WIVENHOE DAM

EMERGENCY ACTION PLAN

FOR USE BY STAFF OF

SEQWATER

AND

EMERGENCY RESPONSE PERSONNEL

Uncontrolled Copy

DISTRIBUTION, AUTHORISATION AND REVISION STATUS

Distribution

Copy No.	Agency	Position	Location
1	Seqwater	Dam Safety and Source Operations Manager	Brisbane
2	Seqwater	Principal Engineer Dam Safety	Ipswich
3	Seqwater	Storage Supervisor	Wivenhoe Dam
4	SunWater	Senior Flood Operations Engineer	Flood Operations Centre, Brisbane
5	NRW	Director Dam Safety	Brisbane
6	Department of Emergency Services	Duty Officer – Disaster Management Service	Brisbane
7	Somerset Regional Council	Local Disaster Response Coordinator	Esk
8	Ipswich City Council	Local Disaster Response Coordinator	Ipswich
9 – 13	Brisbane City Council	Local Disaster Response Coordinator	Brisbane
14	Emergency Management Queensland	Regional Director, Brisbane District	Brisbane

Authorisation

Approved for Issue by:_____ Date _____

Seqwater Principal Engineer
(Dam Safety)

Revision Status

Rev No.	Date	Revision Description
0		Original

TABLE OF CONTENTS

APPENDICES

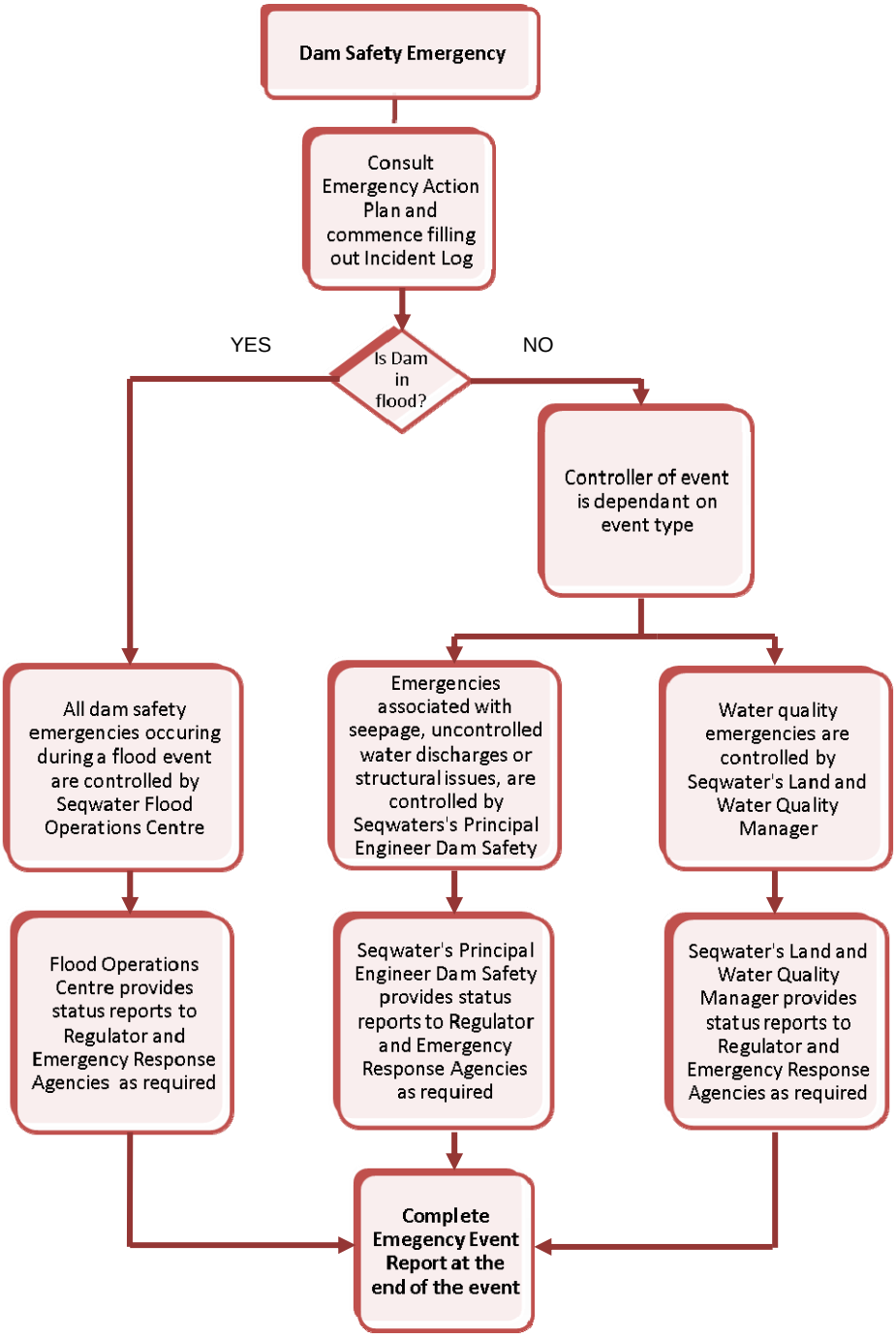
ABREVIATIONS

AEP	Annual Exceedance Probability
AHD	Australian Height Datum
AMTD	Adopted Middle Thread Distance
BoM	Bureau of Meteorology
DCF	Dam Crest Flood
EAP	Emergency Action Plan
FSL	Full Supply Level
FOC	Flood Operations Centre, SunWater
GS	Gauging Station
ML	Megalitre
NRW	Department of Natural Resources and Water
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
PMPDF	Probable Maximum Precipitation Design Flood

1 INTRODUCTION

This Emergency Action Plan (EAP) identifies emergency conditions that could endanger the integrity of the dam and prescribes procedures which should be followed by Seqwater staff in the event of such an emergency. A primary focus of these actions is to provide timely warning to appropriate emergency response and management agencies, to allow these agencies to implement protection measures for downstream communities.

The flowchart below summarises the actions that occur in an emergency situation.



2 AGENCIES AND RESPONSIBILITIES

The following table shows the agencies and personnel who have responsibilities under this Emergency Action Plan.

AGENCIES AND PERSONNEL	RESPONSIBILITIES
Seqwater	• Undertake emergency response at the dam. • Determine the area of potential impact from the Dam Safety Emergency. • Provide the relevant Disaster Response Agencies with timely notification of impending and actual emergencies, including details of the emergency and estimates of potential impacts downstream of the dam.
Seqwater Flood Operations Centre	• Coordinate dam safety emergency actions for Seqwater during a flood event.
Principal Engineer Dam Safety (Seqwater)	• Coordinate dam safety emergency actions for Seqwater outside a flood event, for dam safety emergencies involving actual or potential structural failures.
Land and Water Quality Manager (Seqwater)	• Coordinate dam safety emergency actions for Seqwater outside a flood event, for water quality emergencies.
Director Dam Safety (NRW)	• Provide regulatory input during a dam safety emergency.
Regional or City Council	• Exercise primary responsibility for disaster response and management within its boundaries, in accordance with the Queensland Disaster Management Act 2003. • Deploy all appropriate resources to contribute to response and recovery during the dam safety emergency, until its resources are fully committed. • Mobilise disaster response assistance from other relevant Disaster Response Agencies, as appropriate during the emergency.

A list of agencies and personnel who may need to be contacted in the event of an emergency is included in Appendix A of this document. Once notification is made to a person within an agency on the list, it is the person's responsibility to notify other relevant persons within the agency. Generally attempts to contact an agency should be in the priority order outlined in the list. However discretion should be exercised if the gravity of the situation warrants.

3 DAM TECHNICAL DATA SHEET

WIVENHOE DAM		
POPULATION AT RISK	- Sunny Day Failure - Flood	244000 > 1000 (Not fully assessed)
Type of dam		Gated concrete spillway, earth and rockfill embankment with 2 saddle dams.
Dam Owner		Seqwater
Construction Completed		1984
Watercourse		Located on the Brisbane River near Fernvale.
Catchment Area		7,020 km^2
Length of dam		2,300 m
Maximum Height		50 m
Clear length of spillway		60 m
Number of radial spillway gates		5
Size of each Radial Gate		12 m wide x 16.6 m high
Full Supply level		EL 67.0 m
Top of Closed Radial Gate		EL 73.0 m
Dam Crest Level	- Embankment Level - Concrete Parapet Wall	EL 79.0 m EL 80.1 m
Storage capacity at F.S.L.		1 150 000 ML
Peak water level as a result of PMF		Dam overtopped
Spillway Capacity (Including fuse plugs)		28,100 m^3/s (EL 79.0 m)
Maximum discharge as a result of PMF		37,400 m^3/s
AEP of Spillway Capacity (Including fuse plugs)		In 100, 000 (EL 79.0 m)

3.1 CRITICAL FLOOD LEVELS

The dam is overtopped for the PMF event, and is unlikely to withstand being overtopped.

