

## Fort Bribie – defending Brisbane in WW11

Fort Bribie was built to defend the North West Channel into Moreton Bay during WW II. Now its remains are under attack from a different challenge: the persistent forces of coastal erosion.

Queensland National Park rangers are working to preserve Fort Bribie digitally through imagery, GIS mapping and 3D rendered modelling. We invite you to explore the fort when it was operational, view the changes over time, and appreciate the coastal processes that will eventually bring its demise.



**Number One gun emplacement** (southern gun). Photo Matt Nash-Arnold © Qld Govt

## Fort Bribie history

Written content sourced from: Queensland Government WWII Historic Places

Fort Bribie, constructed between 1940 and 1942, consisted of two 6-inch guns and their extensive support infrastructure. The Fort was built to defend the North West Channel into Moreton Bay in World War 11.

Prior to the emplacement of two 6-inch guns at Cowan Cowan on the West side of Moreton Island in 1937, the coastal defence of the Moreton Bay region was based at the mouth of the Brisbane River at Fort Lytton, constructed in the 1880s.

## Fort Bribie's military history

After the outbreak of World War II in September 1939 these defences, at Moreton Island and Fort Lytton, were supplemented by two 6-inch Mk XI guns (8th Heavy Battery) positioned at the north end of Bribie Island. The guns were installed by March 1940, but their temporary steel cruciform mounts were unstable and sand dunes blocked their field of fire.

In July 1940 there was only a timber control tower, the magazines had no floors and there were no searchlight emplacements, but in February 1941 plans were being developed to upgrade Fort Bribie with additional camp huts, two gun emplacements, a Battery Observation Post (BOP), Command Post (CP), Observation Post (OP) and two DEL (Defence Electric Lights, also known as CASL, or Coastal Artillery Searchlights). In March 1941 Colonel JS Whitelaw, Commander Coast Defences, Eastern Command, recommended building a BOP about 200 yards north of the northern gun; a CP about 200 yards south of the southern gun, and a plotting room halfway between the northern gun and the BOP.

Fort Bribie's role was to provide close defence of the North West Channel into Moreton Bay.

The entry of Japan into the war on 7 December 1941 spurred efforts to upgrade Fort Bribie and increase the infantry defence of the island.



**Roster board inside the southern gun emplacement** — 1980, left (© Sunshine Coast Libraries), 2006, centre (Marcus Toyne © Qld Govt) and 2018, right (Matthew Nash-Arnold © Qld Govt)

An inspection of Fort Bribie in February 1942 noted that a good hutted camp existed at the fort, complete with showers, latrines and a very fine kitchen and refrigerator. However, the power supply and a lack of water were problems. A canteen and Post Office were being constructed, and the 'technical' (BOP etc) buildings were all in a partially finished state.

Other units on the island at the time of this inspection included a Garrison Battalion, an AIF Composite Company, and a Militia Battalion. Volunteer Defence Corps (VDC) personnel also helped with construction work on the island. The AIF Composite Company had a number of machine gun positions north and south of Fort Bribie, plus two mortar positions and two timber pillboxes south of Fort Bribie, by 31 December 1941. Mosquitoes, sandflies and fleas proved to be a major irritant for all personnel stationed on Bribie. In addition to the infantry, the Australian Women's Army Service (AWAS) arrived in 1943, and were involved in most aspects at Fort Bribie except the manning of the guns. Their huts were located south of the Officer's Mess and the CP.

Construction of the new two storey gun emplacements, two storey searchlight emplacements, BOP, CP and Plotting Room at Fort Bribie was completed by April 1942. Later that year two American 155mm guns were stationed at Skirmish Point at the south end of Bribie Island, and in 1943 a similar battery was positioned at Rous, on the east side of Moreton Island.



**Northern observation post** — 1980, left (© Sunshine Coast Libraries), 2006 centre (Marcus Toyne © Qld Govt) and 2018, right (Matthew Nash-Arnold © Qld Govt)

Within Fort Bribie are two Mine Control Huts used by Royal Australian Navy (RAN) Station 2 during 1942 and 1943. These controlled "guard" indicator loops and mine loops set in the North West Channel. An Indicator loop relies on the production of an induced current in a stationary loop of wire when a magnet moves overhead, and when a submarine was detected by the guard loop, the operator would wait until there was also a galvanometer 'swing' on the mine loop and then the mines would be detonated from the Mine Control Huts, by sending a current down the mine loop. The Mine Control Huts have no windows, so observation of the ocean surface (to confirm that a submerged object had been detected) was most likely conducted from the structure located just north of the mine huts.



