8 Sustainable resource management strategies and policies – s210(1)h**

The *Water Act 2000* makes provision for the allocation of water ensuring both economic and environmental sustainability. Approval of the application is consistent with the Mareeba Water Management and Use water allocation strategy for the water courses comprising the Laura River Catchment, upstream of Coal Seam Creek.

**3.9 The public interest – s210(1)i**

It is unlikely the public interest will be compromised by approval of the application.

**4.0 OTHER LEGISLATIVE MATTERS**

**4.1 Native Title**

The subject reach of the unnamed tributary of One Mile Creek, is of Freehold Tenure and therefore not claimable under Native Title legislation. Module BA applies.

**5.0 ATTACHMENTS TO THIS REPORT**

- Attachment 101 under State Government Native Title Work Practice.

**6.0 APPLICATION AND ADMINISTRATION FEES**

Application fees paid	\$89.10	
Annual Licence fee paid	\$112.20	( 2 years )
Receipt No.	3670110	

**7.0 RECOMMENDATION**

Having considered the facts I recommend Water Licence application 143698 be approved in ~~part~~ subject to conditions and Development Permit application 143700 granted accordingly.

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**Signature**

**Name** Paul Le'Gear

**Position** Project Officer

**Date** 25/09/2008



**8.0 CONDITIONS**

**8.1 Conditions for Water Licence**

Period of Licence 2 years 31/10/2010  
 Activity Location One Mile Creek, on Lot 10 on Plan RP747317  
 Attached Land Lot 10 on Plan RP747317.  
 Purpose Irrigation  
 Nominal Entitlement 40 Megalitres ✓  
 Maximum Instantaneous extraction rate 6.5 litres per second ✓

408668

**Conditions Schedule A**

- Impose Standard Schedule A terms 1.01, 1.10 and 6.21.

~~Conditions Schedule B~~

- Impose Standard Schedule B term SPEC 01

**8.2 Conditions for Development Permit**

408694

**Works reference 31050**

- Installation of a PUMPING UNIT. ✓
- Must be located at Lot 10 on Plan RP747317. ✓
- Installed ✓

**Conditions**

Standard Schedule A Terms D001, D003 and D015  
 Standard Schedule B Term SPEC01 (dpspec) ✓

Insert in WERD the following details:

<b>Geographic Location</b>	<b>Latitude</b>	15° 52' 6.70"	<b>Longitude</b>	144° 49' 58.97"
	<b>East</b>		<b>North</b>	
	<b>Datum</b>	GDA94 – Zone 55	<b>Source</b>	Google Earth
	<b>Map</b>	7866-II Butchers Hill	<b>Topographic</b>	1:50,000
	<b>Parish</b>	Bullhead	<b>Shire</b>	Cook
<b>Water Course Detail</b>	<b>Subgroup code</b>	MBN24		

**DECISION MADE BY**

**Approving Officer**

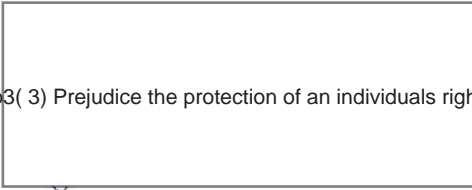
The applications for a Water Licence and a Development Permit are granted in accordance with the recommendations stated in section 7.0 of this report.

I am an authorised officer with the delegation to decide Water Licence applications under section 211 of the *Water Act 2000* as prescribed by the *Water Act Delegation (no. 2) 2008* and Development Permit applications under section 3.5.13 of the *Integrated Planning Act 1997* as prescribed by the *Water Resources (IPA) Delegation (No.2) 2008*.

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**Signature**



**Name**

John Charles

**Position**

Senior Technical Officer – Water Management and Use.

**Date**

~~25/09/2008~~

20/10/2008

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## DRAFT TEMPLATE FOR AN INFORMATION NOTICE

### Background Matters

Water Licence application 143698 sought to authorise the taking of 40ML of water per year for irrigation purposes within Lot10 on Plan SP747317, at a maximum instantaneous extraction rate of 6.5 litres per second, from One Mile Creek.

### Decision

The Department of Natural Resources and Water delegates officers to exercise the power of the Chief Executive to make decisions about Water Licence applications.

As a delegated officer of this Department, I have decided to *grant with conditions* the above application and provide the following information about my decision. This Information Notice is advice of my decision and the reasons for the decision.

### Evidence or other material on which the findings are based

- The *Water Act 2000* and *Water Regulation 2002*
- Departmental policies, work practices and guidelines.
- The Mareeba Water Management and Use water allocation strategy for the Laura River catchment upstream of Coalseam Creek.
- The application lodged on the 25/06/2008.
- A site inspection conducted by departmental officers Paul Le'Gear and Shane Garozzo on the 17/09/2008.
- The departments Water Entitlements Registration Database (WERD).
- Departmental cadastral and topographic mapping.
- The investigation for the application prepared by departmental officer Paul Le'Gear, dated the 25/09/2008.

### Findings on material questions of fact

The property is located within the Normanby River basin on which a public notice of proposal to prepare a draft water resource plan has not been published. Therefore the application has been dealt with under section 210 of the *Water Act 2000*.

Section 210 of the *Water Act 2000* requires the Chief Executive to consider certain criteria when deciding an application for a water licence. Investigation of the application has determined that the application could be granted for irrigation purposes.

The taking of 40 megalitres of water from One Mile Creek per water year is not considered excessive for the irrigation of 30 hectares of Pongamia trees.

Although One Mile Creek is a perennial watercourse, the taking of 40 megalitres of water will have a minimal effect upon the storage of Honey Dam and any entitlements which source water from Honey Dam.