Dam Critical Stability Levels

Description	Level (m AHD)
Full Supply level	67.00
Fuse Plugs Fixed Crest	67.00
Gate Operation Trigger Level	67.25
Top of Closed Radial Gates	73.00
Minimum Land Resumption Level	75.00
Centre Fuse Plug Crest	75.70
Right Fuse Plug Crest	76.20
Left Fuse Plug Crest	76.70
Evaluation Design Level	77.00
Main Embankment Crest	79.00
Top of Wave Wall	79.90
Saddle Dam Embankment Crest	80.00

The spillway rating curves were used to route the inflow floods through the reservoir for various flood exceedence probabilities as shown below:

Dam Flood Routing Results

Event (AEP)	Peak Inflow (m^3/s)	Peak Outflow (m^3/s)	Peak Water Level (m)
1 in 200	83,00	2,800	73.0
1 in 6,000		12,250	75.8
1 in 22,500		21,800	76.9
1 in 65,000		32,850	78.4
1 in 100,000	43,300	35,000	79.0
PMF	49,000	37,500	> 79.0

4 EMERGENCY EVENTS AND ACTIONS

The following events define the triggers for initiation of the Emergency Action Plan:

- Reservoir Level approaching EL 67.0 with further rain forecast
- Increase in Seepage or New Area of Seepage
- Earthquake, Explosion, Structural Damage to Dam, Abnormal Instrumentation Readings or Major Electrical or Mechanical Failure
- Contamination of the Catchment Area or Reservoir Including Bloom of Algae
- Object Crashes into the Dam or Reservoir
- Potential Damage or Indicators of Damage

4.1 RESERVOIR LEVEL IS APPROACHING 67.0M AND FURTHER RAIN IS FORECAST

STORAGE SUPERVISOR	FLOOD OPERATIONS CENTRE
◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ Notify Flood Operations Centre of dam status and rainfall. ◗ If the Flood Operations Centre cannot be contacted, notify the Principal Engineer, Dam Safety or the Dam Safety and Source Operations Manager.	◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ Obtain and confirm forecast from BOM. ◗ Despatch appropriate staff to site if necessary. ◗ Advise the Dam Supervisor of dam monitoring actions.
◗ Monitor rainfall, lake levels and rates of rise of lake level. ◗ Record instrumentation readings as per Dam Standing Operating Procedures. ◗ Report damage and unusual observations to the Flood Operations Centre.	◗ Direct the overall operation of the dam in accordance with the Manual of Operational Procedures for Flood Releases from Wivenhoe Dam.
◗ Monitor the situation as directed by the Flood Operations Centre. If communication with Flood Operations is lost, continue monitoring and attempt to restore communications.	◗ Inform the persons of the event and the status of the dam in accordance with the Manual of Operational Procedures for Flood Releases from Wivenhoe Dam.
◗ Undertake actions as directed by the Flood Operations Centre. ◗ If communications with the Flood Operations Centre Fail operate the dam in accordance with the Wivenhoe Dam Flood Manual and attempt to restore communications.	◗ Direct visual gate observations at intervals generally not exceeding 30 minutes. ◗ Direct regular instrumentations readings and inspections.
◗ If lake level is < 67.0m, advise Flood Operations Centre.	◗ If lake level is < 67.0m and no more rain is forecast, advise Dam Supervisor to close incident.
◗ Complete Incident Log and Report.	◗ Complete Incident Log and Report.

4.2 INCREASE IN SEEPAGE OR NEW AREA OF SEEPAGE

STORAGE SUPERVISOR	PRINCIPAL ENGINEER, DAM SAFETY
◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ Notify the Principal Engineer, Dam Safety of the situation. ◗ If the Principal Engineer, Dam Safety cannot be contacted, notify the Dam Safety and Source Operations Manager or the Executive General Manager, Operations. ◗ Monitor the situation by measuring the rate of seepage flow and observe the clarity of the seepage flow, keeping notes and photographs for the Incident Log. ◗ Provided it is safe to do so, undertake inspections and instrumentation readings as directed by the Principal Engineer, Dam Safety.	◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ Assemble and activate an Incident Management Team to investigate the incident. ◗ Inform the following persons of the event and the status of the dam: o Local Disaster Response Coordinator o CEO o Flood Operations Centre o Director, Dam Safety (NRW)
◗ Remain in contact with the Principal Engineer, Dam Safety and proceed as directed.	◗ Undertake site investigations and proceed with actions as appropriate. Such actions may include: o Directing remedial works o Obtaining advice from specialist Dam Safety Consultants o Draining down the dam storage level ◗ If a potential dam failure is suspected, immediately inform the following persons: o Local Disaster Response Coordinator o CEO o Flood Operations Centre o Director, Dam Safety (NRW)
◗ Complete Incident Log and Report.	◗ Once satisfied that the incident is resolved, stand down the incident team and close the incident. ◗ Complete Incident Log and Report.

4.3 EARTHQUAKE, EXPLOSION, STRUCTURAL DAMAGE TO DAM, ABNORMAL INSTRUMENTATION READINGS OR MAJOR ELECTRICAL OR MECHANICAL FAILURE

STORAGE SUPERVISOR	PRINCIPAL ENGINEER, DAM SAFETY
◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ Notify the Principal Engineer, Dam Safety of the situation. ◗ If the Principal Engineer, Dam Safety cannot be contacted, notify the Dam Safety and Source Operations Manager or the Executive General Manager, Operations. ◗ Provided it is safe to do so, perform a Dam Safety Inspection including instrumentation and seepage measurements. ◗ Report damage and unusual observations to the Principal Engineer, Dam Safety.	◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ Assemble and activate an Incident Management Team to investigate the incident. ◗ Inform the following persons of the event and the status of the dam: o Local Disaster Response Coordinator o CEO o Flood Operations Centre o Director, Dam Safety (NRW)
◗ Remain in contact with the Principal Engineer, Dam Safety and proceed as directed.	◗ Undertake site investigations and proceed with actions as appropriate. Such actions may include: o Directing remedial works o Obtaining advice from specialist Dam Safety Consultants o Draining down the dam storage level ◗ If a potential dam failure is suspected, immediately inform the following persons: o Local Disaster Response Coordinator o CEO o Flood Operations Centre o Director, Dam Safety (NRW)
◗ Complete Incident Log and Report.	◗ Once satisfied that the incident is resolved, stand down the incident team and close the incident. ◗ Complete Incident Log and Report.

4.4 CONTAMINATION OF THE CATCHMENT AREA OR RESERVOIR INCLUDING BLOOM OF ALGAE

STORAGE SUPERVISOR	LAND AND WATER QUALITY MANAGER
◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ On receipt of information regarding contamination of the catchment area or reservoir, notify the Land and Water Quality Manager of the situation. ◗ If the Land and Water Quality Manager cannot be contacted, notify the Principal Engineer, Dam Safety or the Dam Safety and Source Operations Manager.	◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ Assemble and activate an Incident Management Team to investigate the incident. ◗ Inform the following persons of the event and the status of the dam: o Local Disaster Response Coordinator o CEO o Executive General Manager, Operations
◗ Remain in contact with the Land and Water Quality Manager and proceed as directed.	◗ Undertake site investigations and proceed with actions as appropriate. Such actions may include: o Containing the contamination o Cleaning up the contamination o Stoping water releases from the dam o Obtaining advice from specialist Water Quality Consultants ◗ If a serious water contamination incident i is suspected, immediately inform the following persons: o Local Disaster Response Coordinator o CEO o Executive General Manager, Operations
◗ Complete Incident Log and Report.	◗ Once satisfied that the incident is resolved, stand down the incident team and close the incident. ◗ Complete Incident Log and Report.

