



REPORT ON HYDROLOGICAL & ENGINEERING ISSUES

PARADISE DAM FISHWAYS

BURNETT RIVER, QLD

PART 2 **Figures & Attachments**

Prepared for:

Environmental Defenders Office (Qld)

Prepared by:

M.F Winders

22 June 2009

DOCUMENT CONTROL SHEET

MWA Environmental

Level 15 241 Adelaide Street
GPO Box 3137 Brisbane 4001

Job Name: Paradise Dam

Job No: 09-065

Telephone: 07 3002 5500

Facsimile 07 3002 5588

Original Date of Issue: 22 June 2009

Email: mail@mwaenviro.com.au

DOCUMENT DETAILS

Title: Report on Hydrological & Engineering Issues – Paradise Dam
Fishways, Burnett River Qld

Principal Author: Mr Max Winders

Client: Environmental Defenders Office (Qld) Inc.

Client Address: 30 Hardgrave Street, West End Qld 4101

Client Contact: Ms Jo-Anne Bragg

REVISION/CHECKING HISTORY

Version Number	Date	Issued By		Checked By	
1	22/06/09	MFW			
2					
3					
4					
5					
6					
7					
8					

DISTRIBUTION RECORD

Destination	Version Number								
	1	2	3	4	5	6	7	8	9
Client (bound)									
Client (unbound)									
Client (electronic)									
File Copy	1								
MWA Enviro Library	1								

PART 2

FIGURES

Figure 1	View from Downstream of the Dam Wall	5
Figure 2	Views of Stepped Face of Spillway and of Stilling Basin	6
Figure 3	View Upstream from Dam Wall of Right Bank	7
Figure 4	View Upstream from Dam Wall of Left Bank	8
Figure 5	Comparison of Pre- and Post-Flow Exceedance Curves	9
Figure 6	Comparison of Incidence of Flood Flow Events	10
Figure 7	Comparison of Impact upon Flow Pulses	11
Figure 8	Comparison of Pre-and Post Dam Flows < 500 ML/day	12
Figure 9	Comparison of Pre-and Post-Dam Flows < 100 ML/day	13
Figure 10	Dam Water Level Percentage Exceedance Curve	14
Figure 11	Time History of Dam Levels 1890- 1997	15
Figure 12	Time History of Dam Levels 1976 – 1995	16
Figure 13	Photographs of Upstream Fishway Hopper	17
Figure 14	Photographs of Entrances to Upstream Fishway	18
Figure 15	Photographs of Entrance to Downstream Fishway	19
Figure 16	Photographs of Exit from Downstream Fishway	20
Figure 17	Photographs of Stepped face of Spillway & Stilling Basin	21
Figure 18	Skimming and Nappe Flow Regimes	22

ATTACHMENTS

Attachment 1:	QDPI&F, <i>Waterway Barrier Works Approval & Notification to Build Fishways</i>	23
Attachment 2	Letters of Instruction to M.F. Winders	30
Attachment 3	CV of M.F. Winders	44
Attachment 4	Summary Description of Burnett Basin IQQM Model	48
Attachment 5	Extracts from <i>Water Resource Plan (Burnett Basin) 2000</i>	60
Attachment 6	Extracts from <i>Resource Operations Plan (Burnett Basin) 2003</i>	76
Attachment 7	<i>Burnett River Dam – Flow Strategy for Lungfish</i>	88
Attachment 8	Summary of Stream Gauging at Figtree.	96
Attachment 9	Structural Details of Paradise Dam & Associated Works	104
Attachment 10	Summary of Details of Upstream Catchment	111
Attachment 11	Results of Spells Analysis of Hydrological Data.	114
Attachment 12	Summaries of Reports on Fishways & Management	117
Attachment 13 & 14	Details of Downstream & Upstream Fishway	136
Attachment 15	Relevant Aspects of Flume from Spillway to Downstream Fishway	146
Attachment 16	Extracts from Reference 11	153

