Middle Creek Dam

Dam Safety Management Program

Emergency Action Plan

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

Emergency Activation Quick Reference

The Emergency Action Plan (EAP) for Middle Creek Dam covers four hazards evaluated within Mackay Regional Council's Dam Safety Management Program. Use the following Table to select the relevant section of the EAP that deals with the hazard.

Dam Hazards and section numbers	Activation levels				
	Watch	**Alert**	**Lean Forward**	**Stand Up**	**Stand Down**
	Nominated Staff	Nominated Staff	Incident manager and Local Disaster Coordinator	Incident manager and Local Disaster Coordinator	Incident manager and Local Disaster Coordinator
	Activation triggers for dam hazards				
Flooding and/or Embankment failure. Section 6.1	Significant rainfall event excess of 50 mm in 24-hour period anticipated	Water level overtops the spillway by more than 1000 mm and significant rainfall event anticipated (>100 mm in 24-hour period)	Dam level at 2000 mm over FSL and significant rainfall continuing	Dam level at 3000 mm over FSL and significant rainfall continuing	Dam levels drop to less than 1000 mm over spillway and no more significant rainfall anticipated
Excessive or New Seepage Section 6.2	N/A	Field staff become aware of seepage	Seepage occurring at unusual rate, or significant increase in turbidity downstream	Seepage considered likely to cause dam failure	Dam seepage controlled and no longer considered a hazard
Earthquake/Movement of Dam Section 6.3	N/A	Field staff become aware of apparent movement. Earthquake reported or felt in the area	Confirmed movement of part or all of the dam embankment structures	Dam Safety Engineer considers dam to be at risk of collapse	Risk assessment determined that failure risk has reduced
Terrorist activity Section 6.4	N/A	N/A	N/A	Evidence of structural damage to either embankments or spillway	Risk assessment determined that failure risk has reduced

Emergency Action Plan Distribution

Organisation	Position	Person
Local Disaster Management Group	Chair	
Local Disaster Management Group	Local Disaster Coordinator	
Mackay Regional Council	Chief Executive Officer	
Mackay Regional Council	Director Engineering and Commercial Infrastructure	
Mackay Regional Council	Chief Operating Officer	
Mackay Regional Council	Manager Water Treatment	
Mackay Regional Council	Dam Safety Officer	
Mackay Regional Council	Water Treatment Coordinator (Dam Operator)	
Mackay Regional Council	Recycled Water Officer	
Department of Natural Resources and Mines & Energy	Dam Safety Regulator	
Mackay Regional Council	Emergency Management Team	
Queensland Police Service - Sarina	Officer in Charge	
Mackay District Disaster Management Group	Executive Officer	
Queensland Fire and Emergency Service	Emergency Management	**Vacant at time of review**
Community	Middle Creek Dam Liaison Officer	
Community	Middle Creek Dam Liaison Officer	

Document Control Sheet

Approved by: Date: 8 June 2022

Manager Water Treatment

Revision Records:

Issue-Revision Number	Revision Description	Section	By	Revision Date
1	2018 Version	All		12/03/2018
2	Updated	All		22/06/2018
3	Additional comments	All		09/07/2018
4	Updates	Various		18/07/2018
5	Updates	Pages 4,20.		15/8/2018
6	Updates	Various		18/8/2018
7	Updates	Pages 4,20		07/02/2019
8	Updates	Contact details & Attachment C		15/8/2019
9	Updates	Contact details		10/9/2020
10	Updates	Contact details		08/09/2021
11	Updates	Contact details. Updates on Pages: 4,16,20,21,26, and Attachment F.		06/06/2022

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1. Introduction

1.1. Purpose

This Emergency Action Plan (EAP) describes the coordination of necessary actions by the Mackay Regional Council (MRC) and its officers to provide timely notification to Queensland Police Service, Mackay Local Disaster Management Group (LDMG) and affected persons in the event of an emergency condition at the MCD.

Twenty-five (25) residential properties could be impacted by flood inundation from Middle Creek Dam. Inundation impact could amount to flooding up to 300 mm above ground level within residential buildings. Actual number of Population at Risk (PAR) would be dependent on occupation within properties. All 25 properties will be contacted by landline or mobile phone at the time of any prescribed incident.

Controlled releases from Middle Creek Dam (MCD) do occur as and when downstream water supplies are in need of replenishment. During these releases the 450-mm outlet valve at the bottom of the dam is opened and water is released. This release operation does not impact on any residential properties downstream of MCD, due to the size of the outlet and the subsequent volume able to be released. Impact on private residential road access is minimal and does not make road access hazardous.

1.2. Scope

This EAP details Emergency Events and Action Procedures for the following events.

- Flooding and/or Embankment Failure
- Excessive or New Seepage
- Earthquake/Movement of the Dam
- Terrorist activity

Procedures have been developed for various scenarios that may pose a risk to the dam. Each procedure documents a series of events that trigger a decision or action. Each procedure is laid out in a tabular format accompanied by a succinct description to support the decision or required action.

The Mackay Local Disaster Management Group (LDMG) coordinates disaster and planning within the Mackay Regional Council area for floods and other events which significantly impact the community downstream. If an emergency occurs at Middle Creek Dam that causes a community consequence. MRC, and in particular Mackay Water Services, holds the responsibility for the initial notifications of residents and the management of incident unless escalation requires evacuations. The Mackay LDMG will coordinate community response where evacuation of residents is required i.e., establishing evacuation centres etc.

2. Definitions

The following definitions are used throughout this manual.

The Owner	Mackay Regional Council
Declared Incident	A set of circumstances resulting in the EAP being invoked
Community	Residential properties within flood inundation area
Community consequence	Residential properties within flood inundation area are flooded
Routine inspections	Dam inspection in accordance with MCD Standard Operating Procedures (SOP)

2.1. Abbreviations and Glossary of Terms

The following abbreviations or Glossary of Terms apply when using this Emergency Action Plan.

AEP	**Annual Exceedance Probability**
AFC	Acceptable Flood Capacity
COO	Chief Operating Officer Water and Waste Services
DDC	District Disaster Coordinator
DCF	Dam Crest Failure
DNRME	Department of Natural Resources and Mines & Energy
DSTDM	Dam Safety Technical Decision Maker
EAP	Emergency Action Plan
EER	Emergency Event Report
FSL	Full Supply Level
IM	Incident Manager
LDC	Local Disaster Coordinator
DSO	Dam Safety Officer
LDMG	Local Disaster Management Group
LDCC	Local Disaster Coordination Centre
MCD	Middle Creek Dam
MCDLO	Middle Creek Dam Liaison Officers
MRC	Mackay Regional Council
PAR	Population at Risk
PMF	Probable Maximum Flood
SDCC	State Disaster Coordination Centre
SDF	Sunny Day Failure
SO	Standby Operator
SEWS	Standard Emergency Warning Signal
SOP	Standard Operating Procedures

2.2. Business terms and definitions.

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

Term	Definition
Terms set out in section 352A of the *Water Supply (Safety and Reliability) Act 2008 (Qld) - Amended*	
Dam hazard	Means a reasonably foreseeable situation or condition that may: • cause or contribute to the failure of the dam, if the failure may cause harm to persons or property, OR • 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	Means an event arising from a *dam hazard* if: • persons or property may be harmed because of the event, AND • a coordinated response, involving 2 or more of the following *relevant entities*, is unlikely to be required; each *local group* and *district group* for the EAP, each local government whose area may be affected, the chief executive, another entity the owner of the dam considers appropriate, AND • 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 Group)	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	Means an event arising from a *dam hazard* if:
	• persons or property may be harmed because of the event, AND
	• any of the following apply:
	  ○ a coordinated response, involving 2 or more of the following *relevant entities*, is likely to be required; each *local group* and *district group* for the EAP, each local government whose area may be affected, the chief executive, another entity the owner of the dam considers appropriate, OR
	  ○ the event may arise because of a disaster situation declared under the Disaster Management Act, OR
	  ○ 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*

Term	Definition
MCDLO	Middle Creek Dam Liaison Officer. These are nominated residents living upstream of the Middle Creek Dam area and are the point of contact for the Mackay Water Services Incident Manager and Mackay LDMG. Further details of the MCDLO role are defined in Attachment E
Referable dam	A dam, or a proposed dam after its construction, will be a referable dam if: • a failure impact assessment of the dam, or the proposed dam, is carried out under the Act, AND • the assessment states the dam has, or the proposed dam after its construction will have, a category 1 or category 2 failure impact rating, AND • the chief executive has, under section 349 of the Act, accepted the assessment Also, a dam is a referable dam if: • under section 342B of the Act, the owner of a dam is given a referable dam notice and, before the effective day for the notice, does not give the chief executive a failure impact assessment for the dam, AND • the chief executive has not, under section 349 of the Act, accepted a failure impact assessment of the dam
Relevant entity	Means each of the following under the EAP for the dam: • 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, e.g. the owners of parcels of farm land adjacent to the dam or residents of a township • each *local group* and *district group* for the EAP • each local government whose local government area may be affected if a dam hazard event or emergency event were to happen • the chief executive • another entity the owner of the dam considers appropriate e.g., the Queensland Police Service
Terms consistent with Queensland disaster management arrangements:	
Activation levels	The five levels of EAP activation are: • **Watch:** Nominated staff will monitor any potential event that may impact MCD • **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. Mackay LDCC is on standby and prepared but not activated • **Stand Up:** The operational state where resources are mobilised, personnel are activated, and operational activities commenced. Mackay LDCC is activated. The dam owner needs to provide an Emergency Event Report (EER) 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.

Term	Definition
	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 LDMGs or DDMGs.
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/toxic condition	The contamination of water in the storage of the dam that could create a dam 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.
Earthquake	A sudden release of energy in the earth's crust or upper mantle, usually caused by movement along a fault plane or by volcanic activity, resulting in the generation of seismic waves that can be destructive. The potential consequences of an earthquake include: • settlement, sliding, or overturning of monoliths in the dam wall • initiation of seepage lines in the foundations or abutments that could lead to piping damage and potential inoperability of appurtenant works
Flood release	A flood release from a dam occurs when catchment inflows raise the storage level above the Full Supply Level (FSL) resulting in a discharge from the spillway of the dam.
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.

Term	Definition
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.
Terrorist activity	A deliberate attempt to damage, fail or contaminate a dam.

3. Roles and Responsibilities

Any emergency incident at the MCD will involve representatives from a number of agencies including MRC, MWS (a department within MRC) and the Mackay LDMG.

MRC have the ultimate responsibility for the emergency response within the region.

MWS will be responsible for maintaining and executing this EAP. Expectations of MWS are to:

- Ensure the business maintains adequate levels of planning and preparedness for emergencies
- Executes an efficient/effective response to emergency events at MCD, i.e. Releases/Inspections/Communications or Alerts/Warnings to residents downstream; and
- Cooperates with MRC, the Mackay LDMG and all stakeholders in the management of emergencies

Where any emergency is likely to affect the downstream community i.e., Evacuation or temporary accommodation requirements, the Mackay LDMG will assist in the coordination of the operation.

In the event of an emergency, decisions on where, when, and how units are deployed to address the situation downstream of MCD, will be handed down from the LDMG. During an event, regular meetings between MWS and the Mackay LDMG will occur to brief on the situation and to allocate tasks to ensure a co-ordinated response is achieved.