4.5 OBJECT CRASHES INTO THE DAM OR RESERVOIR

STORAGE SUPERVISOR	PRINCIPAL ENGINEER, DAM SAFETY
◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ On confirmation of the event, advise the Police or Ambulance if necessary by phoning 000. ◗ Notify the Principal Engineer, Dam Safety of the situation. ◗ If the Principal Engineer, Dam Safety cannot be contacted, notify the Dam Safety and Source Operations Manager or the Executive General Manager, Operations. ◗ Provided it is safe to do so, perform a Dam Safety Inspection, paying particular attention to the area where the object has crashed, including instrumentation and seepage measurements. ◗ Report damage and unusual observations to the Principal Engineer, Dam Safety from fuel or other substances. ◗ Monitor the situation, keeping notes and photographs for the Incident Log and the routine dam safety inspections.	◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ Assemble and activate an Incident Management Team to investigate the incident. ◗ Inform the following persons of the event and the status of the dam: o Local Disaster Response Coordinator o CEO o Flood Operations Centre o Director, Dam Safety (NRW)
◗ Remain in contact with the Principal Engineer, Dam Safety and proceed as directed.	◗ Undertake site investigations and proceed with actions as appropriate. Such actions may include: o Directing remedial works o Obtaining advice from specialist Dam Safety Consultants o Draining down the dam storage level ◗ If a potential dam failure is suspected, immediately inform the following persons: o Local Disaster Response Coordinator o CEO o Flood Operations Centre o Director, Dam Safety (NRW)
◗ Complete Incident Log and Report.	◗ Once satisfied that the incident is resolved, stand down the incident team and close the incident. ◗ Complete Incident Log and Report.

4.6 POTENTIAL DAMAGE OR INDICATORS OF DAMAGE

Problem	General Characteristic	When and What to Check
Overtopping Imminent	Storage full and water level rising.	During periods of excessive rainfall – check reservoir levels.
Rapid increases or cloudy appearance of seepage	Seepage flow through storage embankment is cloudy and increasing (piping failure has started).	After detection of cloudy water look for source in embankment.
Seepage erosion or piping	Progressive internal erosion of the embankment or saddle dam or foundation to form an open conduit or pipe (piping failure).	During routine inspections or after unaccountable increases in seepage flows, look for an emission point.
Foundation Failure	Sliding, rotation, or settlement of part of or entire dam.	During routine inspection or immediately after earthquakes – inspect for evidence of foundation movement or displacement immediately adjacent to the dam.
Slide in downstream slope	Slide in the downstream face.	During routine inspection or following heavy periods of rainfall – look for cracks or scarps near the crest and bulges at the toe.
Flow slide	Collapse and flow of soil around the storage periphery.	During routine inspections, after heavy or long periods of rainfall. Especially in sedimentary or colluvial soils – look for material displacement around the storage rim.
New springs, seeps or boggy areas	Evidence of internal changes in seepage control (could be initial signs of piping failure).	During routine inspection, look for ‘evergreen’ spots, boggy ground or pools of water.
Gullying	No rock protection or vegetation cover on embankment batters or poor drainage.	During and after large rainfalls – inspect embankment and saddle dam batters for damage to rock protection or vegetation cover.
Increase in gallery seepage	Increase in the normal rate of gallery seepage.	After detection – check for differential movement or cracking in concrete components of spillway and retaining walls.
Landslide	Mass movement of soil or rock from slopes and valley walls around the storage.	During routine inspections or following earthquakes – look for material displacement.
Damage to structural concrete	Movement or cracking of structural concrete.	During routine inspections or when mechanical problems such as burst pipe occur – look for any movement or

Problem	General Characteristic	When and What to Check
		cracking of structural concrete.
Failure of appurtenant structures or operating equipment	Loss of ability to supply water or discharge floods safely.	After detecting an operational anomaly – identify and investigation cause.
Loss of storage contents	Excessive loss from the storage and / or occasionally increased seepage or increased groundwater levels near the storage.	During routine monitoring – look for environmental changes such as vegetation damage, salt scalds, etc
Toe erosion	Erosion of embankment toe by spillway discharge or diversion flows.	During and after large rainfalls – inspect embankment toe.
Wave erosion	Beaching or notching of the upstream face of the embankment by waves generated over long periods of strong wind.	During or after periods of strong wind – inspect upstream face of embankment and saddle dam.

APPENDIX A

CONTACT REGISTER

REGISTER – CONTACT LIST FOR EMERGENCIES & FLOOD INFORMATION – WIVENHOE DAM

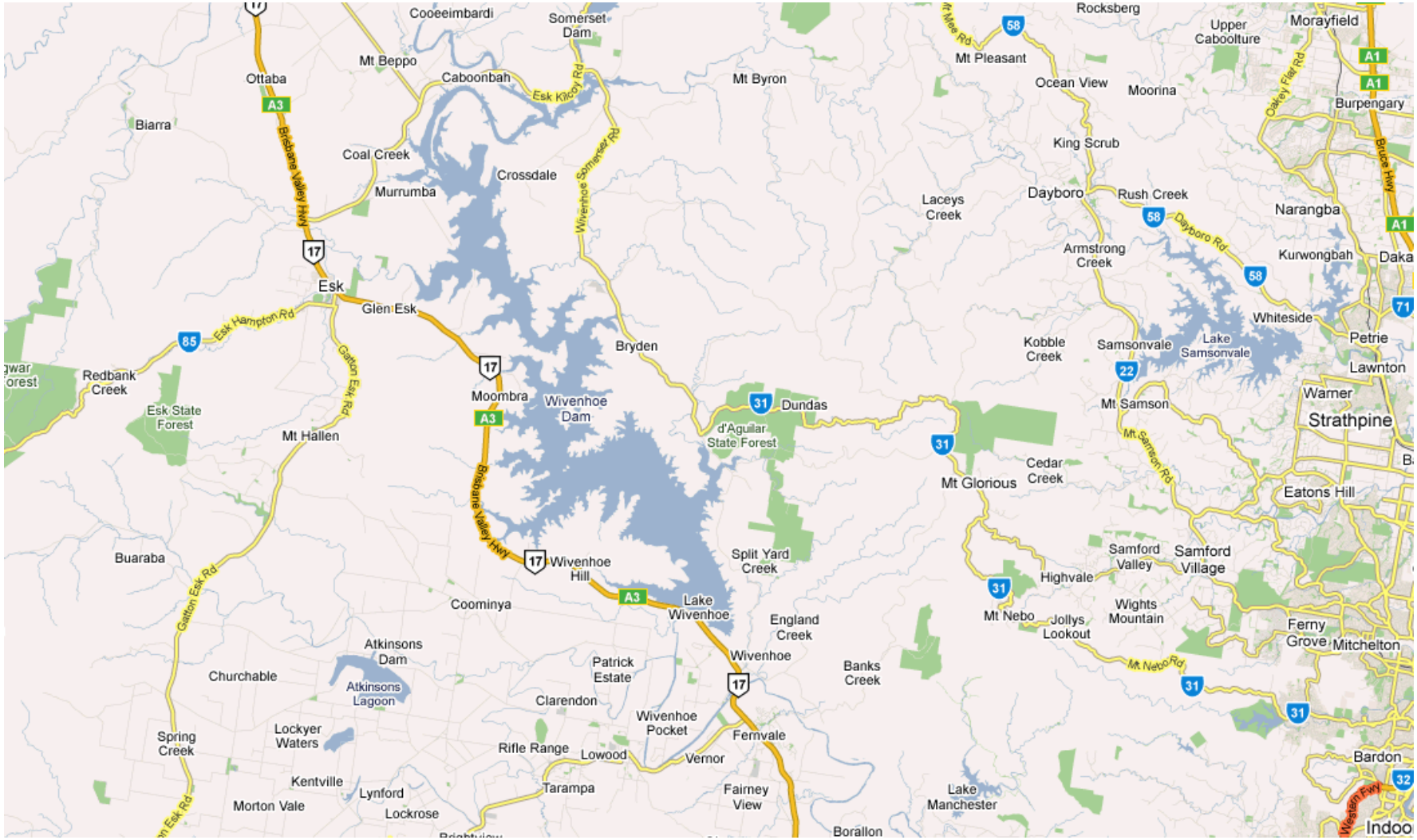
Agency	Position	Working Hrs Priority	Out of Hrs Priority	Name	Work Ph	Fax	Mobile	After Hrs	Contacted By
Seqwater	Principal Engineer Dam Safety	1	1	John TIBALDI	[redacted]	[redacted]	[redacted]	[redacted]	Seqwater/FCC
	Dam Safety and Source Operations Manager	2	2	Robert DRURY	[redacted]	[redacted]	[redacted]	[redacted]	
	Executive General Manager, Operations	3	3	Phil Aldridge	[redacted]		[redacted]		
	Land and Water Quality Manager	1	1	Peter Schneider	[redacted]		[redacted]		
	Chief Executive Officer	3	3	Peter BORROWS	[redacted]	[redacted]	[redacted]	[redacted]	
	Chairman	4	4	Annabelle CHAPLIN	[redacted]	[redacted]	[redacted]	[redacted]	
	Storage Supervisor	1	1	Doug GRIGG	[redacted]	[redacted]	[redacted]	[redacted]	
	Standby Officer	2	2	Allan GEORGE	[redacted]	[redacted]	[redacted]	[redacted]	
	Seqwater On-call Staff (attended 24 hours)	3	3	Seqwater Controller	[redacted]				
Department of Natural Resources & Water	Director, Dam Safety	1	1	Peter ALLEN	[redacted]	[redacted]	[redacted]	[redacted]	Seqwater/FCC
	Director, Water Industry Asset Management & Standards	2	2	Peter ARTEMIEFF	[redacted]	[redacted]	[redacted]	[redacted]	
	Dam Safety Engineer	3	3	Ron GUPPY	[redacted]	[redacted]	[redacted]	[redacted]	
Flood Operations Centre (operated by Sunwater)	Senior Flood Operations Engineer	3	3	Rob AYRE	[redacted]	[redacted]	[redacted]	[redacted]	Seqwater/FCC
	Senior Flood Operations Engineer	4	4	John RUFFINI*	[redacted]	[redacted]	[redacted]	[redacted]	
	Flood Operations Engineer	5	5	Terry MALONE	[redacted]	[redacted]	[redacted]	[redacted]	
	Flood Control Room (Operational)	1	1	General Phones	[redacted]	[redacted]			
	Flood Control Room (Not operational)	2	2		[redacted]	Recorded message identifies on-call engineer.			
	Back up FCC (Mineral House)	3	3		[redacted]				

