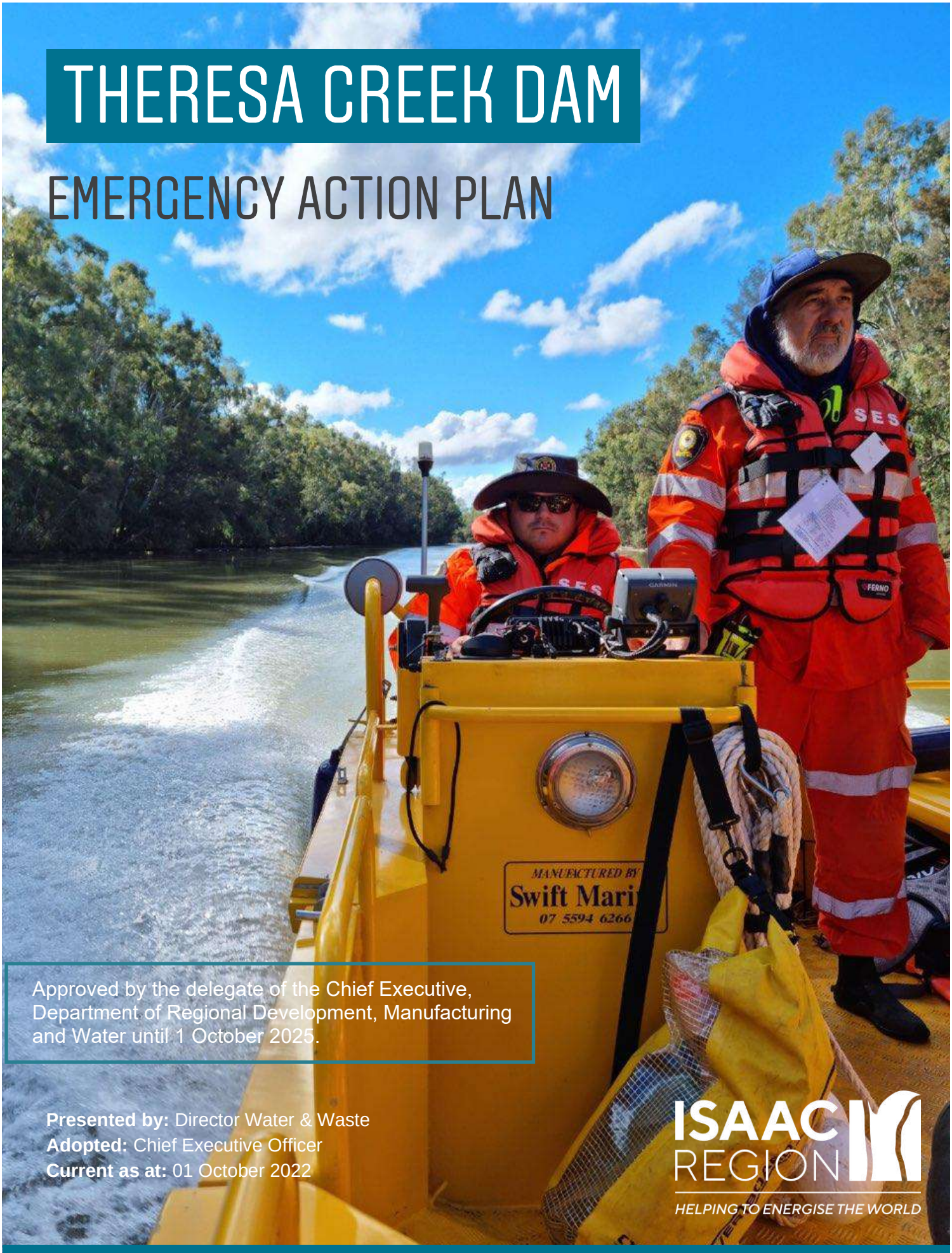
THERESA CREEK DAM

EMERGENCY ACTION PLAN



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

Presented by: Director Water & Waste
Adopted: Chief Executive Officer
Current as at: 01 October 2022

ISAAC REGION
HELPING TO ENERGISE THE WORLD

ISAAC.QLD.GOV.AU ISAAC REGIONAL COUNCIL ABN 39 274 142 600
P 1300 472 227 F 07 4941 8666 A PO Box 97 Moranbah QLD 4744
isaacregionalcouncil isaacregionalcouncil Isaacrcouncil

REVISION HISTORY & AUTHORISATION

Document: Emergency Action Plan

Revision: 10 Edition

Original Issue Date: 30/08/2016

This register identifies the current custodians of copies of the above document. The custodian of a controlled copy of this document is personally responsible for:

1. Its safekeeping;
2. Ensuring prompt incorporation of amendments;
3. Making it available to personnel for whom responsible;
4. Ensuring observance by such personnel;
5. Returning document to the Document Controller on request or on change of function.

REVISION NO	REVISION DESCRIPTION	AUTHORISATION	REVISION DATE
1	Approved Issue	Parsons Brinckerhoff	29/07/2016
2	Updated in line with DNRME 2017 Guidelines	GHD	22/10/2018
3	Reviewed by IRC Disaster Management Officer	Isaac Regional Council	15/11/2018
4	Updated with Dam owners' comments by TD		06/02/2019
5	Updated with comments from DNRME team		30/08/2019
6	Updated based on the outcome of debrief		15/02/2020
7	Updated based on the outcome of Desktop exercise on 03.09.2020		22/09/2020
8	Updated based on the outcomes of the 2020 Failure Impact Assessment and Annual Review 20/21 (extension approved to December 2022)		01/10/2021
9	Updated based on 2021 DRDMW Guideline Requirements.(submitted to DRDMW but not approved)		01/03/2022
10	Updated with comments from RDMW review, 2022		26/09/2022

APPROVED:

fficer, Isaac Regional Council

EMERGENCY ACTIVATION QUICK REFERENCE

EMERGENCY CONTACTS: SEE CONTROLLED COPY DISTRIBUTION LIST

DAM LOCATION: 18 km SOUTH OF CLERMONT (22°58'21"S, 147°33'34"E)

DAM NUMBER: 0366

EMERGENCY EVENT	ACTIVATION LEVEL	WATER LEVEL (m AHD)	SPILLWAY GAUGE BOARD (m)	SCENARIO	EVENT SUMMARY	ACTIONS	AFFECTED AREAS	WARNING MESSAGE
Sunny Day Dam Failure	Alert	≤ 271	-	Identification of structural issues, new or increased seepage. Earthquake. Public warnings.	Figure 9-1 Sunny Day failure flow chart	Table 9-1 SunnyDay Event Table 9-1 Sunny Day event	Table 2-2 and Appendix B impacted homesteads / buildings during various emergency events	Appendix H Warning messages and distribution
	Lean Forward	≤ 271	-	Progress / worsening of items identified under "Alert" activation level. Public warnings and evacuation preparation.				
	Stand Up	≤ 271	-	Identification of dam safety issues that put the dam at immediate risk. Dam failure is developing, occurring, or has occurred. Evacuation.				
Flooding	Alert	≥ 271.2 ≤ 271.5	≥ 0.2 ≤ 0.5	High rainfall predicted in the dam catchment. High rainfall occurring in the dam catchment. Remote monitoring shows upstream stream gauge (IRC owned, Theresa Creek – Kilmarnock Station BOM:535161) is recording high flows entering the dam.	Figure 9-2 Flood Inflow Flow Chart	Table 9-2 Flood Inflow Events	Table 2-2 and Appendix B impacted homesteads / buildings during various emergency events	Appendix H Warning messages and distribution
	Lean Forward	≥ 271.5 ≤ 272.5	≥ 0.5 ≤ 1.5	Flood inflows and discharges taking place through spillway. Flooding expected or commencing downstream. Public warnings and evacuation preparation.				
	Stand Up	≥ 272.5	≥ 1.5	Major inflows and discharges taking place through spillway. Extensive flooding expected or commencing downstream. Evacuation.				
Terrorism	Stand Up	N/A	-	• Possible terrorist activity noticed at dam or threat received • Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit) • Failure in progress or likely due to impact or explosion • Sufficient water in storage to create a dam hazard	Figure 9-3 Terrorism event flow chart	Table 9-4 Terrorism event	Table 2-2 and Appendix B impacted homesteads / buildings during various emergency events	Appendix H Warning messages and distribution

TABLE OF CONTENTS

Sections 1 and 2 have been redacted

3. ABBREVIATIONS AND DEFINITIONS

3.1 ABBREVIATIONS

Acronyms relevant to this Emergency Action Plan are summarised as follows.

Table 3-1 Acronyms / Abbreviations

ACRONYM	TERM
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
ARI	Average Recurrence Interval
BOM	Bureau of Meteorology
CHRC	Central Highlands Regional Council
DDS	Director, Dam Safety
DIO	Dams Inspection Officer
DO	Dam Operator
DWW	Director of Water and Waste
DNRME	Department of Natural Resources, Mines and Energy
DRDMW	Department of Regional Development, Manufacturing and Water
EAP	Emergency Action Plan
EER	Emergency Event Report
FIA	Failure Impact Assessment
FSL	Full Supply Level
IRC	Isaac Regional Council
LDC	Local Disaster Coordinator
LDCC	Local Disaster Coordination Centre
LDMG	Local Disaster Management Group
LDMP	Local Disaster Management Plan
ML	Megalitre
O&M	Operation and Maintenance
OMM	Operations and Maintenance Manual
OO	Operations Officer
PAR	Population at Risk
PMP	Probable Maximum Precipitation

ACRONYM	TERM
QFES	Queensland Fire and Emergency Services
QLD	Queensland
RL	Reduced Level
RPEQ	Registered Professional Engineer of Queensland
SES	State Emergency Services
SMS	Short Message Service
SOP	Standard Operating Procedure
UHF	Ultra-High Frequency

3.2 DEFINITIONS

The meaning of terms used in this section are set out in accordance with relevant legislation or as defined by operator requirements.

Table 3-2 Definitions (the Act)

TERMS SET OUT IN SECTION 352A OF THE *WATER SUPPLY SAFETY AND RELIABILITY ACT (QLD,2008)*	
Dam hazard	For a dam, means a reasonably foreseeable situation or condition that may: 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	For a dam, means an event arising from a dam hazard if: 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.
Disaster Management Plan	Of a district group or local government, means the group's or local government's disaster management plan under the *Disaster Management Act*.
District Group (District Disaster Management Plan)	For an emergency action plan (EAP), means a district group established under the *Disaster Management Act*, section 22 whose disaster district under that Act could, under the plan, be affected by a dam hazard.
Emergency Event	For a dam, means an event arising from a dam hazard if: a. persons or property may be harmed because of the event; and b. any of the following apply: 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.
Local group (Local Disaster Management Group)	For an EAP, means a local group established under the *Disaster Management Act*, section 29 whose local government area could, under the plan, be affected by a dam hazard.
Notice response	A dam owner's written response to a notice following an assessment of an EAP by a local government or district group.

TERMS SET OUT IN SECTION 352A OF THE *WATER SUPPLY SAFETY AND RELIABILITY ACT (QLD,2008)*	
Relevant Entity	For a dam, means each of the following under the emergency action plan for the dam: 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; Examples for paragraph (a) • the owners of parcels of farmland adjacent to the dam • residents of a township b. each local group and district group for the emergency action plan; (Each local government whose local government area may be affected if a dam hazard event or emergency event were to happen for the dam); c. the chief executive officer; d. another entity the owner of the dam considers appropriate. Example for paragraph (d) • the Queensland Police Service

Table 3-3 Definitions (Disaster Management)

TERMS CONSISTENT WITH QUEENSLAND DISASTER MANAGEMENT ARRANGEMENTS	
Activation Levels	The four levels of EAP activation are: **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 Alert level indicates the dam owner is getting ready to activate the Lean Forward level of the EAP if the situation deteriorates. **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. **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 in accordance with the provision of the Act. **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 the LDMG.
Bureau of Meteorology flood level classifications	The three levels of flooding are: **Minor flooding:** This causes inconvenience such as closing of minor roads and the submergence of low-level bridges and makes the removal of pumps located adjacent to the river necessary. **Moderate flooding:** This causes the inundation of low-lying areas requiring the removal of stock and / or the evacuation of some houses. Main traffic bridges may be closed by flood waters. **Major flooding:** This causes inundation of large areas, isolating towns and cities. Major disruptions occur to road and rail links. Evacuation of many houses and business premises may be required. In rural areas widespread flooding of farmland is likely.
Chemical spill or toxic condition	The contamination of water in the storage of the dam that could create a public safety or downstream release hazard.
Dam crest failure	Dam crest flood is when failure occurs during a flood event with the water level at the crest of the non-overflow section of the dam embankment. • for an embankment dam, is the lowest point of the embankment crest. • for a concrete dam, is the level of the non-overflow section of the dam, excluding handrails and parapets if they do not store water against them. • for a concrete faced rockfill dam, is the lowest point of the crest structure.
Dam failure	Dam failure is the physical collapse of all or part of a dam or the uncontrolled release of any of its contents.

TERMS CONSISTENT WITH QUEENSLAND DISASTER MANAGEMENT ARRANGEMENTS	
Earthquake	A sudden release of energy in the Earth's crust or upper mantle, usually caused by a 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: • Settlement, longitudinal or traverse cracking in an embankment dam that could lead to piping or overtopping if the settlement is greater than the available freeboard. • Settlement, sliding or overturning of monoliths in the dam wall. • Initiation of seepage lines in the foundations or abutments that could lead to piping. • Liquefaction of foundation sands leading to slope failure and loss of freeboard causing overtopping if the settlement is greater than the available freeboard. • Damage and potential inoperability of appurtenant works.
Flood release	A flood release from a dam occurs when catchment inflows raise the storage level above Full Supply Level (FSL) resulting in a discharge from the spillway of the dam.
Piping	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.
Plane strike or other impact	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.
Probable maximum flood	Probable maximum flood is the flood resulting from probable maximum precipitation coupled with the worst catchment conditions that can be realistically expected.
Probable maximum precipitation	Probable maximum precipitation is the theoretical greatest depth of precipitation physically possible based on generalised methods.
Probable maximum precipitation design flood	Probable maximum precipitation design flood is the flood resulting from probable maximum precipitation coupled with standard catchment conditions that can be expected.
'Sunny day' failure	'Sunny day' dam failure is where the failure occurs at the full supply level and there is no concurrent rain associated flooding.
Vandalism or Terrorist Activity	A deliberate attempt to damage or fail a dam.

Note: Isaac Regional Council has attempted to write the EAP to cope with all reasonably foreseeable emergency situations. However, there is considerable uncertainty about how any emergency situation might develop and progress. Factors such as the weather, the location, the mechanics, and the rate and size of any actual failure can considerably affect any resulting flood discharges. Therefore, a significant number of assumptions have had to be made in compiling sections of the EAP. Some variation in outcome should be expected where the event differs from the assumed behaviour.

3.3 ROLES AND RESPONSIBILITIES

The roles and responsibilities of relevant entities in the management of Theresa Creek Dam are described in Table 3-4.

Table 3-4 Responsible person/organisation and their responsibility

POSITION TITLE	DESCRIPTION
Dam Owner (Isaac Regional Council CEO)	The **Dam Owner** has the responsibility to share information with stakeholders regarding the condition of the dam, dam levels, the extent and nature of flooding, including dam failures, and the dam safety management procedures in place to respond to a range of risks. The dam owner should understand the safety status of their structure. Best practice demands that structural, hydrology, earthquake, foundation engineering and operational advice and assistance be used in this process. Facilitate Dam Safety Training Courses and specific training and accreditation for relevant staff. Ensure necessary resources are available to manage any event. Record communications, notifications and observations as required.
Director Water and Waste (DWW)	The **DWW** is responsible for: • Recommendation for the Activation, escalation and demobilisation of the EAP (as required by procedures in this EAP) • Dissemination of information to IRC Brand Media and Communications department for the media and public

POSITION TITLE	DESCRIPTION
	• Advise LDC that evacuation is recommended at per calculated predictions of the event • Updating and checking the adequacy of the EAP, undertaking desk, field and training exercises.
Dam Operator (DO) Manager Operations & Maintenance Water and Wastewater	Onsite and remote monitoring of the situation at the dam and keeping parties informed of developing conditions at the dam. • Assess the following during an event: • Catchment rainfall rate • Upstream inflow rate • Rate of increase of the dam water level • Earthquake. Notification of **DWW** and/or **IRC LDC** of developing conditions at the dam. Ensure an up-to-date copy of the EAP is on site at all times.
Operations Officer (OO) Technical Officer Dams	Undertake inspections as required by the EAP and notify the **Dam Operator** of up-to-date operational information during an event. Provide technical support to the **Dam Operator** as required. Ensure all names and numbers on the EAP notification listing are up to date by 1 October of each year.
Dam Inspection Officer/s Technical Officer Dams	Carry out operations in accordance with the dam safety documentation including DOMM, SOPs and EAP. Carry our routine inspections and maintenance of the dam as directed by the **Operations Officer**.
Onsite Caretaker Theresa Creek Dam Campground	Onsite monitoring of dam water levels (spillway flow depth) and keeping the **Dam Operator** informed of changing water levels at the dam. Shall inform the **Dam Operator** of any sudden or gradual changes to the dam operating conditions or structures (e.g. spillways, embankments, piping). Upon advice from the **Dam Operator**, inform campground occupants of the preferred evacuation route in the event of rising lake levels. Upon advice from the **Dam Operator**, inform recreational boat users on the lake to go to the marina or shoreline (away from the spillway) and boat occupants to go ashore in the event spillway flow commences or dam structural issue is identified. The **Onsite Caretaker** is not obligated under the Dam Safety Conditions or *Water Supply (Safety and Reliability) Act (2008)* to undertake inspections. The **Dam Owner** will train the **Onsite Caretaker** (and permanent/transient onsite operators) as to their responsibilities on an annual basis (just prior to the onset of the wet season) to inform campground occupants of the preferred evacuation route in the event of rising lake levels. The caretaker will be trained in how to advise recreational boat users on the lake to leave the lake in the event where a dam structural issue has been identified or when spillway flows commence. The **Dam Owner** will train the **Onsite Caretaker** (permanent/transient onsite operators) in identifying changes in the dam that are not considered 'normal' as to the condition of the dam. The campground caretaker will notify the Dam Operator in the event that abnormal changes are identified. The responsibilities of the **Onsite Caretaker** will be incorporated into the new lease arrangement and will be transferrable.
Chair of the IRC LDMG	Activation, escalation and demobilisation of the EAP (as required by procedures in this EAP). Dissemination of information to the media and public. Have a responsibility to ensure planning is in place to deal with flooding. Where floods are affected by dams, the plans may need to contain specific arrangements. The affected community needs to be provided with: • Information of the flood risk, escape routes and responses required of them in relation to warnings e.g. Evacuation Plan; • Opportunities to be involved in and influence the planning process; • Accurate and timely information during emergency events; and • Confidence in the emergency management arrangements. Functions of the **IRC LDMG** are described in the *Disaster Management Act (2003).*

POSITION TITLE	DESCRIPTION
IRC LDC	Coordinate event response actions and act as the Incident Controller. Liaise with **LDMG, QPS** and **SES Local Controller** as required. Activate the IRC LDMP as required. Coordinate and approve warnings, alerts and notifications as required.
SES Local Controller Isaac Regional Council	The **SES Local Controller** receives planning information from the **Dam Owners representative (LDC)** to evaluate the risks posed to the community and for which responses can be developed. Liaise and carry out emergency action responsibilities as per a request from the **LDC**.
Dam Safety Regulator Director, Dam Safety (DDS) Department of Regional Development, Manufacturing and Water (DRDMW)	Be provided with information on dam safety status, emergency management plans, and any proposed remedial measures (short or long term) in sufficient detail to conduct audits to ensure the safety of the dam and maintain liaison with emergency management agencies and the dam owner to assist in strategic policy development. The Director Dam Safety, Department of Regional Development, Manufacturing and Water (DRDMW), is responsible for the development of dam safety standards, and auditing and enforcing their compliance by dam owners.
Dam Safety Engineer	An experienced senior dam safety engineer who is RPEQ and meets the role descriptions in the Queensland Dam Safety Management Guideline. The dam safety engineer shall provide independent and specialist dam safety advice and be responsible for technical decision making during an emergency event.

4. IMPLEMENTATION AND REVIEW

4.1 EMERGENCY MANAGEMENT PLAN UPDATES AND TRAINING

Under the *Water Supply (Safety and Reliability) Act 2008* (the Act), the owner of a referable dam must have an approved EAP for the dam. Referable dams, by definition, would put lives at risk if they were to fail.

This EAP has been prepared in accordance with Chapter 4 of the Act. The requirements for EAPs are contained in section 352H of the Act.

Summary of legal requirements – Section 352H

Section 352H(1) of the Act requires that the EAP must identify each dam hazard for the dam; and for each of these dam hazard types (e.g., flood operations, earthquake):

1. identify the area likely to be affected by a dam hazard event or emergency event arising from the dam hazard; and
2. identify each circumstance that indicates a material increase in the likelihood of the dam hazard event or emergency event happening; and
3. state when and how the owner of the dam plans to warn persons who may be harmed, or whose property may be harmed by an event caused by the dam hazard, if one happens, and/or there is a material increase in the likelihood of an occurrence, including the order of priority in which the persons or categories of persons are to be warned; and
4. state when and how the owner plans to notify the relevant entities for the dam, if a dam hazard event or emergency event happens or, there is a material increase in the likelihood of such an occurrence, including the order of priority in which the relevant entities are to be notified; and
5. state the actions the owner of the dam plans to take in response to a dam hazard event or emergency event.

In accordance with section 352H(2) of the Act, the EAP may provide for the dam owner to make arrangements with a relevant entity for warnings to be given by the relevant entity on behalf of the dam owner in appropriate circumstances.

Section 352HA of the Act states that before giving the chief executive an EAP, the owner of the dam must give a copy of the plan to each local government whose area may be affected by a dam hazard identified in the plan; and each district group for the plan.

Section 352HB of the Act states that the local government must assess the EAP for consistency with its disaster management plan. In its assessment, the local government must consult with the local district group for the plan.

Within 30 business days of receiving the EAP, the local government must give the owner of the dam a notice, which states whether it considers the plan is consistent with its disaster management plan; and if not, give reason why it considers the EAP is not consistent. The EAP must include any such notices, provided to the owner of the dam by a local government (or district group); and any responses which the owner gives to these notices. Section 352H(1) further stipulates that an EAP must include any other relevant matter prescribed by regulation.

As per Section 352HA, the local government whose area may be affected by a dam hazard for Theresa Creek Dam has been assessed as Central Highlands Regional Council (CHRC). IRC has provided CHRC with a copy of the draft EAP for assessment.

Section 352HC of the Act states that a district group may review the EAP for consistency with its disaster management plan. The District Disaster Management Group (DDMG) for Theresa Creek Dam has provided with a copy of the draft EAP for review.This EAP is to be reviewed by IRC and the LDMG on an annual basis. A dam safety exercise shall be conducted annually as part of the EAP review process. The exercise may be undertaken as a desktop exercise or alternatively as a field exercise where the lines of communication and the responses of the different agencies is tested. The dam safety regulator should be invited to attend as an observer when EAP scenario training involves one or more stakeholders.

This EAP is to be included in training for dam operators, key council staff involved in the management or operation of the dam and any response agencies.

Larger scale exercises involving coordination between the Counter Disaster Agencies and other authorities should be conducted at least every five years.

4.2 EMERGENCY EVENT REPORT (EER)

Following an emergency event, an EER containing the following information should be completed by the DWW and submitted to DRDMW within 30 business days after the end of the emergency event or, at a period agreed to in writing by the chief executive and the dam owner.

The content of the EER must include:

a. Description of the emergency event to which the report relates.

b. Details of how the EAP was implemented.

   i. List the communications made and actions taken in response to the emergency event (communication logs).

   ii. Actions to monitor the dam and the area affected or potentially affected by the emergency event.

c. Description of any damage to the dam, including by reference to photographs of the damage.

d. State whether and to what extent any damage to the dam has been caused or contributed to by the emergency event.

e. An assessment of whether and to what extent the approved EAP effectively dealt with the emergency event

f. Recommendation for any changes to the approved EAP that would allow the plan to deal with a similar emergency event more effectively

g. Details of any other matter that is relevant to the emergency event or how it was dealt with under the emergency action plan

h. Any other relevant matter prescribed under a regulation.

5. DAM DETAILS

5.1 DAM DETAILS

Name of dam: Theresa Creek Dam 0366

Owner of dam: Isaac Regional Council

Status of dam: Operational

Property description: Lot 23 CLM535, Parish of Stevenson, County of Clermont in the Local Government Area administered by Isaac Regional Council

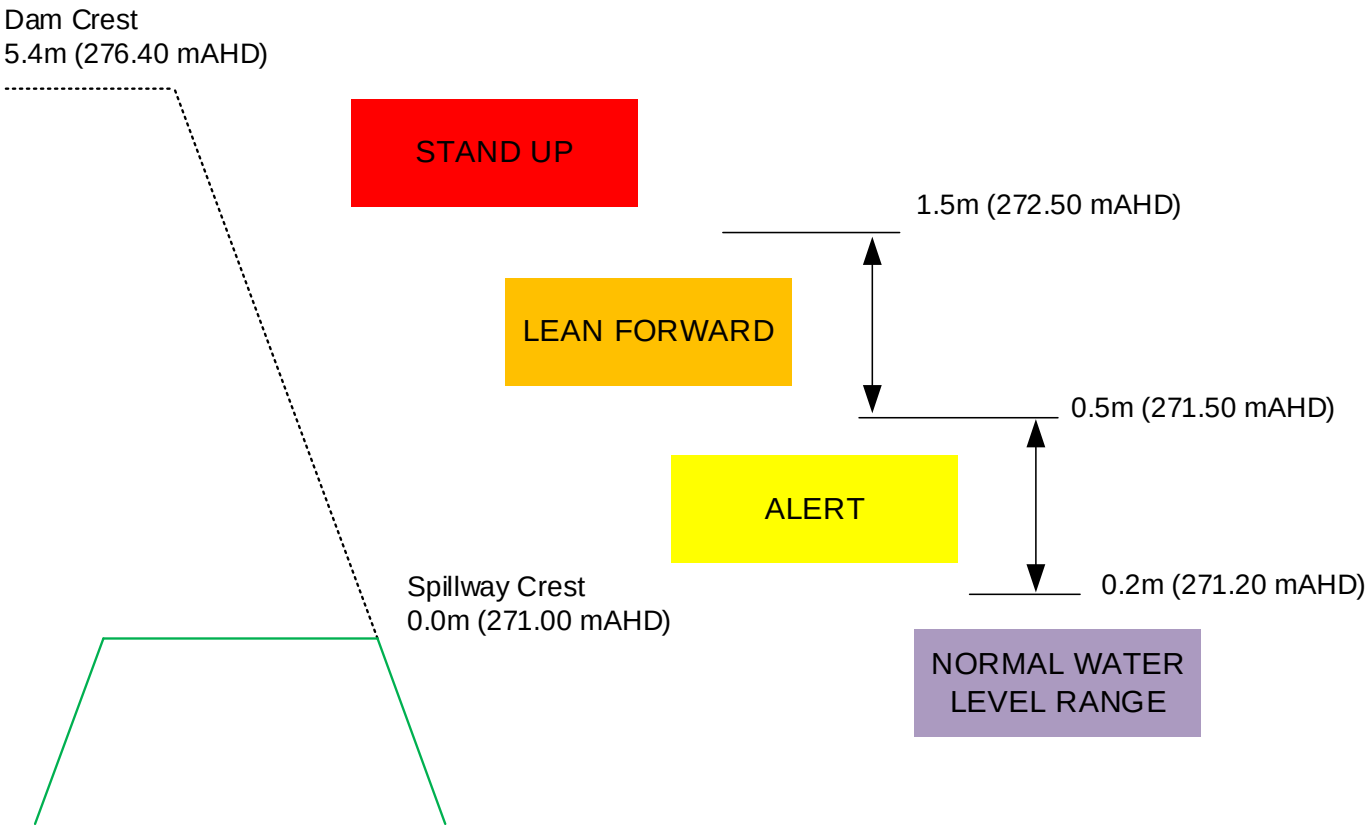
Construction completed: November 1982

5.2 DAM CHARACTERISTICS

Table 5-1 Theresa Creek Dam technical summary

DESCRIPTION	VALUE
GENERAL	
Dam Type	Concrete gravity ogee crested primary overflow, flanking reinforced concrete, earth filled terrace overflow and homogeneous non-overflow embankments to abutments.
General location of dam	On Theresa Creek, approximately 18 km south of Clermont.
Purpose	Formerly water supply for the Blair Athol Coal Project development. Currently used for town water supply and recreation.
STORAGE CHARACTERISTICS	
Storage capacity of dam	9,200 ML to full supply level (FSL) 22,000 ML to dam crest level (DCL)
Height of dam above downstream toe	13 m (approx.)
Catchment area	738 km^2
Catchment description	Theresa Creek and its tributaries are ephemeral streams within gently sloping floodplains, predominantly cleared and mostly used for grazing, but with large areas of rocky, non-absorbent ground and scant herbage contributing to rapid filling of the dam following significant rainfall.
Full supply level (FSL)	RL 0 m (271 m AHD)
Inundation area at FSL	250 ha
Incremental population at risk (PAR)	2.8 to 5.6
Dam crest flood (1 in 1,000,000 AEP) • Peak spillway discharge • Peak reservoir level	 • 9,551 m^3/s • RL 276.4 m AHD
Probable maximum precipitation design flood (PMPDF) • Peak spillway discharge • Peak reservoir level	 • 10,072 m^3/s • EL 276.52 m AHD (overtopping the earth embankment crest by 120 mm
Date of last failure impact assessment	The 2020 FIA was accepted on 7 October 2021
DESCRIPTION OF DAM WALL AND SPILLWAY	
Total dam length including spillway	844 m
Central spillway section length	225 m
Central spillway section elevation	RL 271.0 m AHD

DESCRIPTION	VALUE
Right concrete terraced section length	150 m
Left concrete terraced section length	55 m
Left and right concrete terrace crest elevation	RL 1.5 m (272.5 m AHD)
Maximum height of concrete terraced overflow	8 m approx. (RL 272.5 m to toe of terraced section)
Flanking earthfill embankments – total length	434 m
Flanking earthfill embankments – crest elevation	RL 5.4 m (276.4 m AHD)
Embankment batters	1V:3H slope
Embankment crest width	3 m (approx.)
Maximum embankment Height	7 m (approx. from toe near abutments)
Saddle dams	Nil
DESCRIPTION OF OUTLET WORKS	
Fixed dispersion cone valve	660 mm fixed dispersion cone valve with hand pump oil hydraulic operation. Cast iron body with synthetic rubber nose and body seals, stainless steel nose ring and body seal and bronze guide strips.
Outlet invert level	259.7 m AHD (approx.)
NOTABLE EVENTS	
Flood of Record (17 Jan 2008) • Peak spillway discharge • Peak reservoir level	 • 1,450 m^3/s • 272.96 m AHD
25 November 2021 Flood • Peak spillway discharge • Peak reservoir level	 • 1,150 m^3/s • 272.76 m AHD



Notes:

1. A **lean forward** flood event (i.e. a flood level of 0.5 m (271.5 mAHD)) corresponds to approximately a 1 in 2 AEP critical duration event
2. A **stand-up** flood event (i.e. a flood level of 1.5 m (272.5 mAHD)) corresponds to approximately a 1 in 10 AEP critical duration event
3. A dam crest flood event (i.e. a flood level of 5.4 m (276.4 mAHD)) corresponds to approximately a 1 in 1,000,000 AEP critical duration event.

Figure 5-1 Theresa Creek Dam critical water levels (not to scale)

5.3 OVERVIEW OF THERESA CREEK DAM

5.3.1 General

Theresa Creek Dam consists of a central concrete gravity weir structure with concrete terraced overflow stepped sections each side of the central spillway. The left and right terraced sections are 55 m and 150 m long respectively. Two homogeneous fill non-overflow earth embankment sections with concrete cut-off walls adjoin the terraced sections on each abutment. The dam is located just downstream of the confluence of Iron Hut Creek and Theresa Creek, approximately 18 km south of Clermont in Central Queensland.

The dam was designed by Munro Johnson Hebron in 1981 as a main water supply reservoir of Clermont Water Supply Scheme for the former Belyando Shire Council, and the dam was constructed in approximately 1982. Ownership was transferred to IRC through amalgamation of local government areas in March 2008.

The dam is a referable Dam under the *Water Supply (Safety and Reliability) Act 2008*. In accordance with the Failure Impact Assessment (FIA), the dam is classed as a category 1 referable dam with an incremental population at risk (PAR) between 2 and 100 people. The incremental PAR of Theresa Creek Dam is at least 2.8 and may be as high as 5.6

5.3.2 Purpose

Theresa Creek Dam was designed as a water storage reservoir. It was not designed to provide the function of flood mitigation. It therefore has a minimal capacity to reduce the peak discharge due to its limited storage volume and uncontrolled ogee spillway configuration.

5.3.3 Dam structure

A central concrete gravity, ogee crested 'weir' is flanked by reinforced concrete portal frame, terraced overflow structures, beyond which are homogeneous embankments extending to the abutments. The weir is founded on fresh rock. The portal frames are trenched to refusal (non- erodible surface) and the embankments are founded on firm clay. Figure 5-2 shows the various spillways and embankments.

The weir and terraces discharge to an anchored, reinforced concrete apron with baffle blocks and an end sill.

5.3.4 Dam catchment

Theresa Creek and its tributaries are ephemeral streams within gently sloping floodplains, predominantly cleared and mostly used for grazing, but with large areas of rocky, non- absorbent ground and scant herbage contributing to rapid filling of the dam following significant rainfall. A drawing showing the storage catchment area to Theresa Creek Dam is presented in Appendix C.

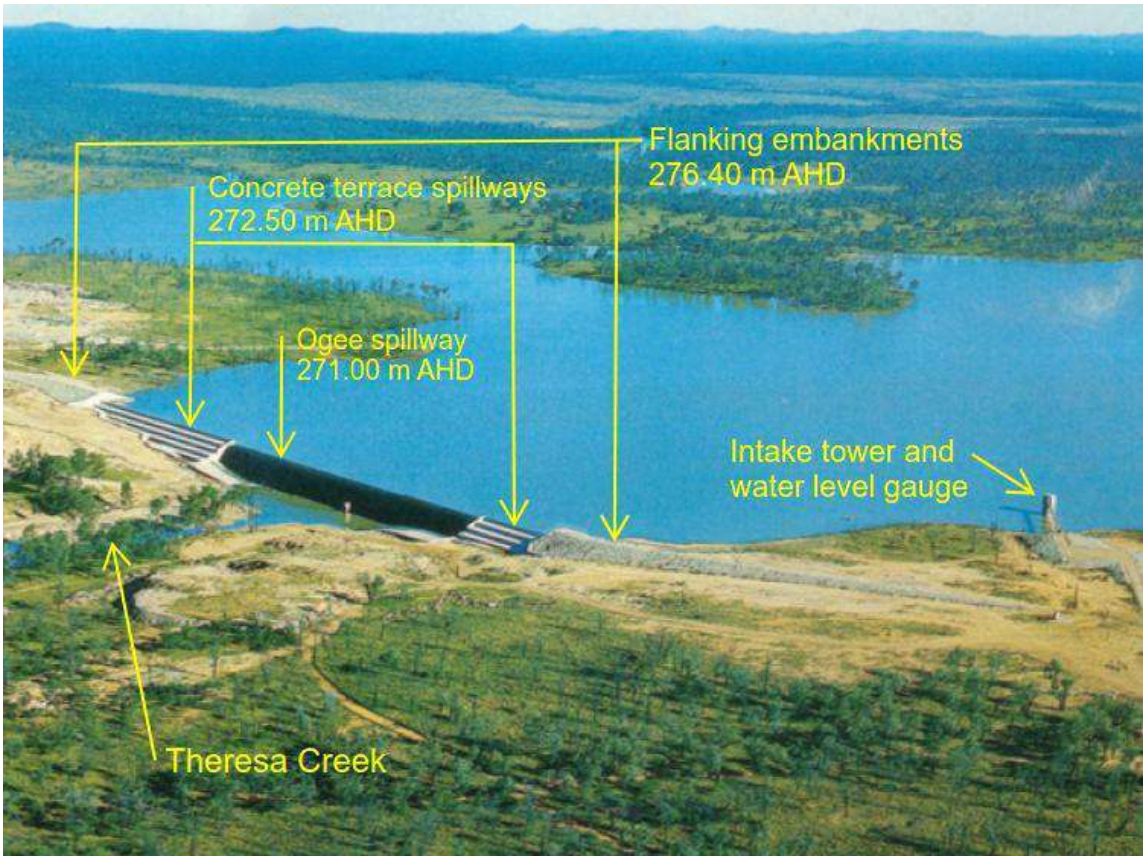


Figure 5-2 Theresa Creek Dam spillways, embankments and intake tower with water level gauge (photograph taken after construction in 1982)

5.4 DAM ACCESS

5.4.1 Road access from Clermont (via Peakvale Road) to dam's left abutment and intake tower

The Dam Inspection Officers are located at the Water Treatment Plant at the corner of Clermont Rubyvale Road and Jeffery Street in the town of Clermont, or at one of Council's offices.

Road access to the dam from the Water Treatment Plant and Council's Clermont office is via:

1. Clermont-Rubyvale Road
2. Copperfield-Rubyvale Road (continuation of Clermont-Rubyvale Road)
3. Christoe Street (continuation of Clermont-Rubyvale Road)
4. Peakvale Road, and then
5. Percy Albert Drive to the dam.

These roads are crossed by multiple streams and creeks. For instance, Peakvale Road crosses Douglas Creek in several locations. The catchment draining to the Peakvale Road crossing of Douglas Creek is a different catchment to that of the dam. It is not known exactly how much rainfall needs to fall in the Douglas Creek catchment for the Peakvale Road crossing to be cut by flood water.

In the event of a situation at the dam, these roads could be cut by flood waters, therefore preventing vehicle access to the dam.

Appendix A presents a map showing road access from Clermont to Theresa Creek Dam.

5.4.2 Road access from Clermont (via Clermont-Rubyvale Road) to dam's right abutment

Vehicle access from Clermont to the dam's right abutment via Clermont-Rubyvale Road is not nominated due to a number of reasons:

Vehicle access by road requires crossings of multiple creeks that could be cut-off by flood water. IRC policies prohibit staff from driving through flood water of any depth.

There are no sealed or Council maintained dirt roads that exist between the Clermont-Rubyvale Road crossing of Theresa Creek and the dam's right abutment.

Access requires an overland route be taken through a private property with a locked gate.

In a Sunny Day event when vehicle access from Clermont to the left abutment is possible, access from the left abutment to the right abutment via foot on the downstream side of the dam wall is not recommended due to the potential danger of being downstream of the wall. Viewing of the right abutment should be done using binoculars.

5.4.3 Alternative access

As road access could be cut by flood water, the only alternative to access the dam in the event of potential failure or during high spillway discharge events would be by helicopter sourced from local townships such as Clermont, Capella or Emerald. Even if a helicopter is available, it may not be practical during high rainfall events. A landing site at the dam's right abutment is not nominated as part of this EAP.

Hiring of a helicopter to access the right abutment should be investigated at the time of the potential emergency event or emergency event.

Below is the list of a few helicopter services in the Clermont area, as well as a couple from Emerald and Moranbah.

NAME	LOCATION	PHONE
Bush Heli-Services Pty Ltd	Clermont	0400 087 305
Dennis, Dale Gordon Francis	Clermont	4983 5069
Suttor Heli Services Pty Ltd	Clermont	0438 835 207
Hornery Helicopter Services Pty Ltd	Moranbah	4941 7116
Calibre Aviation	Emerald	4987 5400 / 0429 875 400
CQ Helicopters	Emerald	4982 2046
Reid Heliwork	Emerald	4987 5725 / 0428 333 236

5.4.4 Mobile phone reception at dam

Full mobile phone reception at the dam is only available at the balance reservoir (located 2 km to north of dam campground along Percy Albert Drive) at the high point or from certain points near the dam.

Mobile phone reception immediately around the kiosk at Theresa Creek Dam Campground has been improved but cannot be relied upon.

The Theresa Creek Dam Campground caretaker and the IRC Local Disaster Coordination Centre (LDCC) have been provided Satellite Phones by Council to keep the lines of communications open. The Local Disaster Coordinator Disaster Manager will make contact with the Dam Operator as required.

5.5 MONITORING

5.5.1 Intake tower water level gauge

An intake tower is situated approximately 200 m upstream of the left abutment. The outlet works are fully independent of the dam structures. The pumps in the tower are not capable of reducing lake water levels rapidly.

An additional level sensor to remotely monitor the levels of the dam has been installed on the intake tower. This is a radar type sensor installed on the outside of the pump tower, with the data from the sensor transmitted via radio to a display panel at the Clermont water treatment plant.

Refer to Figure 5-3 and Figure 5-4 for photographs of the intake tower's location and water level gauge.

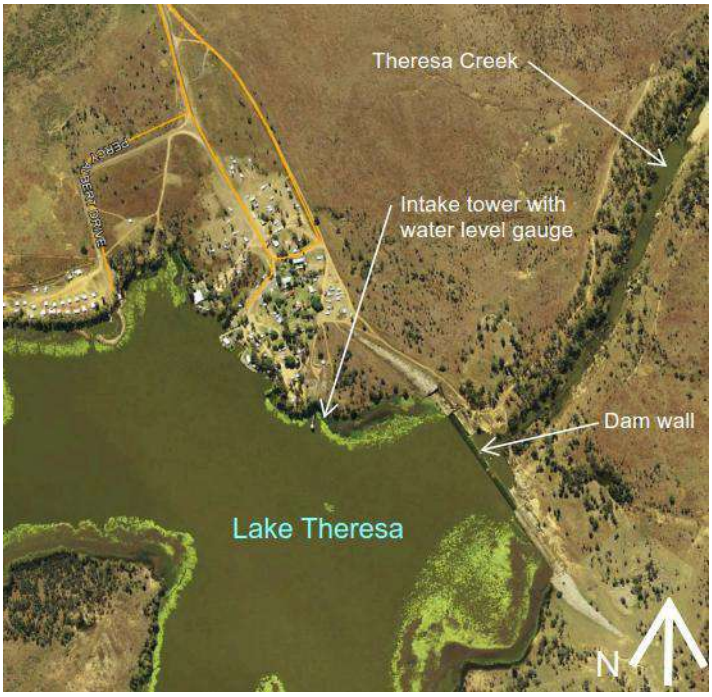


Figure 5-3 Location of intake tower with water level gauge

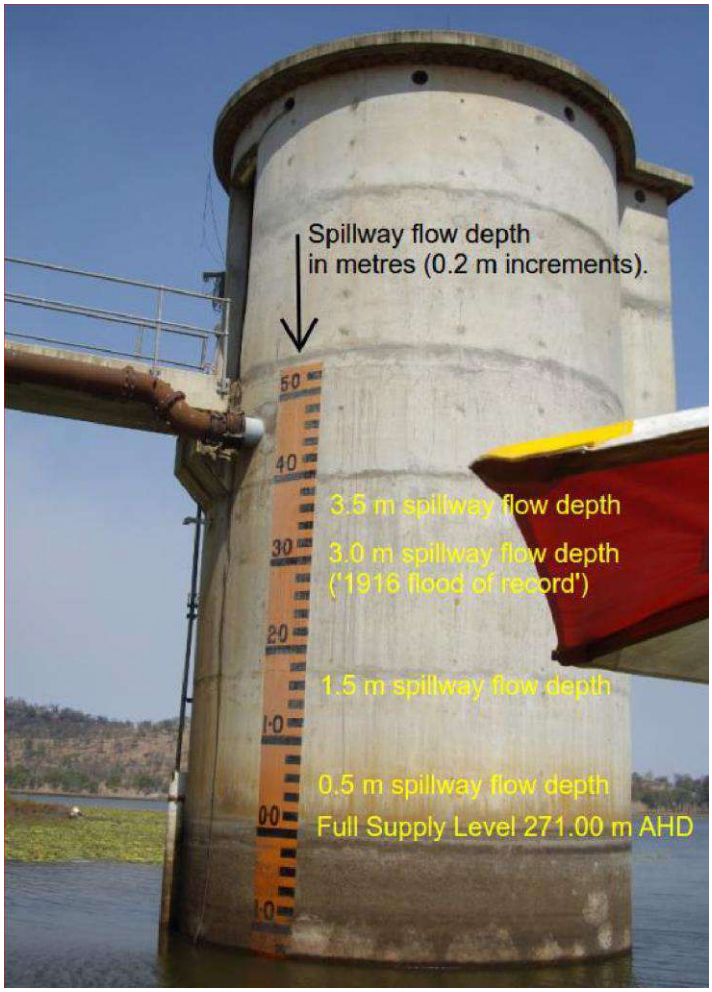


Figure 5-4 Water level gauge on intake tower

Photo notation shows water levels corresponding to various flood events.

5.5.2 Remote water level monitoring system and camera

Remote water level monitoring system at dam

The remote dam monitoring station records continuous dam water level and rainfall. This operates the same as the existing IRC flood monitoring stations. It has all of the same equipment to ensure standardisation across the IRC sites. It also meets BoM specification for monitoring stations and water height details can be found here: River Height data for Theresa Ck at Dam Site T/W * (bom.gov.au)

The data is collected into the IRC Cloud web interface. From here the data is automatically exported to the BoM on an hourly FTP cycle, with the rest of the IRC flood sites. The Cloud based monitoring system dataonline.io can be configured to allow unlimited user Email and SMS alarms. This is currently being utilised by Council staff.

The physical site has solar power and is capable of running without sunlight for 30 days.

Camera on left dam abutment

The camera is mounted to the 3 m tower that houses the water level monitoring equipment (above). The camera is mounted 3 m above the tower and 6 m above the dam crest level (5.4 m (276.4 m AHD)), giving the camera a view over the spillway (refer to Figure 5-5 for location). Images from this camera are updated to the public facing Disaster Dashboard every 30 minutes (refer to Figure 5.6) – Dashboard (isaac.qld.gov.au)

Remote access to the camera is available for approved users to enable the remote tilt and pan to view more of the structure than shown in its default view. The camera also allows the automated water level data to be verified via the images.

The camera system has a solar powered battery system, capable of running for 7 days without sunlight.

The camera also has a flood light fitted to allow night vision in a single direction. Typically towards the staff gauge plates. The images are stored in the cloud-based monitoring system, as above.

Figure 5.5 Location of spillway camera on left dam abutment

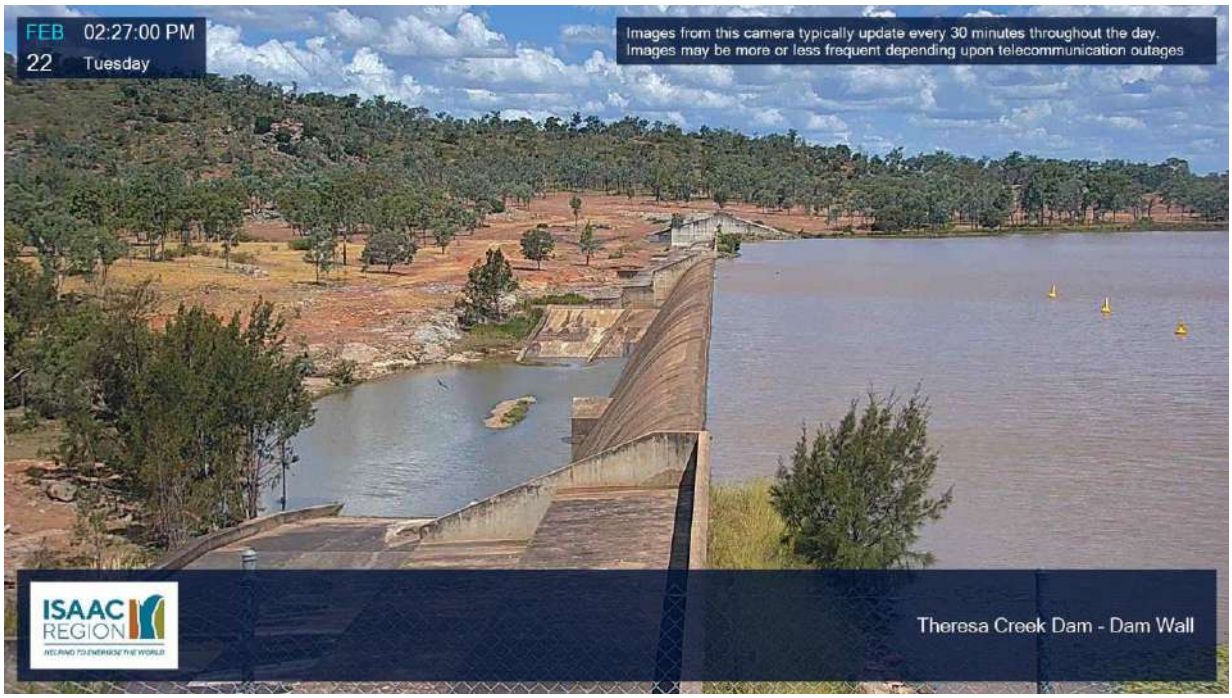


Figure 5.6 Point of view of spillway camera on left dam abutment

5.6 MAINTENANCE AND INSPECTIONS

5.6.1 Routine inspections

To reduce the likelihood of the dam failing under normal operating conditions (dam water level at or below full supply level or minor flows only through the spillway) a program of regular inspection and maintenance is undertaken as detailed in IRC's Operations and Maintenance Manual. This includes the activities noted in the table below.