Pumping at the rate of 6.5 litres per second is unlikely to cause the cessation of streamflow in One Mile Creek.

### Reasons for the decision

Having regard to the evidence, material and findings referred to above, I have decided that the granting of this authority, subject to the attached conditions:

- Will not reduce the reliability of existing water entitlements; and

Release

- Will not have more than a minor and inconsequential impact upon the ecological and physical integrity of One Mile Creek or the balance of the watercourses comprising the upper Laura River catchment; and
- Is consistent with the water allocation strategy for the watercourses comprises of the Laura River catchment upstream of Coal Seam Creek.

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Release



# NORTH AUSTRALIAN WATER STRATEGIES

ABN 52 007 200 721

Post Office Centre, Mareeba, Queensland

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**PROJECT:** Hydrologic Assessment of One Mile Dam

**CLIENT:** DJ PASTORAL COMPANY

**ADDRESS:** P.O. Box 2149 Cairns QLD.

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**LOCATION:** Peninsula Development Rd. Lakeland

**DATE:** October 2014

Lot 214 on RP884196, Parish of Bullhead

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## REPORT OUTLINE

In January of 2014 an application was submitted to the Department of Natural Environment & Mines seeking to authorize works to extract water from an existing dam on Lot 214, RP9884196, on a watercourse locally known as One Mile Creek. The application requested an annual volume of 360 ML to be extracted for the purpose of irrigating a proposed 400 ha teak and sandalwood enterprise on Lot 214. The expected maximum monthly extraction is 40 ML with a maximum pumping rate of 46.29 litres per second.

This report presents information regarding the proposed irrigation project and presents the results of modelling conducted utilising the RUSTIC runoff and irrigation calculator programme to derive the annual yield from One Mile Dam for various levels of reliability. Runoff model results will be presented in tabular and graphical format.

## PREVIOUS INVESTIGATIONS

A Preliminary Failure Impact Assessment of One Mile Dam was made by Sunwater in 2004 and subsequently a Failure Impact Assessment was prepared in November 2009 by GHD. The latter assessment concluded that no population-at-risk existed and therefore the dam has a zero failure impact rating and is classified as non-referable. Catchment and storage data presented in that assessment has been utilised in the modelling conducted for this hydrologic assessment.

## GENERAL PROJECT DESCRIPTION

**Dam Details:** One Mile Dam is located at 267730E, 8245300N some 500 metres up-stream of the Peninsula Development Road. The earth-fill embankment is approximately 500 metres long and a maximum of 8.6 metres high.

An excavated bench at the western, right hand, end of the embankment provides a spillway such that the full supply level, (FSL), of the storage is approximately 0.85 m below the embankment crest level. Assessment of the peak storm discharge from the catchment indicates that the 19 metre wide spillway will cater for a maximum discharge of approximately 23 cubic metres per second.

**Storage Estimate:** Storage volume of One Mile Dam has been assessed by Sunwater in the Preliminary Hazard Assessment at 490 ML, however the dam licence issued some decades ago describes the volume at 317 ML only. It is the author's opinion that both sources probably underestimate the natural storage volume of One Mile Dam. Topographic mapping and GoogleEarth imagery suggests that the topography of the site would result in a fairly shallow mean storage depth; possibly as low as 0.3 x maximum depth, or about 2.3 m. The area at FSL has been determined at approximately 25 ha, therefore the natural storage volume may be in the order of 575 ML. However, the Failure Impact Assessment was based upon the Sunwater volume estimate of 490 ML, which DNRM have indicated acceptance. A generic storage/depth curve has therefore

been developed for use in the RUSTIC analysis for a 490 ML storage of maximum depth of 10.0 m, (assuming excavation for construction material to a depth of about 2 m below the original creek bed), and area at FSL of 25 ha.

### ONE MILE CREEK CATCHMENT

Characteristics of the catchment contributing to the proposed dam-site are presented below.

**Area:** The direct catchment area contributing to the dam has been determined from topographic mapping and Google-earth; validated by field inspections, to be approximately 489 ha, which generally concurs with the Sunwater estimate. Consultation with Peter McKenzie, a representative of the company seeking to develop the irrigated timber project, suggest that crop row direction and on-farm soil conservation structures will result in an additional 41 ha of the row-cropped area in the north-eastern corner of the property being diverted to the dam. Thus the future total catchment area will be approximately 530 ha.

**Description:** One Mile Creek is a tributary of Bullhead Ck.; its junction being 2.0 km down-stream of the dam. The catchment rises northerly from a narrow incised channel and broad, depressed valley to broad, ridges of low relief to the toe-slopes and southern flank of a volcanic vent on the adjacent "Goldtyne" property. Source to site length is approximately 3.5 km.

**Soil types:** Flat to moderate slopes have been in-filled with basaltic clay-loam with a boulder mantle in the mid-slope zone to heavy, black, cracking-clay on the lower slopes and depressed areas surrounding the dam. These lower depressed areas typically exhibit groundwater discharge.

The predominant land use in the catchment is currently beef cattle production on the cleared grassland that covers about 58 % of the area. Sparse native eucalypt woodland and grassland comprises about 37 % of the natural catchment area.

### CATCHMENT ASSESSMENT

**Methodology:** Topographic mapping and GoogleEarth imagery has been used, along with on-site observations, to determine the boundary and characteristics of the catchment. A summary of the land use descriptions and sub-catchment characteristics is shown in Table 1 below. For the purpose of this assessment it is assumed that the proposed timber plantation enterprise is fully developed.