Agency	Position	Working Hrs Priority	Out of Hrs Priority	Name	Work Ph	Fax	Mobile	After Hrs	Contacted By
Department of Emergency Services Disaster Operations	Duty Officer* (24 Hours)	1	1	Rostered	[redacted]	[redacted]	[redacted]		Seqwater/FCC
Somerset Regional Council	Local Disaster Response Coordinator	1	1	Tony Jacobs	[redacted]	[redacted]	[redacted]		Seqwater/FCC
	Local Disaster Response Coordinator	2	2	Andy Bickerton (SES Controller)	[redacted]	[redacted]	[redacted]		
	Local Disaster Response Coordinator	3	3	Robert Bain (CEO)	[redacted]	[redacted]	[redacted]		
Ipswich City Council	Local Disaster Response Coordinator	1	1	Andrew UNDERWOOD (Strategic Infrastructure Manager)	[redacted]	[redacted]	[redacted]	[redacted]	Seqwater/FCC
	Local Disaster Response Coordinator	2	2	Ross DRABBLE (Chief Operations Officer)	[redacted]	[redacted]	[redacted]	[redacted]	
	Local Disaster Response Coordinator	3	3	Arie Van Den ENDE (SES Controller)	[redacted]	[redacted]	[redacted]	[redacted]	
Brisbane City Council	Local Disaster Response Coordinator	1	1	Duty Officer	[redacted]	[redacted]		[redacted]	Seqwater/FCC
	Flood Information Centre	2	2	Duty Officer	[redacted]	[redacted]		[redacted]	
Emergency Management Queensland	Regional Director, Brisbane District	1	1	Jason CAMERON	[redacted]		[redacted]		Seqwater/FCC
Police					000				Seqwater/FCC
Bureau of Meteorology	Engineer in charge Flood Warning*	1	1		[redacted]	[redacted]			Seqwater/FCC
	Meteorologist in Charge (24 hours)	2	2		[redacted]	[redacted]			
Ambulance					000				Seqwater/FCC

Notes:	1.	Contact with an agency is to be made via position with highest priority. That person contacted is then responsible to forward notification to other relevant persons with the agency.
	2.	Agencies to provide notification of updated contact details to John Tibaldi of Seqwater.