**Northern gun emplacement** — 1969, left, (© Sunshine Coast Libraries) and 2018, right, (Matthew Nash-Arnold © Qld Govt). The photographs demonstrate the significant beach erosion impacting the structure.

A 1945 map of Fort Bribie places the CP to the south of the camp (the southern searchlight is off the map), and a Signals Operations Room (SOR) is recorded east of the northernmost section of the camp, south of the southern (Number 1) gun. Reserve magazines are shown west of each gun emplacement. To the north of the northern (Number 2) gun the two Mine Control Huts formerly used by RAN Station 2 are marked as "Magazines", and the structure just to the northeast of these buildings is recorded as a BPR (Battery Plotting Room). Further to the north is a BOP, and beyond that the northern searchlight. An underground hospital, reported to have been built south of the officers' mess and sleeping quarters, is not marked on this map.



**Number One gun emplacement (southern gun)** — 1946, left, (© Sunshine Coast Libraries), 2006, centre (Marcus Toyne © Qld Govt) and 2018, right (Matthew Nash-Arnold © Qld Govt)

The structure marked as the BPR on the 1945 map has also been referred to by various modern sources as the BOP. In 2009 parts of another structure were discovered just south of the Mine Control Huts, and this has been called the BPR. If the structure just north of the Mine Control huts is the BPR, its distance from the northern gun emplacement is much further than is indicated by the

1945 map. However, it does not match an August 1941 requirement that the BOP be constructed as a steel frame and fibrolite structure with bulletproof plating for the rangefinding cells. For the purposes of this web page, the concrete structure just north of the Mine Control Huts will be referred to as an observation structure.

### 2014 fort update

Beach erosion is gradually exposing more elements of the fort over time. The main surviving concrete elements include the northern searchlight, a two storey structure now standing on the beach. The northern (Number 2) gun emplacement is about 640m south of the northern searchlight, while an observation structure is located about 425m south of the northern searchlight. The observation structure consists of two walls supporting a platform above with a partial wall. About 30m to the south is the buried northern Mine Control Hut, and then the larger southern Mine Control Hut.

Recently, concrete and steel remains of another structure were revealed by beach erosion about 60m south of the southern mine hut.

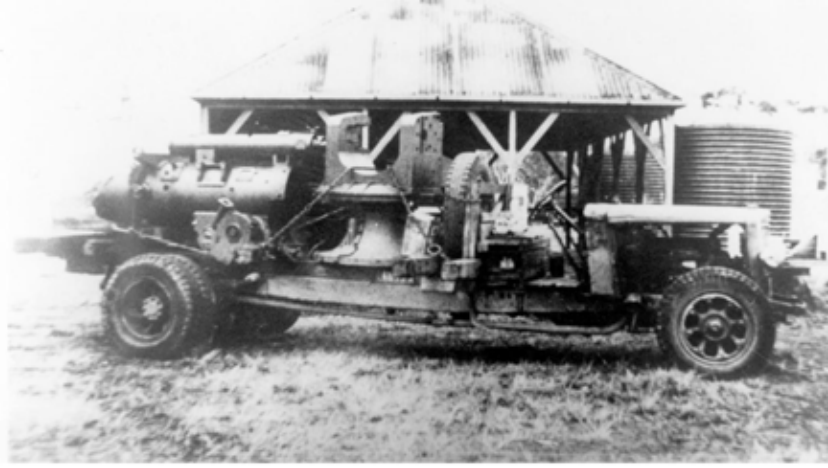
About 160m to the south of the mine huts is the northern gun emplacement, a two storey structure with a gun platform open to the east and five rooms below. The concrete and timber overhead cover for the gun has collapsed. There is over 100m distance between the gun emplacements. The southern (Number 1) gun emplacement retains its overhead cover. About 60m south of the Number 1 gun is the Signals Operations Room (SOR), which was once buried in a sand dune, but is now exposed on the beach.