Table 5-2 Theresa Creek Dam Maintenance and Inspection Schedule

ACTIVITY	DESCRIPTION / DETAILS	TIMING / FREQUENCY
Dam Safety Inspections	Comprehensive	5 Yearly
	Routine Visual	Weekly
	Special / Emergency	As Required (Dependent Upon Changes Within the Environment) e.g. floods, earthquakes etc.
	Safety Review	20 Years
Weed and Tree Removal	Monitored and Conducted	As required, minimum twice yearly
Mowing and Slashing	Monitored and Conducted	As required, minimum twice yearly.

The Dam Inspection Officer's location is at Clermont, approximately 20 km from the dam. By vehicle, it would take approximately 20 minutes to drive to the dam. Alternatively, the Dam Caretaker located at the site may undertake the inspections.

The Routine Inspection form is attached in Appendix E.

5.6.2 During sunny day conditions

As the Dam Inspection Officers are not permanently onsite at the dam to undertake inspections at short notice, the Onsite Caretaker at Theresa Creek Dam campground will notify the Dam Operator and Dam Inspection Officers if obvious changes in the dam are developing or have developed.

If any changes are identified by the onsite caretaker, then the Dam Operator should be notified. The Dam Operator will then go to site to undertake an inspection and decide whether to take further action.

The Dam Inspection Officers can inspect all features of the dam visually during Sunny Day events. If there is apparent shifting of monoliths or imminent failure of the dam, the Dam Inspection Officers should not position themselves or others downstream of the spillway.

Note, the Onsite Caretaker at Theresa Creek Dam Campground is not responsible for undertaking Routine Inspections.

5.6.3 During flood events

As the Dam Inspection Officers is not permanently onsite at the dam to undertake inspections at short notice, the onsite caretaker at Theresa Creek Dam campground will notify the Dam Operator and Dam Inspection Officers if obvious changes in the dam are developing or have developed when spillway flows are less than 0.5 m (271.5 m AHD).

If any changes are identified during spillway flows less than 0.5 m (271.5 m AHD), then the Dam Operator should be notified. The Dam Operator will then contact Dam Inspection Officers to go to site to undertake an inspection and decide whether to take further action.

During spillway flows, the left abutment (campground side of dam) can be visually inspected. The right abutment is not readily accessible during spillway flows, as no vessels are to be put on the water when the spillway is overtopping as there is a risk of the boat being washed over the spillway if it becomes disabled. The only way of inspecting the right abutment from the campground side during spillway flows is from the camera on the left abutment, using binoculars or via helicopter, as vehicle access is not available (refer to section 5.4 Dam Access).

This EAP includes the caretaker's role as described above until formal inclusion of the caretaker's role in Dam Safety Management of Theresa Creek Dam can be made under the renewed lessee agreement.

5.7 RISK AND ISSUES

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

- This EAP addresses emergencies arising from events at Theresa Creek Dam only. The emergency response required for flooding of the township of Clermont due to large flows from other creeks, rivers or tributaries (e.g. Sandy Creek and Wolfgang Creek) are documented elsewhere in the Isaac Regional Council Local Disaster Management Plan (IRC Novmeber 2021).
- Water levels in the dam will rise quickly under heavy rainfall events.
- The location of the dam being a short distance upstream of the township of Clermont (approximately 20 km) and numerous homesteads results in any changes at the dam impacting in a short period (within 15 minutes) of the nearest homestead to Theresa Creek Dam in a Sunny Day failure event.
- It is emphasised that even though flood warning times can be quite large for Clermont and towns in the Isaac Region located near other river system (days), warning times for dam emergency events are very short and very rapid response is required to effectively implement this EAP (minutes to hours).
- Where possible and safe to do so, dam operators should be mobilised early to view the developing situation at the dam. This action may need to be based on predictions of a storm or high rainfall event developing.
- Operators attending site are to be aware that due to flooding and inundation of local roads, they may become isolated at the site until flood levels recede. It is recommended operators attending the dam are equipped with drinking water, food, and appropriate clothing and communications systems suitable for the expected duration of the event (up to 24 hrs). It is noted however, that operators will not be isolated at the dam as a matter of course. The intent is for operators to remain on site only while safe to do so.
- The situations likely to lead to implementation of this EAP are also likely to see intense rainfall conditions elsewhere in the area (up to 178 mm/hr for a 1% AEP and up to 105 mm/hr for a 20% AEP, for 15-minute duration events). This will increase the hazards and risks associated with implementing this plan. Hazards may include dangerous road conditions, reduced visibility, flooding of local roads, downed power lines, trees being blown over and emergency services unable to travel to and from the dam site.
- Consideration should be given to mobilising at least 2 operators to the site to enable safe inspection and monitoring. Operators must not be sent to a potential hazardous situation alone.
- Resources required to respond to a dam safety event may be limited due to these resources being previously deployed elsewhere in the region as a result of the wet weather event, and the time required to organise and for the resources to travel to site.
- In the event that dam operators identify an issue that is developing into a breach of the embankment, terraces or monolith failure, there are minimal actions that they can take to stop or reduce the failure. There is a high likelihood that issues will develop at a rate which exceeds the capacity of the Dam Owner (IRC) to respond and to undertake repairs or mitigate the issue. The main action of the operators under these circumstances will be to observe the situation at the dam (provided it is safe to do so) and provide information to the Dam Operator, Emergency Services and the LDC of the event such that downstream evacuations can be undertaken in a timely manner
- Failure of the dam and the loss of storage capacity will have an impact on the ability of the dam to provide and maintain a potable water supply for Clermont. Separate water supply arrangements may need to be implemented following the event.

5.8 IMPACT OF FLOODING DOWNSTREAM OF THERESA CREEK DAM

5.8.1 General

Revised flood modelling was undertaken in 2020 as part of the Failure Impact Assessment (FIA) for Theresa Creek Dam. Flood inundation maps are included within Appendix B, and provide guidance on the area and the streets, roads and homesteads that may be impacted by various flood scenarios.

The extent and depth of flood inundation detailed on the inundation maps is based on modelling of rainfall / storm events and available ground level information. The inundation plans / maps provide an indication only of the depth of water and inundated areas that can be expected.

There is a relatively short time period between water discharging from the dam and impacts on the nearest homesteads. Due to the short time period available, it is recommended that actions are implemented based on predictions of an event occurring rather than waiting for trigger levels to be reached or dam safety events to have occurred.

5.8.2 Flood travel times

Flood travel times after the commencement of failure or spillway discharge (i.e. commencement of the rainfall event) are presented in this section. Flood travel times are separated into:

- The time for the first flood water to arrive at the location of the homestead
- The time for the arrival of the flood peak at the location of the homestead

Whilst flood travel times are provided for selected properties, these are estimates only limited to the events nominated below to provide an indication of warning times for evacuations, and is not an exhaustive list.

5.8.3 Capella-Rubyvale Road bridge

The elevation of the bridge was assumed to be at 201 mAHD based on the adjacent road elevation obtained from the freely available SRTM (Shuttle Radar Topography Mission) data. This Digital Elevation Model (DEM) has a vertical accuracy of +/- 10 m and therefore cannot accurately reflect the true level of the bridge. Hence, the time of arrival of first flood water may not accurately represent the actual time when water reaches the bridge and should be considered indicative only.

Distance of homesteads downstream of dam

All the homesteads below the dam along Theresa Creek within 60 km thread distance of the dam are in Central Highlands Regional Council. The distance of each homestead downstream of the dam is presented in Table 5-3.

Table 5-3 Homestead distance downstream of dam

ID. NO.	HOMESTEAD OR BRIDGE	THREAD DISTANCE DOWNSTREAM OF DAM (KM)
1.	Wallaby/Ellendale	4.5
2.	Ellendale	4.5
3.	Bellevue	7.0
4.	Peninsula	9.8
5.	Eton Vale	12.0
6.	Ethyl Glee	12.3
7.	Iron Springs	13.1
8.	Makonda	15.4
9.	Niagara	17.6
10.	Tomahawk	19.3
11.	Annmore	25.5
12.	Malthoid	39.1
13.	Forest Home	39.5
14.	Kanowna	41.0

ID. NO.	HOMESTEAD OR BRIDGE	THREAD DISTANCE DOWNSTREAM OF DAM (KM)
15.	Valeria	58.0
16.	Capella-Rubyvale Rd Bridge	58.0

Sunny Day failure event

Flood travel times for the Sunny Day failure event are presented in Table 5-4.

Table 5-4 Flood travel times for Sunny Day failure event

ID. NO.	HOMESTEAD OR BRIDGE	HOURS TO ARRIVAL OF FIRST FLOOD WATER (H:M)	HOURS TO ARRIVAL OF FLOOD PEAK (H:M)
1.	Wallaby/Ellendale	--	--
2.	Ellendale	--	--
3.	Bellevue	--	--
4.	Peninsula	--	--
5.	Eton Vale	--	--
6.	Ethyl Glen	--	--
7.	Iron Springs	--	--
8.	Makonda	--	--
9.	Niagara	--	--
10.	Tomahawk	--	--
11.	Annmore	--	--
12.	Malthoid	--	--
13.	Forest Home	--	--
14.	Kanowna	--	--
15.	Valeria	--	--
16.	Capella-Rubyvale Rd Bridge	39:00	40:00

Flood with spillway flow 1.5 m (272.5 m AHD) (no failure)

The flood travel times to each homestead after the spillway flow starts are presented Table 5-5.

Table 5-5 Flood travel times for flood with spillway flow at 1.5 m (272.5 m AHD) (no failure)

I.D. NO.	HOMESTEAD OR BRIDGE	HOURS TO ARRIVAL OF FIRST FLOOD WATER (H:M)	HOURS TO ARRIVAL OF FLOOD PEAK (H:M)
1.	Wallaby/Ellendale	--	--
2.	Ellendale	--	--
3.	Bellevue	--	--
4.	Peninsula	15:30	33:08
5.	Eton Vale	--	--
6.	Ethyl Glen	--	--

I.D. NO.	HOMESTEAD OR BRIDGE	HOURS TO ARRIVAL OF FIRST FLOOD WATER (H:M)	HOURS TO ARRIVAL OF FLOOD PEAK (H:M)
7.	Iron Springs	--	--
8.	Makonda	25:00	35:17
9.	Niagara	--	--
10.	Tomahawk	--	--
11.	Annmore	--	--
12.	Malthoid	--	--
13.	Forest Home	26:00	39:30
14.	Kanowna	--	--
15.	Valeria	--	--
16.	Capella-Rubyvale Rd Bridge	19:10	41:29

* Sheds, worker quarters and access roads are impacted

Flood with spillway flow at 1.5 m (272.5 m AHD) (failure)

For this larger flood event, the flood travel times are slightly longer as the flood hydrograph is longer. The flood travel times to each homestead after the spillway flow starts are presented in Table 5-6.

Table 5-6 Travel times for flood with spillway flow at 1.5 m (272.5 m AHD) (failure)

I.D. NO.	HOMESTEAD OR BRIDGE	HOURS TO ARRIVAL OF FIRST FLOOD WATER (H:M)	HOURS TO ARRIVAL OF FLOOD PEAK (H:M)
1.	Wallaby/Ellendale	--	--
2.	Ellendale	--	--
3.	Bellevue	--	--
4.	Peninsula	15:20	33:09
5.	Eton Vale	--	--
6.	Ethyl Glen	--	--
7.	Iron Springs		
8.	Makonda	24:50	34:51
9.	Niagara		
10.	Tomahawk		
11.	Annmore	--	--
12.	Malthoid	--	--
13.	Forest Home	26:00	41:00
14.	Kanowna	--	--
15.	Valeria	--	--
16.	Capella-Rubyvale Rd Bridge	19:10	43:14

* Sheds, worker quarters and access roads are impacted

Flood failure wave travel times for flood with spillway flow at 3 m (274 m AHD) (failure)

For this case, the failure occurs when the spillway flow depth is at 3 m (274 m AHD), equivalent to a 1 in 1000 AEP event with dam failure. The flood failure wave travel times to each homestead after the start of failure are presented in Table 5-7.

Table 5-7 Flood wave travel times for flood with spillway flow depth at 3 m (274 m AHD) (failure)

I.D. NO.	HOMESTEAD OR BRIDGE	HOURS TO ARRIVAL OF FIRST FLOOD WATER (H:M)	HOURS TO ARRIVAL OF FLOOD PEAK (H:M)
1.	Wallaby/Ellendale		
2.	Ellendale	--	--
3.	Bellevue	--	--
4.	Peninsula	10:10	20:04
5.	Eton Vale		--
6.	Ethyl Glen	--	--
7.	Iron Springs		
8.	Makonda	14:10	21:03
9.	Niagara		
10.	Tomahawk		
11.	Annmore	--	--
12.	Malthoid	--	--
13.	Forest Home		
14.	Kanowna	--	--
15.	Valeria	--	--
16.	Capella-Rubyvale Rd Bridge	17:30	33:05

* Sheds, worker quarters and access roads are impacted

5.8.4 Evacuation routes

From Theresa Creek Dam Campground

Figure 5-6 shows the direction of evacuation campground occupants should take to higher ground should rising lake levels threaten camp sites. The campground caretaker should be made aware of their responsibilities on an annual basis (preferably just prior to the onset of the wet season) to inform campground occupants of the preferred evacuation route in the event of rising lake levels.

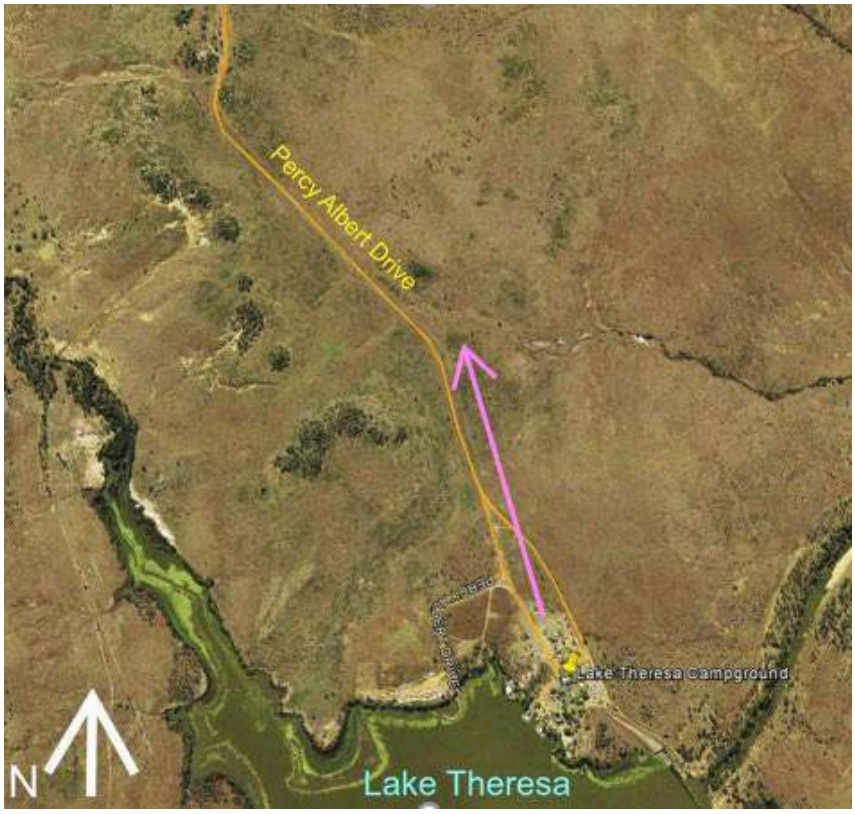


Figure 5-6 Direction of evacuation campground occupants should take to higher ground should rising lake levels threaten camp sites

From homesteads downstream of the dam

Directions of evacuation from each homestead and creek crossing to higher ground are presented in Figure 4 in Appendix I.

6. ALERT LEVELS

Each alert level includes a colour coding which is used to define the level of action outlined in the corresponding flow charts and action plans is provided in Section 9 EAP Activation. A description of each alert level is provided in Table 6-1 Alert level definitions.

Whilst this EAP provides for a situation to develop in stages, it is to be recognised that under some circumstances the immediate activation of this plan to a 'Dam Safety Emergency' may be required. Furthermore, the dam has the potential for its water level to quickly rise. Consideration should be given to escalating from ALERT to STAND-UP if the rate of water level rise is expected to be rapid or may exceed the capacity of responders to react in a timely manner (refer to Section 7.2 Emergency Events – Potential Dam Safety Issues for more detailed information on potential dam safety issues).

Table 6-1 Alert level definitions

LEVEL	DESCRIPTION
ALERT **(Dam safety alert)**	Conditions are developing or have developed that raise the need for closer monitoring of the dam. Conditions may include: • High rainfall predicted in the dam catchment. • High rainfall occurring in the dam catchment. • Remote monitoring shows upstream stream gauge (IRC owned, Theresa Creek – Kilmarnock Station BOM:535161) is recording high flows entering the dam. • Spillway flow depth occurring (above 0.2 m (271.2 m AHD)). Flow levels between 0 m (271 m AHD) and 0.2 m (271.2 m AHD) do not constitute a dam safety alert.

LEVEL	DESCRIPTION
	• Identification of structural issues such as increased cracking of concrete terrace or concrete gravity section (dam and embankment intact but potential for failure). • New or increased seepage areas identified in dam embankment. • Reports or identification of sabotage or vandalism that may comprise dam integrity. • Report of an earthquake in the region. • Identification of dam safety issues (refer to Section Emergency Events – Potential Dam Safety Issues) that could develop further if not addressed in a timely manner.
LEAN FORWARD **(Dam safety event)**	Conditions exist or are developing further where Theresa Creek Dam is filling with water and there is potential for further water level rises OR for dam safety issues to develop or have been observed. The dam (embankment, concrete monoliths or terraces) is intact but there is potential for it to fail. Conditions may include: • Remote monitoring shows upstream stream gauge (IRC owned, Theresa Creek – Kilmarnock Station BOM:535161) is recording high flows entering the dam. • Spillway flow level occurring above 0.5 m (271.5 m AHD) and approaching 1.5 m (272.5 m AHD) (concrete terraces), and high rainfall predicted or occurring. • New leakage or sudden increase in seepage. • New cracks in the dam wall or increased cracking in terraced section. • Slumping of embankment. • Piping through embankment (continuous low-flow or gushing release of water that is greater than regular seepage). • Shifting of monoliths or excessive seepage through monoliths.
STAND UP **(Dam safety emergency)**	Conditions exist or are developing where major flooding downstream of Theresa Creek Dam is expected AND / OR failure of the dam embankment is expected or has occurred. Conditions may include: – Spillway flow level occurring above 1.5 m (272.5 m AHD) (concrete terraces). (homesteads could soon be inundated if dam water level continues to increase) – Spillway flow level approaching 2.8 m (273.0 m AHD) (homesteads could be inundated as dam water level continues to increase). – Spillway flow level approaching 3.5 m (274.5 m AHD) (homesteads inundated). – Spillway flow level approaching 5.4 m (276.4 m AHD) (dam crest will be overtopped at this level and embankment could breach). • Identification of dam safety issues that put the dam at immediate risk. • Dam failure is developing, occurring or has occurred.
STAND DOWN	Rainfall or inflows to Theresa Creek Dam are reducing and the water level of the dam is dropping. Conditions may include: • Capella-Rubyvale Rd Bridge has been inspected and deemed safe to re-open after being inundated. • Dam inspections have not identified any safety issues or structural integrity issues. • All of the conditions specified in ALERT, LEAN FORWARD or STAND- UP levels no longer apply dam inspections have not identified any safety issues or structural integrity issues. • Failure has occurred and the reservoir drains, or it is determined seepage is manageable and is not going to develop into a failure condition.

7. EMERGENCY EVENTS

7.1 NORMAL OPERATING CONDITIONS

Normal operating conditions are defined as when minor or low flows in Theresa Creek are occurring (up to a 50% AEP flood) and no dam safety issues are evident or developing. The dam has the capacity to safely fill to full supply level and for discharges to occur through the dam's main spillway (typically dam water levels ≤ 271.2 mAHD with up to 0.2 m of water flowing over the spillway). This is regarded as a normal situation if it typically does not affect downstream residents or roadways, however flood water will approach existing homesteads and may overtop the Capella-Rubyvale Rd Bridge. A heightened level of awareness is recommended for all flood levels potentially forecast to approach a level of (271.5 m AHD) with up to 0.5 m of water flowing over the spillway.

7.2 POTENTIAL DAM SAFETY ISSUES

Possible dam safety issues that could develop at the dam include those outlined in Table 7-1. The issues outlined are in addition to emergency issues resulting from high inflows from the catchment / major flooding and inundation.

Table 7-1 Potential dam safety issues

POSSIBLE DAM SAFETY ISSUES	DESCRIPTION / CHARACTERISTICS	EMERGENCY EVENT ISSUES
Seepage erosion or piping failure developing	Identification of changes in seepage patterns at the earthen embankment or concrete terraces. Changes can include turbidity/colour (evidence of loss of embankment material) and/or increased flow rates.	Potential for the seepage to develop into a piping failure.
Overtopping of the dam	Water is discharging over the crest or around the abutments of the earth embankments.	Major flooding downstream. Potential for erosion of the earth embankments to take place and develop into a breach.
"Sand Boil" downstream of dam	A raised mound with a discharge of water near or downstream of the dam toe.	Development of a piping failure at depth beneath the dam.
Scour	Wave Scour on earth levee embankments or earth / rockfill upstream of concrete terraces.	Loss of levee embankment fill and destabilisation of the levee embankment (slips). Potential for breach if large slips occur.
Inundation of downstream toe of earth embankments	Saturation of the embankment fill at the downstream toe of the earth embankments.	Potential for instability (slips) to develop in the downstream batter as the flood level recedes. Potential for breach if large slips occur and undercut the embankment toe.
Longitudinal cracks in earth embankments or crest (cracks parallel with crest alignment)	Straight or curved cracks in the earth embankment crest or batters.	Embankment instability leading to slip failures developing and potential for breach. Potential for overtopping if freeboard is lost at the area of the slope failure.
Transverse cracks in earth embankment or crest (cracks running across crest alignment)	Fissures or cracks in the embankment crest or batters.	Transverse cracks create an open water path through the embankment with the potential for piping through the crack if the water level is above the level of the crack base. Potential for further erosion to develop and potential for breach.
Slips, slumps or settlement in the embankment	Depressions in the embankment. Depressions or bulges on the embankment batters.	Embankment instability developing that could develop further including a breach of the embankment owing either to piping or overtopping if freeboard is lost.
Leakage through concrete joints	Excessive or increased leakage through joints in the concrete gravity dam.	Potential for instability (excessive movement of the concrete monoliths) leading to development of a breach.
Spillway apron damage	Loss of concrete and/or exposure of reinforcement in spillway apron.	Potential for undermining of the dam foundation leading to development of a piping failure at depth beneath the dam.
Cracking of concrete terraces	Increased cracking or widening of cracks on surface or walls of concrete terraces.	Increased cracking, leading to break up of concrete, removal during spillway overtopping

POSSIBLE DAM SAFETY ISSUES	DESCRIPTION / CHARACTERISTICS	EMERGENCY EVENT ISSUES
		and subsequent structural failure of terraces resulting in breach.
Spillway debris	Large trees or objects trapped against the spillway during flood flow.	Potential damage to spillway crest and/or increase in flood levels due to inefficient spillway operation or premature overtopping/failure of embankments.

8. COMMUNICATIONS

8.1 EQUIPMENT

The means of communication to be engaged for this EAP and to be used by the resources responding to a dam safety incident shall include:

- Landline Telephone
- Mobile Telephone (including text messaging)
- Satellite Telephone (where mobile phone coverage is not available or unreliable)
- Local ABC and FM Radio Broadcast
- Police radio
- Email
- UHF Radio
- Public announcement system (Horn)
- Social media and internet (including Disaster Dashboard: Dashboard (isaac.qld.gov.au))

All persons engaged in this plan shall maintain a log of any communications sent or received together with any corresponding actions taken, observations and other relevant notes. Refer Appendix G.

The National Emergency Alert System is also considered to be a means of issuing alerts and warnings via SMS (Text) messages through nominated polygons.

It is to be noted that both Satellite Telephone and Mobile Phone systems can be impacted by adverse weather conditions. Where possible, backup communications via mobile VHF system (DCC 2019) are to be provided.

8.2 INTERNAL COMMUNICATIONS (COUNCIL)

During all but the most severe operating conditions, telephones should be used as the main form of communication. The Dam Operator shall be responsible for keeping the emergency contact register from the Emergency Action Plan updated. The emergency contact register must always be up to date and the EAP reviewed annually by 1 October.

If telephone communications at Theresa Creek Dam are hampered, the Dam Operator must carry a mobile phone, Satellite Phone and UHF Radio at all times and the devices must be well maintained.

8.3 EXTERNAL COMMUNICATIONS (OUTSIDE OF COUNCIL WHEN THE LDMG IS INVOLVED)

Procedures for external communications are referred to in the EAP Activation tables, and within the Isaac Regional Council Local Disaster Management Plan (IRC October 2020).

- IRC LDC is to contact the CHRC LDC by phone to advise that there is a risk. Then once an official message has been approved by the Chair of the IRC LDMG this is to be sent also in the event of flood and/or failure event.

Priority is to be given to contacting homesteads that are at risk according to Table 2-2 depending on the flood category/event, however all homestead owners/residents should be notified.

For a potential Sunny Day failure or Downstream Release Hazard flood event, the CHRC LDMG should be notified so they may take appropriate action to close the Capella-Rubyvale Road Bridge over Theresa Creek.

- IRC LDMG contacting homestead owners/residents by telephone or UHF Radio (or other methods detailed in the IRC LDMP) where available.
- Local mass communications media (Dashboard Dashboard (isaac.qld.gov.au), Media and Social Media e.g. Facebook – https://www.facebook.com/IsaacLDCC
- National Emergency Alert System
  - Emergency services can use “Emergency Alert” to send a warning message to mobile telephones based on the last known location of the handset and to all telephones based on registered service addresses. The website https://www.qld.gov.au/alerts.com presents alerts issued in Queensland. Refer to Figure 8-1 and Figure 8-2 for the Population at Risk region and polygon for “Emergency Alerts”.
  - IRC LDMG has prepared voice and text messages for dam event scenarios including failure of wall and spillway discharge.
- People at risk should be informed about the existence of this EAP and what the potential messages means to them, through letters or through other communication.

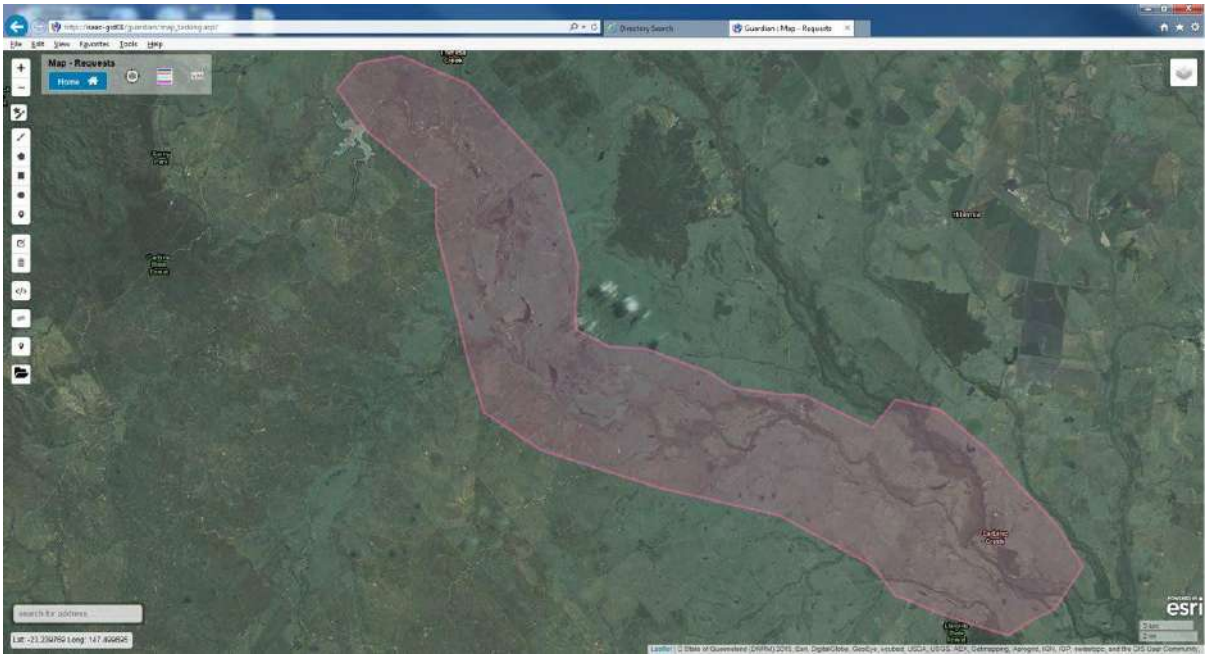


Figure 8-1 Population at Risk (PAR) region and "Emergency Alert" polygon (aerial photo). Theresa Creek Dam is at the western (upstream) end of the polygon.

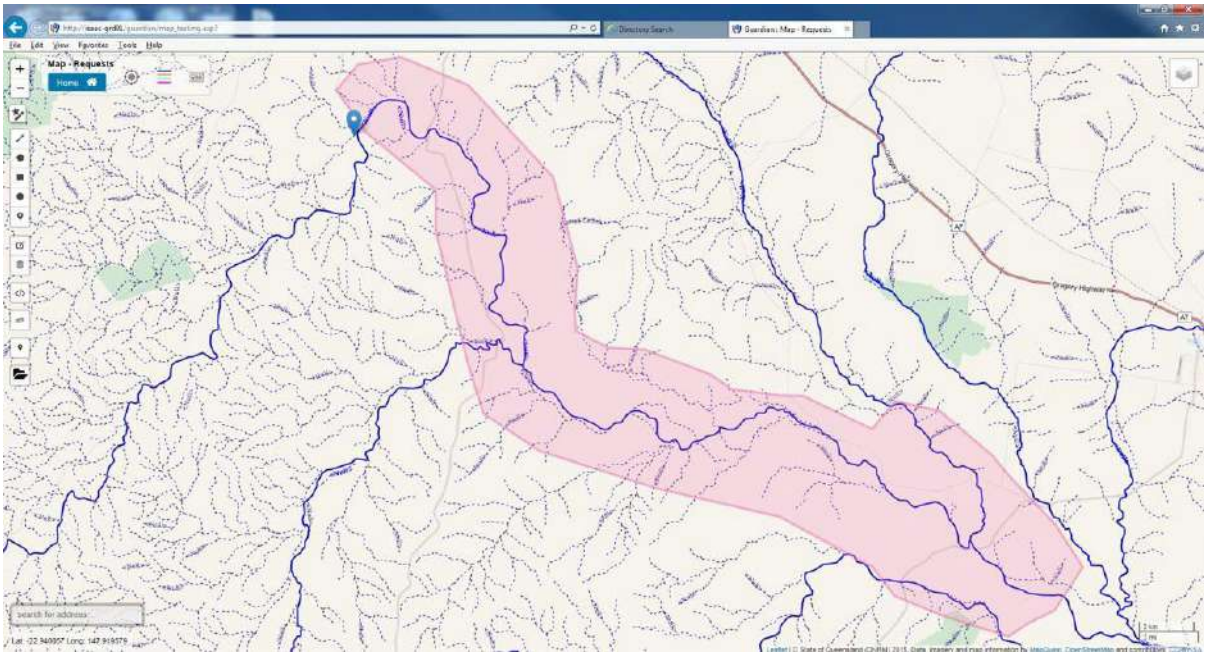


Figure 8-2 Population at Risk (PAR) region and "Emergency Alert" polygon (streams and watercourses). Theresa Creek Dam is at the western (upstream) end of the polygon.

8.4 ISSUING FLOOD WARNINGS AND EVACUATION NOTICES

The following methods of issuing flood warnings and evacuation notices (refer for message templates) are to be used where appropriate:

- Warnings issued using the National Emergency Alert “Polygon” System (SMS alert through the mobile phone system).
- Use of loud speakers via a vehicle travelling the streets.
- Door knocking selected properties known vulnerable residents (refer Table 2-2 Impacted homesteads/crossing during various emergency events).
- Local emergency response personnel making public broadcasts and where necessary door knocking individual residences or places of occupancy.
- Local media releases including Radio and Television.
- The sounding of a siren or other audible warning devices to alert both general and transient populations.
- Through social media including Facebook

9. EAP ACTIVATION

9.1 OVERVIEW

At Theresa Creek Dam there are several different events that may lead to this EAP being activated. The activation of the EAP is the sole responsibility of the IRC LDMG based on the recommendation from DWW. In consultation with stakeholders through meetings the deactivation of the EAP and the declaration of Stand Down is also the sole responsibility of the IRC LDMG.

The following events are considered to be the most relevant for the dam. The scenarios outlined below are to be used as a guide to the possible dam safety events and emergency situations along with the actions and responses that may need to be considered.

It is important to note that an event may unfold in a different manner to the scenarios outlined below. This may be due to varying rainfall patterns, several storm events following in quick succession or other factors. The scenarios below are to be used as guide only in developing appropriate responses.

9.2 SUNNY DAY FAILURE

Under this scenario (refer Table 9-1 and Figure 9-1), a failure develops during a period of dry weather (i.e. low or nil precipitation in the dam catchment and low or nil inflow to the dam). Failure of the dam occurs when it is least expected and is not related to flood conditions or during periods of high rainfall. There have been no indications in the past of any dam safety issues and the last dam safety inspection did not identify any seepage, cracking, movement or other issues. The following conditions may, however, be applicable (one or more of the following):

- Generally fine weather conditions (inflow to the dam may vary from nil to low stream flows).
- The dam water level is at or below Full Supply Level (FSL).

Under this scenario, there is less risk for the downstream population as the PAR has been assessed as zero in the 2020 Failure Impact Assessment. However, a dam safety emergency could still be triggered by any of the following:

- Changes in seepage.
- Sand boils developing along the toe of the downstream embankment or in the vicinity of the toe.
- Water flowing from cracks or development of ‘piping’ holes in the embankment.
- Slips, slumps or movement of material on the embankment.
- Development of cracks, horizontal movement or settlement of the dam embankment.
- An earthquake leading to structural damage to the dam embankment or liquefaction of underlying soils.
- Damage to or failure of the spillway (e.g. concrete terraces, apron slabs or concrete gravity sections).
- Other stability issues or combination of any of the above that leads to concerns around the stability of the dam embankment or spillway.

Figure 9-1 Sunny Day failure flow chart

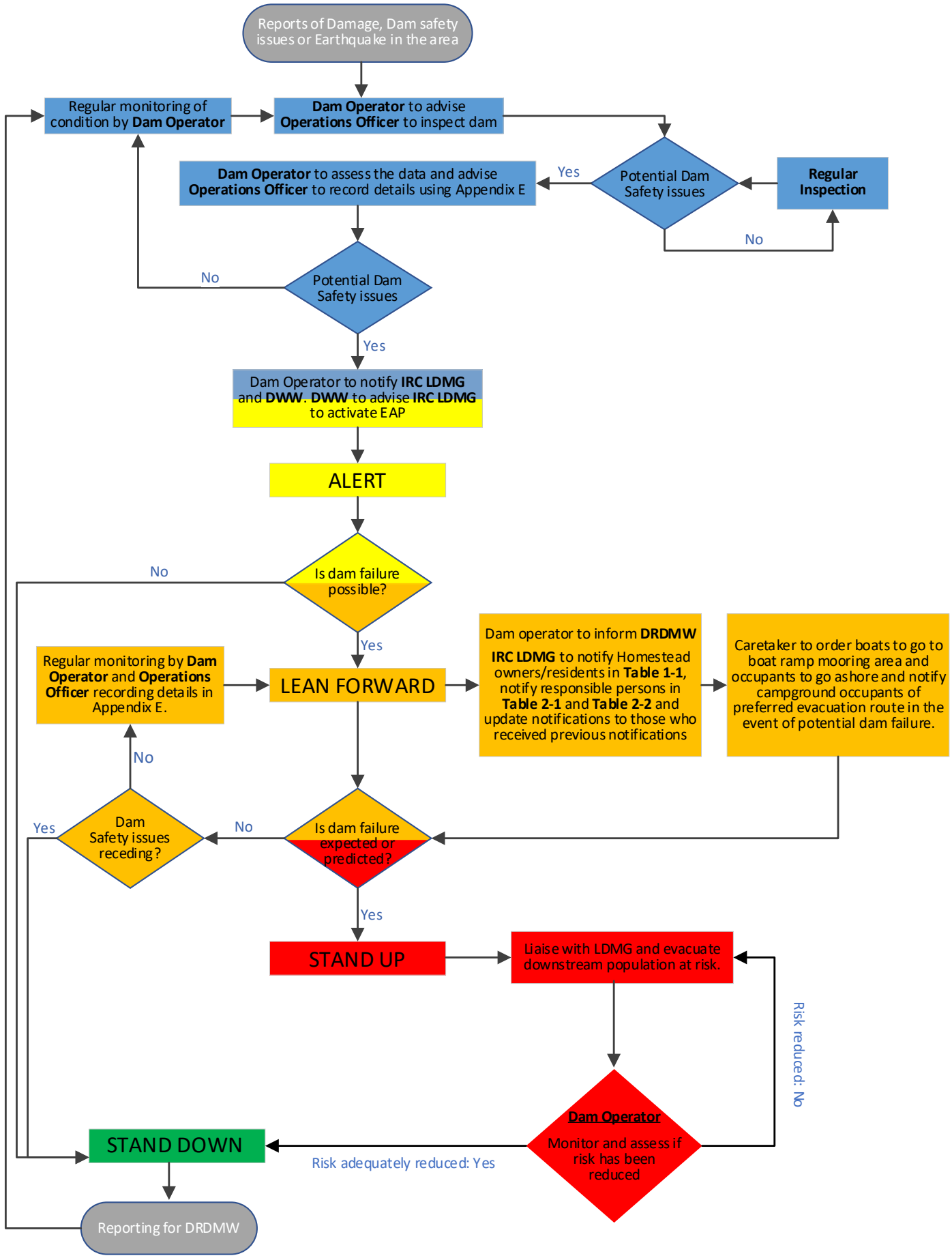


Table 9-1 Sunny Day Event

SUNNY DAY EVENT						
DAM INSPECTIONS OFFICER / CARETAKER						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
ALERT (Dam Safety Alert)	Sudden or gradual changes to the dam spillway distress such as cracks.	• Notify **Dam Operator** of any sudden or gradual changes to the dam (spillway, embankments, piping). • Take photos of any dam safety issues. • Record dam water levels from tower gauge board. • Undertake increased frequency of inspections (minimum twice daily). • Provide twice daily updates to **Dam Operator** if safe to do so. • Continue to monitor water levels.	**Operations Officer** **Dam Operator** **Onsite Caretaker**		SMS Mobile Phone Landline Phone Satellite Phone	
LEAN FORWARD (Dam Safety Event)	Embankment Stability issues deterioration of embankment condition.	• Order vessels on lake to boat ramp mooring area and occupants to go ashore. • Continue to record dam water levels from tower gauge board and update to **Dam Operator.**	**Dam Operator** **Onsite Caretaker**	Boat or any vessel user in lake Campground Occupants	Public Announcement Horns / Megaphone	Refer to Appendix "H" Warning Messages and Distribution
STAND UP (Dam safety Emergency)	Loads on embankment increasing or cracking / deformation increasing to the safety of the dam is significantly impaired. Cracking / deformation is beyond repair and still worsening.	• Evacuate campground occupants to higher ground. Roads will be impacted by flooding so evacuation should not be offsite. • Continue to monitor any changes to the Dam and notify **Dam Operator**.	**Dam Operator** **Onsite Caretaker**	Campground Occupants	Public Announcement Horns / Megaphone	Refer to Appendix "H" Warning Messages and Distribution
STAND DOWN	The risk of failures drops significantly to the level that the dam is safe for normal operations.	• Receive notification from **Dam Operator** of STAND DOWN. • Participate in review of the event as directed by the **LDC**.	**Dam Operator** **IRC LDMG**	**LDC**	SMS Mobile Phone Landline Phone Satellite Phone	

SUNNY DAY EVENT						
OPERATIONS OFFICER (OO)						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
ALERT (Dam Safety Alert)	Sudden or gradual changes to the dam spillway distress such as cracks.	• Undertake inspection as advised by **Dam Operator**. • Provide technical support to **Dam Operator** and continue to report findings. • Record details using the template provided in Appendix H. • Appendix E - Routine Inspection Form. • Maintain log of all communications (refer to Appendix G).	**Dam Operator** **Onsite Caretaker**		SMS Mobile Phone Landline Phone Satellite Phone	
LEAN FORWARD (Dam Safety Event)	Embankment Stability issues deterioration of embankment condition.	• Remain onsite (if safe to do so) and continue to monitor issue(s). • Take photos of issue(s). • Record details using the template provided in Appendix E. • Maintain log of all communications (refer to Appendix G). • Immediately advise **Dam Operator** of any observed changes.	**Dam Operator** **Onsite Caretaker**		SMS Mobile Phone Landline Phone Satellite Phone	
STAND UP (Dam safety Emergency)	Loads on embankment increasing or cracking / deformation increasing to the safety of the dam is significantly impaired. Cracking / deformation is beyond repair and still worsening.	• Remain onsite (if safe to do so) and continue to monitor issue(s). • Take photos of issue(s). • Record dam water levels from tower gauge board. • Record details using the template provided in Appendix E. • Maintain log of all communications (refer to Appendix G). • Immediately advise **Dam Operator** of any observed changes.	**Dam Operator** **Onsite Caretaker**		SMS Mobile Phone Landline Phone Satellite Phone	
STAND DOWN	The risk of failures drops significantly to the level that the dam is safe for normal operations.	• Receive notification from **Director Water and Waste** or **IRC** **LDMG** of STAND DOWN. • Participate in a review of the event as directed by the **Dam Operator.** • Recommence routine visual inspections and monitoring.	**Director Water and Waste** **IRC LDMG** **Dam Operator**	**LDMG**	SMS Mobile Phone Landline Phone Satellite Phone	

SUNNY DAY EVENT						
OPERATIONS OFFICER (OO)						
ALERT LEVEL	TRIGGER	ACTION	INTERNAL COMMS TO	COMMS EXTERNAL TO	COMMS METHOD	EXTERNAL MESSAGE

SUNNY DAY EVENT						
DAM OPERATOR (DO)						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
ALERT (Dam Safety Alert)	Sudden or gradual changes to the dam spillway distress such as cracks.	• Receive and review all information from the **Operations Officer Inspector/ Caretaker**. • Receive automated earthquake notification from Geoscience Australia and / or reports of damage to the dam. • Request **Operations Officer** to attend site and inspect the dam. • Review all data and information received from the **Operations Officer**. • Take water levels from the Council Cloud web interface. • Continue to monitor onsite and remote monitoring of the situation at the dam. • Advise **Director Water and Waste** and **IRC LDMG** of any observed changes. • Maintain log of all communications (refer to Appendix G).	**Onsite Caretaker** **Operations Officer** **Director Water and Waste** **IRC LDMG**	**LDMG**	SMS Mobile Phone Landline Phone Satellite Phone	
LEAN FORWARD (Dam Safety Event)	Embankment Stability issues deterioration of embankment condition.	• Receive notification from **Director Water and Waste** and **IRC LDMG** of LEAN FORWARD. • Receive automated earthquake notification from Geoscience Australia and / or reports of damage to the dam. • Review all data and information received from the **Operations Officer**. • Take water levels from the Council Cloud web interface. • Continue to monitor onsite and remote monitoring of the situation at the dam. • Advise **Director Water and Waste** and **IRC LDMG** of any observed changes. • Maintain log of all communications (refer to Appendix G). • Engage specialist Dam Safety Engineer to inspect dam. • Arrange for additional resources to attend site for repairs where required. • Notify **DDS** about the current situation	**Onsite Caretaker** **Operations Officer** **Director Water and Waste** **IRC LDMG** **DDS**	**LDMG**	SMS Mobile Phone Landline Phone Satellite Phone	

SUNNY DAY EVENT						
DAM OPERATOR (DO)						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
STAND UP (Dam safety Emergency)	Loads on embankment increasing or cracking / deformation increasing to the safety of the dam is significantly impaired. Cracking / deformation is beyond repair and still worsening.	• Receive notification from **Director Water and Waste** and **IRC LDMG** of STAND UP. • Receive automated earthquake notification from Geoscience Australia and / or reports of damage to the dam. • Review all data and information received from the **Operations Officer**. • Take water levels from the Council Cloud web interface. • Continue to monitor onsite and remote monitoring of the situation at the dam. • Advise **Director Water and Waste** and **IRC LDMG** of any observed changes. • Maintain log of all communications (refer to Appendix G). • Direct additional resources undertake emergency site repairs (if safe to do so).	**Onsite Caretaker** **Operations Officer** **Director Water and Waste** **IRC LDMG**	**LDMG**	SMS Mobile Phone Landline Phone Satellite Phone	
STAND DOWN	The risk of failures drops significantly to the level that the dam is safe for normal operations.	• Receive notification from **Director Water and Waste** and **IRC LDMG** of STAND DOWN. • Engage specialist Dam Safety Engineer to inspect dam, organise repairs and record details. • Prepare and Emergency Event Report (EER) for submission to the **DDS** within 30 business days after the end of the emergency event. • Provide an interim report to the **DDS** within 10 business days after the end of the emergency event.	**DDS**	**DDS** **LDMG**	SMS Mobile Phone Landline Phone Satellite Phone	

SUNNY DAY EVENT						
DIRECTOR OF WATER AND WASTE (DWW)						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
ALERT (Dam Safety Alert)	Sudden or gradual changes to the dam spillway distress such as cracks.	• Receive and review updates from **Dam Operator.** • Notify **IRC LDMG** of the potential need for ALERT level. • Maintain log of all communications (refer to Appendix G).	**Dam Operator** **IRC LDMG**	**LDMG**	SMS Mobile Phone Landline Phone Satellite Phone	
LEAN FORWARD (Dam Safety Event)	Embankment Stability issues deterioration of embankment condition.	• Notify **IRC LDMG** of the potential need for LEAN FORWARD level. • Review all data and information received from the **Dam Operator**. • Maintain log of all communications (refer to Appendix G). • Assign resources to assist **Operations Officer** as required. • Provide updates to **IRC LDMG.**	**Dam Operator** **IRC LDMG** **Operations Officer**	**LDMG**	SMS Mobile Phone Landline Phone Satellite Phone	
STAND UP (Dam safety Emergency)	Loads on embankment increasing or cracking / deformation increasing to the safety of the dam is significantly impaired. Cracking / deformation is beyond repair and still worsening.	• Notify **IRC LDMG** of the potential need for STAND- UP level. • Review all data and information received from the **Dam Operator**. • Maintain log of all communications (refer to Appendix G).	**Dam Operator** **IRC LDMG**	**LDMG**	SMS Mobile Phone Landline Phone Satellite Phone	
STAND DOWN	The risk of failures drops significantly to the level that the dam is safe for normal operations.	• Collaborate with **IRC LDMG** to jointly determine when to Stand Down. • Coordinate and conduct a review of the event and all responses.	**DDS**	**LDMG**	SMS Mobile Phone Landline Phone Satellite Phone	

SUNNY DAY EVENT						
LOCAL DISASTER MANAGEMENT GROUP (LDMG)						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
ALERT (Dam Safety Alert)	Sudden or gradual changes to the dam spillway distress such as cracks.	• Receive and review all information received from **Director Water and Waste**. • Declare ALERT level activating EAP. • Commence new operation in Guardian IMS • Maintain log of all communications via Guardian IMS.	**Dam Operator** **Director Water and Waste**		SMS Mobile Phone Landline Phone Satellite Phone Disaster Dashboard	
LEAN FORWARD (Dam Safety Event)	Embankment Stability issues deterioration of embankment condition.	• Receive notification from **Director Water and Waste** and review for the potential need for LEAN FORWARD. • Declare LEAN FORWARD. • Notify homestead owners/residents in Table 2-2 using SMS via Guardian IMS. Notify Responsible Persons in Table 1-1, Table 2-1, Table 2-2 using SMS via Guardian IMS. • Update notifications to those who received previous notifications. • Maintain log of all communications via Guardian IMS.	**Dam Operator** **Director Water and Waste**	**D/S** residents who will be affected as per Table 2-2 State Emergency Services and Police as per Table 2-1 **CHRC**, **DDS** and **IRC** as per Table 1-1	SMS via Guardian IMS Mobile Phone Landline Phone Satellite Phone Disaster Dashboard Social Media systems Local radio	Refer to Appendix "H" Warning Messages and Distribution
STAND UP (Dam safety Emergency)	Loads on embankment increasing or cracking / deformation increasing to the safety of the dam is significantly impaired. Cracking / deformation is beyond repair and still worsening.	• Receive notification from **Director Water and Waste** and review for the potential need for STAND UP. • Declare STAND UP. • Update notifications to those who received previous notifications. • Notify Responsible Persons in Table 1-1, Table 2-1, Table 2-2. • Maintain log of all communications via Guardian IMS.	**Dam Operator** **DDS**	**D/S** residents who will be affected as per Table 2-2 State Emergency Services and Police as per Table 2-1 **CHRC**, **DDS** and **IRC** as per Table 1-1	SMS via Guardian IMS Mobile Phone Landline Phone Satellite Phone Social Media systems Local radio	Refer to Appendix "H" Warning Messages and Distribution
STAND DOWN	The risk of failures drops significantly to the level that the dam is safe for normal operations.	• Collaborate with **Director Water and Waste** to jointly determine when to Stand Down. • Declare STAND DOWN. • Issue a final notification advising the end of the emergency event.	**DDS** **CHRC LDC**	**D/S** residents who will be affected as per Table 2-2 State Emergency Services and Police as per Table 2-1	SMS via Guardian IMS Mobile Phone Landline Phone Satellite Phone Social Media systems	

SUNNY DAY EVENT						
LOCAL DISASTER MANAGEMENT GROUP (LDMG)						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
		• Notify homestead owners/residents in Table 2-2 using National Emergency Alert system or fastest method of notification. • Notify Responsible Persons in Table 1-1, Table 2-1, Table 2-2.		**CHRC**, **DDS** and **IRC** as per Table 1-1	Local radio	

9.3 FLOODING OR FLOODING AND DAM FAILURE EMERGENCY EVENT SCENARIOS

Under this scenario, conditions exist, are developing or are predicted to develop where flood inflow from the Theresa Creek catchment into Theresa Creek Dam is taking place or expected to occur.

