# AURIZON NETWORK Review Event - 2017 Tropical Cyclone Debbie

**22 September 2017**

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“Cyclone Debbie led to the closure of all four coal systems, and across the network we had 844 damaged sites with 184 of these requiring major repairs.

However, while the impacts were severe, the speed of recovery was exceptional as a result of thorough preparation, technology and hard work.”

**Jason Livingston, Head of Network Asset Management (Public statement made in July 2017)**

# Overview of Submission

## Summary

On 28 March 2017, Tropical Cyclone Debbie hit the Queensland coastline south of Bowen, bringing an extended period of heavy rainfall and high winds to northern and central Queensland. Widespread daily rainfall totals of 150-200mm and wind speeds of 263km/h were recorded in certain areas.

As Debbie crossed and tracked inland, weakening to an ex-tropical cyclone (see **Figure 1**), flooding occurred in numerous river catchments associated with heavy rainfall. Riverine flooding occurred in some coastal catchments from Bowen and south to the New South Wales border, extending inland to parts of the Central Highlands and Coalfields, Maranoa and Warrego, and Darling Downs districts. Major flooding continued in some catchments into April.[1]

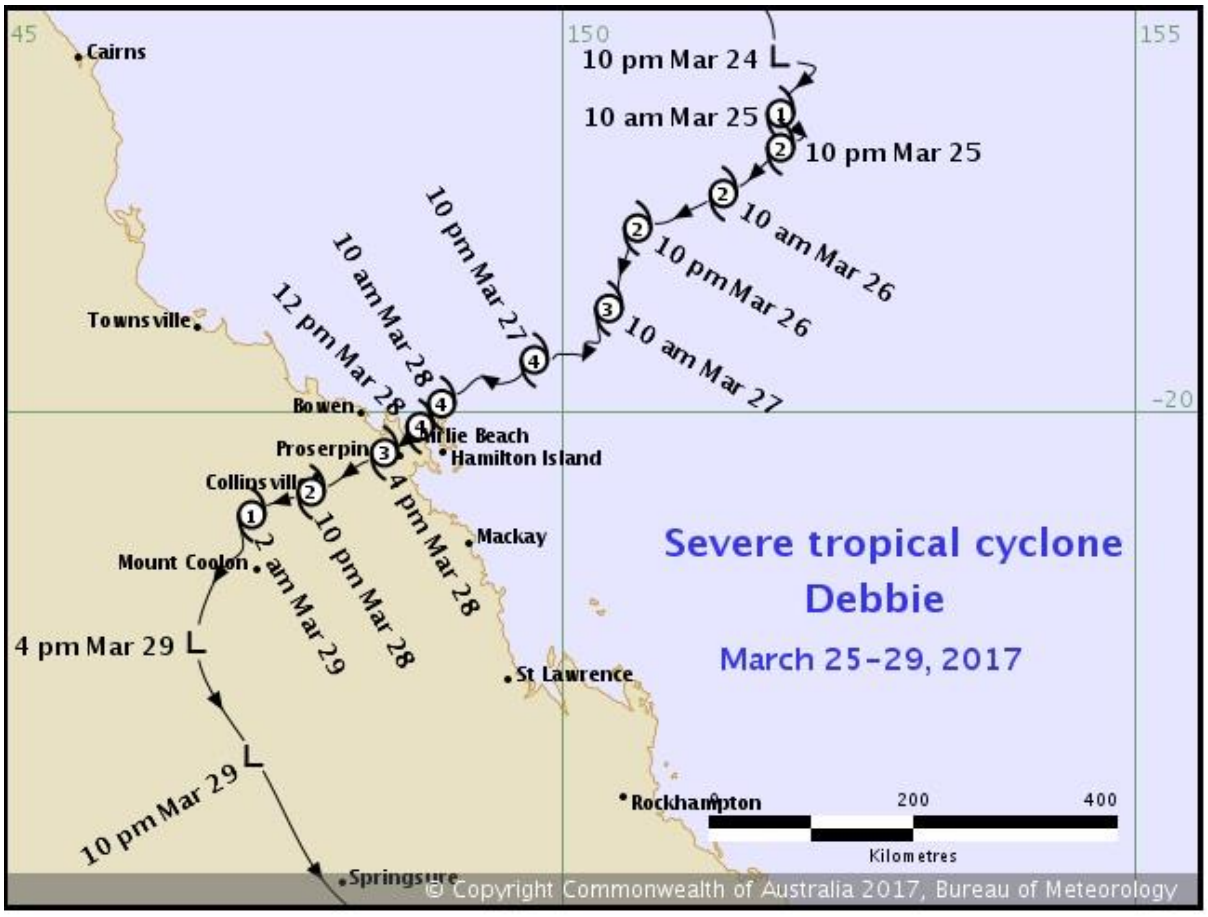


**Figure 1 – BOM Tropical Cyclone Debbie tracking map, 25-29 March 2017**

This weather event caused widespread damage to infrastructure across each of the Newlands, Goonyella, Blackwater and Moura Systems, which impaired Aurizon Network's ability to provide rail access to train services across the entire Central Queensland Coal Network (**CQCN**) for varying periods. Never before had a single weather event severely impacted all four (4) systems simultaneously.

[1] "*Monthly Climate Summary for Queensland*" Bureau of Meteorology: www.bom.gov.au/climate/current/month/qld/archive/201703.summary.shtml (3 April 2017)

The magnitude of the event necessitated Aurizon Network declaring force majeure across the entire CQCN for a period of time. During this time, and subsequent to the reopening of the network to traffic, significant repairs were performed across all four (4) systems. The cost of these repairs to the damaged infrastructure, which are attributable to operating expenditure only, are $16,930,953 (pre-escalation).

The purpose of this submission is to propose a Reference Tariff variation consistent with the change in the cost to Aurizon Network as a result of the damage caused by Tropical Cyclone Debbie to the CQCN. The variation in respect of a Review Event is submitted under clause 5 of Schedule F of the 2016 Access Undertaking (**UT4**). Details of the tariff variations are set out in the section entitled '***Reference Tariff Variation***'.

# Regulatory Framework

Where a Review Event occurs, Aurizon Network may propose a variation to relevant Reference Tariffs under clause 5 of Schedule F of UT4. That Reference Tariff variation is to be submitted to the Queensland Competition Authority (**QCA**) for review and approval within sixty (60) days of Aurizon Network becoming aware that a Review Event has occurred.

Given the scale of this weather event, the timing for completion of rectification works, and the subsequent consolidation of cost data critical to this submission, Aurizon Network sought, and had approved by the QCA, an extension of time under clause 5.6 of Schedule F of UT4[2].

This Reference Tariff variation now submitted within the approved extended time frame, sets out the requirements of the submission, in compliance with clause 5.4 of Schedule F of UT4, as follows:

> the tariff inputs to be varied are nominated as AT3 and AT4, for each of the Blackwater System, the Goonyella System, Moura System, Newlands System, and Goonyella to Abbot Point System,[3] which is further detailed in the section entitled '***Reference Tariff Variation***';

> the methodology, data and assumptions used to vary the Reference Tariffs are described[4], particularly in the sections entitled '***Reference Tariff Variation***' and '***Costs Incurred***'; and

> the Review Event has occurred[5], as evidenced in the section entitled '***Review Event***'.

# Review Event

A Review Event is characterised as having occurred where circumstances meeting the definition of a 'Force Majeure Event' have affected Aurizon Network. Aurizon Network must also in these circumstances, have incurred additional Incremental Costs (of a value greater than $1 million), which Aurizon Network has not sought to recover through a previous variation of the relevant Reference Tariff or does not recover through its approved regulatory allowances. These requirements are set out in clause 5.3 of Schedule F of UT4.

The onset of Tropical Cyclone Debbie and the ensuing rainfall, flooding, wind and turbulence was an uncontrollable event, the occurrence of which could not reasonably have been prevented. The

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[2] "*Review Event - 2017 Tropical Cyclone Debbie, Request for approval to extend time to submit*" Aurizon Network letter to QCA dated 10 May 2017; "*Extension for 2017 flood review event*" QCA letter to Aurizon Network dated 24 May 2017

[3] Clause 5.4(a), Schedule F, UT4

[4] Clause 5.4(b), Schedule F, UT4

[5] Clause 5.4(d), Schedule F, UT4

circumstances of the cyclone, flood, and severe conditions attributable to the weather event exemplify this as a 'Force Majeure Event' under UT4.

The rectification costs associated with this event are:

> additional Incremental Costs;

> more than the $1 million financial materiality threshold; and

> not the subject of a prior variation to the relevant Reference Tariff.

This is described in further detail in the section of this submission entitled '***Costs Incurred***'.

As such, Aurizon Network submits that the conditions associated with Tropical Cyclone Debbie are a Review Event.

# The Advent of Tropical Cyclone Debbie

## CQCN Pre-Cyclone

The CQCN plays a significant role in supply to the global seaborne coal market. Managing rail infrastructure that transverses an area twice the size of Tasmania requires substantive resources and efforts which are exacerbated by the unpredictable and extreme weather events associated with a subtropics location. Aurizon Network has a detailed knowledge about its infrastructure and complexities of its operating environment, and prepares for this accordingly.

Aurizon Network has adopted "*good operating practices, and prudent and effective maintenance and asset replacement policies and practices*".[6] Considerable effort is made to ensure ongoing enhancement of asset management practices, including:

> continued and increasing organisational emphasis on asset management;

> improving and rationalising asset management systems;

> standardising components (where possible); and

> exploring and trialling innovative and state of the art technology.