Fort Bribie's Command Post, 1942. (© Sunshine Coast Libraries)

In the area to the west and south of the SOR are a number of concrete slabs and concrete stumps for various camp buildings. Other concrete structures survive around the camp area, including several round wells, urinals, pump house, septic tank, and septic pipeline mountings. Little remains of the Command Post (CP) at the south end of the men's section of the camp.

The most southern element is another searchlight, located close to the beach about 620m south of the Number 1 gun emplacement.



**6" Naval Gun bound for Fort Bribie on Bribie Island, ca 1939, left. A.I.F. Bribie Covering Force Coastal Defence Unit, Bribie Island, 15 January 1942, right** (© Sunshine Coast Libraries)

Credits:

Written content - Queensland Government WWII Historic Places

Title Fort Bribie plan (BP378/1, Folder B Folio 39) - National Archives of Australia

Historic photography - Sunshine Coast Council Libraries

## Explore the remains of Fort Bribie

This section of the storymap shows photographs which document Fort Bribie and its support infrastructure (the camp) remains in 2018 and 2019.

Map: An overview of the location of the Fort Bribie infrastructure

The red teardrops show where the photographs in this section were taken.



Map of the location of the Fort Bribie infrastructure photos

Photo 1: Gun Emplacement 1 (Southern) side view



**Gun Emplacement 1 (southern).** Photo June 2018, Matthew Nash-Arnold © Qld Govt

Photo 2: Gun Emplacement 1 (Southern) beach view



**Gun Emplacement 1 as viewed from the beach.** Photo June 2018, Matthew Nash-Arnold © Qld Govt

### Photo 3: Gun Emplacement 2 (northern) looking south

Significant erosion to the beach over the decades has exposed several fort structures. This photo shows the gun emplacement structure now well below the dune line on the beach in June 2018.



Gun Emplacement 2 (northern) looking south to Woorim. Photo June 2018, Matthew Nash-Arnold © Qld Govt.

### Photo 4: Daily roster board

Located on the ground floor of Gun Emplacement 2, was used to assign daily duties for the soldiers.



Daily roster board. Photo June 2018, Matthew Nash-Arnold © Qld Govt.



### Photo 5: Southern Searchlight

Photograph looking south to Woorim showing the southern searchlight structure. There are two searchlight buildings located approximately 1.2 kilometres apart.



**Southern searchlight.** Photo July 2018, Matthew Nash-Arnold © Qld Govt.

### Photo 6: AWAS Signal Station

Australian Women's Army Service (AWAS) Signal Station, looking south to Woorim. The Signal Station was used to manage all phone calls in and out of Fort Bribie. This building used to be located well behind the dune line but is now on the beach.



**Australian Women's Army Service (AWAS) Signal Station.** Photo July 2018, Matthew Nash-Arnold © Qld Govt.

### Photo 7: Northern Searchlight

The northern searchlight structure looking north to Caloundra. This building used to be located behind the second row of dunes. The two searchlight buildings were used to illuminate targets for the fort's guns.



**Northern Searchlight.** Photo November 2018, Matthew Nash-Arnold © Qld Govt.

### Photo 8: Mine Control room.

The Mine Control Room (MCR) was used to monitor and coordinate several 'mine loops' which ran out perpendicular to the beach. These structures were located well behind the dune line but have been exposed due to heavy beach erosion over the decades.



**Mine Control room.** July 2018, Matthew Nash-Arnold © Qld Govt.

Photo 9: Mine Control Room entrance.

Photo, facing due east, of the Mine Control Room entrance, overgrown by vegetation.



Mine Control Room entrance. Photo July 2018, Matthew Nash-Arnold © Qld Govt.

Photo 10: Mine Control Rooms.

In February 2019, large seas caused by Cyclone Oma hit Bribie Island producing significant beach erosion. This photo shows significant erosion to the sands around the northern mine control room which is no longer level.



Mine Control Rooms. Photo March 2019, Leanne Siebuhr © Qld Govt.

Photo 11: Officer's mess building footings.

Photo of the Officer's mess building taken from the southern end of the structure. The building was a split-level structure.



Officer's mess building footings. Photo taken November 2018, Matthew Nash-Arnold © Qld Govt.