Within MRC and MWS, key roles and responsibilities for development and implementation of this EAP are outlined in **Table 1.**

Table 1: Roles and Responsibilities

Role		General Responsibility	Personnel (and alternative)
Mackay Water Services	Emergency Action Plan custodian	The custodian of the EAP will be responsible for development and overseeing implementation of the EAP. Primary responsibility of the EAP custodian will be to ensure that MWS MRC has sufficient capability to manage its response to an emergency as efficiently and effectively as possible.	Manager Water Treatment
	Preparedness Coordinator	Primarily responsible for the execution of the emergency planning and preparedness activities. Promote opportunities for improved emergency management including review of plans, “live” exercises etc. to ensure that plans and arrangements are operable. Coordinate with, and support, MRC and other regional or state agencies in developing MRC’s emergency management capability on a broader scale.	Manager Water Treatment
	Incident Manager	Ensure that in the event of an emergency, the business resources are coordinated as envisaged under this EAP. The Incident Manager will assume the overall ‘day to day’ responsibility for management of an event.	Manager Water Treatment
	Dam Safety Officer	Management of Middle Creek Dam EAP including the following operations; • Monitoring online Level sensors and online rain gauge. • Maintaining Dam levels during wet weather events in consultation with the **Incident Manager.** • Maintaining updated versions of Middle Creek Dam EAP and associated documentation. • Liaison with MCDLO with reference to roles and responsibilities. • General Management of dam safety issues at MCD. (Road, Embankment and Spillway maintenance). • Documentation of an incident or event report.	Treatment Engineer Alternative: Recycled Water Officer

Role		General Responsibility	Personnel (and alternative)
	Incident Management Team	Overall responsibility for managing the tactical and wider operational aspects of the incident and for coordinating all operational aspects of the response and recovery effort for MWS. In doing so, the Incident Management Team has the following objectives: • Ensure the safety of the overall operational response; • Maintain the integrity of the operating systems; • Minimise the impact to customers, the community and the environment; • Ensure that the site operation has adequate organisation support and resources.	As determined by the Incident Manager and Mackay LDMG
	Field Coordinator	Management of the 'on the ground' assessment and execution of the emergency response to an incident. Provide feedback to the Incident Manager on key aspects of the event. This includes monitoring the MCD level and operating the Middle Creek discharge valve as required.	Water Treatment Coordinator
	Site Management Team	The Site Management Team will have responsibility for managing the localised site based operational aspects of the incident for MWS and in doing so, will make best endeavours to: • Ensure the safety of all persons on site; • Restore services with minimum disruption to customers, community, and the environment; and • Provide regular updates to the Incident Management Team at the times requested.	As determined by the Field Coordinator
Mackay Regional Council	Communications /Media Manager	Provides a single point of communication with all parties internal and external to MRC Coordinates any media releases	CEO, MRC Manager Corporate Communications Mayor
	Local Disaster Coordinator	Responsibilities include: • Roles under the Disaster Management Act 2003; • Coordinating the evacuation or residents in the vicinity of the flood inundation area; and • Coordinating relief to properties affected.	LDMG Coordinator Alternative: CEO, MRC
	LDMG Chair	Chair of the Mackay LDMG	Mayor

Role		General Responsibility	Personnel (and alternative)
		In consultation with DDC authorises voluntary or directed evacuations	Alternative; Deputy Mayor
	Sarina Water Treatment Plant Staff	MCD Inspections.	Field Coordinator
Community	Middle Creek Dam Liaison Officer	In the event of communications failure, this MCDLO will enable access to dam level information. For responsibilities refer to Attachment E	MCDLO

3.1. Emergency Communications and Contact List

The Incident Manager, or delegate, is a member of Mackay Water Services, is responsible for reporting on rainfall, water levels and dam condition. The Incident Manager is responsible for identifying and managing an emergency situation. The Incident Manager provides updates and information into the LDMG once it is established.

Mobile phones are the main channel of communication between MCD and the Sarina field office. However, mobile phones cannot be relied upon during emergencies for this area due to poor reception. The quality of the telephone reception depends on the service provider used. Council has at its disposal, 2-way UHF radio systems. This equipment is either in the form of handheld radio systems or vehicle equipped systems. This provides a back-up communication system between MCD and the control centre, should the mobile phone system fail.

A number of local residents have been identified as being at risk of flooding or inundation during an emergency event, based on the 'Middle Creek Dam Sarina Dam Safety Review' (Cardno, 2013). A list of properties and contact addresses and phone numbers are included in *Attachment C*. The residents have been prioritised based on their proximity to MCD. During an emergency event, MRC will attempt to contact these residents by telephone or in person.

As part of any notification requirement, designated Mackay Water Services staff, will be specifically allocated the task of contacting these residents by telephone (mobile or landline) to warn them of a potential flood incident. Should any residents not be contactable via telephone, MRC will make every effort to physically visit affected residential properties to make necessary contact.

In the event of a dam failure or potential dam failure at MCD, and subject to lead times to warn residents downstream of MCD, alternative warning alerts will be used i.e. door knocking, vehicle and loud hailer. However, residents need to be prepared for an emergency and should not wait to receive a warning before they plan and act. They will need to refer to their Safety Information Kit for further information in what PAR may need to do. This Safety Information Kit is available on MRCs website and is reviewed as necessary **and is issued annually in a process whereby residents are requested to update contact details for emergency contact.**

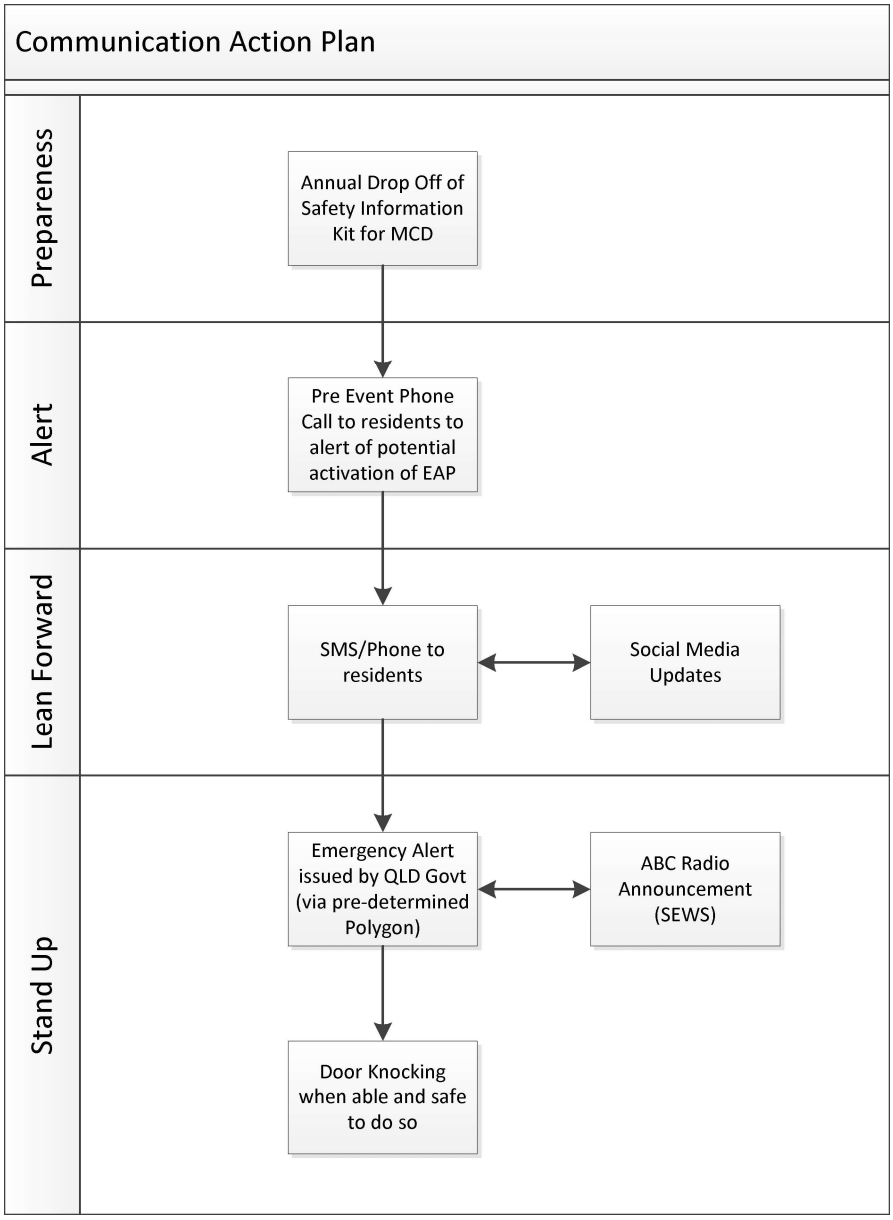
The Mackay Water Services Incident Manager will request, via the LDMG, for residents to be notified via an automatically generated SMS text (Refer Appendix D) of the imminent danger and to watch and prepare. If the event escalates, the Mackay Water Services Incident Manager will request, via the LDMG that the State Disaster Coordination Centre, send a text via a defined polygon. The message is currently lodged and stored at the State Disaster Coordination Centre.

An additional contingency communication provision is to notify residents via local ABC radio broadcast (SEWS) and other local radio stations as deemed necessary by the LDMG.

The communication protocol in order of escalation is in the following manner. Each communication step will be utilised if the previous choice is unavailable for any reason:

1. Staff designated by the Incident Manager, will contact the 25 residents via land line or mobile
2. Automatically generated text to contact list via Mackay LDMG
3. Automatically generated text via polygon through Mackay LDMG and the State Disaster Coordination Centre
4. If safe for staff, door knocking
5. Local ACB radio broadcast via Mackay LDMG

The Diagram below provides a summary of the proposed communications protocol;



Preformatted warning messages in accordance with priority are indicated in Attachment D.

Table 2 contains a list of contact names and telephone numbers that can be used to contact key personnel during an emergency.

Table 2 has been redacted

4. Middle Creek Dam Background Information

Table 3 provides a summary of key MCD information.

Table 3: Summary of Middle Creek Dam Information

Parameter	Value
Location	
Location Map	Shown in Figure 1
Watercourse	Middle Creek, AMTD 5.5km
Address	Middle Creek Road, Sarina
Latitude	21 Degrees 28 Minutes
Longitude	149 Degrees 6 Minutes
Geometry	
Surface Area	17.5 ha
Catchment Area	7.4km^2
Dam Volume When Full	1,120 ML
Dam Wall	
Wall Length	130m
Maximum Height	26m (Embankment crest to downstream toe)
Type of Structure	Rolled earth and rock fill with separating filter zones
Construction Method	Compacted clay/ earth fill
Source of Materials	Local
Dam Spillway	
Type of Spillway	Fixed flow control
Means of FFC	Broad-Crested Weir
Location	Left Abutment
Crest Width	24.38m
Spillway Level	RL 133.3
Embankment Crest Level	RL 137.8
Discharge Capacity	340 m^3/s (approx.)
Dam Outlet	
Type	Cast Iron Pipe
Diameter	450mm
Method of Control	Down Stream Valve
Maximum Release Rate	171 ML/day

The current spillway discharge capacity of the dam meets a 1 in 2000 Annual Exceedance Probability (AEP) flood.

The only operating equipment at MCD is the dam discharge valve. The dam valve is opened manually via a standard water valve key carried in the vehicles of all local MWS Operations and Maintenance personnel. The valve is located at the toe of the dam wall. Access to the dam may not be possible in the event of a dam emergency.

For more detailed information refer to the MCD Standard Operating Procedures and the MCD Operations and Maintenance Manual. These documents are stored electronically in SharePoint.

