# INQUIRY INTO RESPONSE TO MAJOR FLOODING ACROSS NEW SOUTH WALES IN 2022

**Organisation:** Telstra Corporation Limited

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# TELSTRA CORPORATION LIMITED

**Submission to the:**

# Select Committee on the response to major flooding across New South Wales in 2022



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# Table of contents

# 1    Introduction

Telstra welcomes the opportunity to make a submission to the **Select Committee on the response to major flooding across New South Wales in 2022.**

The 2022 flood event resulted in widespread and significant impacts to many areas within north-east NSW and the central Sydney region. Lives were lost, homes and properties were destroyed, and businesses were significantly impacted or worse, decimated. We express our sincere appreciation and thanks to the many brave and determined emergency workers, ADF personnel and other individuals for the assistance they provided to minimise impact to telecommunications networks and help to restore services, often in very hazardous and changeable conditions.

The flood event resulted in substantial damage to telecommunications infrastructure and the power grid, causing mass disruptions to our customers' mobile and fixed services. It is in that context we make this submission, which outlines how we sought to minimise the impact to our network and customers and how we prioritised and restored services, along with some information on how we responded to the community.

Our submission is structured in four sections:

- Section 2 identifies the impact of the floods on our network and to our customers;

- Section 3 outlines our response to the floods, including restoration of our network, and assistance we provided to the community;

- Section 4 describes some of the longer-term work we must undertake to fully recover from the impact of the floods; and

- Section 5 contains some suggestions we wish to make to improve our network's resilience and our ability to respond to future flood events.

# 2    Impact to our network and customers

Telstra's network facilities throughout north-eastern New South Wales and Sydney were disrupted by power outages and flood damage during the three-week period from 28 February to 21 March 2022 inclusive. Network facilities are components of Telstra's network used to provide fixed, mobile and other services to customers. Examples of network facilities include mobile network radio equipment, mobile towers, fixed and mobile equipment huts, transmission infrastructure including subterranean optic fibre cables, power systems such as generators, and roadside cabinets.

In the initial days of flooding, network facility disruptions were largely due to loss of mains power, coupled with inability to access sites (due to flooding) to deploy backup power generators and keep them refuelled. However, once floodwaters receded, the power utilities were able to restore mains power to many locations reasonably quickly, and in many cases, this enabled services to be brought back online except for locations where our network facilities had been impacted.

At this point, our response to restoring network facilities focused on remediating three main types of impact: 1) direct equipment damage due to water ingress or landslides; 2) damage to optic fibre some distance away that isolates a community from the overall network; and 3) extended loss of mains power. With scenarios (1) and (2), back-up power solutions such as temporary power generator were not of any practical use as equipment had to be replaced and infrastructure (buildings, towers, etc) rebuilt.

Flood related damage can be very difficult to locate. Land needs to only slide or shift a few tens of centimetres to damage optic fibres and locating the site of the land slip can be very challenging along a route that can be several kilometres long, as per Figure 1 below.[1]



**Figure 1**: Land slip in Booyong NSW that damaged an optic fibre cable.

Where mass outages occur during extreme weather conditions,[2] Telstra and other telecommunications providers declare Mass Service Disruptions (MSDs). This indicates that there are circumstances outside the provider's control that result in a delay in conducting repair activities to restore services. Telstra declared separate MSDs for North-East NSW and Sydney as shown in Figure 2. In north-eastern NSW, the MSD was declared for Monday 28 February 2022 to Monday 21 March 2022 inclusive, and in Sydney, the MSD was declared for Friday 4 March 2022 to Friday 18 March 2022 inclusive.
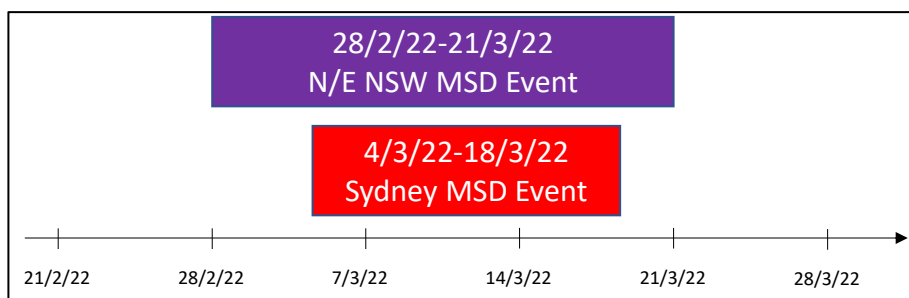


**Figure 2**: Duration of MSD Events in NSW

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1    https://www.google.com.au/maps/place/28.73918798S+153.45596702E
2    In accordance with Schedule 3 of the Telecommunications (Customer Service Guarantee) Standard 2011, available at
     https://www.legislation.gov.au/Details/F2011C00791

Figures 3 and 4 below show damage to an optic fibre cable and its conduit and the extent of damage caused to one of our mobile network facilities caused by the flood.



