



EMERGENCY ACTION PLAN

LIMESTONE PARK DETENTION BASIN

Located off Griffith Road, Ipswich

January 2024

Version 2.3

Approved by the delegate of the Chief Executive,
Department of Regional Development, Manufacturing
and Water until 1 October 2025.

Emergency Activation Quick Reference Guide

This Emergency Action Plan provides details on the prescribed procedures to be undertaken in the event of an emergency at the Limestone Park Detention Basin. This quick reference can be used to determine the relevant section of the EAP required to address an emergency event.

Table 1-1 Emergency Activation Quick Reference Guide

Activation Level:	EAP Alert	EAP Lean Forward	EAP Stand Up	EAP Stand Down
Decision Authority	<ul style="list-style-type: none"> Dam Incident Controller (DIC) 	<ul style="list-style-type: none"> Dam Incident Controller (DIC) 	<ul style="list-style-type: none"> Dam Incident Controller (DIC) 	<ul style="list-style-type: none"> Dam Incident Controller (DIC)
Activation Triggers				
Extreme Flood Event with Embankment Issues (Section 9.3, page 34)	<ul style="list-style-type: none"> High rainfall occurring or forecast; AND/OR Water level in basin likely to > 35.83 m AHD (0.74 m); AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> High rainfall occurring or forecast; AND/OR Basin embankment safety issue identified as outlined in Table 9-1; AND/OR Water level in basin likely to > 36.35 m AHD (1.26 m); AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> High rainfall occurring or forecast; AND/OR Basin embankment safety issue identified as outlined in Table 9-1; AND/OR Water level in basin likely to > 36.55 m AHD (1.46 m); AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> Risk of basin failure no longer imminent; AND No further rainfall or inflows forecast; AND Basin water level < 36 m AHD (0.91 m).
Extreme Flood Event without Embankment Issues (Section 9.4, page 34)	<ul style="list-style-type: none"> High rainfall occurring or forecast in the order of 40 mm/h; AND/OR Water level in basin > 0.74 m / 35.83 m AHD; AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> Water level in basin > 1.26 m / 36.35 m AHD; AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> Water level in basin > 1.46 m / 36.55 m AHD; AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> Water level in basin < 0.91 m / 36.00 m AHD; AND No further rainfall or inflows forecast.
Earthquake (Section 9.5, page 47)	<ul style="list-style-type: none"> Earthquake intensity 5 or greater reported or felt in area; AND High rainfall occurring or forecast in the order of 40 mm/h; AND/OR Water level in basin > 0.74 m / 35.83 m AHD; AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> Earthquake intensity 5 or greater reported or felt in area; AND Visual inspection of the dam yields evidence of any damage as described in Table 9-1; AND Water level in basin > 1.26 m / 36.35 m AHD; AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> Earthquake intensity 5 or greater reported or felt in area; AND Water level in basin likely > 36.55 m AHD (1.46 m) 	<ul style="list-style-type: none"> Risk of basin failure no longer imminent; AND No further rainfall or inflows forecast; AND Basin water level < 36 m AHD (0.91 m).
Terrorist threat/activity or high energy impact (Section 9.6, page 53)	<ul style="list-style-type: none"> Credible report of potentially damaging event; AND High rainfall occurring or forecast in the order of 40 mm/h; AND/OR Water level in basin > 0.74 m / 35.83 m AHD; AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> Credible report of potentially damaging event; AND Visual inspection of the dam yields evidence of any damage as described in Table 9-1; AND Water level in basin > 1.26 m / 36.35 m AHD; AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> Credible report of potentially damaging event; AND Water level in basin likely > 36.55 m AHD (1.46 m) 	<ul style="list-style-type: none"> Risk of basin failure no longer imminent; AND No further rainfall or inflows forecast; AND Basin water level < 36 m AHD (0.91 m).

Water surface levels within the detention basin can be obtained by reading the level gauge on the eastern or western ends of the embankment or via Guardian IMS (GIMS) Flood Intelligence System. The location of these gauges are provided in Appendix B. Stage-storage curves for the basin are also provided in Appendix B.

1 Distribution Control And Approval

1.1 Distribution Control Sheet

Copy No.	Agency	Position	Contact Details
1	Ipswich City Council	Dam Owner	Ipswich City Council
2		Dam Operator/ Dam Incident Controller	General Manager Asset and Infrastructure Services [REDACTED] [REDACTED]
3		Council Officer	Manager, Assets Services [REDACTED] [REDACTED]
4	City of Ipswich Local Disaster Management Group (LDMG)	Deputy Local Disaster Coordinator	Disaster and Emergency Manager [REDACTED] [REDACTED]
5		Local Disaster Coordinator	General Manager, Environment and Sustainability [REDACTED]
6	Department of Regional Development, Manufacturing and Water (RDMW)	Chief Executive /Director, Dam Safety	Department of Regional Development, Manufacturing and Water (RDMW) PO Box 2771, Brisbane QLD 4000 [REDACTED] [REDACTED] [REDACTED]
7	State Disaster Coordination Centre (SDCC)	SDCC Watch Desk	[REDACTED] [REDACTED]
8	Ipswich District Disaster Management group (DDMG)	District Disaster Coordinator and Chair	[REDACTED] [REDACTED]
9	Queensland Police Service	Officer in Charge	Ipswich Station 37 Ellenborough Street, Ipswich QLD 4305 Ph.: (07) 3437 2777 www.police.qld.gov.au
10	Queensland Fire and Emergency Service	Officer in Charge	Bundamba Fire Station 61 Brisbane Road, Bundamba, QLD 4034 [REDACTED]

1.2 Amendment Register

Revision No.	Author	Revision Date	Revision Description	Changes
1	SMEC	11/01/19	Draft, for submission to stakeholders.	
2	SMEC/ICC	25/1/19	Draft, for submission to LDMG and DDMG	
3	SMEC	22/3/19	Final, for submission to DNRME	
4	ICC	16/9/2019	Annual Review	
5	ICC	9/10/2020	Annual Review 2020	
6	Cardno/ICC	16/02/2021	Final updated Plan, for submission to RDMW	
7	ICC	14/09/2021	Annual Review 2021	
8	ICC	4/08/2022	Annual Review 2022	
V2.0	Engeny	08/09/2023	Draft, for submission to stakeholders.	
V2.1	Engeny	25/09/2023	Draft, for DRDMW review.	Minor document amendments and corrections.
V2.2	Engeny	30/11/2023	Draft, for submission to stakeholders.	Minor document amendments and corrections.
V2.3	Engeny	16/01/2024	Final, for submission to DRDMW.	Minor document amendments and corrections.

1.3 Document Control and Approval

The Limestone Park Detention Basin Emergency Action Plan (EAP) is a controlled document.

This updated Revision V2.3 supersedes all previous document versions, which should be destroyed.

The distribution of this document is controlled by the dam owner, namely Ipswich City Council. Refer to the Distribution Control Sheet for relevant copies.

Controlled document versions are approved by the dam owner. If your document does not have an original signature, it is not a controlled version of the plan. Please contact the dam owner. Refer to Amendment register for a document revision history.

This is an approved controlled version of the '**Limestone Park Detention Basin– Emergency Action Plan**'.

Copy Number: 1

Authorised by: 

Position: General Manager (Asset and Infrastructure Services)

Company: 

Signature: 

Date: 

2 Revision Status

Revision No.	Date	Description of Revision	Prepared By	Reviewed By
1	11/01/19	Draft, for submission to stakeholders.	SMEC	
2	25/1/19	Draft, for submission to LDMG and DDMG	SMEC/ICC	
3	22/3/19	Final, for submission to DNRME	SMEC	
4	16/9/2019	Annual Review	ICC	
5	9/10/2020	Annual Review 2020	ICC	
6	16/02/2021	Final updated Plan, for submission to RDMW	Cardno/ICC	
7	14/09/2021	Annual Review 2021	ICC	
8	4/08/2022	Annual Review 2022	ICC	
V2.0	08/09/2023	Draft, for submission to stakeholders.	(Engeny)	(Engeny)
V2.1	25/09/2023	Draft, for submission to DRDMW	(Engeny)	(Engeny)
V2.2	30/11/2023	Draft, for submission to stakeholders.	(Engeny)	(Engeny)
V2.3	16/01/2024	Final, for submission to DRDMW	(Engeny)	(Engeny)

Note: A complete set of documents in hard copy shall be held in Council Asset and Infrastructure Services Department, Asset Management Section at 1 Nicholas Street Level 7. The electronic copies are held in [REDACTED] and on the USB Drive attached to Controlled Copy Number 1.

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Appendix A – Mapping

Appendix B – Supporting Information

Appendix C – Impacted Persons/Properties Contact Details

Appendix D – Manual Documentation Templates

4 References, Abbreviations and Definitions

Table 4-1 **References/Associated Documents**

Document	Reference
Failure Impact Assessment – Limestone Park Flood Mitigation Project	SMEC, 2017 https://iccecm.ipswich.qld.gov.au:8643/id:A4038995/document/versions/published
Limestone Park Detention Basin Operation and Maintenance Manual (OMM)	September 2022 https://iccecm.ipswich.qld.gov.au:8643/id:A8287859/document/versions/published
Queensland Emergency EAP Alert Manual – M.1.174	November 2022 - https://www.disaster.qld.gov.au/_data/assets/pdf_file/0027/339417/M1174-Queensland-Emergency-EAP-Alert-Manual.pdf
Queensland Prevention, Preparedness, Response and Recovery Disaster Management Guideline	January 2018 - https://www.disaster.qld.gov.au/_data/assets/pdf_file/0032/359465/QLD-Disaster-Management-Guideline.pdf
Queensland Weather Information (Flood Warnings)	http://www.bom.gov.au/qld/warnings/flood/index.shtml
Daily Rainfall Data	http://www.bom.gov.au/climate/data/
Water Supply (Safety and Reliability) Act 2008 (Section 352A)	https://www.legislation.qld.gov.au/view/html/inforce/current/act-2008-034
Emergency Action Plan for Referable Dam Guideline – Version 4	October 2023 - https://www.resources.qld.gov.au/_data/assets/pdf_file/0018/84015/eap-guideline.pdf

Table 4-2 Abbreviations and Acronyms

Code	Reference	Code	Reference
AEP	Annual Exceedance Probability	EER	Emergency Event Report
ARI	Annual Recurrence Interval	FIA	Failure Impact Assessment
AHD	Australian Height Datum	GM	General Manager
AWS	Australian Warning System	ICC	Ipswich City Council
BOM	Bureau of Meteorology	LDMG	Local Disaster Management Group
CEO	Chief Executive Officer	LDMP	Local Disaster Management Plan
CTO	Counter Terrorism Officer	ML	Megalitres
CO	Council Officer/Council Engineer	OMM	Operation and Maintenance Manual
DCE	Dam Crest Elevation	PAR	Population at Risk
DDS	Director, Dam Safety	PMF	Probable Maximum Flood
DDO	Dam Duty Officer	QFES	Queensland Fire and Emergency Service
DEWS*	Department of Energy and Water Supply	QPS	Queensland Police Service
DIC	Dam Incident Controller	QR	Queensland Rail
DO	Dam Operator	RDMG	Relevant Disaster Management Group (Ipswich LDMG & Ipswich DDMG)
DTMR	Department of Transport and Main Roads	RDMW	Department of Regional Development, Manufacturing and Water
EA	Emergency Alert	RPEQ	Registered Professional Engineer of Queensland
EAP	Emergency Action Plan	SDCC	State Disaster Coordination Centre
EARF	Emergency Alert Request Form	SDF	Sunny Day Failure
		SES	State Emergency Service

*Note that DEWS has been superseded by RDMW.

Table 4-3 Terms and Definitions

Term	Definition
Terms set out in section 352A of the Water Supply (Safety and Reliability) Act (QLD, 2008)	
Dam hazard	<p>For a dam, is a reasonably foreseeable situation or condition that may-</p> <ol style="list-style-type: none"> a. cause or contribute to the failure of the dam, if the failure may cause harm to persons or property; or b. require an automatic or controlled release of water from the dam, if the release of the water may cause harm to persons or property.
Dam hazard event	<p>For a dam, means an event arising from a dam hazard if—</p> <ol style="list-style-type: none"> a. persons or property may be harmed because of the event; and b. a coordinated response involving 2 or more of the relevant entities mentioned in paragraphs (b) to (d) of the definition relevant entity is unlikely to be required to respond to the event; and c. the event is not an emergency event.
Emergency event	<p>for a dam, means an event arising from a dam hazard if—</p> <ol style="list-style-type: none"> a. persons or property may be harmed because of the event; and b. any of the following apply— <ol style="list-style-type: none"> i. a coordinated response involving 2 or more of the relevant entities mentioned in paragraphs (b) to (d) of the definition relevant entity is likely to be required to respond to the event. ii. the event may arise because of a disaster situation declared under the Disaster Management Act. iii. an entity performing functions under the State disaster management plan may, under that plan, require the owner of the dam to give the entity information about the event.
Referable dam	<p>A dam, or a proposed dam after its construction, will be a referable dam if:</p> <ol style="list-style-type: none"> a. a failure impact assessment of the dam, or the proposed dam, is required to be carried out under the Act, AND b. the assessment states the dam has, or the proposed dam after its construction will have, a category 1 or category 2 failure impact rating, AND c. the Chief Executive has, under section 349 of the Act, accepted the assessment.
Relevant entity	<p>for a dam, means each of the following under the emergency action plan for the dam—</p> <ol style="list-style-type: none"> a. the persons who may be affected, or whose property may be affected, if a dam hazard event or emergency event were to happen for the dam; <p>Examples for paragraph (a)—</p> <ul style="list-style-type: none"> • the owners of parcels of farm land adjacent to the dam • residents of a township <ol style="list-style-type: none"> b. each local group and district group for the emergency action plan. c. each local government whose local government area may be affected if a dam hazard event or emergency event were to happen for the dam. d. the chief executive. e. another entity the owner of the dam considers appropriate. <p>Example for paragraph (d)—</p>

Term	Definition
	the Queensland Police Service
Terms consistent with Queensland disaster management arrangements:	
Activation levels	<p>The four levels of EAP activation are:</p> <ul style="list-style-type: none"> ▪ EAP Alert: A heightened level of vigilance due to the possibility of an event occurring. No further action may be required; however, the situation should be monitored by someone capable of assessing the potential of the threat. Moving to an EAP Alert level indicates the dam owner is getting ready to activate the EAP Lean Forward level of the EAP if the situation deteriorates. ▪ EAP Lean Forward: An operational state characterised by a heightened level of situational awareness of an impending disaster event and a state of operational readiness. Disaster coordination centres are on standby and prepared but not activated. ▪ EAP Stand Up: The operational state where resources are mobilised, personnel are activated, and operational activities commenced. Disaster coordination centres are activated. The dam owner needs to provide an Emergency Event Report (EER) in accordance with the provision of the Act. ▪ EAP Stand Down: Transition from responding to an event back to normal core business and/or continuance of recovery operations. There is no longer a requirement to respond to the event and the threat is no longer present. The movement through these levels of activation is not necessarily sequential. It should be applied with flexibility and adaptability and be tailored to the location and event. Triggering one of these levels of activation may not necessarily mean a similar activation of RDMGs. <p>Triggering one of these levels of activation may not necessarily mean a similar activation of RDMGs.</p>
Earthquake	<p>A sudden release of energy in the Earth's crust or upper mantle, usually caused by movement along a fault plane or by volcanic activity, resulting in the generation of seismic waves that can be destructive. The potential consequences of an earthquake include:</p> <ul style="list-style-type: none"> ▪ settlement, sliding, or overturning of monoliths in the dam wall. ▪ initiation of seepage lines in the foundations or abutments that could lead to piping. ▪ damage and potential inoperability of appurtenant works.
Flood release	<p>A flood release from a dam occurs when catchment inflows raise the storage level above the Full Supply Level (FSL) resulting in a discharge from the spillway of the dam.</p>
Piping	<p>Internal scour caused by the water flow and seepage that occurs through earth dams, dam foundations, or dam abutments. The internal scour can lead to the formation of a pipe, which can lead to a failure of the dam.</p>
Object crash into dam (plane strike or other impact)	<p>The impact of a plane, meteorite, or other high-energy item on or in close vicinity of a dam that could damage the dam structure or create a wave that could overtop the dam.</p>
Terrorist activity	<p>A deliberate attempt to damage or fail a dam.</p>

5 Dam Details

5.1 General Description

This Emergency Action Plan (EAP) is part of a suite of dam safety and management documents for Ipswich City Council (ICC). When using this plan, reference is also to be made to the current version of City of Ipswich Local Disaster Management Plan (LDMP). ICC is the owner of Limestone Park Flood Detention Basin and any emergency response in relation to the basin is to be managed and directed as per this EAP.

The Limestone Park Detention Basin is a flood detention structure located in the upper reach of the Ipswich Central catchment. The embankment of the detention basin is accessed via Griffith Road, Ipswich. The detention basin was constructed to reduce the impact of flooding on Ipswich Central by storing runoff from the Limestone Park catchment, releasing it at a reduced rate and lowering the probability of inundation to properties and infrastructure.

The catchment draining into Limestone Park Detention Basin has an approximate area of 28.2 ha and is made up mostly of park and open space with some urban development. Extents of the catchment contributing to the Limestone Park detention basin are illustrated in Appendix A of this EAP. Downstream of the basin lies Ipswich City CBD with a high density of commercial premises, a rail-line and the Bremer River. The downstream flow path is heavily developed and includes an underground drainage network. The drainage system is design to convey high frequency events, larger events will result in surface flows conveyed within both road and private allotments.

In the case where there is no storm event occurring within the catchment the basin is dry and acts as a cricket and football field, as such Sunny Day Failure is not considered within this document.

The Limestone Park Detention Basin was constructed as an earth embankment structure and was completed in 2019. It has an embankment height of approximately 2.5 meters and a total combined length of spillway and embankment in the order of 130 meters. The basin has two staged spillways located in the embankment towards the north, which is designed to discharge the Acceptable Flood Capacity (AFC) of 0.01% AEP.

Limestone Park Detention Basin has been assessed to be a Category 1 referable dam, (maximum incremental Population at Risk (PAR) of 66) due to its proximity to the Ipswich Central and the population at risk. Details of the Flood Impact Assessment (FIA) used to calculate the PAR are presented in *Failure Impact Assessment – Limestone Park Flood Mitigation Project* (SMEC, 2017).

As the detention basin is located a short distance upstream of the CBD and the fast rate of rise within the detention basin, there will be minimal time to react and implement actions to safeguard the community should an overtopping or dam failure event occur. It is estimated that the nearest residences and properties will be impacted within minutes of a dam failure or overtopping event occurring.

5.2 Dam Technical Data

Key parameters for the Limestone Park detention basin are listed below in Table 5-1.

Table 5-1 General Information and Dam Parameters

Parameter	Value
GENERAL	
Name of Dam	Limestone Park Detention Basin
Owner of Dam	Ipswich City Council (Attn: Asset Management) PO Box 191 Ipswich QLD 4305 Australia [REDACTED] [REDACTED]
Owner Representative	General Manager, Asset and Infrastructure Services (Dam Operator) [REDACTED] [REDACTED]
Failure Impact Assessment Category	1
Sunny Day Failure Incremental PAR: 1:5,000 AEP Failure Critical Incremental PAR:	Not applicable 66 (Non-failure PAR of 723)
Acceptable Flood Capacity	1:10,000 AEP
Dam Crest Flood Capacity	1:10,000 AEP
Status of Dam	Existing
Property Description	Lot 2 on RP907847
Location of Dam (approx.)	27°37'17.0" S, 152°45'58.0" E
Name of Watercourse	Not applicable
DAM DESCRIPTION:	
Embankment Construction	Earth Fill Embankment – Homogeneous Fill
Dam Capacity at Crest Level	25.2 ML
Dam Crest Elevation	37.3 m AHD
Dam Capacity at Spillway Level	10.8 ML
Spillway Elevation	Upper – 36.65 m AHD Lower – 36.55 m AHD (Full Supply Level)
Spillway Width	Upper – 30 m Lower – 4 m
Embankment Height	2.5 m
Crest Length	130 m
Crest Width	3 m
Spillway	Concrete crest cap section which includes: <ul style="list-style-type: none"> – A two-tiered weir to cater for different frequency of flows. – Each spillway is connected via a 1 to 10 transition. – Unlined discharge channel which runs down the left abutment to the stilling basin.

Parameter	Value
Outlet Works	Reinforced concrete pipe(s) (RCP) with pre-cast intake structure(s), discharging into existing stormwater network. <ul style="list-style-type: none"> - Central (Outfall): 1 / 1050 mm RCP, - RHS: Central Intake: 1 / 450 mm RCP (34.2m) + 1 / 525 mm RCP (45.7m) - LHS: Central Intake: 1 / 450 mm RCP (20.9m) / 1 / 525 mm RCP (4.6m)
Catchment Area	28.8 ha

Additional information including storage capacity curves and selected drawings is provided in Appendix B.