Middle Creek Dam Operations and Maintenance Manual –
http://bruce/CorpSystems/WWS_Doc_Store/WWS_Doc_Store/Middle_Creek_Dam_O_M Manual.docx

Middle Creek Dam Standard Operating Procedures –
http://bruce/CorpSystems/WWS Doc Store/WWS Doc Store/Middle Creek Dam SOPs.doc

The MRC document storage and control system and hardcopies are maintained in the Disaster Management and Incident kit.

4.1. Location and Access to Middle Creek Dam

MCD is located off Middle Creek Road, approximately 12 kilometres west-southwest of the town of Sarina (Figure 1).

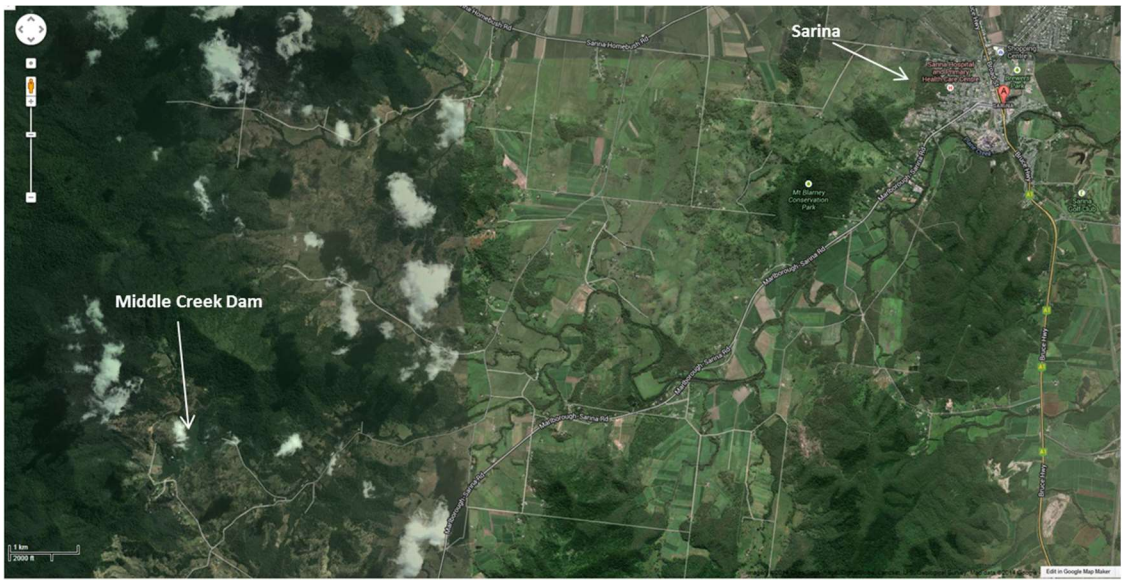


Figure 1: Location of Middle Creek Dam in Relation to Sarina (source: Google Maps)

Access to MCD

Creek Road. Travel north for approximately 1 km

- Turn left onto Middle Creek Road. Travel north-west for approximately 5.5 km until reaching a locked gate. (The locked gate is located on a private property . The key to open

the gate is the former Sarina Shire Council key which should be carried by all local water personnel). Turn right once through the gate

- Travel 1.1 km along a dirt road to access the eastern end of the MCD wall. The spillway can be accessed by driving approximately 130 m along the dam wall
- The roads used to access MCD are shown in **Figure 2**

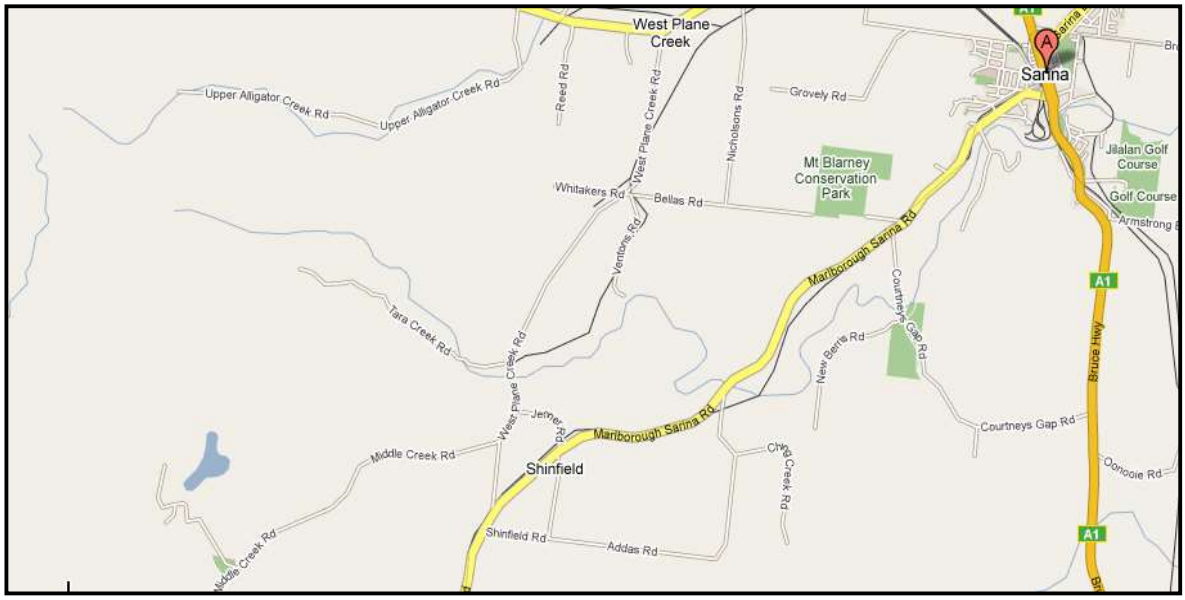


Figure 2: Map of Road Route between Sarina and Middle Creek Dam (source: Google Maps)

Dry Weather Access to Middle Creek Dam Wall

During dry weather conditions, the approximate travel time between Sarina and MCD is 20 minutes. The dam wall is able to be accessed by all vehicle types.

Wet Weather Access to Middle Creek Dam Wall

During wet weather conditions, a 4-wheel drive vehicle will be required past the locked gate. However, there will be no vehicle access to the dam wall or spillway. Access will be by foot only, starting approximately 500 m from the dam wall.

During periods of heavy rain resulting in localised flooding, the culverts on Middle Creek Road are likely to become inundated. In this case, there will be no access to MCD.

4.2. Monitoring and Inspection Programs

Routine inspections of the MCD are undertaken by local MRC field staff in accordance with seasonal rainfall events and rainfall expectancy. MCD Standard Operating Procedures provides some guidance to the field staff as to what to look for, and actions to be taken should any issues be identified. Findings from each inspection are recorded in a Logbook. The proposed monitoring and inspection program is as follows;

- May through December – routine inspections every month.
- January through April – routine inspection once every fortnight.

- During wet weather events (at any time during the year). Any weather forecast prediction of rainfall precipitation in excess of 100 mm during any 24-hour period will automatically trigger a visual inspection.
- During EAP activation, dam routine inspection will immediately apply, either daily or in accordance with situation report at the time.
- There are two level sensors located on a floatation buoy approximately 30 metres from the dam wall. Level sensors measure water levels in the storage system relative to the spillway. One sensor transmits level signals via the Telstra 3G network, and the second senor transmits level signals via the Telstra 4G network. The intent of using both mobile communications networks is to increase the level of redundancy. Information from both sensors is available via the MRC SCADA network, which is monitored remotely by Mackay Water Services staff and during an incident, this will be closely monitored by the Incident Management Team. Both level sensors are capable of triggering SMS alerts.
- Level sensor data can also be accessed by MWS staff via a web-based program, accessible from any internet-connected computer/iPad/smart phone, at any time. Both level sensors are also triggered to send SMS alarms to the Incident Manager plus Emergency Management Team (Emergency Management Coordinator and Technical Officer Emergency Management) when the MCD levels reach 500 mm over full supply level and 1000 mm over full supply level.
- A rainfall measurement device (Telstra 4G) is in place at MCD. Live rainfall activity is available via a web-based program. In the event of rainfall events of either 50 mm precipitation in one hour or, 100 mm in three hours, SMS advice will be provided to send an SMS alarm to the Chief Operating Officer, the Manager Treatment, the Emergency Manager Coordinator and other relevant staff.
- Additionally, three flood level indicators have been located on the upper reaches of MCD to provide visual water level indication particularly for the MCDLO. See Attachment F.

Should the meteorological department indicate that a severe wet weather event is likely, all of the above monitoring systems will be continually under observation by MRC staff nominated by the Incident Manager.

Should all above monitoring systems fail, MRC has appointed two Middle Creek Dam Liaison Officers (MCDLO). Should an Emergency Event be anticipated i.e. Cyclone or Rainfall event, the MCDLO will be mobilised and a communications check will be undertaken.

MCDLO will be engaged to provide:

- Community Liaison between MRC Water and Waste Incident Manager, LDMG and/or LDCC and community in times of disasters and emergency operations.
- Conduct Rapid Impact Assessments (visual or windscreen) in the community to provide the MRC Water and Waste Incident Manager, LDMG/LDCC situational awareness.
- Provide Situation Reports (SITREPS) as required to the MRC Water and Waste Incident Manager, LDMG when the LDCC is activated, written or verbal.

- When requested conduct a resource analysis in the area of operation.
- Provides an on the ground source of information via the flood level indicators.

Flood level indicators situated on the upper reaches of MCD, will be easily accessible to the MCDLO. The MCDLO will provide dam level information to MRC, LDMG and LDCC via VHF radio communication. VHF radios have been installed in each of the MCDLO residential properties. The radios have been provided by MRC and are tested annually (or as required) prior to the wet season and/or prior to a cyclone being anticipated.

5. Documentation and Reporting

Sitreps are recorded in the Guardian IMS system by the Local Disaster Coordination Centre.

It is essential that activities and decisions undertaken during any incident be duly recorded in chronological order in a personal log or in Guardian IMS.

Following activation of this EAP, at stand down stage, a debrief will be held with MRC staff who are listed in this EAP to identify opportunities for continuous improvement.

An Emergency Event Report is to be provided to the DNRME Chief Executive within 30 business days after the end of the emergency event.

The Emergency Event Report is to include the following:

- A description of the event.
- Time, date and description of any actions.
- Regular dam level recordings.
- Description of any observed damage.
- Photographs and/or sketches.
- Details of communication and actions taken during the emergency; and
- A description of how the EAP was implemented during the event and any comments on the adequacy of the EAP, as well as any proposed changes.

6. Dam Hazards - Emergency Events and Actions

Residents likely to be impacted by flood inundation will be contacted by landline or mobile phone at the time of any declared incident. Contact of 25 properties is considered a manageable task at the time of any incident and certainly as reliable as an automated advisory system.

Emergency Alerts are pre-prepared, loaded and tested for Middle Creek Dam in the Disaster Management Portal to be distributed to the public by the State Disaster Coordination Centre.

Emergency alerts would be issued for two action requirements;

- Watch and Act
- Evacuate now

6.1. Flooding and/or Embankment Failure

For rainfall events with an AEP greater than 1 in 2000 flood, there is a risk that the spillway capacity will be exceeded, and the dam will overtop.

The water level in the dam is monitored by an automated level sensor. It provides a level reading at all times and will automatically send an SMS alarm to key emergency staff.

In the event of communications failure, the MCDLO will be contacted to visually assess the dam levels via installed surveyed levels markers positioned on the upper reaches of MCD. Refer Attachment F.

Table 4 provides the triggers and appropriate actions to be taken should an emergency flooding event take place.