**Figure 3**: damaged fibre duct alongside a washed-out bridge, NSW/Qld border region



**Figure 4**: Flood-damaged mobile network equipment at Buckendoon (near Woodburn) in North-east NSW (See Case Study 2 below)
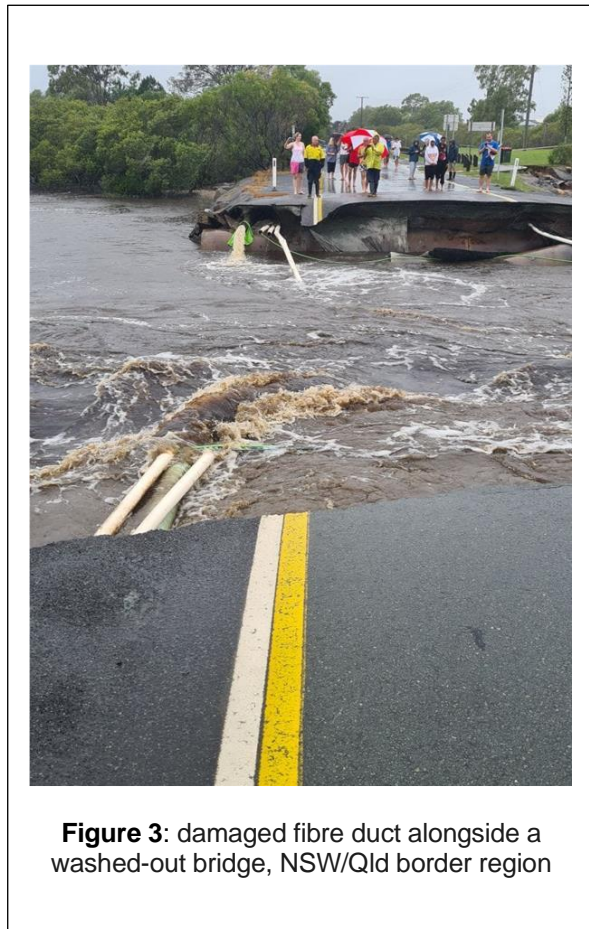
The total number of affected services, Mobile Base Stations and communities that were isolated in the north-east NSW and central Sydney regions for the periods shown in Figure 2 are shown in Table 1 below. Not all these services, Mobile Base Stations and communities were necessarily affected for the entire duration of associated MSDs. To be included in the numbers in Table 1 below there had to be an outage somewhere within the window of the MSD.

| Item | N/E NSW | Sydney |
|---|---:|---:|
| Fixed line (PSTN) | 12,830 | 1,749 |
| ADSL | 4,218 | 1,250 |
| NBN | 40,854 | 2,086 |
| Mobile Base Stations | 88 | 36 |
| Communities in Isolation | 22 | 1 |

**Table 1**: Affected services, Mobile Base Stations and communities in NSW

# 3    Telstra's response to the floods

## 3.1    Telstra's approach to restoration of services and network

In responding to the 2022 floods, Telstra operated on a three-day, three-week and three-month time horizon for crisis response, service restoration and network recovery, as follows:

- The three-day time horizon focuses on service recovery. Our top priorities are support to government emergency networks and restoring services to communities in isolation.

- The three-week time horizon is broken into two elements: (1) service recovery, including prioritisation of fibre repair and decisions on the deployment of temporary replacement infrastructure such as COWs[3] and MEOWs™[4] (see Figure 5); and (2) infrastructure repair and impact assessment, including repair of minor damage to facilities, cable replacement, deployment of COWs and MEOWs™, and assessment of rebuild requirements.