The dam water level is rising or expected to rise above full supply level (discharges taking place through the main spillway and discharges around the end of the dam embankments or overtopping of the dam may occur).

An additional scenario is when the dam is experiencing minor or major flood inflows (with discharges through the main and auxiliary spillways expected or taking place) and a dam safety issue is identified or developing. A breach of the dam embankment or scouring around the end of the dam may potentially occur such that the discharge flow rate from the dam increases or expected to increase.

The following conditions may be applicable (one or more of the following):

- Heavy or high intensity rainfall in the catchment located upstream of Theresa Creek Dam.
- The upstream catchment has been saturated from previous rainfall events or the rainfall event is expected to quickly saturate the catchment and runoff to commence within a short period of time.
- Major storm activity or high rainfall events are predicted over the catchment. The rainfall event may include a high rainfall intensity event (>100 mm per hour) or a rainfall system that is continuous over a long period of time.
- The dam is expected to fill quickly and discharges to commence through the main spillway.
- A dam safety issue is developing or that may lead a breach of the embankment, failure of the concrete dam monoliths or concrete terraces in conjunction with a rainfall event.
- Overtopping of the dam crest and erosion of the dam crest is expected or taking place.

Under this scenario (Flood Inflows to Dam and potentially a Dam Safety Issue), a dam safety emergency could be triggered by any of the following:

- Flood inflows to Theresa Creek Dam taking place (flood warnings issued for Theresa Creek upstream of the dam).
- Dam water levels expected to rise above or have reached the nominated trigger levels.
- Dam water levels rising to the point where discharges are taking place or expected to take place over the spillway.
- Inflows to Theresa Creek Dam expected to fill dam to dam crest level or overtop the dam.
- Dam safety issue identified or developing that is likely to lead failure of the dam or the dam has been found to have failed (i.e. a breach through the dam embankment, sliding failure of the monoliths or similar).

Figure 9-2 Flood Inflow Flow Chart

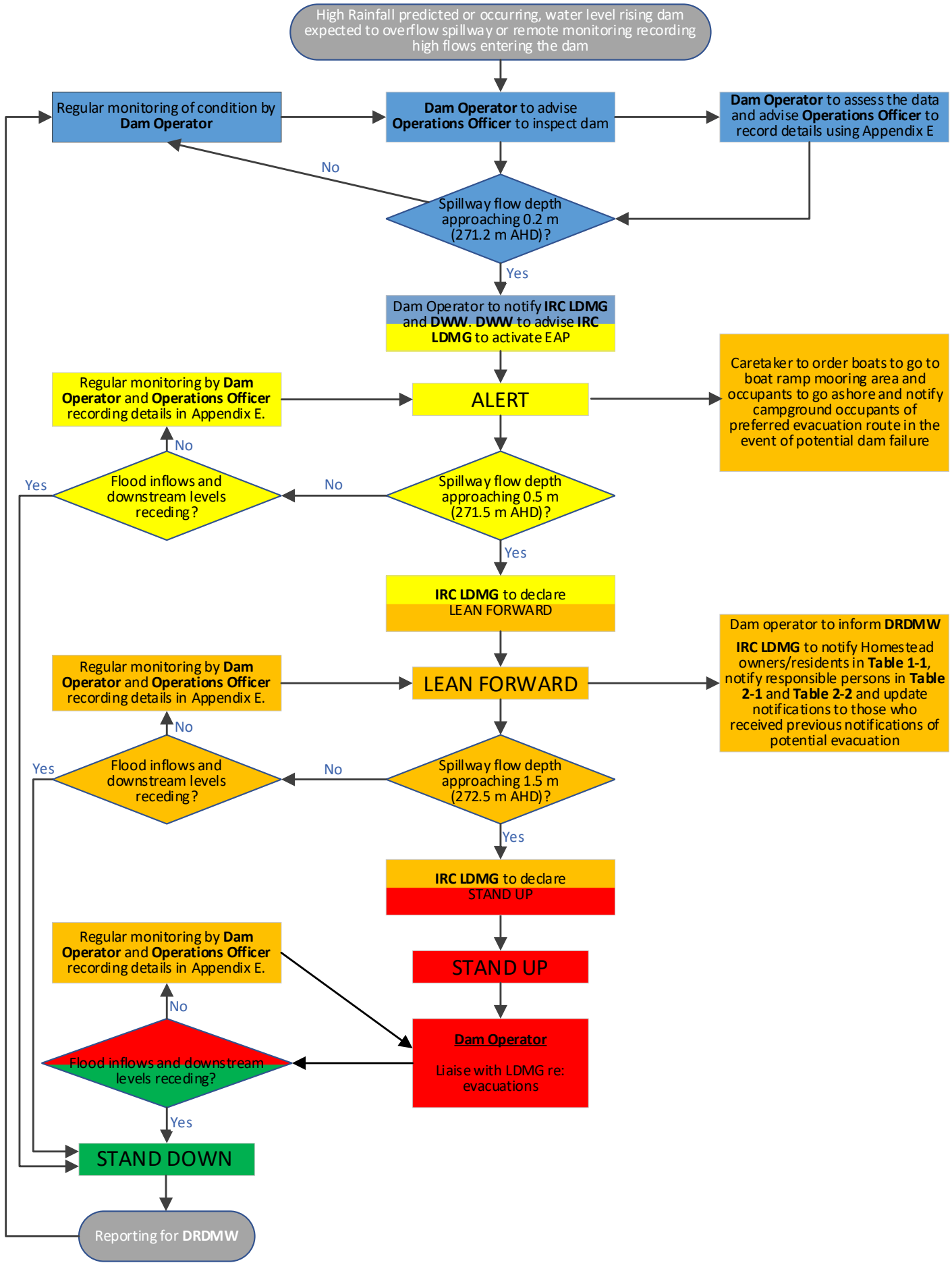


Table 9-2 Flood Inflow Events

FLOOD INFLOW EVENTS						
DAM INSPECTIONS OFFICER / CARETAKER						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
ALERT (Dam Safety Alert)	Water level ≥ 0.2 m (271.2 m AHD)	• Notify **Dam Operator** of any sudden or gradual changes to the dam (spillway, embankments, piping). • Notify **Dam Operator** of any sudden or gradual changes to the dam water level. • Take photos of any dam safety issues. • Record dam water levels from tower gauge board. • Undertake increased frequency of inspections (minimum twice daily). • Provide twice daily updates to **Dam Operator** if safe to do so. • Continue to monitor water levels.	**Operations Officer** **Dam Operator** **Onsite Caretaker**		SMS Mobile Phone Landline Phone Satellite Phone	
LEAN FORWARD (Dam Safety Event)	Water level ≥ 0.5 m (271.5 m AHD)	• Order vessels on lake to boat ramp mooring area and occupants to go ashore. • Notify campground occupants of preferred evacuation area in the event of rising lake levels. • Continue to record dam water levels from tower gauge board and update to **Dam Operator**.	**Dam Operator** **Onsite Caretaker**	Boat or any vessel user in lake Campground Occupants	Public Announcement Horns SMS Mobile Phone Landline Phone Satellite Phone	Refer to Appendix "H" Warning Messages and Distribution
STAND UP (Dam safety Emergency)	Water level ≥ 1.5 m (272.5 m AHD)	• Evacuate campground occupants to higher ground. Roads will be impacted by flooding, so evacuation **should not** be offsite. • Continue to monitor any changes to the Dam and notify **Dam Operator.**	**Dam Operator** **Onsite Caretaker**	Campground Occupants	Public Announcement Horns SMS Mobile Phone Landline Phone	Refer to Appendix "H" Warning Messages and Distribution
STAND DOWN	Flooding stopped, and risk of failures drops significantly to the level that the dam is safe for normal operations.	• Receive notification from **Dam Operator** of STAND DOWN. • Participate in review of the event as directed by the LDC.	**Dam Operator** **RC LDMG**	**LDC**	SMS Mobile Phone Landline Phone Satellite Phone	

FLOOD INFLOW EVENTS						
DAM INSPECTIONS OFFICER / CARETAKER						
ALERT LEVEL	TRIGGER	ACTION	INTERNAL COMMS TO	COMMS EXTERNAL TO	COMMS METHOD	EXTERNAL MESSAGE
			Onsite Caretaker			

FLOOD INFLOW EVENTS						
OPERATIONS OFFICER (OO)						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
ALERT (Dam Safety Alert)	Water level ≥ 0.2 m (271.2 m AHD)	• Undertake inspection as advised by **Dam Operator.** • Take photos of any dam safety issues if identified and notify **Dam Operator** immediately. • Take dam water level from tower gauge board and record on the dam level plot Appendix D. • Provide technical support to **Dam Operator** and continue to report findings. • Record details using the template provided in Appendix E. • Maintain log of all communications (refer to Appendix G).	**Dam Operator**		SMS Mobile Phone Landline Phone Satellite Phone	
LEAN FORWARD (Dam Safety Event)	Water level ≥ 0.5 m (271.5 m AHD)	• Remain on site if safe to do so and continue to monitor issue **OR** monitor site remotely from remote camera and maintain regular communication with **Caretaker** and **Dam Operator**. • Record details using the template provided In Appendix E. • Maintain log of all communications (refer to Appendix G). • Immediately advise **Dam Operator** of any observed changes.	**Dam Operator** **Onsite Caretaker**		SMS Mobile Phone Landline Phone Satellite Phone	
STAND UP (Dam safety Emergency)	Water level ≥ 1.5 m (272.5 m AHD)	• Remain on site if safe to do so and continue to monitor issue **OR** monitor site remotely from remote camera and maintain regular communication with **Caretaker** and **Dam Operator**. • Record details using the template provided in Appendix E. • Maintain log of all communications (refer to Appendix G). • Immediately advise **Dam Operator** of any observed changes.	**Dam Operator** **Onsite Caretaker**		SMS Mobile Phone Landline Phone Satellite Phone	
STAND DOWN	Flooding stopped, and risk of failures drops significantly to the level that the dam is safe for normal operations.	• Receive notification from **Director Water and Waste** or **IRC LDMG** of STAND DOWN. • Participate in a review of the event as directed by the **Dam Operator**. • Recommence routine visual inspections and monitoring.	**Director Water and Waste** **IRC LDMG** **Dam Operator**	**LDMG**	SMS Mobile Phone Landline Phone Satellite Phone	

FLOOD INFLOW EVENTS						
OPERATIONS OFFICER (OO)						
ALERT LEVEL	TRIGGER	ACTION	INTERNAL COMMS TO	COMMS EXTERNAL TO	COMMS METHOD	EXTERNAL MESSAGE

FLOOD INFLOW EVENTS						
DAM OPERATOR (DO)						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
ALERT (Dam Safety Alert)	Water level ≥ 0.2 m (271.2 m AHD)	• Receive and review all information from **Inspector/ Caretaker**. • Receive automated notification of dam water level. • Request **Operations Officer** to attend site and inspect the dam. • Review all data and information received from the Operations Officer. • Monitor water levels and rainfall from BOM website. • Take water levels from the Council Cloud web interface. • Arrange for additional inspection resource to attend site if required. • Continue to monitor onsite and remote monitoring of the situation at the dam. • Advise **Director Water and Waste** and **IRC LDMG** of any observed changes and if dam levels are likely to exceed 0.5 m (271.5 m AHD). • Maintain log of all communications (refer to Appendix G).	**Onsite Caretaker** **Operations Officer** **Director Water and Waste** **IRC LDMG**	**LDMG**	SMS Mobile Phone Landline Phone Satellite Phone	
LEAN FORWARD (Dam Safety Event)	Water level ≥ 0.5 m (271.5 m AHD)	• Receive notification from **Director Water and Waste** and **IRC LDMG** of LEAN FORWARD. • Contact **Operations Officer** and advise of LEAN FORWARD. • Monitor weather forecasts and flood warnings on the BOM website. • Take water levels from the Council Cloud web interface. • Review all data and information received from the **Operations Officer**. • Continue to monitor onsite and remote monitoring of the situation at the dam. • Advise **Director Water and Waste** and **IRC LDMG** of any observed changes. • Maintain log of all communications (refer to Appendix G). • Engage specialist Dam Safety Engineer to inspect dam. • Arrange for additional resources to attend site for repairs where required.	**Onsite Caretaker** **Operations Officer** **Director Water and Waste** **IRC LDMG** **DDS**	**LDMG**	SMS Mobile Phone Landline Phone Satellite Phone	

FLOOD INFLOW EVENTS						
DAM OPERATOR (DO)						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
		• Immediately advise **Director Water and Waste** of any changes. • Notify **DDS** about the current situation.				
STAND UP (Dam safety Emergency)	Water level ≥ 1.5 m (272.5 m AHD)	• Receive notification from **Director Water and Waste** and **IRC LDMG** of Stand UP. • Contact **Operations Officer** and advise of STAND UP. • Monitor weather forecasts and flood warnings on the BOM website. • Take water levels from the Council Cloud web interface. • Review all data and information received from the **Operations Officer.** • Continue to monitor onsite and remote monitoring of the situation at the dam • Advise **Director Water and Waste** and **IRC LDMG** of any observed changes. • Maintain log of all communications (refer to Appendix G). • Direct additional resources undertake emergency site repairs (if safe to do so).	**Onsite Caretaker** **Operations Officer** **Director Water and Waste** **IRC LDMG**	**LDMG**	SMS Mobile Phone Landline Phone Satellite Phone	
STAND DOWN	Flooding stopped, and risk of failures drops significantly to the level that the dam is safe for normal operations.	• Receive notification from **Director Water and Waste** and **IRC LDMG** of Stand Down. • Engage specialist Dam Safety Engineer to inspect dam, organise repairs and record details. • Prepare Emergency Event Report (EER) for submission to the DDS within 30 business days after the end of the emergency event. • Provide an interim report to the **DDS** within 10 business days after the end of the emergency event.	**DDS**	**DDS** **LDMG**	SMS Mobile Phone Landline Phone	

FLOOD INFLOW EVENTS						
DIRECTOR OF WATER AND WASTE (DWW)						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
ALERT (Dam Safety Alert)	Water level ≥ 0.2 m (271.2 m AHD)	• Receive and review updates from **Dam Operator**. • Review all data and information and maintain log of all communications (refer to Appendix G). • Notify **IRC** **LDMG** of the potential need for ALERT level. • If dam failure is possible, advice **IRC** **LDMG** to go for LEAN FORWARD. • If dam water level exceeds or is likely to exceed 0.5 m (271.5 m AHD), go to LEAN FORWARD. • If dam failure is not possible and dam water level reduces to below 0 m (271 m AHD), go to STAND DOWN.	**Dam Operator** **IRC** **LDMG**	**LDMG** **SES** Local Emergency Services (Police)	SMS Mobile Phone Landline Phone Satellite Phone	
LEAN FORWARD (Dam Safety Event)	Water level ≥ 0.5 m (271.5 m AHD)	• Notify **IRC** **LDMG** of the potential need for LEAN FORWARD level. • Review all data and information received from the **Dam Operator.** • Maintain log of all communications (refer to Appendix G). • Assign resources to assist **Operations Officer** as required. • Provide updates to **IRC** **LDMG**. • If dam failure is possible, go to STAND UP. • If dam water level exceeds or is likely to exceed 1.5 m (272.5 m AHD), go to STAND UP. • If dam failure is not possible and dam water level reduces to below 0 m (271 m AHD), go to STAND DOWN.	**Dam Operator** **IRC** **LDMG** 6 **Operations Officer**	**LDMG**	SMS Mobile Phone Landline Phone Satellite Phone	
STAND UP (Dam safety Emergency)	Water level ≥ 1.5 m (272.5 m AHD)	• Notify **IRC** **LDMG** of the potential need for STAND UP level. • Review all data and information received from the **Dam Operator.** • Maintain log of all communications (refer to Appendix G). • If dam failure is not possible and dam water level reduces to below 0 m (271 m AHD), go to STAND DOWN.	**Dam Operator** **IRC** **LDMG**	**LDMG**	SMS Mobile Phone Landline Phone Satellite Phone	
STAND DOWN	Flooding stopped, and risk of failures	• Collaborate with **IRC** **LDMG** to jointly determine when to Stand Down.	**DDS**		SMS	

FLOOD INFLOW EVENTS						
DIRECTOR OF WATER AND WASTE (DWW)						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
	drops significantly to the level that the dam is safe for normal operations.	• Coordinate and conduct a review of the event and all responses.			Mobile Phone Landline Phone	

FLOOD INFLOW EVENTS						
LOCAL DISASTER MANAGEMENT GROUP (LDMG)						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
ALERT (Dam Safety Alert)	Water level ≥ 0.2 m (271.2 m AHD)	• Receive and review all information received from **Director Water and Waste**. • Declare ALERT level activating EAP. • **Commence new operation in Guardian IMS** • **Review staffing requirements** • Notify **QPS** and **SES** and local emergency services of issues and possible need to mobilise and implement emergency actions. • Issue the alert message for: a. "Developing Flood Conditions" in Appendix H Warning messages and distribution • Maintain log of all communications via Guardian IMS • Review EAP and possible actions. • If spillway level goes above 0.5 m (271.5 m AHD) close Capella-Rubyvale Rd. (Refer to DataOnline - Ck - Clermont Rubyvale Rd (BOM: 535160)	**Dam Operator** **Director Water and Waste** **SES** **QPS** Clermont	**D/S** residents who will be affected as per Table 2-2 State Emergency Services and Police as per Table 2-1 **CHRC**, **DDS** and **IRC** as per Table 1-1	SMS via Guardian IMS Mobile Phone Landline Phone Satellite Phone Disaster Dashboard Social Media systems Local radio	Refer to Appendix "H" Warning Messages and Distribution
LEAN FORWARD (Dam Safety Event)	Water level ≥ 0.5 m (271.5 m AHD)	• Receive notification from **Director Water and Waste** and review for the potential need for LEAN FORWARD. • Declare LEAN FORWARD. • Issue the alert message for: a. "Developing Flood Conditions" in Appendix H Warning messages and distribution • Notify Responsible Persons in Table 1-1, Table 2-1 and Table 2-2 using SMS via Guardian IMS • Maintain log of all communications in Guardian IMS	**Dam Operator** **Director Water and Waste**	**D/S** residents who will be affected as per Table 2-2 State Emergency Services and Police as per Table 2-1 **CHRC**, **DDS** and **IRC** as per Table 1-1	SMS via Guardian IMS Mobile Phone Landline Phone Satellite Phone Disaster Dashboard Social Media systems Local radio	Refer to Appendix "H" Warning Messages and Distribution
STAND UP (Dam safety Emergency)	Water level ≥ 1.5 m (272.5 m AHD)	• Receive notification from **Director Water and Waste** and review for the potential need for STAND UP • Issue the alert message for:	**Dam Operator**	**D/S** residents who will be affected as per	SMS via Guardian IMS	Refer to Appendix "H" Warning

FLOOD INFLOW EVENTS						
LOCAL DISASTER MANAGEMENT GROUP (LDMG)						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
		a. "Developing Flood Conditions" in Appendix H Warning messages and distribution • Notify Responsible Persons in Table 1-1, Table 2-1 and Table 2-2 using SMS via Guardian IMS • Maintain log of all communications in Guardian IMS	**DDS**	Table 2-2 State Emergency Services and Police as per Table 2-1 **CHRC**, **DDS** and **IRC** as per Table 1-1	Mobile Phone Landline Phone Satellite Phone National Emergency Alert System Council SMS alert system Social Media systems Local radio	Messages and Distribution
STAND DOWN	Flooding stopped, and risk of failures drops significantly to the level that the dam is safe for normal operations.	• Collaborate with Director Water and Waste to jointly determine when to Stand Down. • Declare STAND DOWN • Issue a final notification advising the end of the emergency event using Guardian IMS • Notify homestead owners/residents in Table 2-2 using SMS via Guardian IMS Notify Responsible Persons in Table 1-1 and Table 2-1	**DDS** **CHRC**	**D/S** residents who will be affected as per Table 2-2 State Emergency Services and Police as per Table 2-1 **CHRC**, **DDS** and **IRC** as per Table 1-1	SMS via Guardian IMS Mobile Phone Landline Phone Satellite Phone Council SMS alert system Disaster Dashboard Social Media systems Local radio	Refer to Appendix "H" Warning Messages and Distribution

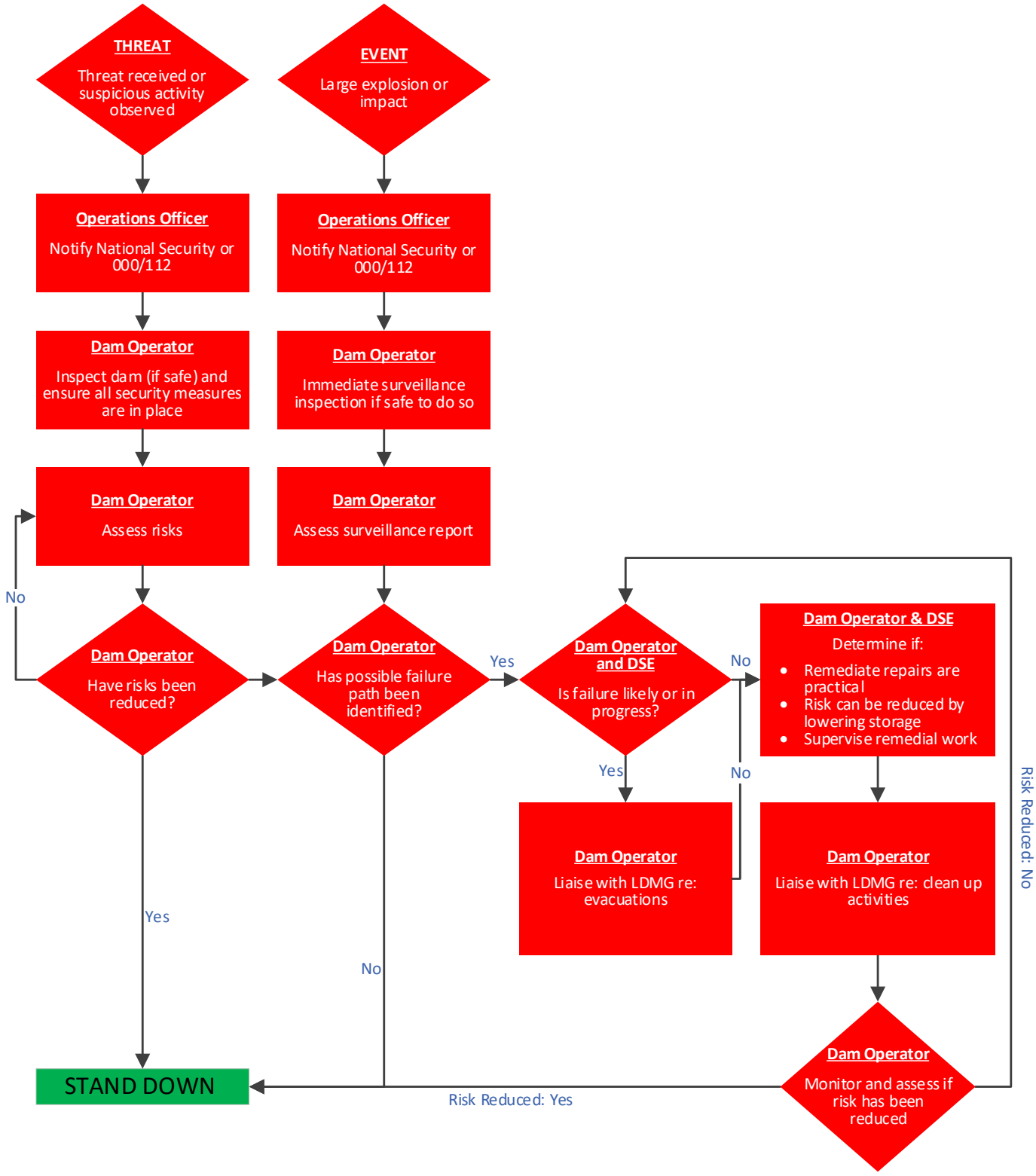
9.4 TERRORISM

Theresa Creek Dam is considered to be a low value target for terrorism. As the dam does not have any outlet works or other infrastructure that could be easily damaged and release a sudden flow of water, a terrorist act on the dam is considered unlikely to trigger a dam safety event.

To create a breach in the dam wall would require extensive excavation / preparation and / or the use of a large amount of explosive material. This type of activity may be noticed by local residents and reported and investigated before a dam breach could be developed.

Although terrorism is not considered a credible threat to the dam and therefore not a specific scenario noted in this EAP, any terrorism act that impacts the dam will be managed under the IRC Local Disaster Management Plan (LDMP) and the National Security Hotline (PH: 1800 123 400) shall be notified by the LDMG.

Figure 9-3 Terrorism event flow chart



.

Table 9-4 Terrorism threat / activity or high energy impact

TERRORISM THREAT / ACTIVITY OR HIGH ENERGY IMPACT						
DAM INSPECTIONS OFFICER / CARETAKER						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
ALERT	N/A					
LEAN FORWARD	N/A					
STAND UP 1 (Threat)	• Possible terrorist activity / suspicious behaviours noticed at the dam OR • Threat received	• If suspicious notify National Security 1800 123 400 or 000/112 • Notify Operations Officer	**Operations Officer** **Onsite Caretaker**	National Security Hotline	SMS Mobile Phone Satellite Phone	Notify immediately the National Security Line or 000/112 "National Security Hot Line 1800 123 400"; Email: hotline@nationalsecurity.gov.au
STAND UP 2 (Event)	• Large explosion heard/observed at dam (e.g. bomb explosions, aircraft hit)	• As per previous activation level AND • Vacate the immediate vicinity of the affected area • Evacuate campground occupants to higher ground. Roads will be impacted by flooding so evacuation should not be offsite. • Continue to monitor any changes to the Dam and notify **Dam Operator**.	As per previous activation level	Campground Occupants	Public Announcement Horns / Megaphone	Refer to Appendix "H" Warning Messages and Distribution
STAND UP 3 (Response)	• Failure in progress or likely due to impact or explosion, AND • Sufficient water in the storage to create a dam hazard	• As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level
STAND DOWN	• Risk assessment has determined that failure risk has reduced	• Receive notification from **Dam Operator** of STAND DOWN. • Participate in review of the event as directed by the LDC.	**Dam Operator** **IRC LDMG**	LDC	As per previous activation level	

TERRORISM THREAT / ACTIVITY OR HIGH ENERGY IMPACT						
DAM INSPECTIONS OFFICER / CARETAKER						
ALERT LEVEL	TRIGGER	ACTION	INTERNAL COMMS TO	COMMS EXTERNAL TO	COMMS METHOD	EXTERNAL MESSAGE

TERRORISM THREAT / ACTIVITY OR HIGH ENERGY IMPACT						
OPERATIONS OFFICER						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
ALERT	N/A					
LEAN FORWARD	N/A					
STAND UP 1 (Threat)	• Possible terrorist activity / suspicious behaviours noticed at the dam OR • Threat received	• If suspicious notify National Security 1800 123 400 or 000/112 • Notify **Dam Operator** • Remain onsite (if safe to do so) and continue to monitor issue(s). • Maintain log of all communications (refer to Appendix G).	**Operations Officer** **Dam Operator** **Onsite Caretaker**	National Security Hotline	SMS Mobile Phone Satellite Phone	Notify immediately the National Security Line or 000/112 “National Security Hot Line 1800 123 400”; Email: hotline@nationalsecurity.gov.au
STAND UP 2 (Event)	• Large explosion heard/observed at dam (e.g. bomb explosions, aircraft hit)	• Vacate the immediate vicinity of the affected area. • Continue to monitor any changes to the Dam and notify **Dam Operator**.	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level
STAND UP 3 (Response)	• Failure in progress or likely due to impact or explosion, AND • Sufficient water in the storage to create a dam hazard	• As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level
STAND DOWN	• Risk assessment has determined that failure risk has reduced	• Receive notification from **Dam Operator** of STAND DOWN. • Participate in review of the event as directed by the LDC.	**Dam Operator** **IRC LDMG**	LDC	As per previous activation level	

TERRORISM THREAT / ACTIVITY OR HIGH ENERGY IMPACT						
DAM OPERATOR						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
ALERT	N/A					
LEAN FORWARD	N/A					
STAND UP 1 (Threat)	• Possible terrorist activity / suspicious behaviours noticed at the dam OR • Threat received	• Receive notification from Dam Inspection Officer/caretaker of STAND UP. • Liaise with Onsite Caretaker and Operations Officer regarding the situation. • Notify the **IRC LDMG** and **Director Water and Waste** regarding the situation	**Onsite Caretaker** **Operations Officer** **Director Water and Waste** **IRC LDMG**	LDMG	SMS Mobile Phone Landline Phone Satellite Phone	Notify immediately the National Security Line or 000/112 “National Security Hot Line 1800 123 400”; Email: hotline@nationalsecurity.gov.au
STAND UP 2 (Event)	• Large explosion heard/observed at dam (e.g. bomb explosions, aircraft hit)	• As per previous activation level	• As per previous activation level	• As per previous activation level.	• As per previous activation level.	• As per previous activation level.
STAND UP 3 (Response)	• Failure in progress or likely due to impact or explosion, AND • Sufficient water in the storage to create a dam hazard	• As per previous activation level, AND • Liaise with **IRC LDMG** for potential evacuations	• As per previous activation level	• As per previous activation level.	• As per previous activation level.	• As per previous activation level.
STAND DOWN	• Risk assessment has determined that failure risk has reduced	• Receive notification from **Dam Operator** of STAND DOWN. • Participate in review of the event as directed by the LDC. Prepare and Emergency Event Report (EER) for submission to the **DDS** within 30 business	**DDS**	**DDS**	• As per previous activation level	

TERRORISM THREAT / ACTIVITY OR HIGH ENERGY IMPACT						
DAM OPERATOR						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
		days after the end of the emergency event. • Provide an interim report to the **DDS** within 10 business days after the end of the emergency event. • Engage specialist Dam Safety Engineer to inspect dam, organise repairs and record details.				

TERRORISM THREAT / ACTIVITY OR HIGH ENERGY IMPACT						
DIRECTOR OF WATER AND WASTE (DWW)						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
ALERT	N/A					
LEAN FORWARD	N/A					
STAND UP 1 (Threat)	• Possible terrorist activity / suspicious behaviours noticed at the dam OR • Threat received	• Activate EAP • Review all data and information received from the **Dam Operator**. • Maintain log of all communications (refer to Appendix G).	**Dam Operator** **IRC LDMG** **DDS**	**IRC LDMG, DDS**	SMS Mobile Phone Landline Phone Satellite Phone	
STAND UP 2 (Event)	• Large explosion heard/observed at dam (e.g. bomb explosions, aircraft hit)	• As per previous activation level AND • Inspect the dam if safe to do so.	• As per previous activation level	• As per previous activation level,	• As per previous activation level,	
STAND UP 3 (Response)	• Failure in progress or likely due to impact or explosion, AND • Sufficient water in the storage to create a dam hazard	• As per previous activation level, AND • Update records	• As per previous activation level	• As per previous activation level,	• As per previous activation level,	
STAND DOWN	Risk assessment has determined that failure risk has reduced	• Collaborate with **IRC LDMG** to jointly determine when to Stand Down. • Coordinate and conduct a review of the event and all responses.	• As per previous activation level	**IRC LDMG**	• As per previous activation level.	

TERRORISM THREAT / ACTIVITY OR HIGH ENERGY IMPACT						
LOCAL DISASTER MANAGEMENT GROUP (LDMG)						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
ALERT	N/A					
LEAN FORWARD	N/A					
STAND UP 1 (Threat)	• Possible terrorist activity / suspicious behaviours noticed at the dam OR • Threat received	• Review all data and information received from the **Dam Operator** and Director Water and Waste • Declare STAND UP • **Commence new operation in Guardian IMS** • Review staffing requirements • Notify homestead owners/residents in Table 2-2 using SMS via Guardian IMS or National Emergency Alert system Notify Responsible Persons in Table 1-1, Table 2-1, Table 2-2 via Guardian IMS. • Update notifications to those who received previous notifications. • Maintain log of all communications via Guardian IMS.	**Dam Operator** **Director Water and Waste** **DDS**	D/S residents who will be affected as per Table 2-2 and Appendix B State Emergency Services and Police as per Table 2-1 **CHRC LDC**, **DDS** and **IRC** as per Table 1-1	SMS via Guardian IMS Mobile Phone Landline Phone Satellite Phone National Emergency Alert System Disaster Dashboard Social Media systems Local radio	Refer to Appendix "H" Warning Messages and Distribution
STAND UP 2 (Event)	• Large explosion heard/observed at dam (e.g. bomb explosions, aircraft hit)	• Update notifications to those who received previous notifications. • Notify Responsible Persons in Table 1-1, Table 2-1, Table 2-2. • Maintain log of all communications via Guardian IMS.	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level
STAND UP 3 (Response)	• Failure in progress or likely due to impact or explosion, AND • Sufficient water in the storage to create a dam hazard	• As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level

TERRORISM THREAT / ACTIVITY OR HIGH ENERGY IMPACT						
LOCAL DISASTER MANAGEMENT GROUP (LDMG)						
ALERT LEVEL	**TRIGGER**	**ACTION**	**INTERNAL COMMS TO**	**COMMS EXTERNAL TO**	**COMMS METHOD**	**EXTERNAL MESSAGE**
STAND DOWN	The risk of failures drops significantly to the level that the dam is safe for normal operations.	• Collaborate with **Director Water and Waste** to jointly determine when to Stand Down. • Declare STAND DOWN. • Issue a final notification advising the end of the emergency event. • Notify homestead owners/residents in Table 2-2 using National Emergency Alert system or fastest method of notification. • Notify Responsible Persons in Table 1-1, Table 2-1, Table 2-2.	**DDS** **CHRC LDC**	D/S residents who will be affected as per Table 2-2 and Appendix B State Emergency Services and Police as per Table 2-1 **CHRC LDC**, **DDS** and **IRC** as per Table 1-1	SMS via Guardian IMS Mobile Phone Landline Phone Satellite Phone Disaster Dashboard Social Media systems Local radio	Inform all previously notified contacts of stand down

10.REFERENCES

CHRC (2014). Central Highlands Local Disaster Management Plan Version 6.1 24 February 2021. Central Highlands Regional Council. Available online: https://www.chrc.qld.gov.au/wp-content/uploads/2021/03/CHRC_LDMP_WORD_MASTER_FINAL_V6.pdf Accessed: 22 April 2016.

DNRME (2018). Guidelines for Failure Impact Assessment of Water Dams. Department of Energy and Water Supply. Queensland Government. Available online: https://www.resources.qld.gov.au/__data/assets/pdf_file/0005/78836/guidelines-failure-impact-assessment.pdf Accessed: February 2022

DNRME (2020). Dam Safety Management Guideline, Department of Natural Resources, Mines and Energy. Queensland Government. Available online: https://www.resources.qld.gov.au/__data/assets/pdf_file/0007/78838/dam-safety-management.pdf Accessed: February 2022

DRDMW (2021). Emergency Action Plan for Referable Dam Guideline. Department of Regional Development, Manufacturing and Water. Queensland Government. Available online: https://www.dews.qld.gov.au/__data/assets/pdf_file/0018/84015/eap-guideline.pdf Accessed: July 2021

IRC (2020). Isaac Regional Council Local Disaster Management Plan. Version 2 Amended October 2020. Isaac Regional Council. Available online: https://www.isaac.qld.gov.au/disaster-emergency-management Accessed: February 2022.

IRC (2022) Isaac Regional Council Disaster Dashboard https://dashboard.isaac.qld.gov.au/

GHD (2019/2020) Theresa Creek Dam Terraced Overflow Investigation Report. 2020.

GHD (2020) Theresa Creek Dam Failure Impact Assessment Report. December 2020.

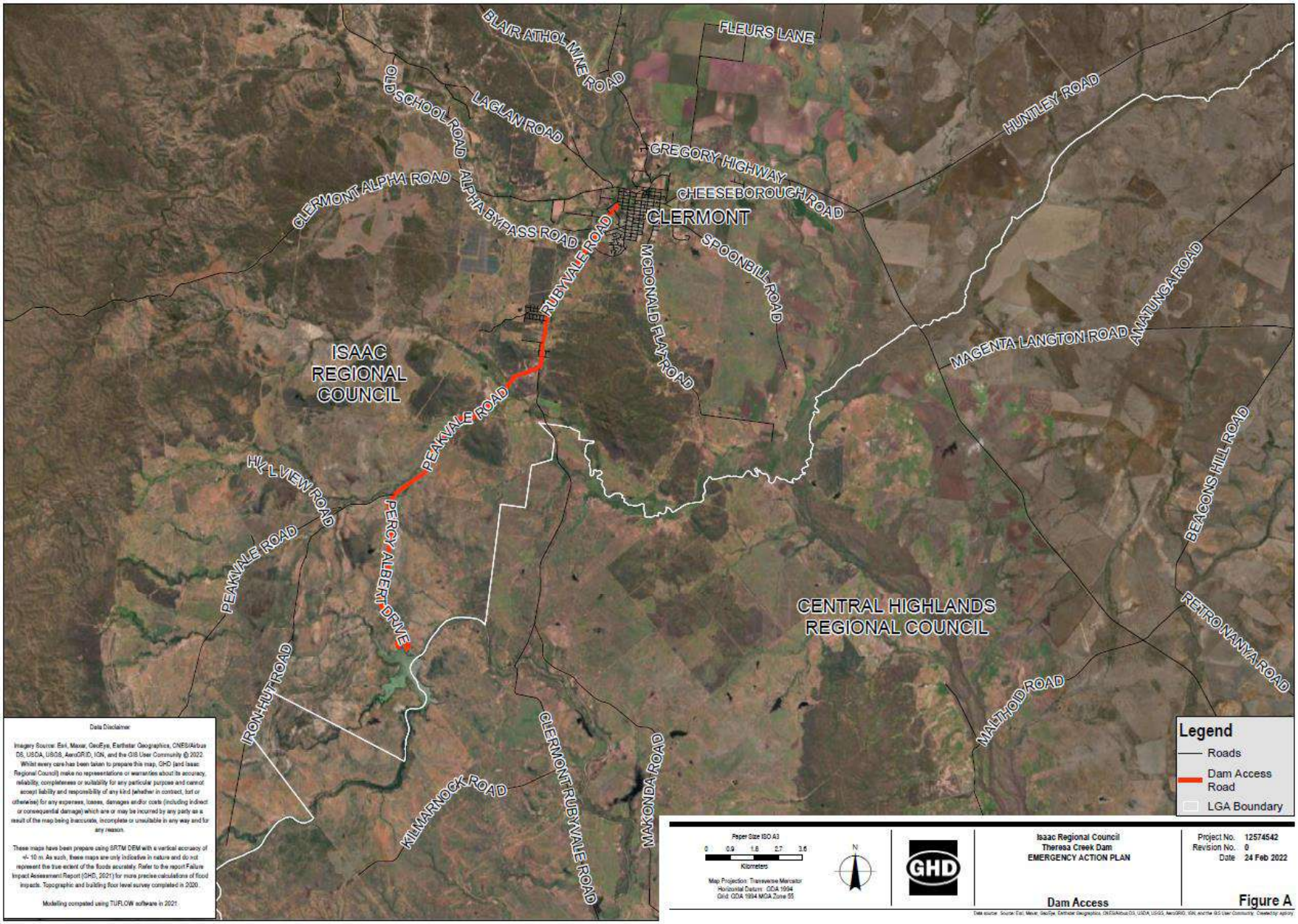
MJA (1981). Clermont Water Supply – Theresa Creek Dam. Report on Hydraulic Model Study. November 1981. Munro, Johnson and Associates.

MJH (1981), Clermont Infrastructure Water Supply. Proposed Theresa Creek Weir. Preliminary Design Report. July 1981. A Blair Athol Coal Project. Munro Johnson Hebron.

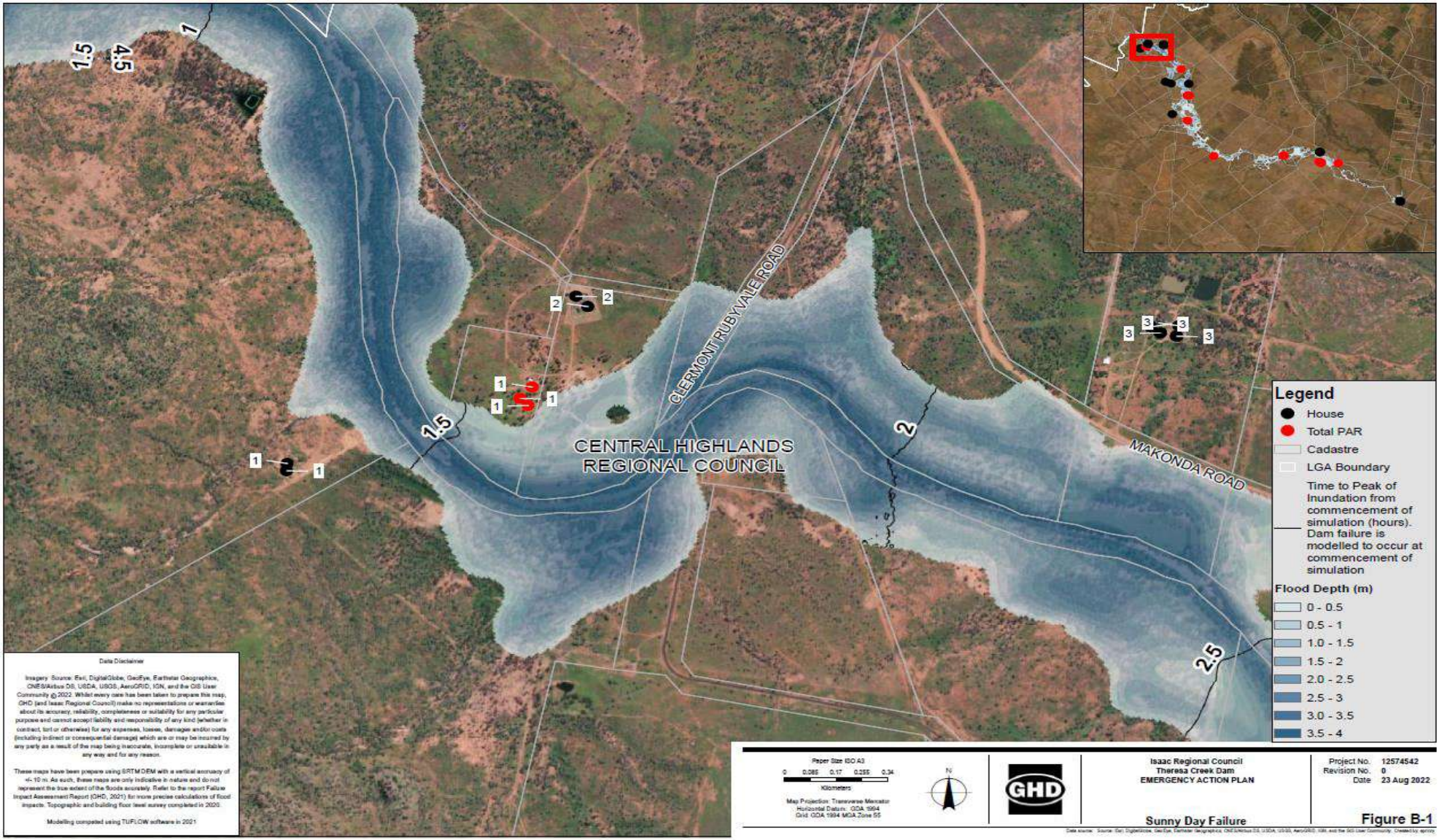
MJA, 1983. *Report on construction of Theresa Creek dam*. Munro Johnson and Associates. October 1983. Queensland Government (2003). *Disaster Management Act (2003)*. Current as at 27 October 2014.