Road closures will be managed between Queensland Police Services and Mackay Regional Council

Table 4: Flooding – Triggers and Actions

Activation level	Watch	Alert	Lean Forward	Stand Up	Stand Down
Activation trigger	Significant rainfall event excess of 50 mm in 24-hour period anticipated	Water level overtops the spillway by more than 1000 mm and significant rainfall event anticipated (>100 mm in 24-hour period)	Dam level at 2000 mm over FSL and significant rainfall continuing	Dam level at 3000 mm over FSL and significant rainfall continuing	Dam levels drop to less than 1000 mm over spillway and no more significant rainfall anticipated.
Actions	An automated alert is received by the nominated staff. Nominated staff will continually monitors rainfall and level data. MCDLO mobilised and communications systems checked	An automated alert is received via SMS from the MCD level sensor. Nominated staff will initiate inspection of the dam if appropriate. Rainfall and dam levels continue to be monitored. Nominated staff will inform the LDC and others on contact list that there is potential for activation of EAP.	The Incident Manager alerts the LDC and others on contact list. Under the directions of the Incident Manager, residents of properties within the possible inundation area are contacted and informed, as advised by LDC.	The Incident Manager alerts the LDC and others on contact list. Under the directions of the Incident Manager, residents of properties within the possible inundation area are contacted and informed, as advised by LDC. An Emergency Alert will be issued by SDCC on request by Mackay LDMG to all persons within the inundation area as indicated by a pre-determined polygon area.	Return to routine surveillance activities and frequencies — inspect the dam for any damage and photograph any damage identified. Compile data, recording sheets, and photographs for the EER.
Internal notifications	Incident Manager (IM) Standby Operator (SO) Chief Operating Officer (COO)	IM SO COO Director, Engineering & Commercial Infrastructure (ECI)	IM SO COO Director, ECI CEO	As per previous activation level	As required
External notifications	1. As required	1. As required	1. Downstream residents 2. DNRME	1. LDMG 2. DNRME	1. LDMG 2. DNRME

6.2. Excessive or New Seepage

Monitoring seepage is part of routine dam maintenance. A routine inspection of the dam is undertaken by the local field staff as indicated in section 4.2.

When inspecting for seepage, signs to look for include:

- Increase in seepage quantity.
- Unaccountable increases in seepage flow.
- “Evergreen” spots, boggy ground, or pools of water; and
- Detection of cloudy water at seepage monitoring points.

When seepage of an unusual pattern is observed, a closer inspection is undertaken. Details of the seepage are recorded in an Incident Log which is maintained along with the MCD Data Book.

If further investigation identifies a substantial increase in the flow of seepage, the Field Coordinator is to inform the Incident Manager.

The Incident Manager will be responsible for ensuring that the appropriate action is taken, such as:

- Direction of remedial works.
- Engaging specialist Dam Safety Engineers / Consultants.
- Informing the Mackay LDMG of the potential for an emergency event.

MRC will be responsible for issuing public information and warnings to all properties and residents along the inundation path.

The Mackay LDMG will be responsible for issuing any Voluntary or Directed Evacuation orders for all properties along the inundation path, if required.

There may be occasion when the Incident Manager may need to make the call to evacuate; specifically, when there is no lead time for consultation in which case the Incident Manager will need to make an executive decision and make a call to evacuate now.

Table 5 provides the triggers and appropriate actions to be taken should an emergency seepage event take place.

Table 5: Excessive or new Seepage – Triggers and Actions

Activation level			Stand Up	
				Downstream residents advised accordingly
				As per previous activation level
				1. Downstream residents 2. LDMG 3. DNRME

6.3. Earthquake/Movement of Dam

Dam movement is considered a general term associated with slide, slump, slip, scarp, bench and overstep area or change of grade. A series of movements may lead to the failure of the dam.

Monitoring dam movement is part of routine dam maintenance. A routine inspection of the dam is undertaken by the local field staff.

When inspecting for dam movement, signs to look for include:

- Foundation movement.
- Overly steep grades.
- Local settlement.
- Cracking, slumping or slipping.

When dam movement is observed, the Field Coordinator is immediately notified, who in turn informs the Incident Manager. Constant monitoring from a safe distance is undertaken, until stood down by the Incident Manager. Details of the movement are recorded in an Incident Log.

Table 6 provides the triggers and appropriate actions to be taken should a dam movement event take place.

Table 6:Earthquake/Dam Movement– Triggers and Actions

Activation level			Stand Up	
			The Incident Manager alerts the	Downstream residents advised accordingly
				1. Downstream residents 2. Dam Safety Engineer 3. DNRME 4. LDMG

6.4. Terrorist Activity

In the event of Terrorist Activity, concern centres on the structural stability of the dam. Movement could occur during the incident resulting in or leading to failure of the dam.

The size and location of MCD to a terrorist attack is very low

Inspection process similar to that indicated in **Section 6.3 Movement of Dam** to be carried out.

Table 7: Terrorist Activity – Triggers and Actions

Activation level			Stand Up	
				Downstream residents advised accordingly
			1. Police 2. Downstream Residents 3. DNRME 4. LDMG	1. Police 2. Downstream residents 3. DNRME 4. LDMG

7. Evacuation Procedure Resulting from Dam Flooding or Failure

In the event of a flood (from overtopping) or a dam failure, there is a risk of inundation of downstream properties. A dam failure inundation profile has been developed to identify properties and structures at risk. The latest available inundation mapping is provided in *Attachment B. Attachment C* provides the names, addresses and contact details of all properties at risk. During an overtopping or failure event, the following roads will become impassable (see Figure 3):

- Breen's Crossing on Rifle Range Road.
- Jackson's Crossing on Pirie St.
- Jenners Crossing.
- West Plane Creek.

In the event of dam failure there will be no access to or from Middle Creek Road. During dry weather releases no roads are impacted.

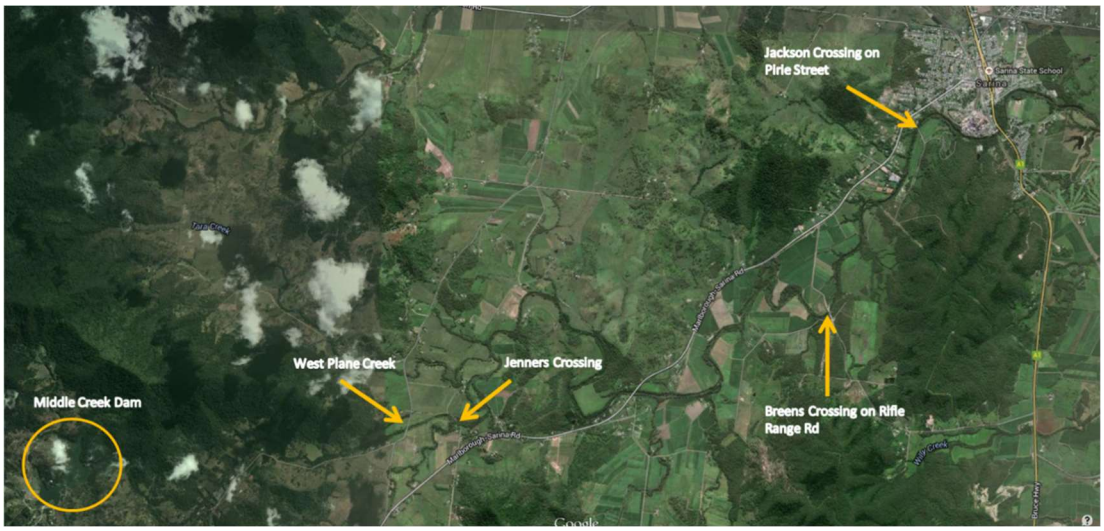


Figure 3: Location of impassable crossings in the event of a failure at Middle Creek Dam

Attachment A

Monitoring and Inspection Programs – Middle Creek Dam

Attachment A

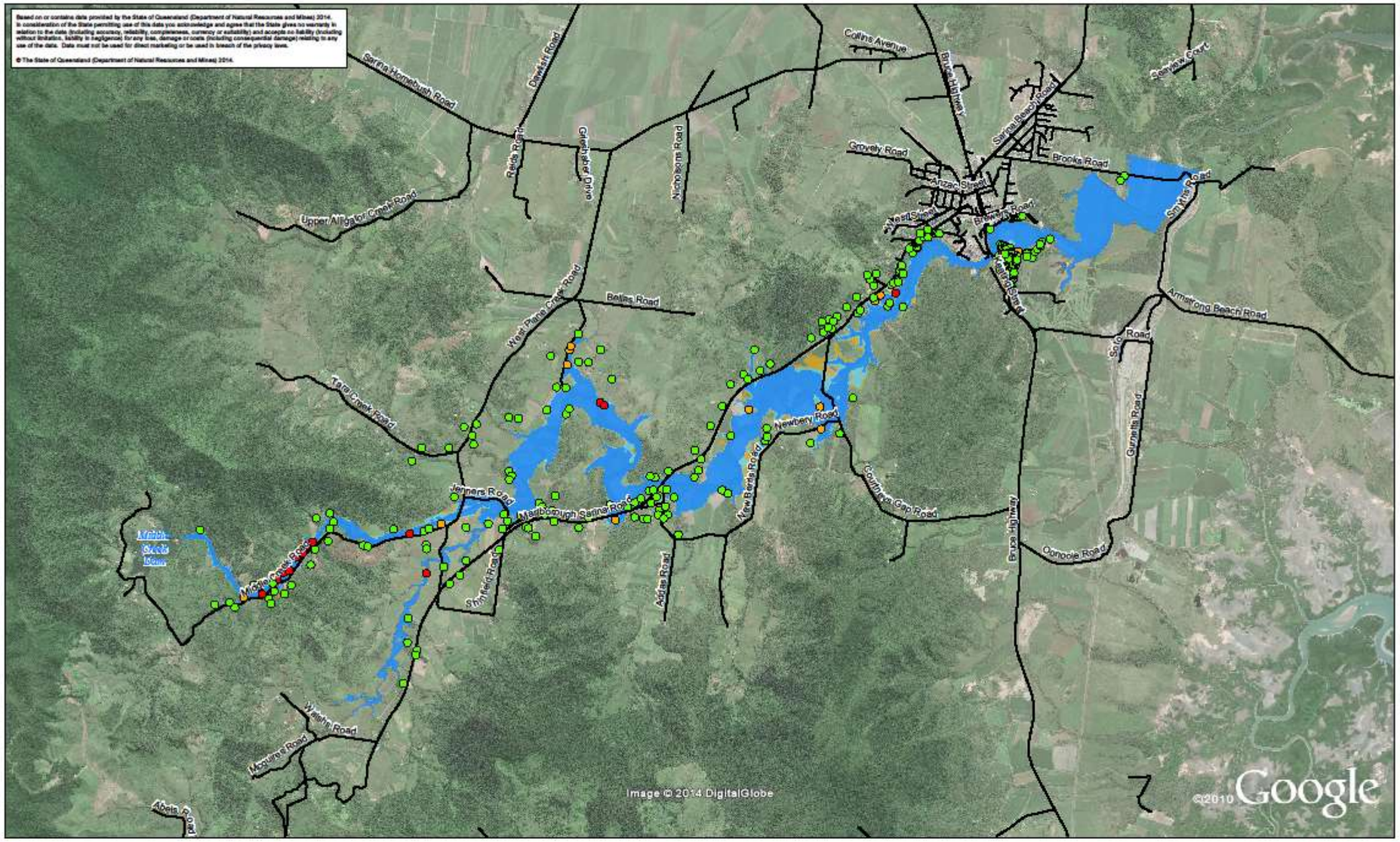
Monitoring and Inspection Programs – Middle Creek Dam