- The three-month time horizon focuses on the rebuilding of permanent infrastructure, including the clean-up of flood-damaged sites and restoring the network to the desired longer-term state. While we call this third phase the "three month" time



**Figure 5**: Mobile Exchange on Wheels (MEOW) transported from Victoria to our forward staging area in Newcastle NSW.

horizon, depending on the extent of the damage and any decisions to permanently relocate facilities to minimise future risk of damage this phase may take substantially longer than three months. See section 4.1 below for further explanation.

To facilitate coordination with Emergency Service Organisations (ESOs), and with state and regional Emergency Control Centres (ECCs), Telstra staff are appointed as Emergency Service Liaison Officers (ESLOs) who liaise directly with the ESOs prior to and during emergencies. The ESLOs were vital to Telstra's coordination with state and federal ESOs, and with regional and state ECCs, as they provided a

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[3]    COWS: Cell on Wheels –a mobile base station mounted on a trailer and connected to our core network via fibre cable or microwave radio links; however, can also refer to any interim mobile solution.

[4]    MEOWS: Mobile Exchange on Wheels™ – these are portable telephone exchanges mounted on trailers that can provide temporary landline and ADSL2+ enabled broadband services.

single point of contact between Telstra and these organisations and centres. Telstra's Government Relations team also worked closely with the Federal and State Governments to keep them informed about the impacts on our services and our response.

## 3.2    Telstra's temporary facilities

Telstra has a national fleet of deployable temporary facilities including COWs, SatCOWs,[5] Repeater trailers, and MEOWs, all designed to support real time emergency services communications requirements during disasters, to provide communications where network infrastructure has been damaged beyond short term repair timeframes, and to provide emergency communications into areas declared as a community in isolation.[6] These temporary facilities are not one size fits all solutions, with differing capabilities to reinstate fixed-line or mobile connectivity as required to agencies and communities in need.

Temporary facilities are one way that telecommunications carriers can provide services in the aftermath of a disaster and where physical damage to infrastructure has occurred. However, there are some limitations as to how, when and where they can be deployed, as outlined below:

- **Availability**: There are limited numbers of temporary facilities. Telecommunications carriers determine where they are deployed based on criteria including priority and suitability of the facilities to address the specific requirements at a location. Generally, only once the type and extent of site damage is confirmed can a decision be made to deploy any temporary facilities. Technicians must first assess site damage, determine type and length of time of remediation activity to restore permanent facilities, and finally assess the priority level compared to other impacted sites across the carrier's network. Carriers also consult with ESOs in determining where facilities are deployed, both to support emergency efforts and community connectivity.

- **Site access**: Most temporary facilities need to be deployed using roadways. This can be challenging following disasters. For example, following floods, fallen trees (or the risk of falling trees) and ongoing flood activity can limit road access. Telecommunications carriers work with ESOs, and the Australian Defence Force (ADF) if involved, to gain access to sites as soon as possible but only once ESOs say it is safe to enter.

- **Capacity**: Temporary facilities can provide services when permanent facilities are compromised. However, temporary facilities generally have less capacity than permanent facilities. Coverage is typically more limited due to technical and physical limitations (for example, obstacles blocking the line of sight to infrastructure or height limitations). Where generators have been deployed to provide backup power sources, fuel reserves may become depleted and refuelling may not be possible if it is unsafe to re-enter the impacted area.

- **Set up time**: Temporary facilities can be deployed much more rapidly than permanent facilities (which can take months to become operational) but they are not all instantaneous. Some temporary facilities can take a week or so to be deployed.

- **Deployed after a disaster, not during**: Temporary facilities are typically deployed following a disaster rather than during it. This is because technicians can only be deployed when ESO's

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[5]    Sat COWS: Satellite Cell on Wheels –a mobile base station mounted on a trailer and connected to our core network via satellite (not via terrestrial transmission such as optic fibre or microwave links).

[6]    **Community in Isolation**, as used here, is only from the perspective of Telstra's network. It is possible that residents have services and/or coverage from other network operators (e.g., Optus, TPG, etc). We do not have visibility of the status of their networks, and as such, where we use the term "Community in Isolation" we mean the community is unable to make or receive communications (fixed line, mobile or broadband) from the Telstra network.

indicate it is safe to do so including under escort conditions where necessary. Additionally, when a disaster is ongoing there may be a risk that the temporary facility will be destroyed by the event that destroyed the permanent facility. Having said this, telecommunications carriers do have mechanisms available to rapidly deploy assistance to ESOs to aid in first responder efforts.