FIGURES

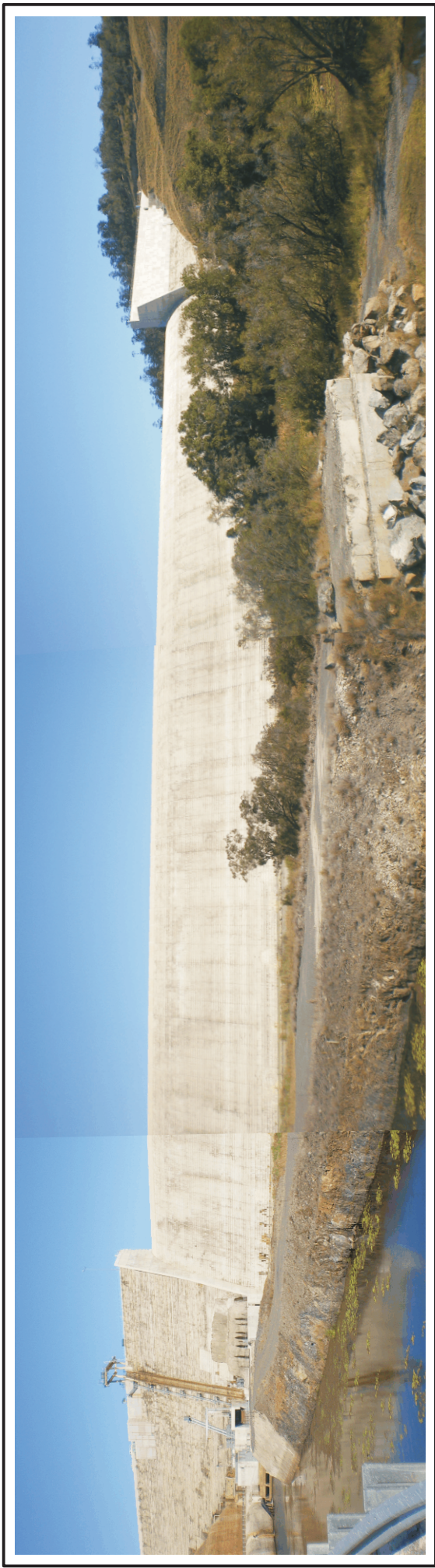


FIGURE 1
VIEW UPSTREAM OF SPILLWAY & FLOW RELEASE CHANNEL



FIGURE 2(a)
VIEW OF STEPPED FACE OF SPILLWAY



FIGURE 2(b)
VIEW SPILLWAY & STILLING BASIN



FIGURE 3
VIEW OF RIGHT BANK, UPSTREAM OF DAM WALL

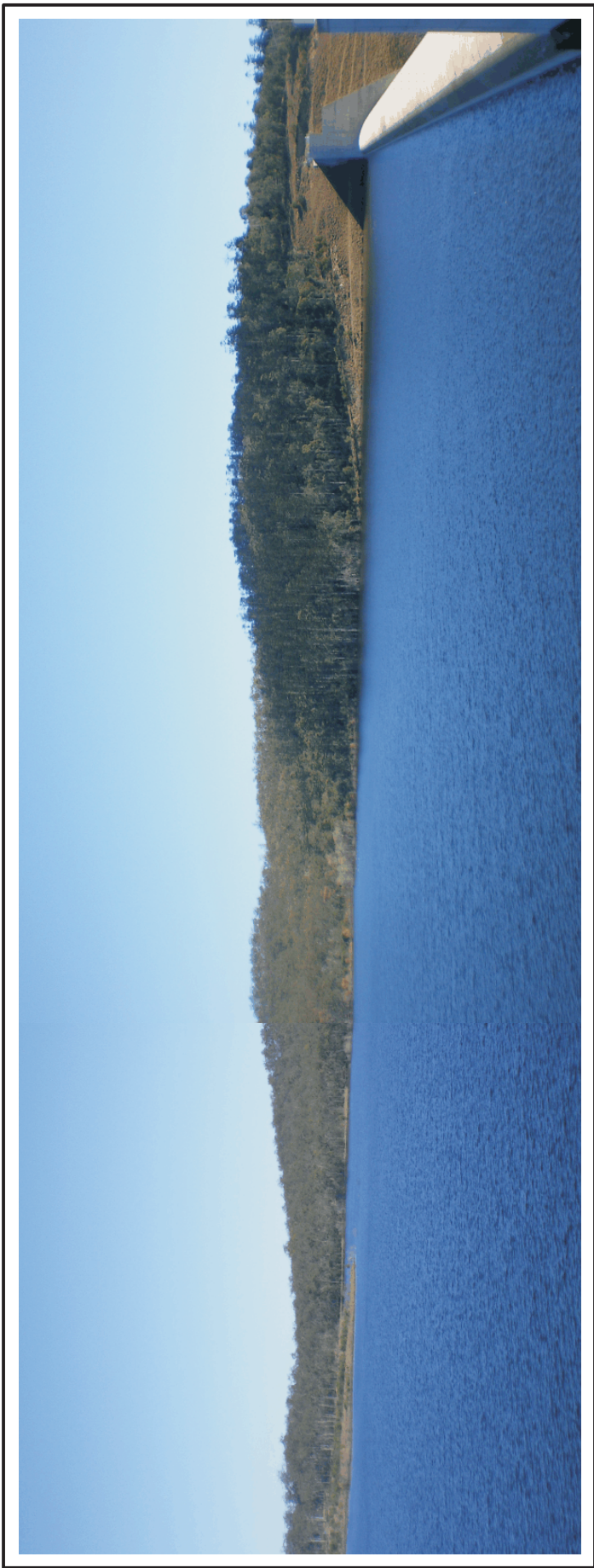
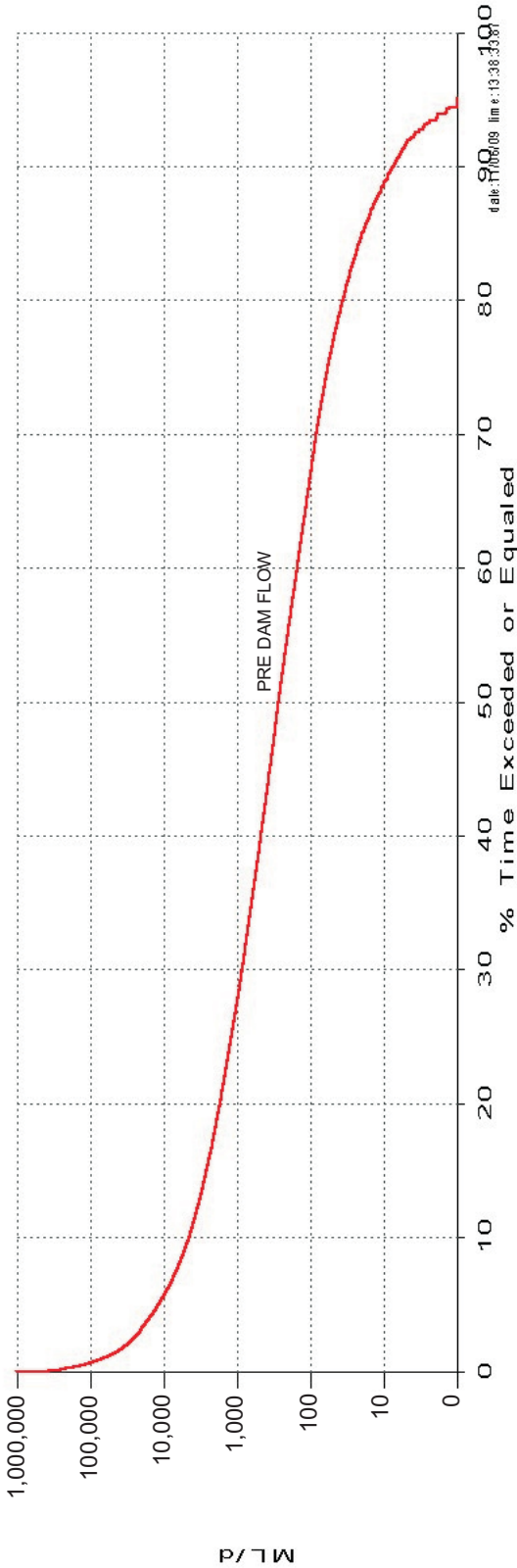


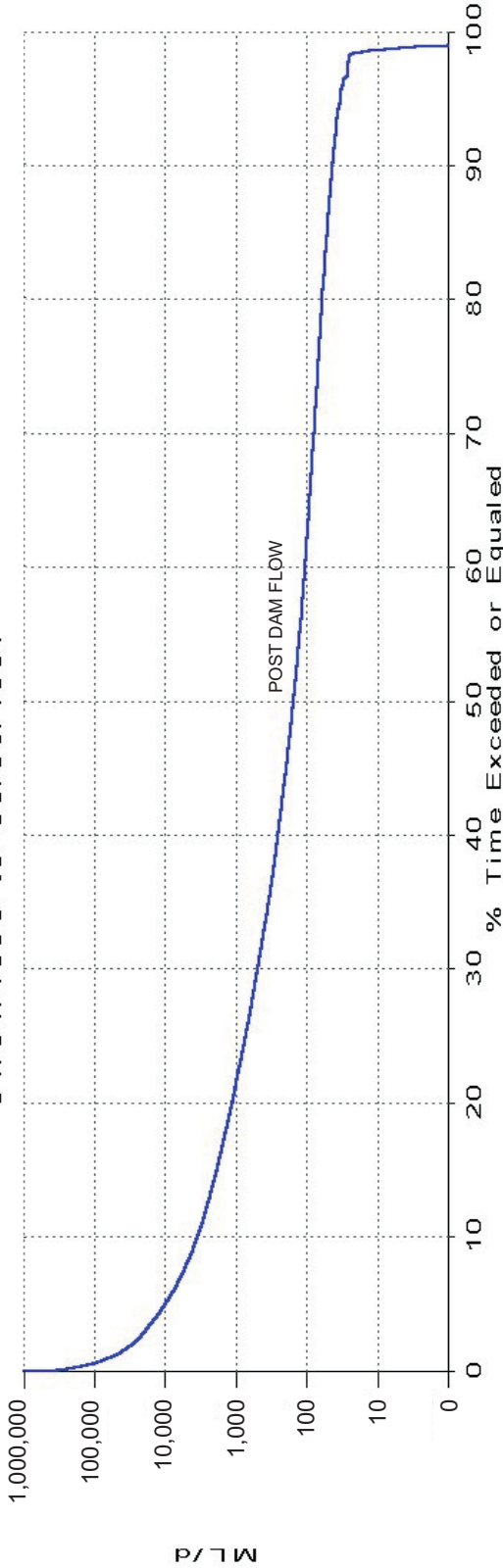
FIGURE 4
VIEW OF LEFT BANK, UPSTREAM OF DAM WALL

LEGEND

- PRE DAM FLOW
- POST DAM FLOW



01/01/1890 to 30/06/1997



PROJECT
PARADISE DAM
Fishways, Hydraulic Aspects
Wide Bay Conservation Council
Inc b Burnett Water Pty Ltd

CLIENT
Environmental Defenders Office (Qld) Inc

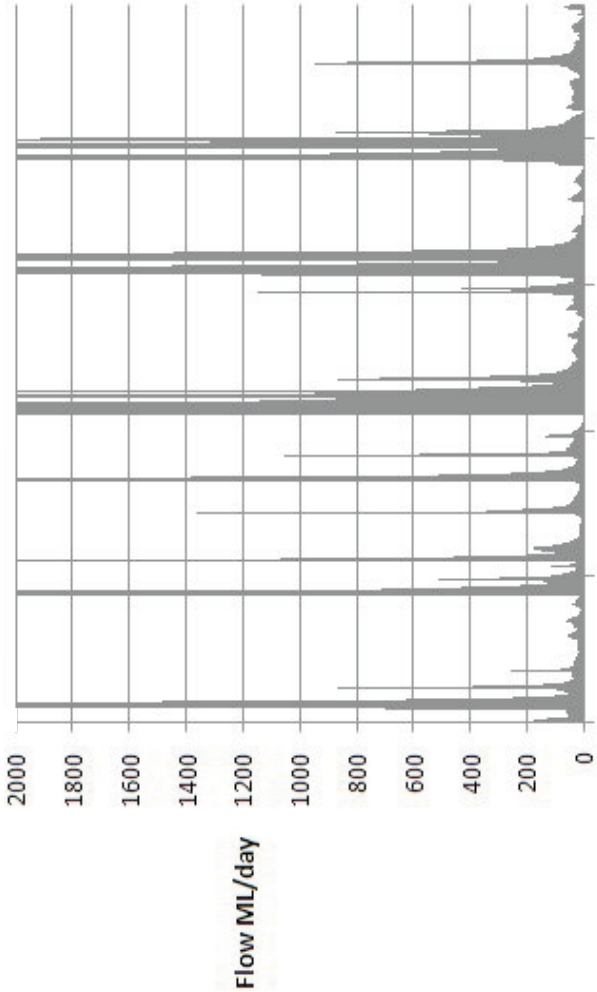
TITLE
**PRE & POST DAM
FLOWS LOG SCALE**