5.3 Design Event Performance

The design event flood levels as assessed in *Failure Impact Assessment – Limestone Park Flood Mitigation Project* (SMEC, 2017) are provided in Table 5-2.

During flood events up to and including the 10% AEP flood event the rate of flow entering the detention basin will be stored within the basin and drain via the underground stormwater network. No flows passing over the spillway are to be expected during these minor events.

Increased levels of inflow to the detention basin (greater than the 10% AEP event) will result in the water level rising until it reaches or exceeds the basin's spillway level. Although this will result in overland flows downstream, these water levels are within design expectations and the detention basin is operating as intended. At this time, there is a level of flood risk to downstream property and infrastructure. Depending on the severity of the flood inflow, it may be necessary to activate this EAP.

Table 5-2 Design Event Performance

Design Flood Event AEP (%)	Design Flood Event ARI (years)	Peak Basin Water Level (m AHD)
39% AEP	35.83	35.83
10% AEP	36.33	36.33
Lower Spillway Level		36.55
Upper Spillway Level		36.65
1% AEP	36.84	36.84
0.01% AEP	37.20	37.20
Crest Level		37.30

5.4 Emergency Inspections and Monitoring

5.4.1 Inspections

Inspections of the condition of the dams should be carried out in accordance with the frequencies outlined in Table 5-3.

Table 5-3 Inspection Frequencies

Inspection Type	Frequency
Routine	Conducted bi-monthly, and in any situation where an elevated risk of failure of the dams is brought to the attention of the Dam Operator.
Detailed	Conducted annually.
Comprehensive	Conducted every 5 years.
Special	Conducted after a flood event.

The appropriate procedures, including maintenance and inspection checklists, involved in carrying out the inspections are detailed in the OMM.

5.4.2 Instrumentation

The following instrumentation listed in Table 5-4 is in place at Limestone Park Detention Basin (see Appendix B for localities).

Table 5-4 Instrumentation at Limestone Park Detention Basin

Instrument Type	Reference	Code
Reservoir Level	2x Gauge Boards	Routine Inspection and During Flood Events
	1x Water Level Sensor	By Telemetry
Rainfall	1x Rainfall Gauge	By Telemetry
Surface Movement Monitoring	3x Points – (Star Pickets) 4x Points – Screws in Concrete 2x Point – Permanent Survey Marker (PSM) (star picket and standard brass plaque)	Two-Yearly

The system relays data to the Enviromon monitoring system. Enviromon is an Australian Government, Bureau of Meteorology product with a capacity to collect and monitor rainfall and water level data in real time. This system then transfers data to the Guardian IMS (GIMS) Flood Intelligence System.

Trigger water surface levels given within this document are in both m AHD and the level applicable to the reading in the Guardian IMS (GIMS) Flood Intelligence System. The BoM Enviromon, and therefore GIMS flood gauge zero level (0 m) is 35.091 m AHD.

5.5 Risks and Issues

The following risks and issues may need to be considered in respect to the operation, use and activation of this EAP:

- The catchment has a fast response time with localised storm events leading to water rising in the detention basin after less than 1 hour.
- Where possible, dam inspectors should be mobilised early to view the developing situation at Limestone Park Detention Basin. This action may need to be based on predictions of an event developing.
- Inspectors attending site are to be aware that due to flooding and inundation of local roads they may be isolated at the site until the flood levels recede.

- Access to the detention basin crest area on the right-hand side of the spillway (as viewed looking downstream) is limited and in the event of a flood and discharge through the spillway, this area of the embankment is not likely to be accessible, as it is understood Griffith Road receives significant overland flow. Monitoring of this area of the embankment will have to be from the left side of the spillway (access via Quarry Street / Tennyson Street).
- Evacuation, based on context (forecast rainfall, fallen rainfall, community antecedents and timing of day etc) and risk should be considered from (EAP Lean Forward – Extreme Flood Event with Embankment Issues) if the basin spillway is likely to be engaged (to be triggered at 200 mm freeboard to the level of the lower spillway) and an embankment safety issue has been identified.
- Dam failure mechanisms may develop quickly with a high likelihood of ICC being unable to undertake any actions to mitigate or reduce the development of the failure in a timely manner.
- In the event that dam inspectors identify an issue that is developing into a breach of the embankment, there are minimal actions that they can take to stop or reduce the failure. The main action of the inspectors under these circumstances will be to observe the situation at the detention basin and provide further warning and updates to the Emergency Services and the Dam Operator.
- The detention basin embankment has the potential of developing a failure under flood conditions due to the following:
 - The embankment only experiencing water levels on the upstream side infrequently, resulting in testing of the structural integrity of the embankment.
 - Seepage through the embankment will only be evident when there is water stored in the basin. If seepage is identified, then it is likely that an open passage exists through the embankment (highly porous area or a piping mechanism is developing).
 - The embankment fill material will be slowly drying and potentially developing cracks.
 - The embankment is homogenous with no filters. Seepage through the embankment or cracks will be uncontrolled and could therefore develop relatively quickly into a dam failure mechanism.
- It should be noted that the Queensland Ambulance Service (QAS) Ipswich Station and the Ipswich City State Emergency Service (SES) have their headquarters located next to the Limestone Park Detention Basin. Any potential flooding could significantly reduce their capacity to respond to an emergency and therefore they must be notified during the EAP Alert stage and updated regularly. Reduced ability to respond by these services could result in negative flow on effects to the LDMG, Ipswich Hospital and other parts of the SEQ health and QAS network.

Section 6.1 has been redacted

6.2 Notification Process

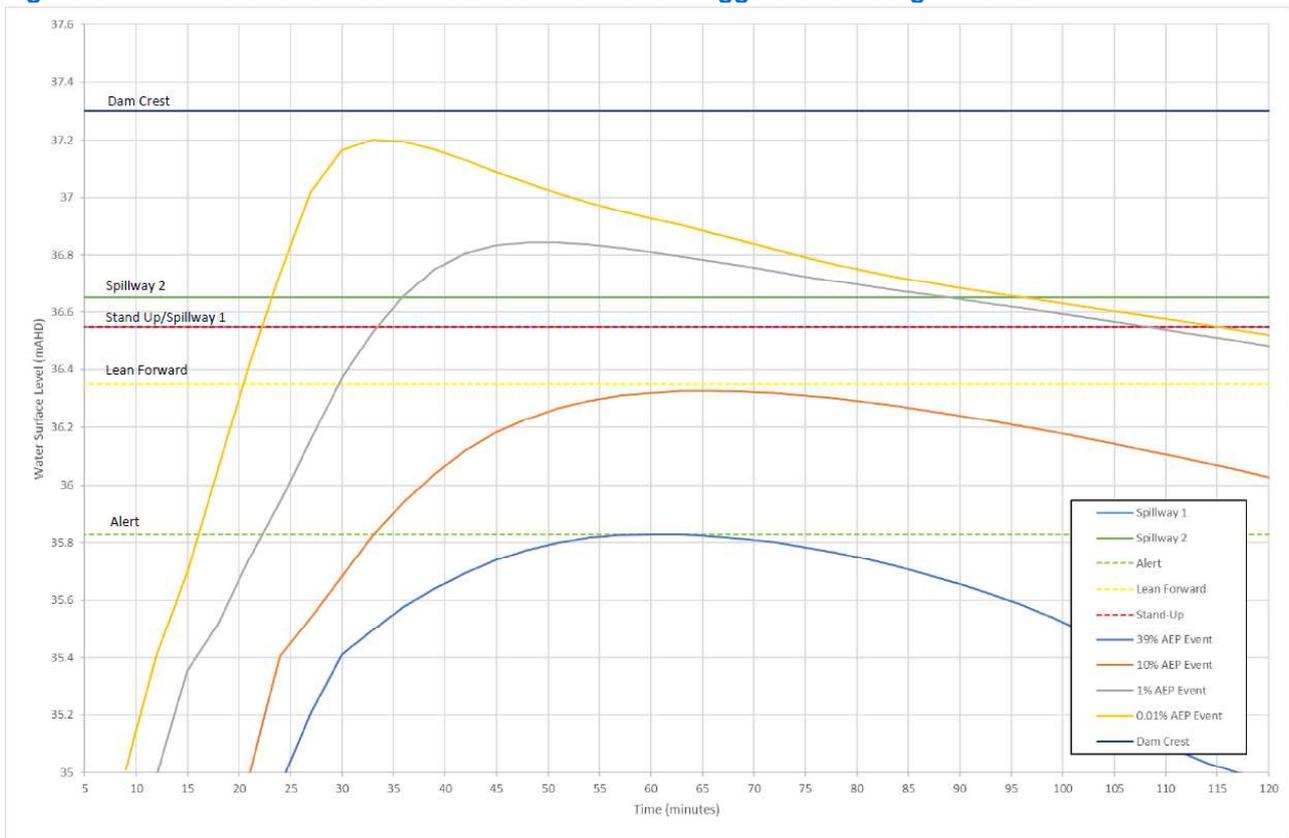
6.2.1 Notifications

The Ipswich City Council website includes a dedicated page to encourage members of the community to be prepared for disasters. The page can be accessed at https://www.ipswich.qld.gov.au/services/emergency_management. In the absence of other reasons for triggering EAP Alert levels, the nominated water level triggers are given in Table 6-2. These levels are shown graphically in Figure 6-1, with comparison to the spillway elevations, crest elevation, and the design event water level versus time series.

Table 6-2 Alert Level Basin Water Surface Level Triggers

Alert Level	Detention Basin Water Level (m AHD)
EAP Alert	35.83
EAP Lean Forward	36.25 (200 mm to Spillway 1)
EAP Stand-Up	36.55 (Spillway 1)
EAP Stand-Down	36.00

Figure 6-1 Alert Level Basin Water Surface Level Triggers and Design Events



6.2.2 Warnings

In an Emergency Event, notifications to the PAR are distributed via the following means:

- National Emergency Alert (EA) system in accordance with the Queensland Emergency Alert Guidelines Version 2.0, with messages formatted per the requirements of the Australian Warning System (AWS).
- Other channels deemed appropriate at the time including, but not limited to social media and websites,

6.2.2.1 National Emergency Alert Warning System

Emergency Alert is the national telephone warning system used by emergency services to send messages, primarily text messages to mobile phones in a defined area. EA is just one way of warning communities and will not be used in all circumstances. Emergency Alert relies on telecommunications networks to send messages, and message delivery cannot be guaranteed.

An EA polygon containing the PAR have been provided to the State Disaster Coordination Centre (SDCC), as shown in Appendix A. In an Emergency Event, the EA system will provide voice messages to landlines and text messages to mobile phones located within this polygon. The Dam Operator has access to the portal. The website to access the portal is prescribed below:

<https://sdccgfes.nogginoca.com/>.

In certain Emergency Events, the Dam Operator may be required to forward an Emergency Alert Request Form (EARF) to the SDCC [REDACTED]. Pre-filled copies of the EARF for the Emergency Events listed in are provided in Appendix B. The content of the distributed message is detailed in Table 6-5 and is consistent with the Australian Warning System (the full pre-prepared messages for distribution are included in Appendix B). To accompany the AWS messages, a guide on when each AWS message is issued is provided in Table 6-3.

Table 6-3 – Guidance as to when to Issue AWS Messages

Emergency Event	EAP Alert	EAP Lean Forward	EAP Stand Up	EAP Stand Down
Extreme Flood Event with Embankment Issues	E4 Advice	E1 Watch and Act	E2 Emergency Warning	E3 Advice
Extreme Flood Event without Embankment Issues	E4 Advice	-	E5 Watch and Act	E3 Advice
Earthquake	-	E1 Watch and Act (Only with rainfall)	E2 Emergency Warning (Only with rainfall)	E3 Advice
Terrorist Threat/Activity or High Energy Impact	-	E1 Watch and Act (Only with rainfall)	E2 Emergency Warning (Only with rainfall)	E3 Advice

6.2.3 Impacted Persons and Property

The applicable Population at Risk and their contact details are available in Appendix C.

6.3 Road Inundation and Road Closure

Table 6-4 lists streets within Ipswich Central which experience inundation resultant from flood conditions as demonstrated by the FIA (SMEC, 2017), irrespective of water depth. Note that failure and non-failure events result in the same roads being affected.

Table 6-4 – Road Closures for Different Flood Events

Flood Designation	Roads / Streets Inundated with Water
Major Flood Event (1% AEP Event)	<ul style="list-style-type: none"> • Barry Street • Bremer Street • Brisbane Street • Burley Griffin Drive • Chelmsford Avenue • Churchill Street • Darcy Doyle Place • Darling Street • East Street • Elizabeth Street • Ellenborough Street • Foote Lane • Garden Street • Goleby Avenue • Gordon Street • Gray Street • Griffith Road • Horan Street • King Edward Parade • Limestone Street • Marsden Parade • Martin Street • Mary Street • Merle Finimore Avenue • Milford Street • Mortimer Lane • Mortimer Street • Murphy Lane • Murphy Street • Nicholas Street • Olga Street • Pine Street • Pring Street • Queen Victoria Parade • Roderick Street • Roseberry Parade • South Street • Thorn Street • Waghorn Street • Warwick Road • West Street • Wharf Street • Wilson Lane
Extreme Flood Event (0.01% AEP Event)	All of the above listed roads plus the following additional streets/areas: <ul style="list-style-type: none"> • Burnett Street • Mansfield Place • Prasser Lane

Flooding of roads beyond the Ipswich Central can also be expected due to wider flooding that is likely to occur under the rainfall conditions being experienced throughout Ipswich.

Flood or dam failure releases from the Limestone Park Detention Basin are not expected to result in any flood impacts in the Bremer River downstream of the Ipswich Central.

6.4 Evacuation Routes / Evacuation Centre

The City of Ipswich evacuation centres will be established in accordance with the local disaster management plan. When considering evacuation routes, the following should be considered:

- Flooding along the overland flow path downstream from the Limestone Park Detention Basin may result in inundation of roads and streets in the Ipswich Central area making access to the Evacuation Centre difficult.
- In order to ensure that the population can safely access the evacuation centre at Ipswich it will be necessary to activate this EAP well in advance of any hazardous weather conditions developing and roads becoming impassable or closed.
- The weather conditions may make road conditions hazardous.
- Be aware that the weather conditions leading to activation of this EAP may also result in flooding of the Bremer River and its tributaries.
- The safest approach during a natural flood or dam emergency event may be to seek higher ground and avoid additional risks associated with evacuating such as attempting to drive through floodwaters, which is never recommended.

The LDMG has plans and locations of evacuation routes and centres that are for use across all hazards.

Table 6-5 Emergency Alert Emergency Event Notification Messages

Emergency Action Status	Contact	Voice Message Contents	Text Message Contents
EAP Lean Forward / AWS Message E1*	QFES (SDCC)	This is a Watch and Act message from Ipswich City Council. Flash flood conditions may occur, with possible failure of Limestone Park detention basin. Prepare to leave so you can go quickly if conditions worsen. Decide where you will go. Warn friends, family, and neighbours. Localities affected include parts of Ipswich Central from Griffith Road to King Edward Parade. For more information listen to a b c radio or visit w w w dot disaster dot Ipswich dot q l d dot gov dot a u.	Ipswich Council advises possible failure of Limestone Park detention basin likely soon. Prepare to leave. Warn Others. Visit www.ipswich.disaster.qld.gov.au
EAP Stand Up / AWS Message E2*	QFES (SDCC)	This is an Emergency Warning message from Ipswich City Council. Flash flood conditions likely, with potential failure of Limestone Park detention basin. Leave immediately or move to higher ground away from flash floodwater now. Localities affected include parts of Ipswich Central from Griffith Road to King Edward Parade. For more information listen to a b c radio or visit w w w dot disaster dot Ipswich dot q l d dot gov dot a u.	Ipswich Council advises possible failure of Limestone Park detention basin. Leave immediately. Move to higher ground. Visit www.ipswich.disaster.qld.gov.au .

**Please refer to Section 9 for Emergency Events and applicable triggers for distribution of messages.*

7 Roles and Responsibilities

7.1 Priority of Action

All actions taken, including dam structure damage control should align with the priorities of:

1. Protection of life;
2. Preservation of property; and,
3. Preservation of the environment.

7.2 Activation of the EAP

Activation of the EAP is the responsibility of the Dam Operator, as detailed in Section 7.3.

7.3 Schedule of Roles and Responsibilities

The agencies and personnel who have roles and responsibilities under this Emergency Action Plan routinely are listed in Table 7-1. The agencies and personnel roles and responsibilities during a dam emergency event are listed in Table 7-2.

Table 7-1 EAP Roles and Responsibilities - Routine

Agencies and Personnel	Responsibilities During Routine Conditions
Dam Owner's Delegate <i>General Manager Asset and Infrastructure Services (ICC)</i>	<ul style="list-style-type: none"> • Responsible for the management, budgeting, and appropriate governance of the Council's dam safety arrangements. • Accountable for the performance of the EAP. • Ensure the development and maintenance the EAP in accordance with the provisions of the <i>Water Supply (Safety and Reliability) Act 2008</i>. • Ensure the capability and capacity of personnel to respond to dam safety matters, inclusive of ensuring EAP training occurs. • Ensure dam safety risks are understood and adequate controls are in place. • Ensure effective liaison with the dam safety regulator and minister as required.
Manager Asset Services and Asset Manager	<ul style="list-style-type: none"> • Effectively implement the dam safety arrangements and responsibilities of the Dam Owner's delegate. • Ensure arrangements to actively monitor weather and conditions likely to lead to a dam safety event. • After a dam emergency event ensure the: <ul style="list-style-type: none"> ○ Facilitation of a lessons and opportunities process to improve EAP and Council processes. ○ Compilation of a historical record/brief of the dam emergency event ○ Submission of an emergency report to the dam safety regulator
Council Officer/Council Engineer (CO) <i>Asset Management Section</i>	<ul style="list-style-type: none"> • Regular monitoring and visual inspection of conditions at the basin with documentation and reporting (as required). • Inform DOP of any dam safety issues arising from inspections. • Own or have access to mobile device capable of video conferencing for situations where other staff are unable to access the dams. The device should remain on person at all times when on site. • Identify appropriate technical resources required in an emergency, potentially drawn from geotechnical, civil and environmental engineers (all RPEQ) and experienced construction personnel. Update annually as appropriate.

Agencies and Personnel	Responsibilities During Routine Conditions
State Disaster Coordination Centre (SDCC)	<ul style="list-style-type: none"> • Ensure that pre-prepared EA polygons have meet the system technical requirement and meet the relevant guidelines. • Ensure that EA polygons provided by the dam operator are stored and available for use.
Department of Regional Development, Manufacturing and Water (RDMW) (DDS)	<ul style="list-style-type: none"> • Review & approve EAP as required under legislation. • Liaise with chief executive as required in administering the act.
Ipswich City Council (Disaster & Emergency)	<ul style="list-style-type: none"> • Review the EAP in accordance with s352HB of the Act for consistency with the local disaster management plan. • Issue a notice of local government related to the outcome of the assessment within 30 business days
Ipswich Local Disaster Management Group (LDMG)	<ul style="list-style-type: none"> • Review and provide feedback on EAP relative to local disaster management plan. • Promote community education and messaged prepared by ICC in relation to the dam safety hazard and the EAP. • Participate in exercises related to the basin and its EAP.
Ipswich District Disaster Management Group (DDMG) (Ipswich and Somerset LGA's)	<ul style="list-style-type: none"> • Review and provide feedback on EAP relative to District Disaster Management Plan.

Table 7-2 EAP Roles and Responsibilities – During a Dam Emergency Event

Agencies and Personnel	Responsibilities During a Dam Emergency
Dam Operator (DO) <i>General Manager Asset and Infrastructure Services (ICC)</i>	<ul style="list-style-type: none"> • Ensure strategic oversight of the dam emergency event including effective and efficient EAP response activities. • Ensure the provision of appropriate resourcing, financial or nonfinancial for the dam emergency event. • Ensure effective liaison with the dam safety regulator and minister as required.
Dam Incident Controller (DIC) 1. <i>Asset Manager</i> 2. <i>Manager Asset Services</i> 3. <i>Manager Infrastructure Strategy</i>	<ul style="list-style-type: none"> • Provide operational leadership for the dam emergency event. • Responsible for making appropriate dam safety related decisions, based on advice from DDO and/or Consulting Engineer or suitably qualified professional. • Activate/deactivate the EAP, when necessary and assume command of the emergency on site and lead external communications. • Liaise with the LDMG as required (through Council Disaster & Emergency management or the Local Disaster Coordination Centre or the Local Disaster Coordinator) • Determine the threat and area of potential impact from the dam emergency event through establishment of visual inspection and instrument monitoring arrangements. • Coordinate all actions relating to the dam emergency event, including repair/remedial/make safe activities. • Establish and undertake emergency event situation reporting to key stakeholders • Ensuring appropriate resources and rosters are in place for the dam emergency event that mitigate fatigue risk.