Photo 11: Stairs.

Remaining set of stairs to a raised building footing, possibly to the kitchen or one of the mess buildings.



Stair remains. Photo taken November 2018, Matthew Nash-Arnold © Qld Govt.

Photo 13: Sleeping quarters footings.



Sleeping quarters footings. July 2018, Matthew Nash-Arnold © Qld Govt.

Photo 14: Officers' latrine and showers.



Officers' latrine and showers. Photo Matthew Nash-Arnold © Qld Govt

Photo 15: Men's latrine.

The men's latrine and shower block footings and slab, taken from the south east corner of the block.



Men's latrine footings. November 2018, Matthew Nash-Arnold © Qld Govt.

Photo 16: Remains of the men's latrine toilets.



Remains of the men's latrine toilets. November 2018, Matthew Nash-Arnold © Qld Govt.

Photo 17: Men's toilet remains.

A close up of what remains of one of the toilets in the men's latrine.



Close-up of remains of toilet. November 2018, Matthew Nash-Arnold © Qld Govt.

Photo 18: Septic tank.

Latrines facilities for the fort feed into this septic tank. Once treated the sewage was pumped via a pipeline to Pumicestone Passage, July 2018.



Septic tank. July 2018, Matthew Nash-Arnold © Qld Govt.

Photo 19: Septic line piers.

Once the sewage had been treated in the septic tank it was transported to Pumicestone Passage via a pipe line. The piers seen in this photo supported the pipeline. Photo taken looking due west towards Pumicestone Passage.



Septic line piers. November 2018, Matthew Nash-Arnold © Qld Govt.

Photo 20: Septic line piers.

Photo taken looking east to the septic tank.



Septic line piers, looking east to the septic tank. November 2018, Matthew Nash-Arnold © Qld Govt



Photo 21: Machine gun position.

Approximately a dozen machine gun and mortar positions were established west of the fort to protect from invasion from Pumicestone Passage. This photo shows one of the raised sand mounds used as a defensive position.



**Machine gun position.** December 2018, Marcus Toyne © Qld Govt.

Photo 22: Mortar position.

Photo showing the remains of one of the mortar positions located to the west of the fort.



**Mortar position.** December 2018, Marcus Toyne © Qld Govt.

Photo 23: Mortar position.

Another mortar position located west of gun emplacement 2 (northern).