JOB	PARADISE DAM
JOB NO	09-065
DATE	18/06/09
SCALE	N.T.S.
DRAWING NUMBER	09-065-5

FIGURE 5

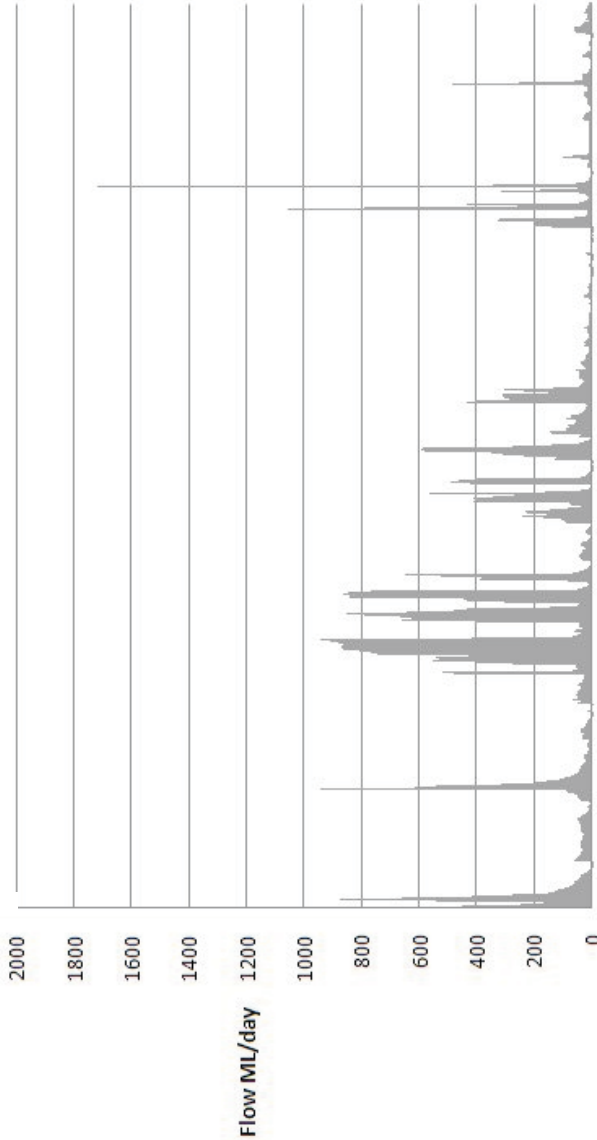


Max Winders & Associates Pty Ltd has MWA Environmental
Level 15/24 Adelaide St, Brisbane, GPO BOX 3137, Brisbane Qld 4001
P 07 3002 5500 F 07 3002 5588 E mail@mwaenviro.com.au
W www.mwaenviro.com.au
ABN 94 010 833 064



2/1/2001 2/1/2002 2/1/2003 2/1/2004 2/1/2005

PRE DAM FLOWS 2001-2005 (<2000 ML/day)



1/1/2005 1/1/2006 1/1/2007 1/1/2008

PROJECT

PARADISE DAM
Fishways, Hydraulic Aspects
Wide Bay Conservation Council
Inc b Burnett Water Pty Ltd

CLIENT

Environmental Defenders Office (Qld) Inc

TITLE

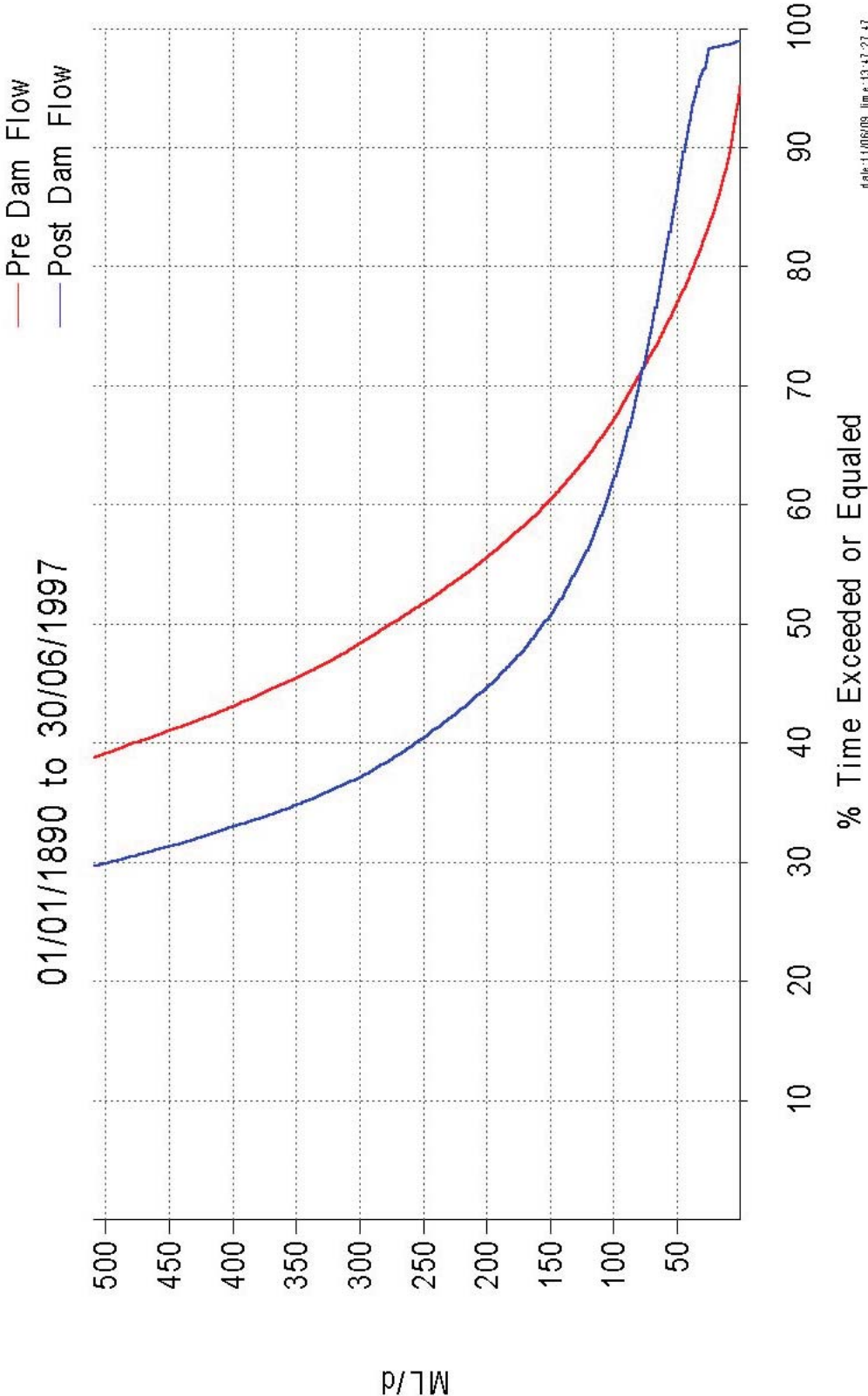
**PRE AND POST
DAM FLOWS**

JOB	PARADISE DAM	FIGURE 7 DRAWING NUMBER 09-065-7
JOB NO	09-065	
DATE	18/06/09	
SCALE	N.T.S.	



Max Winders & Associates Pty Ltd as MWA Environmental
Level 15 241 Adelaide St, Brisbane, GPO BOX 3137, Brisbane Qld 4001
P 07 3002 5500 F 07 3002 5588 E mail@mwaenviro.com.au
W www.mwaenviro.com.au
ABN 94 010 833 064

Paradise Dam



PROJECT

PARADISE DAM
Fishways, Hydraulic Aspects
Wide Bay Conservation Council
Inc b Burnett Water Pty Ltd

CLIENT

Environmental Defenders Office (Qld) Inc

TITLE

PRE & POST DAM FLOW
less than 500 ML per day

JOB

PARADISE DAM

JOB NO

09-065

DATE

18/06/09

SCALE

N.T.S.