On 4 March 2022, Telstra initiated a pre-positioning request for its two largest MEOWs to be relocated from Melbourne (Vic) to Newcastle (NSW) in readiness for field deployment (see Figure 5). By 6 April 2022, both were located in Telstra's Newcastle depot, bolstering the already existing pool of deployable MEOW (Mobile Exchange on Wheels) and COW/SatCOW assets available close to the flood affected regions.

### 3.3    Case study 1: Flood damage to Lismore Exchange, NSW

Flood levels at Lismore peaked at 14.5m; the levy is only 10m. This significantly impacted the Telstra Lismore Exchange which connects fixed line telephone, broadband and supports mobile services in the Lismore region. Telstra's Lismore exchange ground floor and half of the first floor were inundated with water – See Figure 6. This affected power and other facilities such as air-conditioning. The first floor also contained our transmission equipment linking Lismore to our wider network. Fibre washouts in the surrounding areas further affected Lismore connectivity.



**Figure 6**: Lismore Exchange after flood waters had receded.
The red line shows the high-water mark.

To provide some insight, the following steps are an outline of the work required to assess and then restore an exchange. All these steps were required at the Lismore exchange.

1. **Initial site assessment**. An assessment is conducted to ensure the site is safe for workers to enter the building and commence clean up. This includes assessing the building for structural hazards and carefully assessing electrical safety hazards such as on-site batteries which may still have power, if for example, a circuit-breaker cut off supply to water-logged communications equipment before the battery reserves were exhausted.

2. **Cleaning**. Initial cleaning is required to remove mud, debris and water.

3. **Environmental hazard inspection**. This is an assessment for environmental hazards such as asbestos. In the Lismore exchange, asbestos floor tiles had started to warp and curl causing potential asbestos risks by breaking underfoot and becoming friable, and environmental mitigation measures were required.

4. **Environmental mitigation**. When an environmental hazard is confirmed, a mitigation plan is developed to make the workplace safe, and the plan is implemented.

5. **Temporary power restoration**. Diesel generators are brought to site and connected to equipment and systems that have been confirmed not to have been damaged by water ingress. This also allows lighting to be turned on, once electrical systems are confirmed to be safe. Work continues in parallel with power companies on restoration of AC Mains supply.

6. **Planning**. Network engineers are engaged to plan the short- and longer-term restoration of services. Planners work to achieve two goals: Firstly, to restore customer services; and secondly, to develop a more flood-proof solution, to minimise the possibility of future floods causing the same level of service disruption. In the case of Lismore Exchange, the plan included relocating some transmission equipment to the second floor, as well as upgrading it to higher capacity to accommodate future bandwidth growth in the region.

7. **Implementation**. Once the plans are developed and approved, work commences to deploy new equipment. Material and equipment are ordered, shipped and installed. In the case of Lismore Exchange, technicians skilled in different technologies worked in parallel. While some technicians rebuilt transmission infrastructure on the second floor, Optic Fibre technicians worked on fibre repairs.

8. **Customer migration**. Finally, customers are migrated to the new equipment and services are restored. In the case of Lismore exchange, it was our backhaul transmission that was impacted. At the date of writing this submission, the majority of customers had been migrated onto a permanent backhaul solution, however, a small subset of customers are still being served by a temporary backhaul solution that involved rebuilding parts of the water-damaged transmission service. We plan to migrate these customers to a permanent solution once the transmission upgrades (see step 6 above) are complete.

## 3.4    Case study 2: Interim network deployments for temporary service restoration

Below, we briefly outline three examples where we deployed interim network arrangements to temporarily restore service to a local community, ahead of commencing work to replace and repair equipment for a permanent restoration of services.

**Broadwater**. Once we were able to gain access to the site where our exchange hut is located in Broadwater (after the floodwaters receded), it was identified that the exchange had been completely inundated by floodwaters. Upon initial inspection it was identified that a MEOW deployment would be the most appropriate and timely method to reinstate customer connectivity. With this understanding, Telstra deployed one of its Brisbane based small MEOWs to the Broadwater site in preparation to cutover services. While the deployment plan was being formulated and the unit transported to site, further assessment of the damage and logistics of replacing physical hardware was being performed. With both

recovery avenues running in parallel, community services were ultimately restored within a week via a complete hardware replacement of all electronic hardware at site. This occurred with the MEOW still deployed at site just in case it was needed for service recovery. The call was made to assess a MEOW deployment on the 11 March, and with both restoration plans running in parallel, full reinstatement of all customer services was achieved by 17 March.