PROBLEM	GENERAL CHARACTERISTICS	WHEN & WHAT TO CHECK	ACTION
Overtopping imminent	Storage full and water level rising.	During periods of excessive rainfall.	Monitor water levels. Enact evacuation plan if dam wall overtops.
Wave erosion	Beaching or notching of the upstream face of embankments by wave generated over prolonged periods of strong wind.	During or after periods of strong wind – inspect upstream face of embankment.	Initiate engineering assessment and rehabilitation.
Toe erosion	Erosion of embankment toe by spillway discharge or diversion flows.	During and after large rainfalls – inspect embankment toe.	Initiate engineering assessment and rehabilitation as required.
Gullying	No armoring or vegetation cover on embankment batters or poor drainage.	During and after large rainfalls inspect embankment batters for damage to armoring to vegetation cover.	Initiate engineering assessment and rehabilitation as required.
Loss of storage contents	Excessive loss from the storage and/or occasionally increased seepage or increased groundwater levels near the storage.	During routine monitoring – look for environmental changes such as vegetation damage, salt scalds, etc.	Initiate engineering assessment and rehabilitation as required.
Seepage erosion or piping	Progressive internal erosion of the embankment or foundation to form an open conduit or pipe.	During routine inspection or after unaccountable increases in seepage flows, look for an emission point.	Initiate engineering assessment and rehabilitation as required.
New springs, seeps or boggy areas	Evidence of internal changes in seepage control (could be initial signs of piping failure).	During routine inspection, look for “evergreen” spots, boggy ground or pools of water.	Initiate engineering assessment and rehabilitation as required.
Rapid increases or cloudy appearance of seepage.	Seepage flow through the storage embankment is cloudy and increasing (piping failure has started).	After detection of cloudy water at seepage monitoring points – look for the source of cloudy water.	Initiate engineering assessment and rehabilitation as required.
Increase in gallery seepage	Increase in the normal rate of gallery seepage.	After detection – check for differential movement or cracking in concrete components.	Initiate engineering assessment and rehabilitation as required.
Foundation Failure	Sliding, rotation or settlement of part or entire dam.	During routine inspection or immediately after earthquakes – inspect for evidence of foundation movement or displacement immediately adjacent to dam.	Initiate engineering assessment and rehabilitation as required.

PROBLEM	GENERAL CHARACTERISTICS	WHEN & WHAT TO CHECK	ACTION
Slide in downstream slope	Slide in the downstream face.	During routine inspection – look for cracks or scarps near the crest and bulges at the toe.	Initiate engineering assessment and rehabilitation as required
Flow slide	Collapse and flow of soil around the storage periphery.	During routine inspection and especially with sedimentary/colluvial soils – look for material displacement around the storage rim.	Initiate engineering assessment and rehabilitation as required.
Landslide	Mass movement of soil or rock from slopes and valley walls around the storage.	During routine inspection – look for material displacement.	If major soil movement on dam wall enact evacuation plan. In minor soil movement, initiate engineering an assessment and rehabilitation as required.
Movement or cracking in structural concrete work	Failure of mechanical components such as pipes, gates, etc.	During routine inspection or when mechanical problems such as a burst pipe or a jammed gate occur – look for any movement or cracking of the structural concrete work to determine the cause.	Initiate engineering assessment and rehabilitation as required.
Failure of appurtenant structures or operating equipment	Loss of ability to supply water or discharge floods safely.	After detecting an operational anomaly – identify and investigate the cause.	Initiate engineering assessment and rehabilitation as required.
Chemical spills	Dead fish and other aquatic life in storage, or a strange odour or colour.	On detection.	Use alternate water source, initiate chemical testing, identify, and investigate the cause.

Attachment B

Flood Inundation Maps



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0 0.5 1 1.5 2

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Property not impacted by flood or breach
- Property impacted by flood and breach by less than 300mm
- Property impacted by flood by at least 300mm
- Property impacted by flood and breach by at least 300mm
- Major Roads
- No Failure Flood Extent
- Incremental Impact (Depth < 300 mm)
- Incremental Impact (Depth > 300mm)

Mackay Regional Council
Middle Creek Dam - Hydrology Modelling

Job Number	42-19053
Revision	0
Date	17 Mar 2016

Probable Maximum Flood (PMF)
Main Dam Failure - Incremental Impact

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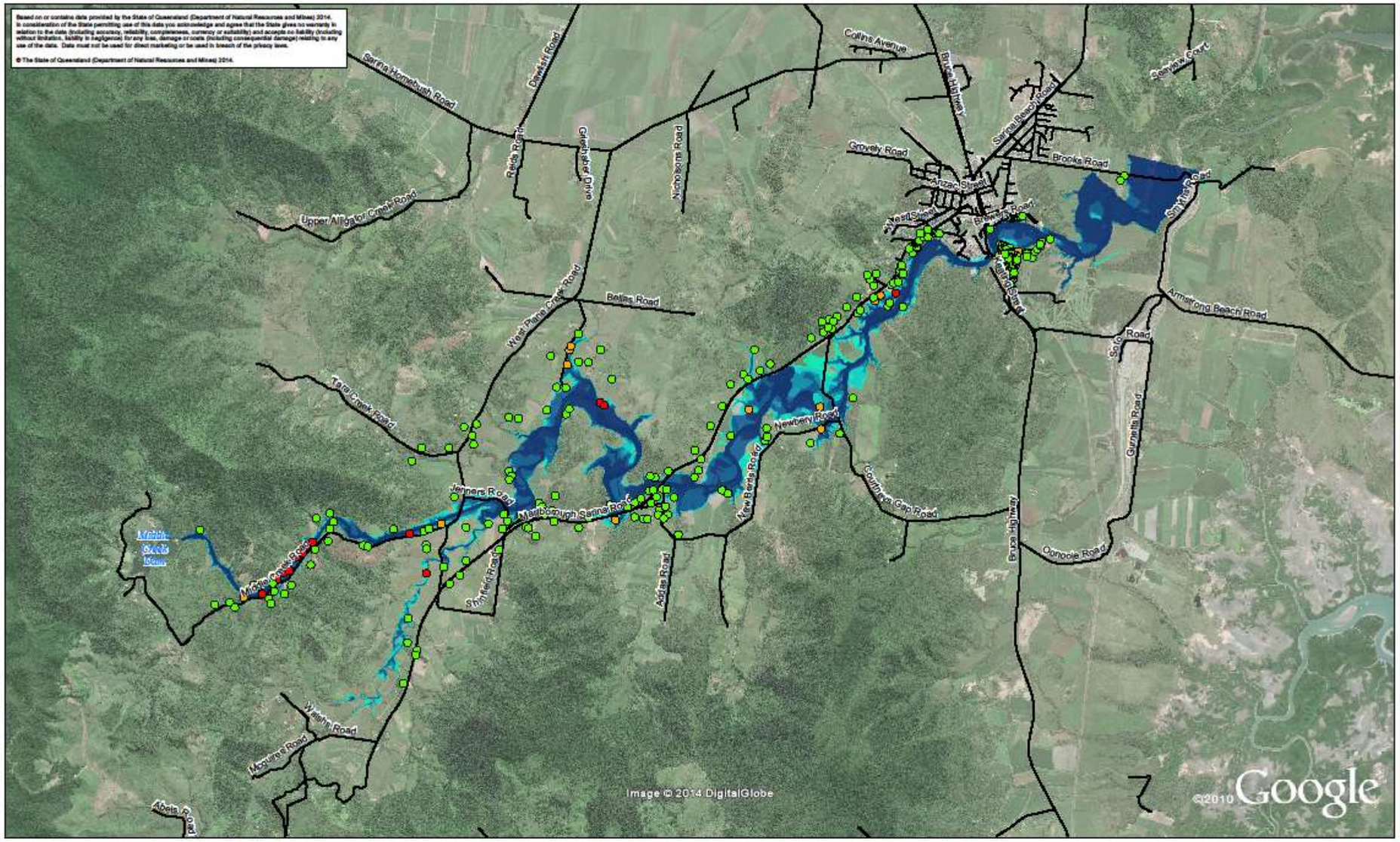

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Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Qld: GDA 1994 MGA Zone 55

N

LEGEND

- Property not impacted by flood or breach
- Property impacted by flood and breach by less than 300mm
- Property impacted by flood by at least 300mm
- Property impacted by flood and breach by at least 300mm

Major Roads

Depth (m)

- < 0.3
- 0.3 - 1
- 1 - 1.5
- 1.5 - 3
- > 3

Mackay Regional Council
Middle Creek Dam - Hydrology Modelling

Job Number	42-19053
Revision	0
Date	17 Mar 2016

Probable Maximum Flood (PMF) - Max Depth

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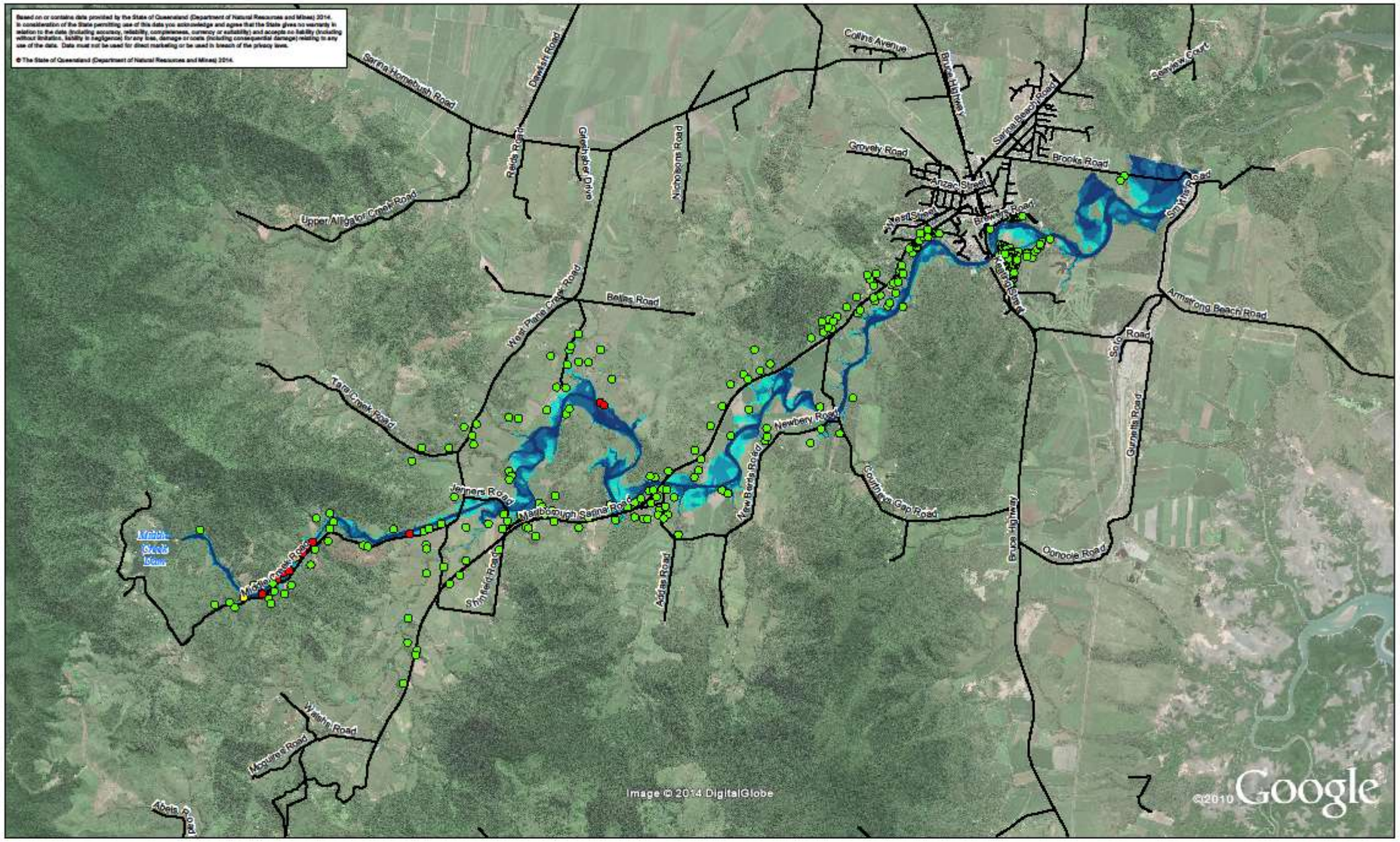