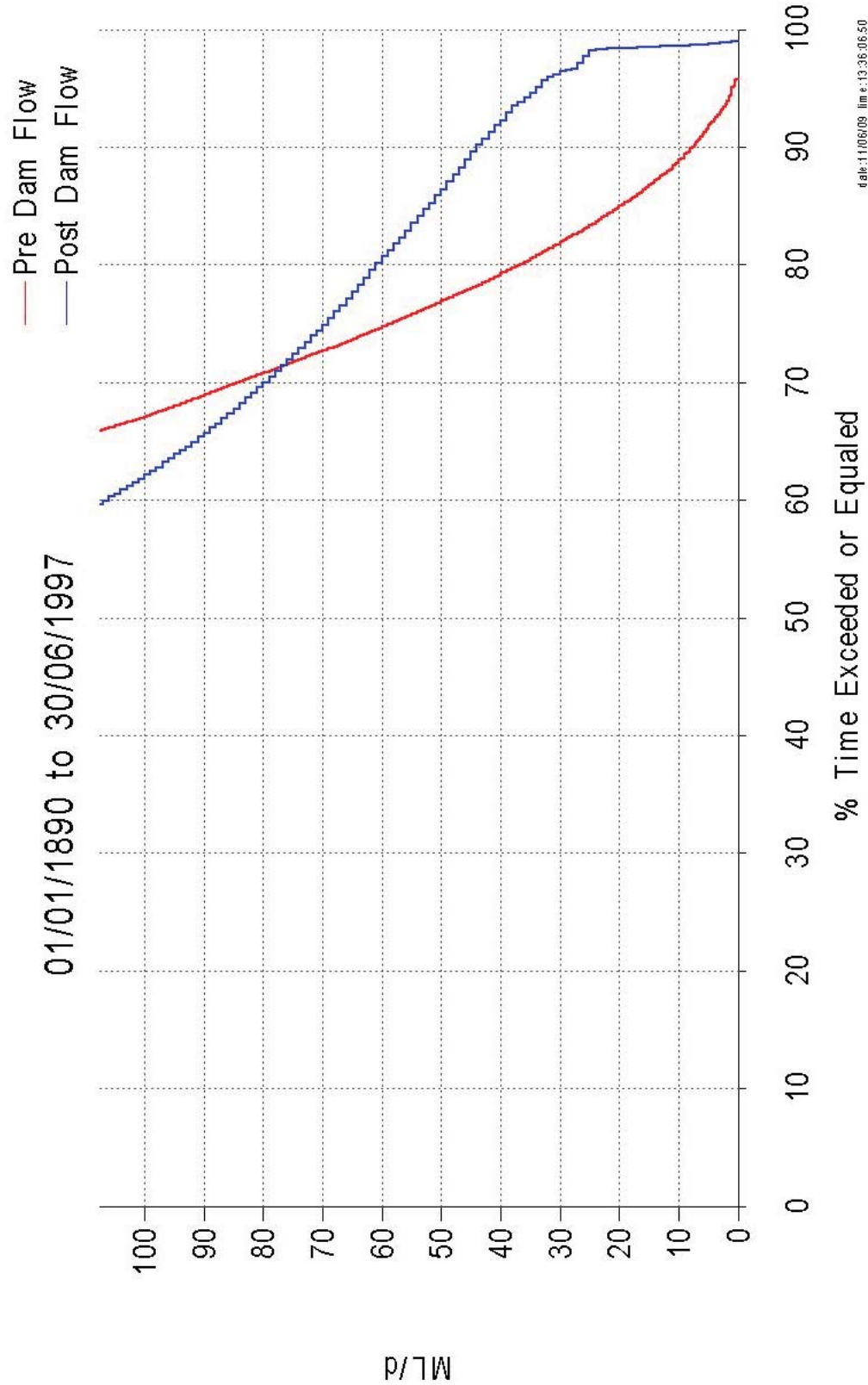
FIGURE 8

DRAWING NUMBER

09-065-8

Max Winthers & Associates Pty Ltd as MWA Environmental
Level 15/241 Adelaide St, Brisbane, GPO BOX 3137, Brisbane Qld 4001
P 07 3002 5500 F 07 3002 5588 E mail@mwaenviro.com.au
W www.mwaenviro.com.au
ABN 94 010 833 064

Paradise Dam



PROJECT
PARADISE DAM
Fishways, Hydraulic Aspects
Wide Bay Conservation Council
Inc b Burnett Water Pty Ltd

CLIENT
Environmental Defenders Office (Qld) Inc

TITLE
**PRE & POST DAM
LOW FLOWS**

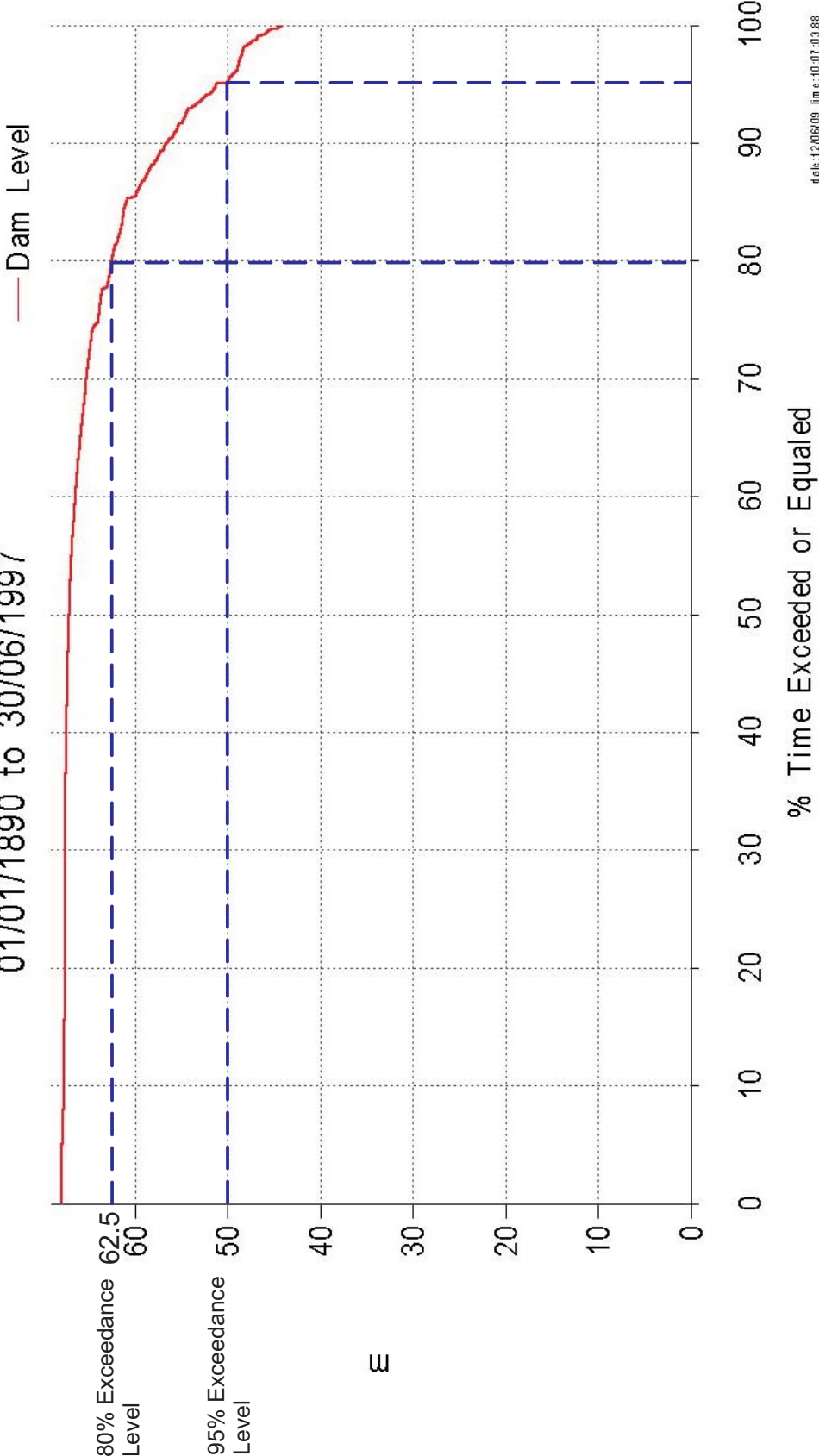
JOB	PARADISE DAM	FIGURE 9
JOB NO	09-065	DRAWING NUMBER
DATE	18/06/09	
SCALE	N.T.S.	09-065-9



Max Widders & Associates Pty Ltd as MWA Environmental
Level 15/24 Adelaide St, Brisbane, GPO BOX 3137, Brisbane Qld 4001
P 07 3002 5500 F 07 3002 5588 E mail@mwaenviro.com.au
W www.mwaenviro.com.au
ABN 94 010 833 064

Paradise Dam Levels (m)

01/01/1890 to 30/06/1997



PROJECT
PARADISE DAM
Fishways, Hydraulic Aspects
Wide Bay Conservation Council
Inc b Burnett Water Pty Ltd

CLIENT
Environmental Defenders Office (Qld) Inc

TITLE
DAM LEVELS RANKED
1890 to 1997

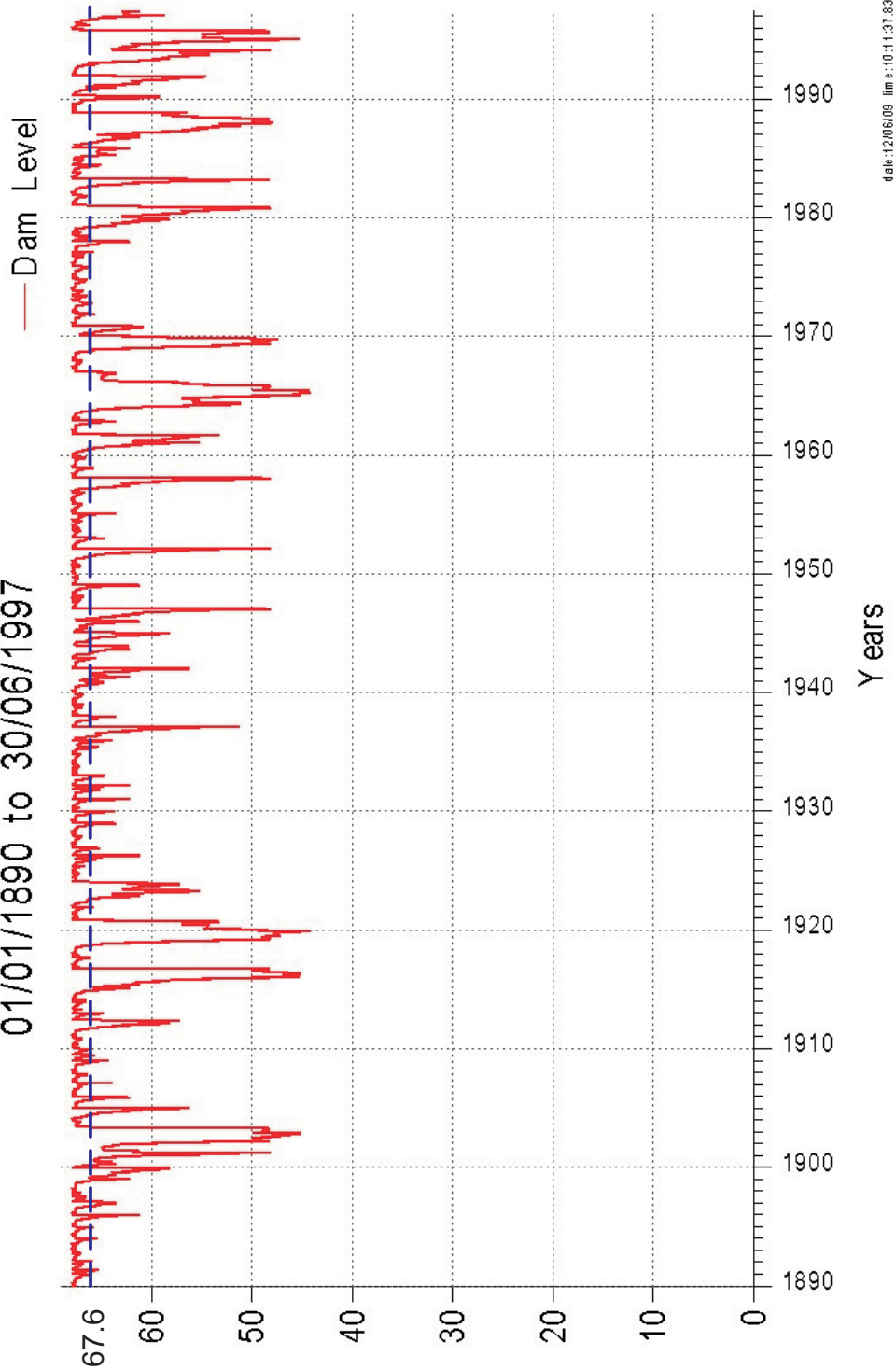
JOB	PARADISE DAM	FIGURE 10
JOB NO.	09-065	DRAWING NUMBER
DATE	18/06/09	
SCALE	N.T.S.	09-065-10



