Ararat Network Report

A brief detailing the Ararat network; the program, issues and remedies and the schedule for further works

November 2025

The Ararat Network

The Ararat Network was constructed to provide fine-scale micro-climate weather throughout Ararat to support the local farming community and provide public access to better weather and environmental information. The network also incorporated fire detection at locations bordering the Grampians and air quality monitoring throughout the network.

Additional programs that were incorporated into the Ararat Network included:

- Stormwater monitoring at three additional locations - George Road, Queen Street and View Point Street.
- Dual weather and soil moisture monitoring at 11 of the 28 locations - farm locations.
- Weather reporting elements of the program include wind speed, wind direction, wind gusting, wind vectoring, temperature, relative humidity and rainfall.

Weather

Weather accuracy throughout the network has been consistent, accurate and compliant with Bureau of Meteorology and World Meteorology Organisation standards.

Weather reporting has been examined throughout the operation of the network and validated to comply with World Meteorological Organisation and Bureau of Meteorlogy standards of reporting. A continuous equivalence program, headed by Dr Greg Ayers continues to analyse all weather data with that of trusted sources to ensure validated weather data readings.

Rainfall has been the exception. Rainfall was found to be under-reading initially due to high wind impacts on ultrasonic measurement and led to the decision to install rain bucket tippers.

Rainfall

Rainfall accuracy early in the network was plagued by high winds leading to under-reading of rainfall amounts in many locations.

Attentis incorporated weather monitoring components from the world leading provider of weather monitoring sensors, sensors that are also employed by the BoM. These weather sensors employ a rainfall measurement using ultrasonics to determine the amount of rainfall. Although the ultrasonic readings provided accuracy in low wind conditions, it was discovered that high wind events and areas of higher wind patterns, impacted the ultrasonic rainfall readings, leading to under-readings of actual rainfall. To combat this under-reading, Attentis made the decision to install additional equipment in the form of rain tipper buckets to provide a secondary measurement of rainfall. Although rain tipping buckets are generally placed on the ground, due to the risk of vandalism and possible impact (although specially designed cages were fabricated and employed to rectify this in some locations), the tipping buckets were placed on an arm and attached to the pole.

It is noted that all multi-sensor units required an upgrade to incorporate the additional rain buckets.

Rain Tipping Buckets

To address the rainfall under-reading, Attentis, at its own cost, commenced the installation of rainfall tipping buckets to provide a secondary rainfall reading. The rainfall buckets were located on an arm attached to the pole, placed approximately 1 metre from the pole structure. In some cases the rain buckets were placed on a concrete plinth on the ground and protected by mesh cages.

Further rainfall comparisons ensued during periods of rain. Rainfall results were found to have improved, however during high wind events some locations were found to now be over-reading rainfall. Further examination determined that high wind were causing the rainfall tipping bucket arm to vibrate, causing the tipping to over-read. The ground located bucket tippers were reading correctly.

Relocation of arm mounted rain tipping buckets.

The tipping buckets were removed from the 1 metre arms and placed on new shorter arms with additional rigidity, located closer to the centre of the pole. Further testing revealed the tipping buckets provided accurate rainfall data, inline with the ground placed tipping buckets. New arms and rain tipping buckets have been installed to all but five locations.

The remaining five locations requiring the addition of rain tipping buckets shall be installed in November / December 2025, to ensure consistency throughout the network.

Animal Encroachment

Animal encroachment in locations across the Ararat Network has had a significant impact across the network requiring replacement of weather stations at multiple locations; one location requiring four replacements.

Animal encroachment, generally birds, have impacted the network throughout operation, eating cables, chewing wind measurement arms, stripping cables and connections requiring ongoing attendance and the introduction of an array of bird deterrent additions. Stainless steel braided hoses, bird spikes and crown spikes have been employed to reduce the level of impact. Some locations, although hardened have continued to be impacted, Mt Nicholson in particular. The ongoing application of additional hardening devices will continue. Animal encroachment has been an ongoing impact that has caused a range of data feeds to be impacted at a range of locations throughout the ongoing operation of the network.

Communication

The Ararat network has experienced an array of communication fluctuations throughout its operational term, notably on the outer fringes of the network.

Communication at all locations has been constantly reviewed to maintain network operations. Devices experiencing intermittent data transmission problems have been logged, review and in some cases telemetry tested to gain a greater understanding of the cause of communication outages. It is noted that locations that have experienced multiple communication impacts are those of the outer edges of the network, in particular Warrak Bridge, Nerrin Nerrin, Wickcliffe and Ballyrogan. Warrak Bridge in particular has significant fluctuations in the availability of communication, noting high impacts on the Telstra service, due in part to a local resident employing a signal booster (intermittently) causing loss of communication. This particular issue requiring exhaustive investigation to determine the cause, due to the intermittent nature of the engagement.

Communication will continue to impact the network at certain locations. Attentis will continue to monitor these impacts locations and engage further solutions to stabilise communication, employing a range of antennas, boosters and networks to maintain communication at these difficult locations.

Stormwater Network

The Stormwater monitoring network is the centre of Ararat has proven to be accurate and reliable throughout its operation from the 1st July 2024 to today.

The construction of the stormwater network has been faultless throughout operation providing consistent, accurate and steady data, images, information and communication since construction. Whether this is the result of being in town, with greater protection from severe weather impacts, or the stability of communication, these three locations have operated faultlessly since construction.

Data used to support

The Ararat network was used by the CFA and Geoscience Australia throughout the Grampians Fire providing a key resource for information, with data utilising during and after the event, including providing smoke impact reports for the Grampians Estate to support there impact reports.

The Ararat Network has providing data for a range of events including the Grampians Fires where the data was utilised by Geoscience Australia, to support the combating efforts of the local emergency services.

Weather and air quality data gathered from the Grampians Estate location during the fires was formalised into a series of analytical reports, constructed by Attentis, provided to the Estate to support the claims associated with impacts to the vineyards on the Estate.

Still be to implemented

The Ararat Network still has some components and features to be delivered as well as further analysis into communication stability.

Attentis continues to schedule works on the Ararat Network including the installation of five additional short arm tipping buckets and the installation of soil moisture sensors of 11 farms within the network.

Additional work is continuing at Warrak Bridge, Nerrin Nerrin, Wickcliffe and Pomonal to rectify communication issues, animal impacts and rectify some gaps in data from components that have been impacted and no longer proving data.

These elements will be constructed during November and December to return the network to complete operational status. Attentis has compiled a complete diagnosis of all elements of every unit in the network and is working through a range of software and hardware upgrades to address the impacts the network has endured.

WORKS SCHEDULE FOR ARARAT

Willaura Town Hall - Camera replacement - this unit has been in operation since February 2023

Tatyoon Reserve - Weather replacement - animal impact

Lake Bolac - Weather replacement - animal impact

Mt Nicholson - Weather impact - animal impact

Pomonal East - Weather impact - unknown cause

Hucker Road - Communication upgrade

Woorndoo - Stream Rd - Communications upgrade

Laby Street - rain bucket installation

Armstriong Road - rain bucket installation

Parri-Yalloak Road - Communication upgrade

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