These practices go towards safeguarding the 2,670km of rail network, including 2,000km of electrified track.

Aurizon Network has processes, and uses systems, in an ongoing effort to capture and illustrate its planned works for the CQCN at any given point in time. Included within these processes is the Critical Asset Alignment Calendars (**CAACs**) which provide a documented plan for scheduled maintenance activities, which activities are funded either through the regulatory allowances or the capital approval process. In addition, the CAACs highlight the maintenance activities planned and assist in demonstrating that any works conducted subsequent to the advent of Tropical Cyclone Debbie were in addition to these maintenance activities and capital works.

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[6] "*Central Queensland Coal Network (CQCN) Condition Based Assessment FY 2016*" Advisian http://www.qca.org.au/Rail/Aurizon/Intro-to-Aurizon/2016-Access-Undertaking/Ongoing-Compliance/Condition-Based-Assessment/Final-Report/Condition-Based-Assessment#finalpos (5 May 2017)

# Preparation Activities

Building resilience into how Aurizon Network manages its largest physical asset is an ongoing and continuously improving process. The development of the asset plans, preparation works and maintenance plans is fundamental to mitigating and responding quickly to weather events.

Prior to the wet season, a series of preparation activities are undertaken by Aurizon Network to protect the infrastructure in the event of extreme weather including vegetation management, drainage and culvert cleaning, inspections, systems checks, and maintaining inventory levels. These normal preparatory maintenance tasks are costed and included in Aurizon Network's maintenance allowance under UT4.

These steps are taken as part of the Network Condition Alerting Process (known as "**NETCON"**), a successful tool to indicate the CQCN readiness condition. For events that have the potential to affect the condition of the network, a series of levels (1 to 5) have been established to identify what actions need to be taken by the Network Operations Management Team at each stage. These levels are outline in **Figure 2.**

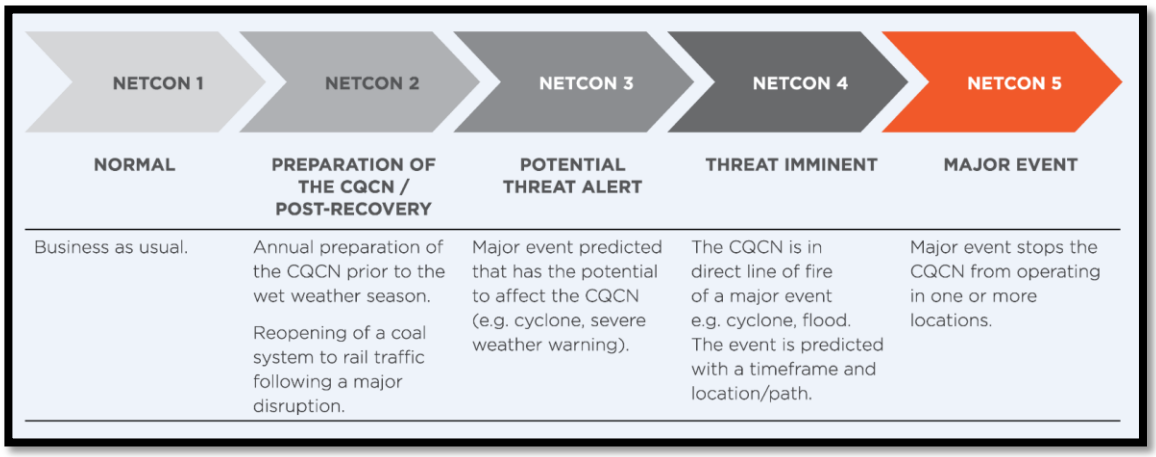


**Figure 2 – NETCON Rating Scale**

NETCON 2 is also known as the 'normal wet season operating mode'. This rating ensures that the annual preparation of the CQCN's below-rail infrastructure prior to the wet weather season commences on 1 September to be completed by 1 November.

The performance of such preparatory maintenance activities not only build general resilience into the network but goes to fostering greater assurance that costs claimed for rectification following a major weather event, such as Tropical Cyclone Debbie, represent a true and efficient change in cost resulting from the Review Event.

Aurizon Network continues to undertake risk assessment on the CQCN, maintaining a Hazard Identification Register for various systems and regions. This register has the purpose of identifying high risk flood areas, to allow up-to-date planning for improved recovery and response times as part of incident response processes.

With this in mind, it is known from the experience of recent weather events that for:

> **Goonyella**: there are very few major rivers in the region, such that the risk of flooding due to river inundation is minimal. Tropical Low and Cyclone related rain events do, however, cause localised flooding due to overland flows;

- **Blackwater**: the system sits within the catchment area of the Fitzroy River. This is the third largest river system in Australia. As such, flooding is a real risk. Of note, given the size of the catchment area, flooding is gradual allowing time for preparation. Tropical Low and Cyclone related rain events do cause localised flooding due to overland flows;
- **Moura**: sections of the Moura system run at the foot hills of the Great Dividing Range and is at flooding risk from downstream flows in creeks and gullies. These flows are large over a very short period and carry large flow energy. Other sections of the system are located on flood plains affected by slow inundation; and
- **Newlands**: this system has been purpose built and the alignment is resistant to most flooding. The main risk to this infrastructure is cyclonic activity given its most northern location.

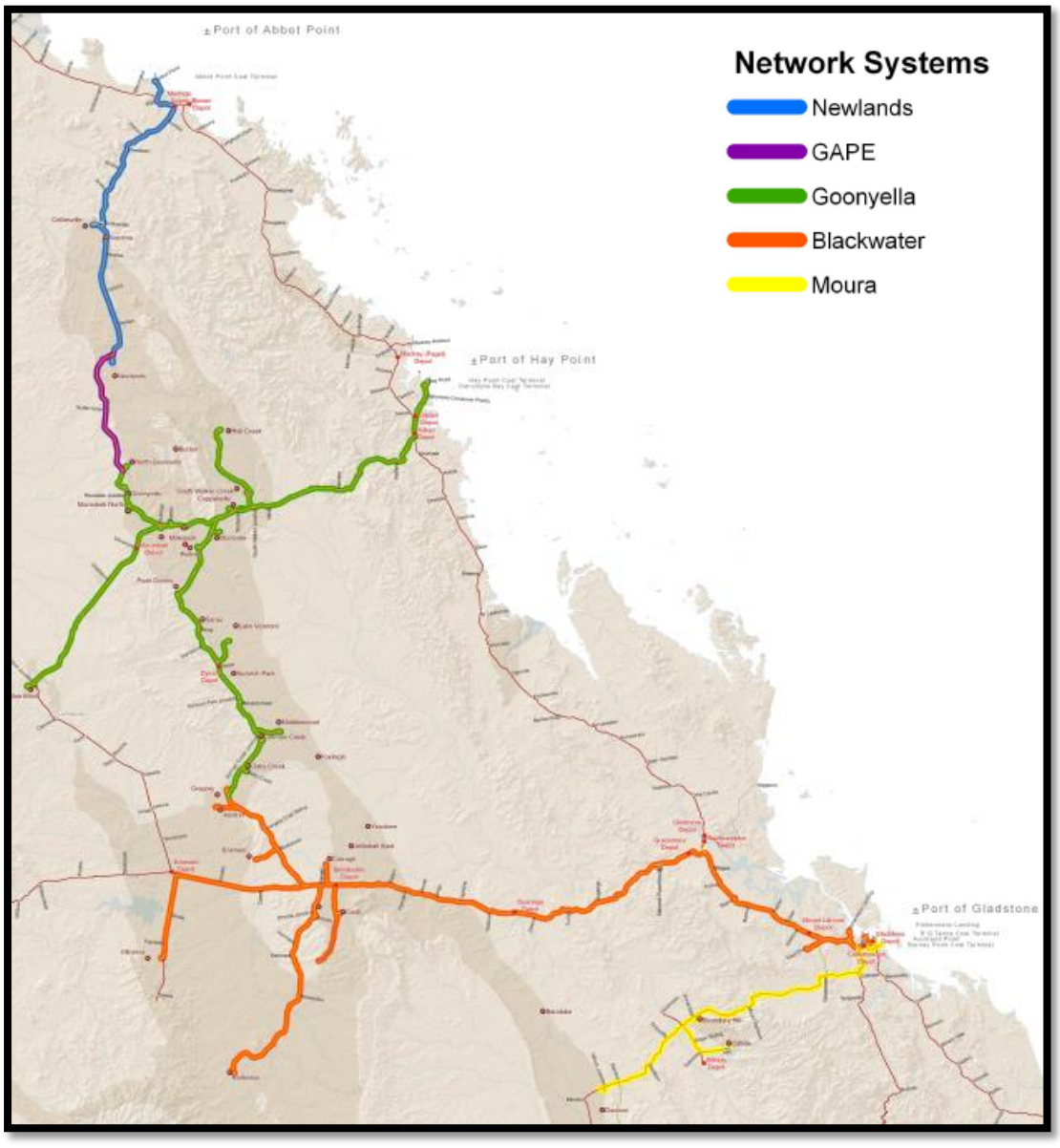


**Figure 3 – CQCN Rail Network**

This knowledge of the impact of weather events on the CQCN (see **Figure 3**) has enabled Aurizon Network to respond in an effective and cost efficient manner to any Review Event.

# Force of Tropical Cyclone Debbie

Severe Tropical Cyclone Debbie made landfall near Airlie Beach on Queensland's Whitsunday Coast on 28 March 2017 as a large and powerful category 4 system (see **Figure 4**). Extensive damage was reported across the Whitsunday Islands, and at Airlie Beach, Bowen and Proserpine. Hamilton Island recorded a wind gust of 263km/h as Debbie passed over.