Agencies and Personnel	Responsibilities During a Dam Emergency
	<ul style="list-style-type: none"> • Prepare, authorise, and execute communication, notification, alerts or warning are issued to the community and population at risk in accordance with the EAP. • Record communications, actions, notifications, and observations to contribute the emergency event report. • Undertake any other actions set out in the EAP or that are reasonable and proportionate, and aligned to the priorities of preservation of life
<p>Duty Dam Operator (DDO)</p> <p><i>Council Officers – Asset and Infrastructure Services, Works and Field Services</i></p>	<ul style="list-style-type: none"> • Provide all reasonable assistance to the Dam Incident Controller to achieve the effective and efficient operation of the EAP in a dam emergency event • Actively monitor weather and conditions likely to lead to a dam safety emergency • Undertake the specific actions nominated in the EAP which include but not limited to: <ul style="list-style-type: none"> ○ Analyse emergency event and provide expert technical advice to DIC. ○ Escalate any issue not covered in the EAP or where actions are not clear. ○ Lead site activities such as surveillance, maintenance and operations. ○ Perform immediate site inspections (if safe to do so). • Ensure DIC is kept informed of the condition of any threats, issues or any other unusual conditions. • Discuss emergency scenario with peers and other technical experts to make sound decisions to mitigate any apparent risk. • Respond to any emerging emergency event conditions and escalate as appropriate. • Record communications, actions, notifications, and observations to contribute the emergency event report
<p>State Disaster Coordination Centre (SDCC)</p>	<ul style="list-style-type: none"> • Issue of emergency alert messages upon request
<p>Department of Regional Development, Manufacturing and Water (RDMW) (DDS)</p>	<ul style="list-style-type: none"> • Provide regulatory input during a dam safety emergency. • Liaison with relevant Minister on necessary actions.
<p>Ipswich Local Disaster Management Group (LDMG)</p>	<ul style="list-style-type: none"> • Support and coordinate disaster operations within the Ipswich LGA. • Identify and coordinate the use of resources and support services that may be requested for an EAP event Identify and coordinate the use of resources as request • Based on the local disaster management plan <ul style="list-style-type: none"> ○ Initiate and coordinate evacuation and emergency sheltering ○ During a regional flooding event or upon negotiation at the time, take the lead in the issue of community warnings and emergency alerts based on the lc. • Identify and provide advice to the relevant DDMG about support services required by the LDMG to manage an EAP event.
<p>Ipswich District Disaster Management Group (DDMG)</p>	<ul style="list-style-type: none"> • Provide support to the LDMG in accordance with the district disaster management plan
<p>Queensland Police Service (QPS)</p>	<ul style="list-style-type: none"> • Manage the initial situation based on local operational procedures; including but not limited to: <ul style="list-style-type: none"> ○ Conduct emergency operations ○ Liaise with other first response organisations

Agencies and Personnel	Responsibilities During a Dam Emergency
	<ul style="list-style-type: none">○ Support evacuation of persons if required○ Control of essential traffic○ Security of specific areas.

7.4 Review and Training

7.4.1 Review

The EAP must be reviewed before 1 October annually and notice submitted to the dam safety regulator by completing the Annual Safety Statement (Appendix L, Emergency Action Plan Guidelines).

Updates resulting from the review are categorised as either substantial or non-substantial. Substantial changes include (dam structure, change of triggers, additional PAR, new AWS warnings, changes to inundation maps) and must follow the full approval process (estimated 90 days). Non-substantial changes include correction of minor errors and updates that do not result in a change of substance (contact or position details, clarity of words/explanations, improving maps etc). **For non-substantive changes, the local government(s) and DDMG(s) are not required to provide the dam owner with a notice.**

7.4.2 Training

All ICC dam safety operations personal including managers and key stakeholders will participate in training in accordance with the ICC Dam Safety Program Procedure.

7.4.3 Exercises

ICC will undertake at least one exercise annual across its dam safety portfolio and lessons and opportunities identified being incorporated into all ICC EAPs per the ICC Dam Safety Program Procedure.

Key stakeholders, including the LDMG and the dam safety regulator should be invited to all exercises. This is to meet the requirements of Section 5.1 of the EAP Guidelines (DRDMW, 2023).

8 Area Maps

8.1 Locality & Access

The locality of the Limestone Park Detention Basin is shown in Appendix A.

Local access to the detention basin embankment is via Griffith Road in a non-flood event, during a flood event this part of the embankment can be viewed from Quarry Street / Tennyson Street.

8.2 Emergency Evacuation Routes

8.2.1 Ipswich Flood Evacuation Centre

Evacuation centres and other emergency sheltering options will be established in accordance with the City of Ipswich LDMG priorities and the Local Disaster Management Plan.

The official evacuation centre is identified as:

- Ipswich Showgrounds – Parker Avenue, Ipswich.

Although this centre is mentioned within disaster plans, it may not necessarily be opened due to a range of operational and non-operational reasons. Hence the LDMG should be consulted at the time on the latest details on the evacuation centres.

8.2.2 Evacuation Routes

Flooding along the overland flow path downstream from the Limestone Park detention basin may result in inundation of roads and streets in the Ipswich Central area making access to the evacuation centre difficult. Weather conditions may also make road conditions hazardous, or also contribute to flooding of the Bremer River and its tributaries. The safest approach during a natural flood or dam emergency event may be to seek higher ground and avoid additional risks associated with evacuating such as attempting to drive through floodwaters, which is never recommended.

Inhabitants of properties downstream of the dams are recommended to proceed to their best evacuation centre. The potentially at-risk properties are shown within the PAR polygon in Appendix A of this EAP.

9 Emergency Events and Action List

9.1 Emergency Identification

The following events have been identified that define the triggers for initiation of the Emergency Action Plan and the associated areas likely to be affected.

- Section 9.3 - Extreme Flood with Embankment Issue.
- Section 9.4 - Extreme Flood without Embankment Issue.
- Section 9.5 – Earthquake.
- Section 9.6 – Terrorist Threat/Activity and/or High Energy Impact.

Following a dam emergency event, the Dam Operator may be required to complete:

- Limestone Park detention basin logbook (using all recorded information provided by DIC and DDO).
- Dam Safety Accident/Incident Report.
- An Emergency Event Report forwarded to the Director, Dam Safety within 30 business days of the close of the event.

9.2 Potential Embankment Issues

Potential safety issues that could develop at the Limestone Park Detention Basin are summarised in Table 9-1.

Table 9-1 Possible Embankment Issues

Possible Dam Safety Issues	Description / Characteristics	Emergency Issues
Blockage of the underground stormwater network or the inlet pit.	Complete or partial blockage of the active stormwater network leading from the basin or of the entry pit.	Reduced discharge capacity through the underground stormwater network. Increased rate of rise of the water level in the detention basin. Potential for discharges through the spillway or the embankment being overtopped.
Imminent overtopping of the basin embankment.	Basin is full and water is discharging through the spillway. Further rainfall or inflows to the basin likely. Potential for embankment crest to be overtopped.	Increased flow of water and further downstream inundation. Potential for erosion of the embankment to take place and develop into a breach.
Seepage Erosion or piping	Identification of seepage in the embankment or at the downstream toe of the embankment.	Potential for the seepage to develop into a piping failure.
Scour	Wave scour on upstream embankment	Loss of grass cover and erosion protection. Exposure of the embankment fill material and increased erosion taking place.
Scour	Scour around spillway or outlet structures. Potential for spillway scour protection and stilling basin to fail (designed to safely pass a 0.01% AEP event).	Loss of embankment fill and destabilisation of the structure.
Rapid increase or cloudy appearance of seepage	Development of a piping mechanism and movement of material out of the embankment.	Development of internal embankment erosion and a flow path through the embankment.

Possible Dam Safety Issues	Description / Characteristics	Emergency Issues
		Potential for the erosion to rapidly increase and the embankment to fail.
Inundation of toe of embankment	Saturation of the embankment fill at the toe of the embankment (upstream or downstream)	Potential for instability to develop in the embankment slopes, particularly as the downstream water level recedes.
Longitudinal cracks in embankment or crest (cracks parallel with crest alignment)	Straight or curved cracks in the embankment crest or the embankment slopes	Embankment instability leading to slip failures developing. Exposure of the embankment and further development of slips.
Transverse cracks in embankment or crest (cracks running across crest alignment)	Fissures or cracks in the embankment crest or the embankment slopes	Transverse cracks create an open water path through the embankment. Potential for further erosion to develop and lead to development of a breach.
Slips, slumps or settlement in the embankment or the embankment slopes	Depressions in the embankment crest. Depressions or bulges on the embankment slopes.	Embankment instability developing that could develop further including a breach of the embankment.
Erosion of the spillway concrete cap	Loss of concrete on the spillway cap.	Exposure of the embankment and potential for development of erosion.
Deterioration of the spillway grouted rock or damage to downstream stilling basin	Spillway flows damaging the grouted rock. Turbulence and high flow velocities wash rip rap out of spillway stilling basin.	Loss of spillway crest control structure leading to increased discharge rates and possible breach of embankment. Erosion of the downstream embankment and development of backward erosion in the area around the spillway.

9.3 Extreme Flood Event with Embankment Issues

Under this scenario, flood inflows into the Limestone Park Detention Basin have exceeded the discharge capacity of the underground stormwater network and the water level in the detention basin rises, reaching within 200 mm of the first stage spillway.

Under this situation, the detention basin is reducing the peak flow rate passing through to the Ipswich Central, but it is to be noted that:

- Inundation of roads within Ipswich Central is likely to occur during natural flooding events (not only failure events)
- Flooding of roads and properties will take place as water levels increase in the detention basin and basin outflows increase.

If the water levels in the detention basin are predicted to exceed the spillway crest level, there will be an increase in the rate of discharge from the detention basin and increased potential for downstream flooding to develop. Refer to the inundation maps (Appendix A) relating to events 1%, 0.02% and 0.01% AEP events.

If the water level in the detention basin is predicted to exceed the basin's embankment crest level (dam crest), the rate of discharge from the detention basin will increase and the potential for downstream flooding increases. If this occurs, there is a high likelihood of the detention basin embankment scouring and a breach of the embankment developing (a continuation of the dam safety event). Refer to the inundation maps (Appendix A) for the 0.01% AEP event.

Table 9-2 presents the Emergency Activation Triggers for an Extreme Flood Event with Embankment Issues.

Table 9-2 Extreme Flood Event Emergency Activation Triggers

Activation Level	Trigger Criteria with Embankment Issues
EAP Alert	<ul style="list-style-type: none"> ▪ High rainfall occurring or forecast in the order of 40 mm/h; AND/OR ▪ Water level in basin > 0.74 m / 35.83 m AHD; AND ▪ Further rainfall and/or inflows forecast.
EAP Lean Forward	<ul style="list-style-type: none"> ▪ Water level in basin > 1.26 m / 36.35 m AHD; AND/OR ▪ Dam safety/embankment issue as described in Table 9-1 identified with failure likely; AND ▪ Further rainfall and/or inflows forecast.
EAP Stand Up	<ul style="list-style-type: none"> ▪ Water level in basin > 1.46 m / 36.55 m AHD; AND/OR ▪ Dam safety/embankment issue as described in Table 9-1 identified with failure likely; AND ▪ Further rainfall and/or inflows forecast.
EAP Stand Down	<ul style="list-style-type: none"> ▪ Water level in basin < 0.91 m / 36.00 m AHD; AND ▪ Remedial works complete and risk of dam failure no longer imminent; AND ▪ No further rainfall or inflows forecast.

The rainfall trigger of 40 mm/h specified in Table 9-2 has been selected as it consistent with the rainfall intensity for a 39% AEP storm event on the Intensity Frequency Duration (IFD) curve for Ipswich Central. This magnitude is expected to cause the water level in the basin to rise to approximately 0.74 m. Storm events causing a similar volume of rainfall as 40 mm/h should also be used as a trigger, such as 80 mm in 2h, 20 mm in 30 minutes etc.

Emergency actions and roles for Extreme Flood Event Emergencies with Embankment Issues are defined in Table 9-3 to

Table 9-5. Figure 9-1 outlines the Extreme Flood Event emergency with Embankment Issues actions flow chart.

Figure 9-1– Extreme Flood Event Emergency Action Plan Flowchart with Embankment Issues

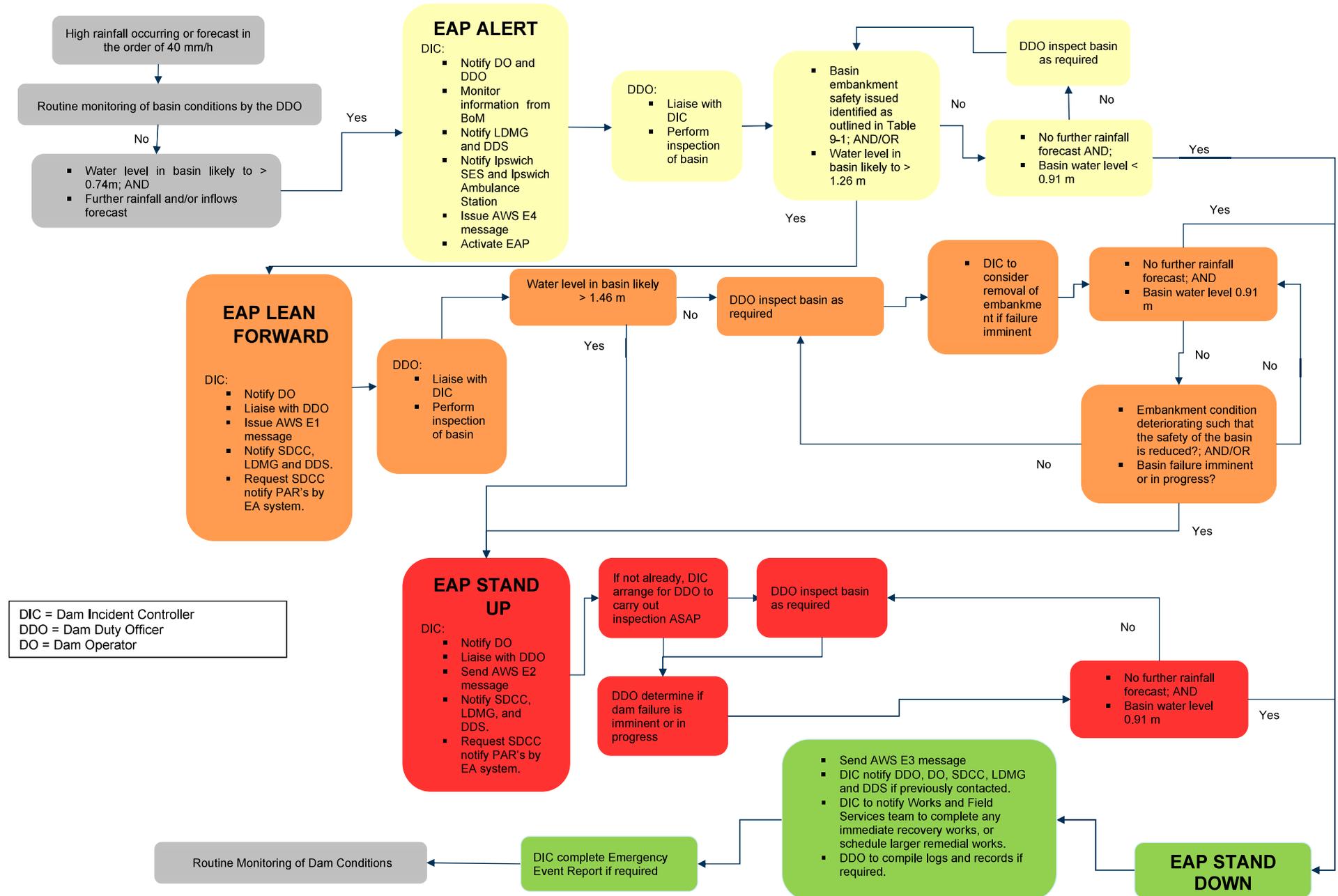


Table 9-3 Extreme Flood Event with Embankment Issues – DIC emergency action procedure

Activation Level:	EAP Alert	EAP Lean Forward	EAP Stand Up	EAP Stand Down
Trigger Criteria:	<ul style="list-style-type: none"> ▪ High rainfall occurring or forecast in the order of 40 mm/h; AND/OR ▪ Water level in basin likely to > 0.74m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Basin embankment safety issue identified as outlined in Table 9-1; AND/OR ▪ Water level in basin likely to > 1.26 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Basin embankment safety issue identified as outlined in Table 9-1; AND/OR ▪ Water level in basin likely to > 1.46 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Risk of basin failure no longer imminent; AND ▪ No further rainfall or inflows forecast; AND ▪ Basin water level 0.91 m.
Actions	<ul style="list-style-type: none"> ▪ Activate EAP ▪ Notify DO ▪ Notify and liaise with DDO to carry out inspection. ▪ Monitor information from BoM ▪ Notify LDMG and DDS. ▪ Notify Ipswich SES and Ipswich Ambulance Station. 	<ul style="list-style-type: none"> ▪ Notify SDCC, including request for emergency alert to PAR's EAP Lean Forward Activation Ref Appendix B. ▪ Prepare and send AWS E1 message. ▪ Notify LDMG ▪ Liaise with DDIO, DO, LDMG ▪ Contact BOM for updates ▪ Continue monitoring and inspections as required by DDO. 	<ul style="list-style-type: none"> ▪ Notify SDCC, including request for emergency alert to PAR's EAP Stand Up Activation Ref Appendix B. ▪ Prepare and send AWS E2 message. ▪ Notify LDMG, and DDS ▪ Liaise with DDO, LDMG re: evacuation requirements. ▪ Continue monitoring and inspections as required by DDO. 	<ul style="list-style-type: none"> ▪ Deactivate EAP ▪ Prepare and send AWS E3 message. ▪ Notify DDO, DO, SDCC, LDMG, DDS ▪ Complete EER and organise delivery to the Dam Safety Regulator if required. ▪ Return to routine activities. ▪ Notify Works and Field Services team to complete any immediate recovery works, or schedule larger remedial works.
Internal Notifications	<ul style="list-style-type: none"> ▪ DDO (Priority 1) ▪ DO (Priority 2) 	<ul style="list-style-type: none"> ▪ DDO (Priority 1) ▪ DO (Priority 2) 	<ul style="list-style-type: none"> ▪ DDO (Priority 1) ▪ DO (Priority 2) 	<ul style="list-style-type: none"> ▪ DDO (Priority 1) ▪ DO (Priority 2)
External Notifications	<ul style="list-style-type: none"> ▪ BOM (Priority 1) ▪ LDMG (Priority 2) ▪ DDS (Priority 3) 	<ul style="list-style-type: none"> ▪ SDCC (Priority 1) ▪ LDMG (Priority 2) ▪ BOM (Priority 2) ▪ DDS (Priority 3) 	<ul style="list-style-type: none"> ▪ SDCC (Priority 1) ▪ LDMG (Priority 2) ▪ BOM (Priority 2) ▪ DDS (Priority 3) 	<ul style="list-style-type: none"> ▪ SDCC (Priority 1) ▪ LDMG (Priority 2) ▪ DDS (Priority 3)