Max Widders & Associates Pty Ltd has MWA Environmental
Level 15 241 Adelaide St, Brisbane, GPO BOX 3137 Brisbane Qld 4001
P 07 3002 5500 F 07 3002 5588 E mail@mwaenviro.com.au
W www.mwaenviro.com.au
ABN 94 010 833 064

Paradise Dam Levels (m)

01/01/1890 to 30/06/1997



Dam Level Exceeds 67.6 for 20% of period

PROJECT		PARADISE DAM	
		Fishways, Hydraulic Aspects	
		Wide Bay Conservation Council	
		Inc b Burnett Water Pty Ltd	
CLIENT		Environmental Defenders Office (Qld) Inc	
TITLE			
DAM LEVELS			
1890 to 1997			
JOB	PARADISE DAM	FIGURE 11	
JOB NO.	09-065	DRAWING NUMBER	
DATE	18/06/09	SCALE	
SCALE	N.T.S.	09-065-11	

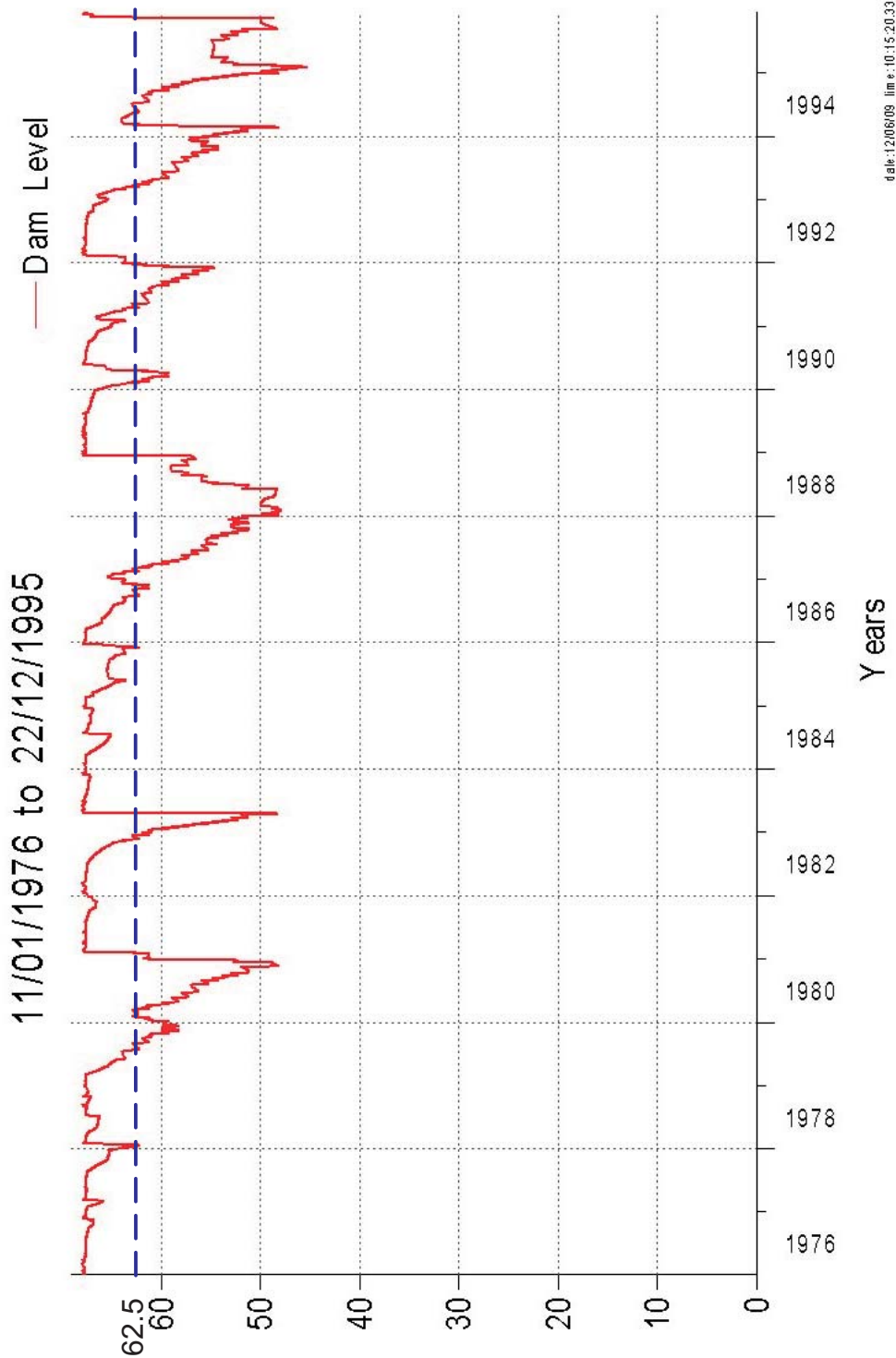


Mwa Winders & Associates Pty Ltd has MWA Environmental Level 15, 241 Adelaide St, Brisbane, QLD 4001. P 07 3002 5500 F 07 3002 5588 E mail@mwaenviro.com.au www.mwaenviro.com.au ABN 94 070 833 984.



Max Widders & Associates Pty Ltd as MWA Environmental
Level 15 241 Adelaide St, Brisbane, GPO BOX 3137, Brisbane Qld 4001
P 07 3002 5500 F 07 3002 5588 E mail@mwaenviro.com.au
W www.mwaenviro.com.au
ABN 94 010 833 064

Paradise Dam Levels (m)



Minimum Fish Lock Operational Level - 62.5

PROJECT		PARADISE DAM	
		Fishways, Hydraulic Aspects	
		Wide Bay Conservation Council	
		Inc b Burnett Water Pty Ltd	
CLIENT		Environmental Defenders Office (Qld) Inc	
TITLE		DAM LEVELS	
		1976 to 1995	
JOB	PARADISE DAM	FIGURE 12	
JOB NO.	09-065	DRAWING NUMBER	
DATE	18/06/09		
SCALE	N.T.S.	09-065-12	



Max Winthers & Associates Pty Ltd as MWA Environmental
Level 15/241 Adelaide St, Brisbane, GPO BOX 3137, Brisbane Qld 4001
P 07 3002 5500 F 07 3002 5588 E mail@mwaenviro.com.au
W www.mwaenviro.com.au
ABN 94 010 833 064