The severity of a tropical cyclone is described in terms of categories ranging from 1 (weakest) to 5 (strongest), as further detailed in ***Annexure A: Tropical Cyclone Intensity***.

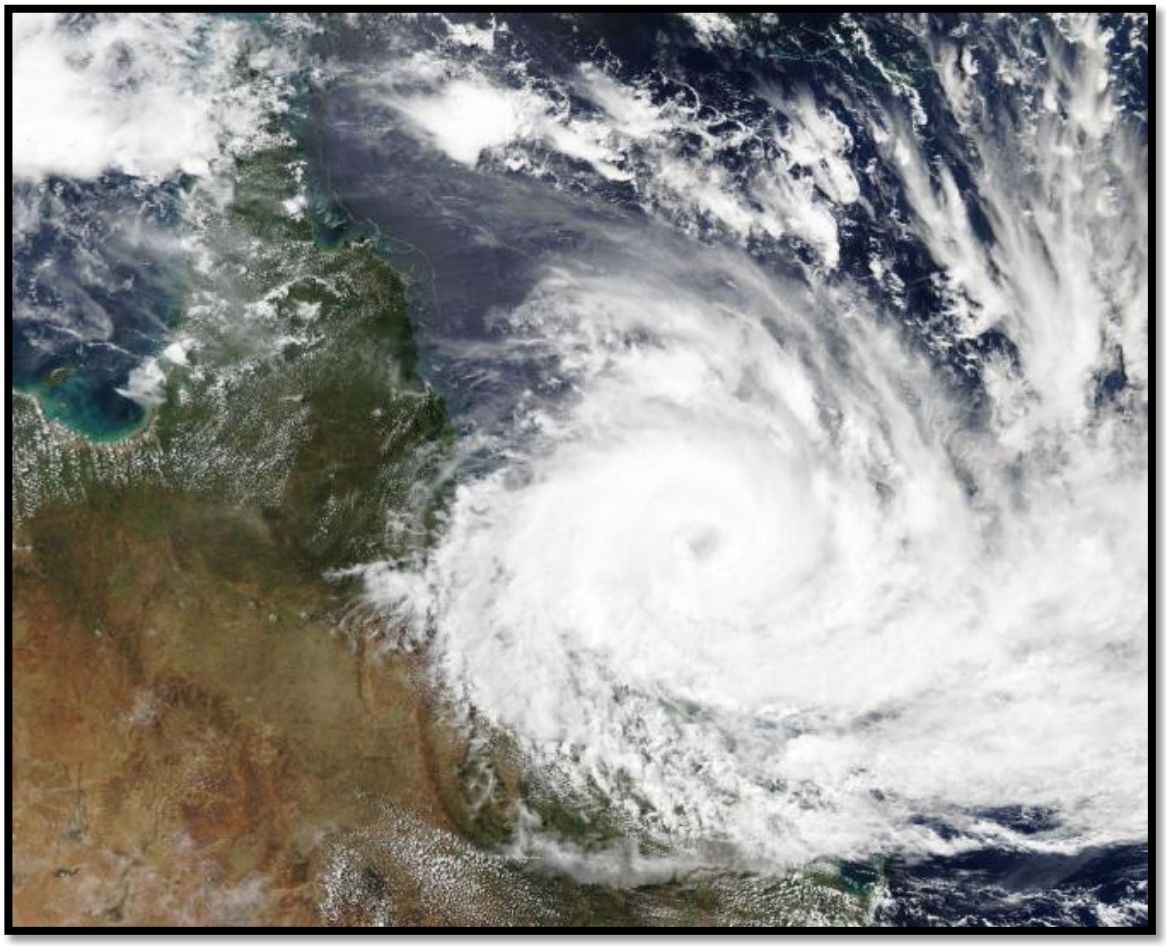

**Figure 4 – Severe Tropical Cyclone Debbie approaching the Qld coast – 2pm AEST on 27 March 2017** [7]

After Debbie made landfall, the system continued its path inland, maintaining tropical cyclone strength as it passed over Collinsville. Roofs were removed at Collinsville, which experienced category 2 strength winds. Debbie weakened below tropical cyclone strength around 3am on 29 March, with the remnant tropical low turning southeast and producing major flooding in central and southeast Queensland and into New South Wales during the following days.

From 28 to 30 March Debbie developed into severe thunderstorms which produced torrential rainfall in eastern Queensland from Bowen to the southeast. Numerous locations recorded extremely heavy rainfall

[7] "*MODIS True colour image*", NASA Worldview, www.worldview.earthdata.nasa.gov (27 March 2017)

over short durations. Areas along the Pioneer River near Mackay recorded 92mm in 60 minutes on 29 March.

Riverine flooding occurred in some coastal catchments from Bowen to the New South Wales border, extending inland to parts of the Central Highlands and Coalfields, Maranoa and Warrego, and Darling Downs districts in Queensland. Rainfall percentages and rainfall totals for March, illustrating the scope for flooding in the region of the CQCN, are shown in **Figure 5** and **Figure 6** below.

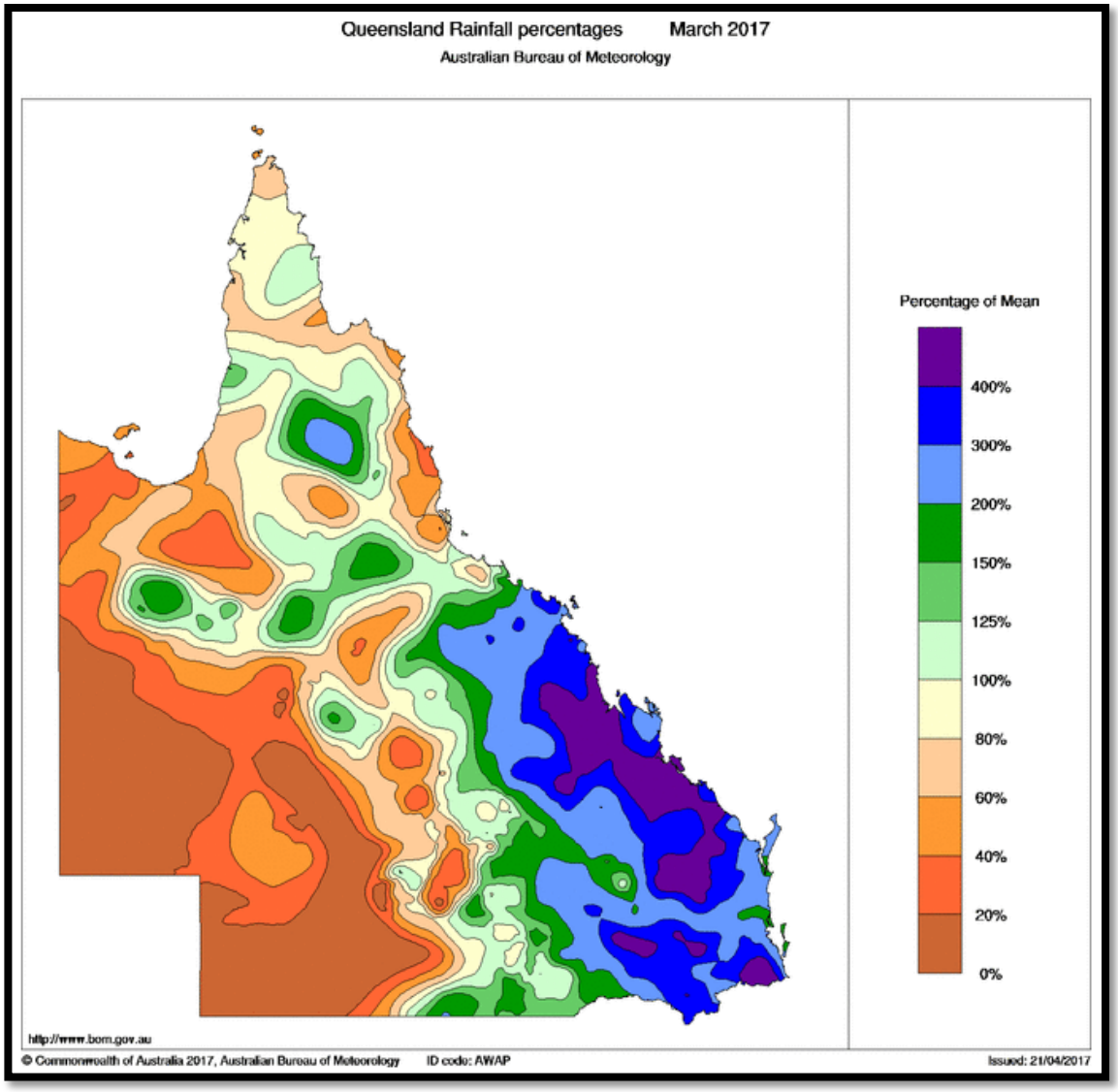


**Figure 5 – Rainfall percentages**

Flood Warnings were issued for the Pioneer, Proserpine and Don rivers. The Proserpine River catchment had an average of 283.18mm of rain on 29 March, the wettest March day on record for the catchment and second-wettest day for any month. The Pioneer River catchment recorded an average of 277.39mm on 29 March, also the wettest March day on record.