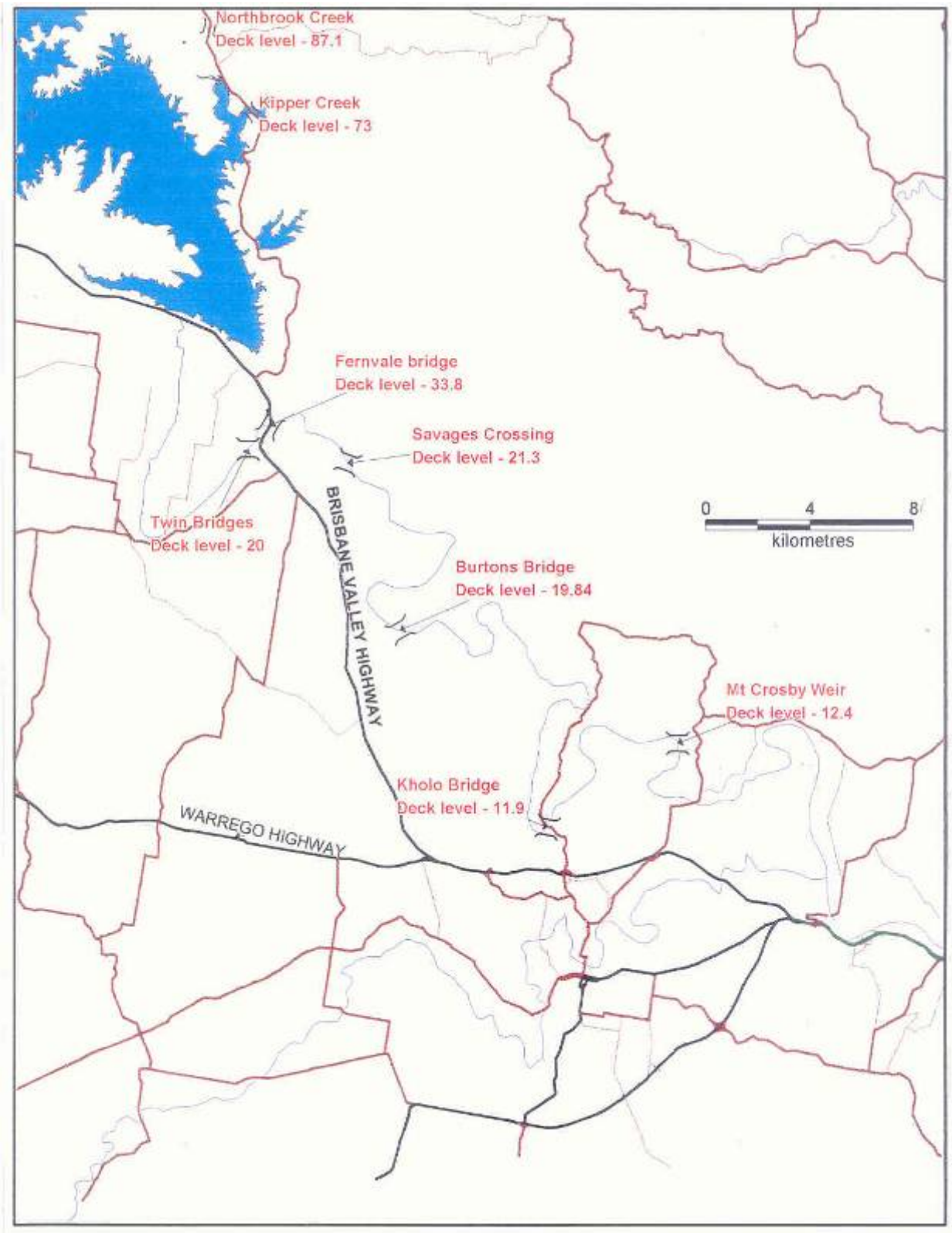
APPENDIX B

MAPS AND PLANS

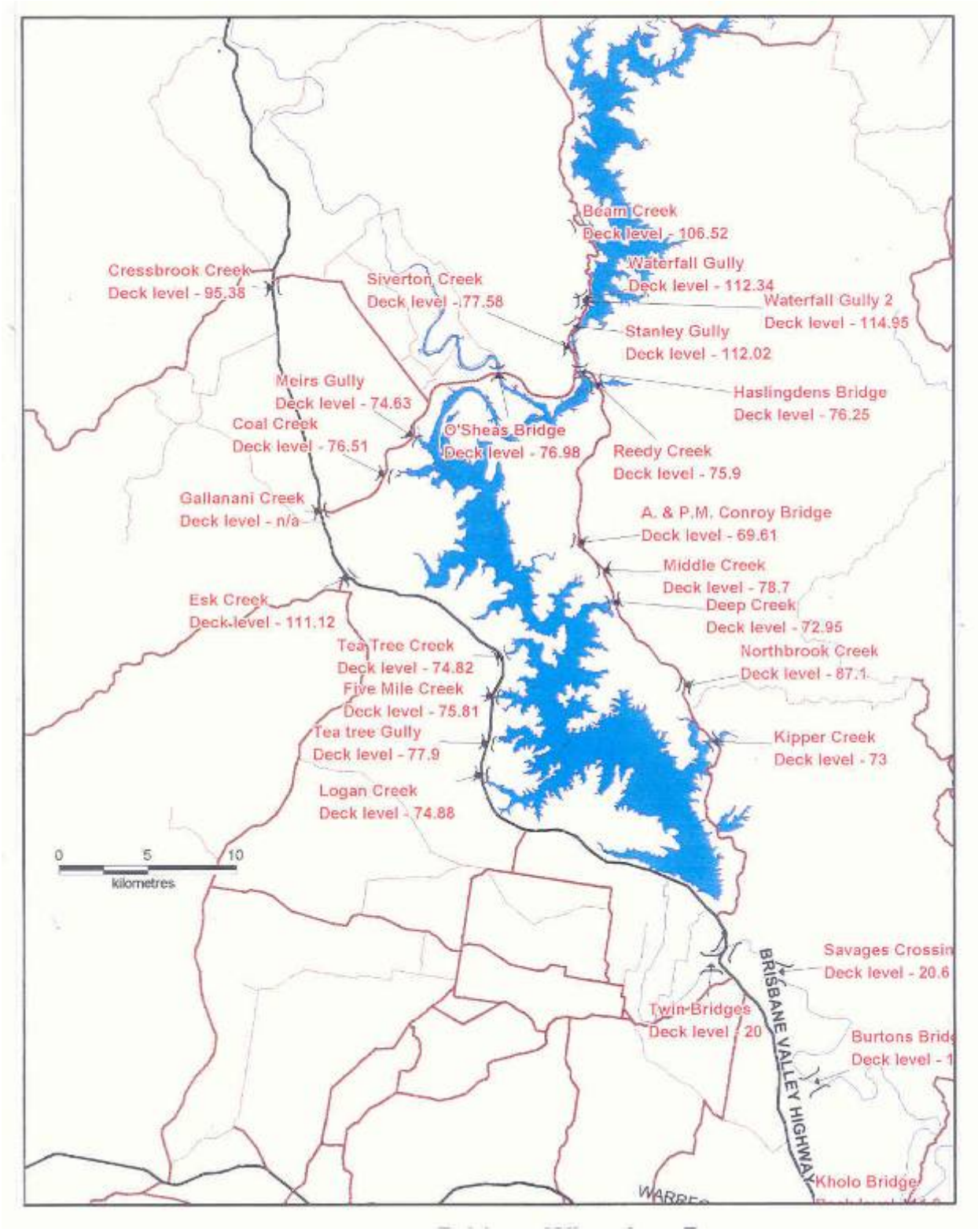


(Reference: http://maps.google.com.au/maps)

BRISBANE RIVER – WIVENHOE DAM TO MT CROSBY



BRIDGES – WIVENHOE DAM



AI-50771

UPSTREAM

DOWNSTREAM

Approach Groynes see drg. AI-50782

Training Walls see drg. AI-54836

Road Bridge see drg. AI-50767

Radial Gates (Not in Contract)

Spillway Piers see drg.

EL 78·0 EL 79·15 FSL EL 67·0 EL 57·0 EL 48·0 EL 44·0 EL 32·0 EL 57·0 EL 45·0 EL 40·5 EL 27·5 EL 26·0 EL 20·0 EL 23·0 EL 17·0 EL 28·0 N.S

Gallery

US Apron

Spillway flip

DS Apron

C-C
Scale a

Left Abutment · Spillway · Right Abutment

EL 53·0 EL 40·5 EL 28·0 EL 26·0

A-A
Scale a

For Embankment details see drg. AI-50819

RC Traffic crash barrier see drg. AI-54666

Armco guard rails see drg. AI-53357

Batter H.

Batter 1 on 1

Grade 1 on 2

294° 08' 02" ℄ DAM AXIS

Batter 1 on 1

EL 53·0 EL 56·0 EL 44·0 EL 32·0 EL 48·0 EL 26·0 EL 23·0 EL 20·0 EL 17·0 EL 40·5

Inlet Structure AI-54612

Service Bridge see drgs. AI-50829

Road Bridge see drg. AI-50767

℄ SPILLWAY 204° 08' 02"

Batter 1 on 2

For Training Walls and Spillway Monolith Nos. see drg AI-56250

Batter 1 on 1·5

For Embankment Details see drg AI-50779

Crest EL 78·0

Training Wall See drg. AI-54 836

Approach Groynes see drg. AI-50782

PLAN
Scale a

B-B
Scale b

740 Spillway Opening

Radial Gate (Not in Contract)

Underground Control and Facilities complex AI-54558

EMBANKMENT EL 79·00 EL 73·0 EL 53·0 EL 40·5 EL 45·00 EL 27·50

Outlet Works see drg. AI-53337 EL 23·0

RIVER

BRISBANE

NOTES:-
1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. Levels Datum - A.H.D. (RSM 34242 = EL 74·784)
3. Contours compiled from Plan AD-42777

AS BUILT
By
Chief
Date 31/10/85

Revision					Schedule		
Oct '85	C	As Built	Er.	Ast Engr	Drawing	AI-54836	Spwy Training Walls-Layout & Key to Marks
30-9-75	B	Render to Working Drgs	K.D.			AI-50782	Approach Groynes-Arrgt & Details
26-2-75	A	Groyne layout amended	M.I.C.			AI-50767	Road Bridge - General Arrangement
13-12-74	A	DIS dissipator excavation amended				AI-50829	Service Bridge - General Arrangement
Date		Remarks	Chd	Ast		AI-56250	Spwy - Key to Working Drawings
						AI-50795	Spilling - Third Stage Construction Excavation Details
						AI-50820	Third Stage Const - Embankment Area Plan

Scale a 0 50m (1:1000)

Scale b 0 10 20 30 (1:500)

(Scales Before Reduction)

CONTRACT N° 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep'd C.H.	Dr. B.R.	
Chd	Chd S.S.	Act. Chief Designing Engineer
Supv	Supv S.	Approved
Submitted		Commissioner 14.6.78
Senior Engineer Designs		