Sub-catchment	Area ha	Description and Land Use	Soil-type
1	310	Irrigated permanent timber plantation.	Basaltic clay-loam to light clay. Type B-C
2	179	Native woodland w/- native & introduced grass under-storey.	Basaltic clay-loam to light clay w/- rocky mantle. Type B-C
3	15	Sparse native forest & grasslands on stream margins and depressed areas.	Heavy clay and/or dense rock mantle. Type C-D
4	1	Home-stead & developed high-traffic areas.	Unpaved roads, roofs, gardens, skeletal soils & bare rock.
5	25	Water bodies – including dam at FSL.	N/A
<b>Total Catchment Area – 530 ha</b>			



**Run-off Indices:** Having identified the various landscape units, the sub-catchments were then classified according to the USDA Rainfall-Runoff method described in Farm Water Supplies Manual Vol. I, S1.3. Catchment Indices,  $K_{II}$ , were then assigned as per Table 1.6 of that publication. The catchment indices for the sub-catchments are shown in Table 2 below.

	<b>Catchment Description</b>	<b>Soil Type</b>	<b>Catchment Index (<math>K_{II}</math>)</b>	<b>Area (ha)</b>
1	Irrigated land; basaltic clay-loam to light clay	B-C	78	310
2	Pasture and grasslands; basaltic clay-loam to light clays w/- rocky mantle.	B-C	71	179
4	Sparse native forest & grassland on stream margins and depressed areas; heavy clays and/or dense rock mantle.	C-D	77	15
5	Home-stead & developed areas; un-paved road & hard-stand areas, skeletal soils & bare rock.	Type D	85	1
7	Water bodies	-	100	25
	<b>TOTAL</b>			<b>530 ha</b>

### **RUNOFF MODELLING**

Assessment of annual runoff was carried out by means of the RUSTIC program, which is ideally suited to the purpose. The RUSTIC program is capable of accepting variable sub-catchment parameters based upon the USDA land use and soil classifications, in order to analyse the runoff resulting from daily rainfall events.

Class A Pan evaporation data is used by RUSTIC to model evapotranspiration from the landscape and from the surface of the storage. Monthly evaporation data was obtained from maps published on the Bureau of Meteorology's web-site.

The model runs were based upon Bureau of Meteorology daily rainfall data from two nearby rainfall stations. Table 4 shows the details of rainfall stations considered when compiling rainfall data for the RUSTIC analysis. Data from the two stations were compiled into a single composite file, with missing data in either file filled-in by adjusted data from the other station. By this means, a complete record of daily rainfall spanning 110 years was available for input to the RUSTIC analysis.

<b>Station No.</b>	<b>Station Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Period of Record</b>	<b>Elevation</b>
028004	Palmerville	16.00	144.08	Dec 1889 – Dec 2000	204 m
031009	Butcher Hill	15.85	144.88	Jan 1956 – Dec 2000	275 m

A chart of the annual rainfall for this composite site used in the RUSTIC analysis is included in the appendix to this report.

### **GROUNDWATER IN-FLOW**

In addition to storm run-off, natural groundwater discharge provides in-flow to One Mile Dam. This "spring-flow" has been included in the RUSTIC modelling by developing a basic hydrograph based upon limited observations of the spring-flow. The estimated inflow from natural groundwater discharge is presented in Table 4 below. This data was included in the RUSTIC model.

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<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sept</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Year</u>
3.0	6.0	7.0	7.0	6.0	5.0	4.5	4.0	3.5	3.0	2.5	2.0	54.5

### SEEPAGE LOSSES

Perennial seepage occurs from One Mile Dam; as is common for dams constructed in the basaltic soils of the Lakeland Plateau. Except for sporadic observations at the Peninsula Development Road culvert, no quantitative data exists regarding seepage loss rate and seasonal variation. In the absence of any quality data, the following estimates of monthly losses from the storage have been derived from a few recent observations, which suggest that seepage loss appears to be reasonably consistent throughout the year. This is due to only minimal demand from grazing stock and groundwater inflow almost negating evaporation losses. Thus the dam water level has historically been maintained at or close to FSL. With the imposition of the proposed irrigation draft it is expected that loss rates will reduce proportionate to the seasonal decline in storage volume and water level resulting from irrigation usage.

It is expected that loss rate will reach a peak of around 5 ML per month at the end of the wet season and then decrease linearly to about 1.0 ML per month by December. Data input reflecting this scenario is presented in Table 5 below and has been included in the RUSTIC model.

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sept</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Year</u>
1.0	2.0	3.0	4.0	5.0	4.5	4.0	3.5	3.0	2.5	2.0	1.5	36.0

### IRRIGATION MODELLING

Modelling of the irrigation extraction from the dam is based upon an estimate of the monthly and annual usage likely to occur on the timber plantation areas under trickle irrigation. The current licence application states a proposed irrigated area of 400 ha with an annual requirement of 360 ML. The proponents of the timber enterprise advise that the proposed sandalwood plantation will be irrigated using a method of deficit irrigation that encourages deep-rooting of the host trees and drought-tolerance. Irrigation will generally only be required from April to December inclusive, with preference given to new plantings and young trees in the first years of growth. In order to model this rather unusual irrigation programme, it was assumed that a nominated demand of 0.9 ML per ha is distributed over the nine irrigation months, roughly proportionate to evaporative demand, as shown in Table 6 below.