FIGURE 13(a)
ENTRANCE TO UPSTREAM FISHWAY HOPPER

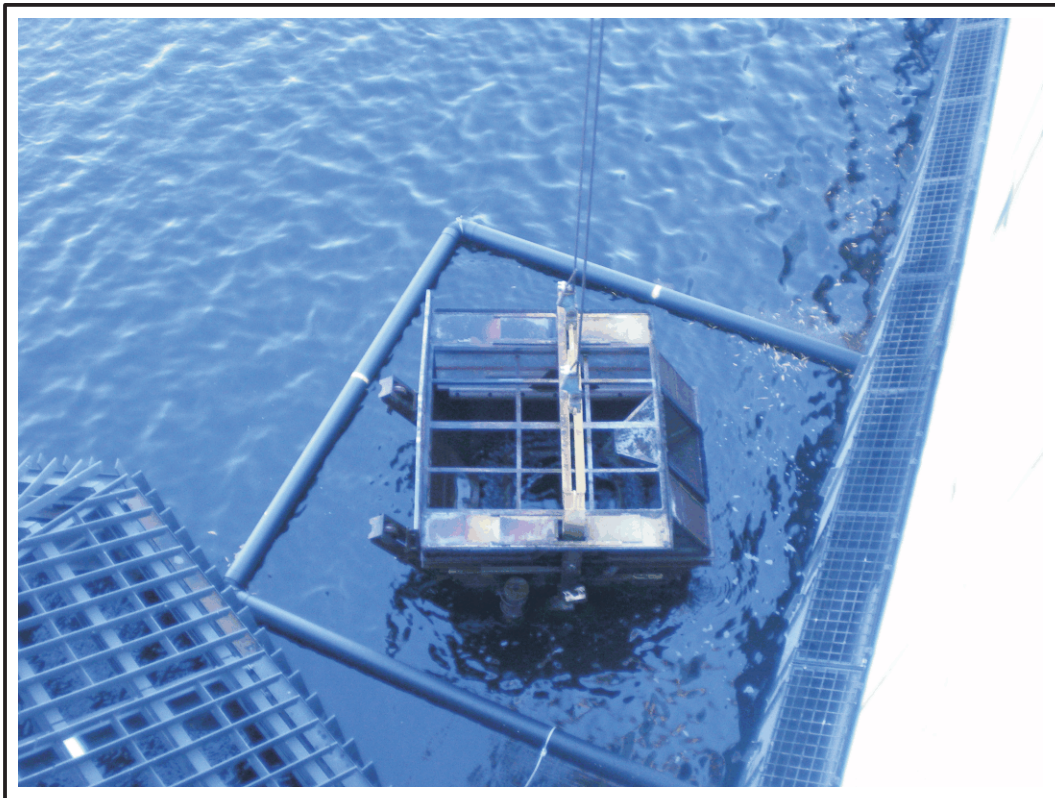


FIGURE 13(b)
UPSTREAM FISHWAY HOPPER IN FLUSHING MODE

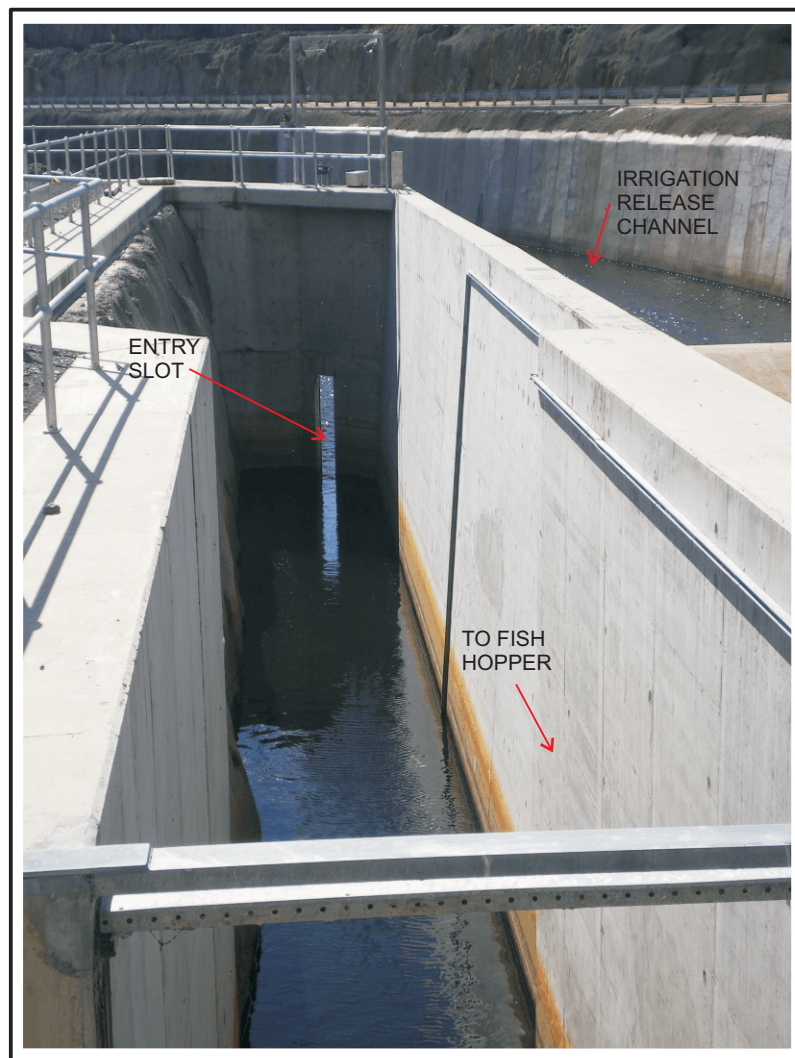


FIGURE 14(a)

ENTRY SLOT INTO UPSTREAM FISHWAY LOOKING DOWNSTREAM FROM DAM WALL

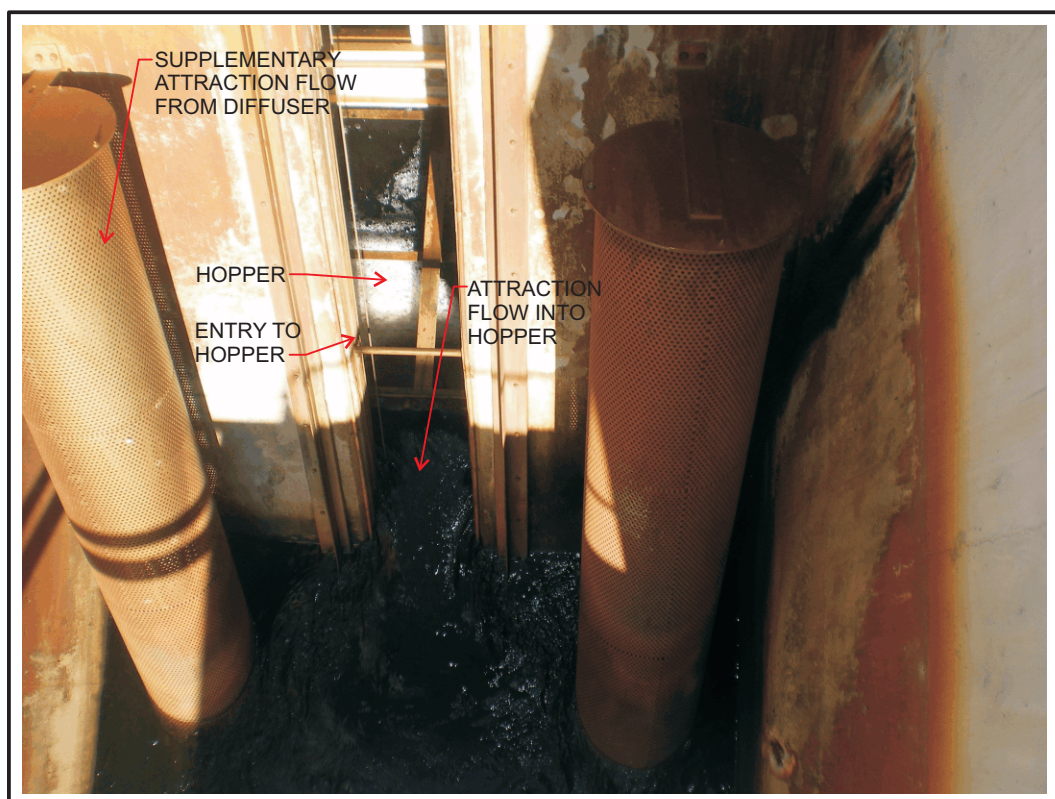


FIGURE 14(b)