CO-ORDINATOR GENERAL'S DEPARTMENT

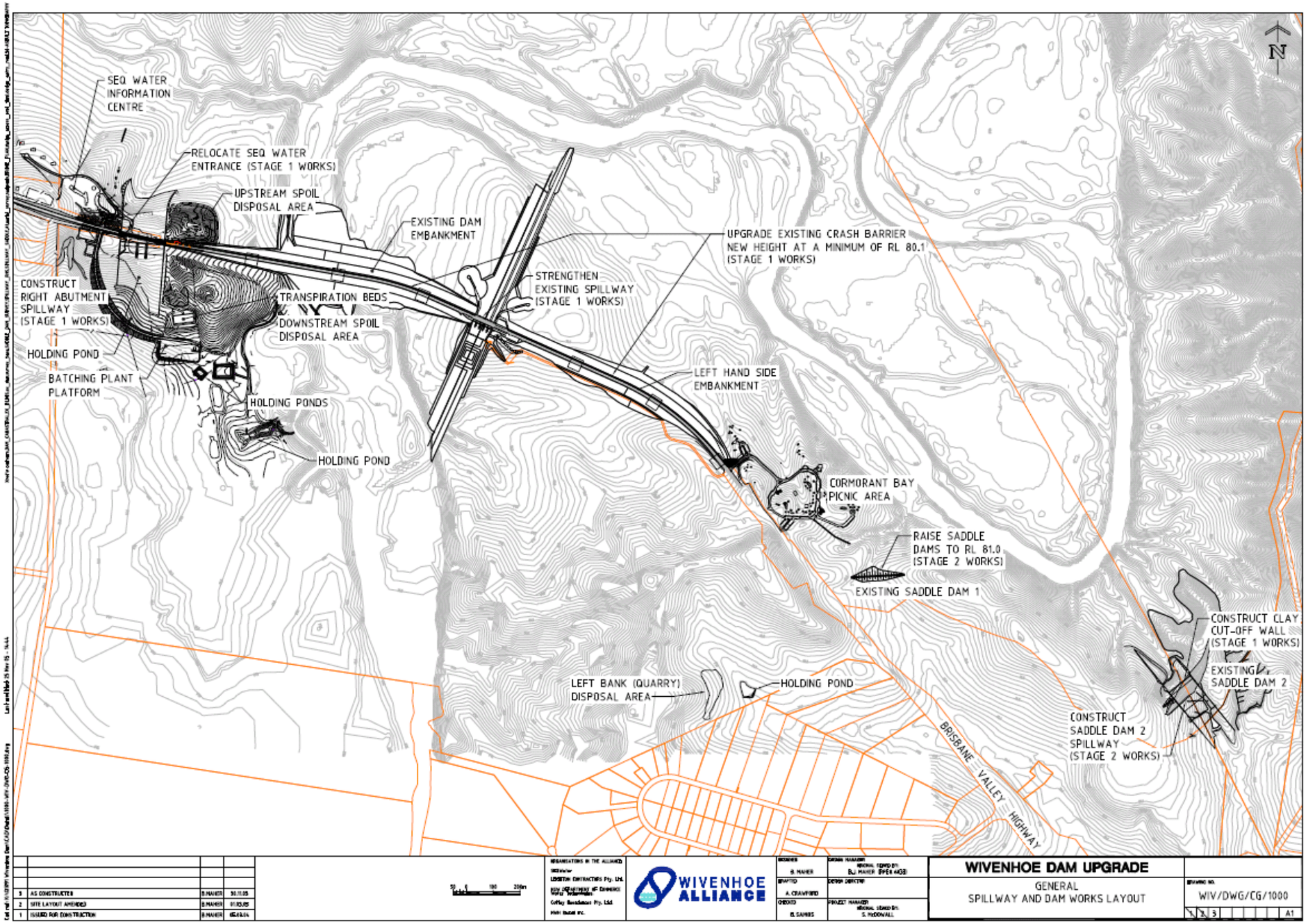
Co-ordinator General 16.6.78

BRISBANE RIVER 150·2 km - WIVENHOE DAM

SPILLWAY

GENERAL ARRANGEMENT

16-6-78 AI-50771 A B W C



3	AS CONSTRUCTED	B.MAHER	30.11.05
2	SITE LAYOUT AMENDED	B.MAHER	01.03.05
1	ISSUED FOR CONSTRUCTION	B.MAHER	05.08.04

ORGANISATIONS IN THE ALLIANCE
Delivering
LEIGHTON CONTRACTORS Pty. Ltd.
NSW DEPARTMENT OF COMMERCE
Water Infrastructure
Coffey Geosciences Pty. Ltd.
Hyder Consulting Pty. Ltd.

WIVENHOE ALLIANCE

DESIGNED: B. MAHER
DRAWN: B.J. MAHER (RPEQ 4438)
CHECKED: A. CRAWFORD
DESIGN DIRECTOR:
CHECKED: B. SAMMS
PROJECT MANAGER: S. McDONALL