<u>Jan - Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sept</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Year</u>
No Irrigation	0.02	0.03	0.04	0.05	0.07	0.09	0.15	0.20	0.25	0.90

### RUSTIC RESULTS

The modelled annual runoff values for the One-mile Dam and associated timber plantation enterprise for the 110 year period are presented in the attached RUSTIC print-outs. By observation, it may be seen that the median or Decile 5 inflow volume is approximately 838 ML and the decile 2.5 volume is approximately 593 ML.

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In summary, the RUSTIC analysis indicates that:

- At least 536 ML of inflow from runoff and groundwater may be expected to occur in 75% of years.
- Median annual inflow volume is 838 ML.
- The catchment run-off and groundwater inflow to One Mile Dam would have provided at least 356 ML per year to the modelled irrigation enterprise over the 110-year period with reliability of 75 %.
- The catchment area and groundwater inflow to the dam would have provided at least 360 ML to the modelled irrigation enterprise with reliability of 50 %.
- There would have been three years over the course of the 110-year rainfall record when irrigation deliveries to the 400 ha enterprise failed to exceed 200 ML. This would have occurred in 1988 – 1991.
- If the dam had been supporting the 400 ha modelled irrigation enterprise, it would have overflowed in 85 of the 110 years of record; i.e. 77 % of years.
- If the dam had been supporting the modelled irrigation enterprise the median overflow volume would have been 334 ML , with a maximum of 2616 ML occurring in 1913, ( a year when annual rainfall exceeded 2 100 mm).

### DOWNSTREAM RIPARIAN IMPACTS

Seepage from One Mile Dam will continue to provide downstream riparian requirements in all but the driest years.

Obviously there will be some negative effect on Honey Dam and irrigators reliant on this source due to the reduction in runoff that will occur as a result of the reduced storage level in One Mile Dam at the end of the dry season. It is noted however that One Mile Dam will still experience over-flow events in 77% of years.

### APPENDICES

- A. Locality Plan
- B. Google-Earth Image showing catchment boundary
- C. RUSTIC input file summary
- D. Original RUSTIC output chart plots

sch4p3( 3) Prejudice the protection of an individuals right to privacy

Jeff Benjamin  
Principal, North Australian Water Strategies  
Mareeba Queensland

TITLE\_START

RUNOFF (ML) INTO STORAGE FROM  
MODELLED RUNOFF SOURCE [Catch01]

TITLE\_END

PARAM\_DATA\_START

Modelled Runoff Parameters.

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Short identifier: Catch01.  
Long identifier : Irrig cult. Soil B-C.

Rainfall File : C:\Ruscas\LAKELAND.OUT.

Catchment Area : 310.00 ha.  
K Factors : K1=60, K2=78, K3=90.  
Dormant Months :

Modelled catchment contains main storage: NO

Short identifier: Catch02.  
Long identifier : Native forest & grassland B-C.

Rainfall File : C:\Ruscas\LAKELAND.OUT.

Catchment Area : 179.00 ha.  
K Factors : K1=52, K2=71, K3=86.  
Dormant Months :

Modelled catchment contains main storage: NO

Short identifier: Catch03.  
Long identifier : Native forest & grassland. Soil C-D.

Rainfall File : C:\Ruscas\LAKELAND.OUT.

Catchment Area : 15.00 ha.  
K Factors : K1=59, K2=77, K3=89.  
Dormant Months :

Modelled catchment contains main storage: NO

Short identifier: Catch04.  
Long identifier : Homestead, roads & skeletal. Soil D.

Rainfall File : C:\Ruscas\LAKELAND.OUT.

Catchment Area : 1.00 ha.  
K Factors : K1=70, K2=85, K3=94.  
Dormant Months :

Modelled catchment contains main storage: NO

Short identifier: Catch05.  
Long identifier : Water bodies.

Rainfall File : C:\Ruscas\LAKELAND.OUT.

Catchment Area : 25.00 ha.  
K Factors : K1=100, K2=100, K3=100.

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Dormant Months :

Modelled catchment contains main storage: YES

Short identifier: One Mile Dam.

Long identifier : One MILE Dam - 490 ML.

Maximum Storage Capacity: 490.00 ML.  
Initial Volume: 490.00 ML.  
Nominated Demand Reserve: 0.00 ML.  
Environmental Reserve: 0.00 ML.

Level/Volume/Surface Area Table.

Level(m)	Volume(ML)	SA(ha)
253.0	0.000	0.000
255.0	15.000	2.500
257.0	100.000	5.000
259.0	140.000	8.000
261.0	165.000	8.500
263.0	490.000	25.000

Rainfall File: C:\Ruscas\LAKE LAND.OUT.

Monthly Evaporation Levels (mm).

Jan: 162.0	Feb: 132.0	Mar: 158.0	Apr: 155.0
May: 132.0	Jun: 127.0	Jul: 133.0	Aug: 162.0
Sep: 198.0	Oct: 212.0	Nov: 225.0	Dec: 212.0

Pan Factors.

Jan: 0.89	Feb: 0.91	Mar: 0.91	Apr: 0.93
May: 0.98	Jun: 1.02	Jul: 0.97	Aug: 0.91
Sep: 0.87	Oct: 0.88	Nov: 0.87	Dec: 0.86

Monthly Seepage Levels (mm).

Jan: 1.0	Feb: 2.0	Mar: 3.0	Apr: 4.0
May: 5.0	Jun: 4.5	Jul: 4.0	Aug: 3.5
Sep: 3.0	Oct: 2.5	Nov: 2.0	Dec: 1.5

Short identifier: One Mile Dam.

Long identifier : One MILE Dam - 490 ML.

Maximum Storage Capacity: 490.00 ML.  
Initial Volume: 490.00 ML.  
Nominated Demand Reserve: 0.00 ML.  
Environmental Reserve: 0.00 ML.