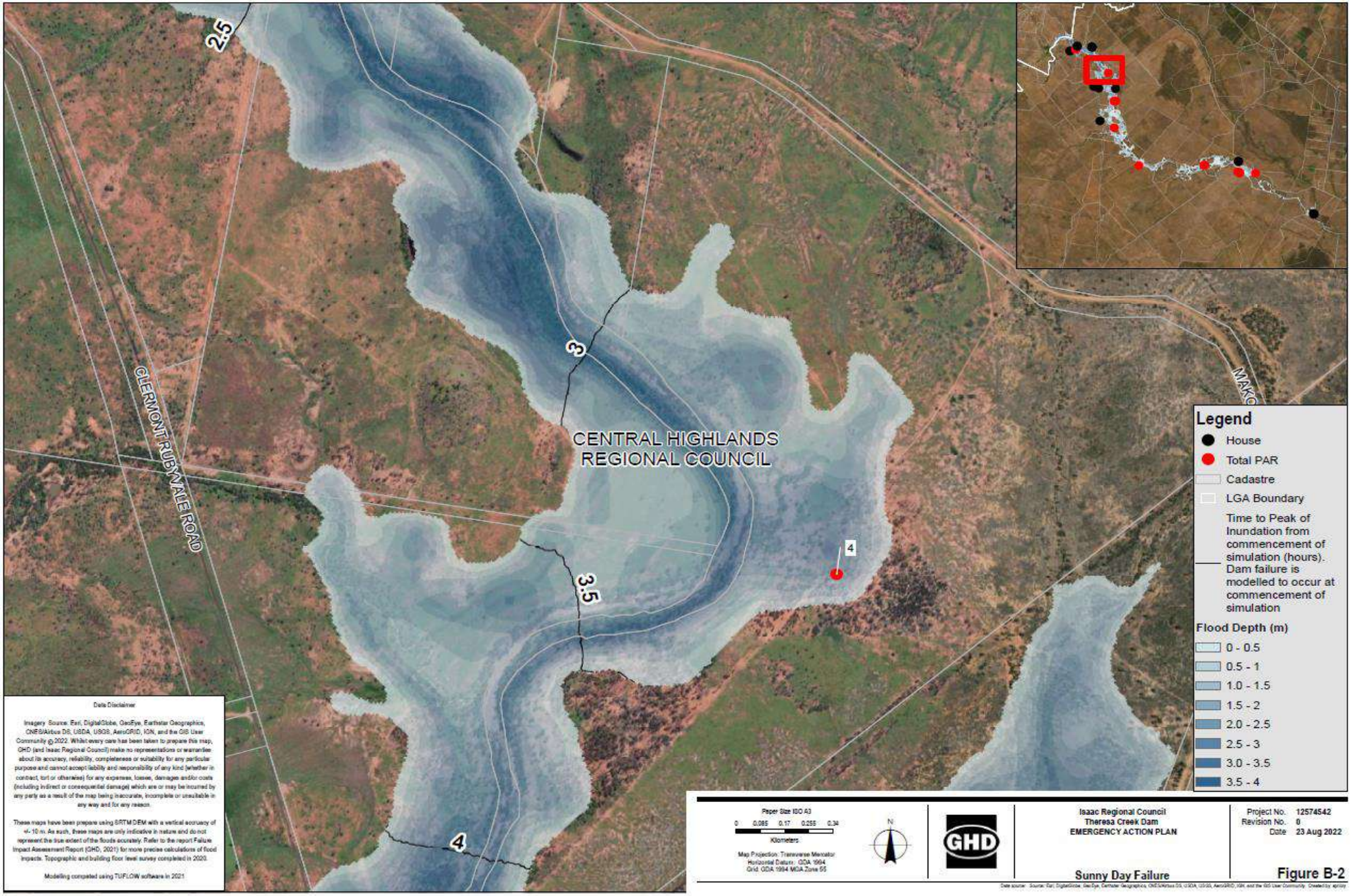
Available online: https://www.legislation.qld.gov.au/leGIsltn/CUrrent/D/DisastmanA03.pdf Accessed: 26 July 2016.Queensland Government (2018). Queensland Emergency Alert Guidelines. Available online: https://www.disaster.qld.gov.au/dmg/st/Documents/M1174-Queensland-Emergency-Alert-Manual.pdf Accessed: August 2018.

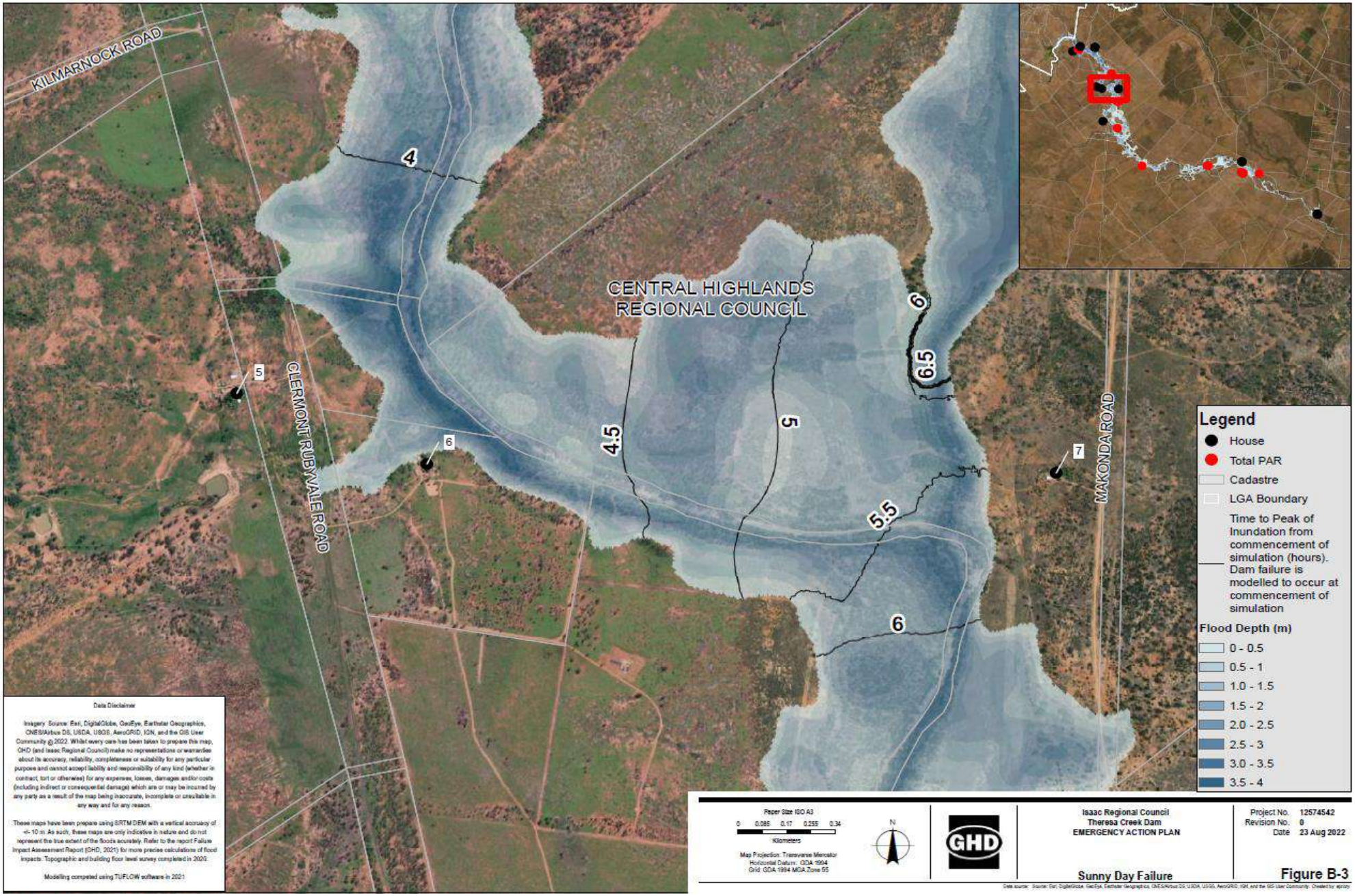
APPENDIX A: AREA MAP / ROAD ACCESS MAP TO DAM

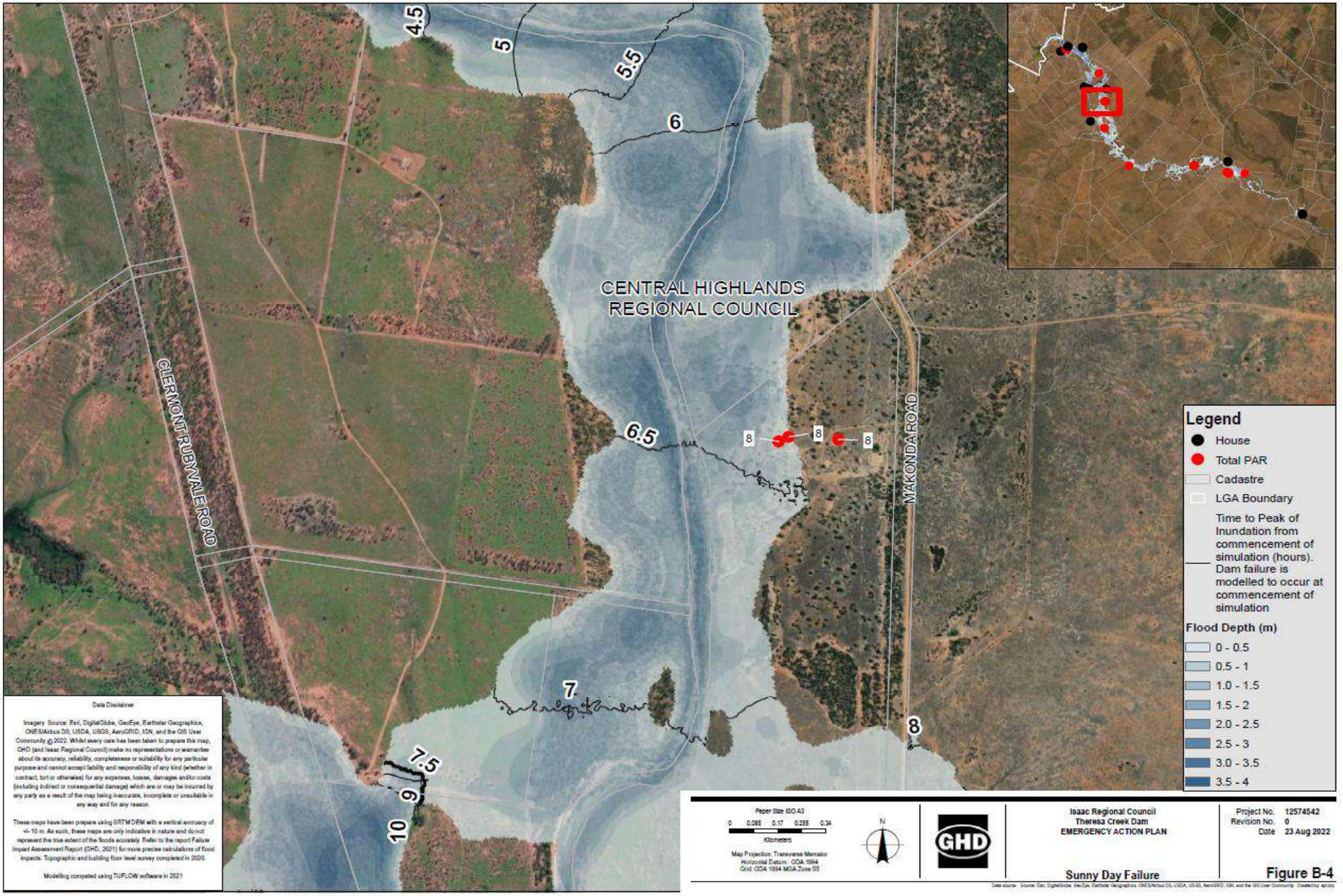


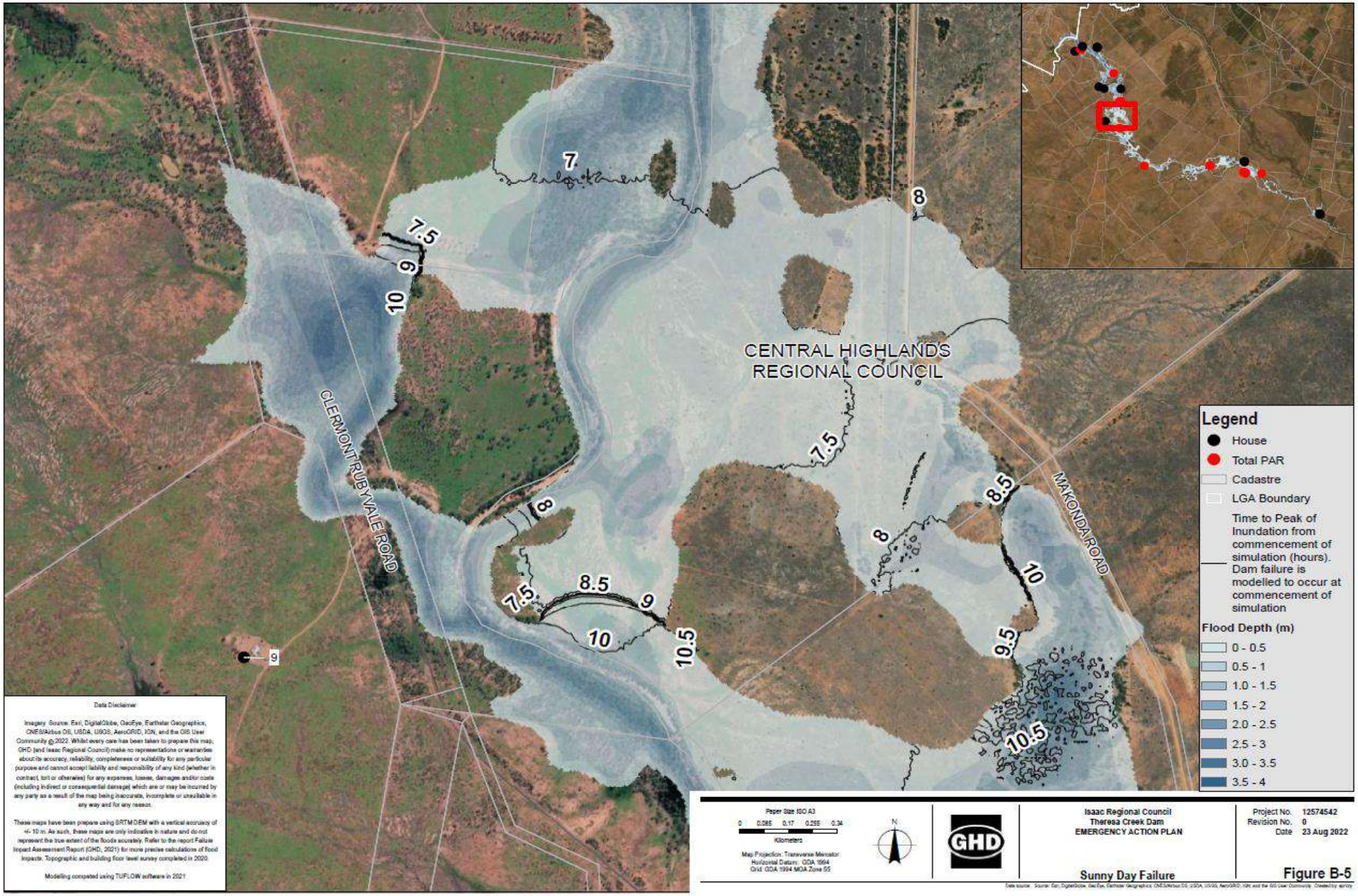
APPENDIX B: FLOOD INUNDATION MAPS

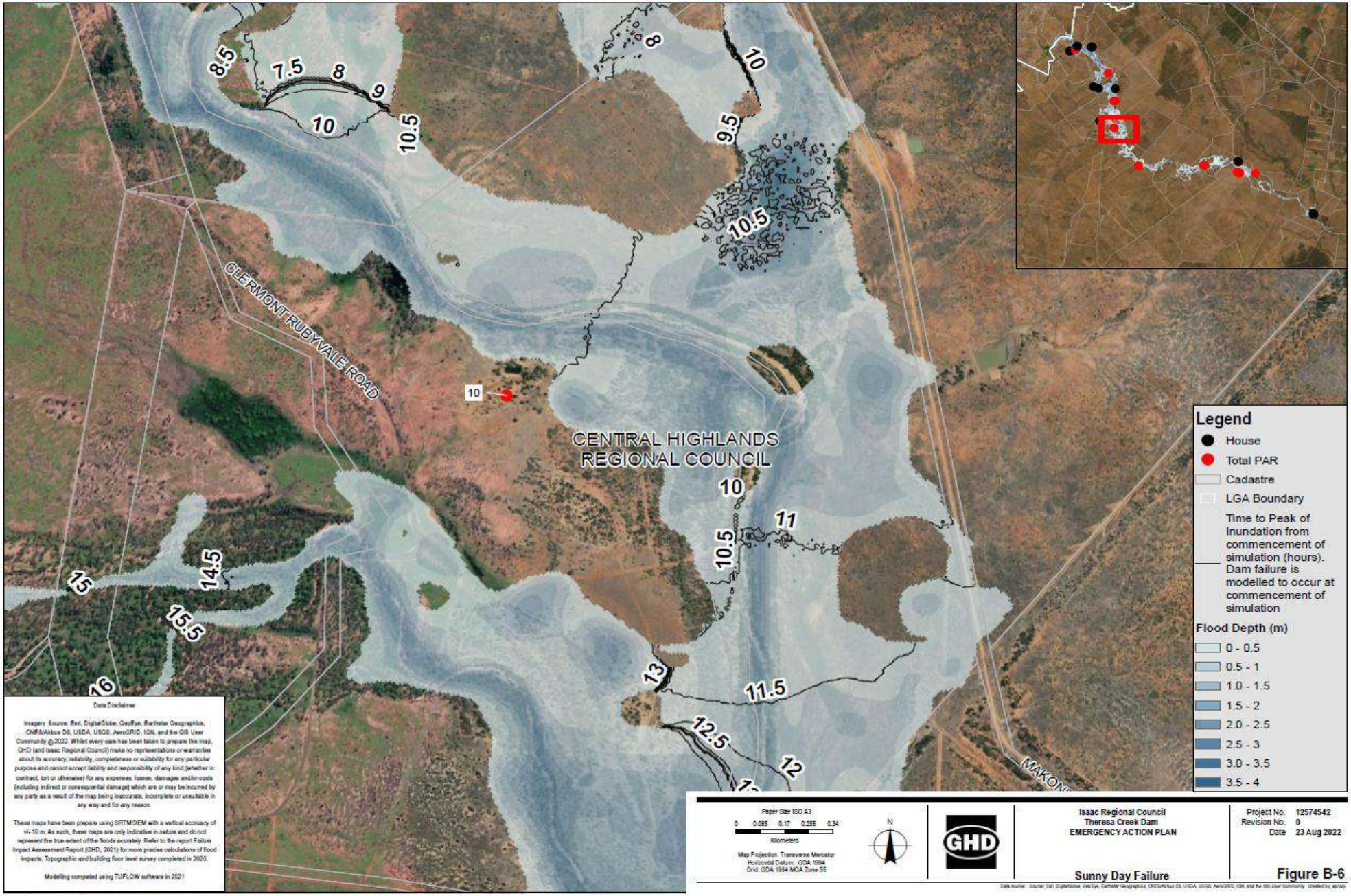


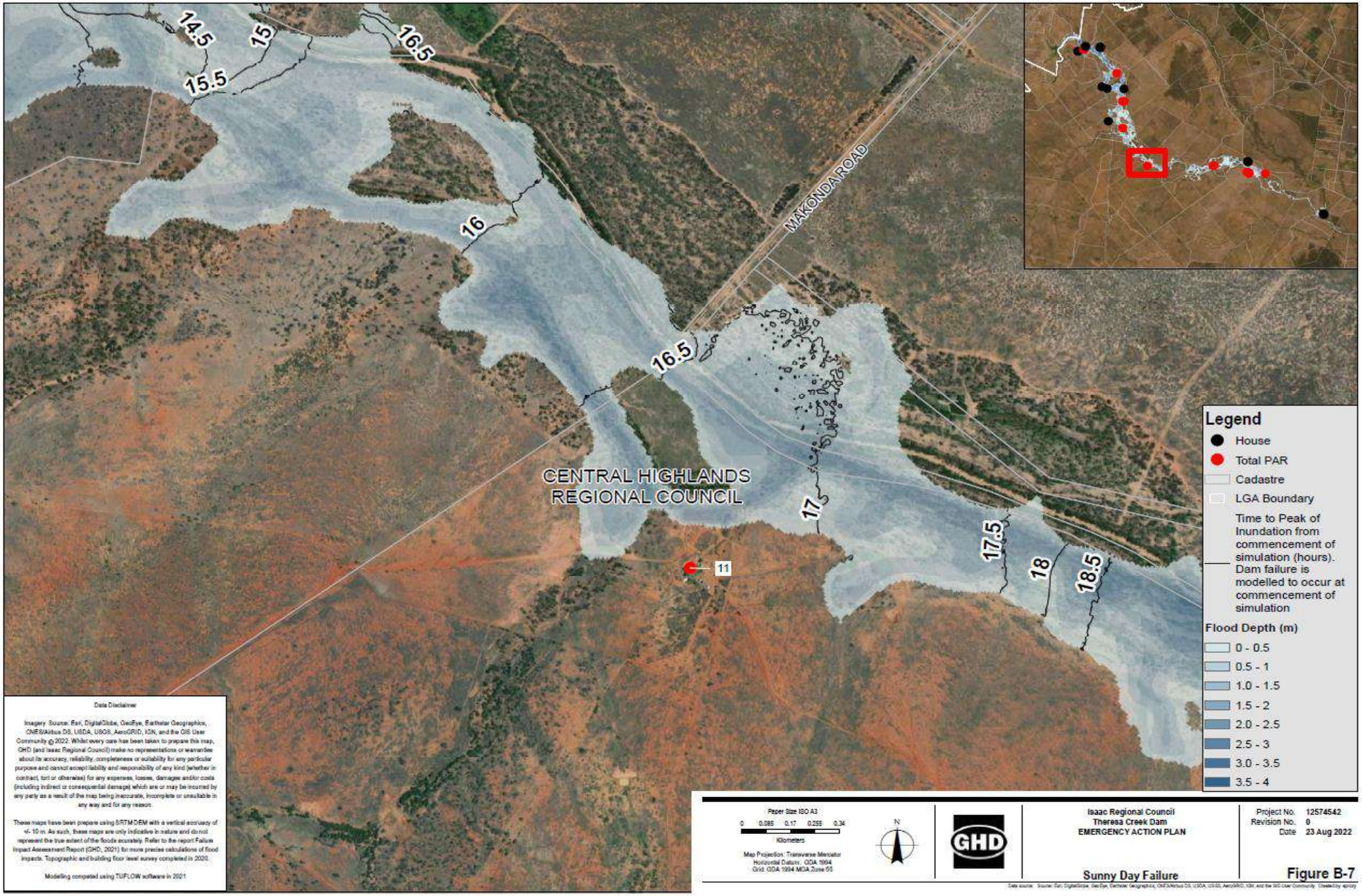

2.5
3
3.5
4
CLERMONT RUBYVALE ROAD
CENTRAL HIGHLANDS
REGIONAL COUNCIL
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of simulation (hours). Dam failure is modelled to occur at commencement of simulation
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling completed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
Sunny Day Failure
Figure B-2


KILMARNOCK ROAD
CENTRAL HIGHLANDS REGIONAL COUNCIL
CLERMONT RUBYVALE ROAD
MAKONDA ROAD
4
4.5
5
5.5
6
6.5
5
6
7
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of simulation (hours). Dam failure is modelled to occur at commencement of simulation
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (c) 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unreliable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods acurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
Sunny Day Failure
Figure B-3

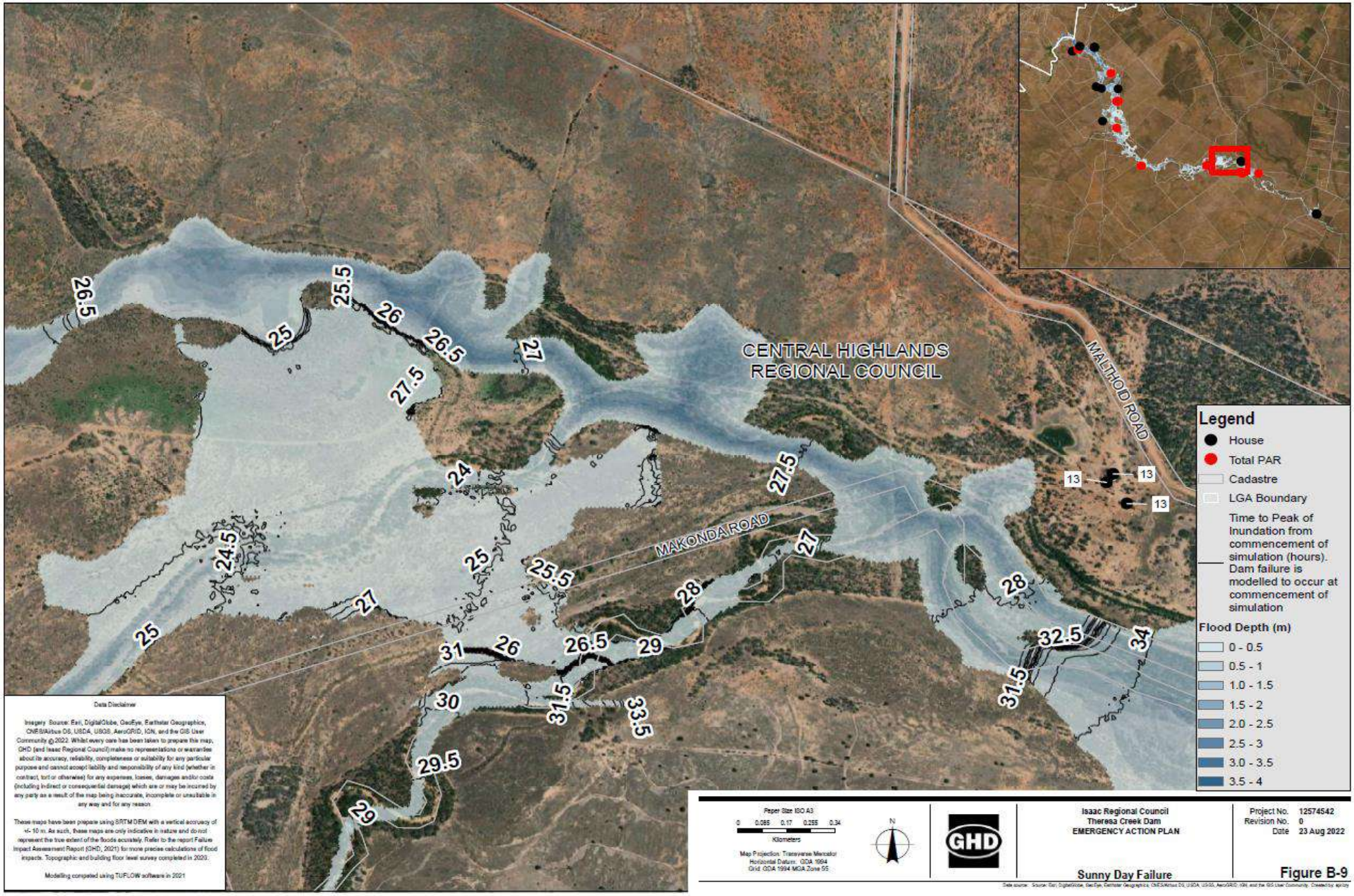

4.5
5
5.5
6
6.5
7
7.5
8
9
10
CENTRAL HIGHLANDS
REGIONAL COUNCIL
CLERMONT RUBYVALE ROAD
MAKONDA ROAD
8
8
8
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of simulation (hours). Dam failure is modelled to occur at commencement of simulation
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
Sunny Day Failure
Figure B-4

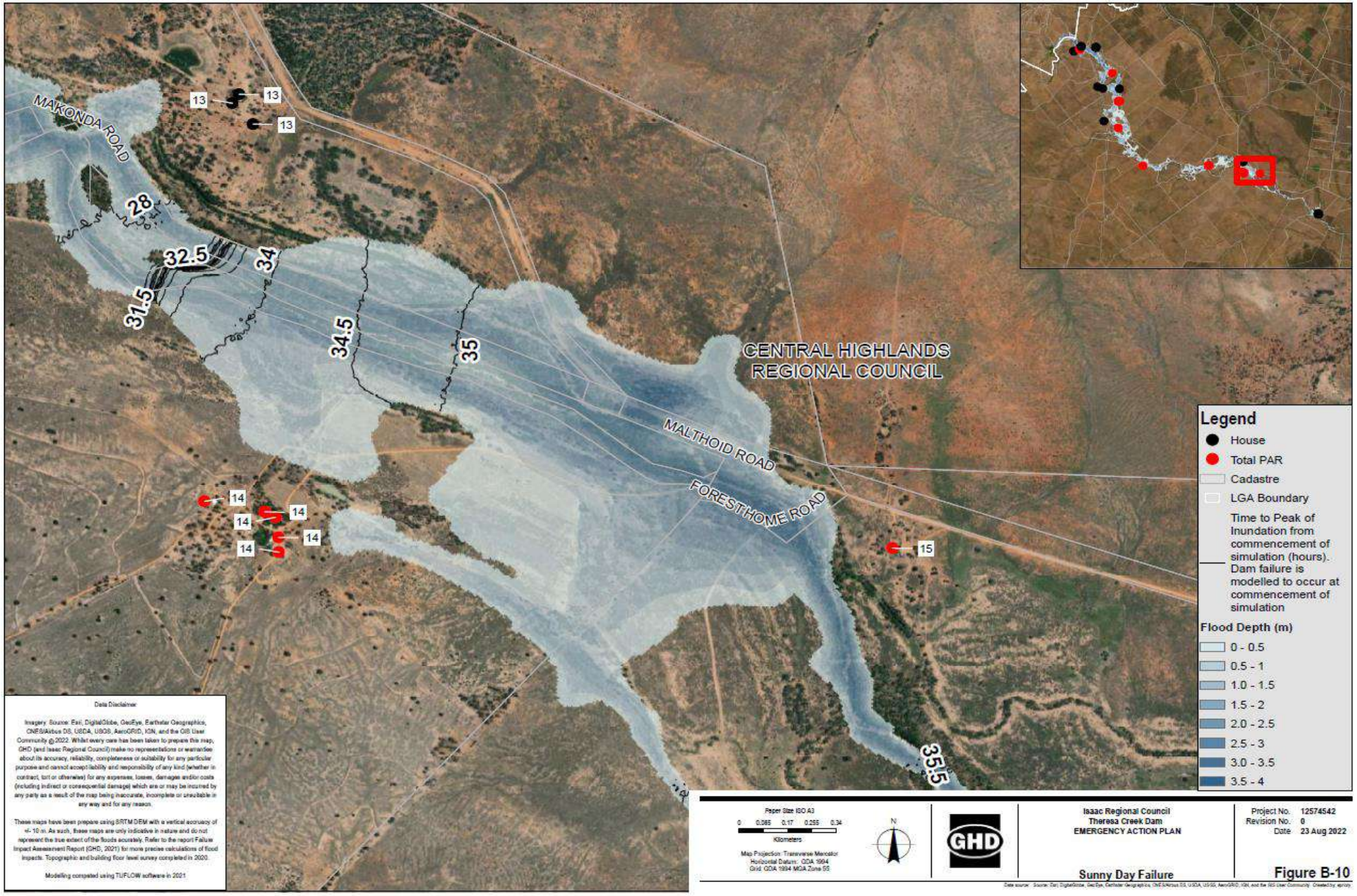

CENTRAL HIGHLANDS REGIONAL COUNCIL
CLERMONT RUBYVALE ROAD
MAKONDA ROAD
7
7.5
8
9
10
8.5
10.5
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of simulation (hours). Dam failure is modelled to occur at commencement of simulation
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Paper Size ISO A3
Kilometers
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
Sunny Day Failure
Figure B-5

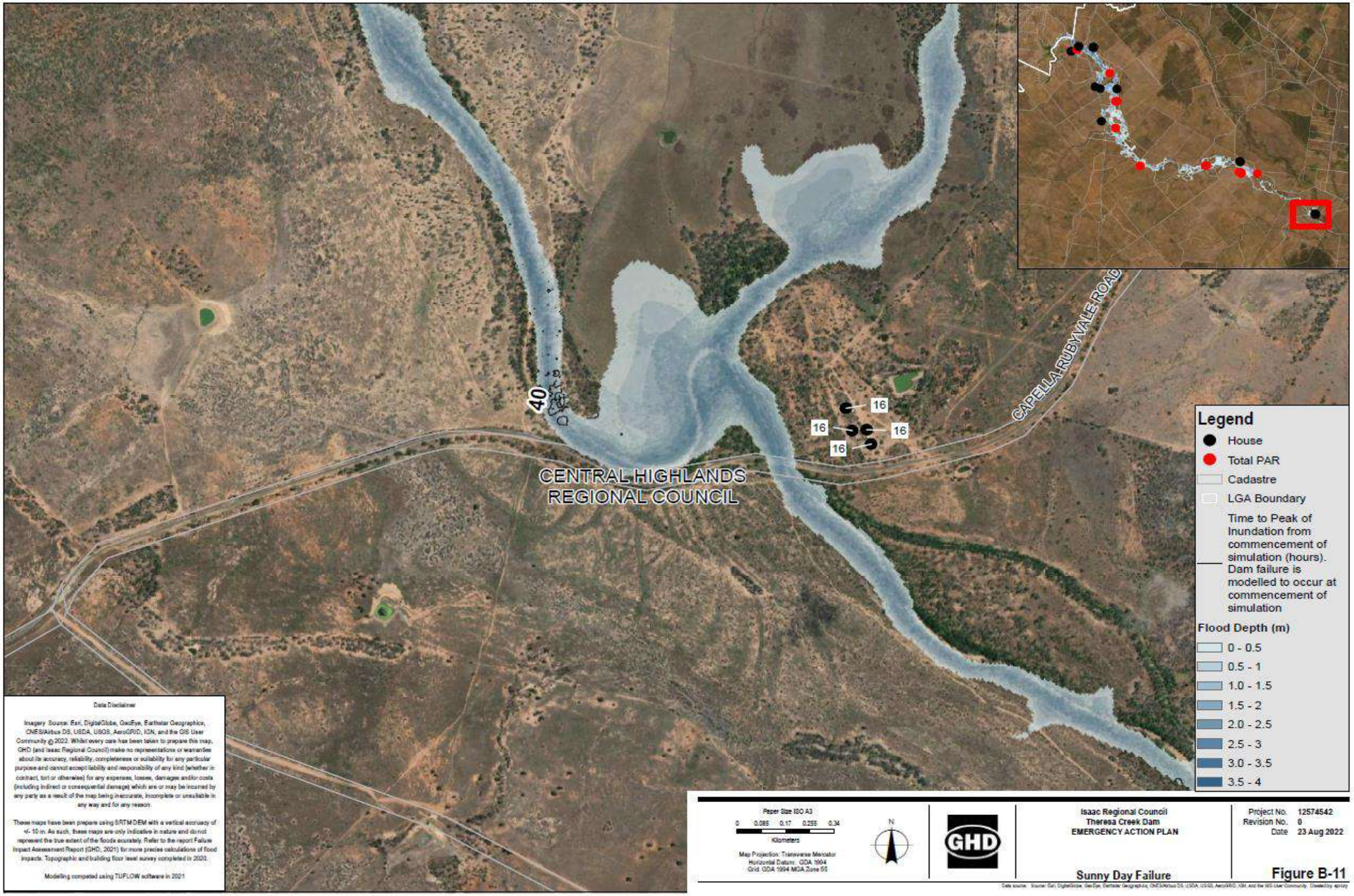

8.5
7.5
8
9
10
10.5
8
10
9.5
10.5
CLERMONT RUBYVALE ROAD
10
CENTRAL HIGHLANDS
REGIONAL COUNCIL
10
11
10.5
14.5
15
15.5
16
13
11.5
12.5
12
MAKO
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of simulation (hours). Dam failure is modelled to occur at commencement of simulation
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
Sunny Day Failure
Figure B-6

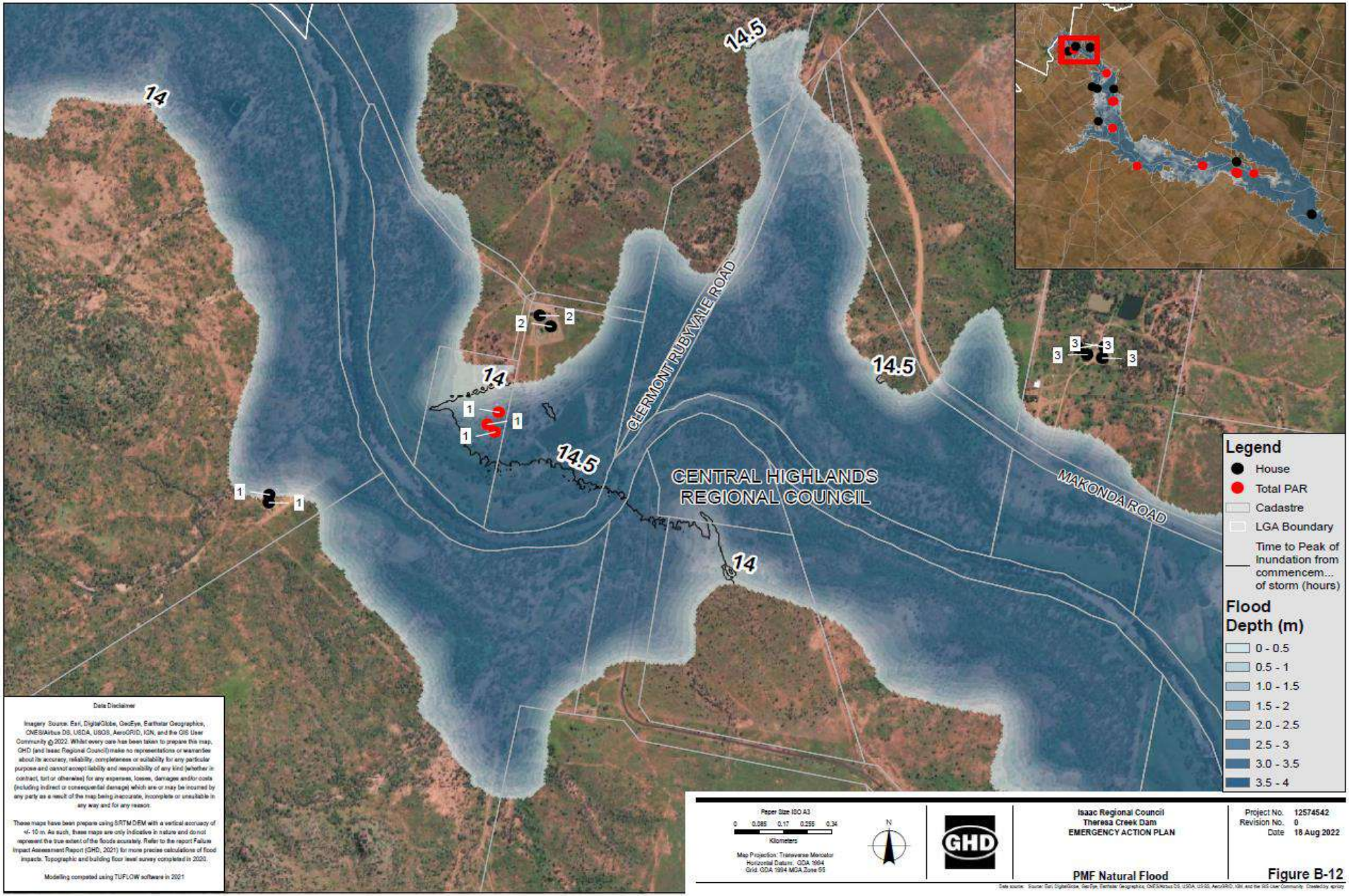

14.5
15
16.5
15.5
16
MAKONDA ROAD
16.5
CENTRAL HIGHLANDS
REGIONAL COUNCIL
17
17.5
18
18.5
11
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of simulation (hours). Dam failure is modelled to occur at commencement of simulation
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
Sunny Day Failure
Figure B-7

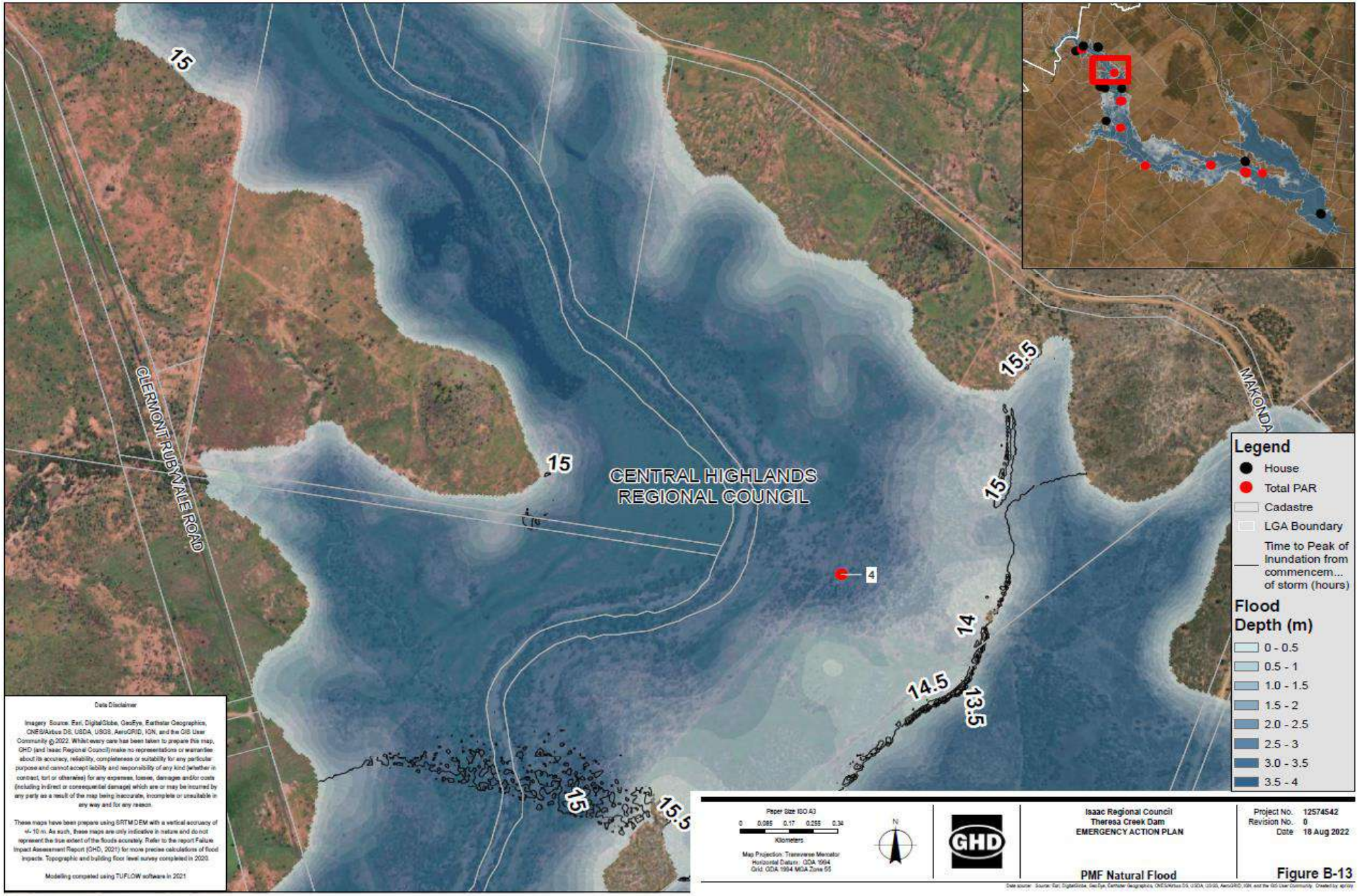

CENTRAL HIGHLANDS
REGIONAL COUNCIL
MAKONDA ROAD
24.5
25
24
22
22.5
23.5
23
21.5
26
12
12
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of simulation (hours). Dam failure is modelled to occur at commencement of simulation
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Paper Size ISO A3
Kilometers
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
Sunny Day Failure
Figure B-8

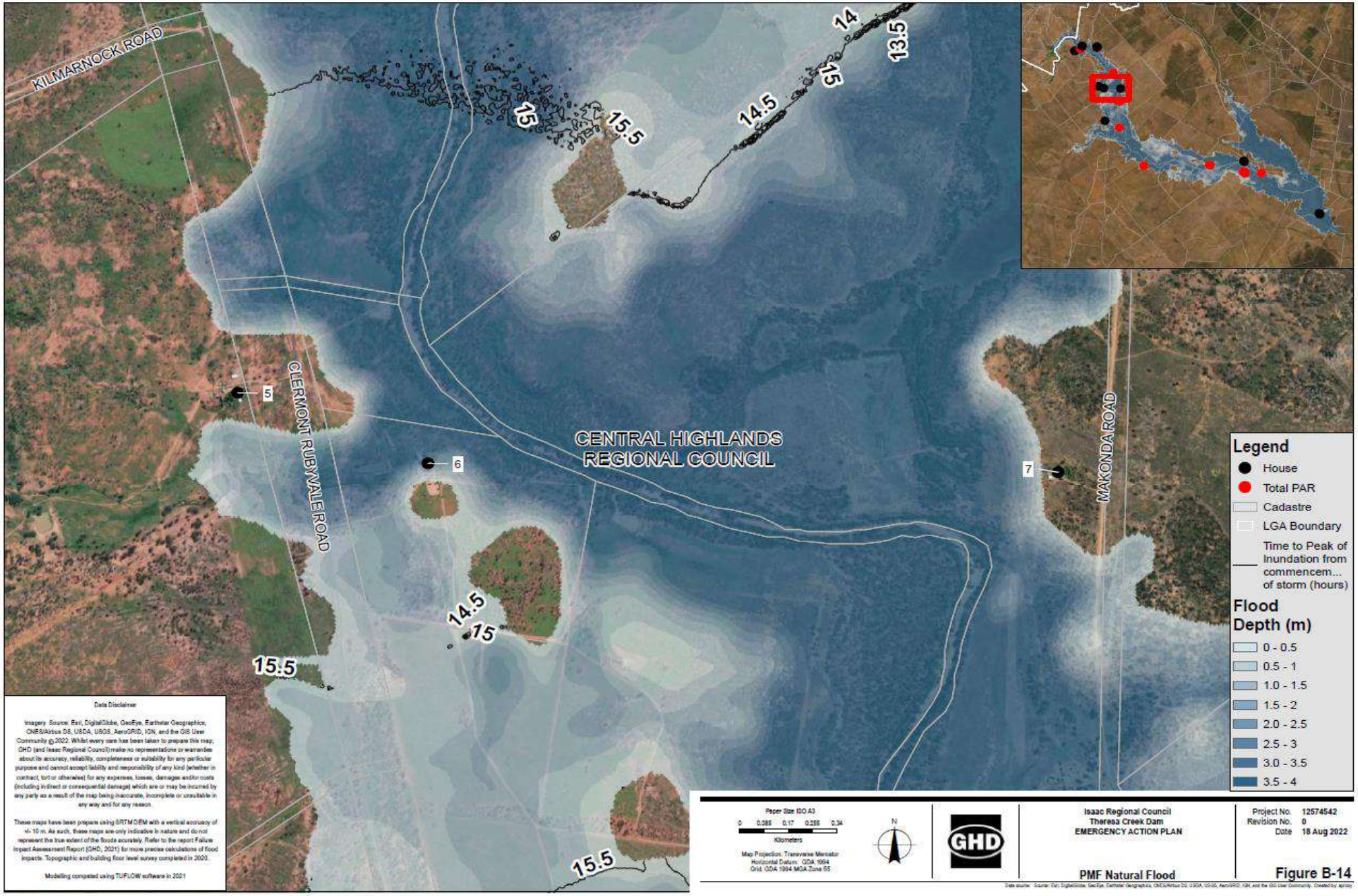

CENTRAL HIGHLANDS
REGIONAL COUNCIL
MALTHOID ROAD
MAKONDA ROAD
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of simulation (hours). Dam failure is modelled to occur at commencement of simulation
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community @ 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling completed using TUFLOW software in 2021
Paper Size ISO A3
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
Sunny Day Failure
Figure B-9