Rapid river rises and record major flood levels occurred in the Isaac River on 30 March, and moderate to major flood levels were reported in the Burnett catchment. Clarke Range, west of Mackay, received 986mm in the 48 hours to 9am on 29 March and Mt Jukes, northwest of Mackay, recorded 635mm in the 24 hours to 9am on 30 March. Several locations in the Fitzroy River basin received up to 1000mm in

rainfall over two days, and the Fitzroy River went into major flood warning at Rockhampton during the following week. [8]

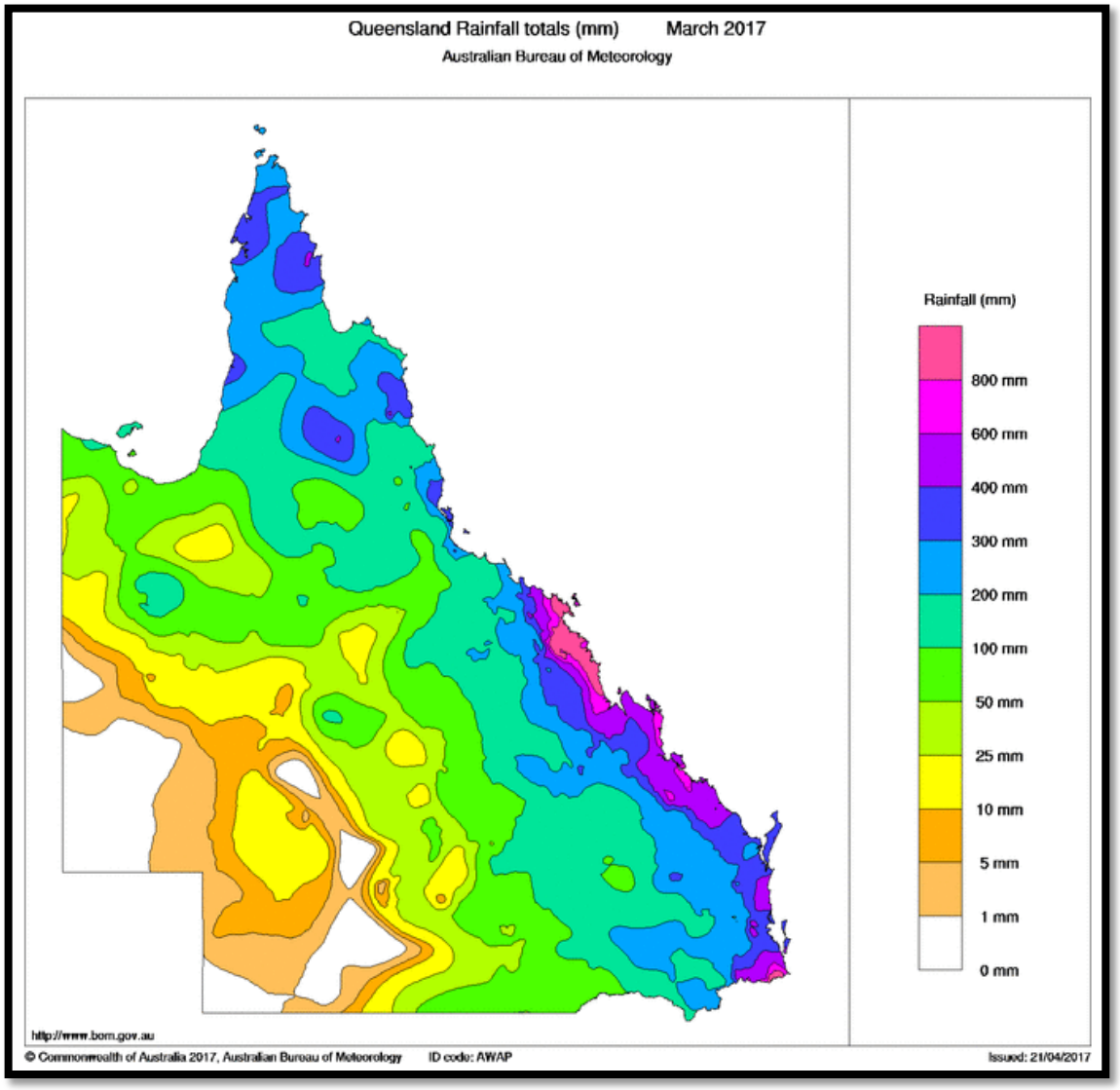


**Figure 6 – Rainfall totals**

As the remnant tropical low tracked into south-eastern Queensland, further flooding occurred. Major flood levels were also observed in the Condamine River. Flooding continued in the Fitzroy River into early April, peaking at a major flood level of 8.9m at Rockhampton on 7 April 2017.[9]

This was an extreme weather event unlike anything which had historically affected the entire CQCN. Inevitably, the response to the impact of this weather event was unlike anything Aurizon Network had undertaken in the past.

[8] "*Tropical Cyclone Debbie Impacts*" Bureau of Meteorology www.bom.gov.au/announcements/sevwx/qld/qldtc20170325.shtml (25 March 2017)

[9] "*Monthly Weather Review Australia – March 2017*", Bureau of Meteorology (1 May 2017)

# Initial Response and Damage Assessment

The NETCON process together with the Aurizon Incident Management Procedure (**IMP**) ensure the appropriate stakeholders are alerted to any changes in the network condition and frames how to respond to such changes. The IMP sets out the response to incidents and provides operational and managerial staff with the structure, procedure and resources to mobilise at short notice. The procedure is activated where there is an event that requires a coordinated management response that if not addressed appropriately, could significantly impact Aurizon's business, reputation or market value, and specifically includes natural disasters such as cyclones and floods.

### NETCON activation and Command Centre

As early as 24 March 2017, before Tropical Cyclone Debbie had made landfall, internal and external stakeholders were being advised of possible disruptions to the network due to Tropical Cyclone Debbie. The Goonyella System was raised to NETCON 3 on that day. NETCON 3 is the alert level that follows the notification of a potential threat – in this case the formation of a cyclone that could impact the CQCN. NETCON 3 results in an upgraded level of preparation for the network and the re-assessment of current and planned maintenance activities.

By the 27th March the northern systems, Newlands and Goonyella had been raised to NETCON 4 – following the notification of an imminent threat. The CQCN was in direct line of fire of a major event, a large category 4 severe Tropical Cyclone. At this alert level, all maintenance activities are cancelled, with safety of staff and assets a priority, particularly allowing the organisation to manage staff fatigue levels in preparation for the recovery effort. The Incident Management Team (**IMT**) is formed to oversee the preparation, and engineering support areas are on standby.

On 28 March the Blackwater System was raised to NETCON 3. However, within 24 hours, on 29 March, all four (4) systems were raised to NETCON 5. A major event had stopped the CQCN from operating in multiple locations. The IMT assumed control of the affected systems and took management of the event through to recovery. This alert level continues to advise internal and external stakeholders on the disruptions to the CQCN.

On 2 April the Recovery Command Centre (**Command Centre**) was established. The Command Centre is the single point of contact and coordination for the incident response, capturing all scope, decisions and costs during the incident. The Command Centre, staffed by Aurizon Network personnel, was initially set up in Rockhampton but given the magnitude of the effect of Tropical Cyclone Debbie, an additional Command Centre was established in Jilalan.

Immediately upon bringing together the Command Centre personnel, collation of the scope of works evidence from the field began to be administered in a central repository by the Integration Possession Execution Manager (**IPEM**), a scheduling planner, support engineer and administrators (as necessary). The Command Centre also focused on the following safety aspects:

> centralised the preparation and management of the Work Health and Safety Management Plan (**WHSMP**);

> ensured safe working limits and track protection were communicated appropriately, and that access was then facilitated centrally; and

> confirmed traction isolations were centrally controlled and particulars were being communicated.

The consequence of implementing this rigorous and well-rehearsed incident recovery procedure, was that Aurizon Network was able to ensure that all rectification works undertaken were efficient and recovery was aligned, prioritised and economical.

## Assessing damage and scoping works

Aircraft and drones (see **Figure 7**) capable of providing time-critical aerial footage along with views of inaccessible areas, allowed Aurizon Network's engineers to gather more information than previously and use technology to generate 3D virtual models of the CQCN.

**Figure 7 – Aircraft and drones in use**

The drone's capability was put to the greatest test in the recovery work on the Goonyella System, where the rail infrastructure curves its way through the thick bushland of the Sarina Range. It is here that Tropical Cyclone Debbie wrought the most havoc on the CQCN, dumping more than 800mm of rain and causing significant landslides on Black Mountain, severely impacting Aurizon Network's infrastructure. The challenging terrain meant that repairs on the mountain would be difficult. In addition to this, the public roads which provide access to the mountain range were significantly damaged, further hampering recovery efforts.

In the days immediately following Tropical Cyclone Debbie, Aurizon Network deployed a fixed wing aeroplane and multi-rotor drones to capture spatial data to accurately assess the extent of the damage. The primary datasets collected included LiDAR scanning of the mountain range – a technology that surveys the ground surface by sending and measuring laser pulses. The LiDAR technology was able to measure through dense vegetation, which was vital to identifying slippages and debris located in undergrowth up and down the steep embankments. This equipped the engineering teams with critical and timely field data to make early estimates of the remediation works.

Secondary datasets were collected to produce 3D models of the most severely affected sites. Engineering teams were able to compare the state of the infrastructure against similar data captured in 2015 to create interactive models of the most damaged sites that were then used in the decision-making processes.

In addition, the preparatory groundwork (including vegetation management, drainage and culvert cleaning, inspections, systems checks, and maintaining inventory levels) undertaken as part of the NETCON 2 process supported the recovery team to mobilise quickly in response to the nature disaster that was Tropical Cyclone Debbie. This drone and LiDAR technology contributed greatly to the speed with which the recovery effort could be mobilised and appropriately directed. Also the Network Asset Management System (**NAMS**) in development by Aurizon Network, was used to more effectively plan and prioritise civil construction works.