Level/Volume/Surface Area Table.

Level(m)	Volume(ML)	SA(ha)
253.0	0.000	0.000
255.0	15.000	2.500
257.0	100.000	5.000
259.0	140.000	8.000
261.0	165.000	8.500
263.0	490.000	25.000

Rainfall File: C:\Ruscas\LAKE LAND.OUT.

Monthly Evaporation Levels (mm).

Jan: 162.0	Feb: 132.0	Mar: 158.0	Apr: 155.0
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Release

May: 132.0	Jun: 127.0	Jul: 133.0	Aug: 162.0
Sep: 198.0	Oct: 212.0	Nov: 225.0	Dec: 212.0

Pan Factors.

Jan: 0.89	Feb: 0.91	Mar: 0.91	Apr: 0.93
May: 0.98	Jun: 1.02	Jul: 0.97	Aug: 0.91
Sep: 0.87	Oct: 0.88	Nov: 0.87	Dec: 0.86

Monthly Seepage Levels (mm).

Jan: 1.0	Feb: 2.0	Mar: 3.0	Apr: 4.0
May: 5.0	Jun: 4.5	Jul: 4.0	Aug: 3.5
Sep: 3.0	Oct: 2.5	Nov: 2.0	Dec: 1.5

Short identifier : Irrigation Demand

Long identifier : Deficit Irrigation Demand - 9 mths

Monthly Nominated Demands (ML).

JAN: 0.0000	FEB: 0.0000	MAR: 0.0000	APR: 8.0000
MAY: 12.0000	JUN: 16.0000	JUL: 20.0000	AUG: 28.0000
SEP: 36.0000	OCT: 60.0000	NOV: 80.0000	DEC: 100.0000

Short identifier : Seasonal springs

Long identifier : Ephemeral Inflow

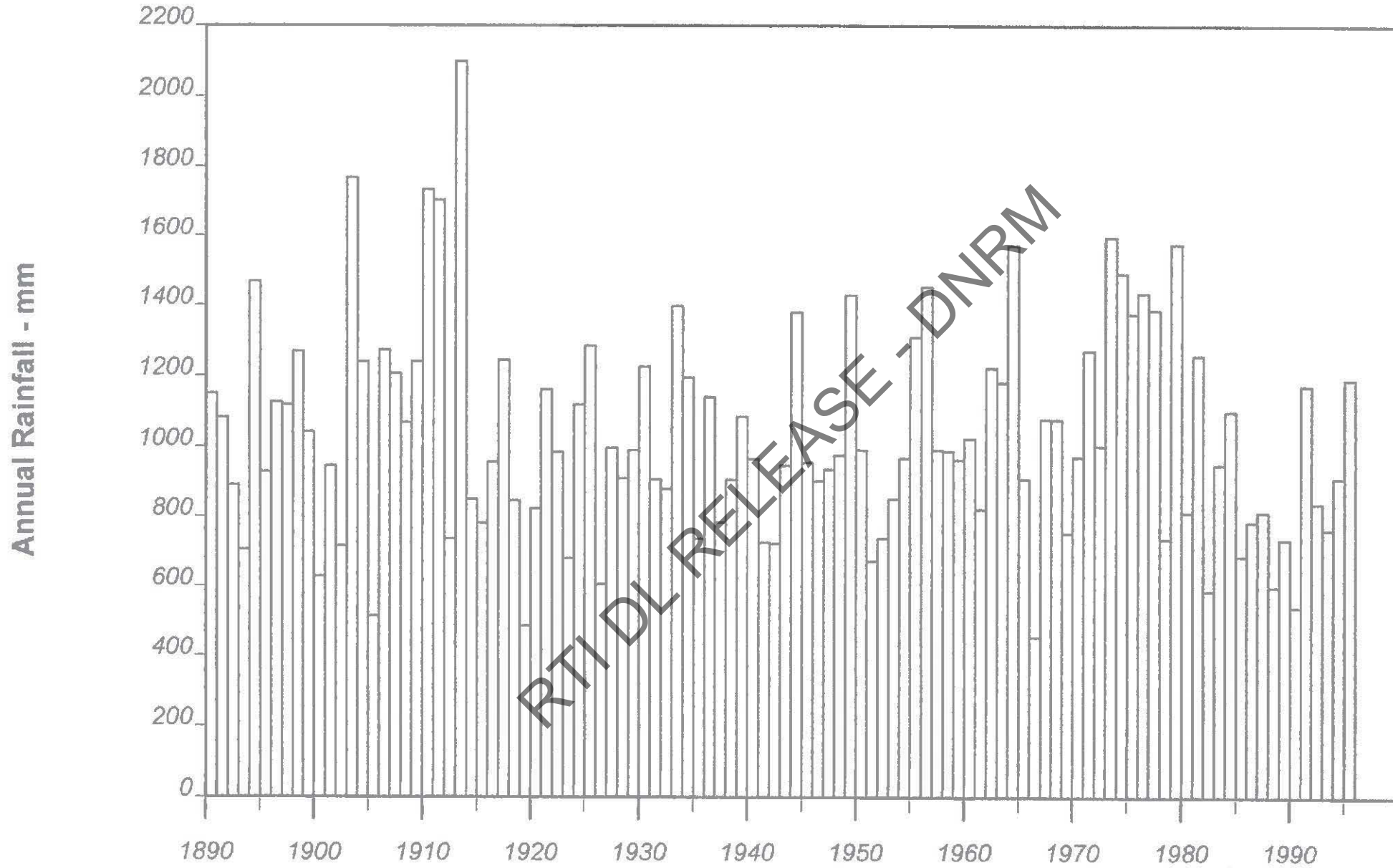
Monthly Nominated Inflows (ML).