**Buckendoon**. The Buckendoon mobile base station, which serves the community of Woodburn, was inundated by floodwater on 2 March 2022, and was completely surrounded by floodwaters for several weeks post the flood peak, as shown in Figure 7.

This loss of mobile coverage resulted in significant communications loss for the Woodburn community, which was overcome by deploying a COW at the back of the Woodburn exchange, as shown in Figure 8

This reinstated mobile coverage on 12 March. This temporary mobile solution will stay in place for several months to allow the original mobile site at Buckendoon to be rebuilt. We note Woodburn was declared a community in isolation from 2 March to 8 March inclusive as PSTN services were also disrupted during this time. Once PSTN services were restored on 8 March, the community in isolation status was removed.



**Figure 7**: Aerial view of the inundated mobile base station at Buckendoon.

**Figure 8**: View of the Woodburn Exchange with the antenna of the COW
visible behind the exchange building (red circle).

**Mullumbimby**. While Mullumbimby was declared a community in isolation from 1 March to 7 March due
to a loss of both mobile and fixed line communications, both were reinstated through a combination of
hardware replacements and optical fibre cable repairs by 7 March. Following reinstatement of mobile
coverage to the community, the mobile tower within the community was set alight in what is being
investigated as a potential arson attack. The damage caused by the fire in the early hours of 18 March
impacted all mobile coverage to the Mullumbimby community.

By 21 March, Telstra had in place a COW that was supporting a reduced mobile coverage footprint
within the Mullumbimby community. Work is still ongoing to fully restore the site.

## 3.5    Engagement and Communication with Emergency Response Coordination

In the lead up to and right throughout the flood event, Telstra continued to be well connected and
engaged with the NSW Telco Authority and Emergency Management Australia (EMA) through its state
and regional Emergency Service Liaison Officers (ESLO). See section 3.1 above for further detail.

Telstra was also well engaged with the energy sector throughout the event, sharing intelligence both
ways on priority restoration sites and areas of response focus.

We also sent twice daily updates (morning and evening) to federal, state, and local stakeholders.

### 3.6 Community assistance

We understand how important it is to reach out to friends and family during times of crisis, and one of our key focuses during natural disasters is making sure that we support our customers, and the local communities, devastated by floods to stay connected.

Telstra implemented several measures to assist our customers, volunteer groups and the rest of the community affected by the 2022 flooding in north-east NSW and the central Sydney regions. These measures included:

- Customer Assistance Packages: We provided a range of short- and long-term assistance packages for people affected by the floods, including account credits and call diversions to alternative numbers at no cost.[7]
- We made grants of up to $10,000 available to flood affected communities across both NSW and Queensland, which were expected to total at least $250,000 to help support flood recovery.[8]
- We provided support at 17 recovery centres across north-east NSW and Sydney in the period after each flooding event, with a total of 15 local staff volunteering their time to work at these centres.

# 4 Ongoing work to recover from the floods

### 4.1 Normalising temporary facilities

As described above, there are many instances where we deploy temporary facilities, which in the recent floods mostly involved temporary, above ground fibre and satellite solutions to restore connectivity to a region. The work required to restore the permanent solution can take many months to complete. For example, before the permanent fibre solution for the transmission route shown in Figure 3 can be deployed, the bridge needs to be rebuilt, inclusive of new cable conduits to house the optic fibre. Temporary facilities can therefore remain in place for many months until permanent solutions can be reinstated.

As mentioned in section 3.1 above, we call this third phase the "three-month" time horizon as it can involve significant rebuilding of civil infrastructure (bridges, roads, etc), or may involve decisions to permanently relocate communications facilities to minimise future risk of damage from natural disasters. As such, this phase may take substantially longer than three months. Our goal is to provide more reliable services in the future, and if rebuilding in a new location will achieve this goal, it can be better to rely on extended use of a temporary solution to achieve the goal.

### 4.2 Ongoing, intermittent faults may not be detectable by our monitoring systems

Flood events can result in water ingress to cables, cable conduits, pits and inspection points without actually washing away or visibly damaging the infrastructure. Initially, there may not be any impact or outage associated with the water ingress. Over time however, water can cause corrosion to metallic joints, which may in turn give rise to intermittent faults, noisy lines or a reduction in broadband data speeds. This can occur on legacy copper (analogue) PSTN services, and even on NBN supplied Fibre to the Node services (although the latter is far less likely, given the far shorter copper lengths involved).