The initial scoping of works for each corridor was undertaken as follows:

> **Newlands:** Aerial inspections of the corridor started on 31 March to assess any residual flooding issues and damage to the rail infrastructure. Crews on the ground were also 'running' the corridor, and level crossing equipment was immediately examined and returned to safe operation.

> **Goonyella:** Aerial inspections were conducted on 30 March. Road and rail access to the rail corridor was severely limited, especially around the Black Mountain area, west of Sarina, where initial assessments indicated significant landslips had occurred on the rail corridor. Further geotechnical assessment of this site occurred on 31 March and 1 April.

> **Blackwater:** Initially closed to traffic at 9pm on 29 March, the system was re-opened on 31 March with some restrictions. It was closed again on 1 April due to flooding in Rockhampton. Once flooding subsided, crews were on the ground 'running' the corridor.

> **Moura:** Aerial inspections of the corridor started on 31 March. Road and rail access to the rail corridor was limited.

## Informing Stakeholders

As is standard practice through the NETCON alert system, Aurizon Network engaged with all supply chain participants in the lead up to, and in the aftermath of, Tropical Cyclone Debbie. These communications took the form of supply chain updates and incident communications through Form 103s.

Given the enormity of this event, Aurizon Network also provided specific operational impact and recovery briefing packs to stakeholders (see **Figure 8**). Aurizon Holdings Limited also made several ASX announcements in accordance with its disclosure requirements.


**Figure 8 – Operational impacts and recovery briefings**

"When you have a critical asset, not only to your own operations, but also the other above rail operators, customers and the whole coal export supply chain, it's important to get it operational as quickly as possible while maintaining control that ensures safety".

**Scott Riedel, General Manager Network Operations**

Customers and supply chain stakeholders were informed the development of the plan for remediation works. The aim was to develop a plan to ensure a safe and reliable rail network was available to allow the most efficient use of the CQCN to deliver volumes through to the end of the financial year.

A number of stakeholders provided information about their operations which Aurizon Network included, as one of many factors considered, when deciding how to prioritise recovery in alignment with port and mine operations. The interconnectivity of the CQCN provides the ability for customers to access alternative ports, subject to available capacity at any destination. This ability to provide alternate routes and facilitate cross-system traffic following an extreme weather event, was communicated to relevant stakeholders.

Overall Aurizon Network engaged with relevant stakeholders on the recovery program, understanding the impact that Tropical Cyclone Debbie had, not only on Aurizon Network's assets and people, but those of its supply chain stakeholders.

## Impacts of Tropical Cyclone Debbie on CQCN

As the scope of works were being determined, each specific site was categorised by qualified rail engineers so as to determine the degree of damage to the infrastructure. These categories were:

- **Category 1:** Not suitable for any rail traffic;
- **Category 2:** Suitable for rail production (maintenance) traffic only; and
- **Category 3:** Damage not prohibiting rail traffic movements.

Aurizon Network prioritised repairs to damaged infrastructure to move as many tasks as possible from categories 1 and 2 to category 3 status to run rail services in the CQCN as soon as safe to do so.

Over 800 individual scopes of work were identified in the CQCN, the majority of the work being civil in nature. There were significant works taking place across the CQCN simultaneously which required Project Management and coordination. The work scopes included:

- **Civil Works**, including:
  - Access road repairs – grading and reconstruction
  - Fencing replacement and repairs
  - Signage repairs
  - Vegetation management, e.g. tree removal
  - Clearing and reinstating drains and drainage
  - Removal of debris from track
  - Repair of scours
  - Culvert damage
  - Profile cutting
  - Damage to cable pits
  - Replacement of ballast and formation
  - Resurfacing
  - Replacing cable protection
  - Bridge and abutment repairs
  - Repairs to Equipment Rooms
  - Removal of rock
  - Shotcreting
- **Electrical and Signalling Works**, including:
  - Checking exposed cables and cable pits for damage
  - Cable repairs and replacement
  - Substation re-energisation works
  - Overhead electrical works
  - Signalling repairs
- **Communications and Control Systems**, including:
  - Optic fibre repairs and replacement
  - Telecommunications equipment repairs
  - Weighbridge telemetry repairs

## Goonyella

From initial assessments, the Goonyella system had borne 48 category 1 scopes, including significant land slips (see Figure 9), access road washouts (see Figure 10**)**, bridge abutment washouts requiring repairs (see **Figure 12**). Also a signalling equipment room was inundated with water and rock debris (see Figure 11) and overhead line and support mast damage.

**Figure 9 – Black Mountain land slips**

**Figure 10 – Goonyella access roads and land slips**

**Figure 11 – Goonyella signalling hut**

**Figure 12 – Goonyella damage**

## Newlands

The Newlands system had four (4) category 1 scopes, including signalling equipment damage, damage to and removal of level crossing signage, and formation damage requiring repair and rebuild (see **Figure 13**).


**Figure 13 –Newlands level crossing and formation repairs**

## Blackwater

From initial assessments the Blackwater system had borne four (4) category 1 tasks, including significant flood debris, signalling equipment damage and critical formation damage requiring rebuild (see **Figure 14**).

**Figure 14 – Blackwater flooding and washout / scour**

## Moura

From initial assessments the Moura system had borne five (5) category 1 tasks, including track washouts which impacted both ballast and formation, cutting scours and access road damage (see **Figure 15** and **Figure 16**).

**Figure 15 – Moura track washouts**

**Figure 16 – Moura washouts**

The ongoing identification of works continued throughout the delivery of the recovery work.

# Prioritising Recovery Works

Given the extent of the damage inflicted by Tropical Cyclone Debbie on the CQCN, the recovery plan involved numerous critical paths, with staged access to infrastructure and ports on different dates. Aurizon Network undertook disciplined execution through the recovery process, including systematic and strategic assessment of infrastructure damage, and operational plans to maximise railings for customers in a phased resumption process.

The Command Centre determined that six (6) critical paths were necessary to return the CQCN to service, albeit, with speed and operational restrictions in the initial period following return to service.

Those paths were:

> **Critical Path 1:** North Goonyella to Tunnel, enabling efficient use of stranded resources;

> **Critical Path 2:** Moura system such that there was access from 'pit to a port';

> **Critical Path 3:** Sonoma to Abbot Pt such that there was access from 'pit to a port';

> **Critical Path 4:** North Goonyella to Sonoma, thereby opening access for the Newlands Mine and endeavouring to make efficient use of resources available in the region;

> **Critical Path 5:** Waitara to North Goonyella. Although this was the initial assessment, it was adjusted during further planning to address Mindi to North Goonyella. This adjustment allowed access for a train service to Hail Creek and South Walker. The next stage of this critical path involved repairs to the section of infrastructure damaged between Hatfield and Mindi, including the location of Pacific National's Nebo facility. This adjustment was made in consultation with numerous stakeholders; and

> **Critical Path 6**: All remaining works priorities by engineering assessment of the damage and endeavouring to maximise the mass haul efficiency of the CQCN.

These critical paths are illustrated in **Figure 17**.

Following completion of works in alignment with these critical paths, Aurizon Network reopened is rail systems, albeit with operational restrictions and at reduced capacity, on the following dates:

> Blackwater, connecting into the Port of Gladstone, 10 April 2017;

> Moura, connecting into the Port of Gladstone, 12 April 2017;

> Newlands, connecting into Abbot Point Coal Terminal, 13 April 2017; and

> Goonyella, connecting into Dalrymple Bay Coal Terminal and Hay Point Coal Terminal, 26 April 2017.

The general timeline for closure and reopening of all four (4) systems is illustrated in **Figure 18**.

# Remaining Works

Consistent with clause 5.3 of Schedule F of UT4, this submission includes provision for recovery works for which Aurizon Network has and will incur additional Incremental Costs. Those additional Incremental Costs yet to be incurred are for a number of jobs across each of the four (4) systems totalling $1,667,032 (pre escalation).

To determine the amount of these costs that will be incurred, Aurizon Network reviewed the remaining work and applied daily rates to an estimated time for completion of these various types of works.