JAN: 3.0000	FEB: 6.0000	MAR: 7.0000	APR: 7.0000
MAY: 6.0000	JUN: 5.0000	JUL: 4.5000	AUG: 4.0000
SEP: 3.5000	OCT: 3.0000	NOV: 2.5000	DEC: 2.0000

RTI DL RELEASE - DNR/M

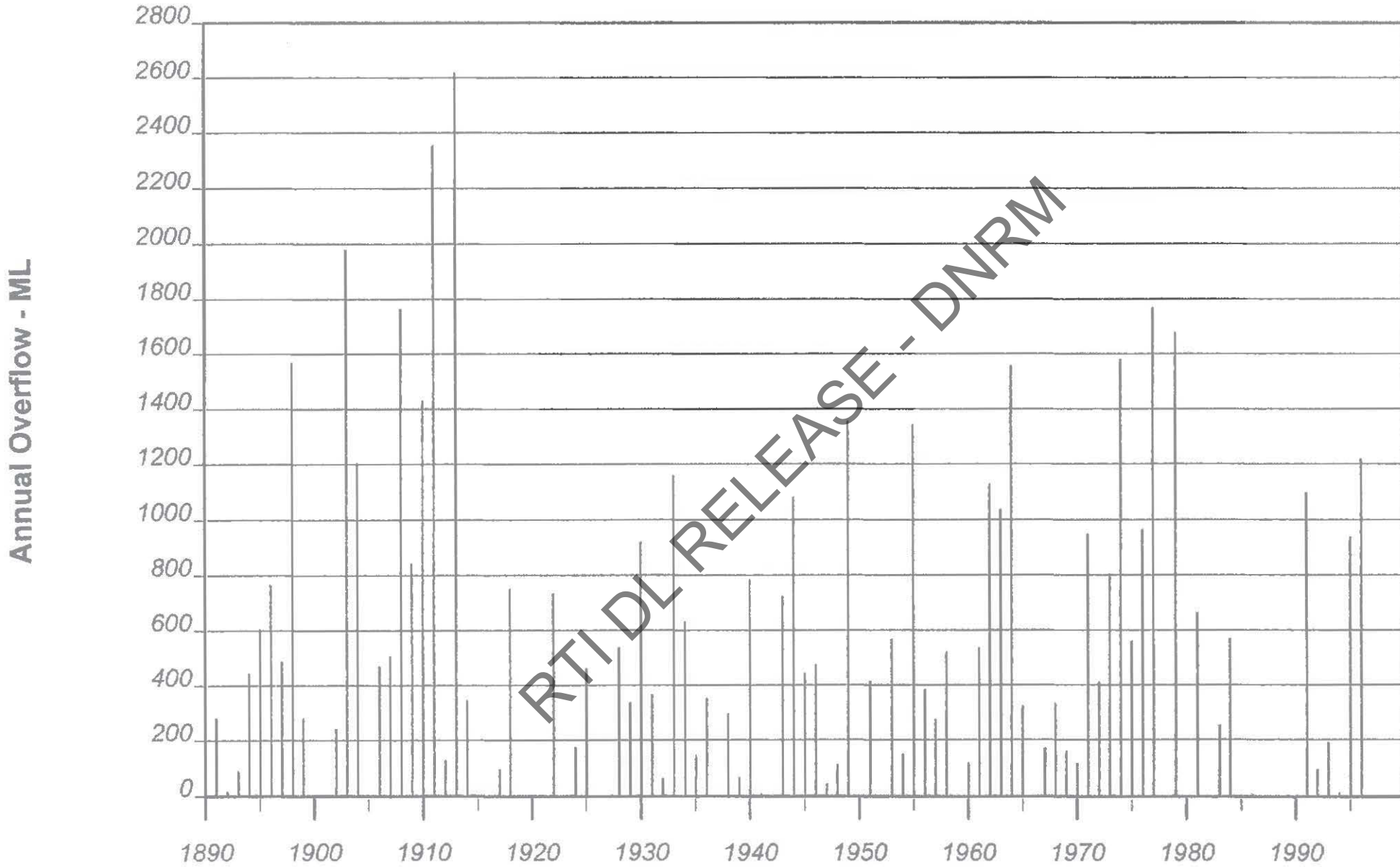


# ANNUAL RAINFALL FOR LAKELAND COMPOSITE STATION



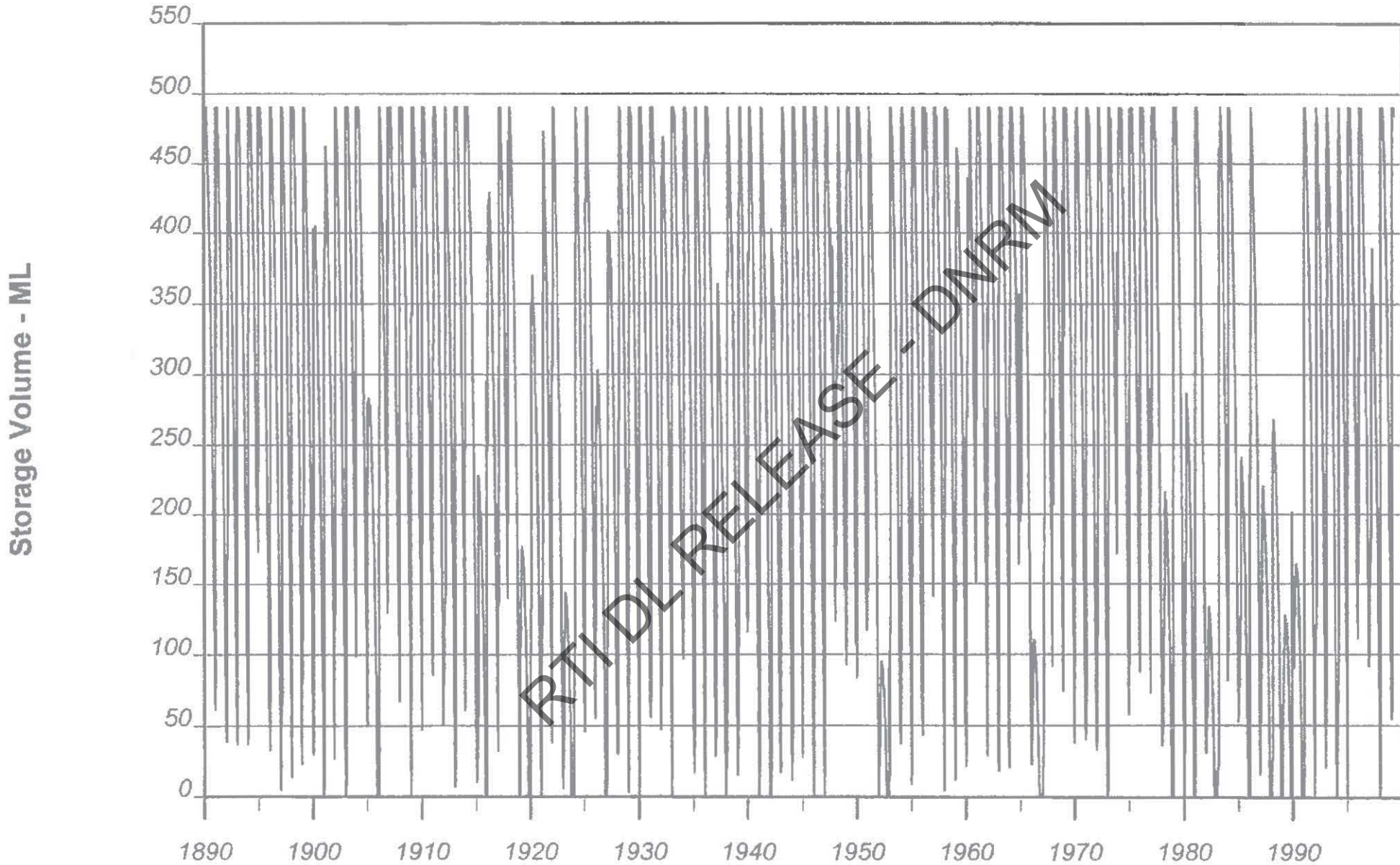