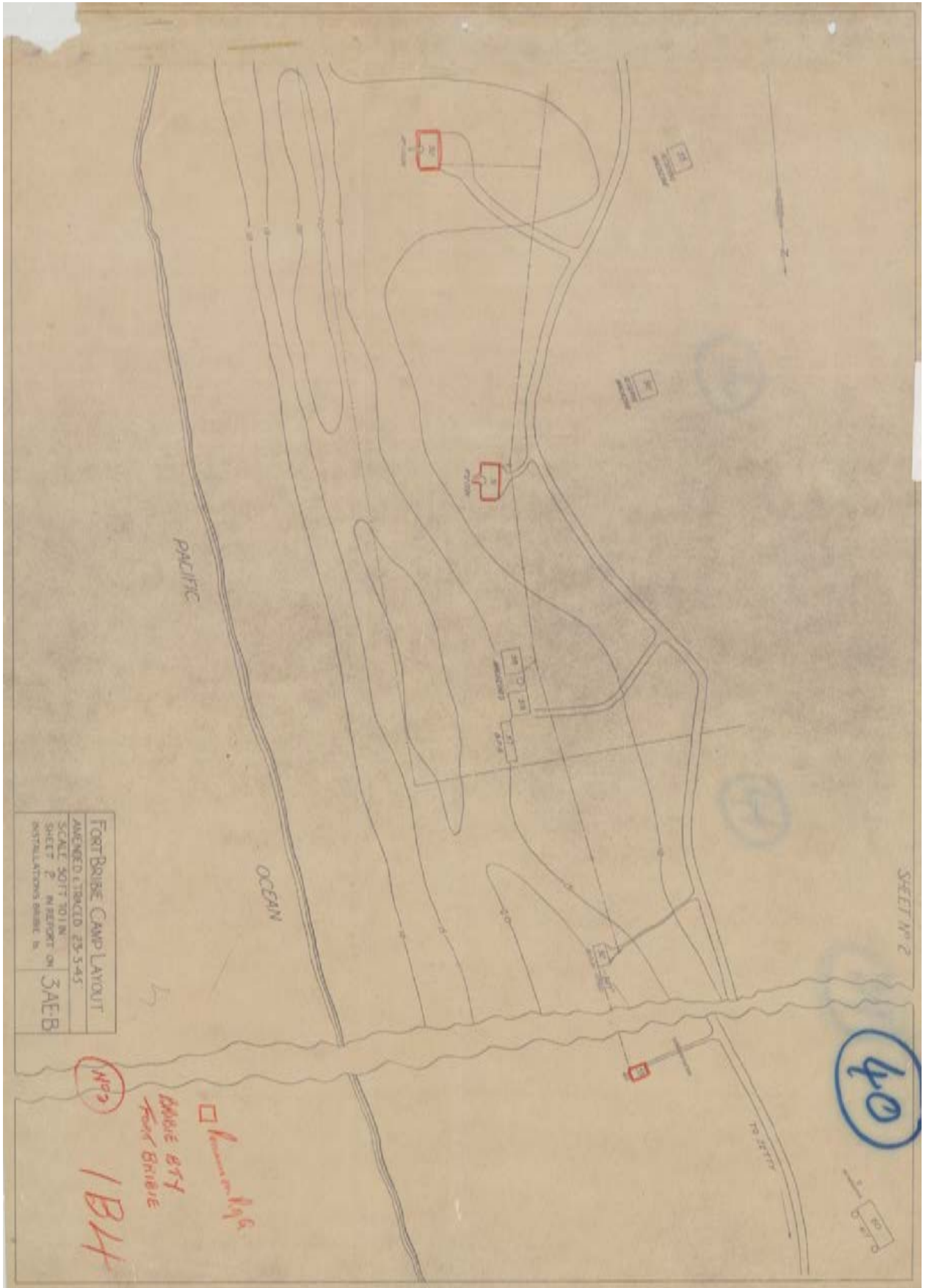
**Mortar position.** December 2018, Marcus Toyne © Qld Govt.

## The 1945 camp

A map of the camp in 1945 when overlaid on an aerial photograph taken in 1961 can show that very little of the camp remained by 1961.



Map of Fort Bribie camp layout, 1945.



Map of Fort Brisbane camp layout, 1945.

## 1961 aerial photograph of the Fort Bribie area

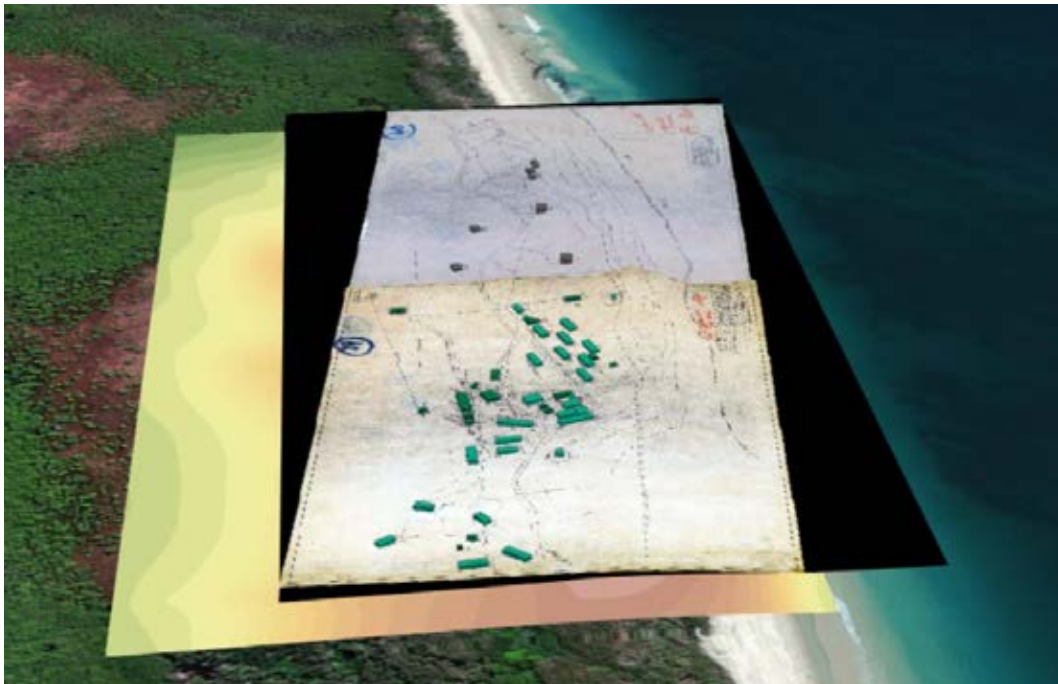
The background is part of the Noosa Heads - Bribie Island 1961 series (Film QAP1131 Frame 22 May 1961), of aerial photography at a scale of 1:12,500.