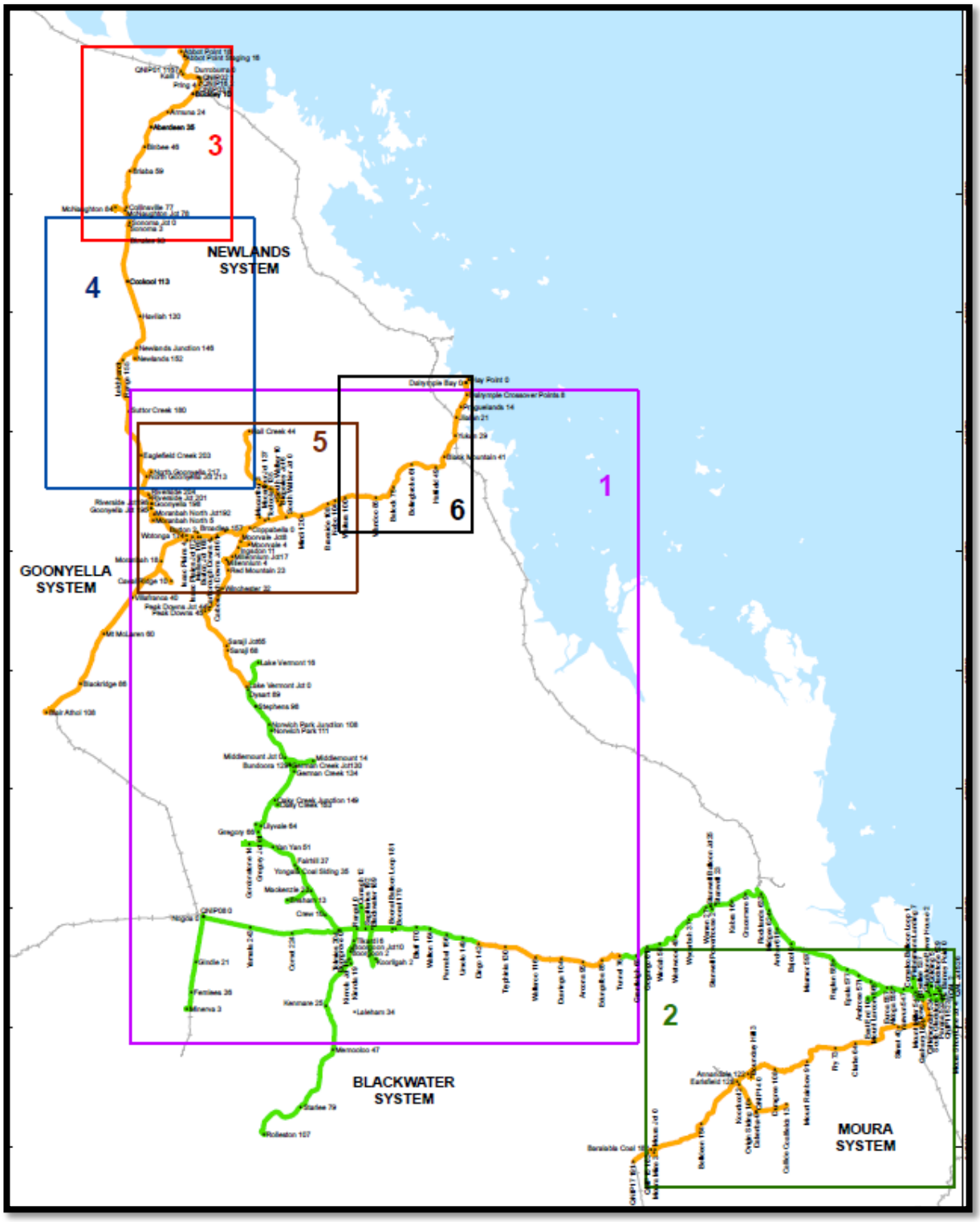


**Figure 17 – Critical Paths across CQCN**

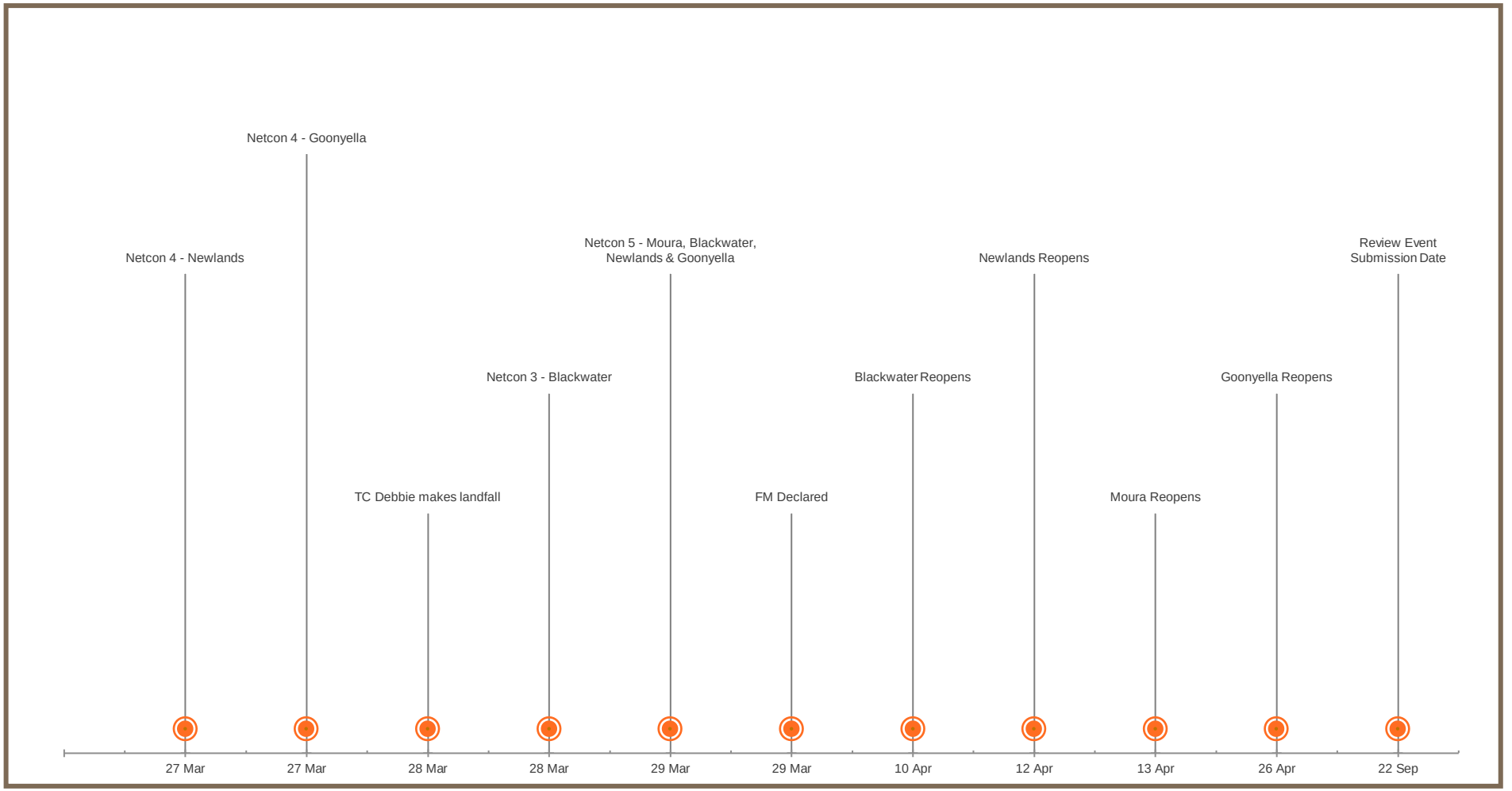


**Figure 18- Review Event timeline**

## Impact on Planned Works

Following the impact of Tropical Cyclone Debbie on the CQCN infrastructure, a review of the closure strategy for the remainder of the financial year was undertaken by Aurizon Network. The general network condition and addressing remedial tasks from the cyclone event were an important consideration through this assessment. Delivering volumes for customers and supply chain partners was also an essential consideration during this planning phase. Accordingly, a number of the Critical Asset Alignment Calendars were adjusted to reflect the impact of the recovery works on otherwise planned works. This involved adjusting closure periods and dates across two of the systems. These changes were communicated with supply chain stakeholders, and immediately implemented.

# Costs and Tariff Variation

## Costs Incurred

### Cost Capture Process

Following identification and inspection of all sites and the determination of a scope of works, every site in that scope is allocated a unique identifier. This enables Aurizon Network to ensure that all costs associated with the Review Event can be allocated to specific works, in an auditable and transparent manner.

To ensure that only additional Incremental Costs are captured, each work order must contain both a revision code (in this case “DEBBIE17”) and an activity number for the specific site that the work relates to. These process checks are implemented to ensure that only costs incurred or to be incurred as a result of the Review Event are attributed to that event.

### Maintenance Allowance

The costs attributable to this Review Event are additional to the approved allowance of the FY17 maintenance allowance under UT4 – this allowance relates solely to maintenance activities required to deliver forecast volumes during the regulatory period, and do not provide an allowance for Review Events above the $1 million threshold.

The cost capture process initiated through the Command Centre and ongoing throughout the recovery and rectification program, ensures demarcation between work specific to a site damaged as a result of the Review Event, and general maintenance works. Further, the production and publication of the Critical Asset Alignment Calendars and maintenance plans prior to and following the impact of a severe weather event such as Tropical Cyclone Debbie, enables the apportionment of costs to the Review Event where they are clearly additional in nature.

### Insurance Allowance

Aurizon Holdings Limited, Aurizon Network’s Ultimate Holding Company, procures insurance on an enterprise-wide basis, rather than being specific or exclusively for the benefit of Aurizon Network.

Aurizon Network’s insurance arrangements take form through a wholly owned captive insurance company of Aurizon Holdings Limited, with reinsurance procured through the commercial insurance market

combined with self-insurance. These arrangements are accounted for in Aurizon Network's operating allowances as approved by the QCA under UT4.

The approved operating allowances under UT4 contain a provision in the allowance for:

> **External insurance premiums:** these costs related to specific risks insured under an Industrial Special Risks policy, as well as general liability insurance, directors and officers insurance, and travel insurance. Of note, only selected bridges and feeder stations are covered under the Industrial Special Risks policy. Other than these declared bridges and feeder stations, rail track infrastructure is not insured in respect of weather events (including flood and washout), earthquake or subsidence.

> **Self-insurance costs**: these costs relate to specific risks such as derailments, dewirements and losses below the specified deductibles.