Release

# OVERFLOW (ML) FROM ONE MILE DAM W/- 360 ML ANNUAL IRRIGATION DEMAND



Release

# STORAGE VOLUME (ML) FOR ONE MILE DAM W/- 360 ML ANNUAL IRRIGATION DEMAND

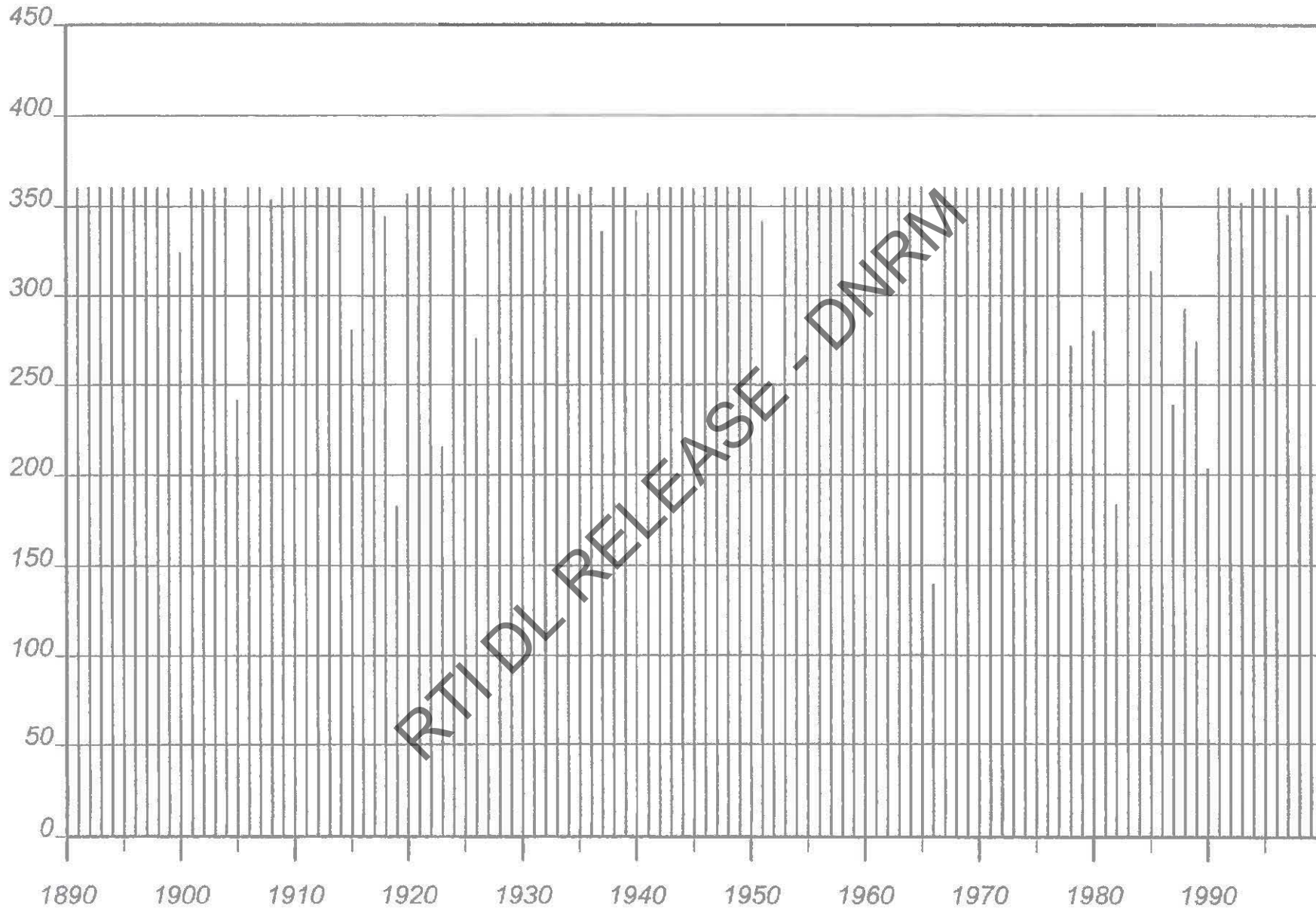


Release



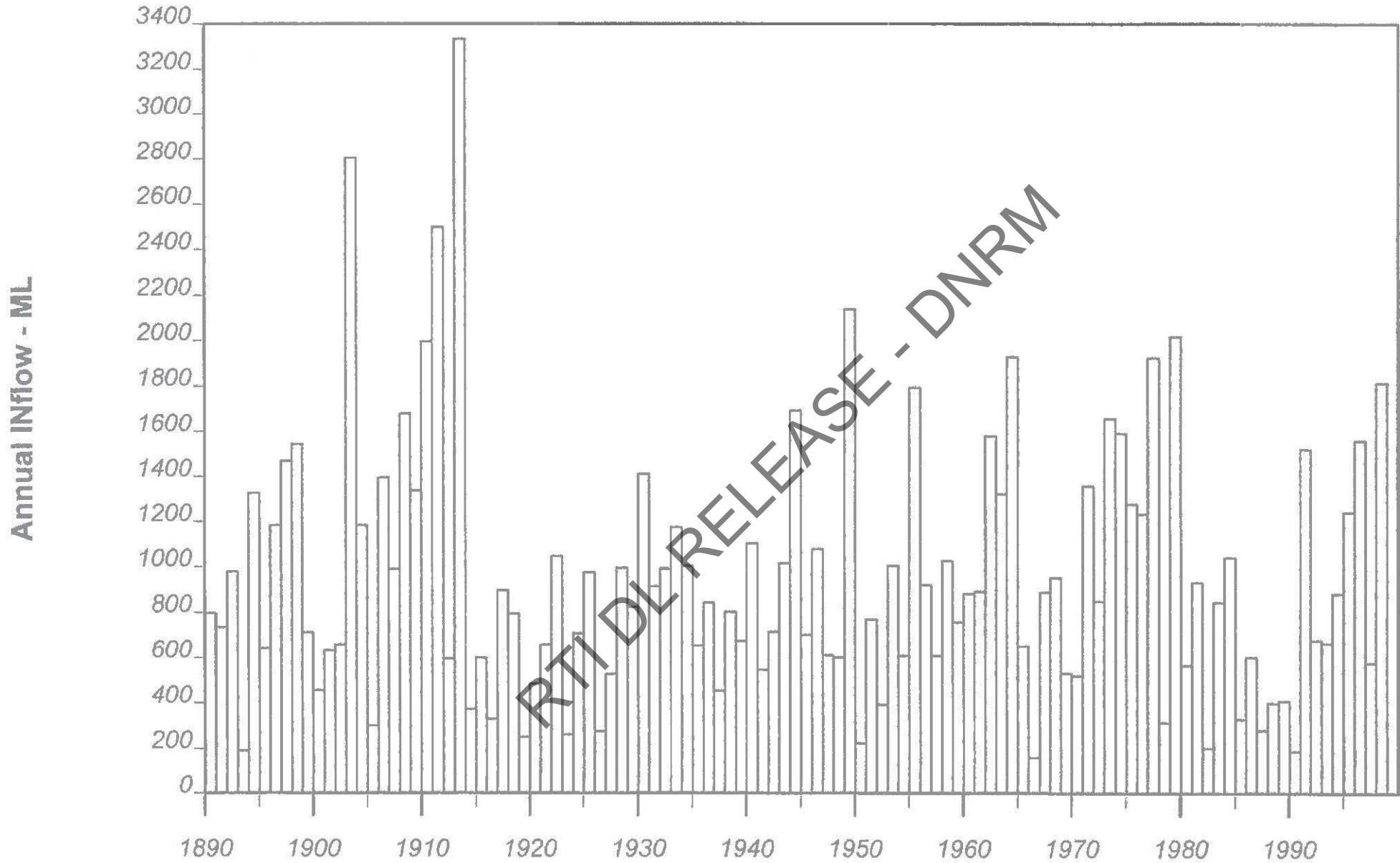
# TOTAL DELIVERY (ML) FROM STORAGE [One Mile Dam] FOR NOMINATED DEMANDS

Annual Irrigation Delivery - ML



Release

# TOTAL IN-LOW (ML) INTO STORAGE [One Mile Dam]



Release





RTI DL RELEASE - DNRM

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Release