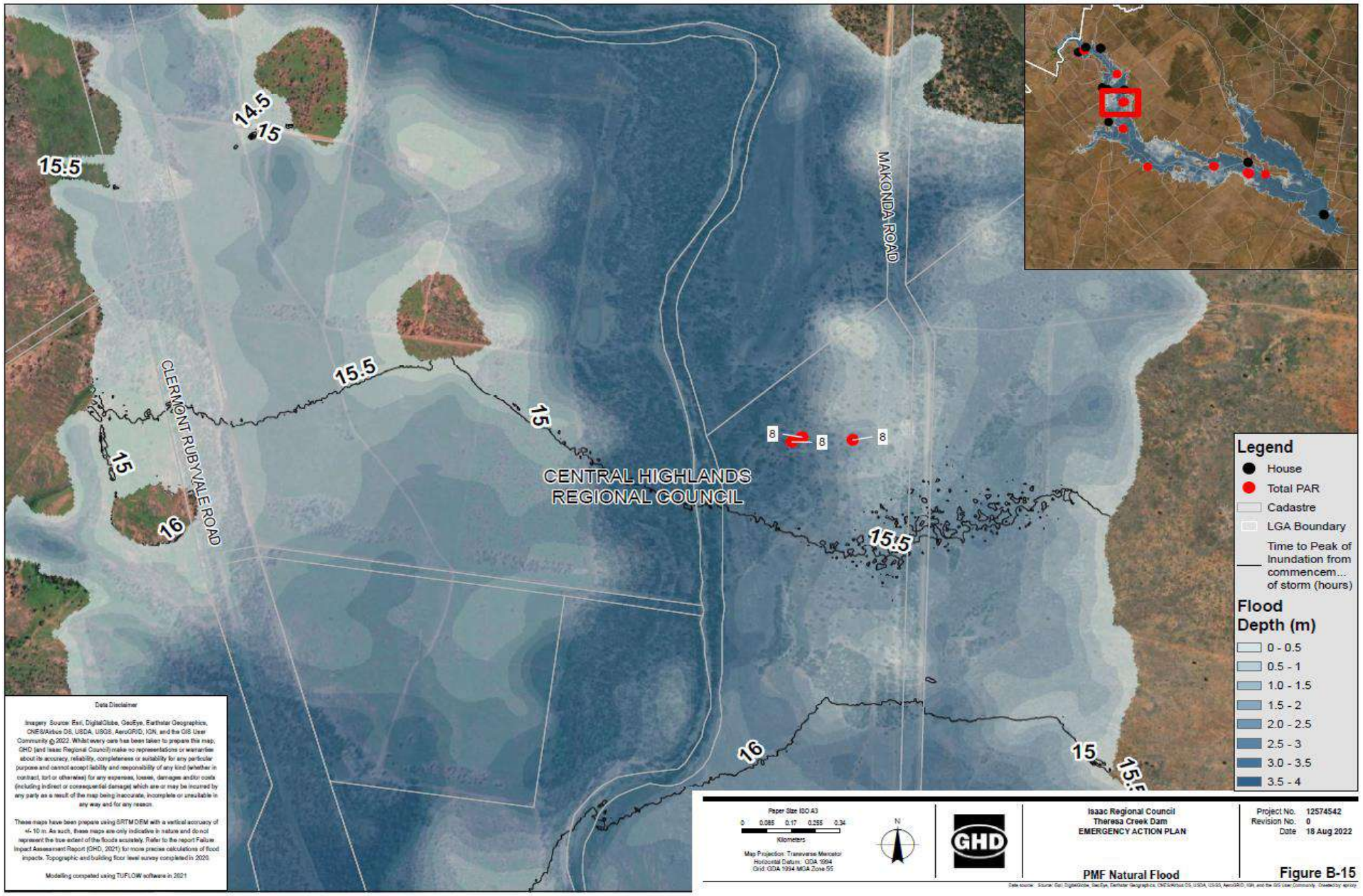

MAKONDA ROAD
CENTRAL HIGHLANDS REGIONAL COUNCIL
MALTHOID ROAD
FORESTHOME ROAD
28
31.5
32.5
34
34.5
35
35.5
13
14
15
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of simulation (hours). Dam failure is modelled to occur at commencement of simulation
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community @2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
Sunny Day Failure
Figure B-10

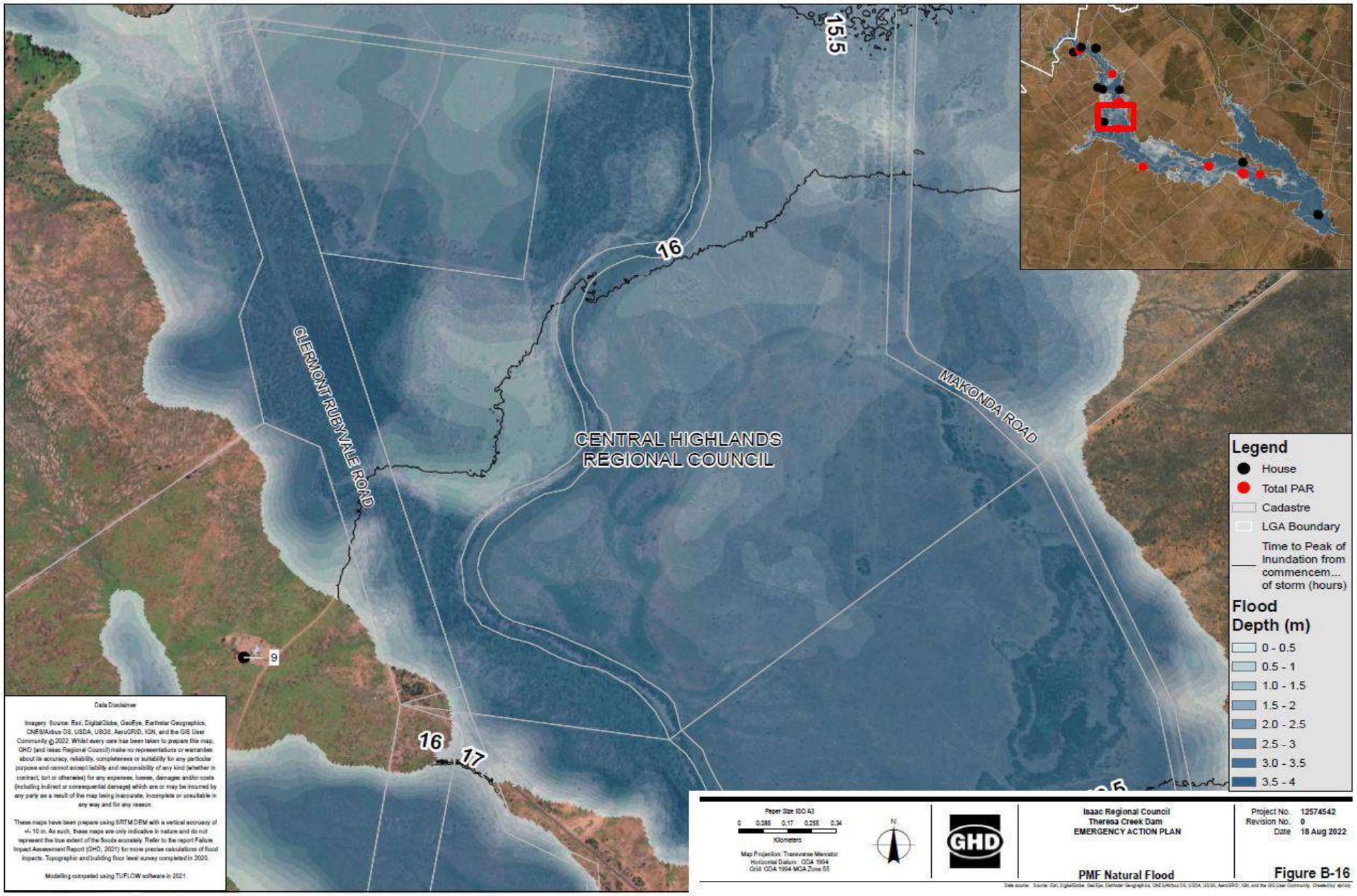

CENTRAL HIGHLANDS
REGIONAL COUNCIL
CAPELLA RUBYVALE ROAD
40
16
16
16
16
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of simulation (hours). Dam failure is modelled to occur at commencement of simulation
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
Sunny Day Failure
Figure B-11

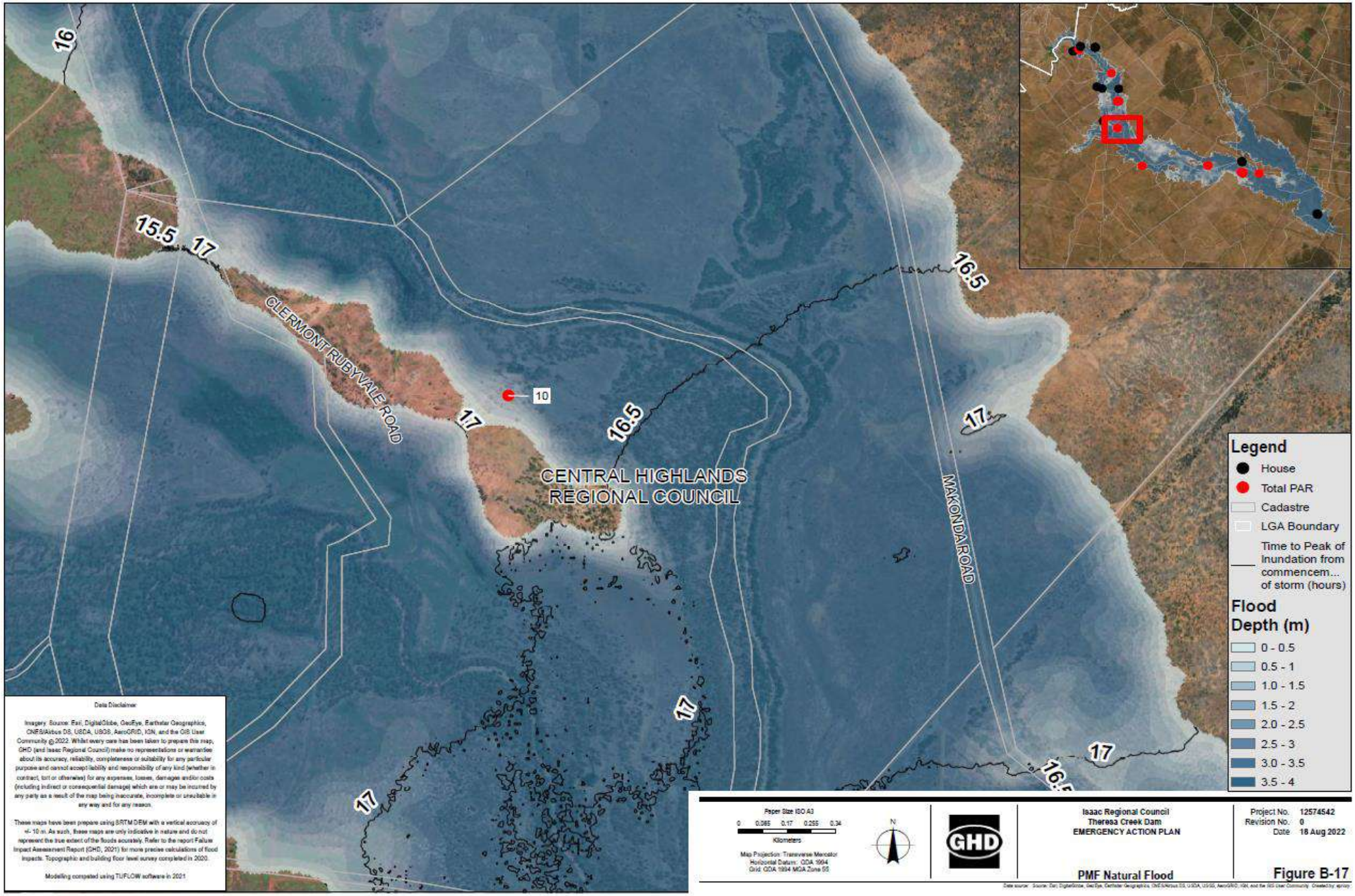

14
14.5
CLERMONT RUBYVALE ROAD
CENTRAL HIGHLANDS REGIONAL COUNCIL
MAKONDA ROAD
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencem... of storm (hours)
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 18 Aug 2022
PMF Natural Flood
Figure B-12

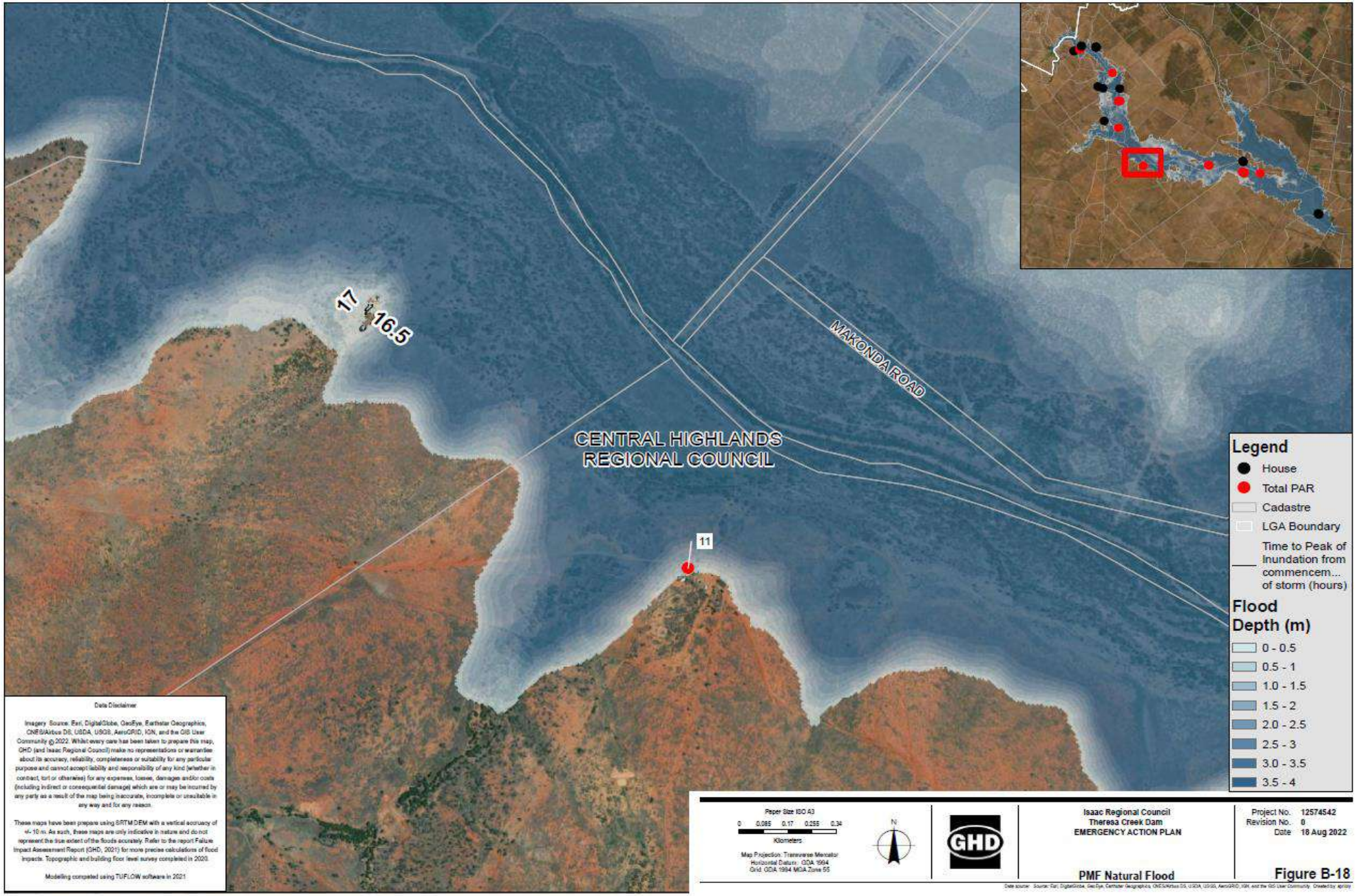

15
CLERMONT RUBYVALE ROAD
15
CENTRAL HIGHLANDS
REGIONAL COUNCIL
15.5
MAKONDA
15
4
14
14.5
13.5
15
15.5
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencem... of storm (hours)
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (c) 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 18 Aug 2022
PMF Natural Flood
Figure B-13

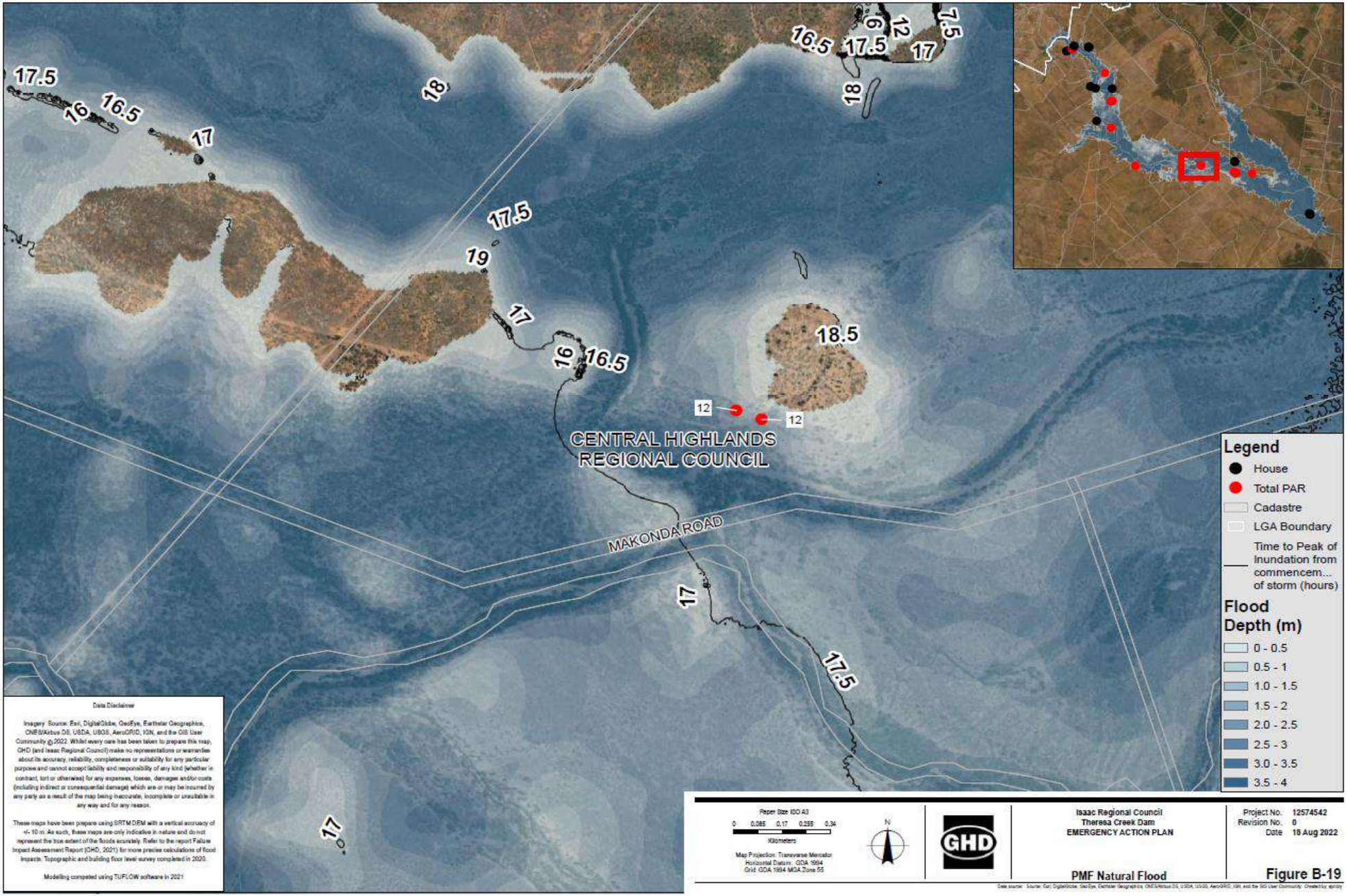

KILMARNOCK ROAD
CLERMONT RUBYVALE ROAD
MAKONDA ROAD
CENTRAL HIGHLANDS REGIONAL COUNCIL
5
6
7
14
13.5
15
14.5
15.5
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencem... of storm (hours)
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 18 Aug 2022
PMF Natural Flood
Figure B-14

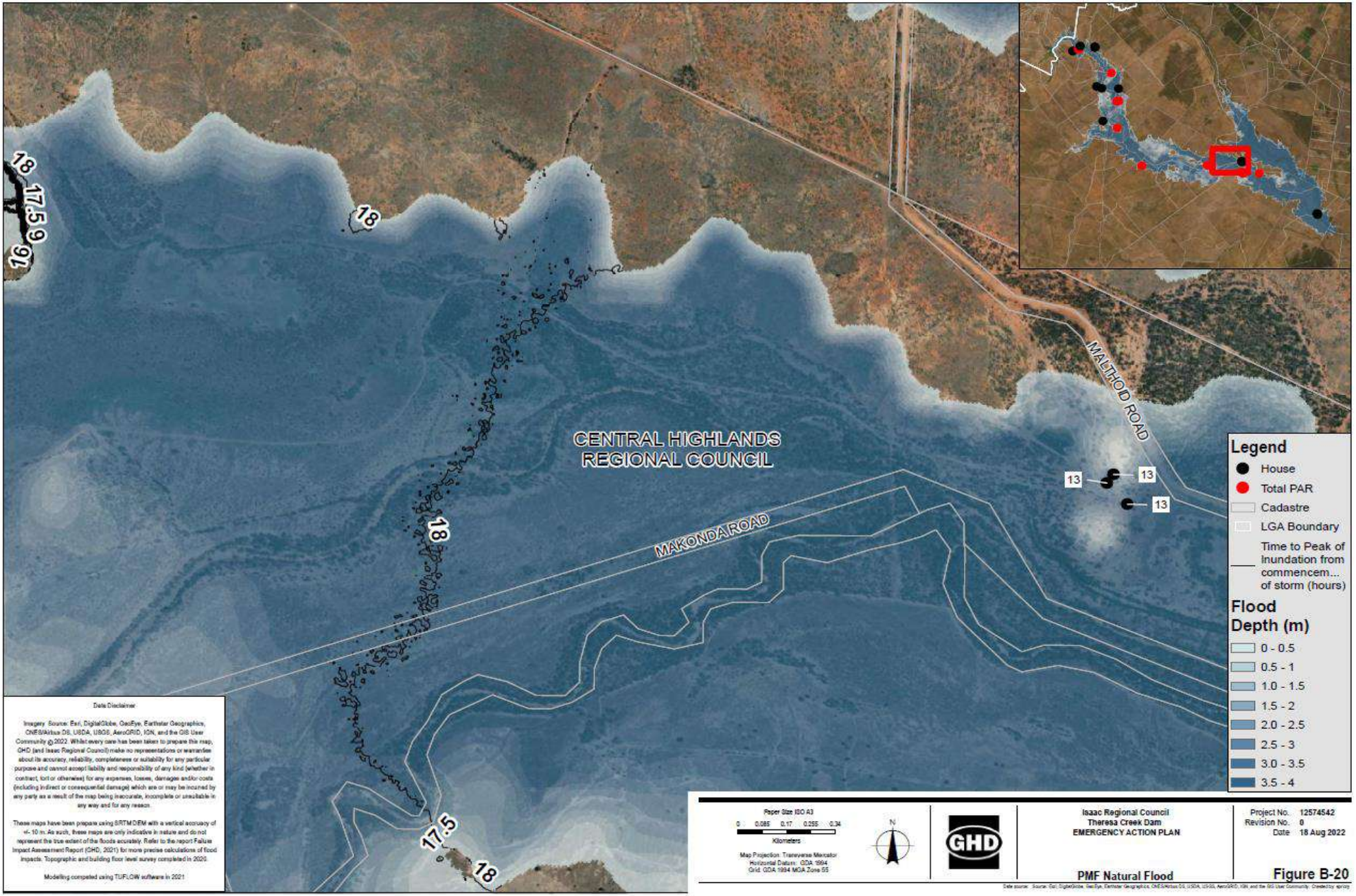

14.5
15
15.5
MAKONDA ROAD
CLERMONT RUBYVALE ROAD
15.5
15
15
16
CENTRAL HIGHLANDS
REGIONAL COUNCIL
8
8
8
15.5
16
15
15
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencem... of storm (hours)
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unreliable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 18 Aug 2022
PMF Natural Flood
Figure B-15

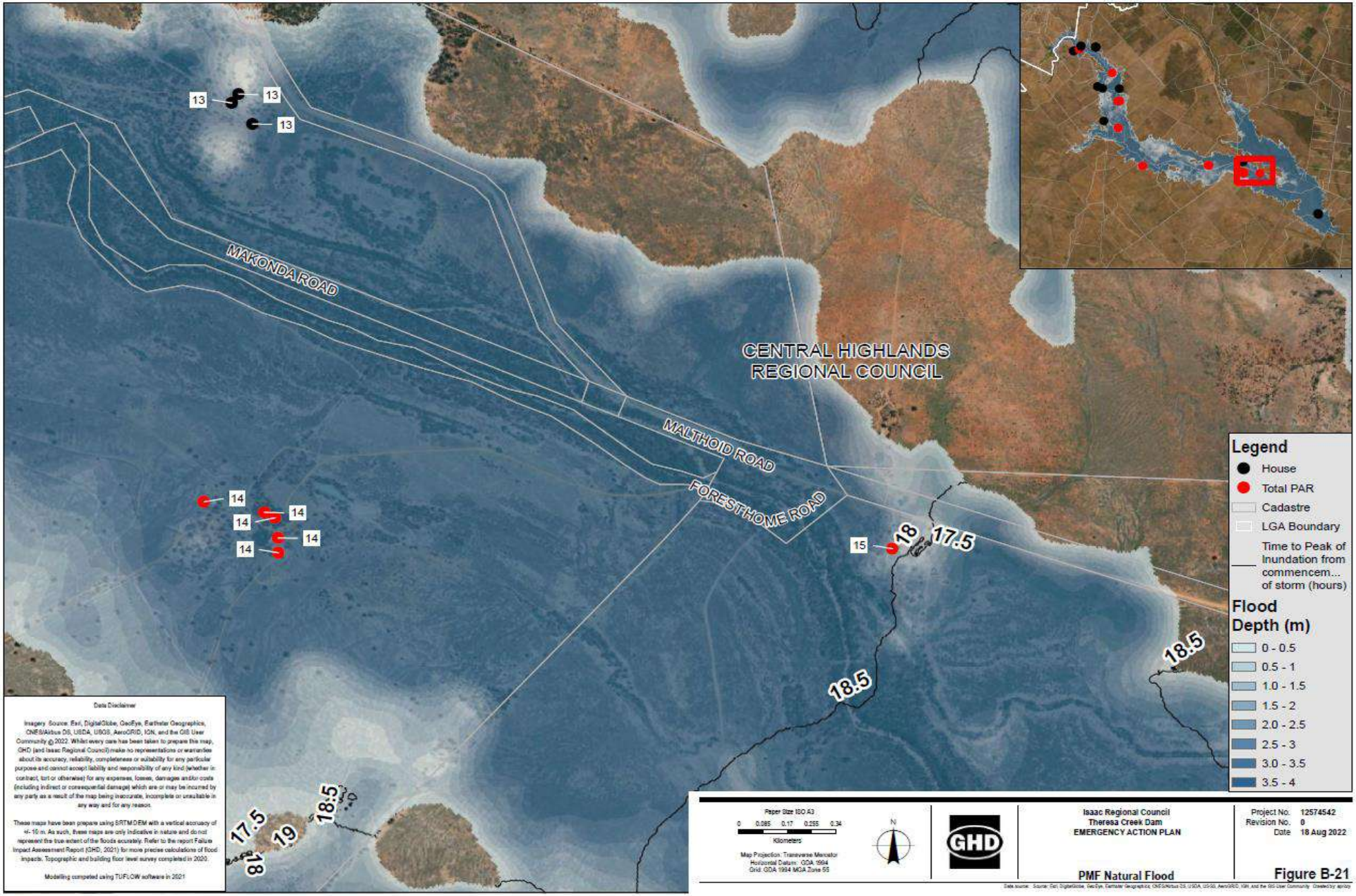

15.5
16
CLERMONT RUBYVALE ROAD
CENTRAL HIGHLANDS
REGIONAL COUNCIL
MAKONDA ROAD
9
16
17
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencem... of storm (hours)
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (c) 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
PMF Natural Flood
Project No. 12574542
Revision No. 0
Date 18 Aug 2022
Figure B-16

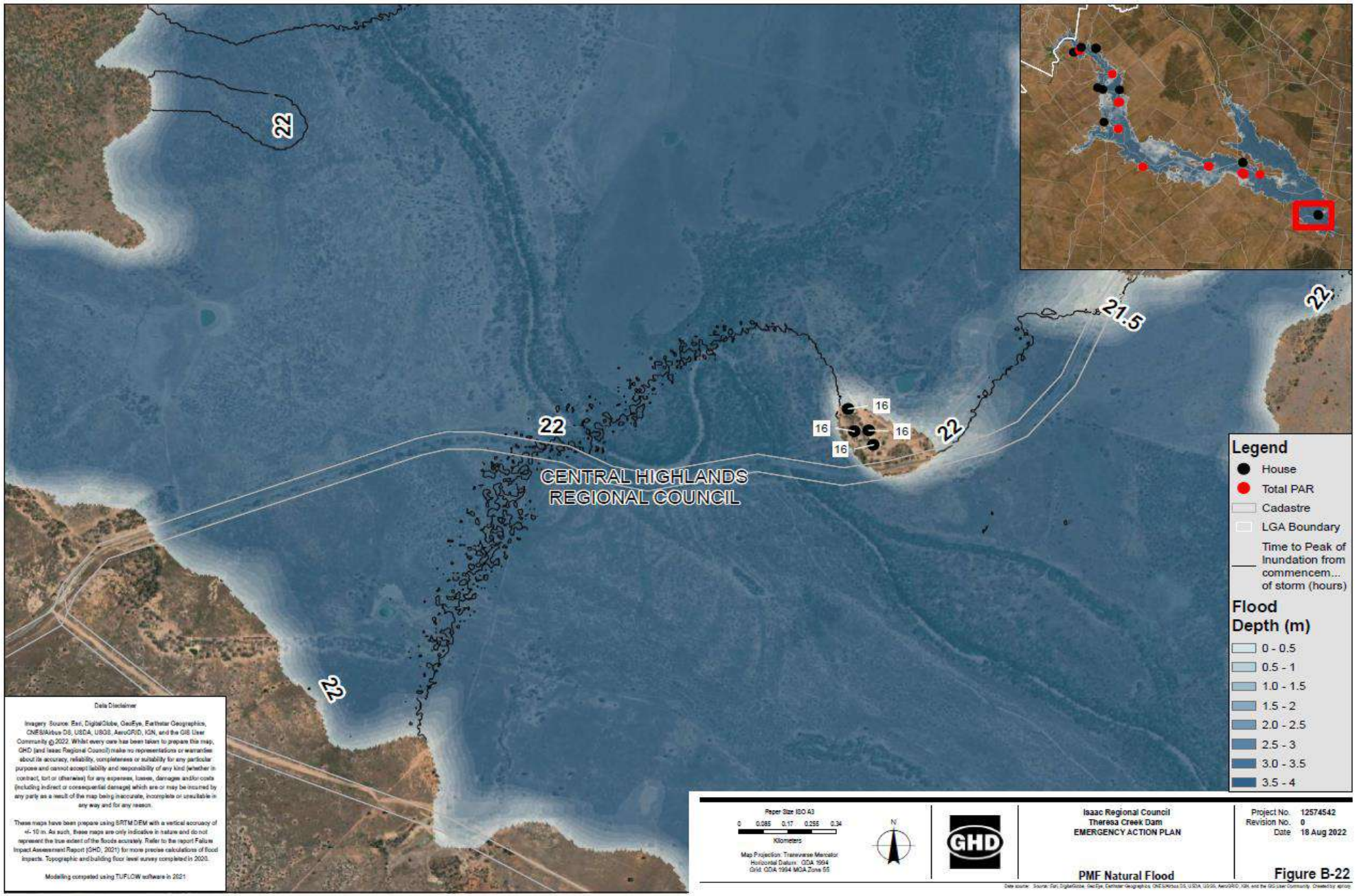

16
15.5
17
CLERMONT RUBYVALE ROAD
10
16.5
17
CENTRAL HIGHLANDS
REGIONAL COUNCIL
MAKONDA ROAD
16.5
17
17
17
17
16.5
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencem... of storm (hours)
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warrantee about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unreliable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
PMF Natural Flood
Project No. 12574542
Revision No. 0
Date 18 Aug 2022
Figure B-17

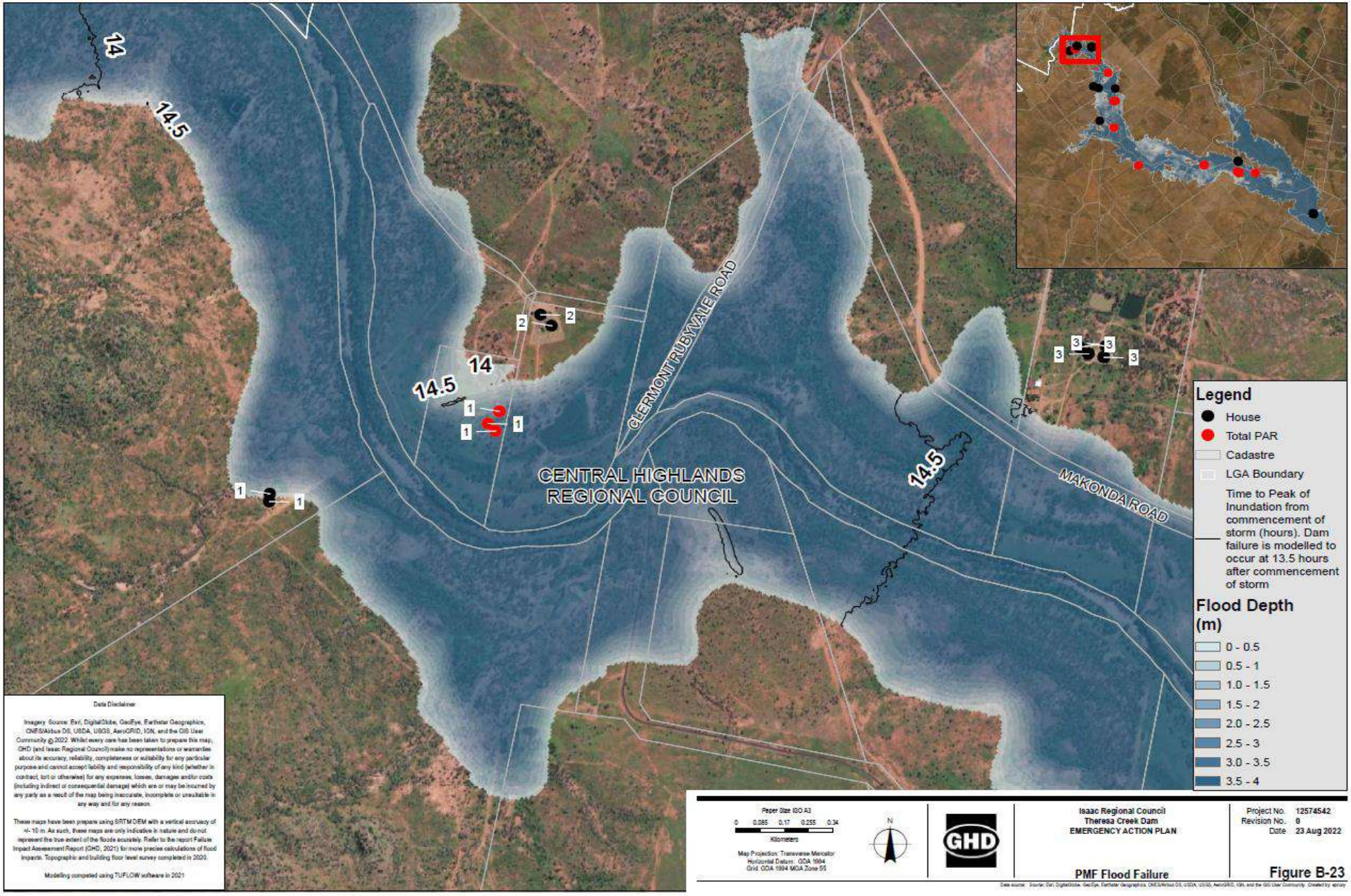

17
16.5
MAKONDA ROAD
CENTRAL HIGHLANDS
REGIONAL COUNCIL
11
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencem... of storm (hours)
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (c) 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
PMF Natural Flood
Project No. 12574542
Revision No. 0
Date 18 Aug 2022
Figure B-18

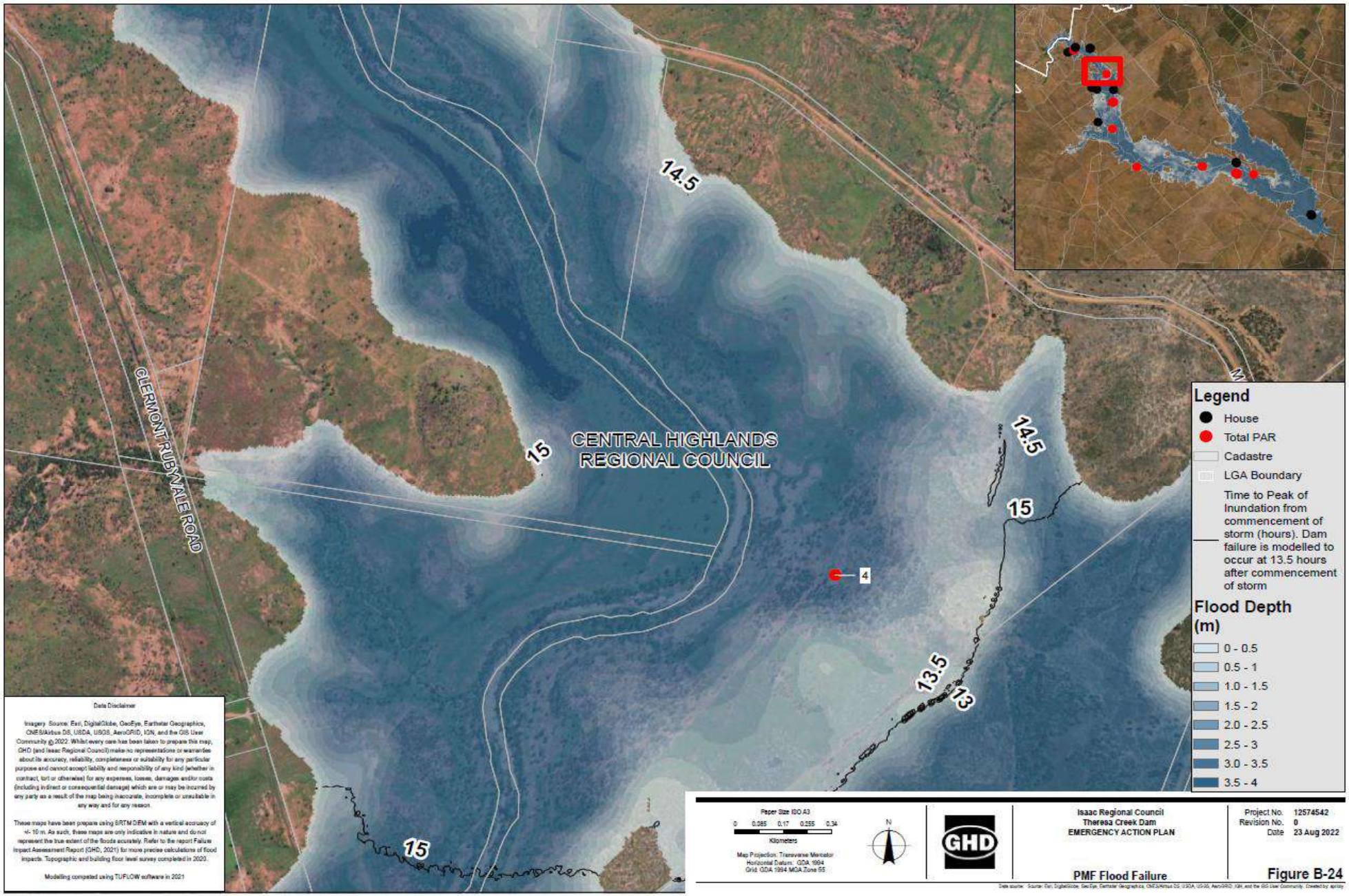

17.5
16
16.5
17
18
16.5
17.5
17
18
17.5
19
17
16
16.5
18.5
12
12
CENTRAL HIGHLANDS
REGIONAL COUNCIL
MAKONDA ROAD
17
17.5
17
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencem... of storm (hours)
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
PMF Natural Flood
Project No. 12574542
Revision No. 0
Date 18 Aug 2022
Figure B-19

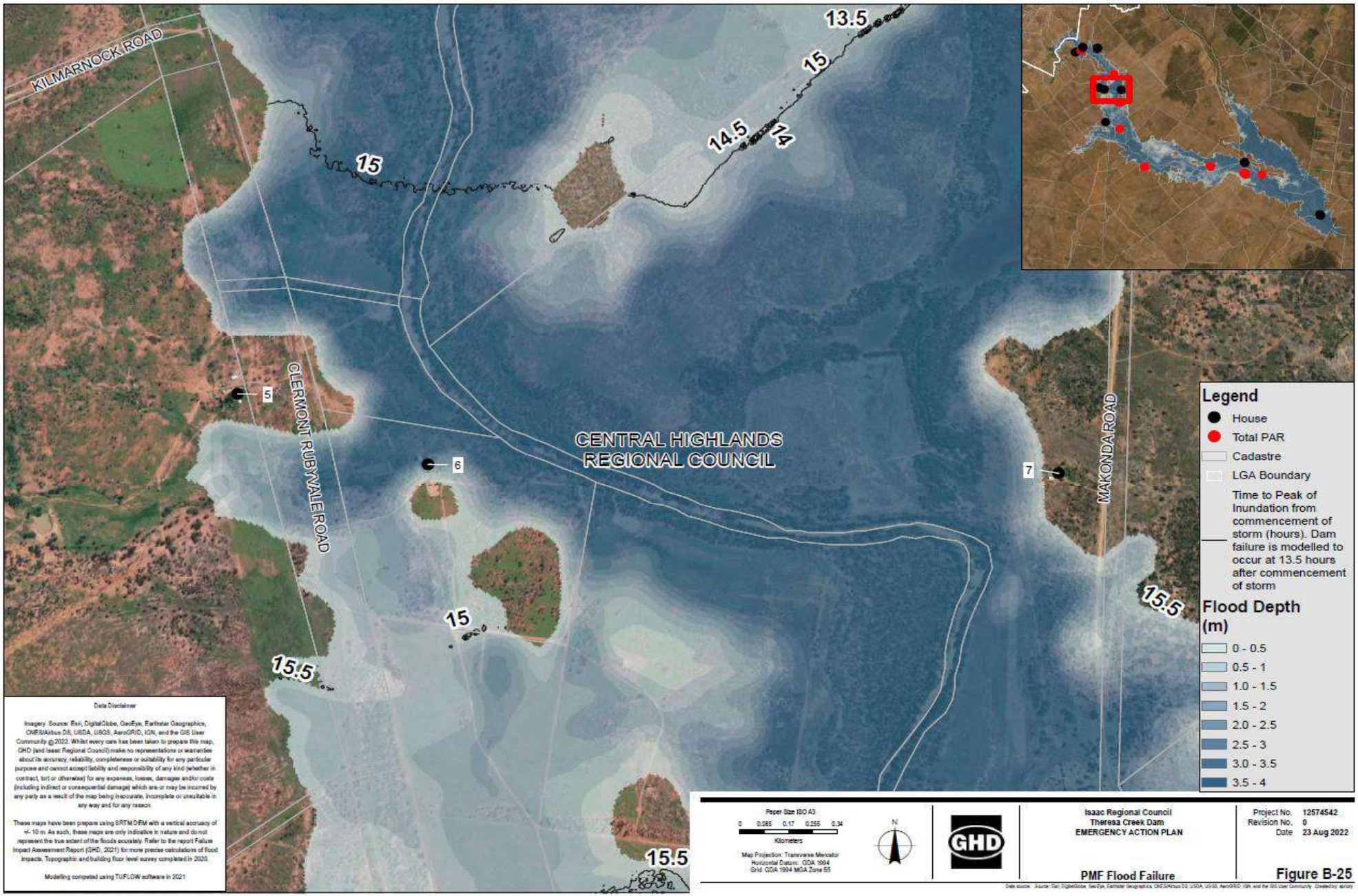

CENTRAL HIGHLANDS
REGIONAL COUNCIL
MALTHOD ROAD
MAKONDA ROAD
18
17.5
19
13
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencem... of storm (hours)
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
PMF Natural Flood
Project No. 12574542
Revision No. 0
Date 18 Aug 2022
Figure B-20

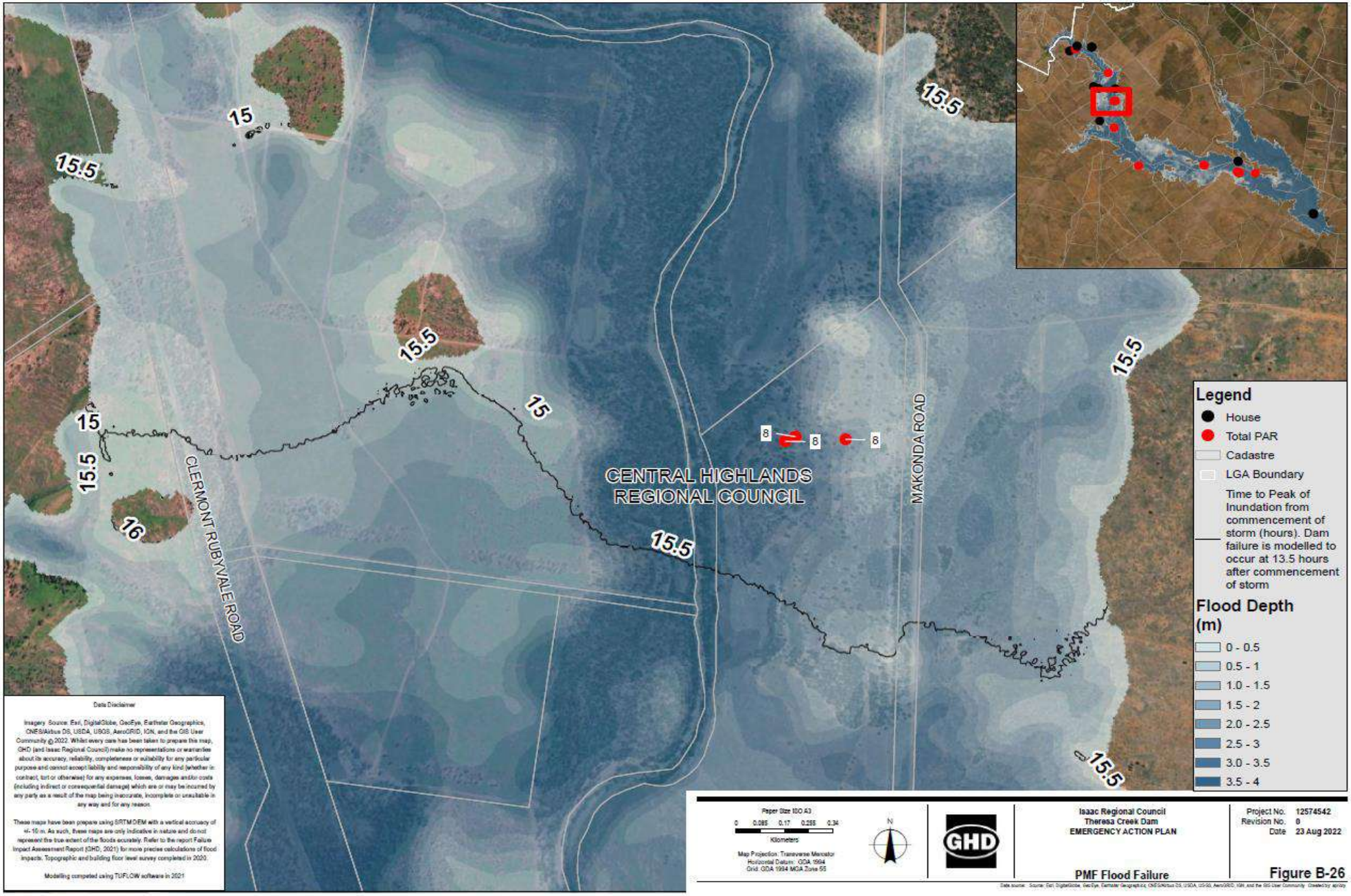

MAKONDA ROAD
CENTRAL HIGHLANDS REGIONAL COUNCIL
MALTHOID ROAD
FORESTHOME ROAD
13
13
13
14
14
14
14
15
18
17.5
18.5
18.5
17.5
19
18.5
18
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencem... of storm (hours)
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 18 Aug 2022
PMF Natural Flood
Figure B-21