Table 9-4 Extreme Flood Event with Embankment Issues - DIC communication plan

Activation Level	Trigger for communications	Internal Contact	Method	External Contact	Method	Message content
EAP Alert	<ul style="list-style-type: none"> High rainfall occurring or forecast in the order of 40 mm/h; AND/OR Water level in basin likely to > 0.74 m; AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> DDO DO 	In person or by mobile			<ul style="list-style-type: none"> Notify DO Liaise with DDO as required
				<ul style="list-style-type: none"> BOM LDMG Ipswich SES Ipswich Ambulance Station. 	Phone	<ul style="list-style-type: none"> Describe emergency event (<i>Change in basin conditions due to significant rainfall</i>) Status of the event Recommended actions (<i>No further action required, standby for further updates</i>)
				<ul style="list-style-type: none"> Public via LDMG 	Phone & email	<ul style="list-style-type: none"> Prepare and send AWS E4 Flash Flood > Advice > Stay Informed
EAP Lean Forward	<ul style="list-style-type: none"> Basin embankment safety issue identified as outlined in Table 9-1; AND/OR Water level in basin likely to 1.26 m; AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> DDO DO 	In person or by mobile			<ul style="list-style-type: none"> Notify DO Liaise with DDO as required
				<ul style="list-style-type: none"> SDCC 	Phone & email	<ul style="list-style-type: none"> Describe emergency event (<i>Extreme flood event – embankment stability issues at basin</i>) Status of the event Recommended actions (<i>Prepare to send alert messages</i>). Complete pre-filled Emergency Alert Request Form (Appendix B) for EAP Lean Forward and email to SDCC for action.
				<ul style="list-style-type: none"> LDMG BOM DDS 	Phone & email	<ul style="list-style-type: none"> Describe emergency event (<i>Extreme flood event embankment stability issues at basin</i>) Status of the event.
				<ul style="list-style-type: none"> Public via LDMG 	Phone & email	<ul style="list-style-type: none"> Prepare and send AWS E1 Flash Flood > Watch and Act > Prepare to Leave
EAP Stand Up	<ul style="list-style-type: none"> Basin embankment safety issue identified as outlined in Table 9-1; AND/OR Water level in basin likely to > 1.46 m; AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> DDO DO 	In person or by mobile			<ul style="list-style-type: none"> Notify DO Liaise with DDO as required
				<ul style="list-style-type: none"> SDCC 	Phone & email	<ul style="list-style-type: none"> Complete pre-filled Emergency Alert Request Form (Appendix B) for EAP Stand Up and email to SDCC for action
				<ul style="list-style-type: none"> LDMG BOM DDS 	Phone & email	<ul style="list-style-type: none"> Describe emergency event (<i>Extreme Flood Event Failure</i>) Status of the event Advise of any known issues
		<ul style="list-style-type: none"> Public via LDMG 	Phone & email	<ul style="list-style-type: none"> Prepare and send AWS E2 Flash Flood > Emergency Warning > Leave Immediately 		

Activation Level	Trigger for communications	Internal Contact	Method	External Contact	Method	Message content
EAP Stand Down	<ul style="list-style-type: none"> ▪ Risk of basin failure no longer imminent; AND ▪ No further rainfall or inflows forecast; AND ▪ Basin water level < 0.91 m 	<ul style="list-style-type: none"> ▪ DDO ▪ DO 	In person or by mobile			<ul style="list-style-type: none"> ▪ Notify DO ▪ Liaise with DDO as required
				<ul style="list-style-type: none"> ▪ Public via LDMG 	Phone & email	<ul style="list-style-type: none"> ▪ Prepare and send AWS E3 Flash Flood > Advice > Return Safely
				<ul style="list-style-type: none"> ▪ SDCC 	Phone & Email	<ul style="list-style-type: none"> ▪ Describe emergency event (<i>Change in basin conditions due to Extreme Flood Event</i>) ▪ Status of the event (<i>Risk subsided</i>) ▪ Recommended actions (<i>Return to normal activities</i>).
				<ul style="list-style-type: none"> ▪ LDMG ▪ QPS 	Phone & Email	

Table 9-5 Extreme Flood Event with Embankment Issues - DDO emergency action procedure

Activation Level:	EAP Alert	EAP Lean Forward	EAP Stand Up	EAP Stand Down
Trigger Criteria:	<ul style="list-style-type: none"> ▪ High rainfall occurring or forecast in the order of 40 mm/h; AND/OR ▪ Water level in basin likely to > 0.74 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Basin embankment safety issue identified as outlined in Table 9-1; AND/OR ▪ Water level in basin likely to > 1.26 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Basin embankment safety issue identified as outlined in Table 9-1; AND/OR ▪ Water level in basin likely to > 1.46 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Risk of basin failure no longer imminent; AND ▪ No further rainfall or inflows forecast; AND ▪ Basin water level < 0.91 m.
Actions	<ul style="list-style-type: none"> ▪ Liaise with DIC ▪ Assist DIC with inspection and monitoring basin levels. 	<ul style="list-style-type: none"> ▪ Perform inspections of the basin to assess condition ASAP. ▪ Continue monitoring and inspections as required. ▪ Determine if embankment condition is impaired and if there is any immediate risk to the integrity basin embankment. ▪ Advise of any remedial works that required to improve condition of basin OR consider if removal of embankment is feasible. ▪ Monitor situation. ▪ Record all communications, findings and outcomes. 	<ul style="list-style-type: none"> ▪ If not already completed, perform inspections of the basin to assess condition ASAP. ▪ Determine if embankment failure is likely or in progress. ▪ Monitor situation. ▪ Record all communications, findings and outcomes. 	<ul style="list-style-type: none"> ▪ Compile logs and records if required. ▪ Return to routine activities.
Internal Notifications	<ul style="list-style-type: none"> ▪ DIC 	<ul style="list-style-type: none"> ▪ DIC 	<ul style="list-style-type: none"> ▪ DIC 	<ul style="list-style-type: none"> ▪ DIC
External Notifications	<ul style="list-style-type: none"> ▪ Nil 	<ul style="list-style-type: none"> ▪ External technical assistance as required 	<ul style="list-style-type: none"> ▪ External technical assistance as required 	<ul style="list-style-type: none"> ▪ External technical assistance as required

9.4 Extreme Flood Event without Embankment Issues

This scenario is similar to that of Extreme Flood Event with Embankment Issues (Section 9.3). However, in this scenario there are no issues identified that will affect the stability of the embankment, and the detention basin is considered as operating as intended.

Escalation of an emergency response will occur due to local flooding in the catchment as a result of the extreme flood event, rather than potential failure of the basin.

Table 9-6 presents the Emergency Activation Triggers for an Extreme Flood Event.

Table 9-6 Extreme Flood Event Emergency Activation Triggers

Activation Level	Trigger Criteria without Embankment Issues
EAP Alert	<ul style="list-style-type: none"> ▪ High rainfall occurring or forecast in the order of 40 mm/h; AND/OR ▪ Water level in basin > 0.74 m / 35.83 m AHD; AND ▪ Further rainfall and/or inflows forecast.
EAP Lean Forward	<ul style="list-style-type: none"> ▪ Water level in basin > 1.26 m / 36.35 m AHD; AND ▪ Further rainfall and/or inflows forecast.
EAP Stand Up	<ul style="list-style-type: none"> ▪ Water level in basin > 1.46 m / 36.55 m AHD; AND ▪ Further rainfall and/or inflows forecast.
EAP Stand Down	<ul style="list-style-type: none"> ▪ Water level in basin < 0.91 m / 36.00 m AHD; AND ▪ No further rainfall or inflows forecast.

The rainfall trigger of 40 mm/h specified in Table 9-2 has been selected as it consistent with the rainfall intensity for a 39% AEP storm event on the Intensity Frequency Duration (IFD) curve for Ipswich Central. This magnitude is expected to cause the water level in the basin to rise to approximately 0.74 m. Storm events causing a similar volume of rainfall as 40 mm/h should also be used as a trigger, such as 80 mm in 2h, 20 mm in 30 minutes etc.

Emergency actions and roles for Extreme Flood Event Emergencies without Embankment Issues are defined in Table 9-7 to Table 9-9. Figure 9-2 outlines the Extreme Flood Event emergency without Embankment Issues actions flow chart.

Figure 9-2 Extreme Flood Event Emergency Action Plan Flowchart without Embankment Issues

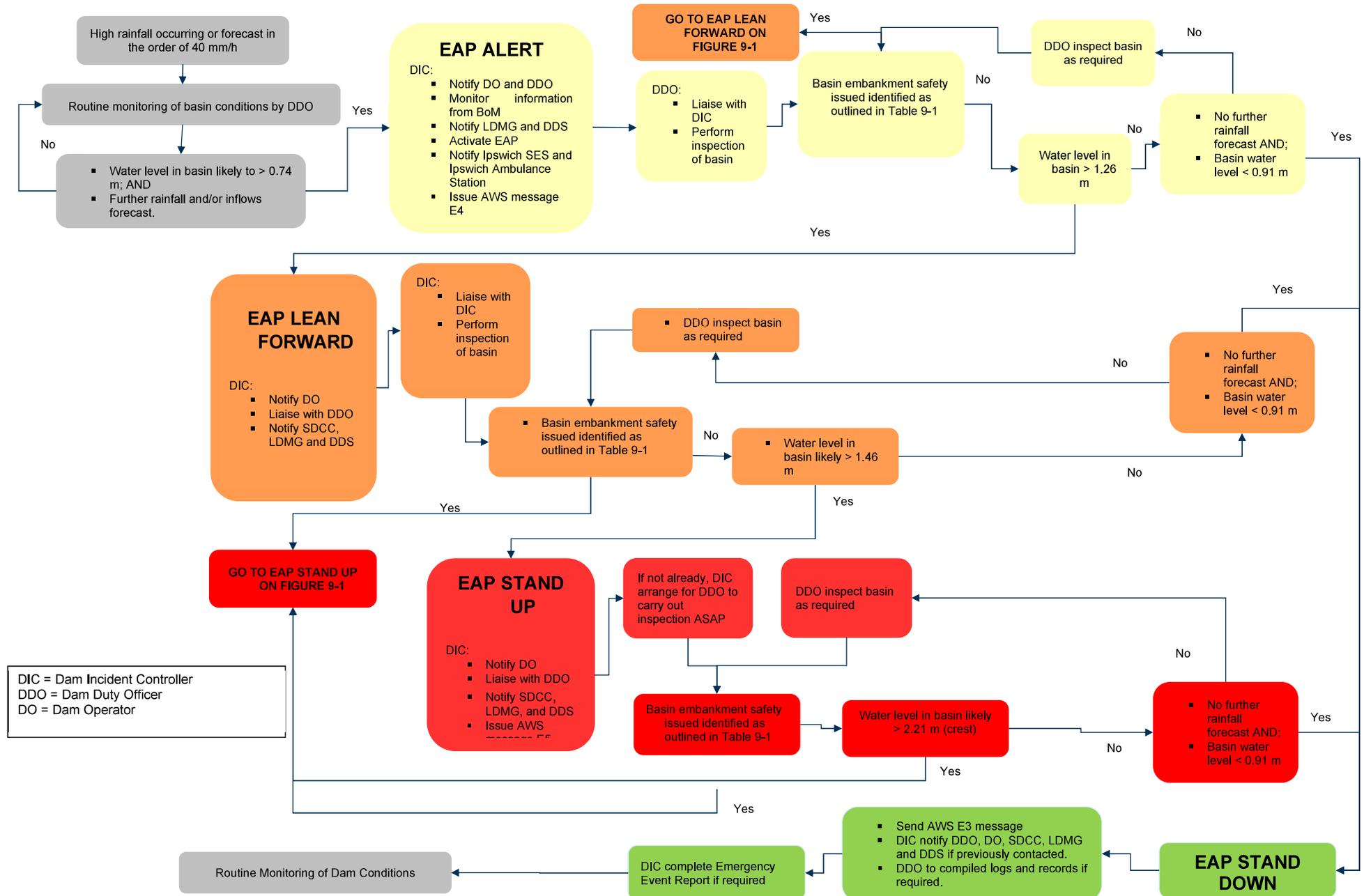


Table 9-7 Extreme Flood Event without Embankment Issues - DIC emergency action procedure

Activation Level:	EAP Alert	EAP Lean Forward	EAP Stand Up	EAP Stand Down
Trigger Criteria:	<ul style="list-style-type: none"> ▪ High rainfall occurring or forecast in the order of 40 mm/h; AND/OR ▪ Water level in basin likely to > 0.74 m AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Water level in basin likely to > 1.26 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Water level in basin likely to > 1.46 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ No further rainfall or inflows forecast; AND ▪ Basin water level < 0.91 m.
Actions	<ul style="list-style-type: none"> ▪ Activate EAP ▪ Notify DO ▪ Notify and liaise with DDO to carry out inspection. ▪ Prepare and send AWS E4 message. ▪ Monitor information from BoM ▪ Notify LDMG and DDS. ▪ Notify Ipswich SES and Ipswich Ambulance Station. 	<ul style="list-style-type: none"> ▪ Notify LDMG ▪ Liaise with DDO, DO, LDMG ▪ Contact BOM for updates ▪ Continue monitoring as required by DDO. 	<ul style="list-style-type: none"> ▪ Notify LDMG, QPS and DDS ▪ Liaise with DDO, LDMG. ▪ Prepare and send AWS E5 message. ▪ Continue monitoring as required by DDO. 	<ul style="list-style-type: none"> ▪ Deactivate EAP ▪ Notify DDO, DO, SDCC, LDMG, DDS. ▪ Prepare and send AWS E3 message. ▪ Complete EER and organise delivery to the Dam Safety Regulator if required. ▪ Return to routine activities.
Internal Notifications	<ul style="list-style-type: none"> ▪ DDO (Priority 1) ▪ DO (Priority 2) 	<ul style="list-style-type: none"> ▪ DDO (Priority 1) ▪ DO (Priority 2) 	<ul style="list-style-type: none"> ▪ DDO (Priority 1) ▪ DO (Priority 2) 	<ul style="list-style-type: none"> ▪ DDO (Priority 1) ▪ DO (Priority 2)
External Notifications	<ul style="list-style-type: none"> ▪ BOM (Priority 1) ▪ LDMG (Priority 2) ▪ DDS (Priority 3) 	<ul style="list-style-type: none"> ▪ LDMG (Priority 2) ▪ BOM (Priority 3) ▪ DDS (Priority 4) 	<ul style="list-style-type: none"> ▪ LDMG (Priority 2) ▪ BOM (Priority 3) ▪ DDS (Priority 4) 	<ul style="list-style-type: none"> ▪ LDMG (Priority 2) ▪ DDS (Priority 3)

Table 9-8 Extreme Flood Event without Embankment Issues - DIC communication plan

Activation Level	Trigger for communications	Internal Contact	Method	External Contact	Method	Message content	
EAP Alert	<ul style="list-style-type: none"> High rainfall occurring or forecast in the order of 40 mm/h; AND/OR Water level in basin likely to > 0.74 m; AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> DDO DO 	In person or by mobile		Phone	<ul style="list-style-type: none"> Notify DO Liaise with DDO as required 	
						<ul style="list-style-type: none"> BOM LDMG Notify Ipswich SES Ipswich Ambulance Station 	<ul style="list-style-type: none"> Describe emergency event (<i>Change in basin conditions due to significant rainfall</i>) Status of the event Recommended actions (<i>No further action required, standby for further updates</i>)
						<ul style="list-style-type: none"> Public via LDMG 	Phone & email
EAP Lean Forward	<ul style="list-style-type: none"> Water level in basin likely to > 1.26 m; AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> DDO DO 	In person or by mobile		Phone & email	<ul style="list-style-type: none"> Notify DO Liaise with DDO as required 	
						<ul style="list-style-type: none"> LDMG BOM DDS 	<ul style="list-style-type: none"> Describe emergency event (<i>Change in basin conditions due to significant rainfall</i>) Status of the event. Recommended actions (<i>No further action required, standby for further updates</i>)
EAP Stand Up	<ul style="list-style-type: none"> Water level in basin likely to > 1.46 m; AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> DDO DO 	In person or by mobile		Phone & email	<ul style="list-style-type: none"> Notify DO Liaise with DDO as required 	
						<ul style="list-style-type: none"> LDMG BOM DDS 	<ul style="list-style-type: none"> Describe emergency event (<i>Change in basin conditions due to significant rainfall</i>) Status of the event Recommended actions (<i>No further action required, standby for further updates</i>)
						<ul style="list-style-type: none"> Public via LDMG 	Phone & email
EAP Stand Down	<ul style="list-style-type: none"> No further rainfall or inflows forecast; AND Basin water level < 0.91 m. 	<ul style="list-style-type: none"> DDO DO 	In person or by mobile		Phone & email	<ul style="list-style-type: none"> Notify DO Liaise with DDO as required 	
						<ul style="list-style-type: none"> Public via LDMG 	<ul style="list-style-type: none"> Prepare and send AWS E3 Flash Flood > Advice > Return Safely

Activation Level	Trigger for communications	Internal Contact Method	External Contact	Method	Message content
			<ul style="list-style-type: none"> ▪ LDMG ▪ DDS 	Phone & Email	<ul style="list-style-type: none"> ▪ Describe emergency event (<i>Change in basin conditions due to Extreme Flood Event</i>) ▪ Status of the event (<i>Risk subsided</i>) ▪ Recommended actions (<i>Return to normal activities</i>).

Table 9-9 Extreme Flood Event without Embankment Issues - DDO emergency action procedure

Activation Level:	EAP Alert	EAP Lean Forward	EAP Stand Up	EAP Stand Down
Trigger Criteria:	<ul style="list-style-type: none"> ▪ High rainfall occurring or forecast in the order of 40 mm/h; AND/OR ▪ Water level in basin likely to > 0.74 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Water level in basin likely to > 1.26 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Water level in basin likely to > 1.46 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ No further rainfall or inflows forecast; AND ▪ Basin water level < 0.91 m.
Actions	<ul style="list-style-type: none"> ▪ Liaise with DIC ▪ Assist DIC with inspection and monitoring basin levels. 	<ul style="list-style-type: none"> ▪ Perform inspections of the basin to assess condition ASAP. ▪ Continue monitoring and inspections as required. ▪ Determine if embankment condition is impaired and if there is any immediate risk to the integrity basin embankment. ▪ Monitor situation. ▪ Record all communications, findings and outcomes. 	<ul style="list-style-type: none"> ▪ If not already completed, perform inspections of the basin to assess condition ASAP. ▪ Determine if embankment condition is impaired and if there is any immediate risk to the integrity basin embankment. ▪ Monitor situation. ▪ Record all communications, findings and outcomes. 	<ul style="list-style-type: none"> ▪ Compile logs and records if required. ▪ Return to routine activities.
Internal Notifications	<ul style="list-style-type: none"> ▪ DIC 	<ul style="list-style-type: none"> ▪ DIC 	<ul style="list-style-type: none"> ▪ DIC 	<ul style="list-style-type: none"> ▪ DIC
External Notifications	<ul style="list-style-type: none"> ▪ Nil 	<ul style="list-style-type: none"> ▪ External technical assistance as required 	<ul style="list-style-type: none"> ▪ External technical assistance as required 	<ul style="list-style-type: none"> ▪ External technical assistance as required

9.5 Earthquake

The Earthquake Emergency Action occurs when a potential basin failure is caused due to the effects of an earthquake event damaging the basin embankment. Damage will likely occur in the range of conditions described in Table 9-1. The basin is required to be inspected and report issued if an earthquake is felt nearby the basin.

A qualitative description of the disruptive or destructive effects of earthquakes is provided by the Modified Mercalli Scale described in Table 9-10. Note there is no direct relationship between the Modified Mercalli Scale and Richter Magnitude, the latter does not take into account the distance from the earthquake epicentre.

Table 9-10 Modified Mercalli Scale

Intensity	Description
1 Not Felt	Not felt except by very few under especially favourable conditions
2 Weak	Felt only by a few people at rest, especially on upper floors of buildings
3 Weak	Felt quite noticeably by people indoors, especially on upper floors of buildings: Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations are similar to the passing of a truck, with duration estimated
4 Light	Felt indoors by many, outdoors by few during the day: At night, some are awakened. Dishes, windows, and doors are disturbed; walls make cracking sounds. Sensations are like a heavy truck striking a building. Standing motor cars are rocked noticeably
5 Moderate	Felt by nearly everyone; many awakened: Some dishes and windows are broken. Unstable objects are overturned. Pendulum clocks may stop.
6 Strong	Felt by all, and many are frightened. Some heavy furniture is moved; a few instances of fallen plaster occur. Damage is slight.
7 Very Strong	Damage is negligible in buildings of good design and construction; but slight to moderate in well-built ordinary structures; damage is considerable in poorly built or badly designed structures; some chimneys are broken.
8 Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned
9 Violent	Damage is considerable in specially designed structures; well-designed frame structures are thrown out of plumb. Damage is great in substantial buildings, with partial collapse. Buildings are shifted off foundations. Liquefaction occurs
10 Extreme	Some well-built wooden structures are destroyed; most masonry and frame structures are destroyed with foundations. Rails are bent
11 Catastrophe	Few, if any, (masonry) structures remain standing. Bridges are destroyed. Broad fissures erupt in the ground. Underground pipelines are rendered completely out of service. Earth slumps and land slips in soft ground. Rails are bent greatly
12 Enormous Catastrophe	Damage is total. Waves are seen on ground surfaces. Lines of sight and level are distorted. Objects are thrown upward into the air.

In the event of an earthquake greater than Intensity 5 being felt, the DIC should monitor notifications from Geoscience Australia, which are reported in Richter Magnitude and location of the earthquake.

Emergency actions and roles for Earthquake Event Emergencies are defined in Table 9-11 to Table 9-13. Figure 9-3 provides a flow chart of actions.