The insurance allowances up to FY17 as approved by the QCA under UT4 are set out in **Table 1**.

| Nominal Amounts | 2013/14 ($m) | 2014/15 ($m) | 2015/16 ($m) | 2016/17 ($m) |
|---|---|---|---|---|
| Insurance premium costs | 3.3 | 3.7 | 3.8 | 3.9 |
| Self- insurance | 5.0 | 5.5 | 6.0 | 6.6 |
| **Total risk and insurance** | **$8.2** | **$9.2** | **$9.9** | **$10.5** |

**Table 1 – UT4 Insurance Allowances**

External insurance

Aurizon Holdings Limited, Aurizon Network's Ultimate Holding Company, procures a range of insurance policies for the Aurizon Group. These policies are negotiated on commercial terms within the global insurance market. This insurance program includes the procurement of an Industrial Special Risks policy that provides coverage for, amongst other things, physical loss or damage to specific assets owned by Aurizon Network. Certain assets are insured for damage as a result of weather events (such as flood or washout). These assets are:

> feeder stations and certain bridges specifically declared under the policy of insurance; and

> track and bridges within specific insured premises, such as stations, marshalling yards, depots and workshops.

These assets were not damaged as a result of this Review Event, and as such, no costs are recoverable under Aurizon Networks external insurance arrangements.

Self-insurance

The QCA has previously, and continues to acknowledge through approval of the UT4 insurance allowances (noted above) that extreme events which occur sporadically, are difficult to model and are beyond the reasonable control of the business. The most efficient way deal with such events is therefore through the provisions under UT4, which facilitate reimbursement of efficient costs incurred by Aurizon Network by way of variations to the Reference Tariffs – and in particular under clause 5 of Schedule F of UT4.

Accordingly, Aurizon Network's self-insurance program is not the appropriate mechanism for mitigation of loss associated with particular risks. These financial risks are better diminished through operation of the relevant provisions of UT4, and as such the following categories of risk are not covered by Aurizon Network's self-insurance:

> damage to the network from major weather events where losses exceed $1 million;

> catastrophic damage to the network from perils such as earthquake, terrorism or acts of war where losses exceed $8 million; and

> liability losses which exceed $8 million.

Given the magnitude of the damage and the costs associated with this Review Event, losses exceed $1 million and are therefore to be recovered by way of a variation to the Reference Tariffs, under clause 5 of Schedule F of UT4.

### Determination of incremental operating and capital costs

The costs captured, and included in the methodology for determining the variation to the Reference Tariffs, only relate to additional Incremental Costs which have been incurred, and are to be incurred, by Aurizon Network as a result of the Review Event. These additional Incremental Costs are operating costs, and do not include capital expenditure.

For the purposes of delineating between capital expenditure and operating expenditure, Aurizon Network has followed the same general assessment criteria which is consistent with the approach for other Review Events. This assessment criteria is applied to all work scopes which are assigned an activity number. This ensures a consistent methodology has been applied to every aspect of work.

The criteria applied by Aurizon Network for capital costs are:

1. the total materials cost (incurred or to be incurred) for that work order is greater than $40,000;
2. for linear assets, the physical distance over which the renewal of infrastructure is required to be undertaken for that activity, is greater than 75 metres; and
3. the work is not ballast undercutting.

Those costs which have been categorised as capital expenditure will be included in the annual submission for the inclusion of capital expenditure in the Regulatory Asset Base. That report will be subject to an assessment by the QCA. Those capital costs have not been included in this Review Event submission, including the variation of the Reference Tariffs.

Having undertaken the above assessment for each work scope, Aurizon Network was able to determine the additional Incremental Costs resulting from the Review Event. **Figure 19** illustrates these costs and to what extent those amounts captured relate to the certain categories.

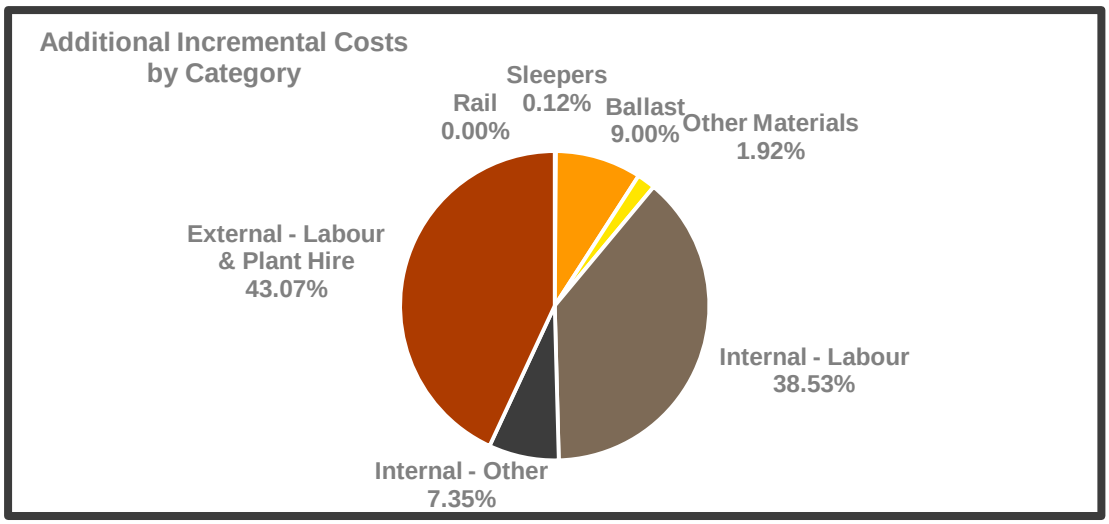


**Figure 19 – Additional Incremental Costs by System and Cost Category**

The nature of the costs incurred or to be incurred can be described as follows:

- **Ballast**: the ballast required to be replaced was washed away or not suitable to be reused due to fouling, primarily through mud;
- **Other Materials**: a range of other materials required to be used in restoring formations, undertaking civil works, rectifying drainage, and restoring electrical infrastructure, including (but not limited to) flood rock, drainage, and electrical materials;
- **Internal – Labour**: Only additional incremental internal labour costs, which relate to overtime hours captured through timesheet procedures, have been included. As has been previous practice, ordinary labour costs associated with labour internal to Aurizon Network have been excluded from this submission on the basis that in the context of previous Review Events, the QCA has not accepted such costs as additional Incremental Costs;
- **Internal – Other**: a range of additional costs incurred as part of the recovery response, including accommodation, airfares and travel expenses for staff required to transfer between work sites in the various systems. This was kept to a minimum by way of prioritising the critical paths to recovery with relocation efforts in mind;
- **External – Labour & Plant Hire**: Various forms of light and heavy machinery, aircraft and equipment from external sources were required throughout the program of works required as a result of Tropical Cyclone Debbie. Aurizon Network does not own all of the plant and equipment necessary to conduct the rectification works, such as excavators, cranes, bob cats, graders, dump trucks, resurfacing machinery, and aircraft (see **Figure 20**). Unavoidably use of this plant and equipment must be procured. Further due to the scale of the damage and the dispersed geographical location of the rectification works, it was necessary for Aurizon Network to engage contractors external to Aurizon Network. Where Aurizon Network could not complete the works itself, external contractors were selected from existing Equipment Wet Hire and Civil and Track Construction Panels held by Aurizon Network. Services were provided under pre-existing terms and conditions, and pre-negotiated hire rates, which does not allow for any price variations or escalations for 'emergency' or recovery works. This drove greater efficiency of costs for Aurizon Network through engagement of existing panel contractors;
- **Rail**: the steel rail required to be replaced where damaged or washed away; and
- **Sleepers**: the sleeper systems required to be replaced where damaged or washed away.

**Figure 20 – Equipment which was mobilised in recovery works**

### Efficient Costs

The costs incurred, and to be incurred, by Aurizon Network in rectification works associated with Tropical Cyclone Debbie reflect the appropriate result for such expenditure given the circumstances, having regard to the environment in which the CQCN operates.

Aurizon Network has substantial experience in the operation and upholding of good operating practices, and prudent and effective maintenance and asset replacement policies and practices.[10] Considerable effort is made to ensure ongoing enhancement of asset management practices across Aurizon Network, ensuring that the management of the infrastructure of the CQCN is effective, efficient and economical.

The systematic and methodical application of preparatory work plans through application of the NETCON procedure, and the IMP in the immediate aftereffects of a major incident, such as a cyclone, ensure that the recovery planning, decision making and execution are effective, without wasted time, effort or expense.

Aurizon Network is capable of responding in a cost efficient manner to a Review Event, including the advent of Tropical Cyclone Debbie, through:

> the implementation of processes and systems, such as NAMS;

> using existing Equipment Wet Hire and Civil and Track Construction Panels for external hire;

> the Hazard Identification Register;

> application of the NETCON procedure; and

> the IMP activation.

Through this and the subsequent strategic assessment of infrastructure damage, and operational plans focused on maximising railings for customers in a phased return to operation process, Aurizon Network ensures that the costs it incurs as a result of this Review Event are, having regard to the environment in which Aurizon Network operates, reasonable and efficient costs.

## Reference Tariff Variation

This Review Event submission proposes a Reference Tariff variation under clause 5 of Schedule F of UT4.

Aurizon Network's 2017 Draft Access Undertaking (**UT5**) submission for the FY2018 - FY2021 regulatory term was submitted to QCA on 30 November 2016. Approval by the QCA has not been received for this UT5 submission. UT4 is currently fixed to expire on 31 December 2017, and as such Aurizon Network is operating on FY18 transitional tariffs at the time of making this submission.