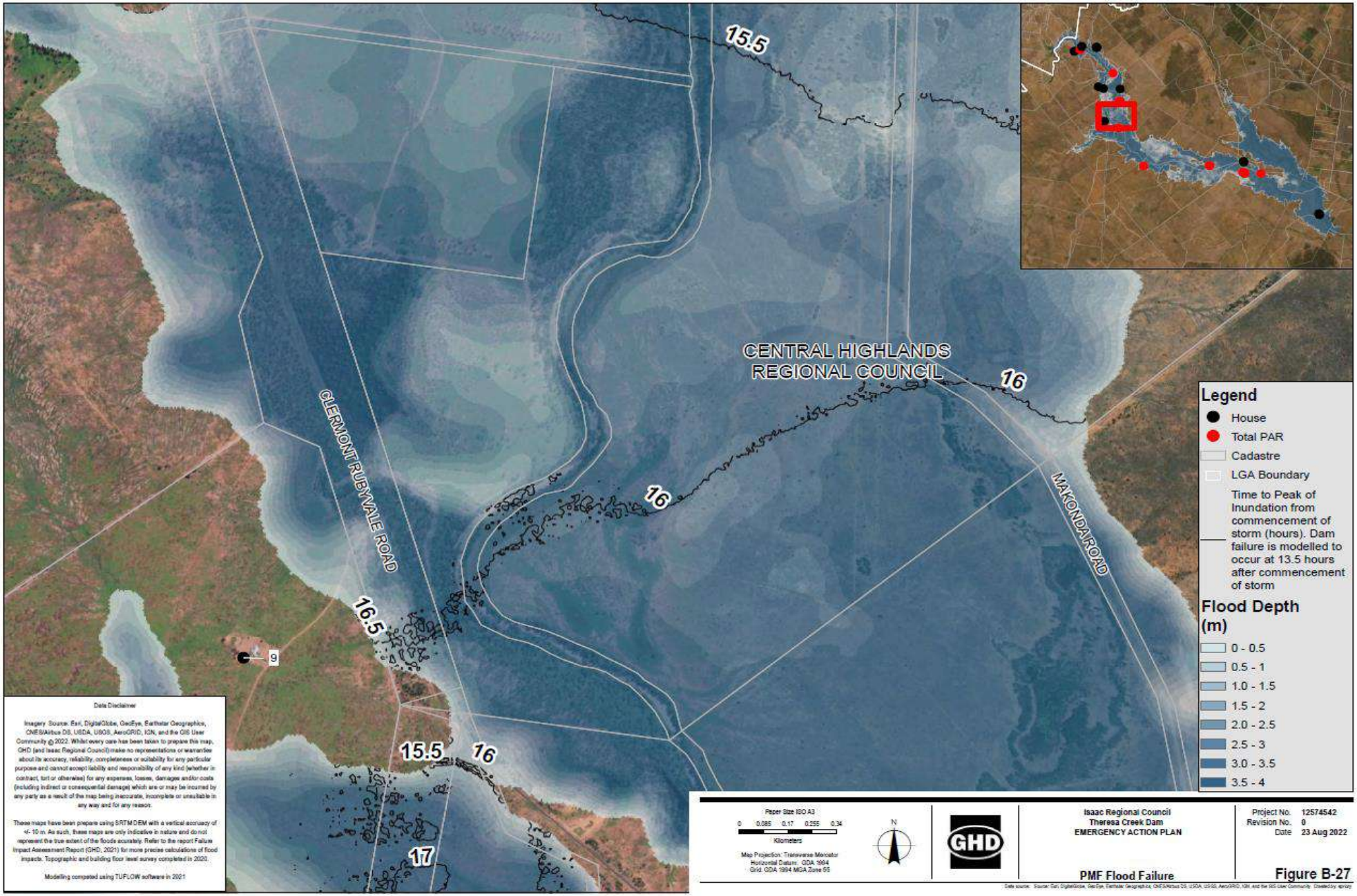

22
21.5
16
CENTRAL HIGHLANDS
REGIONAL COUNCIL
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencem... of storm (hours)
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Paper Size ISO A3
Kilometers
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
PMF Natural Flood
Project No. 12574542
Revision No. 0
Date 18 Aug 2022
Figure B-22

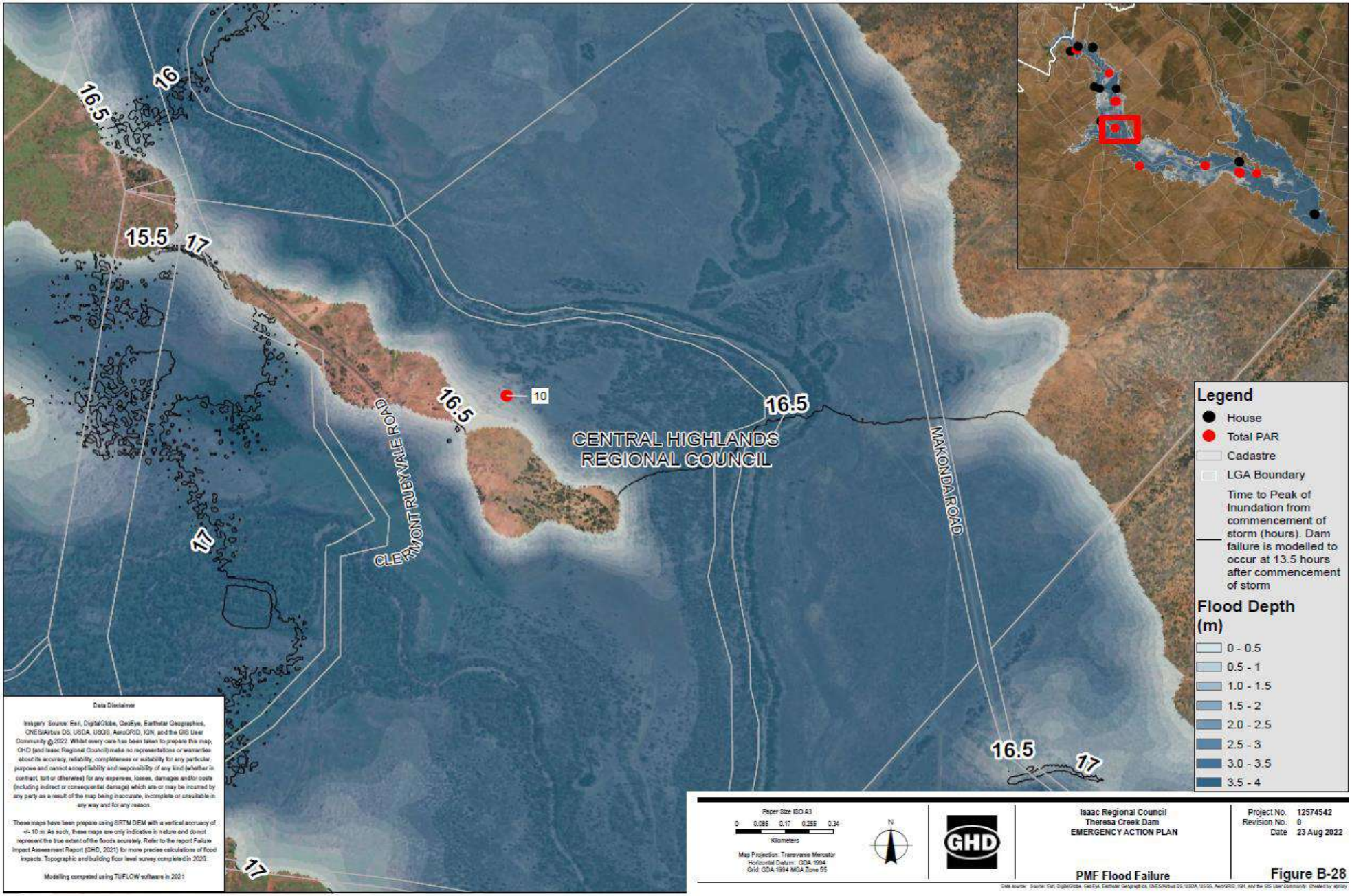

14
14.5
14
14.5
14.5
CLERMONT RUBYVALE ROAD
CENTRAL HIGHLANDS REGIONAL COUNCIL
MAKONDA ROAD
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of storm (hours). Dam failure is modelled to occur at 13.5 hours after commencement of storm
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
PMF Flood Failure
Figure B-23

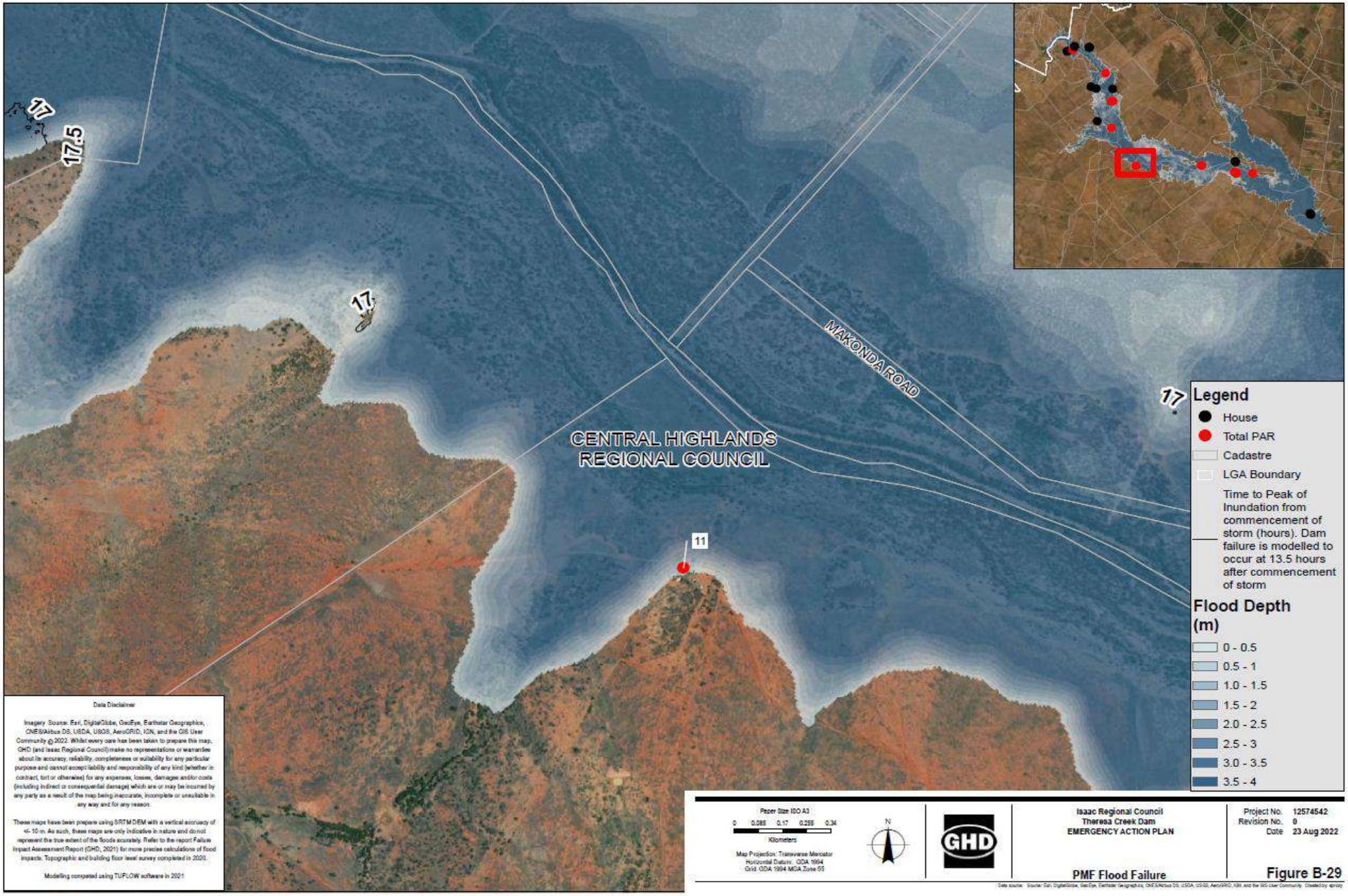

CLERMONT RUBYVALE ROAD
CENTRAL HIGHLANDS REGIONAL COUNCIL
14.5
15
14.5
15
13.5
13
15
4
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of storm (hours). Dam failure is modelled to occur at 13.5 hours after commencement of storm
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
PMF Flood Failure
Figure B-24

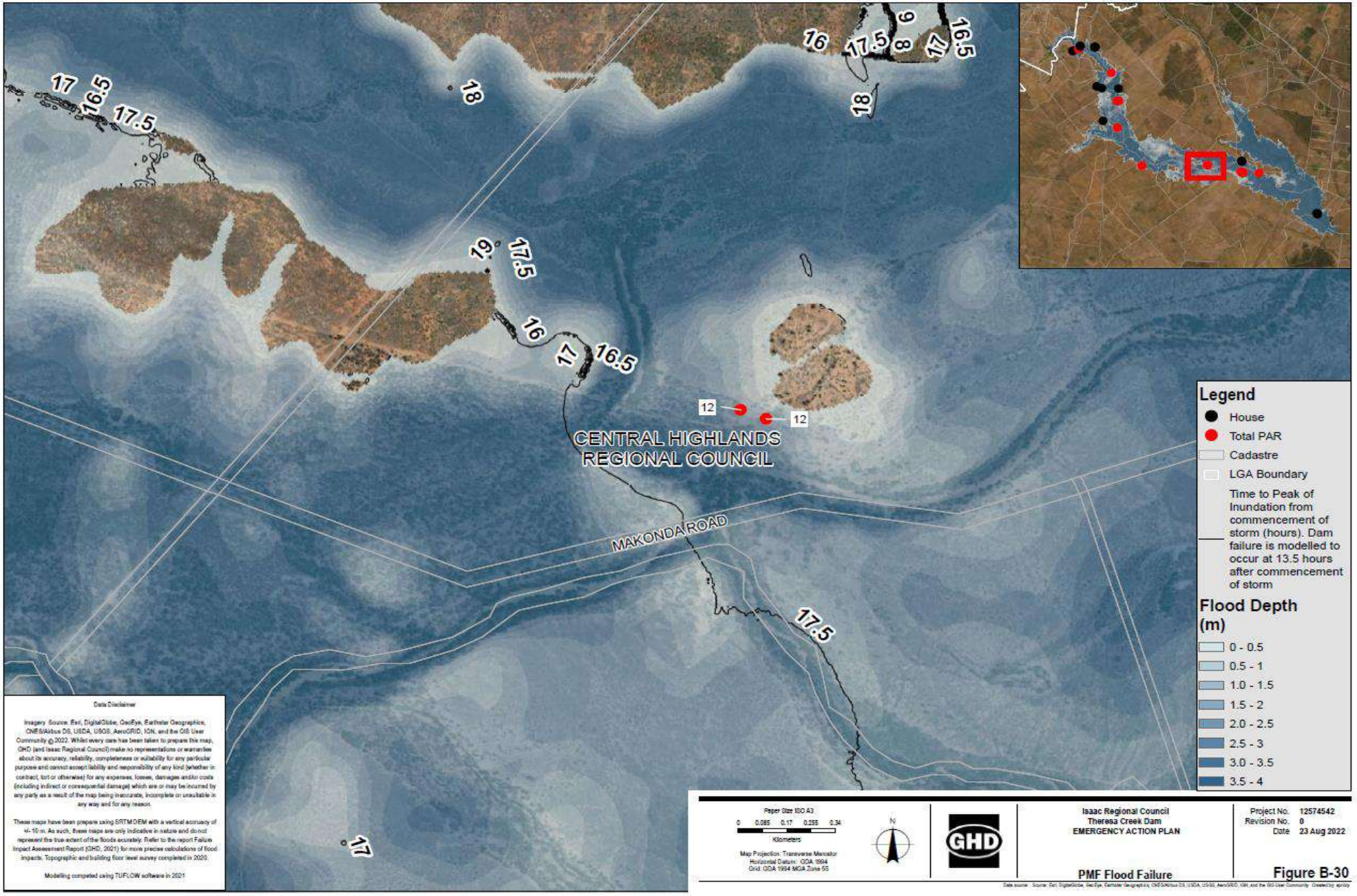

KILMARNOCK ROAD
CLERMONT RUBYVALE ROAD
MAKONDA ROAD
CENTRAL HIGHLANDS REGIONAL COUNCIL
13.5
15
14.5
14
15
15.5
15
15.5
15.5
5
6
7
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of storm (hours). Dam failure is modelled to occur at 13.5 hours after commencement of storm
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling completed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
PMF Flood Failure
Figure B-25

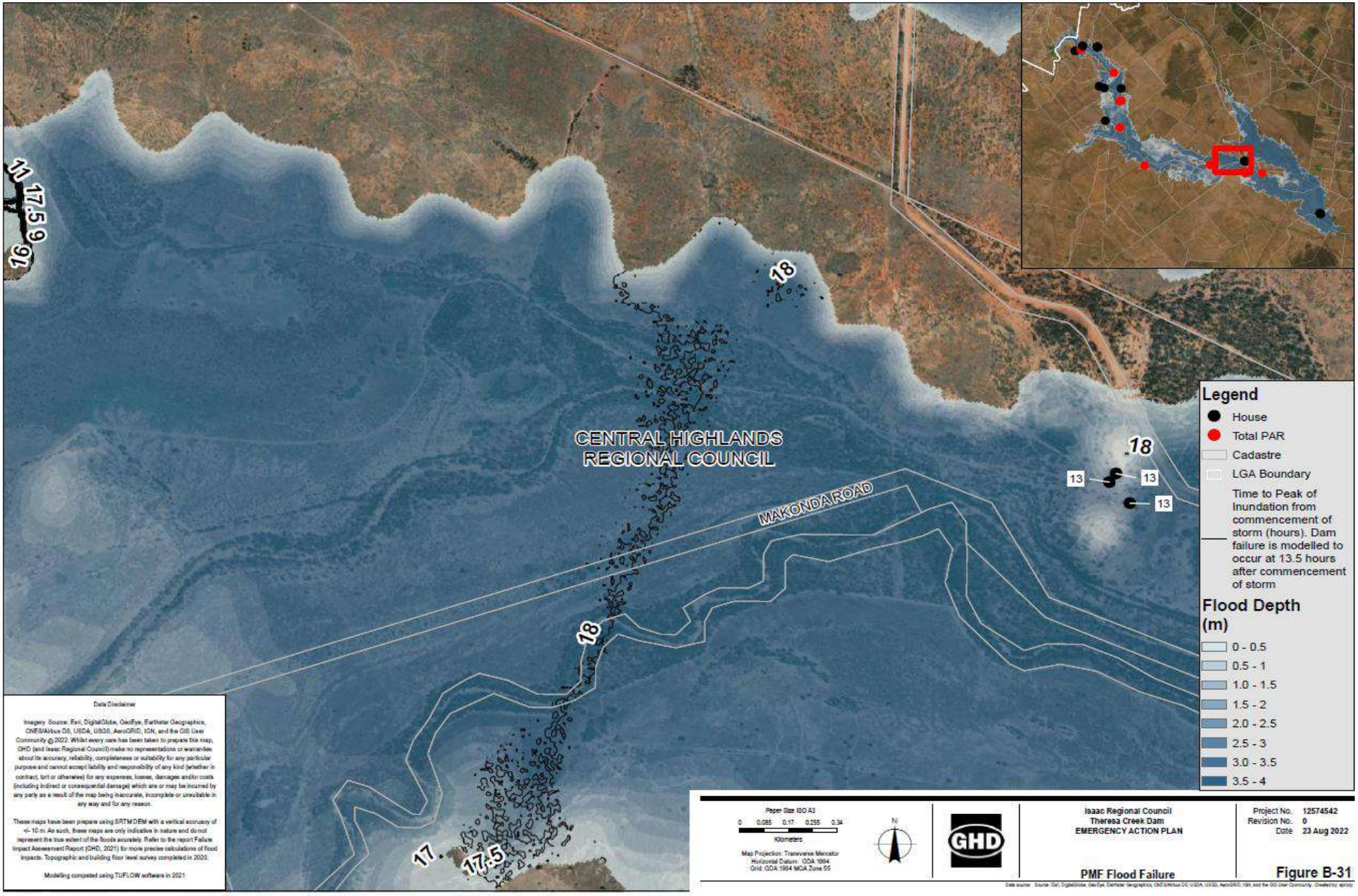

15
15.5
16
CLERMONT RUBYVALE ROAD
CENTRAL HIGHLANDS
REGIONAL COUNCIL
MAKONDA ROAD
8
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of storm (hours). Dam failure is modelled to occur at 13.5 hours after commencement of storm
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
PMF Flood Failure
Figure B-26

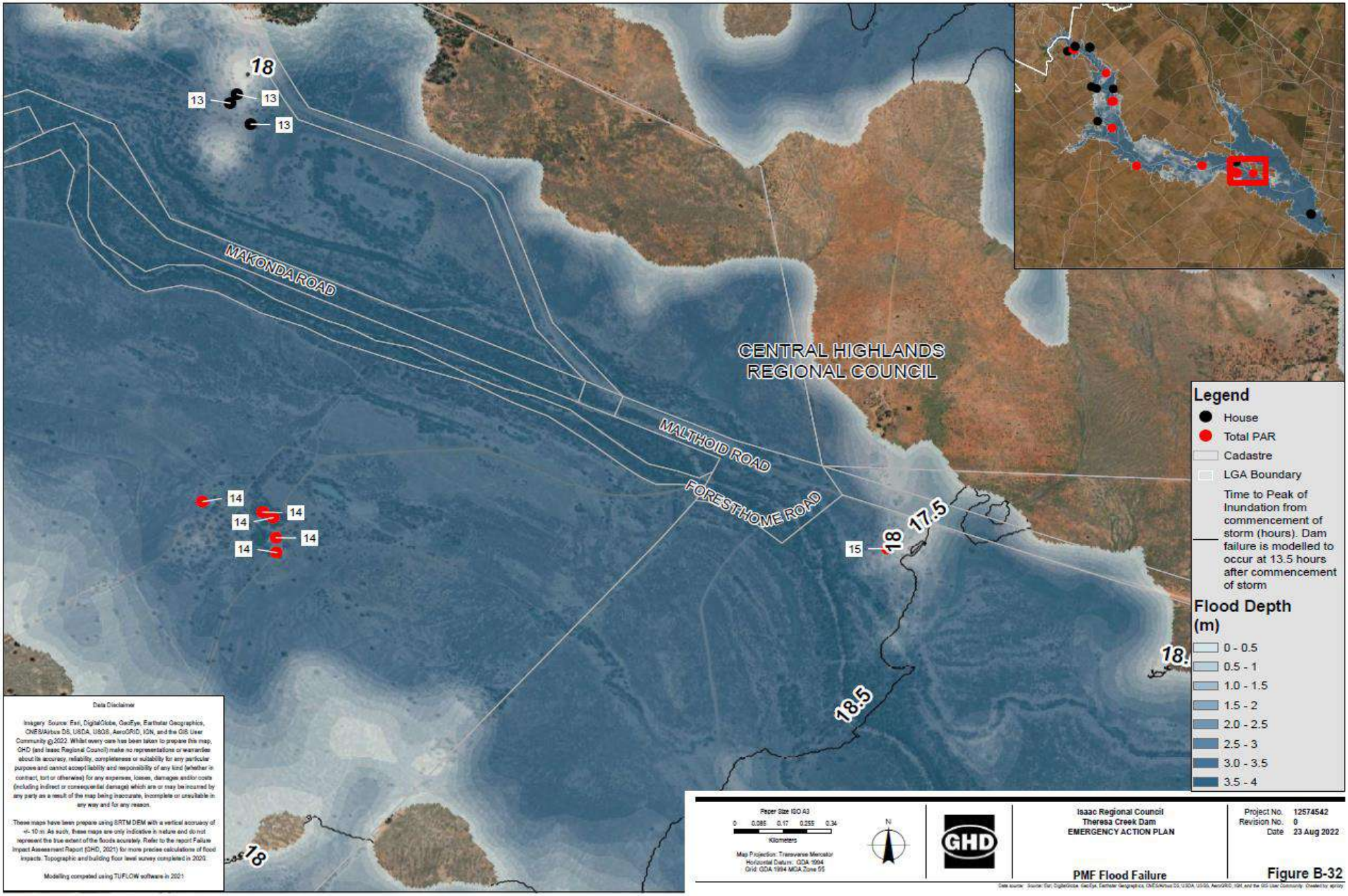

15.5
CENTRAL HIGHLANDS
REGIONAL COUNCIL
16
16
CLERMONT RUBYVALE ROAD
MAKONDA ROAD
16.5
9
15.5
16
17
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of storm (hours). Dam failure is modelled to occur at 13.5 hours after commencement of storm
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
PMF Flood Failure
Figure B-27

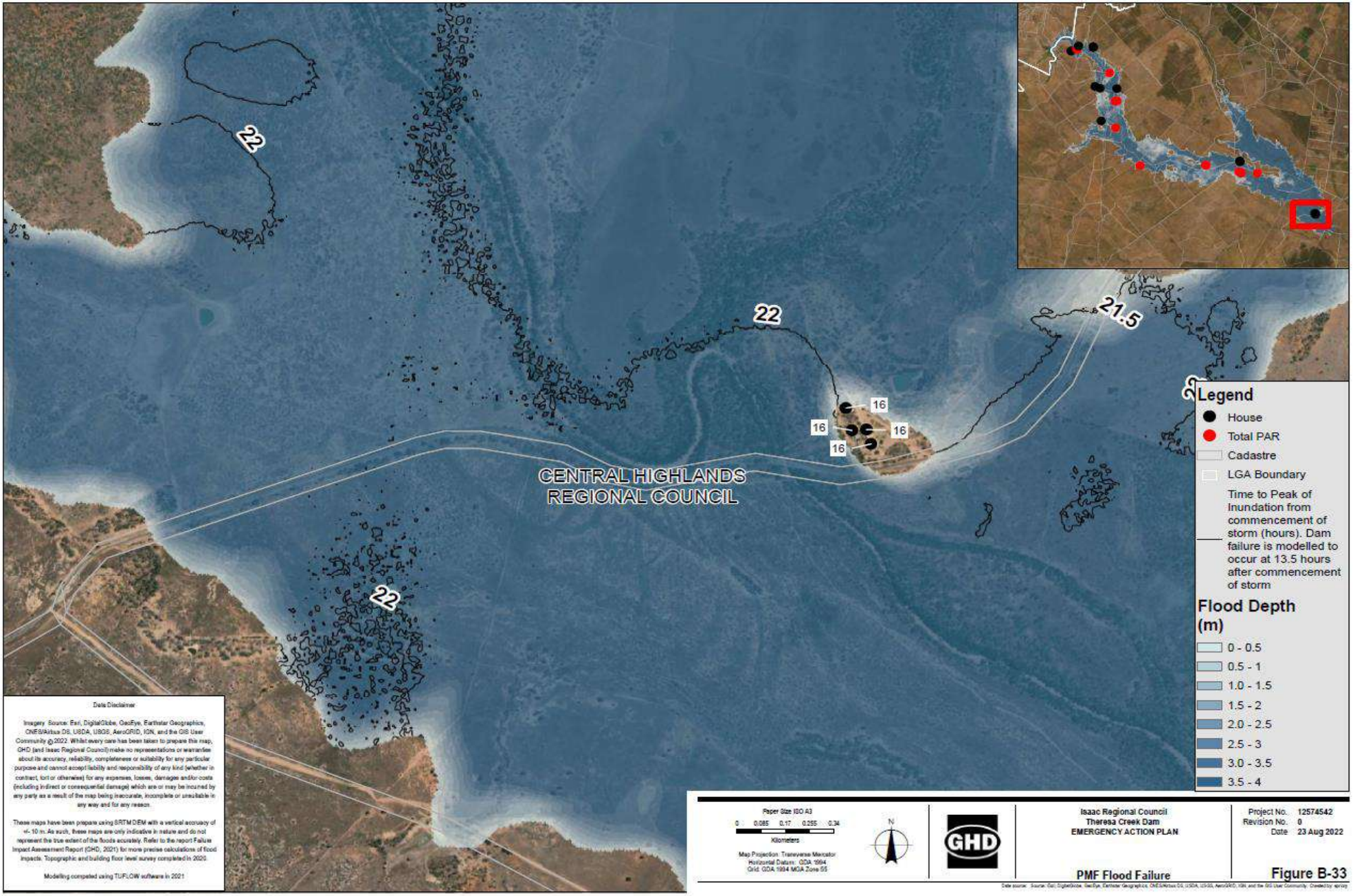

16.5
16
15.5
17
10
16.5
CENTRAL HIGHLANDS
REGIONAL COUNCIL
CLERMONT RUBYVALE ROAD
MAKONDA ROAD
16.5
17
16.5
17
17
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of storm (hours). Dam failure is modelled to occur at 13.5 hours after commencement of storm
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community @2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unreliable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
PMF Flood Failure
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
Figure B-28


17
17.5
17
MAKONDA ROAD
CENTRAL HIGHLANDS
REGIONAL COUNCIL
11
17
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of storm (hours). Dam failure is modelled to occur at 13.5 hours after commencement of storm
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
PMF Flood Failure
Figure B-29

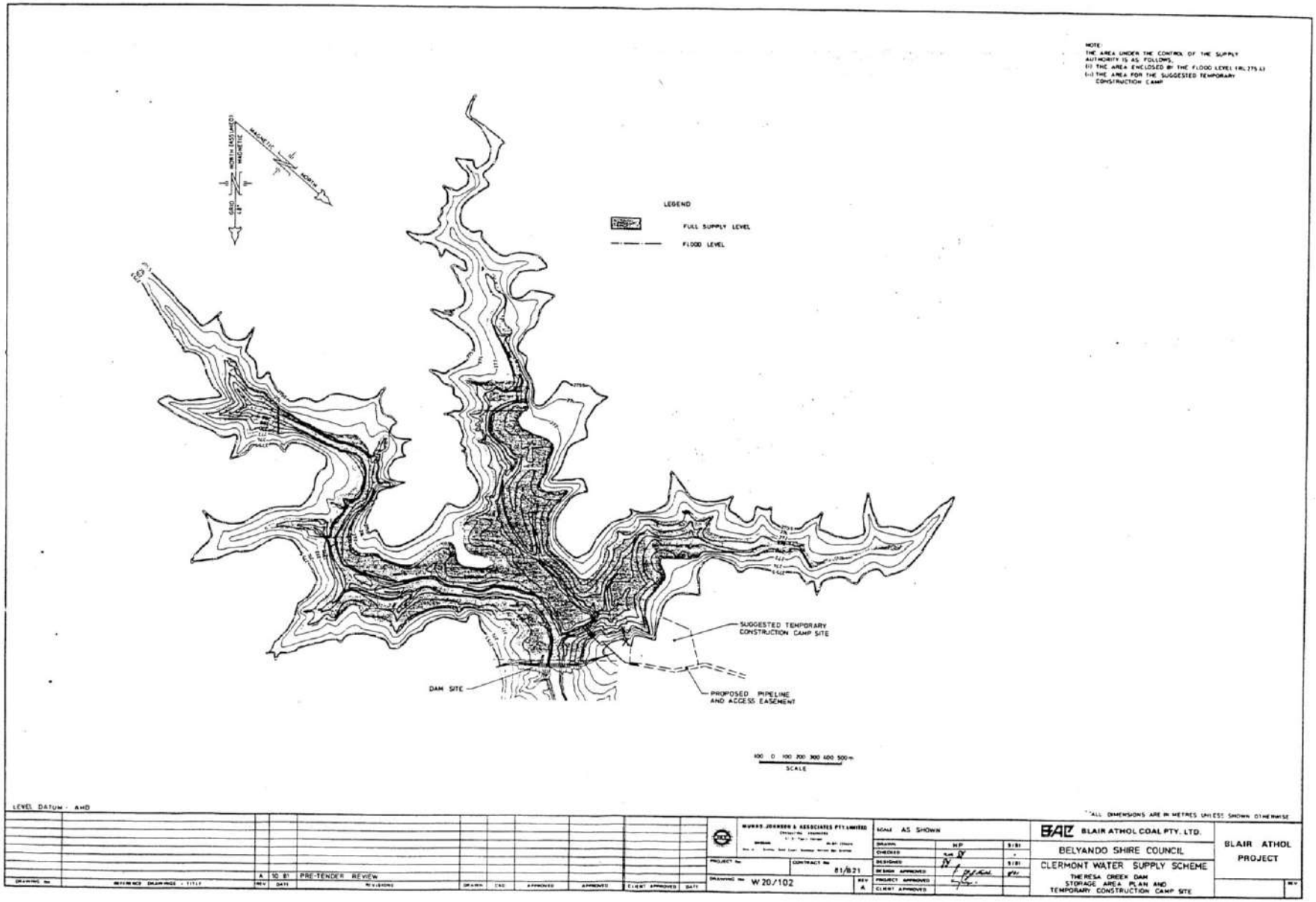

CENTRAL HIGHLANDS REGIONAL COUNCIL
MAKONDA ROAD
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of storm (hours). Dam failure is modelled to occur at 13.5 hours after commencement of storm
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
PMF Flood Failure
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
Figure B-30


CENTRAL HIGHLANDS
REGIONAL COUNCIL
MAKONDA ROAD
11
17.5
16
18
18
13
13
13
18
17
17.5
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of storm (hours). Dam failure is modelled to occur at 13.5 hours after commencement of storm
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community @ 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unreliable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
PMF Flood Failure
Figure B-31


MAKONDA ROAD
CENTRAL HIGHLANDS REGIONAL COUNCIL
MALTHOID ROAD
FORESTHOME ROAD
18
13
13
13
14
14
14
14
15
18
17.5
18.5
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of storm (hours). Dam failure is modelled to occur at 13.5 hours after commencement of storm
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Paper Size ISO A3
Kilometers
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
PMF Flood Failure
Figure B-32


22
22
21.5
22
16
16
16
16
CENTRAL HIGHLANDS
REGIONAL COUNCIL
Legend
House
Total PAR
Cadastre
LGA Boundary
Time to Peak of Inundation from commencement of storm (hours). Dam failure is modelled to occur at 13.5 hours after commencement of storm
Flood Depth (m)
0 - 0.5
0.5 - 1
1.0 - 1.5
1.5 - 2
2.0 - 2.5
2.5 - 3
3.0 - 3.5
3.5 - 4
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
PMF Flood Failure
Figure B-33

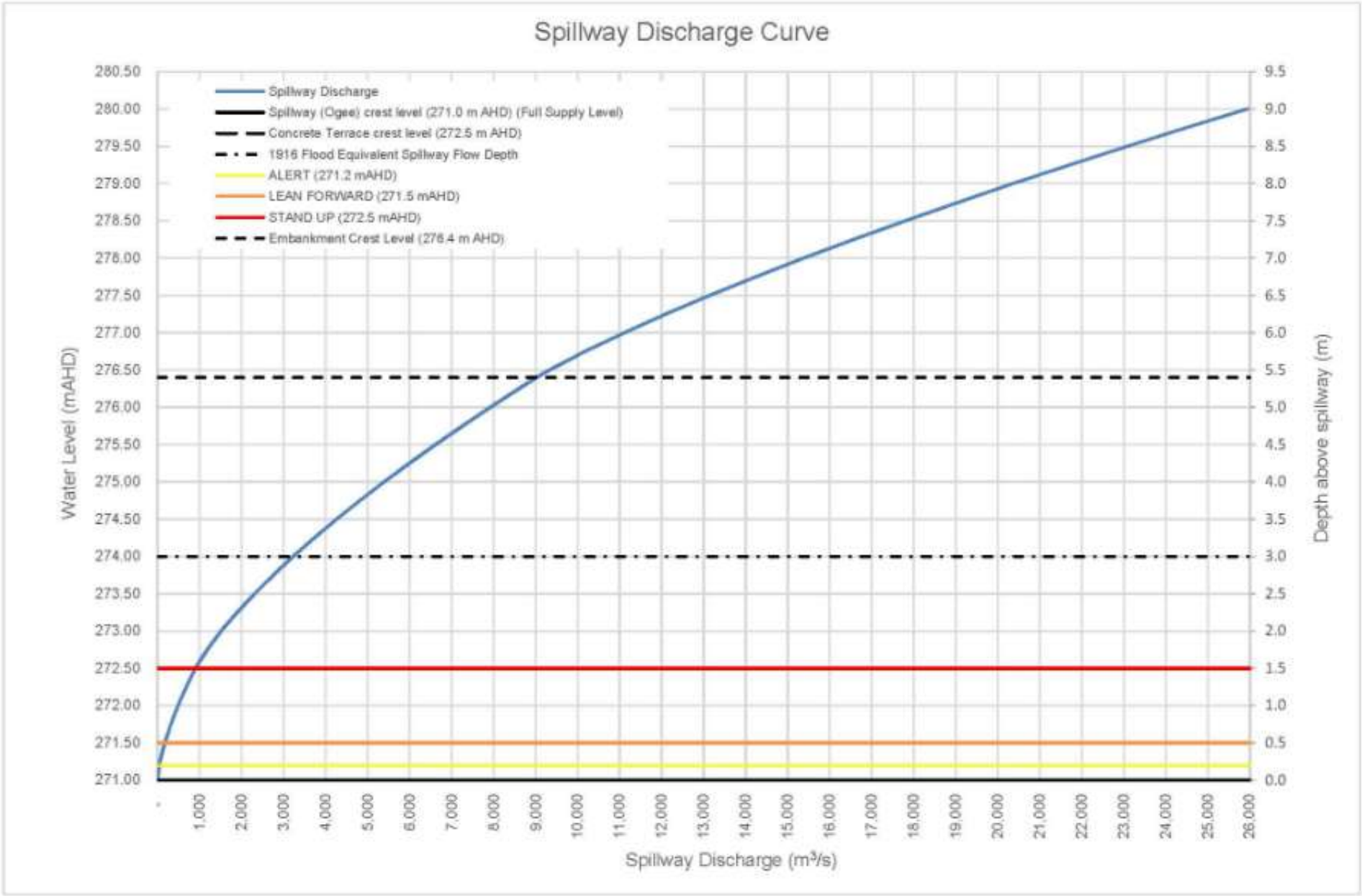
APPENDIX C: STORAGE CATCHMENT AREA DRAWING

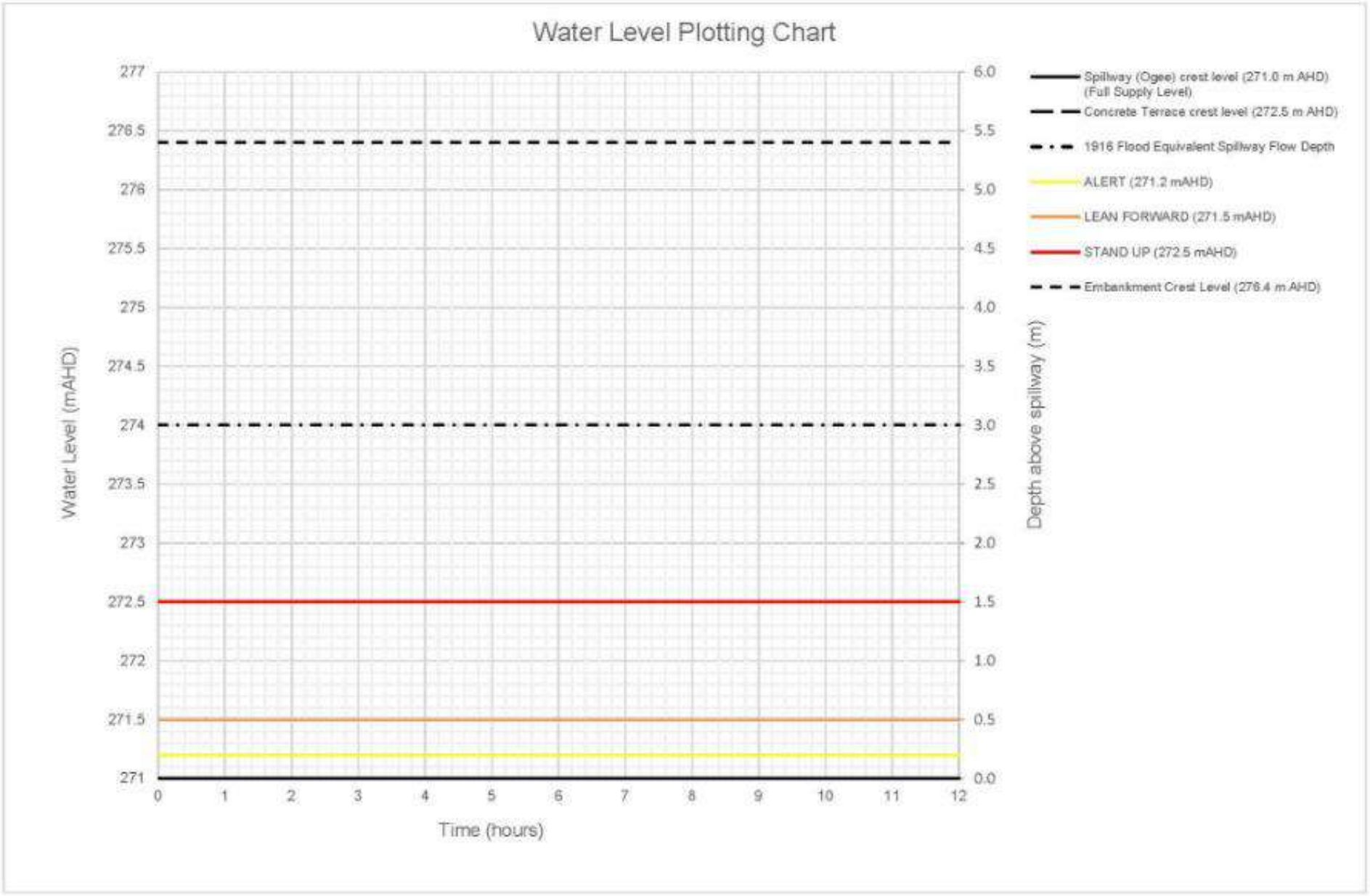


APPENDIX D: SPILLWAY DISCHARGE CURVE AND WATER LEVELS PLOTTING CHART

Isaac Regional Council – Theresa Creek Dam		
Emergency Action Plan		
Rate of rise of dam water levels		
Name:	Date:	
Critical water levels (spillway flow depths):	ALERT:	Equal to or greater than 0.2 m
	LEAN FORWARD:	Equal to or greater than 0.5 m
	STAND-UP:	Equal to or greater than 1.5 m
Spillway crest levels relative to intake tower gauge:	Spillway crest:	0.0 m (271.00 m AHD)
	Concrete terrace crest:	1.5 m (272.50 m AHD)
	Embankment crest:	5.4 m (276.40 m AHD)

Time (24 Hour)	**Water level (intake tower gauge level) (metres above 0.0)**	**Comments**


Spillway Discharge Curve
Spillway Discharge
Spillway (Ogee) crest level (271.0 m AHD) (Full Supply Level)
Concrete Terrace crest level (272.5 m AHD)
1916 Flood Equivalent Spillway Flow Depth
ALERT (271.2 mAHD)
LEAN FORWARD (271.5 mAHD)
STAND UP (272.5 mAHD)
Embankment Crest Level (276.4 m AHD)
Water Level (mAHD)
Depth above spillway (m)
Spillway Discharge (m³/s)
280.50
280.00
279.50
279.00
278.50
278.00
277.50
277.00
276.50
276.00
275.50
275.00
274.50
274.00
273.50
273.00
272.50
272.00
271.50
271.00
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
12,000
13,000
14,000
15,000
16,000
17,000
18,000
19,000
20,000
21,000
22,000
23,000
24,000
25,000
26,000


Water Level Plotting Chart
Water Level (mAHD)
Depth above spillway (m)
Time (hours)
277
276.5
276
275.5
275
274.5
274
273.5
273
272.5
272
271.5
271
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
1
2
3
4
5
6
7
8
9
10
11
12
Spillway (Ogee) crest level (271.0 m AHD) (Full Supply Level)
Concrete Terrace crest level (272.5 m AHD)
1916 Flood Equivalent Spillway Flow Depth
ALERT (271.2 mAHD)
LEAN FORWARD (271.5 mAHD)
STAND UP (272.5 mAHD)
Embankment Crest Level (276.4 m AHD)

APPENDIX E: SUNNY DAY ROUTINE INSPECTION CHECKLIST AND INCIDENT REPORT FORM

Date & Time of Inspection	
Inspection Personnel	
CONDITIONS DURING INSPECTION	
Weather	
Water level (FSL is RL 271.0 m)	
Rainfall in past week – in millimetres	
LEFT SIDE EARTHFILL SECTION	"OK" – is default answer if there is no defect
VISUALLY INSPECT:	
Rip rap condition	
Settlement or movement	
Evidence of seepage downstream	
Trees growing	
Grass cover (should be <300mm high)	
Ditto embankment upstream of terrace	
LEFT SIDE CONCRETE TERRACE	
VISUALLY INSPECT:	
Upstream wave wall for cracks or movement	
Concrete slabs (for cracks, blockages in horizontal and vertical relief holes)	
Training wall for (for movement or misalignment)	
Steps near wingwall (change in gaps)	
Change in wet area downstream of terraces	
Change in erosion beyond sill	
Seepage weir - reading (in millimetres)	
H = height of water in approach channel of v–notch weir	
Q(L/sec) = (H2.50)/22270	
CENTRAL CONCRETE SPILLWAY	
VISUALLY INSPECT:	
Concrete condition for any spalling of crest	
Seepage through vertical joints	
Seepage through horizontal joints	

Alignment of upstream face	
STILLING BASIN	
VISUALLY INSPECT:	
For any debris in the pool	
Any damage after a flood event	
Change in erosion at apron edge	
RIGHT SIDE CONCRETE TERRACE	
VISUALLY INSPECT:	
Upstream wave wall for cracks or movement	
Concrete slabs (for cracks, blockages in horizontal and vertical relief holes)	
Training wall for (for movement or misalignment)	
Change in wet area downstream of terraces	
Change in erosion beyond sill	
Seepage weir - reading (in millimetres) H = height of water in approach channel of v–notch weir	
Q(L/sec) = (H2.50)/22270	
RIGHT SIDE EARTHFILL SECTION	"OK" – is default answer if there is no defect
VISUALLY INSPECT:	
Rip rap condition	
Settlement or movement	
Evidence of seepage downstream	
Trees growing	
Grass cover (should be <300mm high)	
Embankment upstream of terrace	
Any other observations at the dam	
Please attach prints or photos to this form	

INCIDENT REPORT FORM

Theresa Creek Dam

Date:	Time:
Completing Officer's Name:	
Title:	