1961 aerial photograph of the Fort Bribie area highlighted with the red rectangle.

## 3D camp view

A 1945 map of the Fort Bribie camp is overlaying a recent aerial photograph of the area. The support structures have been modelled to look 3-dimensional. In 1945 Fort Bribie camp was hidden from view of ships entering the North west channel by a large sand dune. In 1918 the dune has been replaced by the beach and the ocean is encroaching on what was once safely behind this large dune.



A 1945 map altered to show the location of the sand dune that hid the camp.

## Forces of nature

Coastal processes are continuously shaping the sand islands of South East Queensland. The sand islands of South East Queensland—Fraser Island (K'Gari), Bribie Island, Moreton Island (Mulgumpin), North Stradbroke Island (Minjerrabah) and South Stradbroke Island, along with the Cooloola Coast, combine to form the largest accumulation of sand in the world.

### A river of sand

The nearly pure quartz sand of these islands starts its journey in the New England highlands of New South Wales.



Diagram of New England tablelands topography. Diagram Marcus Toyne © Qld Govt.

Eroded from the granite rocks that dominate the region, the sand is carried down the Hastings, Macleay, Clarence, Brunswick and Tweed rivers to the New South Wales coast.

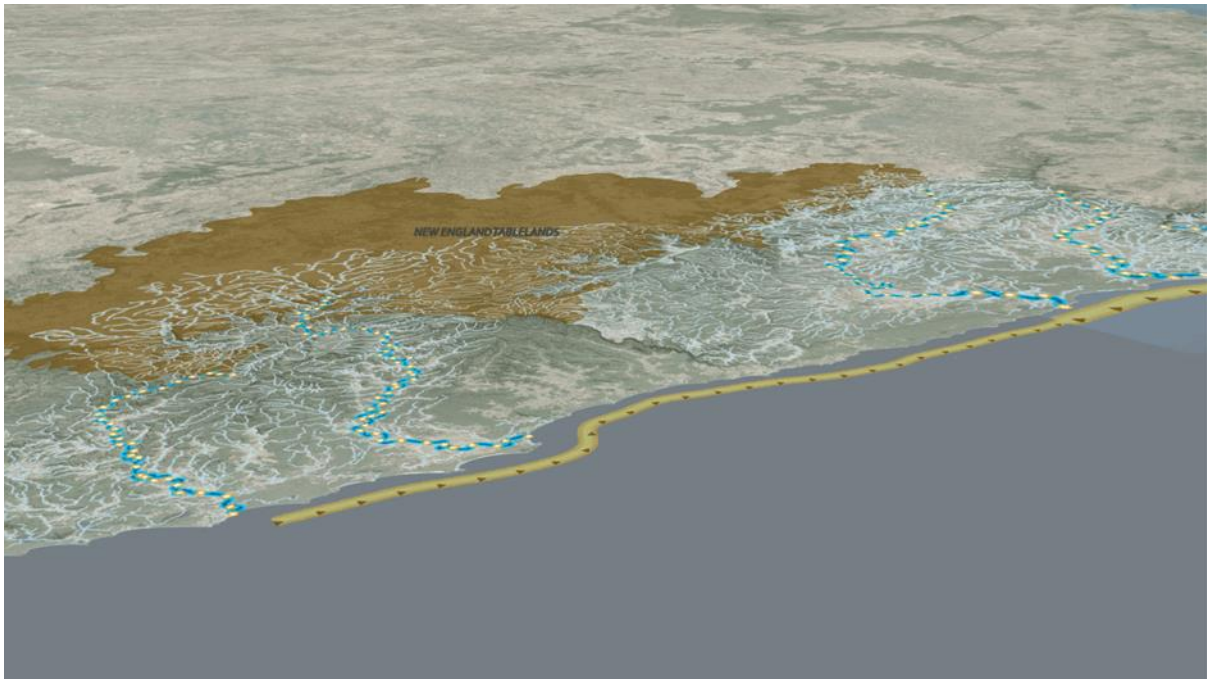
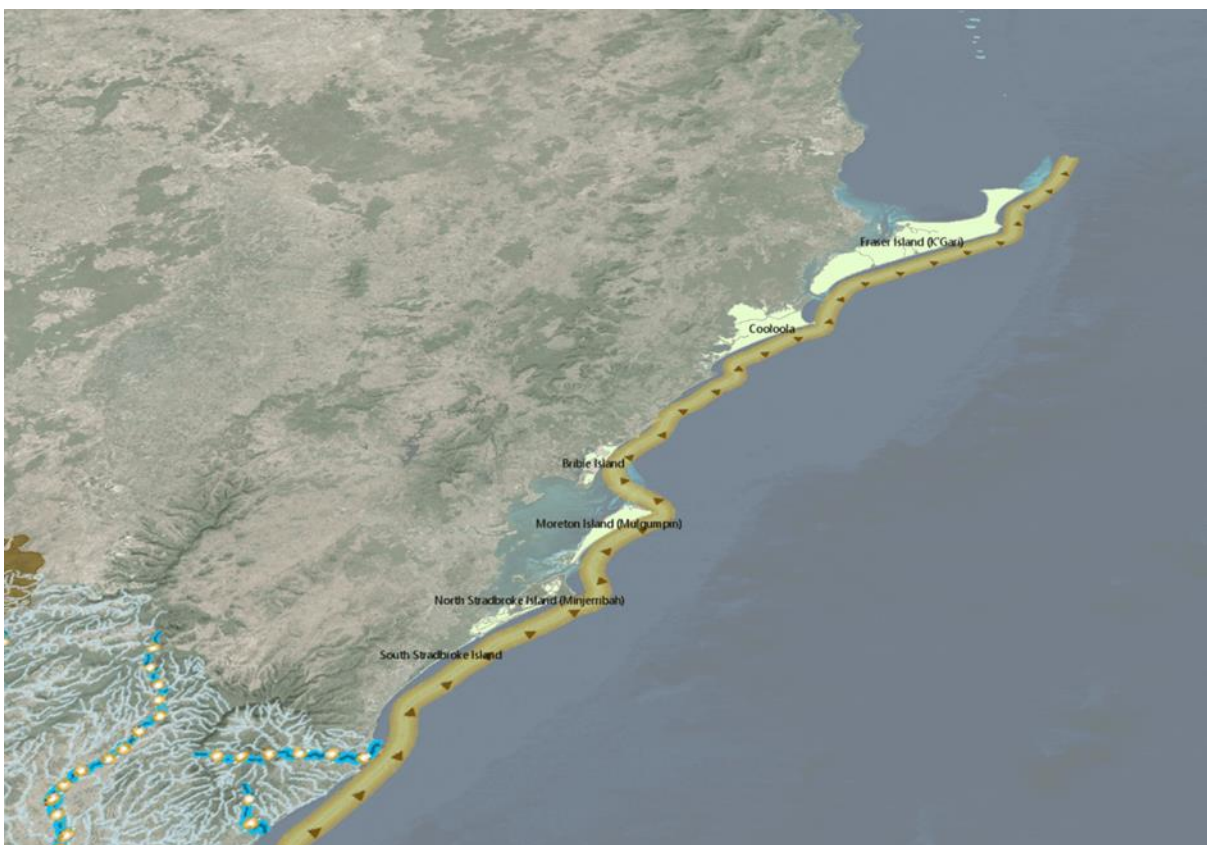


Diagram of rivers flowing to ocean from New England tablelands. Diagram Marcus Toyne © Qld Govt.