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Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Property not impacted by flood or breach
- Property impacted by flood and breach by less than 300mm
- Property impacted by flood by at least 300mm
- Property impacted by flood and breach by at least 300mm

Major Roads

Depth (m)
- < 0.3
- 0.3 - 1
- 1 - 1.5
- 1.5 - 3
- > 3

Mackay Regional Council
Middle Creek Dam - Hydrology Modelling

Job Number	42-19053
Revision	0
Date	17 Mar 2016

Dam Crest Failure (DCF) - Max Depth

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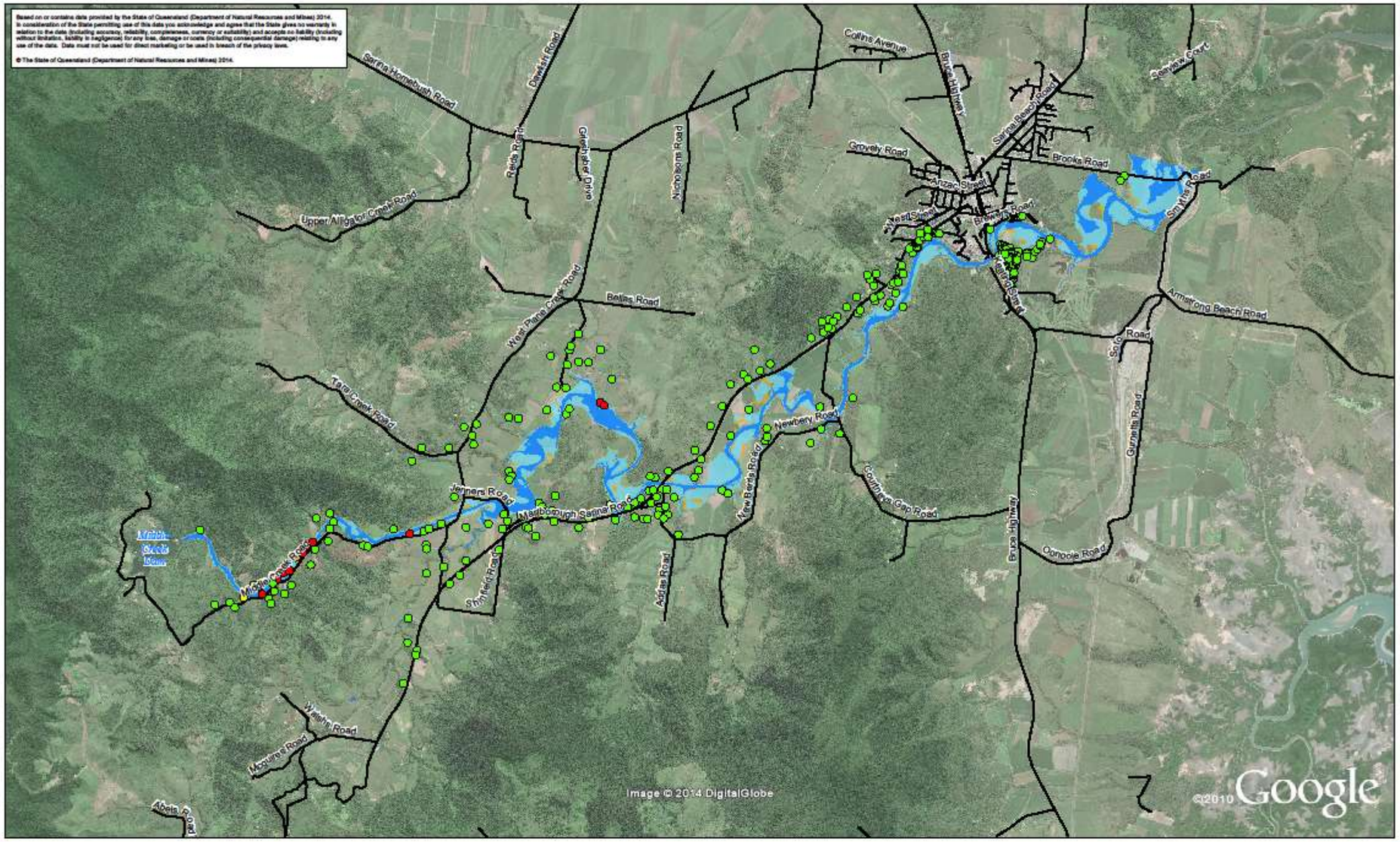
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Dawson Road
Reids Road
Gunnadah Drive
Nicholsons Road
Collins Avenue
Bruce Highway
Sarina Beach Road
Seaview Court
Gravelly Road
Brooks Road
Smiths Road
Upper Alligator Creek Road
West Street
Brooks Road
West Street
Armstrong Beach Road
Bellas Road
West Plane Creek Road
Tara Creek Road
Newbery Road
Gurnetts Road
Jerners Road
Marlborough Sarina Road
New Berts Road
Cowrie Gap Road
Middle Creek Dam
Middle Creek Road
Shinfield Road
Addies Road
Bruce Highway
Oonoole Road
Walsh Road
Montrose Road
Abels Road
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LEGEND
Property not impacted by flood or breach
Property impacted by flood and breach by less than 300mm
Property impacted by flood by at least 300mm
Property impacted by flood and breach by at least 300mm
Major Roads
No Failure Flood Extent
Incremental Impact (Depth < 300mm)
Incremental Impact (Depth > 300 mm)
GHD
Mackay Regional Council
Middle Creek Dam - Hydrology Modelling
Job Number 42-19053
Revision 0
Date 17 Mar 2016
Dam Crest Failure (DCF)
Main Dam Failure - Incremental Impact
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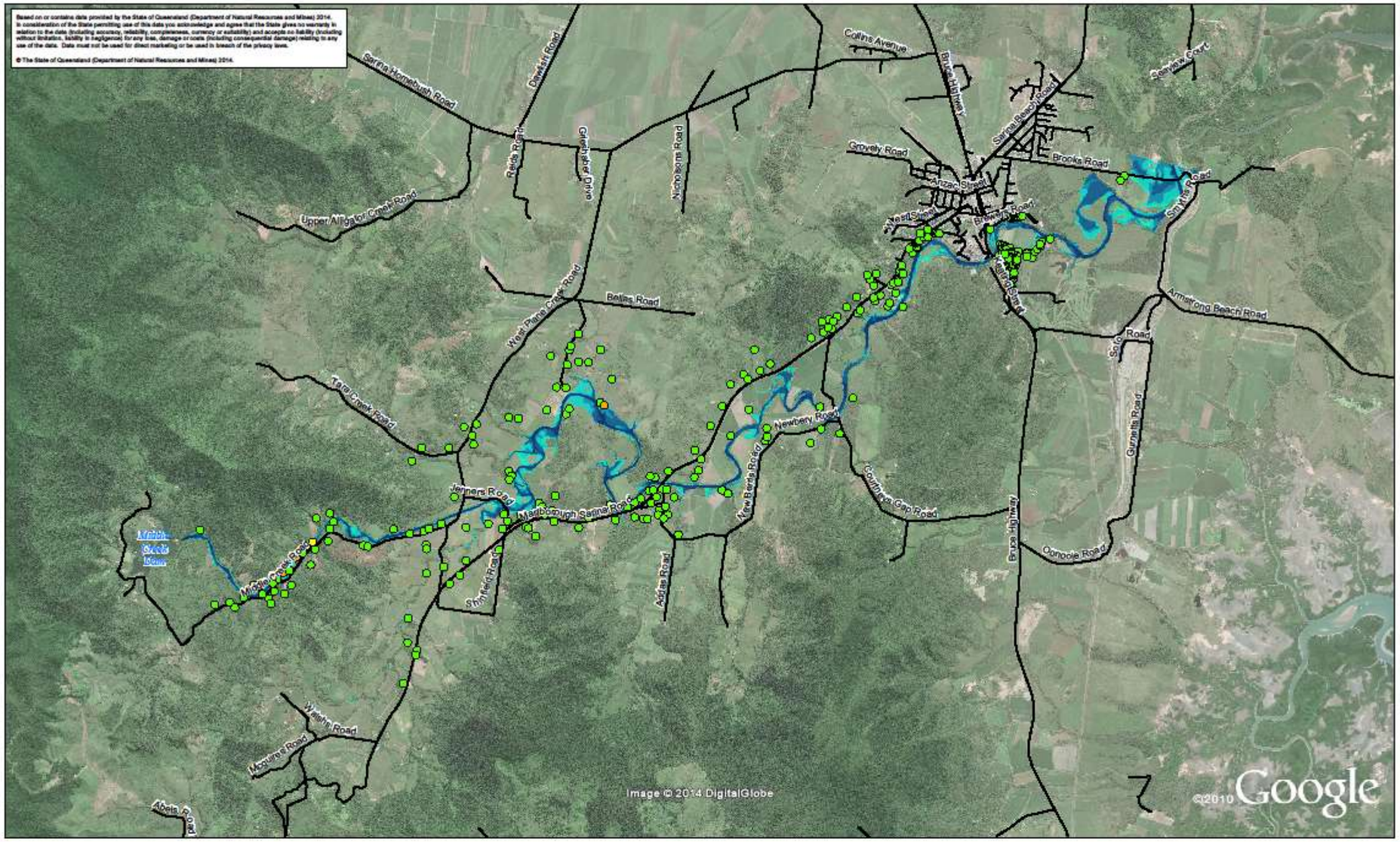

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Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Property not impacted by flood or breach
- Property impacted by flood and breach by less than 300mm
- Property impacted by flood by at least 300mm
- Property impacted by flood and breach by at least 300mm

Major Roads

Depth (m): < 0.3; 0.3 - 1; 1 - 1.5; 1.5 - 3; > 3

Mackay Regional Council
Middle Creek Dam - Hydrology Modelling

Job Number	42-19053
Revision	0
Date	17 Mar 2016

Sunny Day Failure (SDF) - Max Depth

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15 December 2017

Our ref: 4220416-18919
Your ref:

Mackay Regional Council
PO Box 41
Mackay QLD 4740

Dear

Middle Creek Dam Flood Inundation Mapping

GHD have undertaken additional hydrological and hydraulic modelling of Middle Creek dam to produce flood maps for the following flood scenarios:

- Water depth of 0.5 m above spillway crest (RL 133.8 m);
- Water depth of 1.0 m above spillway crest (RL 134.3 m); and,
- Water depth of 2.0 m above spillway crest (RL 135.3 m).