If there has been damage to the embankment, but there is no rainfall event predicted, the EAP will not be activated as the Limestone Park Detention Basin is a dry detention basin, and does not hold water continuously.

Figure 9-3 Earthquake Event Emergency Action Plan Flowchart

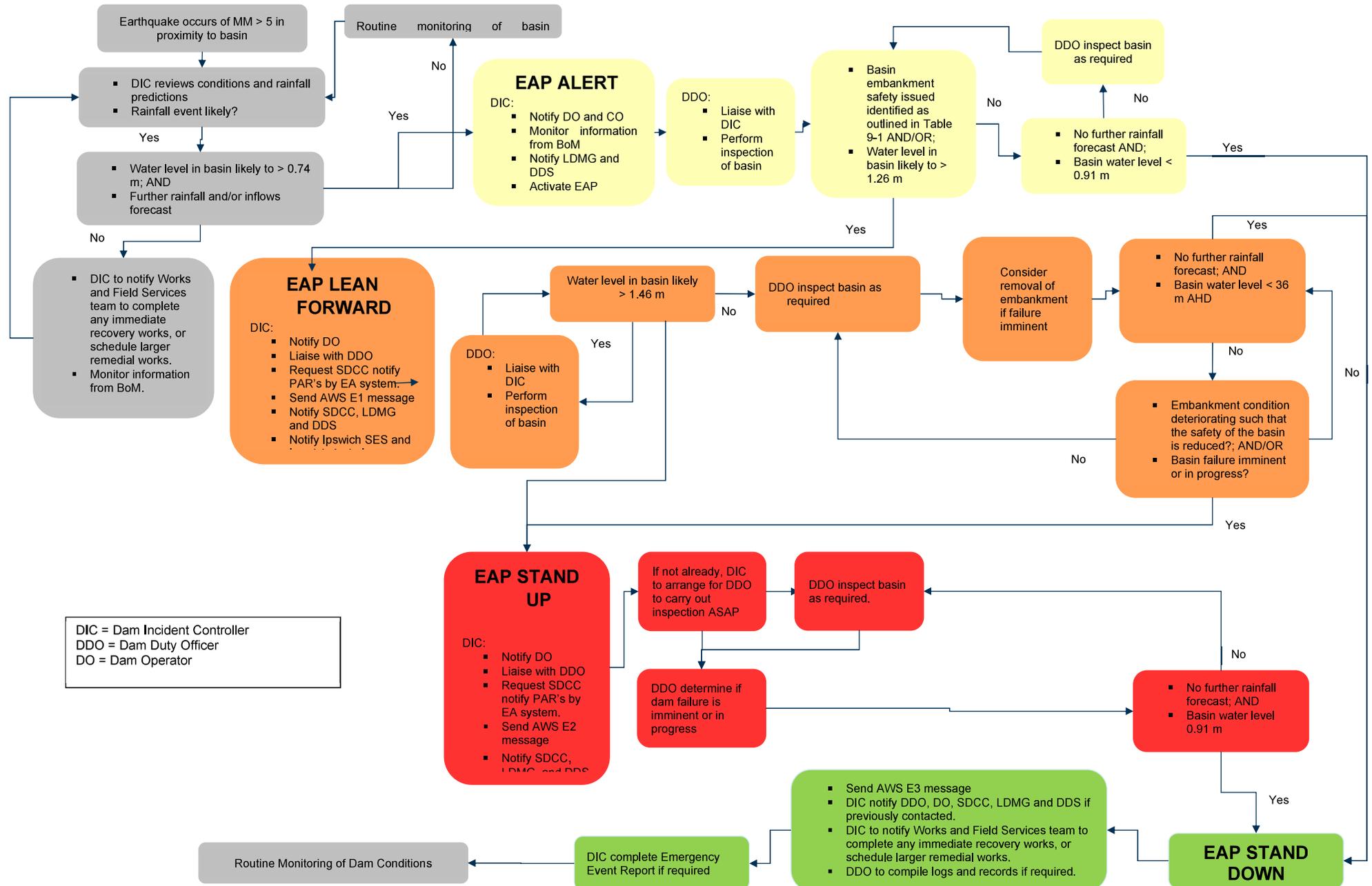


Table 9-11 Earthquake Event - DIC emergency action procedure

Activation Level:	EAP Alert	EAP Lean Forward	EAP Stand Up	EAP Stand Down
Trigger Criteria:	<ul style="list-style-type: none"> ▪ Earthquake intensity 5 or greater reported or felt in area; AND ▪ High rainfall occurring or forecast in the order of 40 mm/h; AND/OR ▪ Water level in basin > 0.74 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Earthquake intensity 5 or greater reported or felt in area; AND ▪ Visual inspection of the dam yields evidence of any damage as described in Table 9-1; AND ▪ Water level in basin > 1.26 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Earthquake intensity 5 or greater reported or felt in area; AND ▪ Water level in basin likely > 1.46 m 	<ul style="list-style-type: none"> ▪ Risk of basin failure no longer imminent; AND ▪ No further rainfall or inflows forecast; AND ▪ Basin water level < 0.91 m.
Actions:	<ul style="list-style-type: none"> ▪ Activate EAP ▪ Notify DO and DDO of observed embankment conditions. ▪ If safe to do so, instruct DDO to inspect affected area of embankment, watch for any signs of damage progressing and photograph/video the affected area(s). 	<ul style="list-style-type: none"> ▪ Notify SDCC, LDMG, DDS. ▪ Notify SDCC, including request for emergency alert to PAR's EAP Lean Forward Activation Ref Appendix B. ▪ Prepare and send AWS E1 message. ▪ Notify Ipswich SES and Ipswich Ambulance Station ▪ Liaise with DDO, LDMG ▪ Continue monitoring and inspections to as required by DDO. 	<ul style="list-style-type: none"> ▪ Notify SDCC including request for emergency alert PAR's EAP Stand Up Activation Ref Appendix B. ▪ Prepare and send AWS E2 message. ▪ Notify LDMG and DDS ▪ Liaise with DDO, LDMG re: evacuation requirements. 	<ul style="list-style-type: none"> ▪ Deactivate the EAP. ▪ Prepare and send AWS E3 message. ▪ Complete EER and organise delivery to the Dam Safety Regulator if required. ▪ Notify Works and Field Services team to complete any immediate recovery works, or schedule larger remedial works. ▪ Return to routine activities.
Internal Notifications	<ul style="list-style-type: none"> ▪ DDO (Priority 1) ▪ DO (Priority 2) 	<ul style="list-style-type: none"> ▪ DDO (Priority 1) ▪ DO (Priority 2) 	<ul style="list-style-type: none"> ▪ DDO (Priority 1) ▪ DO (Priority 2) 	<ul style="list-style-type: none"> ▪ DDO (Priority 1) ▪ DO (Priority 2)
External Notifications	<ul style="list-style-type: none"> ▪ LDMG 	<ul style="list-style-type: none"> ▪ SDCC (Priority 1) ▪ LDMG (Priority 2) ▪ DDS (Priority 3) 	<ul style="list-style-type: none"> ▪ SDCC (Priority 1) ▪ LDMG (Priority 1) ▪ DDS (Priority 2) 	<ul style="list-style-type: none"> ▪ SDCC (Priority 1) ▪ LDMG (Priority 1) ▪ DDS (Priority 2)

Table 9-12 Earthquake Event - DIC communication plan

Activation Level	Trigger for communications	Internal Contact	Method	External Contact	Method	Message content
EAP Alert	<ul style="list-style-type: none"> Earthquake intensity 5 or greater reported or felt in area; AND High rainfall occurring or forecast in the order of 40 mm/h; AND/OR Water level in basin > 0.74 m; AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> DDO DO 	In person or by mobile			<ul style="list-style-type: none"> Notify DO Liaise with DDO as required
				<ul style="list-style-type: none"> LDMG 	Phone & email	<ul style="list-style-type: none"> Describe emergency event (<i>Change in basin conditions</i>) Status of the event Recommended actions (<i>No further action required, standby for further updates</i>)
EAP Lean Forward	<ul style="list-style-type: none"> Earthquake intensity 5 or greater reported or felt in area; AND Visual inspection of the dam yields evidence of any damage as described in Table 9-1; AND Water level in basin > 1.26 m; AND Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> DDO DO 	In person or by mobile			<ul style="list-style-type: none"> Notify DO Liaise with DDO as required
				<ul style="list-style-type: none"> SDCC 	Phone & email	<ul style="list-style-type: none"> Describe emergency event (<i>Earthquake event with extreme rainfall event – structural issues at basin</i>) Status of the event Advise of any known issues Request SDCC standby for further advice Complete pre-filled Emergency Alert Request Form (Appendix B) for EAP Lean Forward and email to SDCC for action
				<ul style="list-style-type: none"> LDMG DDS Notify Ipswich SES Ipswich Ambulance Station 	Phone & email	<ul style="list-style-type: none"> Describe emergency event (<i>Earthquake event – structural issues at basin</i>) Status of the event Advise of any known issues
EAP Stand Up	<ul style="list-style-type: none"> Earthquake intensity 5 or greater reported or felt in area; AND Water level in basin likely > 1.46 m 	<ul style="list-style-type: none"> DDO DO 	In person or by mobile			<ul style="list-style-type: none"> Notify DO Liaise with DDO as required
				<ul style="list-style-type: none"> SDCC 	Phone & email	<ul style="list-style-type: none"> Complete pre-filled Emergency Alert Request Form (Appendix B) for EAP Stand Up and email to SDCC for action
				<ul style="list-style-type: none"> LDMG DDS 	Phone & email	<ul style="list-style-type: none"> Describe emergency event (<i>Earthquake event with extreme rainfall event – structural issues at dam</i>) Status of the event Advise of any known issues
				<ul style="list-style-type: none"> Public via LDMG 	Phone & Email	<ul style="list-style-type: none"> Prepare and send AWS E1 Flash Flood > Watch and Act > Prepare to Leave

Activation Level	Trigger for communications	Internal Contact	Method	External Contact	Method	Message content
				<ul style="list-style-type: none"> Public LDMG 	via Phone & Email	<ul style="list-style-type: none"> Prepare and send AWS E2 Flash Flood > Emergency Warning > Leave Immediately
EAP Stand Down	<ul style="list-style-type: none"> Risk of basin failure no longer imminent; AND No further rainfall or inflows forecast; AND Basin water level < 0.91 m 	<ul style="list-style-type: none"> DDO DO 	In person or by mobile			<ul style="list-style-type: none"> Notify DO Liaise with DDO as required
				<ul style="list-style-type: none"> Public LDMG 	via Phone & Email	<ul style="list-style-type: none"> Prepare and send AWS E3 Flash Flood > Advice > Return Safely
				<ul style="list-style-type: none"> SDCC LDMG QPS DDS 	Phone & email	<ul style="list-style-type: none"> Describe emergency event (<i>Change in dam conditions</i>) Status of the event (<i>Risk subsided</i>) Recommended actions (<i>Return to normal activities</i>)

Table 9-13 Earthquake Event - DDO emergency action procedure

Activation Level:	EAP Alert	EAP Lean Forward	EAP Stand Up	EAP Stand Down
Trigger Criteria:	<ul style="list-style-type: none"> ▪ Earthquake intensity 5 or greater reported or felt in area; AND ▪ High rainfall occurring or forecast in the order of 40 mm/h; AND/OR ▪ Water level in basin > 0.74 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Earthquake intensity 5 or greater reported or felt in area; AND ▪ Visual inspection of the dam yields evidence of any damage as described in Table 9-1; AND ▪ Water level in basin > 1.26 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Earthquake intensity 5 or greater reported or felt in area; AND ▪ Water level in basin likely > 1.46 m 	<ul style="list-style-type: none"> ▪ Risk of basin failure no longer imminent; AND ▪ No further rainfall or inflows forecast; AND ▪ Basin water level < 0.91 m
Actions:	<ul style="list-style-type: none"> ▪ Perform inspection of the dams to assess their condition ASAP. ▪ Determine if embankment condition is impaired and if there is any immediate risk to the integrity dam structure. ▪ Advise of any remedial works that required to improve condition of dam ▪ Monitor situation. ▪ Record all communications, findings and outcomes. 	<ul style="list-style-type: none"> ▪ Perform inspection of basin as required. ▪ Determine if embankment condition is significantly impaired/deteriorating and if there is any immediate risk to the integrity dam structure. ▪ Monitor situation. ▪ Record all communications, findings and outcomes. 	<ul style="list-style-type: none"> ▪ Perform inspection of basin as required. ▪ Determine if dam failure is likely or in progress. ▪ Monitor situation. ▪ Record all communications, findings and outcomes. 	<ul style="list-style-type: none"> ▪ Compile logs and records if required. ▪ Return to routine activities.
Internal Notifications	<ul style="list-style-type: none"> ▪ DIC 	<ul style="list-style-type: none"> ▪ DIC 	<ul style="list-style-type: none"> ▪ DIC 	<ul style="list-style-type: none"> ▪ DIC
External Notifications	<ul style="list-style-type: none"> ▪ External technical assistance as required 	<ul style="list-style-type: none"> ▪ External technical assistance as required 	<ul style="list-style-type: none"> ▪ External technical assistance as required 	<ul style="list-style-type: none"> ▪ External technical assistance as required

9.6 Terrorist threat/activity or High Energy Impact Events

This emergency event includes situations in which the impact of a terrorist activity, plane, meteorite, or other high-energy item on or in close vicinity of the basin that could damage the basin embankment. Damage could potentially occur in the range of conditions described in Table 9-1. The detention basin would therefore be unable to operate as intended or its structural stability would be compromised.

Emergency actions and roles for Terrorist treaty/activity or High Energy Impact Events are defined in Table 9-14 to Table 9-16. Figure 9-4 provides a flow chart of actions.

If there has been damage to the embankment, but there is no rainfall event predicted, the EAP will not be activated as the Limestone Park Detention Basin is a dry detention basin, and does not hold water continuously.

Figure 9-4 Terrorist Threat/Activity or High Energy Impact Event Emergency Action Plan Flowchart

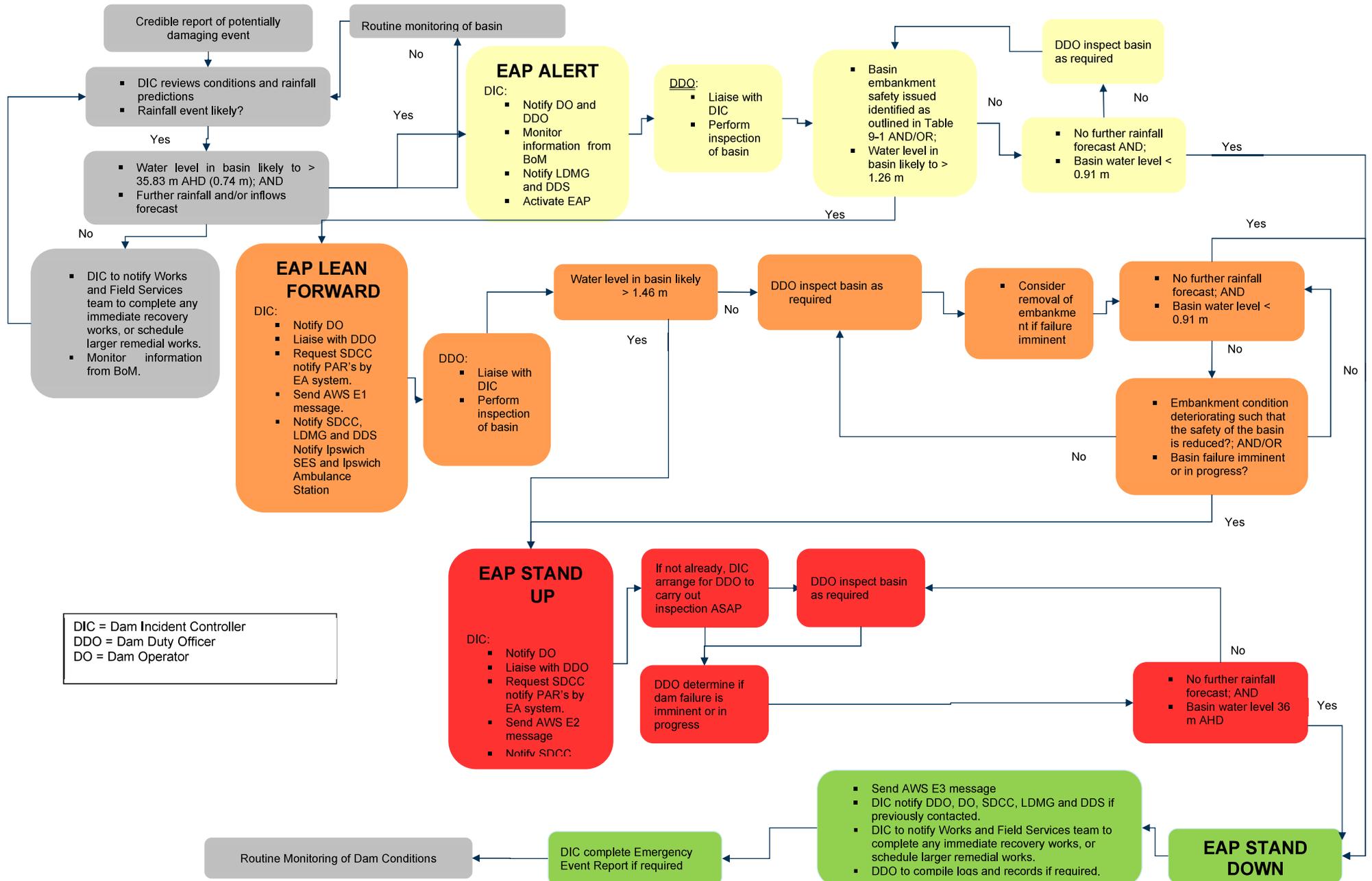


Table 9-14 Terrorist Threat/Activity or High Energy Impact Event - DIC emergency action procedure

Activation Level:	EAP Alert	EAP Lean Forward	EAP Stand Up	EAP Stand Down
Trigger Criteria:	<ul style="list-style-type: none"> ▪ Credible report of potentially damaging event; AND ▪ High rainfall occurring or forecast in the order of 40 mm/h; AND/OR ▪ Water level in basin > 0.74 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Credible report of potentially damaging event; AND ▪ Visual inspection of the dam yields evidence of any damage as described in Table 9-1; AND ▪ Water level in basin > 1.26 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Credible report of potentially damaging event; AND ▪ Water level in basin likely > 1.46 m 	<ul style="list-style-type: none"> ▪ Risk of basin failure no longer imminent; AND ▪ No further rainfall or inflows forecast; AND ▪ Basin water level < 0.91 m.
Actions:	<ul style="list-style-type: none"> ▪ Activate EAP ▪ Notify DO and DDO of observed embankment conditions. ▪ If safe to do so, instruct DDO to inspect affected area of embankment, watch for any signs of damage progressing and photograph/video the affected area(s). 	<ul style="list-style-type: none"> ▪ Notify SDCC, LDMG, DDS ▪ Notify SDCC, including request for emergency alert to PAR's EAP Lean Forward Activation Ref Appendix B. ▪ Prepare and send AWS E1 message. ▪ Notify Ipswich SES and Ipswich Ambulance Station ▪ Liaise with DDO, LDMG ▪ Continue monitoring of basin as required. ▪ 	<ul style="list-style-type: none"> ▪ Notify SDCC including request for emergency alert PAR's EAP Stand Up Activation Ref Appendix B. ▪ Send AWS E2 message. ▪ Notify LDMG, and DDS ▪ Liaise with DDO, LDMG re: evacuation requirements. 	<ul style="list-style-type: none"> ▪ Deactivate the EAP. ▪ Prepare and send AWS E3 message. ▪ Complete EER and organise delivery to the Dam Safety Regulator if required. ▪ Notify Works and Field Services team to complete any immediate recovery works, or schedule larger remedial works. ▪ Return to routine activities.
Internal Notifications	<ul style="list-style-type: none"> ▪ DDO (Priority 1) ▪ DO (Priority 2) 	<ul style="list-style-type: none"> ▪ DDO (Priority 1) ▪ DO (Priority 2) 	<ul style="list-style-type: none"> ▪ DDO (Priority 1) ▪ DO (Priority 2) 	<ul style="list-style-type: none"> ▪ DDO (Priority 1) ▪ DO (Priority 2)
External Notifications	<ul style="list-style-type: none"> ▪ LDMG 	<ul style="list-style-type: none"> ▪ SDCC (Priority 1) ▪ LDMG (Priority 2) ▪ DDS (Priority 3) 	<ul style="list-style-type: none"> ▪ SDCC (Priority 1) ▪ LDMG (Priority 1) ▪ DDS (Priority 2) 	<ul style="list-style-type: none"> ▪ SDCC (Priority 1) ▪ LDMG (Priority 1) ▪ DDS (Priority 2)