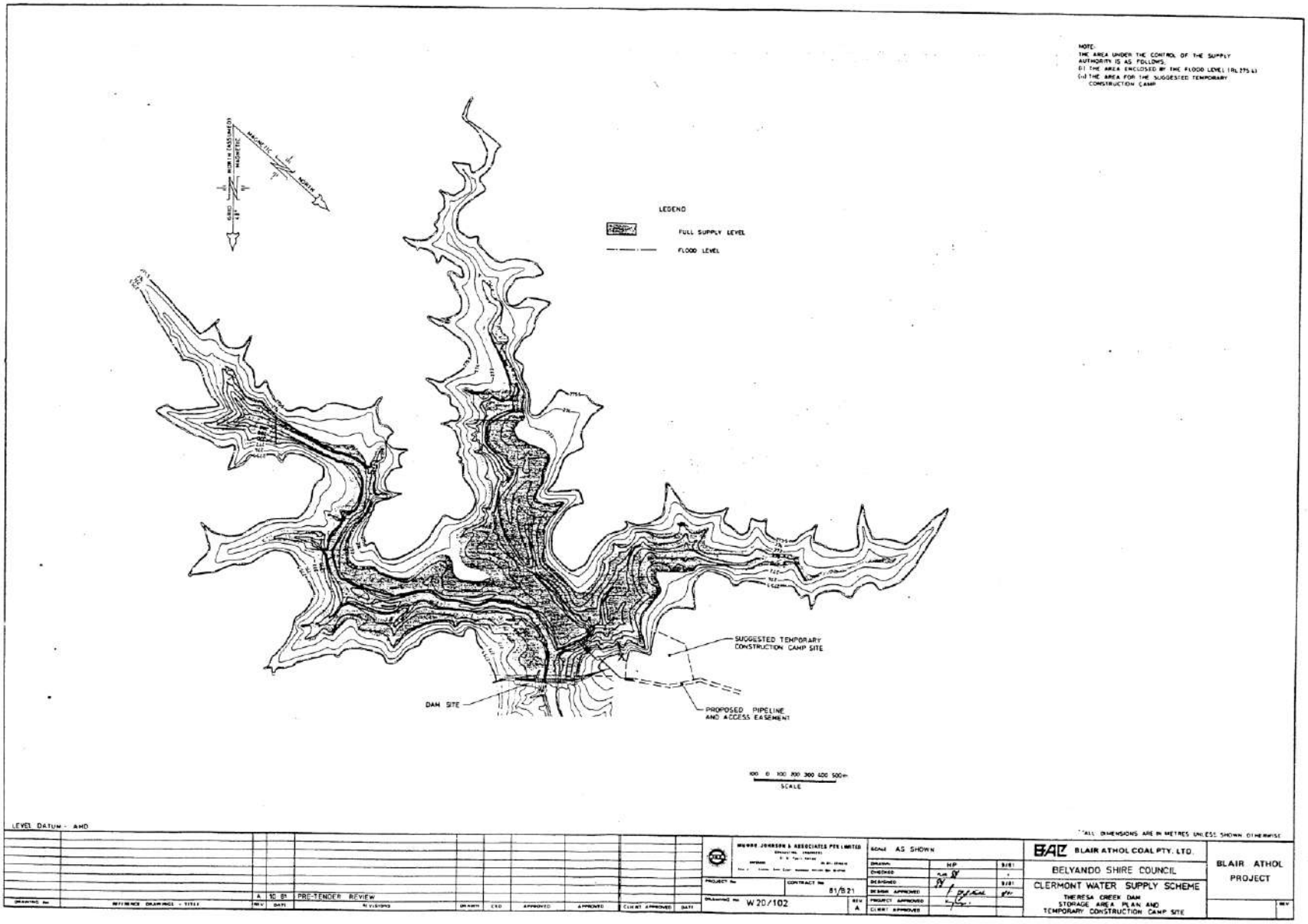
DETAILS OF INCIDENT

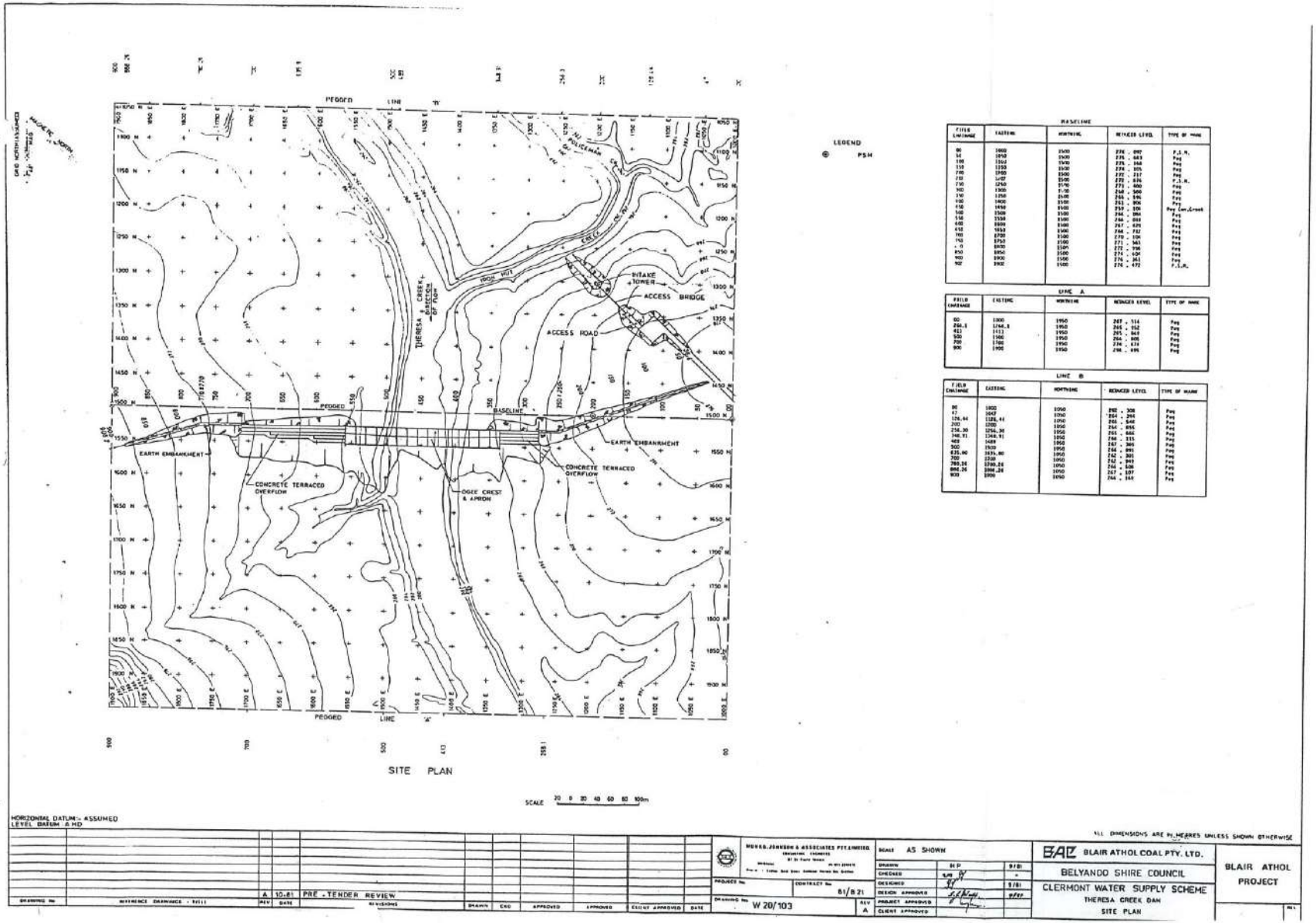
DETAILS OF ACTION

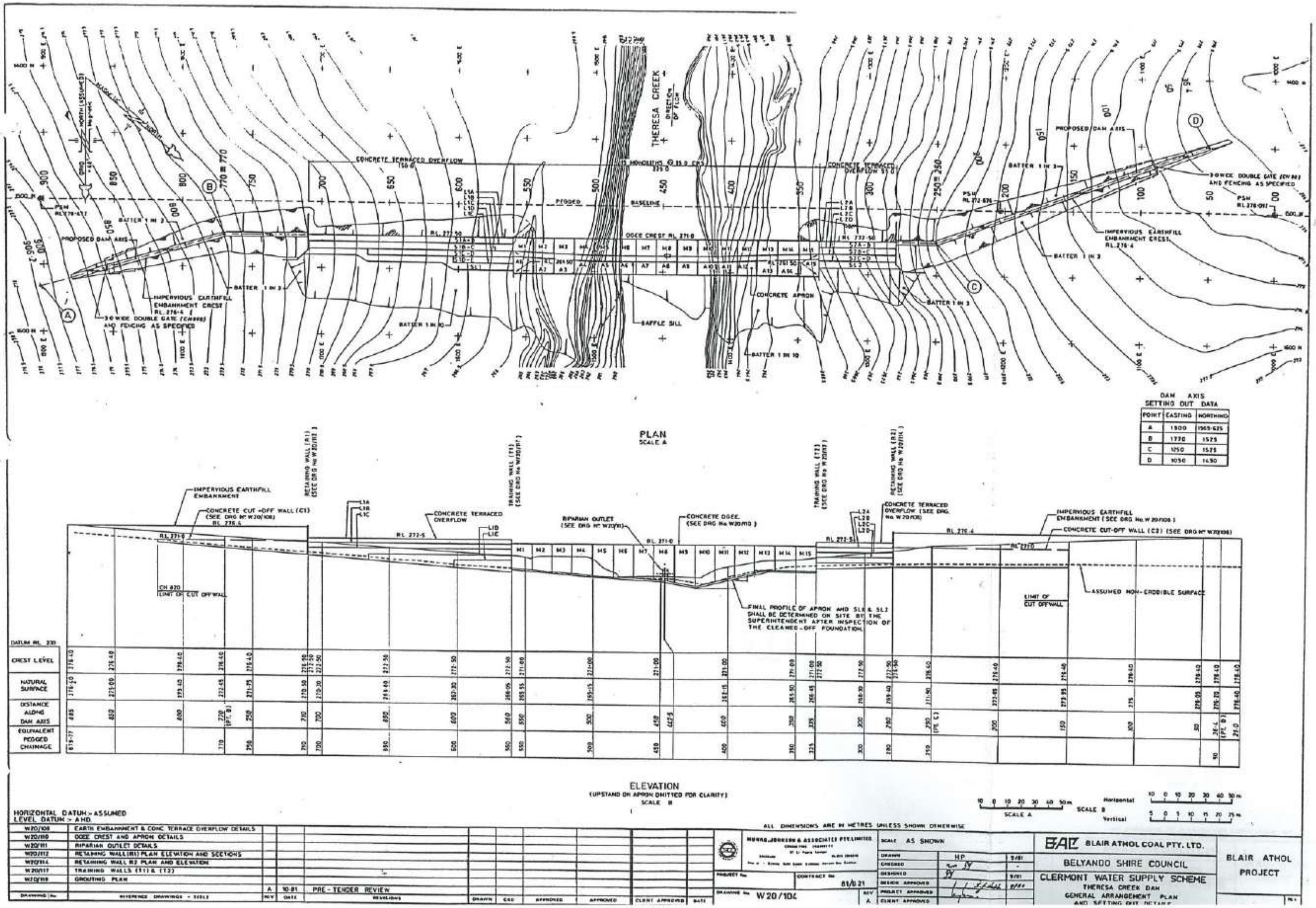
SIGNATURE:

Use more pages if required and attach any further information including photographs

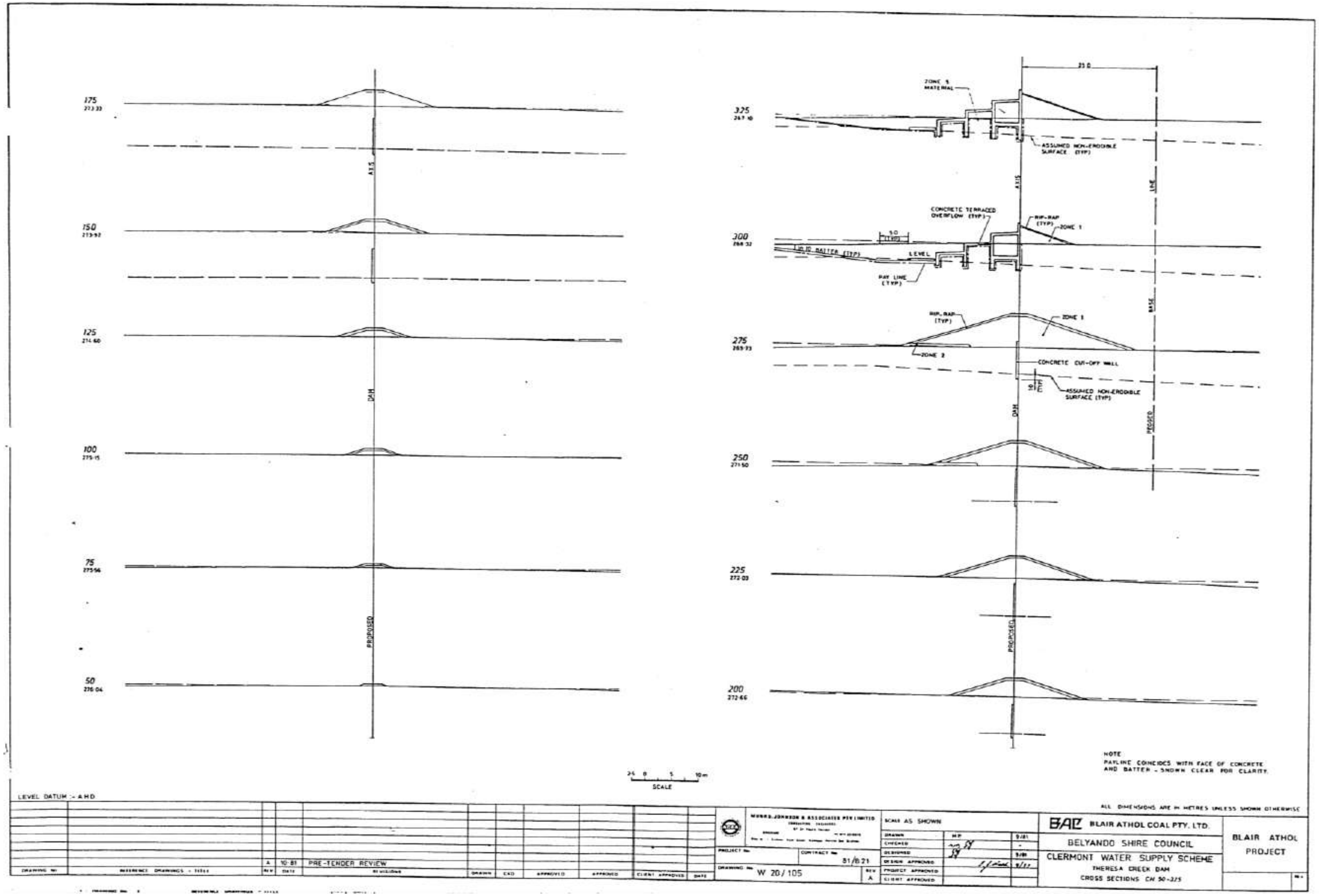
APPENDIX F: SELECTED DAM DRAWINGS



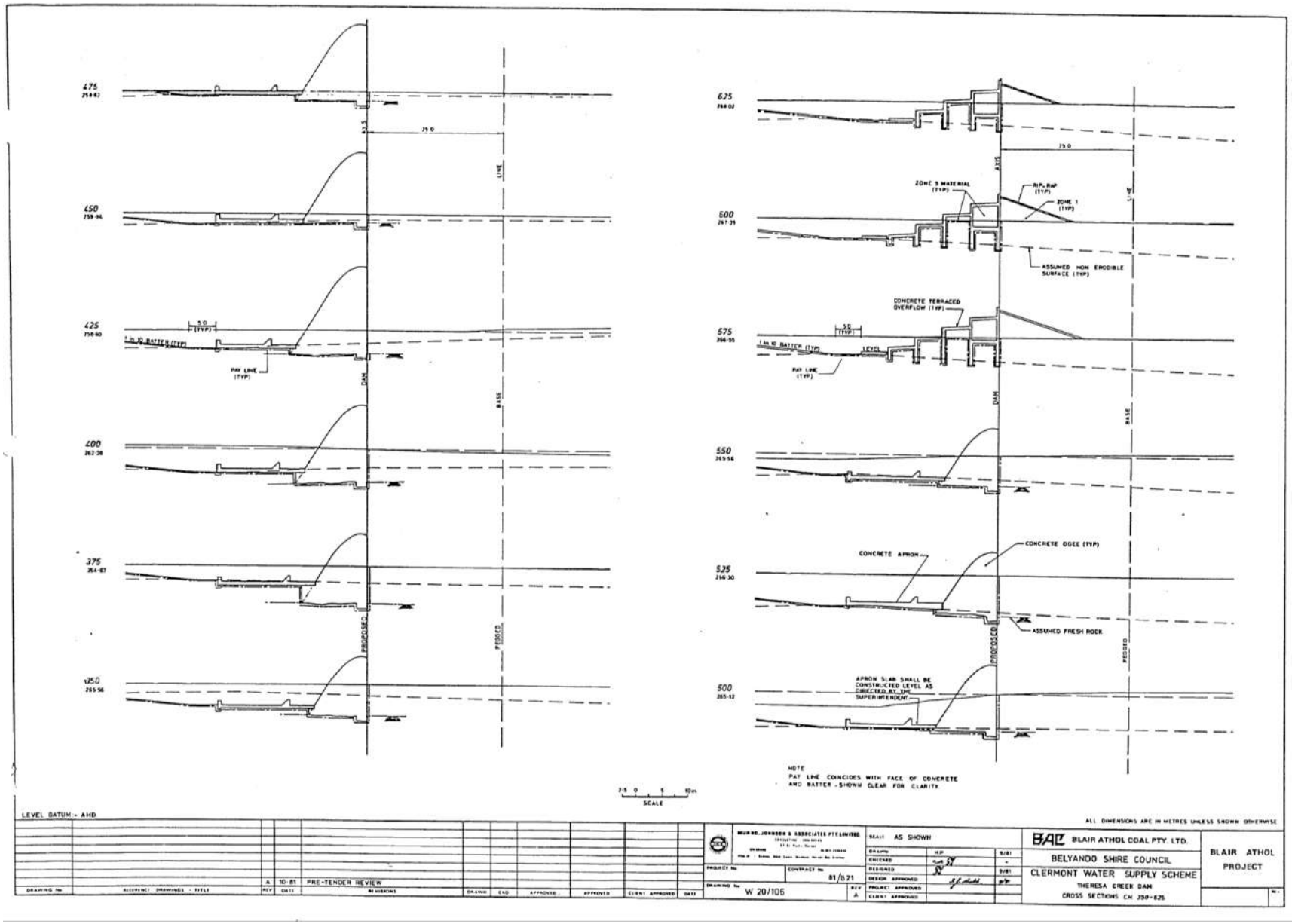

PEGGED LINE
INTAKE TOWER
ACCESS BRIDGE
ACCESS ROAD
THERESA CREEK DIVERSION BANK
EARTH EMBANKMENT
CONCRETE TERRACED OVERFLOW
OGEE CREST & APRON
BASELINE
LEGEND
SITE PLAN
SCALE
HORIZONTAL DATUM:- ASSUMED
LEVEL DATUM :- A.H.D.
ALL DIMENSIONS ARE IN METRES UNLESS SHOWN OTHERWISE
MEWES, JOHNSON & ASSOCIATES PTY. LIMITED
A 10-81 PRE-TENDER REVIEW
W 20/103
BAC BLAIR ATHOL COAL PTY. LTD.
BELYANDO SHIRE COUNCIL
CLERMONT WATER SUPPLY SCHEME
THERESA CREEK DAM
SITE PLAN
BLAIR ATHOL PROJECT

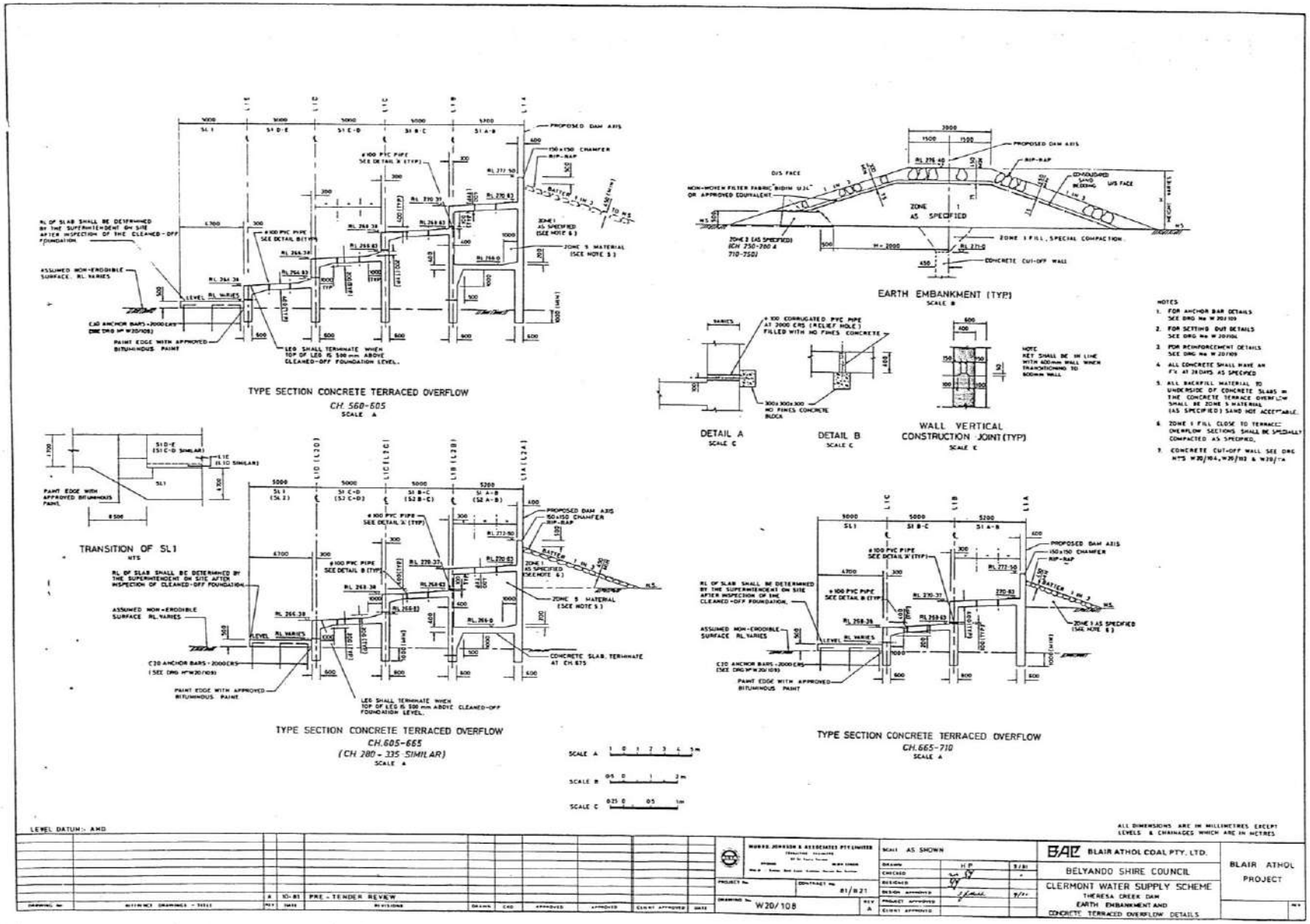


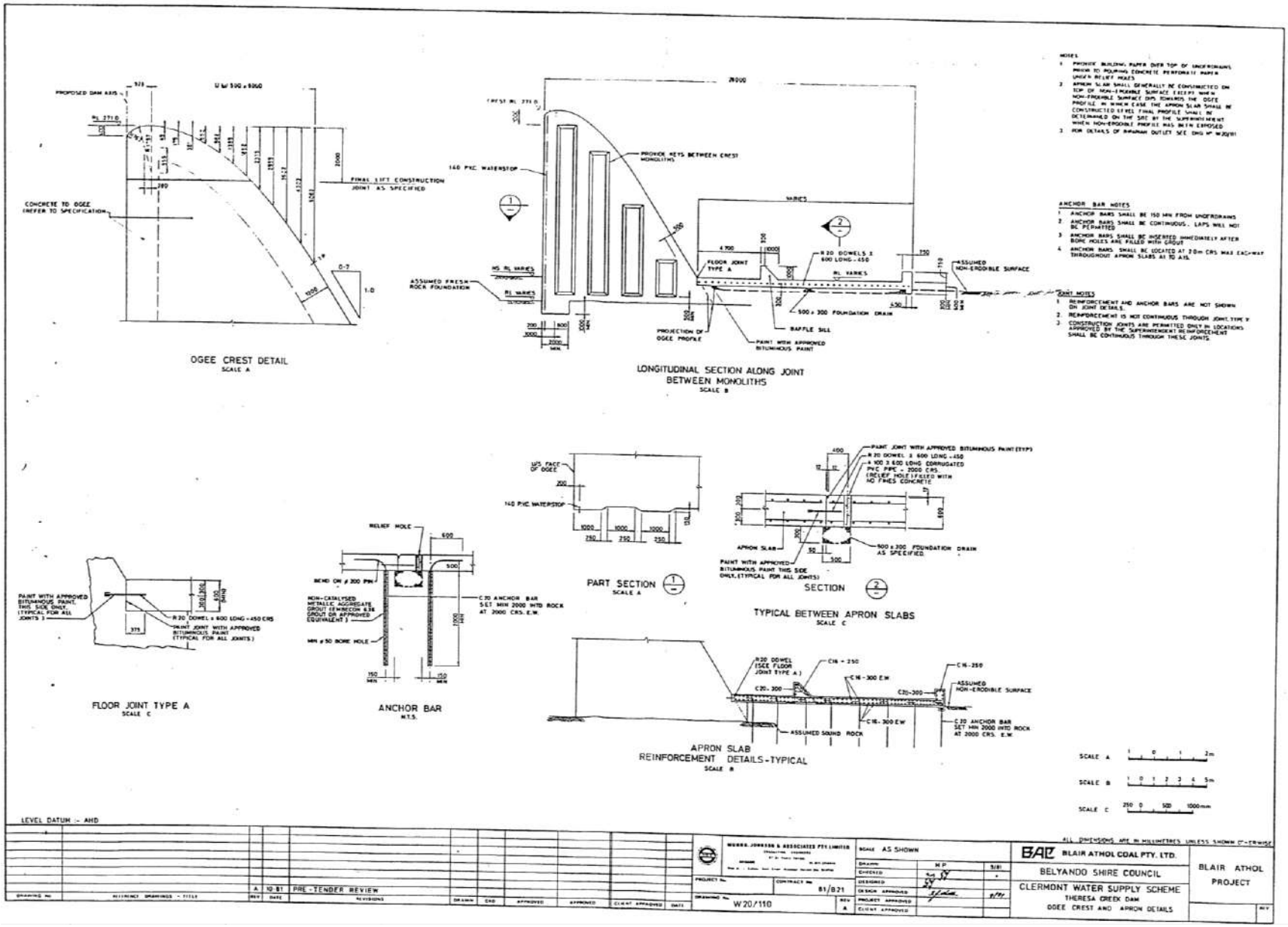
PLAN
SCALE A
ELEVATION
(UPSTAND ON APRON OMITTED FOR CLARITY)
SCALE B
THERESA CREEK
DAM AXIS SETTING OUT DATA
HORIZONTAL DATUM - ASSUMED
LEVEL DATUM - AHD
ALL DIMENSIONS ARE IN METRES UNLESS SHOWN OTHERWISE
BLAIR ATHOL COAL PTY. LTD.
BELYANDO SHIRE COUNCIL
CLERMONT WATER SUPPLY SCHEME
THERESA CREEK DAM
GENERAL ARRANGEMENT PLAN
BLAIR ATHOL PROJECT
W20/104

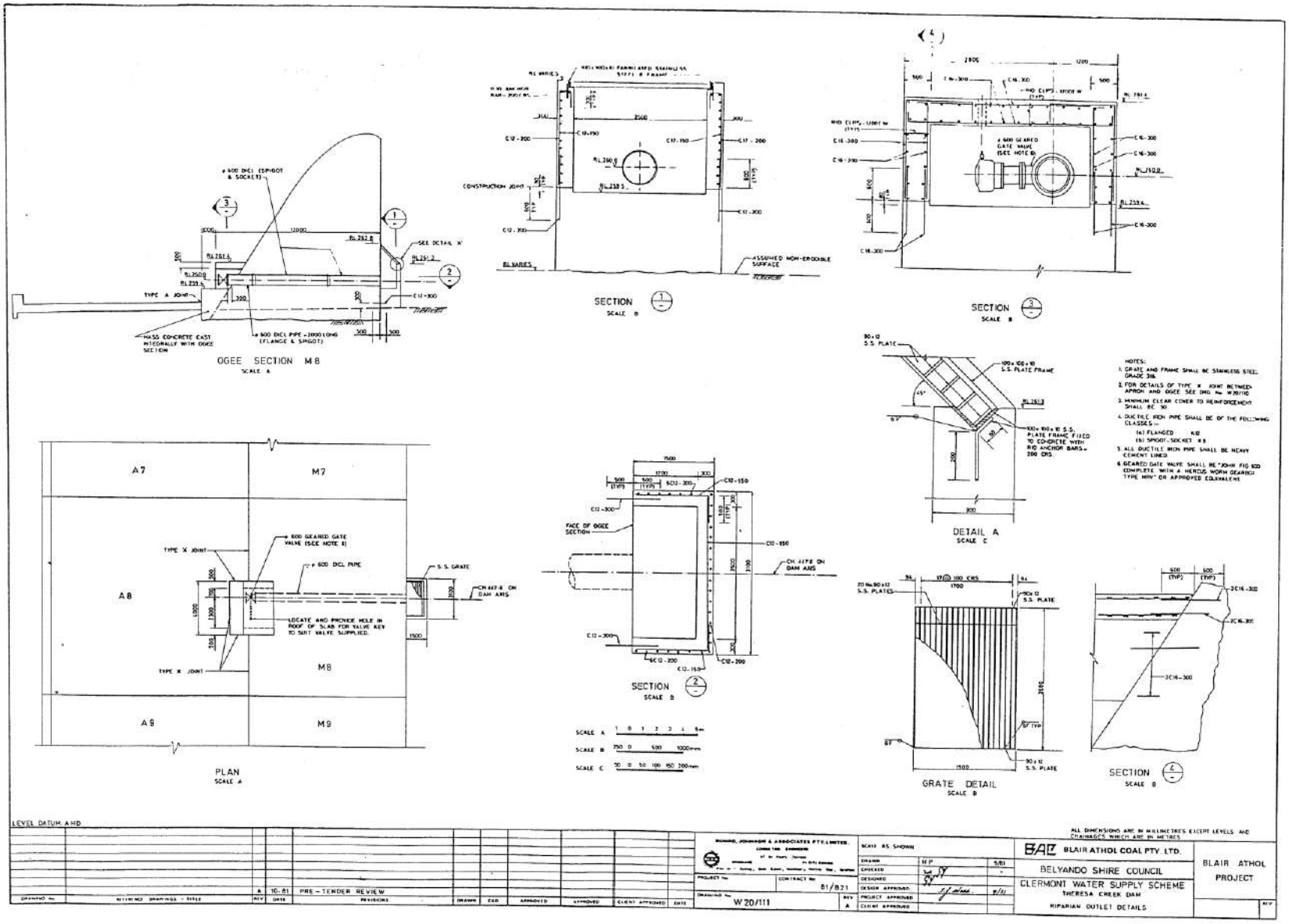


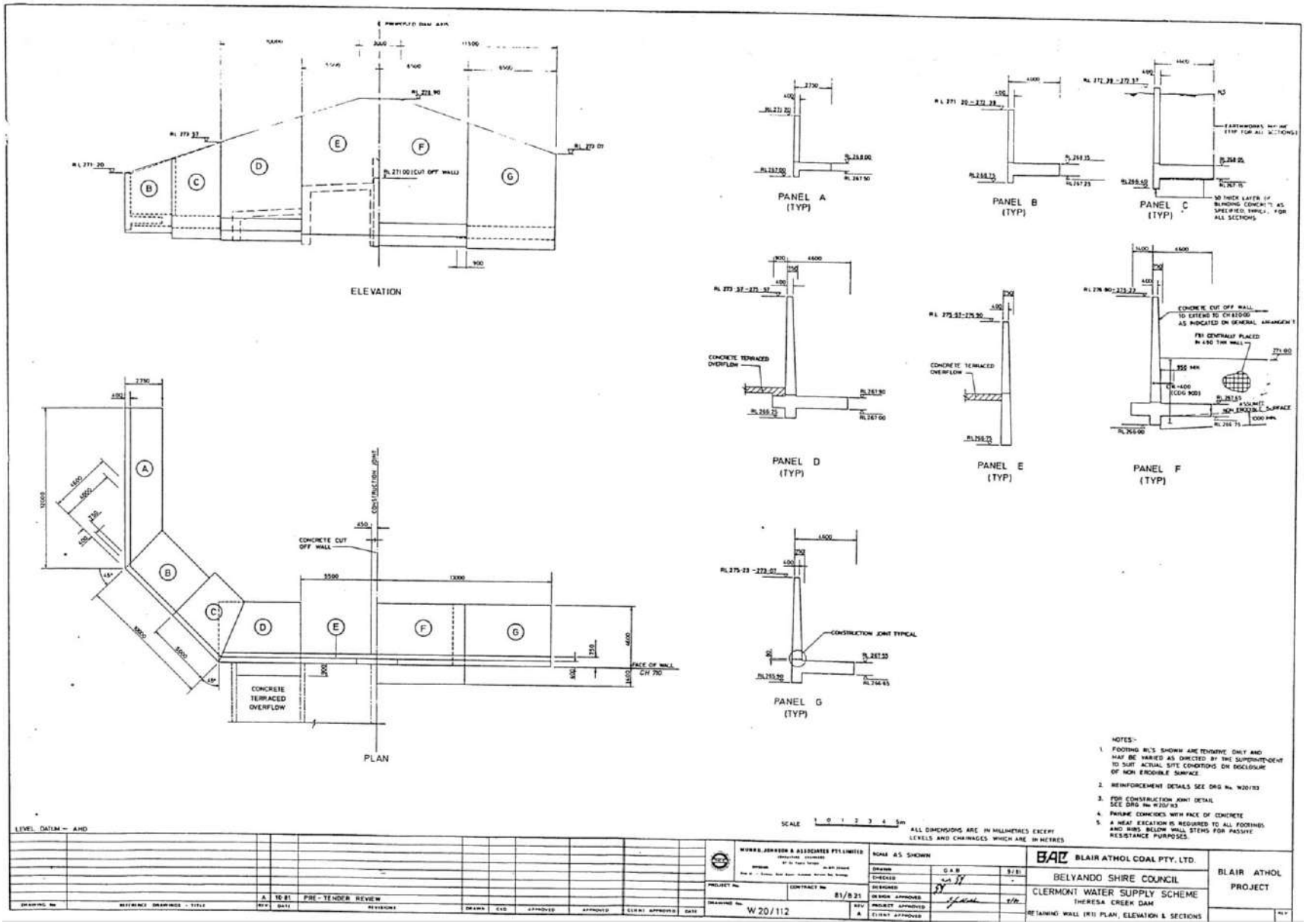
175
150
125
100
75
50
325
300
275
250
225
200
ZONE 5 MATERIAL
ASSUMED NON-ERODIBLE SURFACE (TYP)
CONCRETE TERRACED OVERFLOW (TYP)
RIP-RAP (TYP)
ZONE 1
LEVEL
PAY LINE (TYP)
ZONE 2
CONCRETE CUT-OFF WALL
AXIS
DAM
PROPOSED
NOTE
PAYLINE COINCIDES WITH FACE OF CONCRETE AND BATTER - SHOWN CLEAR FOR CLARITY.
SCALE
LEVEL DATUM :- A.H.D.
ALL DIMENSIONS ARE IN METRES UNLESS SHOWN OTHERWISE
A 10-81 PRE-TENDER REVIEW
SCALE AS SHOWN
CONTRACT No. 81/821
DRAWING No. W 20/105
BLAIR ATHOL COAL PTY. LTD.
BELYANDO SHIRE COUNCIL
CLERMONT WATER SUPPLY SCHEME
THERESA CREEK DAM
CROSS SECTIONS CH 50-325
BLAIR ATHOL PROJECT

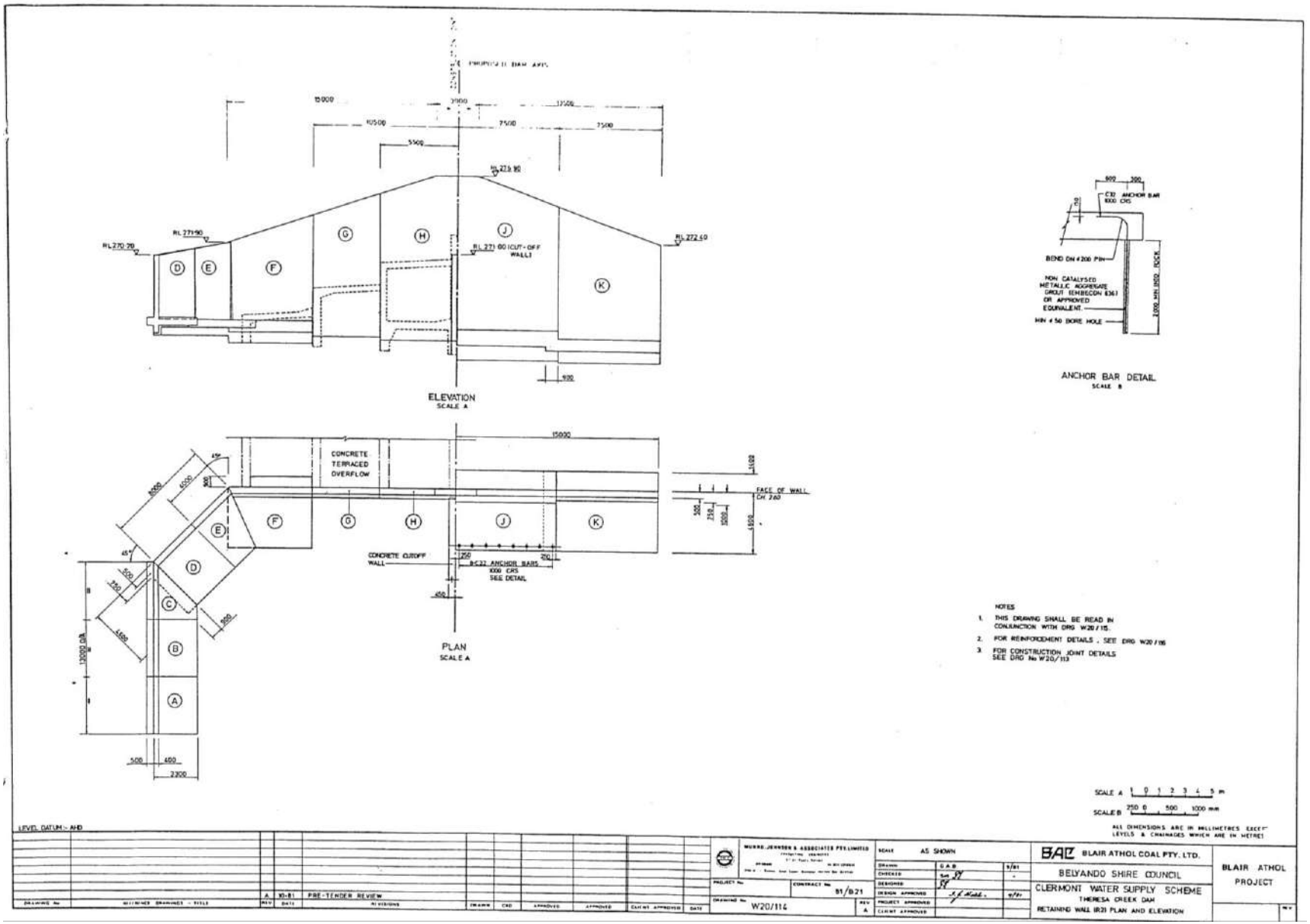

475
450
425
400
375
350
625
600
575
550
525
500
75.0
DAM
BASE
PROPOSED
PEGGED
PAY LINE (TYP)
ZONE 3 MATERIAL (TYP)
RIP. RAP (TYP)
ZONE 1 (TYP)
ASSUMED NON ERODIBLE SURFACE (TYP)
CONCRETE TERRACED OVERFLOW (TYP)
CONCRETE APRON
CONCRETE OGEE (TYP)
ASSUMED FRESH ROCK
APRON SLAB SHALL BE CONSTRUCTED LEVEL AS DIRECTED BY THE SUPERINTENDENT
NOTE
PAY LINE COINCIDES WITH FACE OF CONCRETE AND BATTER - SHOWN CLEAR FOR CLARITY.
SCALE
LEVEL DATUM - AHD
ALL DIMENSIONS ARE IN METRES UNLESS SHOWN OTHERWISE
MUIRHEAD & ASSOCIATES PTY LIMITED
SCALE AS SHOWN
BAC BLAIR ATHOL COAL PTY. LTD.
BELYANDO SHIRE COUNCIL
CLERMONT WATER SUPPLY SCHEME
THERESA CREEK DAM
CROSS SECTIONS CH 350-625
BLAIR ATHOL PROJECT
81/821
W 20/106
A 10-81 PRE-TENDER REVIEW

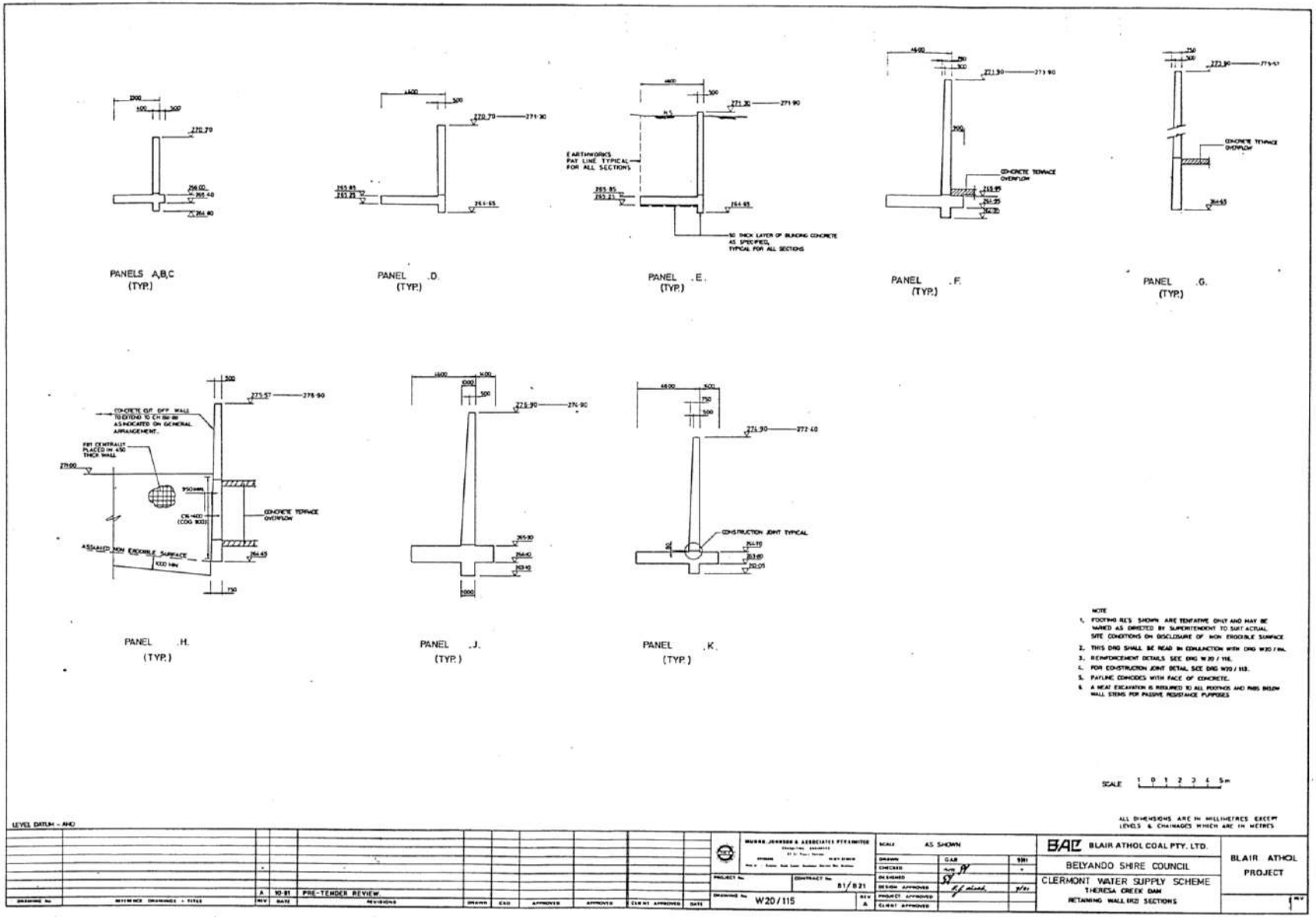

TYPE SECTION CONCRETE TERRACED OVERFLOW
CH. 560-605
SCALE A
EARTH EMBANKMENT (TYP)
SCALE B
DETAIL A
SCALE C
DETAIL B
SCALE C
WALL VERTICAL CONSTRUCTION JOINT (TYP)
SCALE C
TRANSITION OF SL1
NTS
TYPE SECTION CONCRETE TERRACED OVERFLOW
CH.605-665
(CH 280 - 335 SIMILAR)
SCALE A
TYPE SECTION CONCRETE TERRACED OVERFLOW
CH.665-710
SCALE A
SCALE A
SCALE B
SCALE C
LEVEL DATUM :- AHD
ALL DIMENSIONS ARE IN MILLIMETRES EXCEPT LEVELS & CHAINAGES WHICH ARE IN METRES
PRE - TENDER REVIEW
W20/108
BLAIR ATHOL COAL PTY. LTD.
BELYANDO SHIRE COUNCIL
CLERMONT WATER SUPPLY SCHEME
THERESA CREEK DAM
EARTH EMBANKMENT AND
CONCRETE TERRACED OVERFLOW DETAILS
BLAIR ATHOL PROJECT

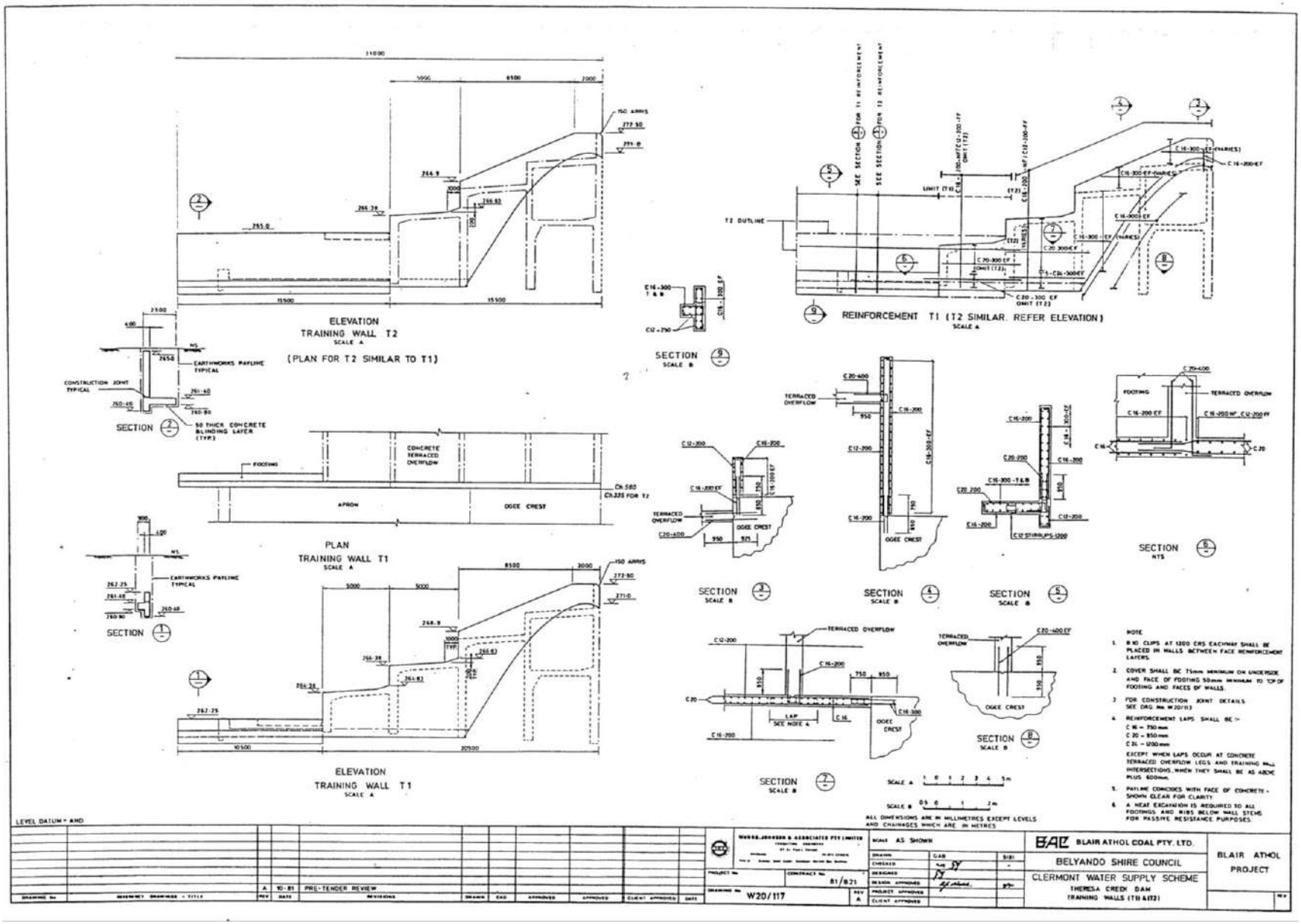

OGEE CREST DETAIL
SCALE A
LONGITUDINAL SECTION ALONG JOINT BETWEEN MONOLITHS
SCALE B
PART SECTION
SCALE A
SECTION
TYPICAL BETWEEN APRON SLABS
SCALE C
FLOOR JOINT TYPE A
SCALE C
ANCHOR BAR
N.T.S.
APRON SLAB REINFORCEMENT DETAILS - TYPICAL
SCALE B
SCALE A
SCALE B
SCALE C
LEVEL DATUM :- AHD
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE
BLAIR ATHOL COAL PTY. LTD.
BELYANDO SHIRE COUNCIL
CLERMONT WATER SUPPLY SCHEME
THERESA CREEK Dam
OGEE CREST AND APRON DETAILS
BLAIR ATHOL PROJECT
W 20/110
PRE-TENDER REVIEW