WIVENHOE DAM UPGRADE

GENERAL
SPILLWAY AND DAM WORKS LAYOUT

DRAWING NO. WIV/DWG/CG/1000

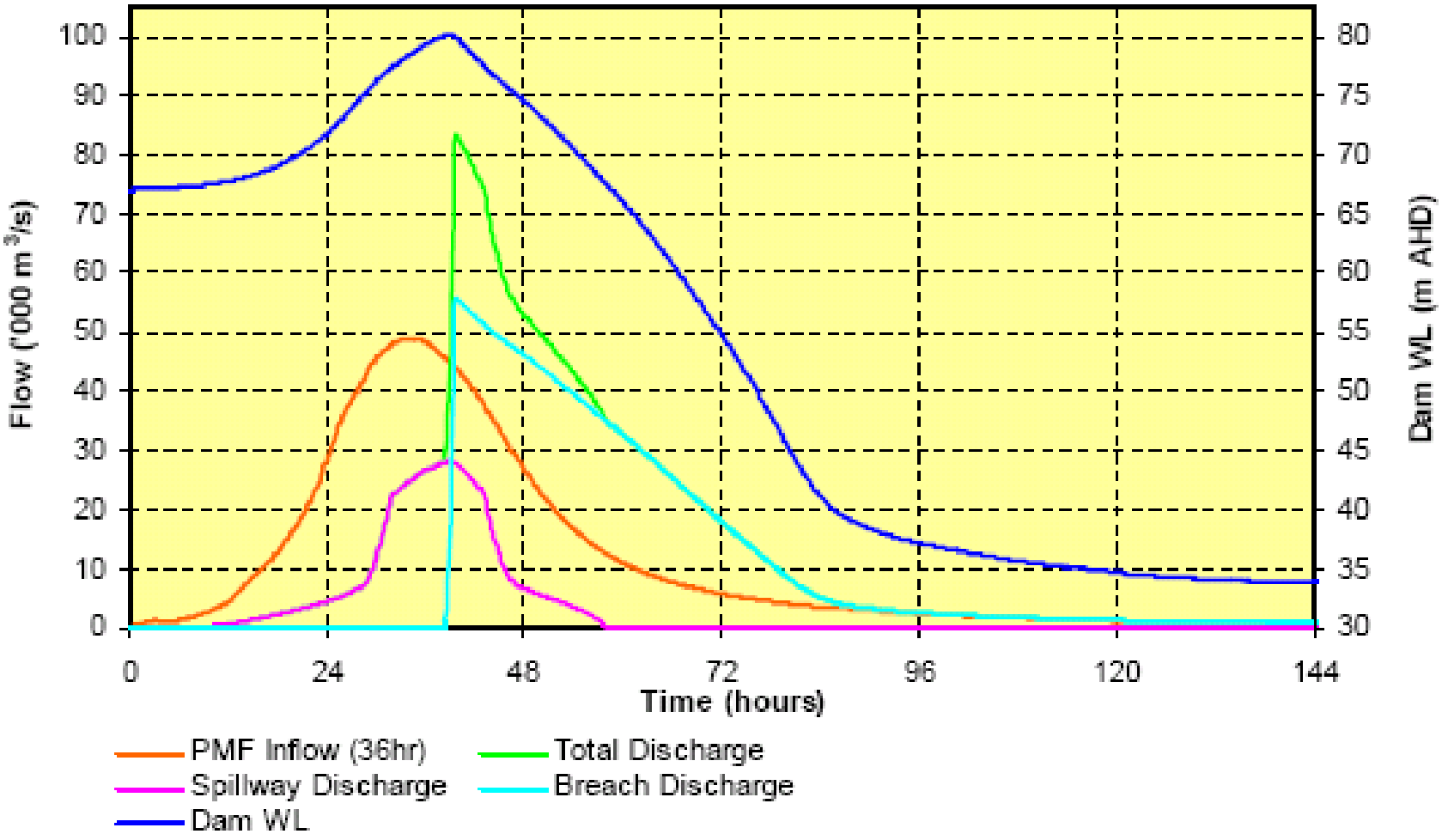
1 2 3 A1

APPENDIX C

FLOOD INUNDATION MAPS AND DAM BREAK ANALYSIS

EMERGENCY EVACUATION

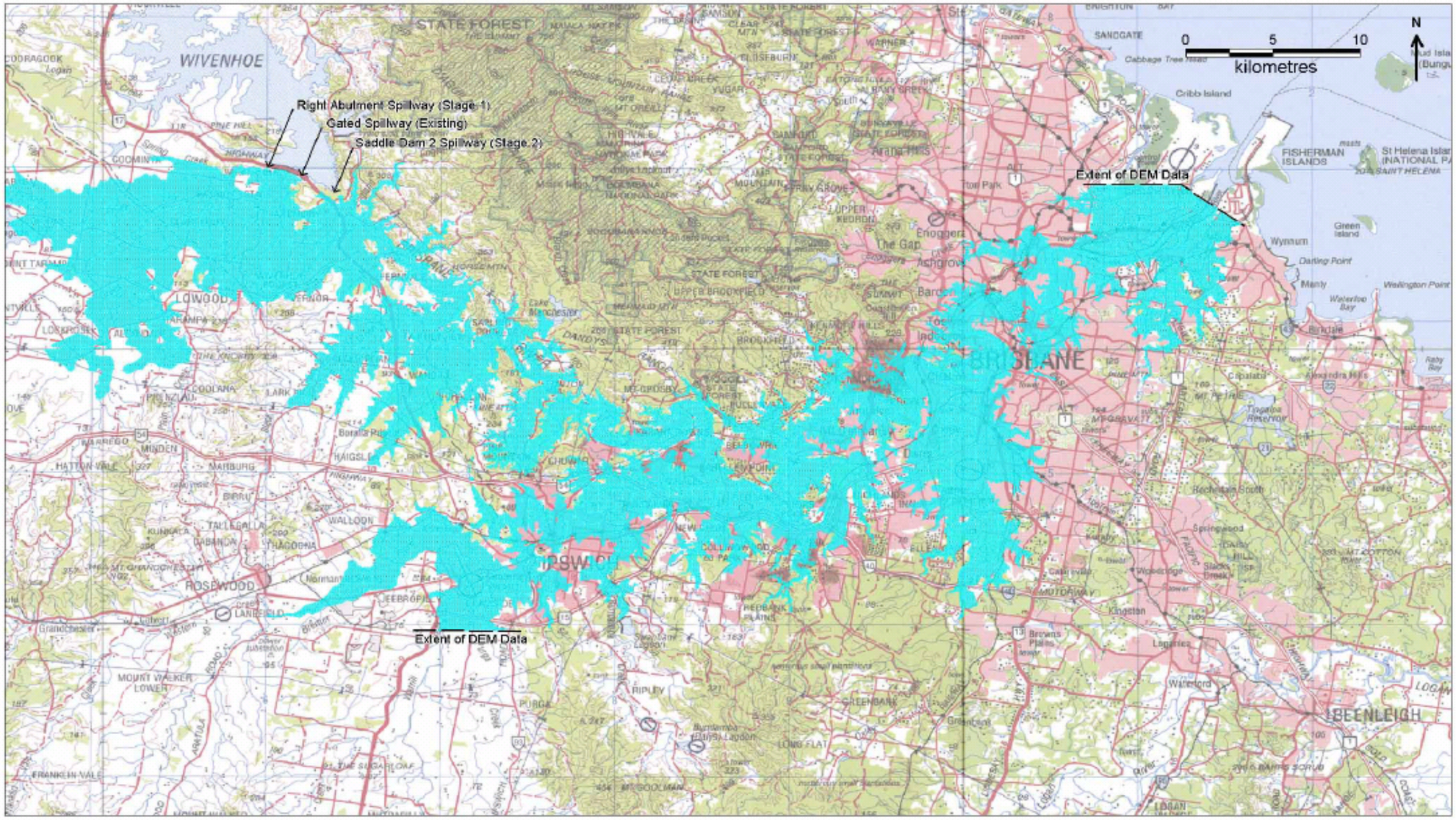
Where possible, emergency evacuation should always be carried out to the upper limit of flood levels shown on the inundation maps, due to the uncertainties associated with the flood development time and likely areas of inundation.



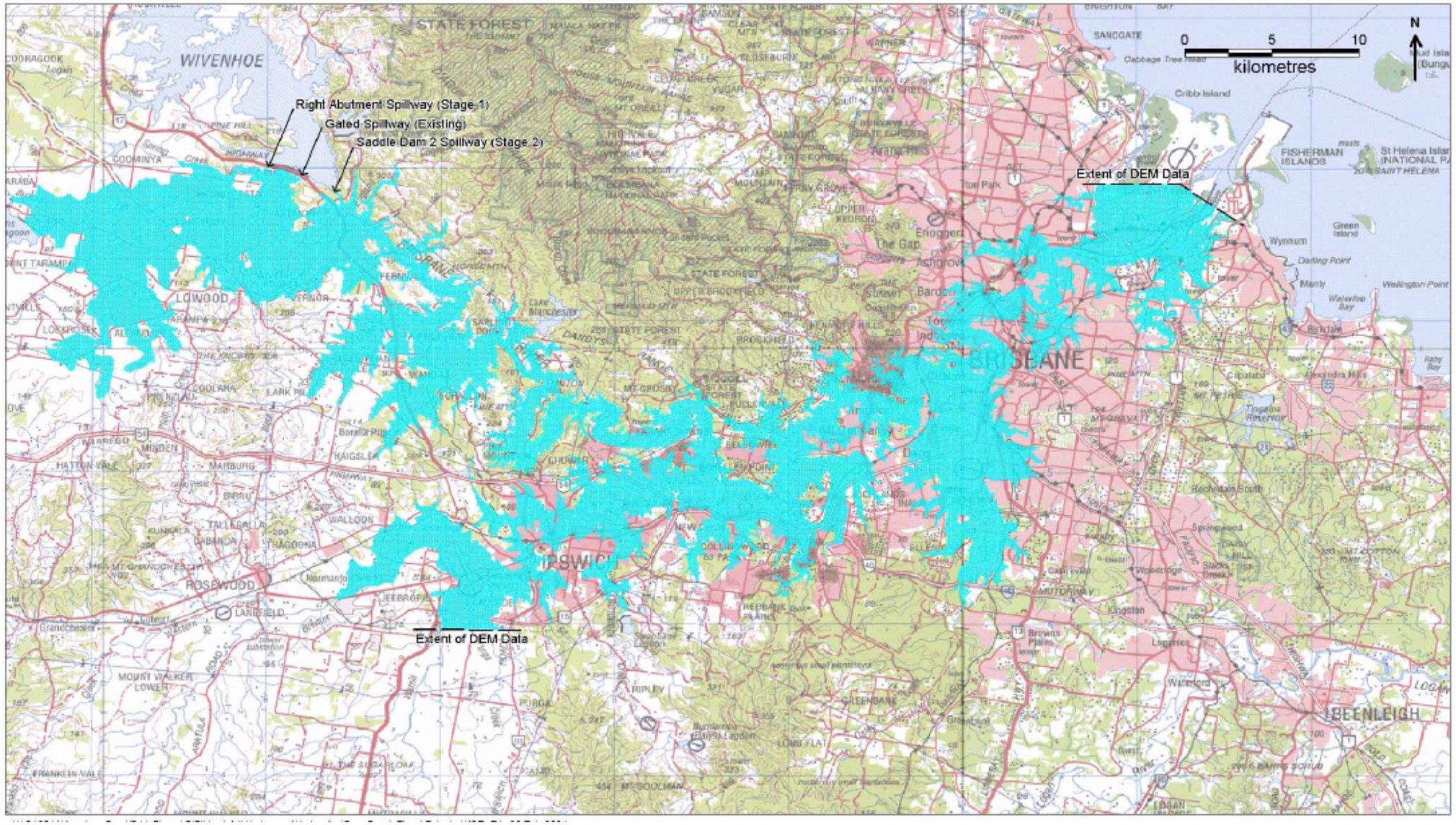
Wivenhoe Dam PMF Hydrographs

Comparison of Flood Peak Travel Time at Key Locations, Wivenhoe Dam PMF event

Location	**Original Dam**	**Existing Dam**	Stage 2	
	(Overtopping Failure)	(Overtopping Failure)	(Overtopping Failure)	(No Failure)
	(hours)	(hours)	(hours)	(hours)
Wivenhoe Dam	0.0	0.0	0.0	0.0
Savages Crossing	16.5	13.0	11.0	11.0
Mt Crosby Weir	20.0	16.5	14.5	14.5
Moggill Gauge	35.0	31.5	29.5	29.5
Port Office	40.5	37.0	35.0	35.0