Table 9-15 Terrorist Threat/Activity or High Energy Impact Event - DIC communication plan

Activation Level	Trigger for communications	Internal Contact	Method	External Contact	Method	Message content
EAP Alert	<ul style="list-style-type: none"> ▪ Credible report of potentially damaging event; AND ▪ High rainfall occurring or forecast in the order of 40 mm/h; AND/OR ▪ Water level in basin > 0.74 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ DDO ▪ DO 	In person or by mobile			<ul style="list-style-type: none"> ▪ Notify DO ▪ Liaise with DDO as required
				<ul style="list-style-type: none"> ▪ LDMG 	Phone & email	<ul style="list-style-type: none"> ▪ Describe emergency event (<i>Change in dam conditions</i>) ▪ Status of the event ▪ Recommended actions (<i>No further action required, standby for further updates</i>)
EAP Lean Forward	<ul style="list-style-type: none"> ▪ report of potentially damaging event; AND ▪ Visual inspection of the dam yields evidence of any damage as described in Table 9-1; AND ▪ Water level in basin > 1.26 m; AND ▪ Further rainfall and/or inflows forecast. 			<ul style="list-style-type: none"> ▪ SDCC 	Phone & email	<ul style="list-style-type: none"> ▪ Describe emergency event (<i>Earthquake event – structural issues at dam</i>) ▪ Status of the event ▪ Advise of any known issues ▪ Request SDCC standby for further advice ▪ Complete pre-filled Emergency Alert Request Form (Appendix B) for EAP Lean Forward and email to SDCC for action
				<ul style="list-style-type: none"> ▪ LDMG ▪ DDS ▪ Ipswich SES ▪ Ipswich Ambulance Station 	Phone & email	<ul style="list-style-type: none"> ▪ Describe emergency event (<i>Earthquake event – structural issues at dam</i>) ▪ Status of the event ▪ Advise of any known issues
				<ul style="list-style-type: none"> ▪ Public via LDMG 	Phone & email	<ul style="list-style-type: none"> ▪ Prepare and send AWS E1 Flash Flood > Watch and Act > Prepare to Leave
EAP Stand Up	<ul style="list-style-type: none"> ▪ Credible report of potentially damaging event; AND ▪ Water level in basin likely > 1.46 m 			<ul style="list-style-type: none"> ▪ SDCC 	Phone & email	<ul style="list-style-type: none"> ▪ Complete pre-filled Emergency Alert Request Form (Appendix B) for EAP Stand Up and email to SDCC for action
				<ul style="list-style-type: none"> ▪ LDMG ▪ DDS 	Phone & email	<ul style="list-style-type: none"> ▪ Describe emergency event (<i>Potentially damaging event – structural issues at dam</i>) ▪ Status of the event ▪ Advise of any known issues
				<ul style="list-style-type: none"> ▪ Public via LDMG 	Phone & email	<ul style="list-style-type: none"> ▪ Prepare and send AWS E2 Flash Flood > Emergency Warning > Leave Immediately

Limestone Park Detention Basin
Emergency Action Plan

Activation Level	Trigger for communications	Internal Contact	Method	External Contact	Method	Message content
EAP Stand Down	<ul style="list-style-type: none"> ▪ Risk of basin failure no longer imminent; AND ▪ No further rainfall or inflows forecast; AND ▪ Basin water level < 0.91 m 	<ul style="list-style-type: none"> ▪ DDO ▪ DO 	In person or by mobile			<ul style="list-style-type: none"> ▪ Notify DO ▪ Liaise with DDO as required
				<ul style="list-style-type: none"> ▪ SDCC ▪ LDMG ▪ DDS 	Phone & email	<ul style="list-style-type: none"> ▪ Describe emergency event (<i>Change in dam conditions</i>) ▪ Status of the event (<i>Risk subsided</i>) ▪ Recommended actions (<i>Return to normal activities</i>)
				<ul style="list-style-type: none"> ▪ Public via LDMG 	Phone & email	<ul style="list-style-type: none"> ▪ Prepare and send AWS E3 Flash Flood > Advice > Return Safely

Table 9-16 Earthquake Event - DDO emergency action procedure

Activation Level:	EAP Alert	EAP Lean Forward	EAP Stand Up	EAP Stand Down
Trigger Criteria:	<ul style="list-style-type: none"> ▪ Credible report of potentially damaging event; AND ▪ High rainfall occurring or forecast in the order of 40 mm/h; AND/OR ▪ Water level in basin > 0.74 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Credible report of potentially damaging event; AND ▪ Visual inspection of the dam yields evidence of any damage as described in Table 9-1; AND ▪ Water level in basin > 1.26 m; AND ▪ Further rainfall and/or inflows forecast. 	<ul style="list-style-type: none"> ▪ Credible report of potentially damaging event; AND ▪ Water level in basin likely > 1.46 m 	<ul style="list-style-type: none"> ▪ Risk of basin failure no longer imminent; AND ▪ No further rainfall or inflows forecast; AND ▪ Basin water level < 0.91 m
Actions:	<ul style="list-style-type: none"> ▪ Perform inspection of the dams to assess their condition ASAP. ▪ Determine if embankment condition is impaired and if there is any immediate risk to the integrity dam structure. ▪ Advise of any remedial works that required to improve condition of dam ▪ Monitor situation. ▪ Record all communications, findings and outcomes. 	<ul style="list-style-type: none"> ▪ Perform inspection of basin as required. ▪ Determine if embankment condition is significantly impaired/deteriorating and if there is any immediate risk to the integrity dam structure. ▪ Monitor situation. ▪ Record all communications, findings and outcomes. 	<ul style="list-style-type: none"> ▪ Perform inspection of basin as required. ▪ Determine if dam failure is likely or in progress. ▪ Monitor situation. ▪ Record all communications, findings and outcomes. 	<ul style="list-style-type: none"> ▪ Compile logs and records if required. ▪ Return to routine activities.
Internal Notifications	<ul style="list-style-type: none"> ▪ 	DIC	<ul style="list-style-type: none"> ▪ DIC 	<ul style="list-style-type: none"> ▪ DIC
External Notifications	<ul style="list-style-type: none"> ▪ External technical assistance as required 	<ul style="list-style-type: none"> ▪ External technical assistance as required 	<ul style="list-style-type: none"> ▪ External technical assistance as required 	<ul style="list-style-type: none"> ▪ External technical assistance as required

Appendix A - Mapping

Map ID	Description
A1	Area Map and Polygon
A2	Catchment Map
A3	Nearby Gauging Stations
A4	1% AEP Depths – Non-Failure Event
A5	1% AEP Depths –Failure Event
A6	0.02% AEP Depths – Critical Failure Event
A7	0.01% AEP Depths – Non-Failure Event
A8	0.01% AEP Depths – Failure Event



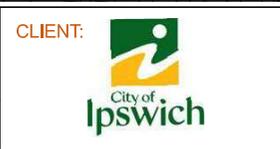
COORDINATE SYSTEM: MGA 94 Zone 56
 PAGE SIZE: A3 SCALE: 1:8000



REVISION: 01 STATUS: Draft SOURCES: Nearmap
 AUTHOR: S. Frisby DATE: 7/01/2019 FIGURE: A1

PROJECT NO: 30032326 PROJECT TITLE: Limestone Park Detention Basin EAP

FIGURE TITLE: Area Map and Alert Polygon





COORDINATE SYSTEM: MGA 94 Zone 56	0 100 200 300 m
PAGE SIZE: A3	SCALE: 1:8000
PROJECT NO: 30032326 PROJECT TITLE: Limestone Park Detention Basin EAP	

REVISION: 01	STATUS: Draft	SOURCES: Nearmap
AUTHOR: S. Frisby	DATE: 7/01/2019	FIGURE: A2
FIGURE TITLE: Catchment Map		

CLIENT: 


Member of the Surbana Jurong Group
SMC AUSTRALIA PTY LTD
ABN 47 065 475 149



Legend

- Limestone Park Detention Basin
- Gauging Stations

COORDINATE SYSTEM: MGA 94 Zone 56
 PAGE SIZE: A3 SCALE: 1:15000

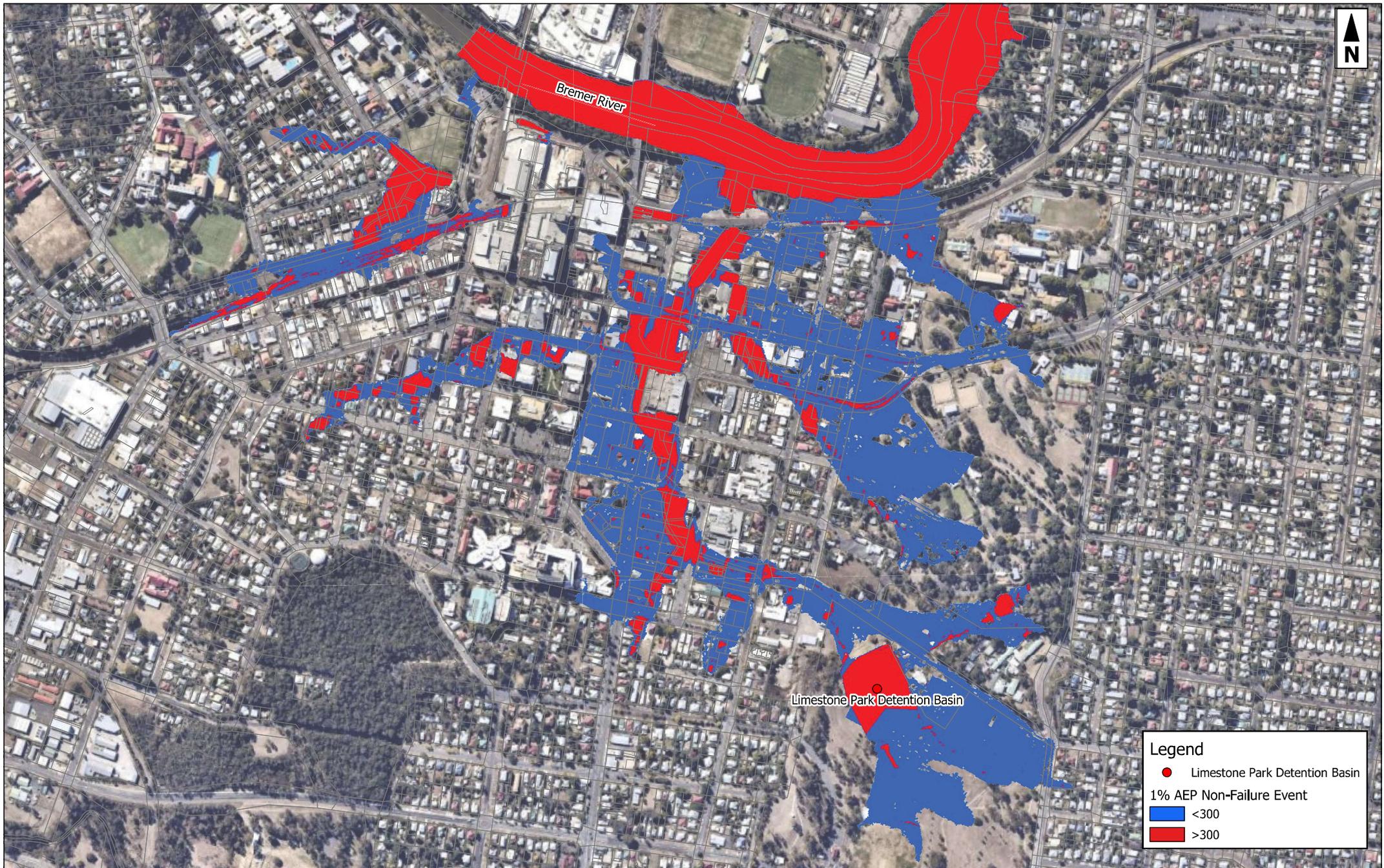
REVISION: 01 STATUS: Draft SOURCES: Nearmap
 AUTHOR: S. Frisby DATE: 7/01/2019 FIGURE: A3

CLIENT:

Member of the Surlana Jurong Group
 SMC AUSTRALIA PTY LTD
 ABN 47 065 475 149

PROJECT NO: 30032326 PROJECT TITLE: Limestone Park Detention Basin EAP

FIGURE TITLE: Nearby Gauging Stations



Legend

- Limestone Park Detention Basin
- 1% AEP Non-Failure Event
- <300
- >300

COORDINATE SYSTEM: MGA 94 Zone 56
 PAGE SIZE: A3 SCALE: 1:7000

0 100 200 300 m

REVISION: 01 STATUS: Draft SOURCES: Nearmap
 AUTHOR: S. Frisby DATE: 9/01/2019 FIGURE: A4

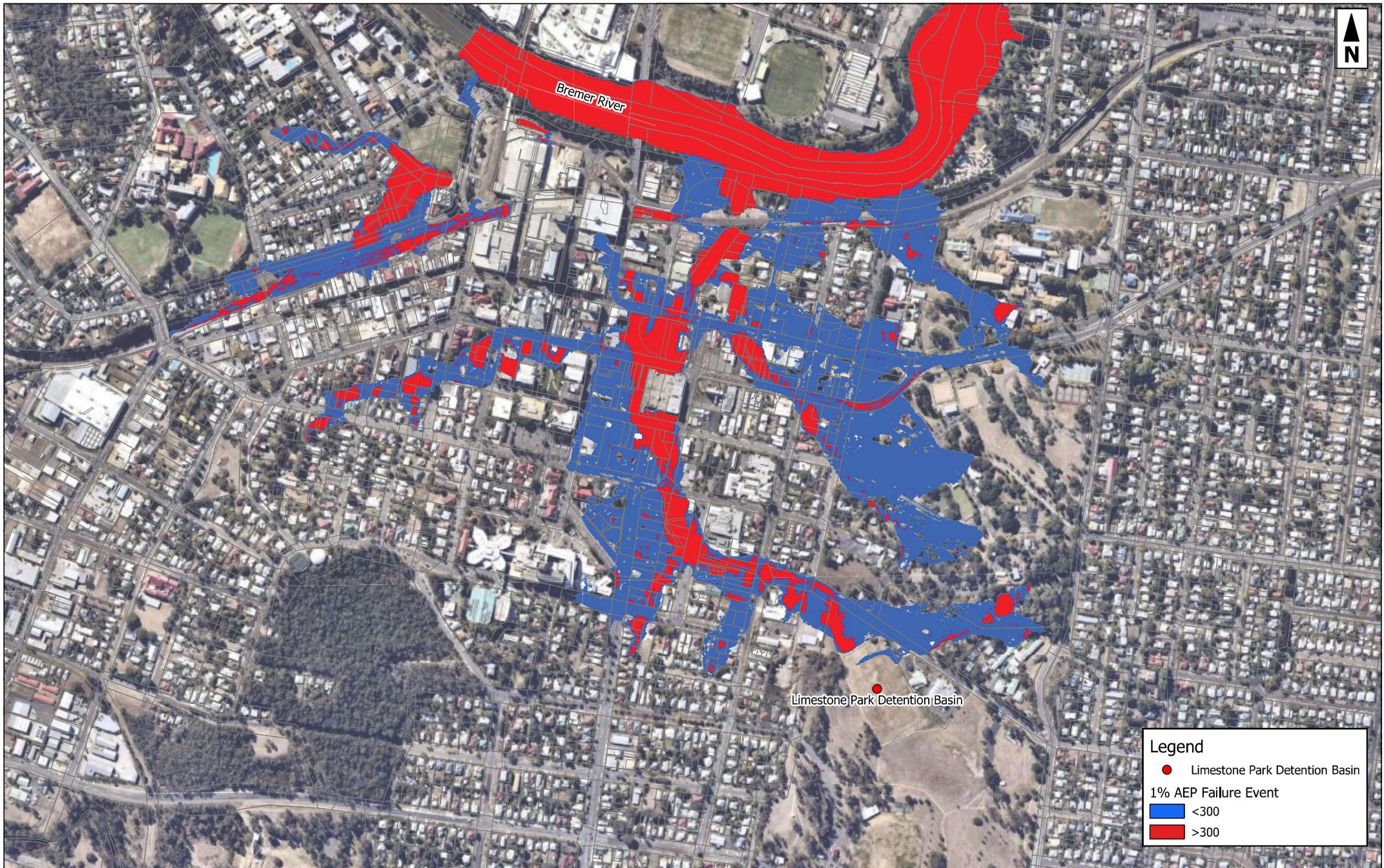
CLIENT:

Member of the Surbana Jurong Group

SMC AUSTRALIA PTY LTD
 ABN 47 065 475 149

PROJECT NO: 30032326 PROJECT TITLE: Limestone Park Detention Basin EAP

FIGURE TITLE: Non-failure Event - 1% AEP Depth Map



Legend

- Limestone Park Detention Basin
- 1% AEP Failure Event
 - <300
 - >300

COORDINATE SYSTEM: MGA 94 Zone 56
 PAGE SIZE: A3 SCALE: 1:7000

0 100 200 300 m

REVISION: 01 STATUS: Draft SOURCES: Nearmap
 AUTHOR: S. Frisby DATE: 9/01/2019 FIGURE: A5

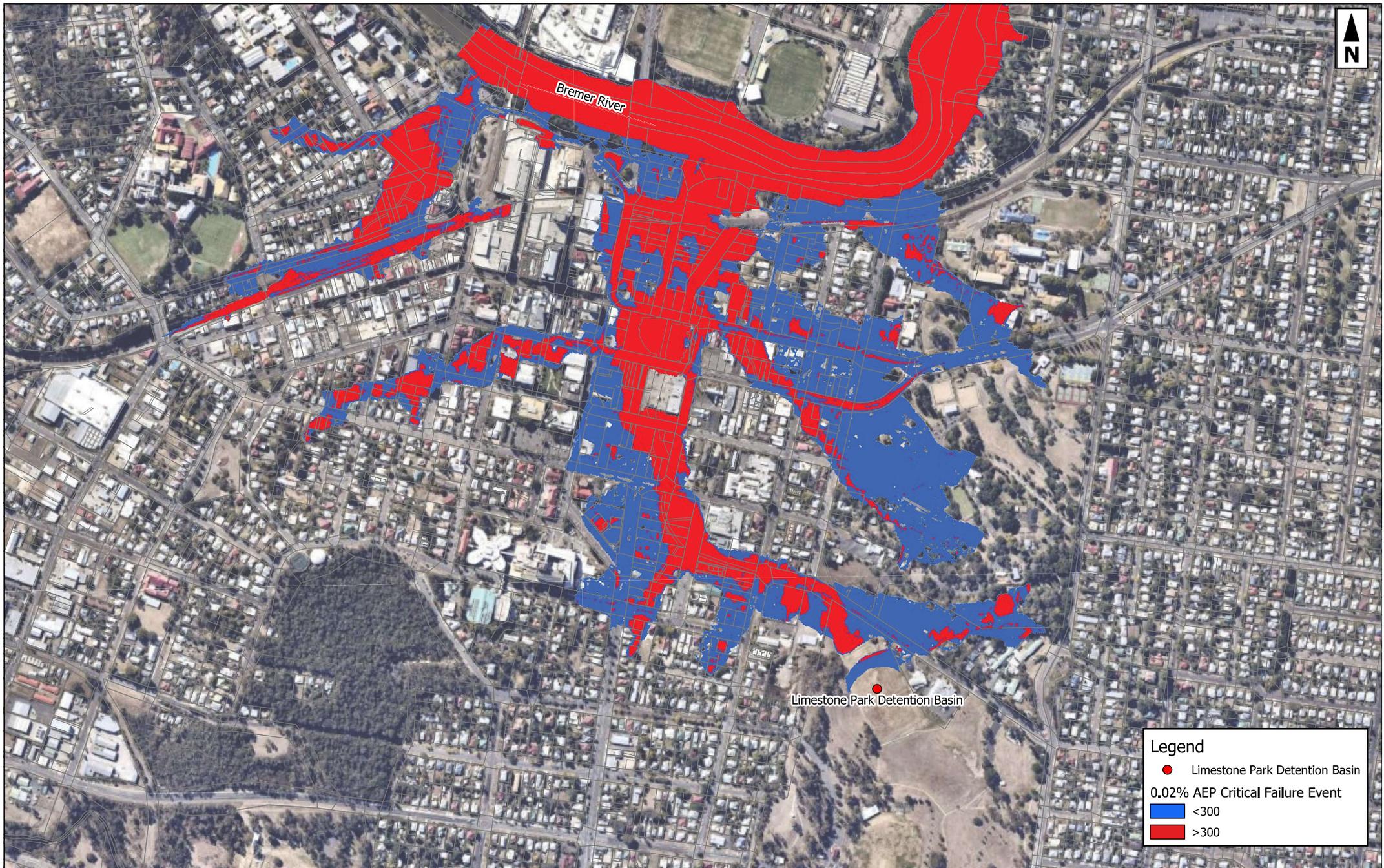
CLIENT:

Member of the Surbana Jurong Group

SMC AUSTRALIA PTY LTD
 ABN 47 065 475 149

PROJECT NO: 30032326 PROJECT TITLE: Limestone Park Detention Basin EAP

FIGURE TITLE: Failure Event - 1% AEP Depth Map



Legend

- Limestone Park Detention Basin

0.02% AEP Critical Failure Event

- <300
- >300

COORDINATE SYSTEM: MGA 94 Zone 56
PAGE SIZE: A3
SCALE: 1:7000

0 100 200 300 m

REVISION: 01
AUTHOR: S. Frisby

STATUS: Draft
DATE: 9/01/2019

SOURCES: Nearmap
FIGURE: A6

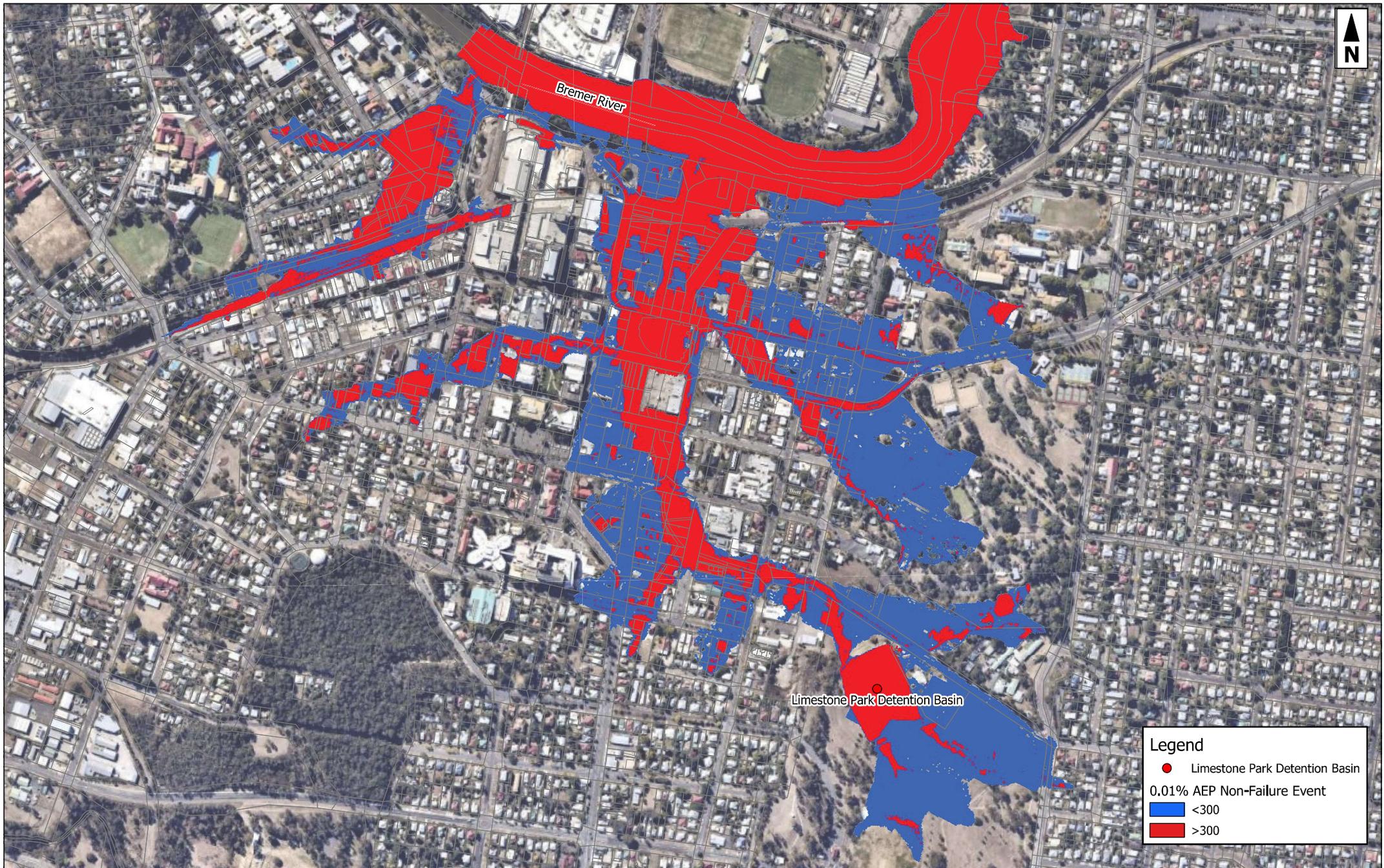
CLIENT:

Member of the Surbana Jurong Group

SMEC AUSTRALIA PTY LTD
 ABN 47 065 475 149

PROJECT NO: 30032326
PROJECT TITLE: Limestone Park Detention Basin EAP

FIGURE TITLE: Critical Failure Event - 0.02% AEP Depth Map



Legend

- Limestone Park Detention Basin
- 0.01% AEP Non-Failure Event
- <300
- >300

COORDINATE SYSTEM: MGA 94 Zone 56
 PAGE SIZE: A3 SCALE: 1:7000

0 100 200 300 m

REVISION: 01 STATUS: Draft SOURCES: Nearmap
 AUTHOR: S. Frisby DATE: 9/01/2019 FIGURE: A7

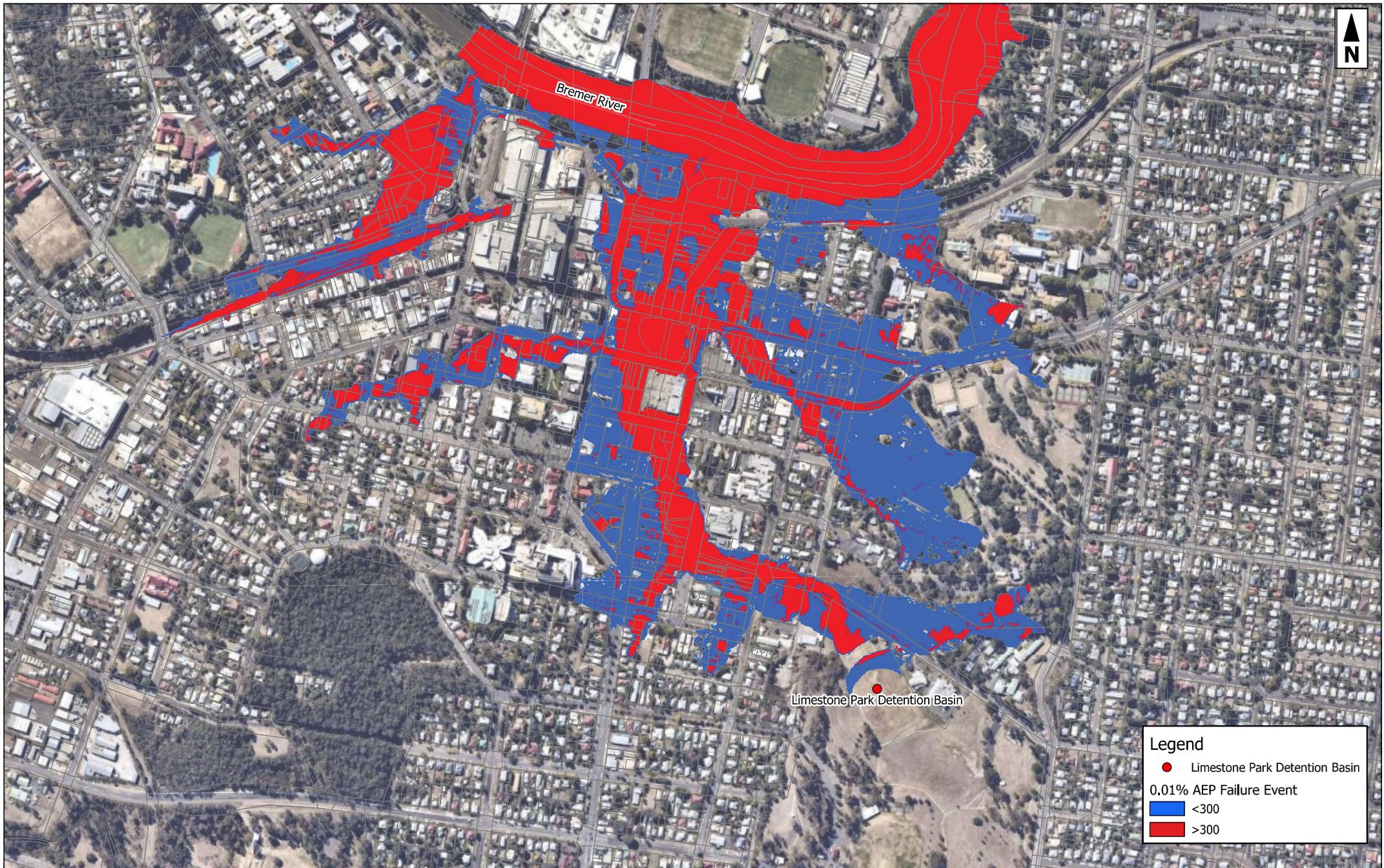
CLIENT:

Member of the Surbana Jurong Group

SMEC AUSTRALIA PTY LTD
 ABN 47 065 475 149

PROJECT NO: 30032326 PROJECT TITLE: Limestone Park Detention Basin EAP

FIGURE TITLE: Non-failure Event - 0.01% AEP Depth Map



COORDINATE SYSTEM: MGA 94 Zone 56
 PAGE SIZE: A3 SCALE: 1:7000

0 100 200 300 m

REVISION: 01 STATUS: Draft SOURCES: Nearmap
 AUTHOR: S. Frisby DATE: 9/01/2019 FIGURE: A8

CLIENT: 

 **SMC**
 Member of the Surbana Jurong Group
 SMEC AUSTRALIA PTY LTD
 ABN 47 065 475 149

PROJECT NO: 30032326 PROJECT TITLE: Limestone Park Detention Basin EAP

FIGURE TITLE: Failure Event - 0,01% AEP Depth Map

Appendix B – Supporting Information

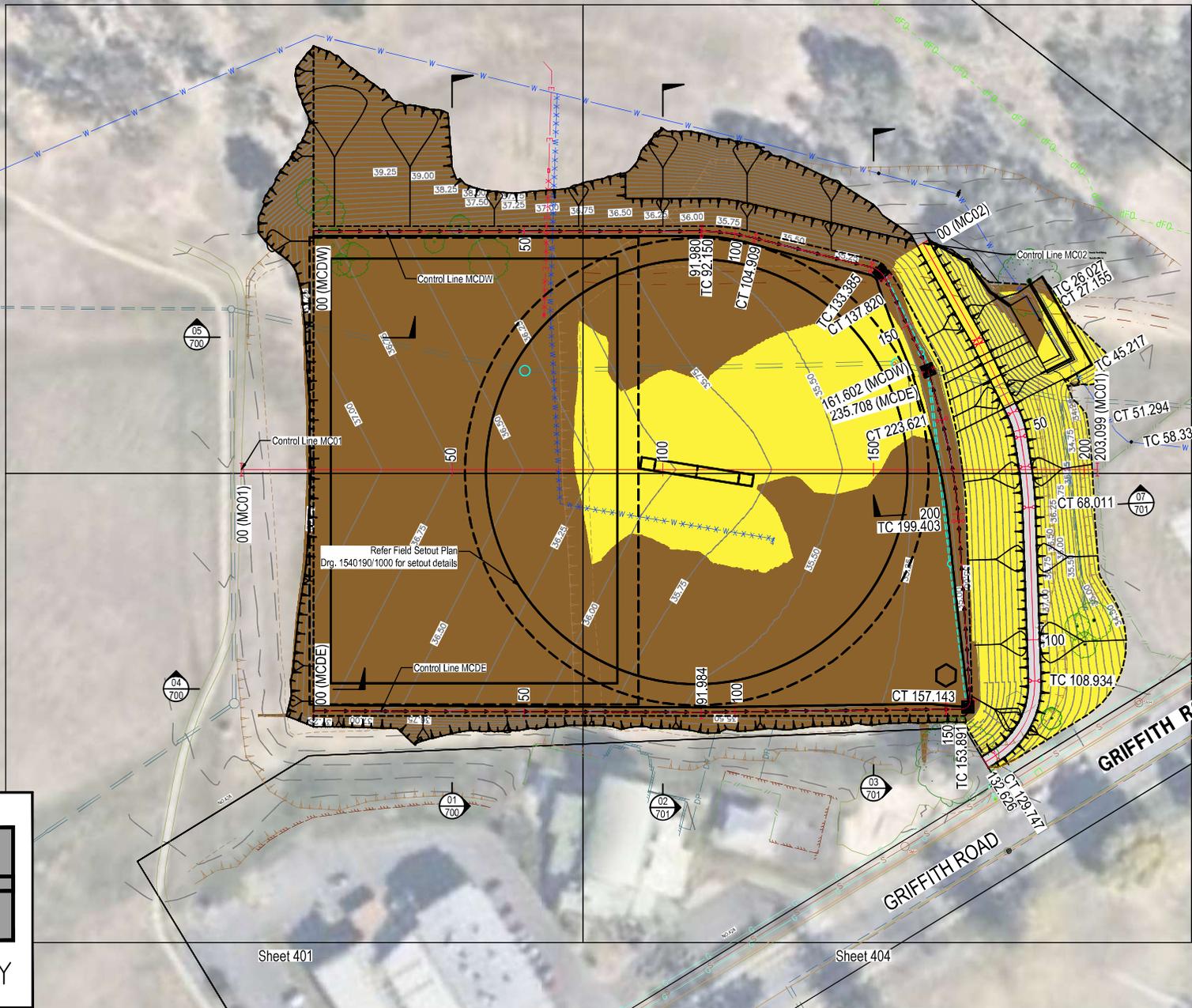
ID	Document	Description
B1	Engineering Details	Selected plans and sections detailing original Limestone Park Detention Basin.
B2	Location of Monitoring Instrumentation	An aerial map for the location of Monitoring Instrumentation
B3	Spillway Discharge Curve	Chart detailing spillway discharge flow rate versus water level
B4	Emergency Alert Request Form	Form that is required to be used to send Emergency Alert Request through SDCC.
B5	Australian Warning System Templates	Pre-prepared emergency messages for issue in accordance with AWS.

Sheet 402

Sheet 403

Legend:

- Proposed control line / chainage
- Proposed table drain invert
- Crest cap
- Concrete Crest Cap
- Grouted Rock Pitching
- Rock
- Fill area
- Cut area
- Design contour / level
- Existing contour / level



402	403
401	404

DRAWING KEY

REVISIONS			
Issue	Revisions/Descriptions	Drawn	Date
A	Issue for Construction	K.T.	06.10.17

SURVEY DATA			
Horiz. Datum	Vertical Datum	Level Book	---
Terrain 2001	A.H.D.	---	---

Size: A1 - Scales before reduction.

Scale: 0 5 10 15 20 25 1:500

Dimensions shown in metres except where shown otherwise

ENGINEERING CERTIFICATION (RPEQ)					
Eng. Area	Name	Signature	No.	Date	
Environmental	Brendan Bolt		11523	06.10.17	

Drawing Status: **FOR CONSTRUCTION**

P.O. Box 191 Ipswich QLD 4305 Australia
 Telephone: (07) 3810 6666
 Facsimile: (07) 3810 7963
 e-mail: dsrequests@ipswich.qld.gov.au

Designated	Name	Date
Designed	J.C.	Oct 17
Drawn	S.M.	Oct 17
Checked	B.B.	Oct 17
Registered	T.Reynolds	Oct 17
Recommended	S.F. Bailey	Oct 17
Approved		

(For Chief Operating Officer (IS))

Project: **LIMESTONE PARK, IPSWICH
IPSWICH FLOOD MITIGATION**

Title: **OVERALL SITE LAYOUT PLAN**

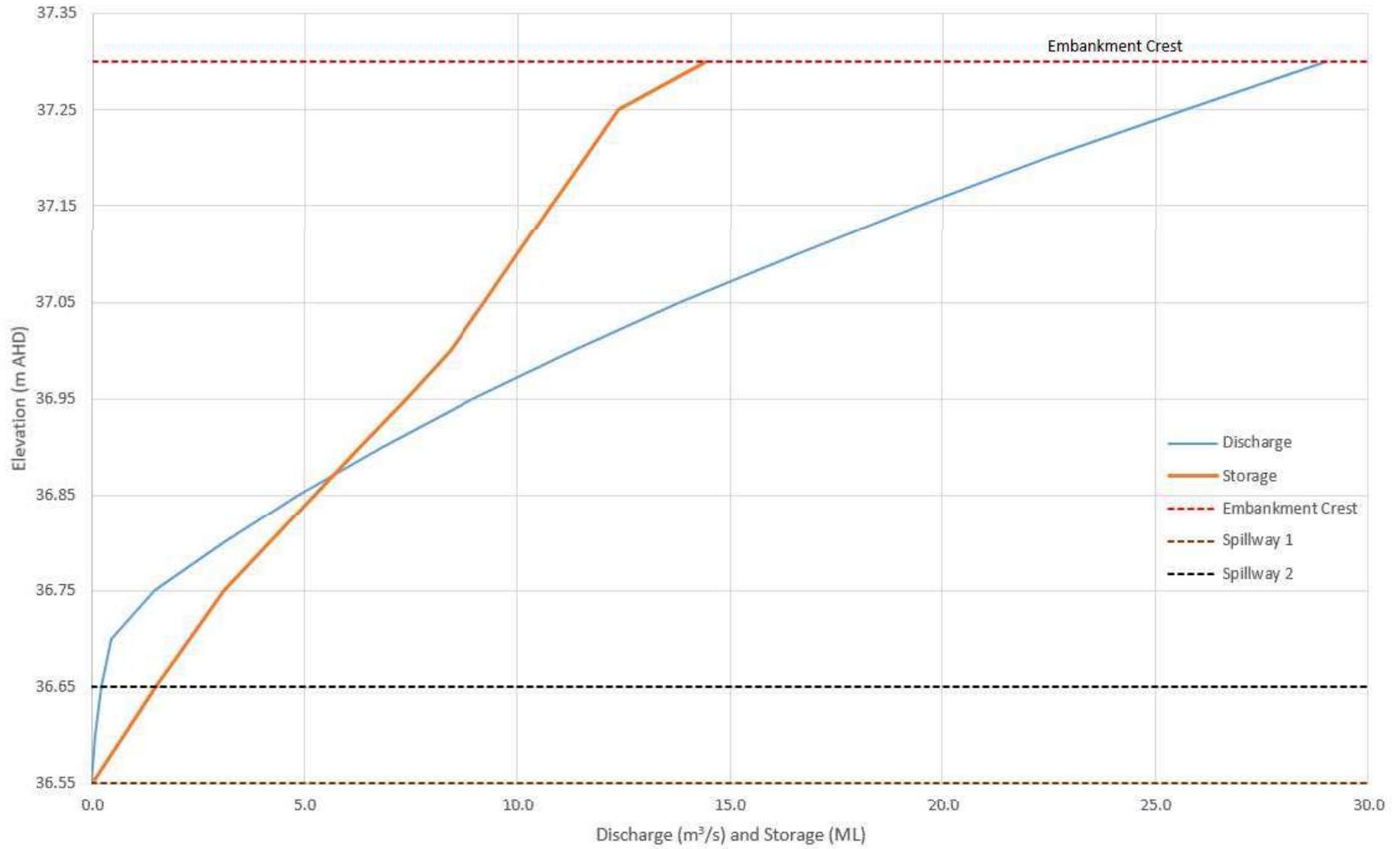
Storage Bar Code:	
Oracle Job No.	INF01024
Project No./Sheet No.	1540190 / 100
Rev.	A

LOCATION OF MONITORING INSTRUMENTATION

(Limestone Park Detention Basin)



Storage-Discharge Curve





PHONE THE SDCC WATCH DESK [REDACTED] - ADVISE EA IS BEING DEVELOPED

EMERGENCY ALERT REQUEST

Location of Alert: Ipswich CBD
(e.g. Suburb, Town)

Date:

LGA/Agency requesting: Ipswich City Council

Time:

Requesting Officer
Name:
Agency/Position:

Telephone:

(SDCC Watch Desk may telephone you)

Email:

Advised LDC/LDMG: YES DDC/DDMG: YES Neighbouring LDMG/LGA: YES N/A

Send Alert Immediately: YES Scheduled: YES Date & Time / / : hrs

Event Type
 Cyclone Storm Tide Flash Flood Flood
 Bushfire Fire Incident Smoke / Toxic Plume Chemical Spill
 Tsunami (Sent as Location Based Text Message ONLY)
 Other (please specify):

Distributed by: (Channel) Voice (Landline only) SMS - Location Based (Location of phone at time of distribution) SMS - Service Address Based (Registered billing address)

Message Severity Emergency Warning (Activates SEWS) Watch & Act Advice

Threat Direction Required? YES N/A Threat location indicated on map? YES N/A
(e.g. Fire, Chemical Spill, Dam Spill) Only For Emergency Warning Voice & Service Address SMS

EA Messaging Filename (Doc, Pdf): Polygon Filename, (Kml, Kmz, Gml, GeoJSON):
Number of polygons ___1___ (if multiple, attach list in order of priority)

Supplied via: DM Portal Email Verbal Other Other (please specify):
Supplied via: DM Portal Email Verbal Other Other (please specify):

Voice: Type or handwrite, max 4000 characters incl spaces. (Ideally message should be < 450 characters)

This is a Watch and Act message from Ipswich City Council. Flash flood conditions may occur, with possible failure of Limestone Park detention basin. Prepare to leave so you can go quickly if conditions worsen. Decide where you will go. Warn friends, family, and neighbours. Localities affected include parts of Ipswich Central from Griffith Road to King Edward Parade. For more information listen to a b c radio or visit w w w dot disaster dot Ipswich dot q l d dot gov dot a u.