DETAILS OF ATTRACTION FLOW INTO FISH HOPPER

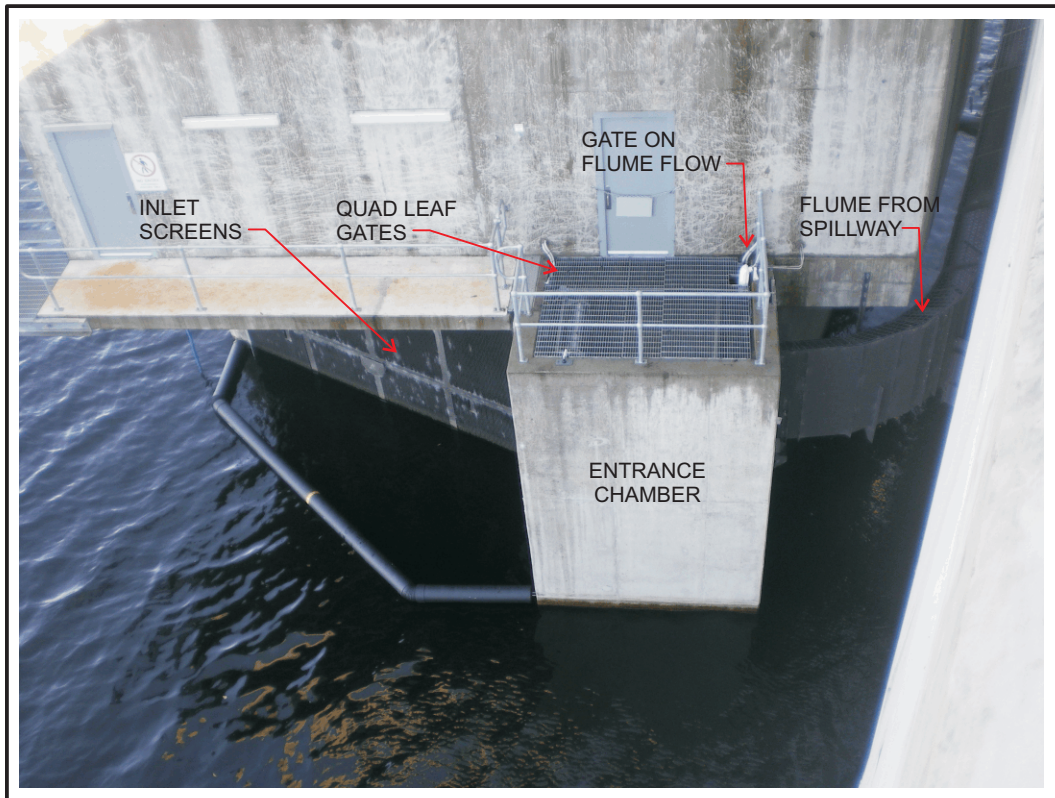


FIGURE 15(a)
ENTRANCE TO DOWNSTREAM FISHWAY FROM ABOVE

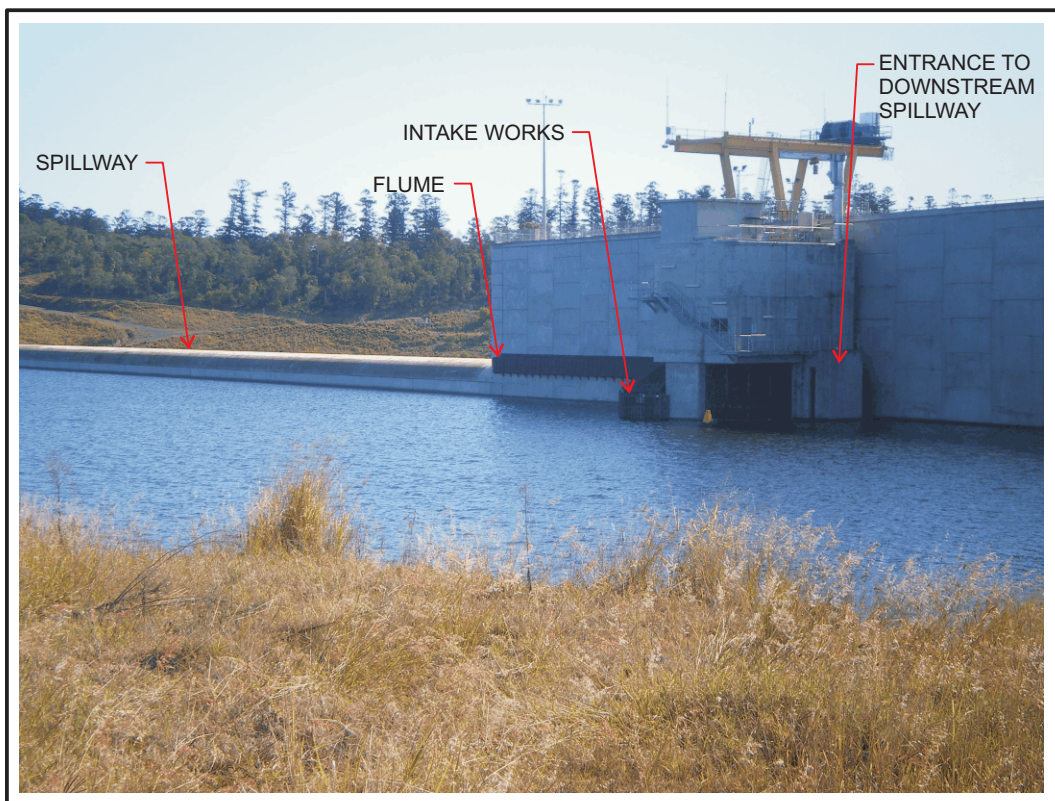


FIGURE 15(b)
SPILLWAY, FLUME, INTAKE WORKS & DOWNSTREAM FISHWAY

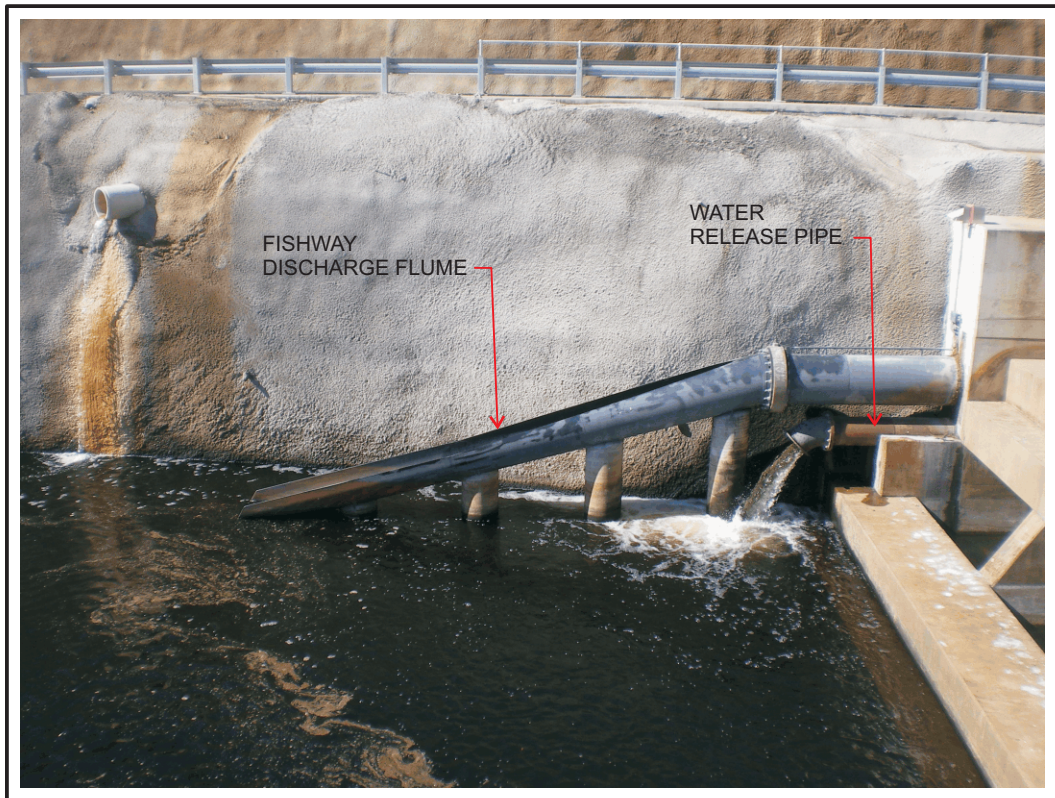


FIGURE 16(a)
DOWNSTREAM FISHWAY DISCHARGE POINTS

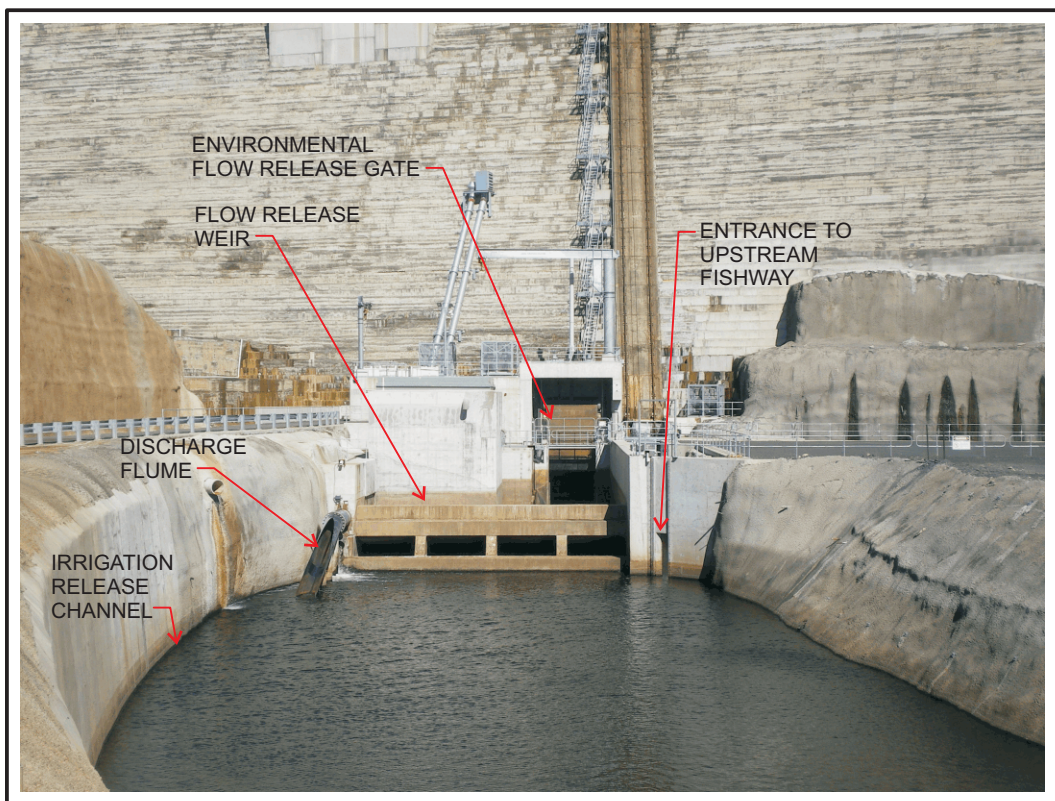


FIGURE 16(b)
LOCATION OF DOWNSTREAM FISHWAY FLUME