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[7]  https://www.telstra.com.au/aboutus/community-environment/disaster-relief#assistance-packages
[8]  https://exchange.telstra.com.au/telstra-flood-grants/

While we do monitor our network broadly to determine service quality and to detect outages, not every outage will be visible to our monitoring systems, especially where the disruption to a service is intermittent in nature. If customers are still experiencing service issues or a degradation of service weeks or months after a flood event and they have not yet reported it to us, we strongly encourage our customers to contact us and report the fault.  Telstra can be contacted through the MyTelstra App, or on 13 22 00.

# 5    Suggestions to help improve responses to future flood events

## 5.1    Earlier and better visibility of predicted flood movements

Earlier and better visibility of predicted flooding patterns is critical to informing telecommunications providers of potential impacts to their networks. If and where available, access to flooding pattern forecasts spanning periods greater than 24-hours could allow us to better:

- manage resource movements before, during and after a flood event, to prepare for recovery works;

- provide improved safety messaging to our staff and contractors;

- manage supply of equipment and construction material into areas likely to be impacted so that it is ready for deployment, thereby reducing restoration timeframes; and

- allow proactive deployment of generators / backup power and ongoing refuelling requirements to ameliorate mains power failures.

This type of information should be provided in an agreed geospatial "vector" data format identifying unambiguous locations. Data providers also need to clearly indicate the status and nature of events, given that some data providers use their data feed for incidents that are non-flood related. All incident location data and attributes need to be machine-readable as large-scale events cannot be effectively analysed by humans.

## 5.2    Access to our infrastructure during and after floods

Telstra appreciated the valuable support it received from government (state and federal) agencies across flood affected regions. However, road closures and other challenges delayed access to sites and service restoration in some instances.

Telstra suggests consideration be given to measures to improve telecommunications providers' ability to access infrastructure sites after floods. Issues to consider include: assistance via aerial escorts when roads are closed; access to fuel for technicians' vehicles; and help assessing whether land and/or trees are safe in proximity to damaged infrastructure.

## 5.3    Improved information flow regarding evacuation centres

During the flood events, we sought to ensure communications at evacuation and operations/recovery centres were not compromised, and in the event they were, we prioritised restoration of services at these locations. As such, timely information about the location of evacuation and operations centres along with occupancy numbers is essential to ensure restoration efforts are efficiently allocated to the highest priority.

Having real-time information, including occupancy numbers, allows us to monitor the network supporting these centres proactively and closely, for both emergency agencies and the public who rely on

communications services. If, for example, a mobile site was to fail for any reason, knowledge that it is supporting an operational evacuation / recovery centre would trigger an escalated response.

For these reasons, we suggest industry is provided with access to a single online source providing information about the plans for evacuation and recovery centres, including their current status. If online information cannot be provided, it would be helpful if information could be incorporated into a written situation report provided to industry.

## 5.4    Better community preparedness for natural disasters

While telecommunications providers build resiliency and redundancy into their networks, terrestrial network infrastructure located in possible flood affected zones may be damaged or impacted, leading to potential interruption to telecommunications services. For this reason, it is important for government, first responders, support organisations (e.g. hospitals, medical centres, community facilities), businesses and consumers to take steps to prepare for possible impacts to telecommunications services during floods and other natural disasters.

While Telstra did not receive any requests for satellite phones during the north-east NSW and Sydney flood events this year, during the 2019-2020 bushfires we received numerous requests for satellite phones from organisations who were not equipped with these devices. While we were able to distribute some satellite phones during those fires, we were unable to meet all requests. Through the subsequent inquiries, we recommended that government and industry encourage organisations, local councils and businesses, particularly those involved in responding to natural disasters, consider whether they are adequately prepared for possible impacts to their telecommunications services during natural disasters, and to take steps to improve their preparedness where necessary, including addressing telecommunications services in their disaster recovery plans.

ACMA compliant mobile repeater devices may also be of assistance to improve coverage in marginal coverage areas, and we encourage community organisation to talk to their mobile service provider (Telstra, Optus or TPG) about these devices.

We would welcome government support for an industry led public awareness campaign and other community engagement about possible impacts to telecommunications services during natural disasters, and possible steps that can be taken to improve their telecommunications preparedness.