The modelling utilises models previously developed for Middle Creek Dam. Hydrologic and hydraulic modelling details are provided in the Middle Creek Dam Acceptable Flood Capacity Risk Assessment, Options Study and Concept Design Report (GHD, November 2014). The current dam configuration (i.e. Full Supply Level = 133.3 m) has been assessed.

Design rainfall intensities were scaled as the Average Exceedance Probability (AEP) of the design rainfall events to produce the above levels fall between the standard probabilities. The 10% AEP 24 hour design storm was selected for scaling as two of the events have an AEP greater than 10% and one between the 10% and 5% AEP design events. The critical outflow duration for the previous dam configuration (i.e. FSL = 134.3) is 24 hours and is assumed to be the same for the new spillway configuration. A 10 mm initial loss was adopted and concurrent flooding downstream of the dam was not assessed. The scaling factors and resultant rainfall totals are contained in Table 1.

Table 1 Scaling Factors and Rainfall Totals

Spillway Water Depth (m)	Scaling Factor	Rainfall Total (mm)	Peak Dam Outflow (m^3/s)
0.5	0.228	81	8.6
1.0	0.465	165	29
2.0	1.050	372	91

The outflow hydrographs were routed through the existing Mike 11 one-dimensional (1D) hydraulic model and peak water levels were mapped

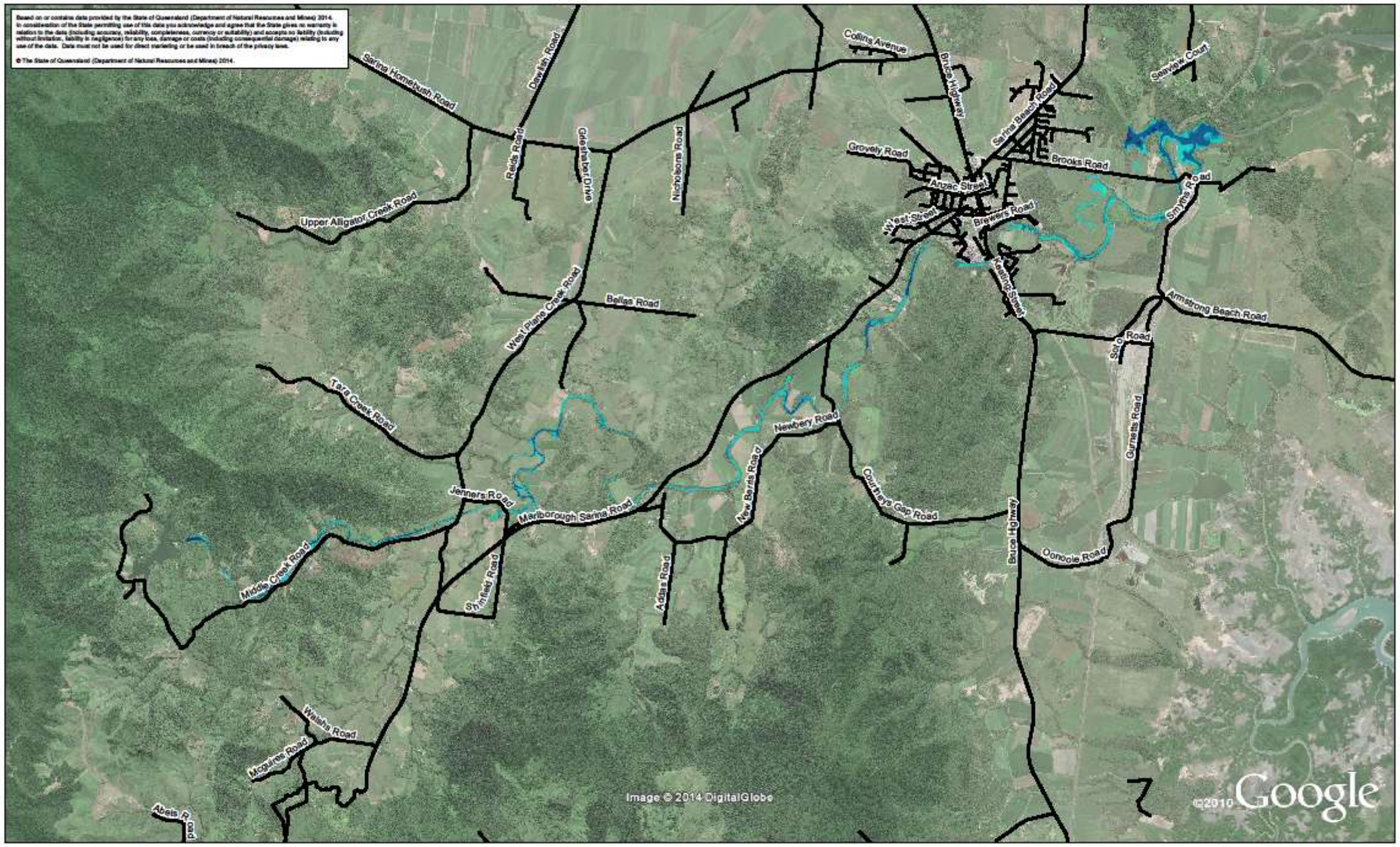
GHD Pty Ltd ABN 39 008 488 373
Suite 4 Level 2, 113 Armandale Street Townsville QLD 4810 PO Box 1642 Townsville QLD 4810 Australia
T 61 7 4721 3000 F 61 7 4721 3199 E townsville@ghd.com W www.ghd.com

Thank you for the opportunity to assist with this project. Please do not hesitate to contact the undersigned if you have any queries.

Kind regards,

Senior Water Resources Engineer
+61 7 4633 8008

Encl: Three (3) peak flooding depth maps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Seaforth Beach Road
Brooks Road
Smyths Road
West Street
Brewers Road
Keating Street
Upper Alligator Creek Road
West Plane Creek Road
Bellas Road
Armstrong Beach Road
Solo Road
Gurnetts Road
Tara Creek Road
Newbery Road
New Barns Road
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Marlborough Sarina Road
Courtneys Gap Road
Donogle Road
Middle Creek Road
Shinfield Road
Adams Road
Walshs Road
Mcgahes Road
Abels Road
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Kilometres
Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
LEGEND
Major Roads
Depth (m)
< 0.03
0.03 - 1
1 - 1.5
1.5 - 3
> 3
Mackay Regional Council
Middle Creek Dam - Hydrology Modelling
Job Number 42-20416
Revision 0
Date 13 Dec 2017
Middle Creek Dam
0.5m Above Spillway - Peak Depth
Figure 1
Suite 4, Level 2, 1-3 Annand Street Toowoomba QLD 4000 Australia T 61 7 4633 9000 F 61 7 4613 1687 E ttbamail@ghd.com W www.ghd.com
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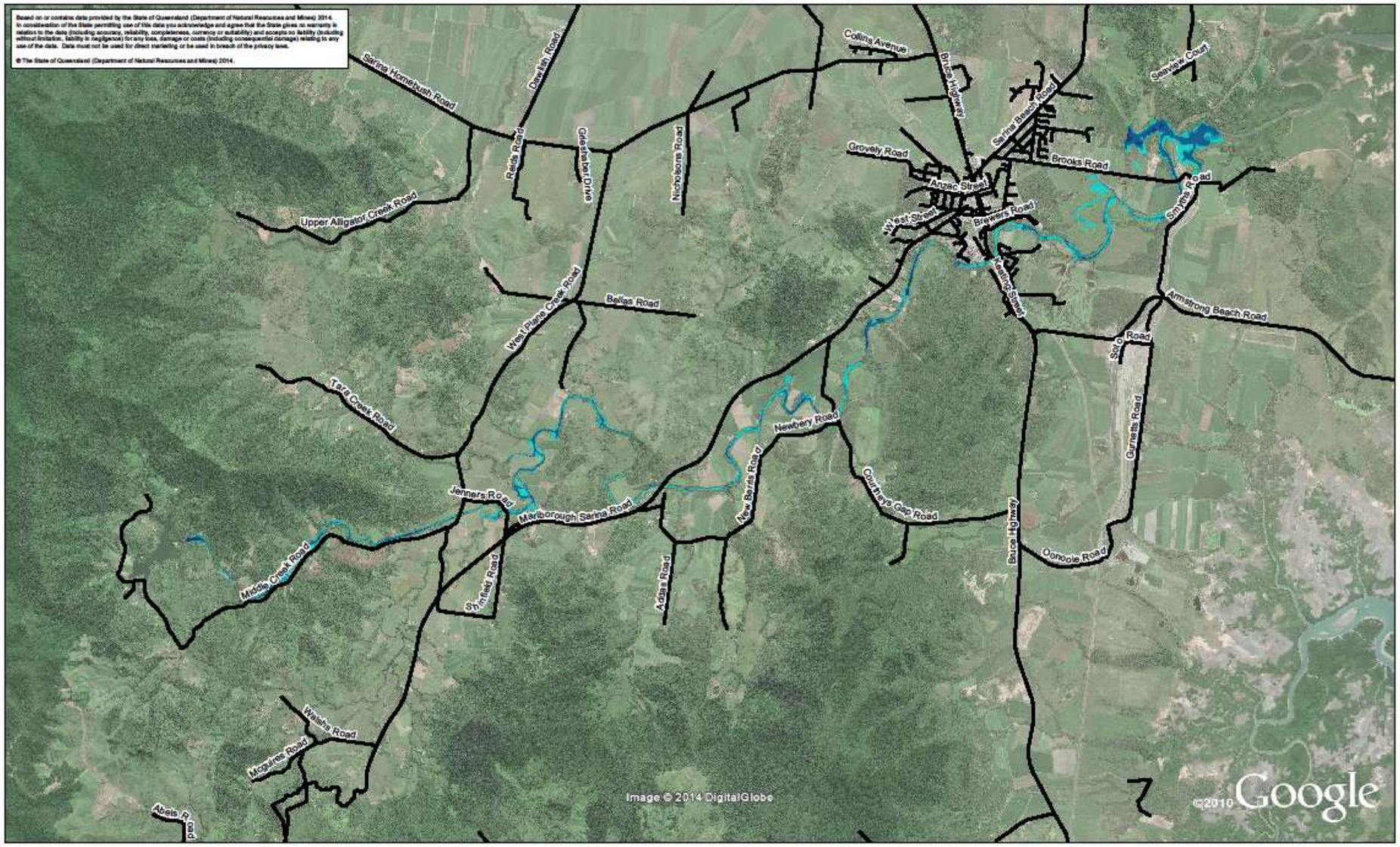

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Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

Major Roads

Depth (m)