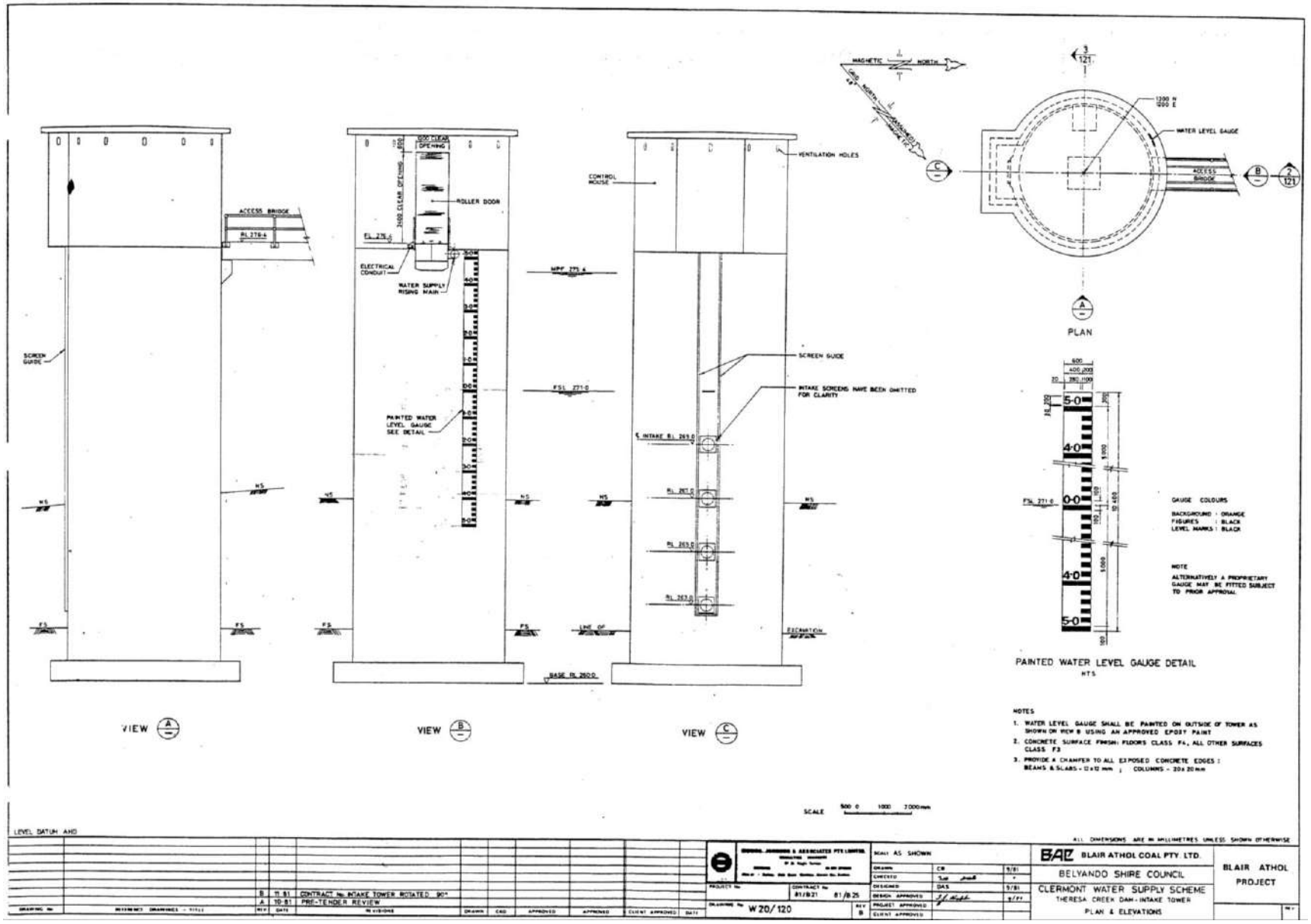

OGEE SECTION M8
SCALE A
SECTION
SCALE B
SECTION
SCALE B
DETAIL A
SCALE C
PLAN
SCALE A
SECTION
SCALE B
GRATE DETAIL
SCALE B
SECTION
SCALE B
NOTES:
1. GRATE AND FRAME SHALL BE STAINLESS STEEL GRADE 316.
2. FOR DETAILS OF TYPE 'X' JOINT BETWEEN APRON AND OGEE SEE DWG No. W20/110
3. MINIMUM CLEAR COVER TO REINFORCEMENT SHALL BE 50
4. DUCTILE IRON PIPE SHALL BE OF THE FOLLOWING CLASSES:-
(a) FLANGED K12
(b) SPIGOT, SOCKET K9
5. ALL DUCTILE IRON PIPE SHALL BE HEAVY CEMENT LINED.
6. GEARED GATE VALVE SHALL BE "JOHN FIG 800 COMPLETE WITH A HERCUS WORM GEARED TYPE MKIV" OR APPROVED EQUIVALENT
LEVEL DATUM AHD
ALL DIMENSIONS ARE IN MILLIMETRES EXCEPT LEVELS AND CHAINAGES WHICH ARE IN METRES
SCALE AS SHOWN
BAC BLAIR ATHOL COAL PTY. LTD.
BELYANDO SHIRE COUNCIL
CLERMONT WATER SUPPLY SCHEME
THERESA CREEK DAM
RIPARIAN OUTLET DETAILS
BLAIR ATHOL PROJECT
81/821
W 20/111
A 10-81 PRE-TENDER REVIEW


ELEVATION
PLAN
PANEL A (TYP)
PANEL B (TYP)
PANEL C (TYP)
PANEL D (TYP)
PANEL E (TYP)
PANEL F (TYP)
PANEL G (TYP)
CONCRETE TERRACED OVERFLOW
CONCRETE CUT OFF WALL
CONSTRUCTION JOINT TYPICAL
NOTES:-
1. FOOTING RL'S SHOWN ARE TENDATIVE ONLY AND MAY BE VARIED AS DIRECTED BY THE SUPERINTENDENT TO SUIT ACTUAL SITE CONDITIONS ON DISCLOSURE OF NON ERODIBLE SURFACE.
2. REINFORCEMENT DETAILS SEE DRG No. W20/113
3. FOR CONSTRUCTION JOINT DETAIL SEE DRG No. W20/113
4. PARLINE COINCIDES WITH FACE OF CONCRETE
5. A NEAT EXCATION IS REQUIRED TO ALL FOOTINGS AND RIBS BELOW WALL STEMS FOR PASSIVE RESISTANCE PURPOSES.
SCALE 1 0 1 2 3 4 5m
ALL DIMENSIONS ARE IN MILLIMETRES EXCEPT LEVELS AND CHAINAGES WHICH ARE IN METRES
LEVEL DATUM = AHD
A 10.81 PRE-TENDER REVIEW
MUNRO, JOHNSON & ASSOCIATES PTY LIMITED
SCALE AS SHOWN
DRAWN G.A.R 9/81
CHECKED
DESIGNED
DESIGN APPROVED
PROJECT APPROVED
CLIENT APPROVED
CONTRACT No. 81/821
DRAWING No. W 20/112
REV A
BLAIR ATHOL COAL PTY. LTD.
BELYANDO SHIRE COUNCIL
CLERMONT WATER SUPPLY SCHEME
THERESA CREEK DAM
RETAINING WALL (R1) PLAN, ELEVATION & SECTIONS
BLAIR ATHOL PROJECT


ELEVATION
SCALE A
PLAN
SCALE A
CONCRETE TERRACED OVERFLOW
CONCRETE CUTOFF WALL
FACE OF WALL CH 260
ANCHOR BAR DETAIL
SCALE B
NOTES
1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRG W20/115.
2. FOR REINFORCEMENT DETAILS, SEE DRG W20/116
3. FOR CONSTRUCTION JOINT DETAILS SEE DRG No W20/113
LEVEL DATUM = AHD
ALL DIMENSIONS ARE IN MILLIMETRES EXCEPT LEVELS & CHAINAGES WHICH ARE IN METRES
BAC BLAIR ATHOL COAL PTY. LTD.
BELYANDO SHIRE COUNCIL
CLERMONT WATER SUPPLY SCHEME
THERESA CREEK DAM
RETAINING WALL IR21 PLAN AND ELEVATION
BLAIR ATHOL PROJECT
W20/114
PRE-TENDER REVIEW


PANELS A,B,C
(TYP.)
PANEL .D.
(TYP.)
EARTHWORKS PAY LINE TYPICAL FOR ALL SECTIONS
PANEL .E.
(TYP.)
CONCRETE TERRACE OVERFLOW
PANEL .F.
(TYP.)
CONCRETE TERRACE OVERFLOW
PANEL .G.
(TYP.)
CONCRETE CUT OFF WALL TO EXTEND TO CH 150.00 AS INDICATED ON GENERAL ARRANGEMENT.
CONCRETE TERRACE OVERFLOW
ASSUMED NON ERODIBLE SURFACE
PANEL .H.
(TYP.)
PANEL .J.
(TYP.)
CONSTRUCTION JOINT TYPICAL
PANEL .K.
(TYP.)
NOTE
1. FOOTING RL'S SHOWN ARE TENTATIVE ONLY AND MAY BE VARIED AS DIRECTED BY SUPERINTENDENT TO SUIT ACTUAL SITE CONDITIONS ON DISCLOSURE OF NON ERODIBLE SURFACE
2. THIS DRG SHALL BE READ IN CONJUNCTION WITH DRG W20 / 114.
3. REINFORCEMENT DETAILS SEE DRG W 20 / 116.
4. FOR CONSTRUCTION JOINT DETAIL SEE DRG W20 / 113.
5. BATTER CONFORMS WITH FACE OF CONCRETE.
6. A KEY EXCAVATION IS REQUIRED TO ALL FOOTINGS AND PADS BELOW WALL STEMS FOR PASSIVE RESISTANCE PURPOSES
SCALE 1 0 1 2 3 4 5m
ALL DIMENSIONS ARE IN MILLIMETRES EXCEPT LEVELS & CHAINAGES WHICH ARE IN METRES
LEVEL DATUM - AHD
A 10-91 PRE-TENDER REVIEW
MURRAY JOHNSTON & ASSOCIATES PTY LIMITED
SCALE AS SHOWN
DRAWN CAB
CHECKED
DESIGN APPROVED
PROJECT APPROVED
CLIENT APPROVED
PROJECT No. 81/821
DRAWING No. W20/115
REV A
BAC BLAIR ATHOL COAL PTY. LTD.
BELYANDO SHIRE COUNCIL
CLERMONT WATER SUPPLY SCHEME
THERESA CREEK DAM
RETAINING WALL (RC2) SECTIONS
BLAIR ATHOL PROJECT


ELEVATION
TRAINING WALL T2
SCALE A
(PLAN FOR T2 SIMILAR TO T1)
REINFORCEMENT T1 (T2 SIMILAR. REFER ELEVATION)
SCALE A
SECTION
SCALE B
PLAN
TRAINING WALL T1
SCALE A
ELEVATION
TRAINING WALL T1
SCALE A
SECTION
NTS
NOTE
1. R10 CLIPS AT 1200 CRS EACHWAY SHALL BE PLACED IN WALLS BETWEEN FACE REINFORCEMENT LAYERS.
2. COVER SHALL BE 75mm MINIMUM ON UNDERSIDE AND FACE OF FOOTING 50mm MINIMUM TO TOP OF FOOTING AND FACES OF WALLS.
3. FOR CONSTRUCTION JOINT DETAILS SEE DRG No W20/113
4. REINFORCEMENT LAPS SHALL BE :-
C 16 – 750 mm
C 20 – 850 mm
C 24 – 1200 mm
EXCEPT WHEN LAPS OCCUR AT CONCRETE TERRACED OVERFLOW LEGS AND TRAINING WALL INTERSECTIONS, WHEN THEY SHALL BE AS ABOVE PLUS 600mm.
5. PAYLINE COINCIDES WITH FACE OF CONCRETE - SHOWN CLEAR FOR CLARITY
6. A HEAT EXCAVATION IS REQUIRED TO ALL FOOTINGS AND RIBS BELOW WALL STEMS FOR PASSIVE RESISTANCE PURPOSES.
ALL DIMENSIONS ARE IN MILLIMETRES EXCEPT LEVELS AND CHAINAGES WHICH ARE IN METRES
LEVEL DATUM = AHD
SCALE AS SHOWN
BAC BLAIR ATHOL COAL PTY. LTD.
BELYANDO SHIRE COUNCIL
CLERMONT WATER SUPPLY SCHEME
THERESA CREEK DAM
TRAINING WALLS (T1 & T2)
BLAIR ATHOL PROJECT
81/821
W20/117
A 10-81 PRE-TENDER REVIEW


VIEW A
VIEW B
VIEW C
PLAN
PAINTED WATER LEVEL GAUGE DETAIL
NTS
BLAIR ATHOL COAL PTY. LTD.
BELYANDO SHIRE COUNCIL
CLERMONT WATER SUPPLY SCHEME
THERESA CREEK DAM - INTAKE TOWER
PLAN & ELEVATIONS
BLAIR ATHOL PROJECT
W 20/120

APPENDIX G: COMMUNICATION

Theresa Creek Dam Communication Log

TIME	TO/FROM	NAME	NOTES	COMPLETED

APPENDIX H: WARNING MESSAGES AND DISTRIBUTION

The following external communications may be used in the event of a dam safety emergency. The appropriate message can be distributed for release as part of providing messages to the residents and others in the area on developing situations, or that an event has occurred. The wording of messages is to be reviewed and amended by the LDC as required, dependant on scenario/activation.

MEDIA RELEASES

All media releases are subject to approval by the LDMG Chair and Local Disaster Coordinator. Approved media releases are:

- distributed via the LDCC – Communications Hub.
- uploaded to Guardian IMS – Bulletins, public bulletins for sharing to the Disaster Dashboard "Latest Updates".
- posted to Social media – Isaac Local Disaster Coordination Centre - (1) Isaac Local Disaster Coordination Centre | Facebook, then shared to Isaac Regional Council's Facebook page.

All outgoing messages posted via Guardian IMS are stored in Broadcast History, which records the date, time and distribution of all messages.

SMS NOTIFICATIONS

SMS notifications can be distributed to PAR – refer to Table 2-2 by the LDMG, via Guardian IMS.

LDCC staff with permissions can perform this function by:

- Communications – Send Broadcast – SMS only – Select Broadcast Template (amend details specific to activation hazard) – select Contacts – Contact Group – Theresa Creek Dam EAP – PAR Notification List

QUEENSLAND EMERGENCY ALERT REQUEST GUIDELINES

Website: https://sdccqfes.nogginoca.com/ (Nominated user – IRC Disaster Management Officer)

An Emergency Alert (EA) Request forms are not to be used for Flood Inflow, UNLESS a flood has triggered an Emergency Event.

The EA Request form should be completed, if required and sent to the SDCC Watch Desk to activate the Theresa Creek Dam Emergency Polygon.

Instructions

1. IRC DMO to log into DM Portal - https://sdccqfes.nogginoca.com/
2. Contact the SDCC Watch Desk and notify of your intention to use the Emergency Alert for Theresa Creek Dam – [redacted]
3. A polygon for this dam is stored in Guardian IMS – Maps – IMS Layers – Saved Polygons. This can be exported as KML file for sending to SDCC Watchdesk with Emergency Alert.
4. LDC and DMO will work together to review and update Emergency Alert relevant to the current situation.

Emergency Alert Request Form - For assistance contact Watch Desk

EA Request Type	Emergency Alert Polygon & Messaging Testing	**Report Status**	Drafting
Submission Type	Manual Form	**Report date**	20/09/2022 15:45

Emergency Alert (All Types) - Requester Information

Requesting Officer	
RO Agency/Position	Isaac Regional Council - Disaster Management Officer
RO Mobile	
RO Email	

Emergency Alert - Campaign information

EA Test Type	EA Wording		
Event Type	Dam EAP	**LDMG**	Isaac LDMG
Dam	Theresa Creek Dam		
Severity	Emergency Warning		
EA File Name			
		No. Polygons Attached	0
		No. Messages Attached	1
LDMG Advised?	No	**Download a copy of the EA Request Form**	https://www.disaster.qld.gov.au/dmg/st/Documents/F1177-EA-Request-Form.dotx

Emergency Alert - Voice and SMS Details

Emergency Alert - Message Builder

		Tropical Cyclone Name	Tropical Cyclone

Emergency Alert - Polygon/Shapefile Information

Watch Desk - EA Testing

Feedback			
EA Operator	This field will be prepopulated.		
Watch Desk - EA System Information for test campaign			
Watch Desk - Email/Verbal Feedback for test campaign			
		Email Address	
Administration			
Prepared By	- Isaac Regional Council - (none)	**Prepared**	20/09/2022 15:47
Modified By	- Isaac Regional Council - Disaster Management Officer	**Modified**	20/09/2022 15:47
These fields are automated and do not need to be completed			
Report ID	R28934422	**Region**	Central ROC
Title	EA Testing: F1177-EA-Request-Form - TCD EAP draft (Dam EAP) as at 20/09/2022 15:45	**DDMG**	Mackay DDMG
Assigned	Watch Desk DM User (Disaster Management),SDCC DM User (Disaster Management),Central Region DM User (Disaster Management),Mackay DDMG DM User (Disaster Management),Isaac LDMG DM User (Disaster Management),Isaac LDMG EA User (Disaster Management)		
		RO Mobile Phone	
		RO Email Address	
		Status	Active
		Future Control	Current
		Lodging agency	Queensland Fire and Emergency Services

Related Documents (1)

Copy 5 of f1177-ea-request-form - tcd eap draft.docx

File Size: 40kb

EMERGENCY ALERT REQUEST

Location: Theresa Creek Dam	Date: / / Time: : hrs
Incident Controller / Requesting Officer:	Telephone:
Agency/Position: ISAAC LMDG - LOCAL DISASTER COORDINATOR	Email:

Event Type	Cyclone	Storm Tide	Flash Flood	Flood
	Bushfire	Fire Incident	Smoke or Toxic Plume	Chemical Spill
	Tsunami (NOTE Tsunami EA campaigns will be sent as Location Based Text Message ONLY)			
	x Other (please specify):			
Message Severity	x Emergency Warning (NOTE activates the SEWS)		Watch & Act	Advice
Campaign Mode	x Voice	x SMS – Location Based		x SMS – Service Address Based
LDMG Advised:	YES NO		DDMG Advised:	YES NO

Threat Direction Required? (NOTE: Can only be used for Emergency Warnings.)	YES NO	Threat location indicated on map?	YES NO
STEP 1. EA Polygon Area: x Map attached		**STEP 2.** Filename:	
STEP 3. Spatial format: (Indicate the format used) **KML** *.kml (preferred format as per Spatial guidelines) **KMZ** *.kmz **GML** *.gml, **GeoJSON** *.json		**STEP 4.** Messaging/spatial data, supplied via: X **DMportal** Specify filenames **Verbal** **Email** **Other**	

Type (please use capitals for clarity) or handwrite Voice message (maximum 4000 characters Ideally message should be less than 450 characters).

EMERGENCY. EMERGENCY. EMERGENCY. THERESA CREEK DAM IS SPILLING. TAKE ACTION TO PROTECT LIFE AND PROPERTY. CURRENT WATER LEVEL IS <0.XXM> OVER SPILLWAY. STAY UPDATED VIA https://dashboard.isaac.qld.gov.au/

Type or handwrite SMS below (maximum of 612 characters including spaces)

EMERGENCY - Theresa Creek Dam is currently spilling and releasing water downstream. Take action to protect life and property. The current water level over the spillway is <insert> m. Stay updated via https://dashboard.isaac.qld.gov.au/

SEND TO TO CONFIRM

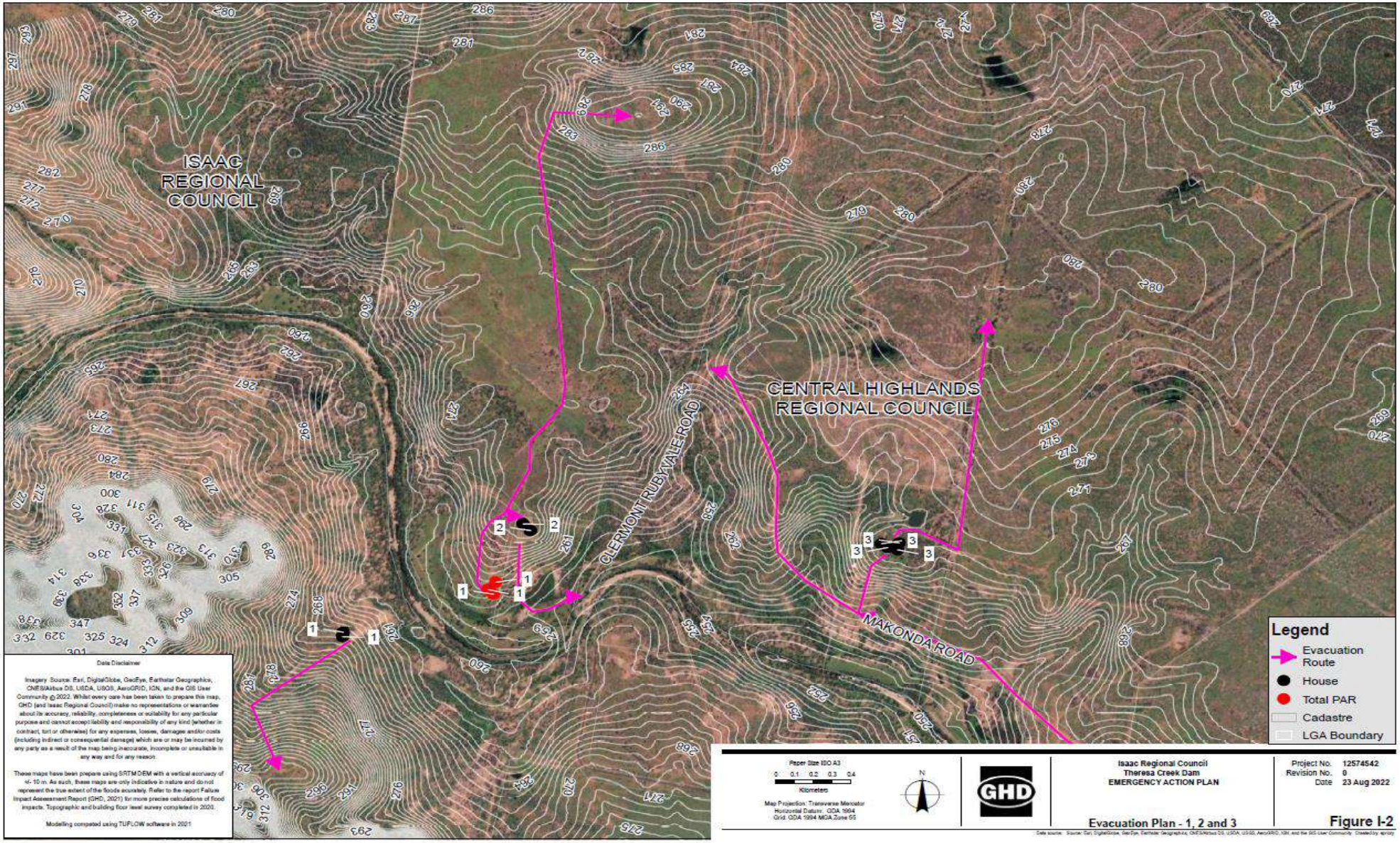
FOR USE BY SDCC

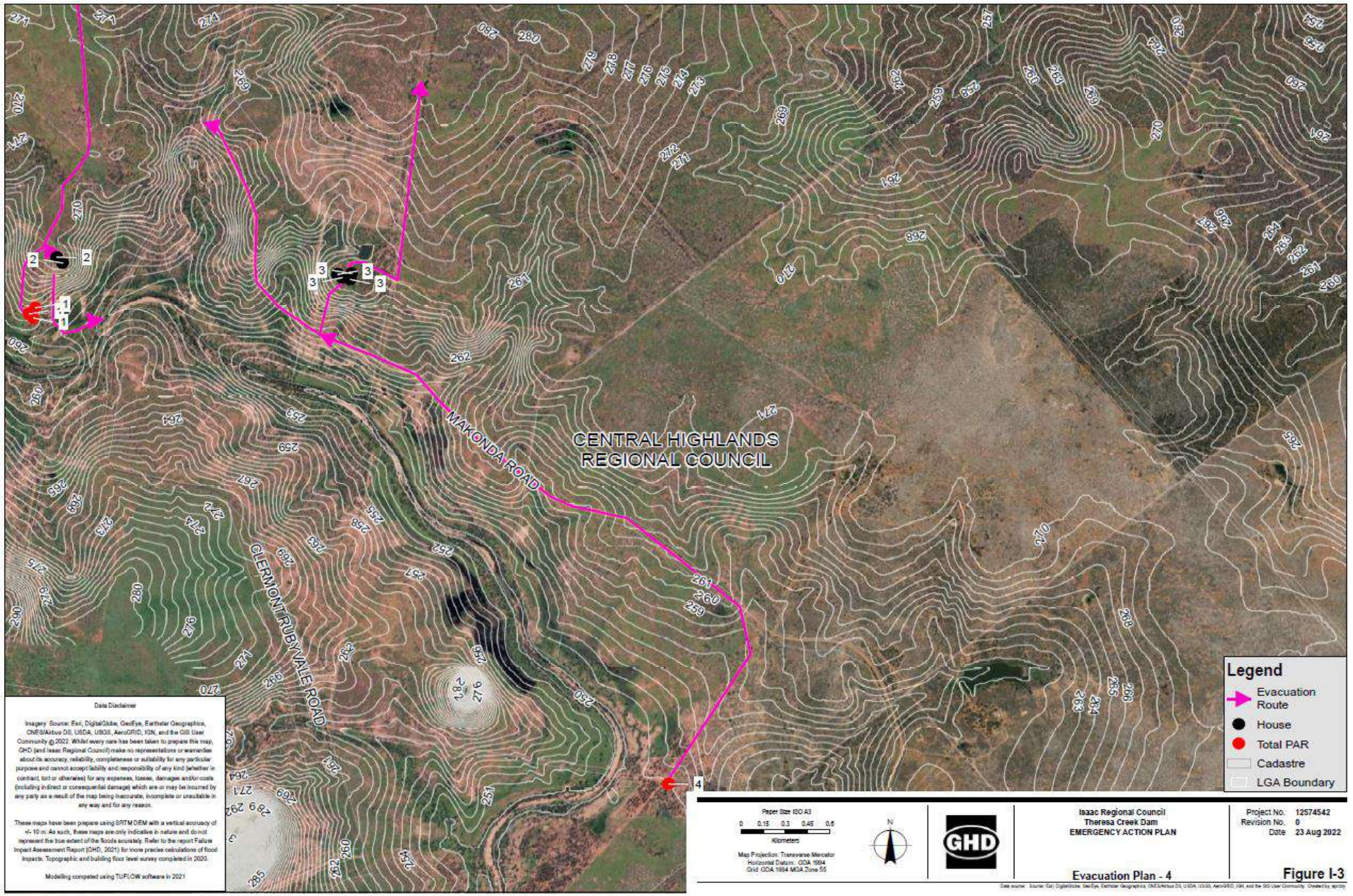
Requesting Officer: Date: / /	Signature	Manual Transmission EMS Transmission EA Campaign No.
EA User Name: Date: / /	Signature	
Authorising Officer Name: Date: / /	Signature	EMS Report ID:

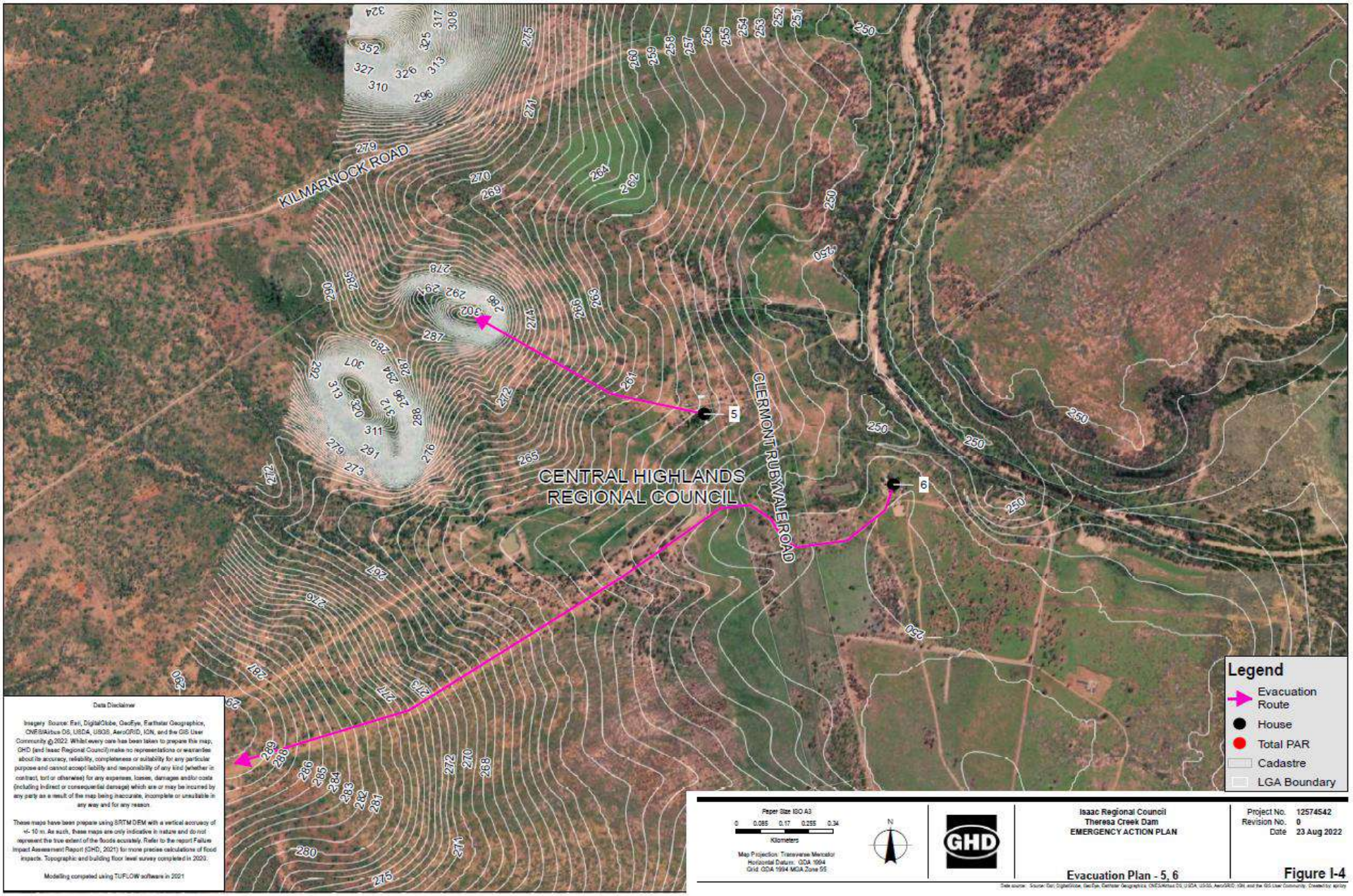
EA Manual and the Emergency Alert Request Form Template are available at: www.disaster.qld.gov.au

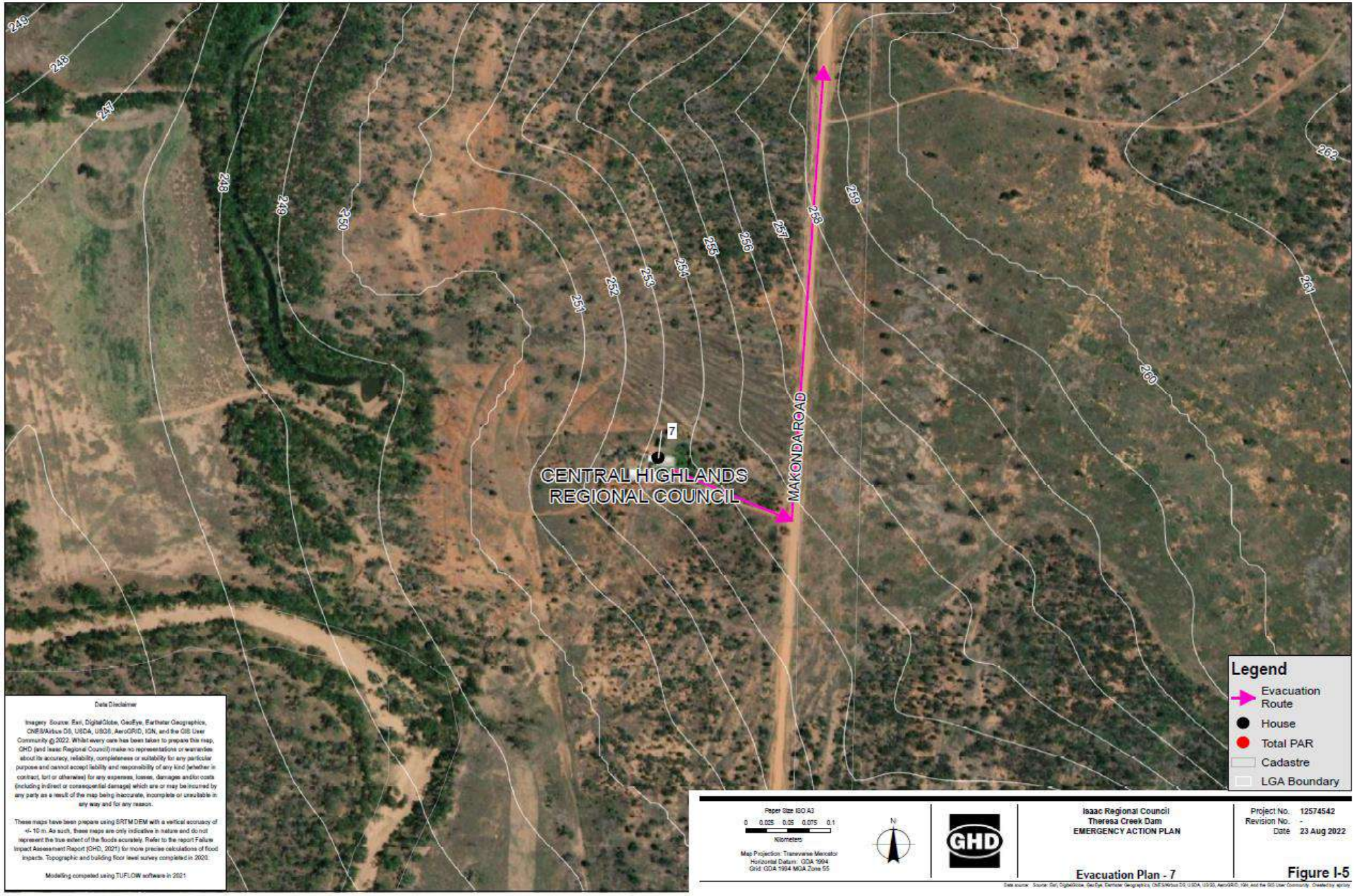
F.1.177 EA REQUEST FORM Last Updated: 15 February 2022 Version 2.5 UNCONTROLLED DOCUMENT WHEN PRINTED UNCLASSIFIED Page 1 of 1

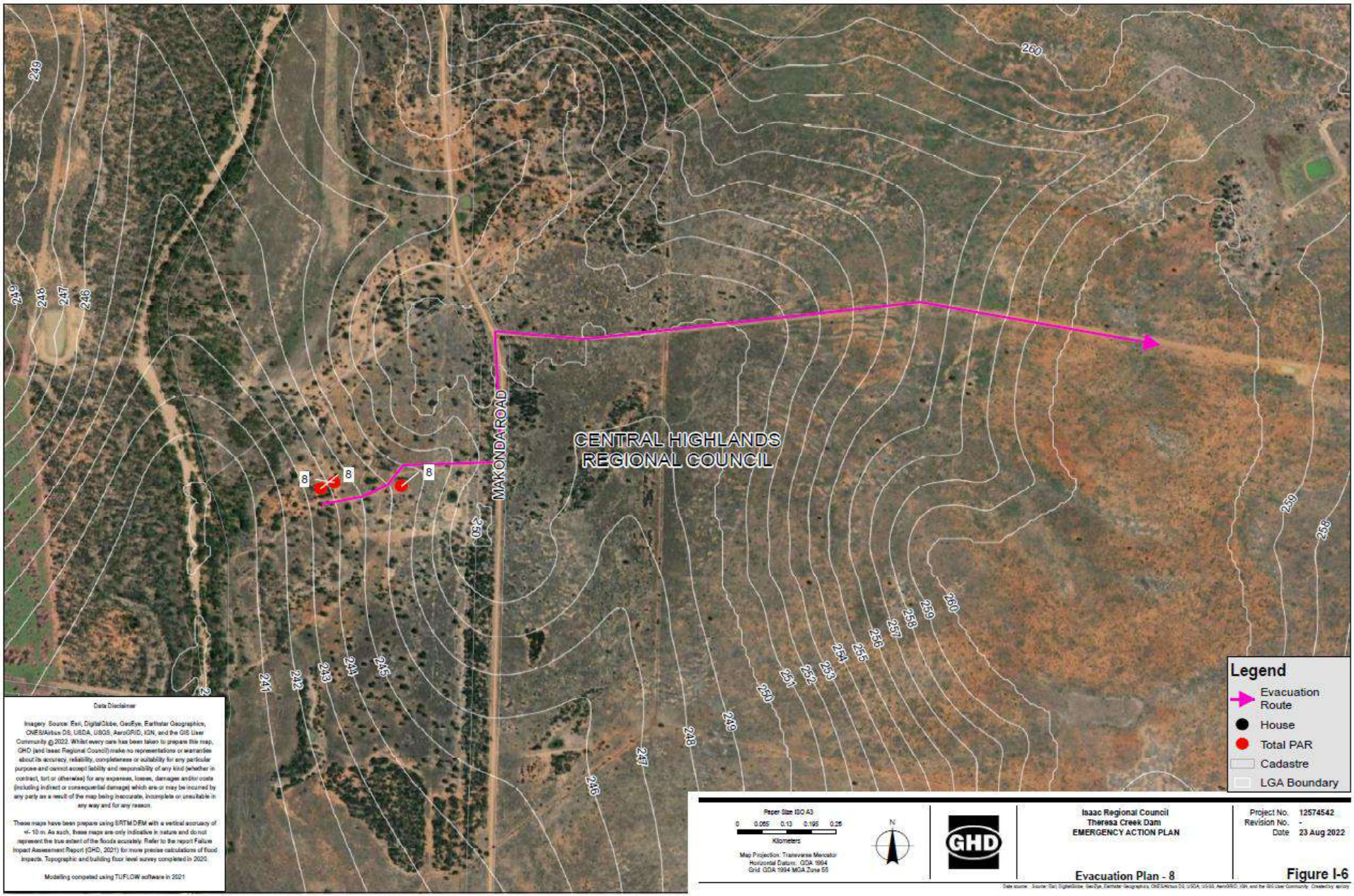
APPENDIX I: EVACUATION ROUTES

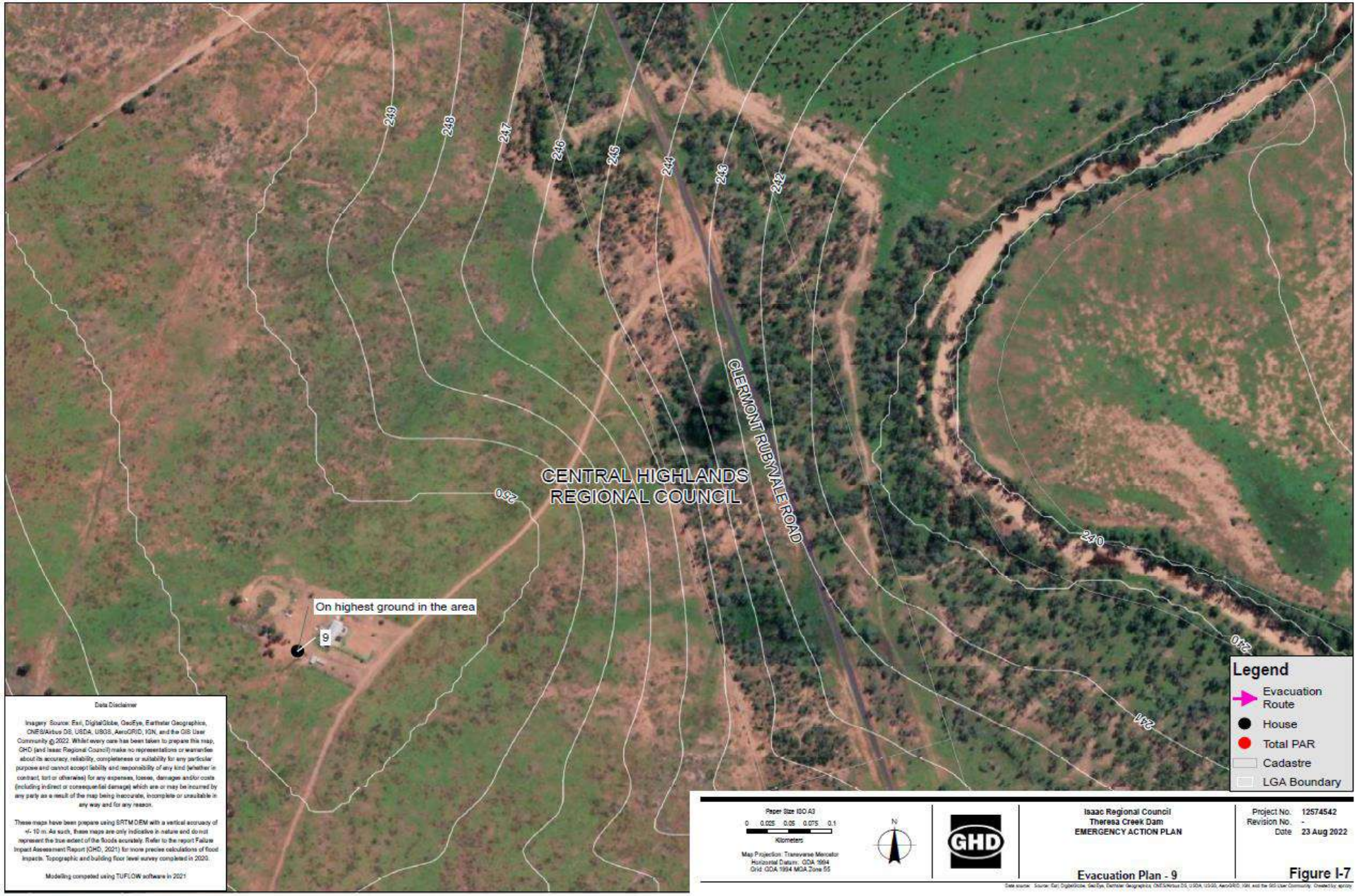


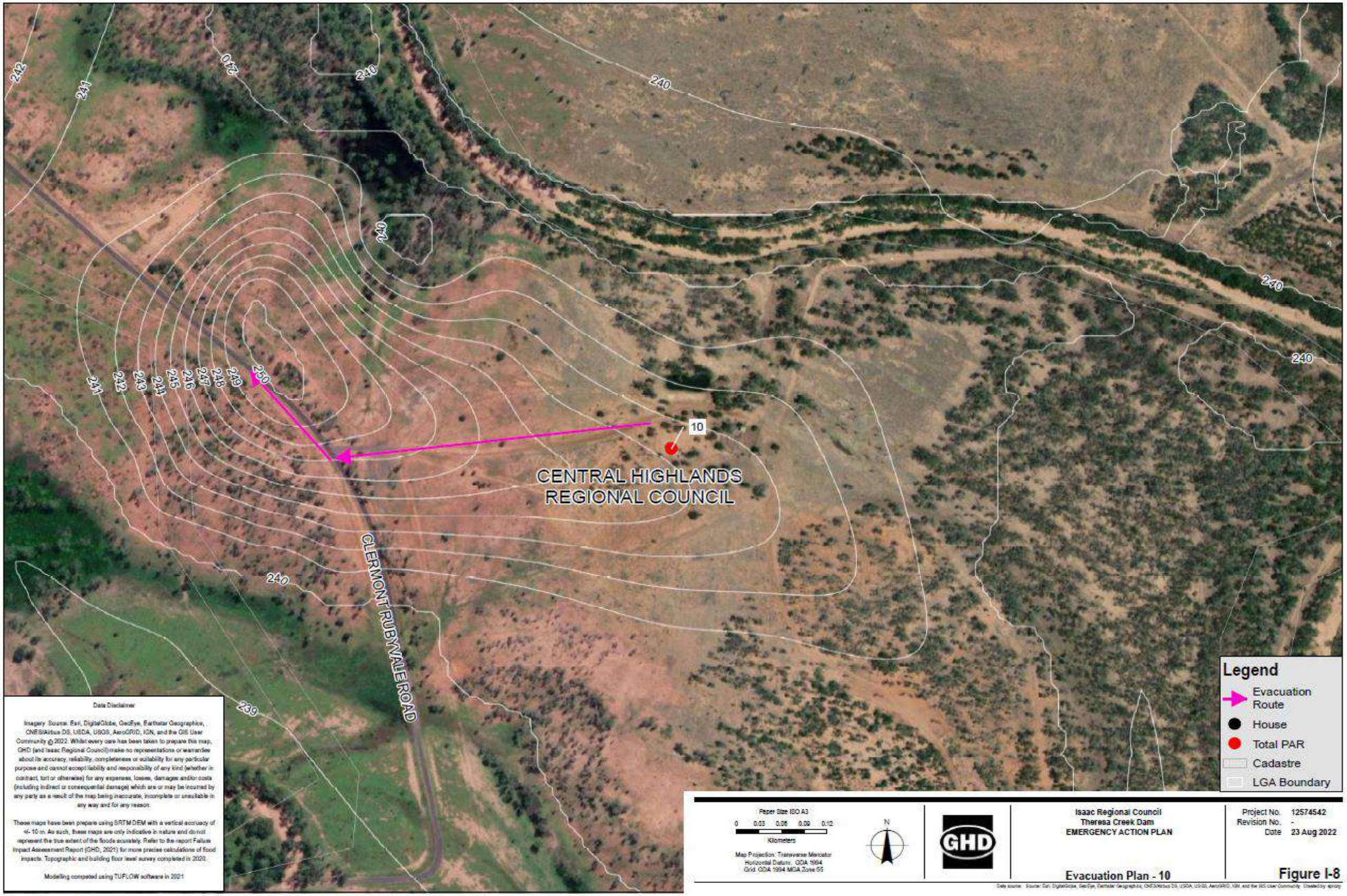

MAKONDA ROAD
CENTRAL HIGHLANDS
REGIONAL COUNCIL
CLERMONT RUBYVALE ROAD
Legend
Evacuation Route
House
Total PAR
Cadastre
LGA Boundary
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community @2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
Evacuation Plan - 4
Figure I-3


KILMARNOCK ROAD
CENTRAL HIGHLANDS REGIONAL COUNCIL
CLERMONT RUBYVALE ROAD
5
6
Legend
Evacuation Route
House
Total PAR
Cadastre
LGA Boundary
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling completed using TUFLOW software in 2021
Paper Size ISO A3
0 0.085 0.17 0.255 0.34
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. 0
Date 23 Aug 2022
Evacuation Plan - 5, 6
Figure I-4


249
248
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
7
CENTRAL HIGHLANDS
REGIONAL COUNCIL
MAKONDA ROAD
Legend
Evacuation Route
House
Total PAR
Cadastre
LGA Boundary
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community @ 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unreliable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.025 0.05 0.075 0.1
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. -
Date 23 Aug 2022
Evacuation Plan - 7
Figure I-5


CENTRAL HIGHLANDS
REGIONAL COUNCIL
MAKONDA ROAD
8
8
8
Legend
Evacuation Route
House
Total PAR
Cadastre
LGA Boundary
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community @2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Paper Size ISO A3
0 0.065 0.13 0.195 0.26
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. -
Date 23 Aug 2022
Evacuation Plan - 8
Figure I-6


249
248
247
246
245
244
243
242
230
240
241
CLERMONT RUBYVALE ROAD
CENTRAL HIGHLANDS
REGIONAL COUNCIL
On highest ground in the area
9
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Legend
Evacuation Route
House
Total PAR
Cadastre
LGA Boundary
Paper Size ISO A3
0 0.025 0.05 0.075 0.1
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. -
Date 23 Aug 2022
Evacuation Plan - 9
Figure I-7


242
241
240
240
240
240
240
240
241
242
243
244
245
246
247
248
249
250
10
CENTRAL HIGHLANDS
REGIONAL COUNCIL
CLERMONT RUBYVALE ROAD
239
Data Disclaimer
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community © 2022. Whilst every care has been taken to prepare this map, GHD (and Isaac Regional Council) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
These maps have been prepare using SRTM DEM with a vertical accuracy of +/- 10 m. As such, these maps are only indicative in nature and do not represent the true extent of the floods accurately. Refer to the report Failure Impact Assessment Report (GHD, 2021) for more precise calculations of flood impacts. Topographic and building floor level survey completed in 2020.
Modelling competed using TUFLOW software in 2021
Legend
Evacuation Route
House
Total PAR
Cadastre
LGA Boundary
Paper Size ISO A3
0 0.03 0.06 0.09 0.12
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
GHD
Isaac Regional Council
Theresa Creek Dam
EMERGENCY ACTION PLAN
Project No. 12574542
Revision No. -
Date 23 Aug 2022
Evacuation Plan - 10
Figure I-8