ENTRANCE TO UPSTREAM FISHWAY



FIGURE 17(a)
VIEW OF STEPPED SPILLWAY & PART OF STILLING BASIN

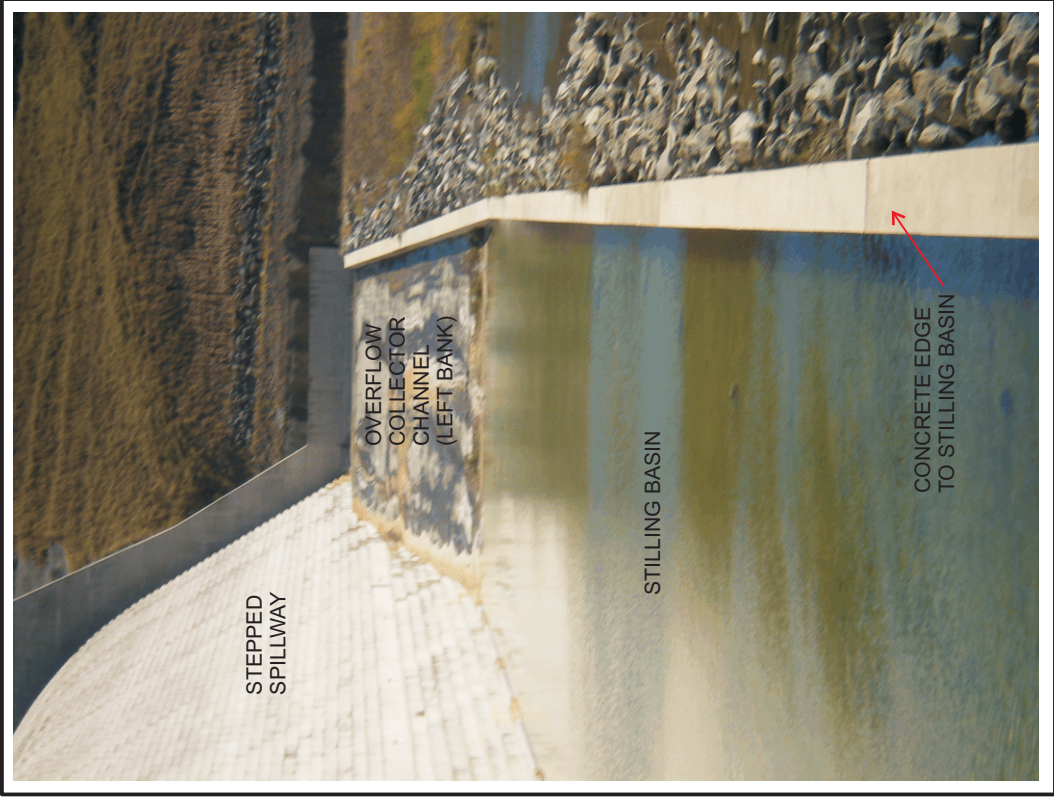


FIGURE 17(b)
VIEW OF LEFT BANK SECTION OF STEPPED SPILLWAY,
STILLING BASIN & COLLECTOR CHANNEL

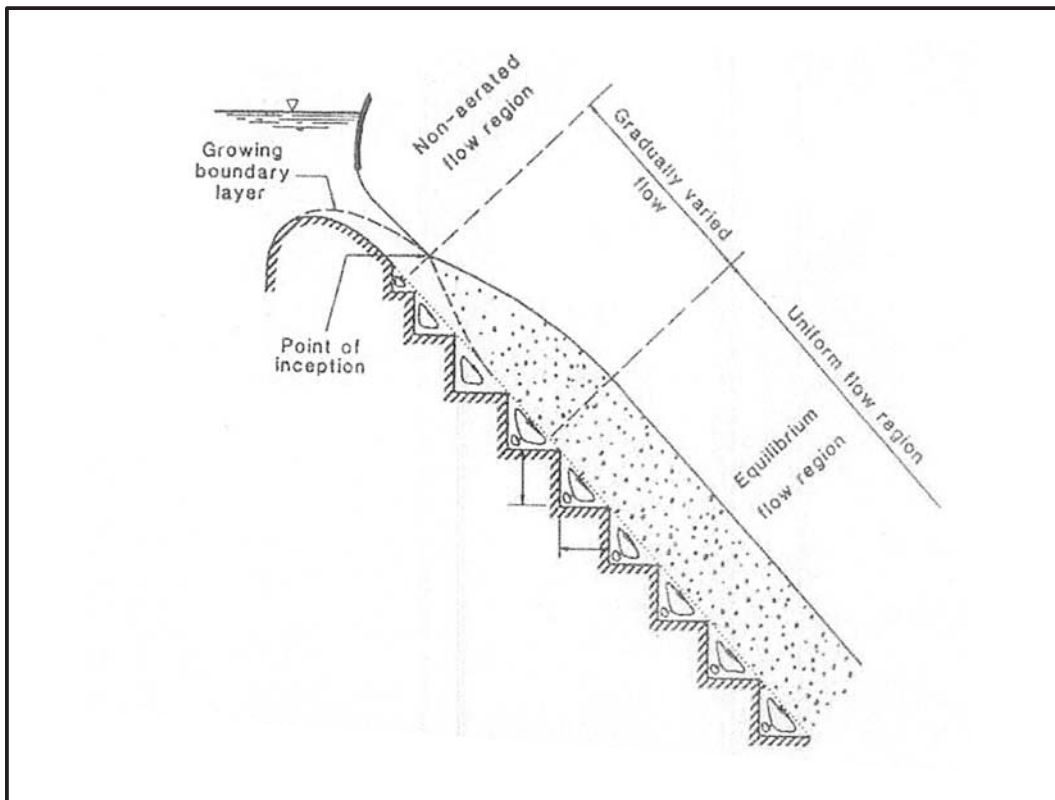


FIGURE 18(a)
SKIMMING FLOW ABOVE A STEPPED SPILLWAY

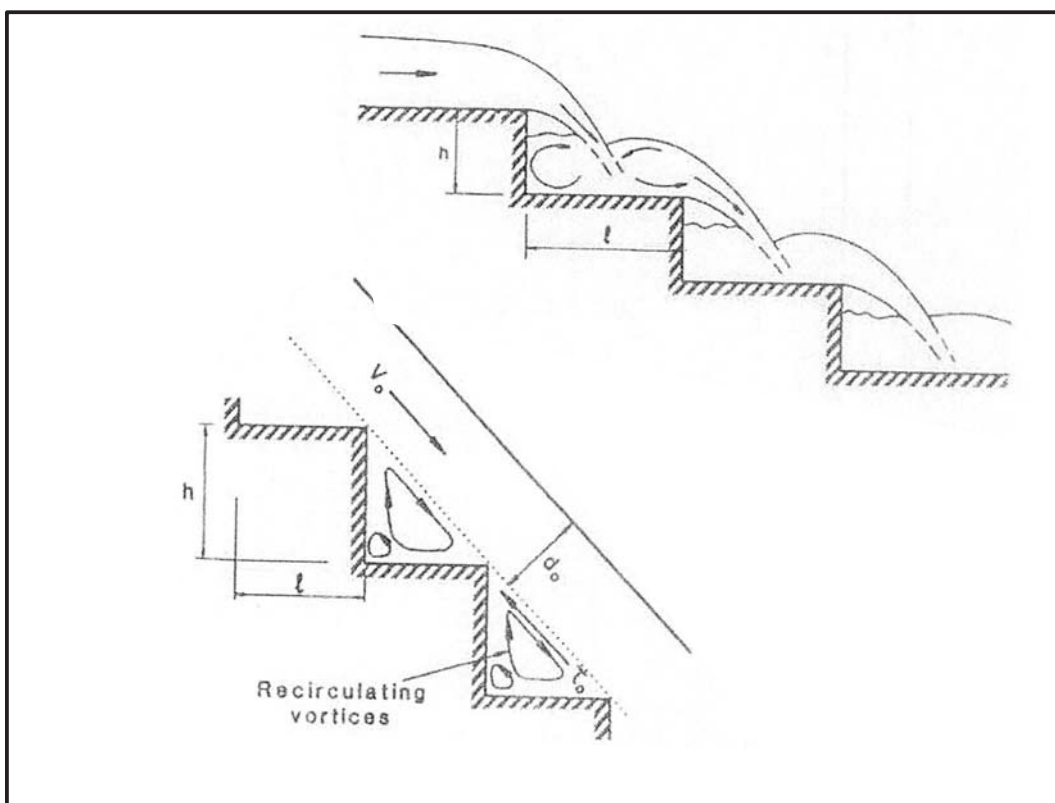


FIGURE 18(b)
NAPPE FLOW DOWN STEPPED SPILLWAY