< 0.03

0.03 - 1

1 - 1.5

1.5 - 3

> 3

Mackay Regional Council
Middle Creek Dam - Hydrology Modelling

Job Number 42-20416
Revision 0
Date 13 Dec 2017

Middle Creek Dam
1.0m Above Spillway - Peak Depth

Figure 2

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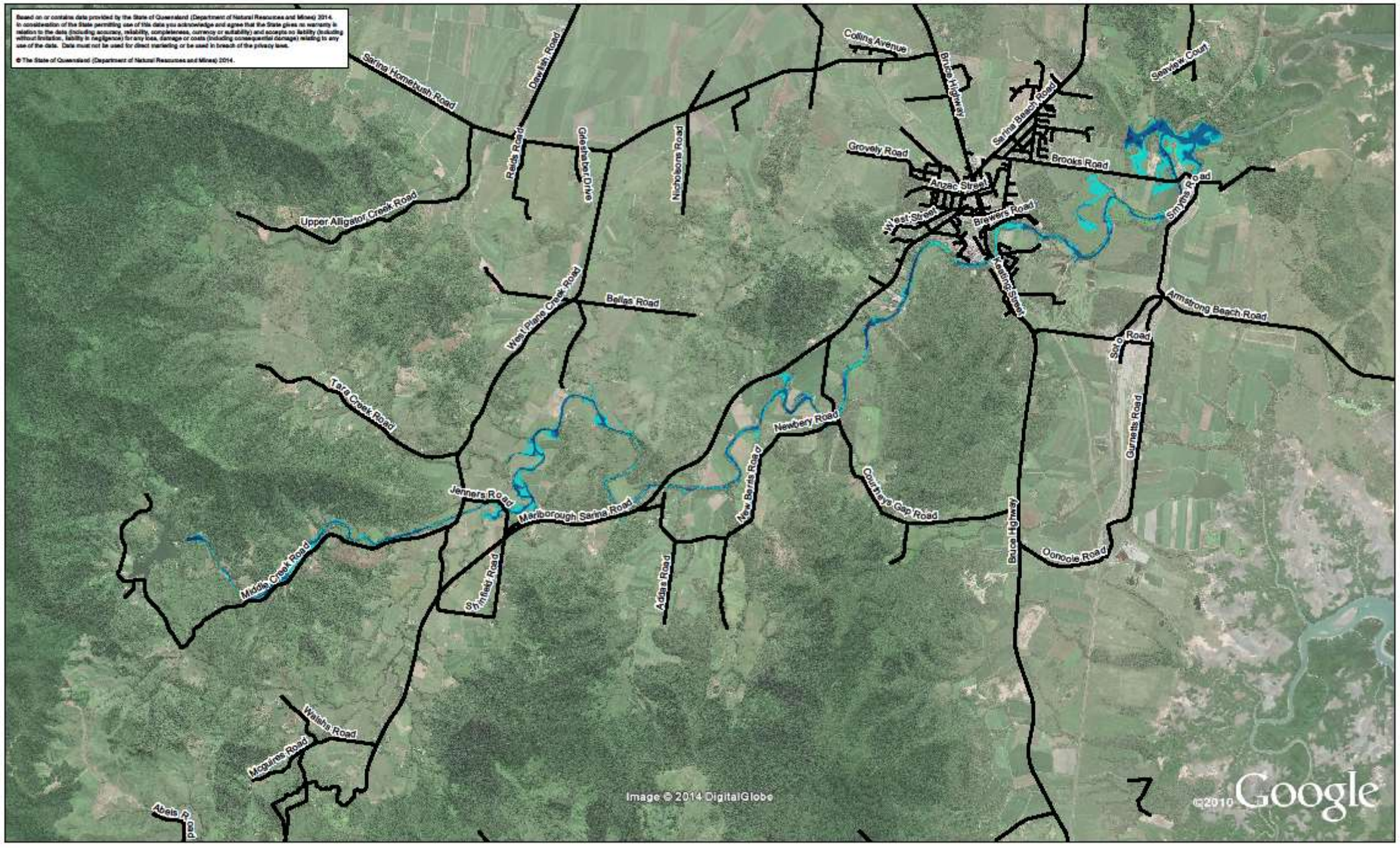
Suite 4, Level 2, 1-3 Annand Street Toowoomba QLD 4000 Australia T 61 7 4633 9000 F 61 7 4613 1687 E ttbamail@ghd.com W www.ghd.com


Based on or contains data provided by the State of Queensland (Department of Natural Resources and Mines) 2014. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.
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Salina Homebush Road
Dawlish Road
Reids Road
Gleneagles Drive
Nicholsons Road
Collins Avenue
Bruce Highway
Seaview Court
Spring Beach Road
Grovely Road
Brooks Road
Anzac Street
Simpins Road
West Street
Brewers Road
Upper Alligator Creek Road
West Plane Creek Road
Bellas Road
Armstrong Beach Road
Sec O Road
Tara Creek Road
Newbery Road
Gurnetts Road
Jenners Road
Marlborough Sarina Road
New Barns Road
Courtneys Gap Road
Bruce Highway
Oongole Road
Middle Creek Road
Shinfield Road
Adams Road
Walshs Road
Mcgahes Road
Abels Road
Image © 2014 DigitalGlobe
©2010 Google
1:50,000 @ A3
0 0.5 1 1.5 2
Kilometres
Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
LEGEND
Major Roads
Depth (m)
< 0.03
0.03 - 1
1 - 1.5
1.5 - 3
> 3
GHD
Mackay Regional Council
Middle Creek Dam - Hydrology Modelling
Job Number 42-20416
Revision 0
Date 13 Dec 2017
Middle Creek Dam
2.0m Above Spillway - Peak Depth
Figure 3
Suite 4, Level 2, 1-3 Annand Street Toowoomba QLD 4000 Australia T 61 7 4633 9000 F 61 7 4613 1687 E tbamail@ghd.com W www.ghd.com
Data source: DNRM - Roads, Place Names (2014). Google Earth Pro - Imagery (Date extracted: 25/07/2014). GHD - Flood Mapping (2017). Created by: PM

Attachment C

At Risk Properties and Contact Details in Case of Evacuation

Attachment C has been redacted

Attachment D

Preformatted Warning Messages in Accordance with Priority

Alert Level	Trigger	Formatted Text Message Sent to Property Owner	Formatted Text Message Sent to Polygon Area
WATCH	Significant rainfall event (>50mm in 1 hour)	**No Message**	**No Message**
ALERT	Significant rainfall event excess of 100 mm in 24-hour period anticipated	**No Message**	**No Message**
LEAN FORWARD	Water level at 1000 mm over FSL and significant rainfall event anticipated (>100 mm in 24-hour period)	**MIDDLE CREEK DAM SPILLING. HEAVY RAINFALL EXPECTED. WATCH AND ACT**	Council advises watch and act for residents down stream of Middle Creek Dam. Check the Council Facebook page, Middle Ck Dam Safety Info Kit or radio for further information, or phone 4951 2466.
STAND UP	Water level at 2000 mm over FSL and significant rainfall event anticipated (>100 mm in 24-hour period)	**MIDDLE CREEK DAM SPILLING. EVACUATION REQUIRED. ACT**	Council advises residents down stream of Middle Creek Dam to EVACUATE NOW. Listen to radio for further information, or phone local disaster coordination centre 4951 2466.

Area of Polygon

Attachment E

Role Statement for the MCDLO

Terms of Reference

Middle Creek Dam Liaison Officers

A. Introduction

This document is for the use of Mackay Water and Waste for the management of Middle Creek Dam in the event of a failure of communications during a storm event.

Middle Creek Dam Liaison Officers (MCDLO) are the point of contact for the Mackay Water and Waste Incident Manager and Mackay LDMG in upstream of Middle Creek Dam (MCD).

MCDLO's will adopt an all-hazards approach to disasters occurring within the MCD catchment. The appointment of MCDLO's will be someone who resides in the local area.

B. List of Terms and Acronyms

LDMG	Local Disaster Management Group
LDMP	Local Disaster Management Plan
LDCC	Local Disaster Coordination Centre
LDC	Local Disaster Coordinator
MCD	Middle Creek Dam
MCDLO	Middle Creek Dam Liaison Officers
MRC	Mackay Regional Council
DMA	Disaster Management Act 2003
QFES	Queensland Fire and Emergency Services
TOR	Terms of Reference
IGEM	Inspector General Emergency Management
EMAF	Emergency Management Assurance Framework

C. Middle Creek Dam Liaison Officer Roles and Responsibilities

- MCDLO will be contacted in anticipation of an Emergency Event (Cyclone or extreme wet weather event). Availability and Communications operating systems will be checked.
- Community Liaison between MRC Water and Waste Incident Manager, Mackay LDMG and/or Local Disaster Coordination Centre (LDCC) and community in times of disasters and emergency operations particularly in the event of communications failure.
- Conduct Rapid Impact Assessments (visual or windscreen) upstream of Middle Creek Dam to provide the MRC Water and Waste Incident Manager, Mackay LDMG and/or LDCC situational awareness.

- Provide daily Situation Reports (SITREPS) to the MRC Water and Waste Incident Manager, and Mackay LDMG when the LDCC is activated and when requested, written or verbal.
- When requested conduct a resource analysis in the area of operation.
- Provides a trusted and trained source of information.
- Notify Council officers when leaving the catchment area during the wet season with duration of leaving

D. Operating Principles

MCDLO's will operate in line with MRC values;

Safety and Wellbeing - We all work safely and actively care for each other's wellbeing

Respect - We embrace diversity and behave with integrity and professionalism

Working Together - Working together for our region and community

Service Excellence - Understanding our client and community needs to deliver best possible outcomes

Integrity - We take pride in our actions by being transparent and continuously improving

E. Reporting Arrangements

MCDLO's will report directly to MRC Water and Waste Incident Manager, LDC or their delegate. They will be tasked by the MRC Water and Waste Incident Manager, LDC or their delegate as required. Note: The MCDLO does not take the lead or manage the disaster at the local level; this is still the responsibility of the Mackay LDMG/LDCC.

F. Training Requirements

On appointment, MRC staff and MCDLO's will need to complete disaster management training that will include, but not limited to;

- Queensland Disaster Management Arrangements
- Communication arrangements between MCD and Mackay LDMG/LDCC.

Further training for MCDLO's will be under the discretion of the MRC Water and Waste Incident Manager, MRC Emergency Management Team, in collaboration with QFES and the Queensland Disaster Management Training Framework.

G. Exercising Requirements

The Middle Creek Dam EAP was exercised in December 2021. The objectives tested the knowledge and understanding of MRC staff in the following:

- Activation triggers and actions
- Staffing roles and responsibilities
- Communication protocols
- Methods of dam inspection
- Data and event capturing mechanisms
- State reporting requirements.

H. Administration and Operation of Emergency Wardens

I. Meetings:

- MCDLO's and MRC Water and Waste Incident Manager or their delegate should meet as and when required.
- Meetings may be required leading up to the storm season in preparing their community.

II. Information Management:

- All correspondence completed by MCDLO's must be kept on file electronically or hard copy. SITREPS will be entered by the LDCC into the Guardian IMS system.

III. Communication:

- MRC will provide the MCDLO with a radio for communications in the event of phone outages.
- It is the responsibility of the MCDLO for communicating appropriate details to the MRC Water and Waste Incident Manager or Mackay LDMG as requested.
- MCDLO's will also provide advice when there are priorities or contentious issues that my surface at the local level, that need to be raised with the MRC Water and Waste Incident Manager or Mackay LDMG.

I. Review of Terms of Reference

This TOR will be reviewed every twelve (12) months or whenever deemed necessary by changes to Strategic Policy Framework, Disaster Management Act 2003, IGEM, EMAF or MRC organisational structure.

Document Control

Version	Notes	Release Date
1.1	Created role description	20 June 2018

Attachment F

Location and Photographs of Middle Creek Dam Flood Level Indicators

Location of Middle Creek Dam Flood Level Indicators

Level 1 Indicator - <u>RL133.3 to RL135.3</u> - indicates 2-meter flood level marker slightly to the west of the boat ramp (MRC Recreational Park). Level zero on the marker will indicate exact level of MCD spillway/full supply level.

Level 2 Indicator - <u>RL135.3 to RL137.3</u> - indicates 2-meter flood level marker slightly to the south-east of the boat ramp (MRC Recreational Park). Level zero on marker will indicate 2 metres above exact level of MCD spillway/full supply level.

Level 3 Indicator - <u>RL135.3 to RL137.3</u> - indicates 2-meter flood level marker situated on the property of [redacted] (MCDLO). Level zero on marker will indicate 2 metres above exact level of MCD spillway/full supply level.