SMS: Type or handwrite, use capitals for clarity, max 612 characters incl spaces. (Ideally should be < 160 characters incl. spaces)

Ipswich Council advises possible failure of Limestone Park detention basin likely soon. Prepare to leave. Warn Others. Visit www.ipswich.disaster.qld.gov.au.

Remove EA from websites: 12 hrs 24 hrs 48 hrs Specify Date & Time: / / : hrs Check back in 12 hrs:
 Replace previous EA message Contact #: _____

Requesting Officer: Signature: Date: / /

Send to [REDACTED] to confirm receipt

FOR USE BY SDCC

EA Request Form completed by: SDCC Watch Desk Requesting Officer

Notification of any delays provided to Requestor: YES NO

EA User Name: Signature: Date: / /
Authorising Officer Name: Signature: Date: / /
Emergency Alert No:
EMS EA Campaign Report ID:

Report provided to Requestor on EA outcomes: YES NO

The EA Manual, EA Quick Reference Guide, EA Request Form Template are available at: www.disaster.qld.gov.au



PHONE THE SDCC WATCH DESK [redacted] – ADVISE EA IS BEING DEVELOPED

EMERGENCY ALERT REQUEST

Location of Alert: Ipswich CBD
(e.g. Suburb, Town)

Date:

LGA/Agency requesting: Ipswich City Council

Time:

Requesting Officer
Name:
Agency/Position:

Telephone:

(SDCC Watch Desk may telephone you)

Email:

Advised LDC/LDMG: YES DDC/DDMG: YES Neighbouring LDMG/LGA: YES N/A

Send Alert Immediately: YES Scheduled: YES Date & Time / / : hrs

Event Type
 Cyclone Storm Tide Flash Flood Flood
 Bushfire Fire Incident Smoke / Toxic Plume Chemical Spill
 Tsunami (Sent as Location Based Text Message ONLY)
 Other (please specify):

Distributed by: (Channel) Voice (Landline only) SMS – Location Based (Location of phone at time of distribution) SMS – Service Address Based (Registered billing address)

Message Severity Emergency Warning (Activates SEWS) Watch & Act Advice

Threat Direction Required? YES N/A Threat location indicated on map? YES N/A
(e.g. Fire, Chemical Spill, Dam Spill) Only For Emergency Warning Voice & Service Address SMS

EA Messaging Filename (Doc, Pdf): Polygon Filename, (Kml, Kmz, Gml, GeoJSON):
Number of polygons ___1___ (if multiple, attach list in order of priority)

Supplied via: DM Portal Email Verbal Other Other (please specify):
Supplied via: DM Portal Email Verbal Other Other (please specify):

Voice: Type or handwrite, max 4000 characters incl spaces. (Ideally message should be < 450 characters)

This is an Emergency Warning message from Ipswich City Council. Flash flood conditions likely, with potential failure of Limestone Park detention basin. Leave immediately or move to higher ground away from flash floodwater now. Localities affected include parts of Ipswich Central from Griffith Road to King Edward Parade. For more information listen to a b c radio or visit w w w dot disaster dot Ipswich dot q l d dot gov dot a u.

SMS: Type or handwrite, use capitals for clarity, max 612 characters incl spaces. (Ideally should be < 160 characters incl. spaces)

Ipswich Council advises possible failure of Limestone Park detention basin. Leave immediately. Move to higher ground. Visit www.ipswich.disaster.qld.gov.au.

Remove EA from websites: 12 hrs 24 hrs 48 hrs Specify Date & Time: / / : hrs Check back in 12 hrs:
 Replace previous EA message Contact #: _____

Requesting Officer: Signature: Date: / /

Send to [redacted] to confirm receipt

FOR USE BY SDCC

EA Request Form completed by: SDCC Watch Desk Requesting Officer

Notification of any delays provided to Requestor: YES NO

EA User Name: Signature: Date: / /
Authorising Officer Name: Signature: Date: / /
Emergency Alert No:
EMS EA Campaign Report ID:
Report provided to Requestor on EA outcomes: YES NO

The EA Manual, EA Quick Reference Guide, EA Request Form Template are available at: www.disaster.qld.gov.au

Appendix B5 – Australian Warning System Pre-Prepared Messages

Appendix B8 shows pre-prepared messages, in accordance with the Queensland flood warning templates (July 2023) issued by the Queensland Fire and Emergency Services and in accordance with Australian Warning System (AWS) requirements. The **yellow highlighted** fields indicate content that will likely requires adapting/input according to specific circumstances.

E1 FLASH FLOOD > WATCH AND ACT > PREPARE TO LEAVE

<h1>PREPARE TO LEAVE</h1> <h2>Watch and Act - Flood</h2>		
<h3>Ipswich Central</h3>		
Warning area:	Ipswich Central; King Edward Parade, Brisbane Street, Limestone Street, South Street, Roderick Street, Griffith Road, Pling Street, Thorn Street.	
Warning issued:	xx	
Details:	Flash flood conditions may occur, with possible failure of Limestone Park detention basin.	
Act now:	Prepare to leave so you can go quickly if conditions worsen. Decide where you will go. Warn friends, family, and neighbours.	

Flash Flood > Watch and Act > Prepare to Leave

PREPARE TO LEAVE – Ipswich Central – possible failure of Limestone Park Detention Basin as at [time, day, date, year].

Warning Level: Watch and Act

Warning Area: Ipswich Central areas downstream (north) of Limestone Park detention basin.

People in the following places must prepare to leave:

- King Edward Parade
- Brisbane Street
- Limestone Street
- South Street
- Roderick Street
- Griffith Road
- Pling Street
- Thorn Street

[Provide link to map of affected area – Appendix A1 of EAP]

Water levels in roads may rise rapidly in addition to rainfall. Prepare to move to higher ground.

Do not expect emergency services to come to your door.

If your life is in danger, call Triple Zero (000) immediately. For flood and storm emergency help, call the SES on 132 500.

Impacts in your area:

- Flooding above ground floor level possible in some places.
- Roads may be closed due to flooding.
- Evacuation routes might be cut off. You could be stuck.
- Power, phones, internet and water might stop working.
- Public transport could stop soon.

What you should do

- Go and stay in a safe place in a high part of Ipswich, away from the warning area. This could be with family or friends.
- If you do not have a safe place, [an evacuation centre has / evacuation centres have] been set up at:
 - venue name and full address [add map link if available].
- If you find it hard to move quickly leave as soon as you can. If you do not drive, call your support service, a family member or a friend to organise transport.
- Decide how you will get to your safe place. If you come to a flooded road, turn around and go another way. Do not drive through floodwater.
- Take your pets, pet food, pet lead or crate, mobile phone, charger, enough clothes for two days, important documents (like identification, insurance papers and passports), medicine, cash and keys with you.
- If you have very young children, pack enough nappies for up to five days, wipes, bottles, formula or baby food. Plan to not have a fridge or microwave.
- If you have children, make sure they stay with you or a responsible adult.
- If it is still safe, prepare your home quickly before you leave:
 - Lift important things onto benches, tables, high shelves or upstairs.
 - Block toilets, sinks and drains with sandbags to stop sewerage backflow if you can.
 - Move cars to high ground.
 - Lock doors and windows.
 - Help others if you can.
- Stay informed:
 - Click here for all warnings [insert website / channel where this warning will be published].
 - Listen to your local radio station 94.9FM.

More information

- Ipswich City Council updates and a map of areas that flood near you, go to [website link]
- Weather warnings go to [Bureau of Meteorology Queensland warnings page](#).
- Power outage information, go to [Energex / Ergon](#).
- Traffic information and closed roads, go to [QLD Traffic](#) or call 13 19 40.
- Public transport information go to [Translink](#).

The next update will be issued at [time, day, date] or when the situation changes.

E2 FLASH FLOOD > EMERGENCY WARNING > LEAVE IMMEDIATELY

LEAVE IMMEDIATELY	
Emergency Warning - Flood	
	
Ipswich Central	
Warning area:	Ipswich Central; King Edward Parade, Brisbane Street, Limestone Street, South Street, Roderick Street, Griffith Road, Pling Street, Thorn Street.
Warning issued:	xx
Details:	Flash flood conditions likely, with potential failure of Limestone Park detention basin.
Act now:	Leave immediately, or move to higher ground away from flash floodwater now.

Flash Flood > Emergency Warning > Leave Immediately

LEAVE IMMEDIATELY – Ipswich Central – potential failure of Limestone Park Detention Basin as at [time, day, date, year].

Warning Level: Emergency Warning

Warning Area: Ipswich Central are downstream (north) of Limestone Park detention basin.

People in the following places must prepare to leave:

- King Edward Parade
- Brisbane Street
- Limestone Street
- South Street
- Roderick Street
- Griffith Road
- Pling Street
- Thorn Street

[Provide link to map of affected area – Appendix A1 of EAP]

People in these places must leave immediately. Fast moving flash floodwater may occur.

Do not expect emergency services to come to your door.

If your life is in danger, call Triple Zero (000) immediately. For flood and storm emergency help, call the SES on 132 500.

Impacts in your area:

- Flooding above ground floor level possible in some places.
- Roads may be closed due to flooding.
- Evacuation routes might be cut off. You could be stuck.

- Power, phones, internet and water might stop working.
- Public transport could stop soon.

What you should do

- Go now to a safe place in a high part of Ipswich, away from the warning area. This could be with family or friends.
- If you do not have a safe place, [an evacuation centre has / evacuation centres have] been set up at:
 - venue name and full address [add map link if available].
- If you do not drive, call your support service, a family member or a friend to organise transport.
- Take your pets, pet food, pet lead or crate, mobile phone, charger, enough clothes for two days, important documents (like identification, insurance papers and passports), medicine, cash and keys with you.
- If you have very young children, pack enough nappies for up to five days, wipes, bottles, formula or baby food. Plan to not have a fridge or microwave.
- If you have children, make sure they stay with you or a responsible adult.
- Stay informed:
 - Click here for all warnings [insert website / channel where this warning will be published].
 - Listen to your local radio station 94.9FM.

If you are inside and can't leave safely

- Stay inside and be aware of rising floodwater.
- If floodwater comes inside, move to a higher point like the kitchen bench or second storey and call Triple Zero (000).

If you are outside

- Stay away from trees, drains, low areas, creeks, canals and floodwater.
- Move indoors away from floodwater now.

If you need to drive to get to a safe place

- Slow right down.
- Do not drive through floodwater. If the road is flooded, go a different way.
- Watch for mud, debris, damaged roads, fallen trees and landslides.
- If driving is dangerous, find a high safe place to pull over – away from trees and drains.
- Listen to your local radio station 94.9 FM for warnings and traffic updates.

More information

- Ipswich City Council updates and a map of areas that flood near you, go to [website link]
- Weather warnings go to [Bureau of Meteorology Queensland warnings page](#).
- Power outage information, go to [Energex / Ergon](#).
- Traffic information and closed roads, go to [QLD Traffic](#) or call 13 19 40.
- Public transport information go to [Translink](#).

The next update will be issued at [time, day, date] or when the situation changes.

E3 FLASH FLOOD > ADVICE > RETURN WITH CAUTION

RETURN WITH CAUTION

Advice - Flood



Ipswich Central

Warning area: Ipswich Central; King Edward Parade, Brisbane Street, Limestone Street, South Street, Roderick Street, Griffith Road, Pling Street, Thorn Street.

Warning issued: xx

Details: Failure of Limestone Park detention basin no longer possible. Flash flooding conditions no longer present.

Act now: If you have left, it is now safe to come back.

Flash Flood > Advice > Return with Caution

RETURN WITH CAUTION – Ipswich Central – flash flood conditions ceased at [time, day, date, year].

Warning Level: Advice

Warning Area: Ipswich Central areas downstream (north) of Limestone Park detention basin:

- King Edward Parade
- Brisbane Street
- Limestone Street
- South Street
- Roderick Street
- Griffith Road
- Pling Street
- Thorn Street

[Provide link to map of affected area – Appendix A1 of EAP]

Failure of detention basin no longer likely. Flash flood conditions has stopped and water has gone down. If you left, it is now safe to come back. Be careful of damage.

What you should do

- Return to your home or business to check the damage.
- Stay away from creeks, rivers and drains.
- If you have children, make sure they are with you or an adult you trust.
- Drive slowly, obey all road signs and never drive through floodwaters. If the road is flooded or damaged, go another way.
- Stay away from the area unless you live or work there, or you are helping.

If your home or business has been flooded

- Check for building damage before you go inside.

- Have all electrical and gas equipment professionally tested before use.
- If water went above power points have the house checked by an electrician before turning the power back on.
- Clean and dry out the building as soon as you can.
- Be careful where you walk – do not trip or slip.
- Protect your health and safety:
 - Wear strong boots, gloves and protective clothing when cleaning up.
 - Wash your hands and clothes often.
 - Do not eat food that has touched floodwater or mud.
 - Throw away food that should be kept cold or frozen if you lost power.
 - Drink only fresh drinking water, like bottled water.
- For flood and storm emergency help, call the SES on 132 500 or download the SES Assistance Queensland app. Help yourself and others if you can.

Support and recovery help

- Go to Ipswich City Council [\[website\]](#) for clean-up and recovery information.
- Recovery services are available [\[insert details of organisations actively involved; ideally on the ground\]](#):
 - Agency – Location, full address and times.
 - Agency – Location, full address and times.
- For general relief and recovery information go to getready.qld.gov.au/after-disaster.
- Natural disasters can affect your mental health. If you need help, call any of these groups:
 - Lifeline: Go to www.lifeline.org.au or phone 13 11 14.
 - Beyond Blue: Go to www.beyondblue.org.au or phone 1300 224 636.
 - Kids Helpline: Go to www.kidshelpline.com.au or phone 1800 551 800.

This will be the last warning issued for this flood in Ipswich Central.

E4 FLASH FLOOD > ADVICE > STAY INFORMED

STAY INFORMED

Advice - Flood



Ipswich Central

Warning area: Ipswich Central; King Edward Parade, Brisbane Street, Limestone Street, South Street, Roderick Street, Griffith Road, Pling Street, Thorn Street.

Warning issued: xx

Details: Limestone Park detention basin filling, operating as intended.

Act now: Stay informed because conditions could change quickly.

Flash Flood > Advice > Stay Informed

STAY INFORMED – Ipswich Central – flash flood conditions ceased at [time, day, date, year].

Warning Level: Advice

Warning Area: Ipswich Central areas downstream (north) of Limestone Park detention basin:

- King Edward Parade
- Brisbane Street
- Limestone Street
- South Street
- Roderick Street
- Griffith Road
- Pling Street
- Thorn Street

[Provide link to map of affected area – Appendix A1 of EAP]

Limestone Park Detention Basin is filling due to local rainfall. The basin is currently operating as intended, but conditions could become dangerous. Some roads could be flooded.

What you should do

- Stay up to date because conditions could change.
- Tell friends, family and neighbours in the area.
- Decide what you will do if flooding starts.
- Find out how to get ready for a flood at qfes.qld.gov.au/prepare/flooding.
- Get and fill sandbags in case you need to block doors and stop water getting inside. You can get sandbags from XX.
- Stay out of rivers, creeks and flood water.
- If flooding starts, do not drive unless you have to.

More information

- Ipswich City Council updates and a map of areas that flood near you, go to [\[website link\]](#)
- Weather warnings go to [Bureau of Meteorology Queensland warnings page](#).
- Power outage information, go to [Energex / Ergon](#).
- Traffic information and closed roads, go to [QLD Traffic](#) or call 13 19 40.
- Public transport information go to [Translink](#).

The next update will be sent when the situation changes.

E5 FLASH FLOOD > WATCH AND ACT > PREPARE NOW FOR POSSIBLE FLOOD

PREPARE NOW FOR POSSIBLE FLOOD	
Watch and Act - Flood	
	
Ipswich Central	
Warning area:	Ipswich Central; King Edward Parade, Brisbane Street, Limestone Street, South Street, Roderick Street, Griffith Road, Pling Street, Thorn Street.
Warning issued:	xx
Details:	With Flows through Limestone Park detention basin spillway, flash flood conditions may occur,.
Act now:	Prepare to leave so you can go quickly if conditions worsen. Decide where you will go. Warn friends, family, and neighbours.

Flash Flood > Watch and Act > Prepare Now for Possible Flood

PREPARE NOW FOR POSSIBLE FLOOD – Ipswich Central – flows through Limestone Park Detention Basin as at [time, day, date, year].

Warning Level: Watch and Act

Warning Area: Ipswich Central areas downstream (north) of Limestone Park detention basin.

People in the following places must prepare to leave:

- King Edward Parade
- Brisbane Street
- Limestone Street
- South Street
- Roderick Street
- Griffith Road
- Pling Street
- Thorn Street

[Provide link to map of affected area – Appendix A1 of EAP]

Water levels in roads may rise rapidly in addition to rainfall. Prepare to move to higher ground.

Do not expect emergency services to come to your door.

If your life is in danger, call Triple Zero (000) immediately. For flood and storm emergency help, call the SES on 132 500.

Impacts in your area:

- Flooding above ground floor level possible in some places.
- Roads may be closed due to flooding.
- Evacuation routes might be cut off. You could be stuck.
- Power, phones, internet and water might stop working.
- Public transport could stop soon.

What you should do

- Go and stay in a safe place in a high part of Ipswich, away from the warning area. This could be with family or friends.
- If you do not have a safe place, [an evacuation centre has / evacuation centres have] been set up at:
 - venue name and full address [add map link if available].
- If you find it hard to move quickly leave as soon as you can. If you do not drive, call your support service, a family member or a friend to organise transport.
- Decide how you will get to your safe place. If you come to a flooded road, turn around and go another way. Do not drive through floodwater.
- Take your pets, pet food, pet lead or crate, mobile phone, charger, enough clothes for two days, important documents (like identification, insurance papers and passports), medicine, cash and keys with you.
- If you have very young children, pack enough nappies for up to five days, wipes, bottles, formula or baby food. Plan to not have a fridge or microwave.
- If you have children, make sure they stay with you or a responsible adult.
- If it is still safe, prepare your home quickly before you leave:
 - Lift important things onto benches, tables, high shelves or upstairs.
 - Block toilets, sinks and drains with sandbags to stop sewerage backflow if you can.
 - Move cars to high ground.
 - Lock doors and windows.
 - Help others if you can.
- Stay informed:
 - Click here for all warnings [insert website / channel where this warning will be published].
 - Listen to your local radio station 94.9FM.

More information

- Ipswich City Council updates and a map of areas that flood near you, go to [website link]
- Weather warnings go to [Bureau of Meteorology Queensland warnings page](#).
- Power outage information, go to [Energex / Ergon](#).
- Traffic information and closed roads, go to [QLD Traffic](#) or call 13 19 40.
- Public transport information go to [Translink](#).

The next update will be issued at [time, day, date] or when the situation changes.

Appendix C – Impacted Persons/Properties Contact Details

Appendix C has been redacted

Appendix D – Manual Documentation Templates

ID	Document	Description
D1	Log Form	Form that can be used to record events and actions.
D2	Communication Form	Form that can be used for sending of information relating to this EAP.
D3	Basin Alert Levels	Form that can be used to record the water level in the Limestone Park Detention Basin versus time.