Aurizon Network considers that it is unlikely that approval for UT5 will be given and the undertaking in place prior to 31 December 2017. In these circumstances, Aurizon Network will propose an Extension Draft Amending Access Undertaking (**DAAU**) for the period of 1 January 2018 to 30 June 2018. This

[10] "*Central Queensland Coal Network (CQCN) Condition Based Assessment FY 2016*" Advisian http://www.qca.org.au/Rail/Aurizon/Intro-to-Aurizon/2016-Access-Undertaking/Ongoing-Compliance/Condition-Based-Assessment/Final-Report/Condition-Based-Assessment#finalpos (5 May 2017)

DAAU will seek to apply the current transitional tariffs, in addition to including the proposed Reference Tariff variation to account for operating expenditure sought under this Review Event submission.

This Review Event submission will therefore propose a variation to the Reference Tariffs for the H2 FY2018, for the six (6) month period between 1 January 2018 and 30 June 2018, to be included in the separate Extension DAAU. The benefits of the proposed six (6) month recovery period are as follows:

> avoids the need to revise the Extension DAAU, agreed with stakeholders and approved by the QCA;
> avoids the need for a lump sum payment of revised Reference Tariffs from July 2017, a circumstance which is likely to be unpalatable to a number of Access Holders, and End Users;
> provides for transparent recovery during FY18 and mitigating against the risk of increasing the quantum of the UT5 Adjustment Charge, upon QCA approval; and
> provides for any under or over recoveries between transitional tariffs and UT5 to be reconciled as part of the UT5 Adjustment Charge process.

### Calculation of the Reference Tariff Variation

A number of calculation steps were required to translate the additional Incremental Costs into variations to each of the relevant Reference Tariffs. The basic methodology is described below.

The additional Incremental Costs incurred by Aurizon Network for this Review Event are $16,930,953 (expressed in FY2017 dollar terms, excluding any escalation). This Review Event submission proposes a variation to the FY2018 Reference Tariffs. Accordingly, a conversion is required from FY17 to FY18 dollar terms to align the costs with the tariffs.

To commence a conversion of the costs from FY17 to FY18 dollar terms requires escalation. The escalation method applied is as follows:

> for costs incurred and recovered in the same year, those costs are escalated by Consumer Price Index (**CPI**) in order to be expressed in nominal dollar terms; and
> for costs deferred to the next year, those costs are escalated at Weighted Average Cost of Capital (**WACC**) to account for deferred recovery over the year.

This methodology is consistent with prior submissions for Review Events, and has been applied in a uniform manner across the four (4) systems.

As a result, the costs incurred from April 2017 were escalated by WACC for two (2) months to the end of FY17, to account for the deferred revenue recovery. CPI escalation was applied to the costs in mid-year terms for FY18 dollars[11] to arrive at the total costs under this submission being $17,447,633 (inclusive of escalation).

The rates of escalation and tonnage assumptions relevant to these calculations (and to be applied in the Extension DAAU) are:

> WACC – 7.17%;
> CPI – 2.5%; and
> FY17 tonnage assumptions, which have been applied on a 6 month pro-rata basis to account for the six (6) month recovery period.

[11] Mid-year treatment of revenue – consistent with QCA UT4 Final Decision

The model which contains the calculations supporting the methodology described above is submitted to the QCA as required under clause 5.4 of Schedule F of UT4. This level of detail is not for publication generally, due to the confidential nature of the information contained in that model.

## Goonyella to Abbot Point Expansion (GAPE) cost allocation

With regards to the flood recovery costs relating to Newlands and GAPE, those costs associated with the Northern Missing Link have been separately identified, and will be recovered from GAPE system users. The balance of flood recovery costs are related to the rectification of shared infrastructure in the Newlands system. As both Newlands and GAPE customers utilise this shared infrastructure, Aurizon Network has allocated these 'common costs' between both systems as they cannot be attributed to each system individually.

Aurizon Network has allocated the common costs between the Newlands and GAPE systems based on the maintenance costs allocation as approved in the FY17 UT4 maintenance allowance.

## System Level Reference Tariffs

Aurizon Network proposes that the tariff inputs to be varied are nominated as AT3 and AT4, for each of the Blackwater System, the Goonyella System, Moura System, Newlands System, and Goonyella to Abbot Point System. Recovery works undertaken as a result of Tropical Cyclone Debbie do include tasks specifically associated with electrical infrastructure. On the basis that:

> the quantum of costs attributable to electrical works is a very small portion of the overall costs attributable to the relevant systems[12]; and

> if necessary, a reconciliation between electric and no-electric Reference Tariffs can take place after a decision is made by the QCA on this Review Event submission,

Aurizon Network is not proposing to adjust the tariff input of AT5 to cover those costs under this Reference Tariff variation, and the subsequent Extension DAAU.

The Reference Tariffs are noted for each of the systems in **Table 2.**

| Cost Recovery | Blackwater | Goonyella | Newlands | GAPE | Moura |
|---|---|---|---|---|---|
| Recovery incl escal ($) | 2,513,870 | 12,167,134 | 503,973 | 1,215,241 | 1,047,415 |
| Tonnes ('000) | 33,905 | 57,812 | 4,506 | 8,500 | 6,256 |
| $ per NT | 0.07 | 0.21 | 0.11 | 0.14 | 0.17 |
| **Tariff increase** | | | | | |
| AT3 | 0.10 | 0.51 | 0.37 | 0.20 | 0.53 |
| AT4 | 0.04 | 0.11 | 0.06 | 0.07 | 0.08 |

**Table 2 – CQCN systems, recovery over six (6) months**

[12] The expected impact on transitional AT5 Reference Tariffs is less than $0.01 per '000 eGTK.

## Stakeholder engagement

In early August, Aurizon Network communicated its intention to seek to amend the Reference Tariffs to recover the additional Incremental Costs attributable to Cyclone Debbie to all Access Holders and Train Operators. The objective was to seek formal support for the Extension DAAU, including the recovery of the costs related to this Review Event. Aurizon Network provided a Fact Sheet that set out further information regarding the scope of works to repair the damage to the CQCN caused by Cyclone Debbie. It was also explained that Aurizon Network would seek to recover these costs within 6 months from when they were incurred, noting that it would be "*considered beneficial in smoothing the tariffs and reducing the potential for compounding regulatory true-ups*".

Aurizon Network received positive responses from a number of stakeholders on the constructive and consultative approach taken, and broad acceptance of the proposed approach.

# Conclusion

Tropical Cyclone Debbie and the ensuing torrential rainfall and flooding resulted in a Force Majeure Event which significantly damaged an unprecedented amount of infrastructure across the entire Central Queensland Coal Network. Never before had a single weather event materially impacted all four (4) systems within the CQCN simultaneously. Aurizon Network employed its processes, systems and capability to ensure an immediate response and a timely recovery to what was an extreme, unpredictable and unpreventable event.

This response effort resulted in a significant change in the cost to Aurizon Network of providing access for train services across the entire CQCN, and has had an impact on the financial position of Aurizon Network. The additional Incremental Costs incurred and to be incurred by Aurizon Network are $16,930,953 (excluding escalation).

Accordingly, Aurizon Network tenders the Reference Tariff variation for a Review Event, as described in detail above, under clause 5 of Schedule F of UT4 for approval by the QCA at its earliest opportunity.

# Annexure A: Tropical Cyclone Intensity

According to the Bureau of Meteorology[13]:

"*A Tropical Cyclone is defined as a non-frontal low pressure system of synoptic scale developing over warm waters having organised convection and a maximum mean wind speed of 34 knots or greater extending more than half-way around near the centre and persisting for at least six hours. Every cyclone is unique varying according to a number of factors including life cycle, intensity, movement, size and impact (wind, storm surge and flooding).*"

The factors which are used to categorise a tropical cyclone are set out in **Table 3**.

| Category | Maximum Mean Wind (km/h) | Typical Strongest Gust (km/h) | Central Pressure (hPa) | Typical Effects |
|---|---|---|---|---|
| 1 | 63 - 88 | < 125 | > 985 | Negligible house damage. Damage to some crops, trees and caravans. Craft may drag moorings |
| 2 | 89 - 117 | 125 - 164 | 985 - 970 | Minor house damage. Significant damage to signs, trees and caravans. Heavy damage to some crops. Risk of power failure. Small craft may break moorings. |
| 3 | 118 - 159 | 165 - 224 | 970 - 955 | Some roof and structural damage. Some caravans destroyed. Power failures likely. |
| 4 | 160 - 199 | 225 - 279 | 955 - 930 | Significant roofing loss and structural damage. Many caravans destroyed and blown away. Dangerous airborne debris. Widespread power failures. |
| 5 | > 200 | > 279 | < 930 | Extremely dangerous with widespread destruction. |

**Table 3 – Tropical Cyclone Intensity categorisation**

Tropical cyclones are classified as ***severe*** when they are producing 'very destructive winds' having sustained surface winds of at least 118km/h near the centre and gusts of at least 165km/h. This corresponds to cyclone categories 3, 4 and 5. Further details are set out in **Table 4**.

| Category | Sustained winds(km/h) | Strongest gust (km/h) | Typical effects |
|---|---|---|---|
| 1 Tropical Cyclone | 63 - 88 | Below 125 | Damaging winds |
| 2 Tropical Cyclone | 89 - 117 | 125 – 164 | Destructive winds |
| 3 Severe Tropical Cyclone | 118 - 159 | 165 - 224 | Very destructive winds |
| 4 Severe Tropical Cyclone | 160 - 199 | 225 – 279 | |
| 5 Severe Tropical Cyclone | Over 200 | Over 280 | |

**Table 4 – Severe Tropical Cyclone categorisation**

[13] "*About Tropical Cyclones – FAQs*" Bureau of Meteorology http://www.bom.gov.au/cyclone/faq/index.shtml#definitions (6 August 2017)