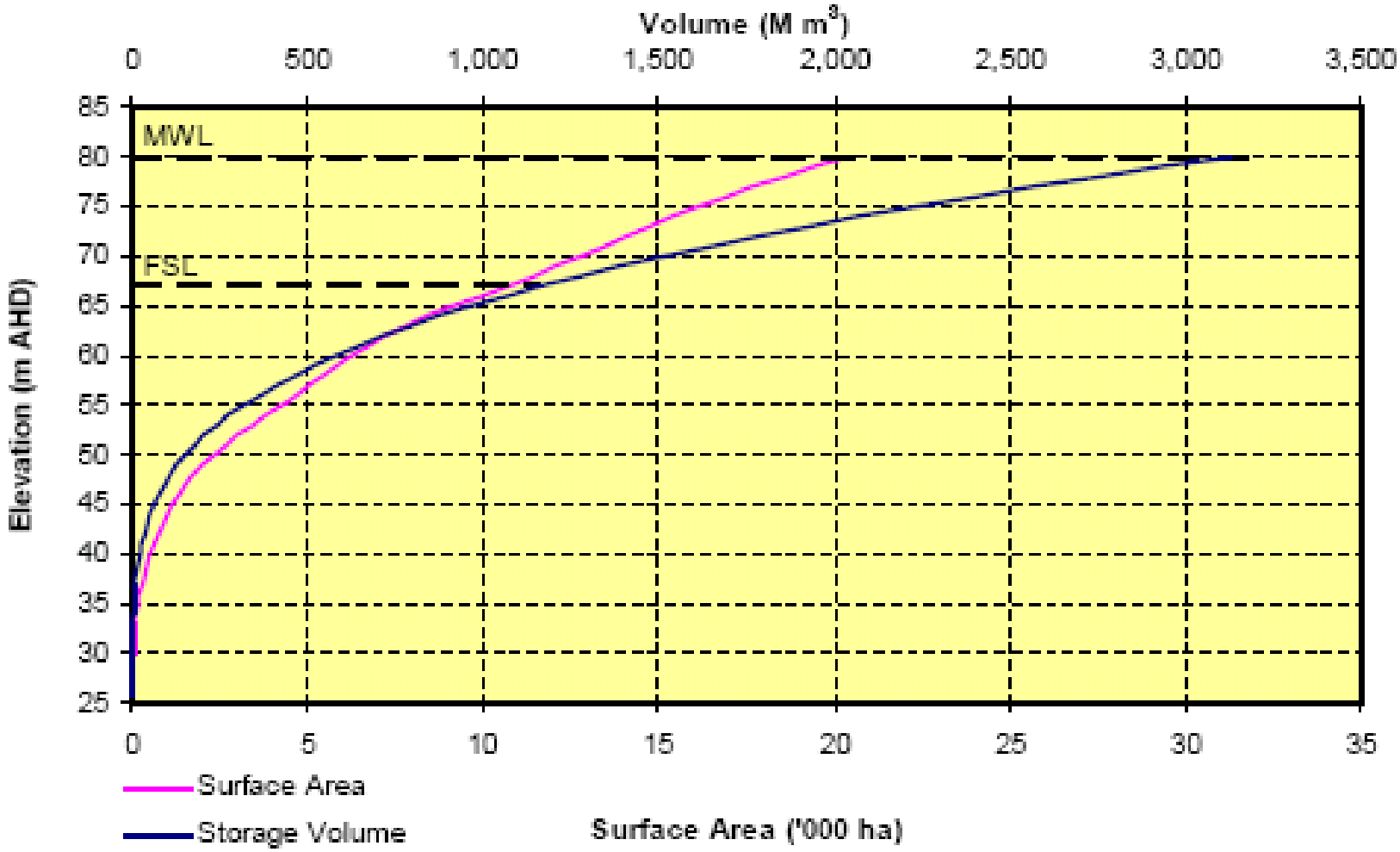
PMF Extent of Flooding, (Overtopping Failure)



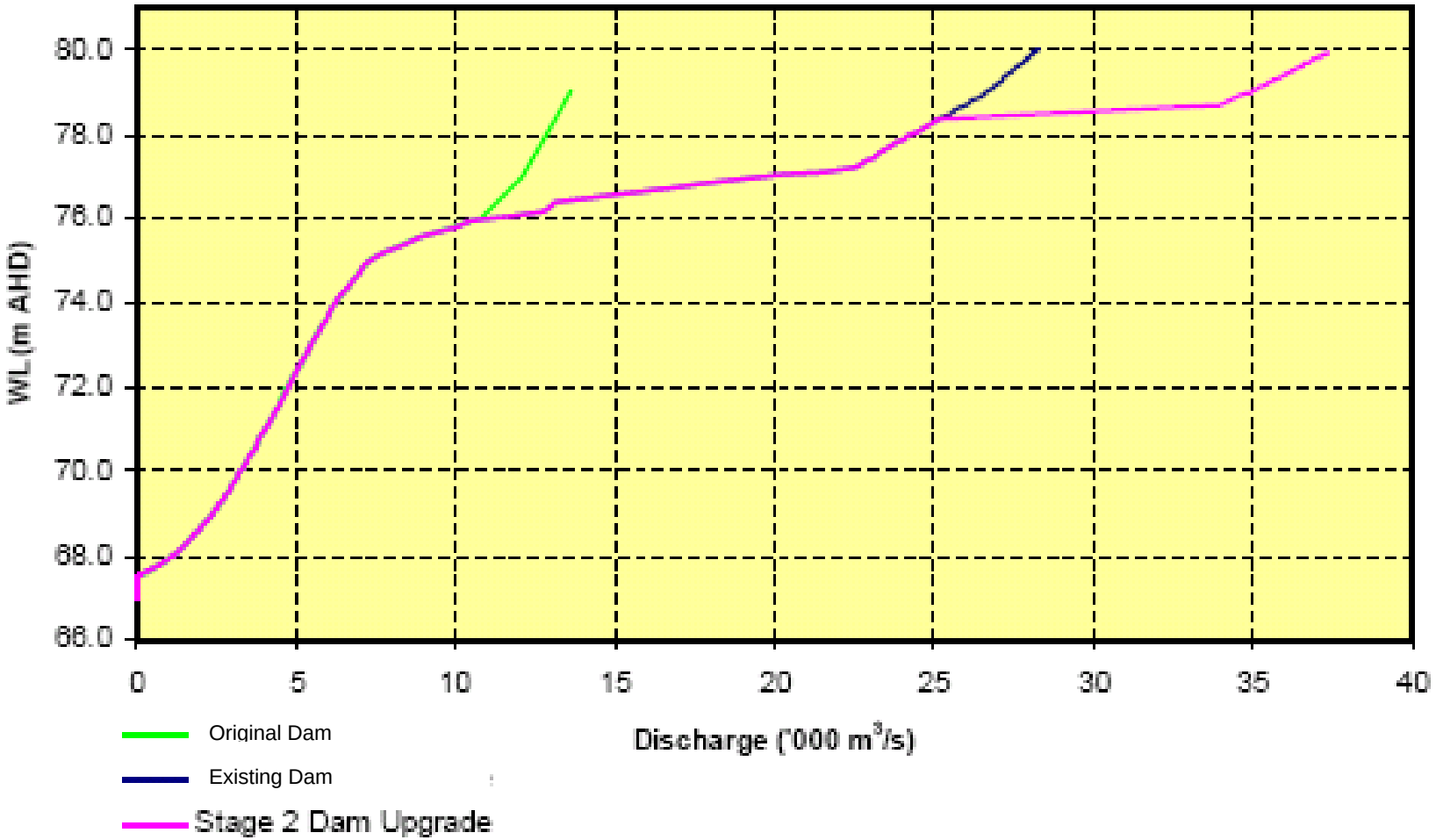
PMF Extent of Flooding, Stage 2 (No Failure)

APPENDIX D

DISCHARGE AND STORAGE CURVES



Storage Relationships, Wivenhoe Dam



Discharge Relationships - **Wivenhoe Dam**

APPENDIX E

INSPECTION AND REPORTING FORMS

WIVENHOE DAM – EMERGENCY ACTION PLAN
LOG OF EVENTS / ACTIONS

Date	Time	EVENT / ACTION DESCRIPTION	RECORDED BY (INITIALS)