Starting from as far south as Port Macquarie, the sand is transported by waves over 800 kilometres up the coast, finishing at the Breaksea Spit on the northern tip of Fraser Island (K'Gari). The sand moves along the spit and cascades down the continental slope into the ocean depths.



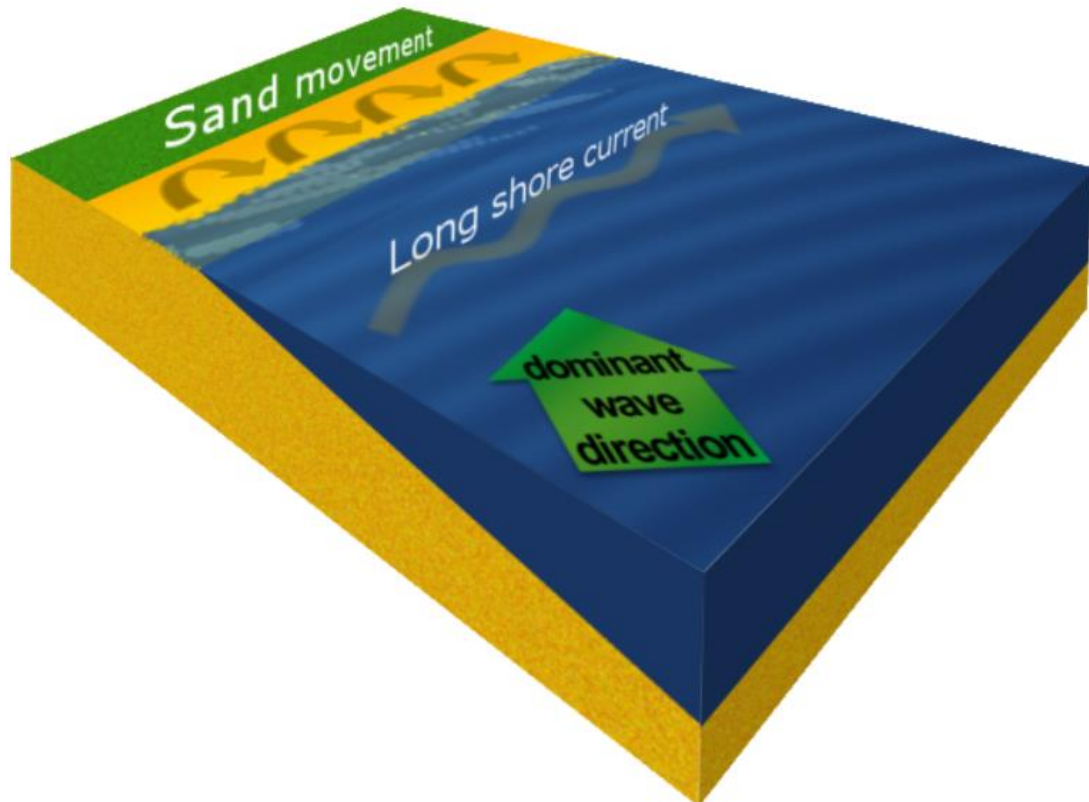
Sand moving north to the tip of Fraser (K'Gari) Island. Diagram Marcus Toyne © Qld Govt.

## Longshore drift

The process that moves sand along the coastline is called longshore drift. Surf zone currents, created by waves, and the predominant wave direction, influence the flow of sand. Under these conditions, waves break at an angle to the shoreline (forming oblique waves) and the sand is moved along the beach in the surf zone.

The coasts of South East Queensland and Northern New South Wales are made up of a series of predominantly wave-dominated beaches separated by headlands. The dominant wave direction is from the south-east which is what drives the sands northerly movement.

It is estimated that approximately 500,000 cubic metres of sand travel up the coast each year!



The process of longshore drift. Diagram Marcus Toyne © Qld Govt.



## Storm and tempest

Extreme weather events impact our coastline and islands dramatically.

Cyclones, and the wild weather associated with them, impact our coasts significantly. The high winds, increased ocean water height, and wave action that accompany them cause coastal erosion and other changes to the shoreline. The magnitude and destructive power of the weather event, including wind speed, wind direction, wave action, and the status of the tide at the time of the event all influence the degree of impact.



Queensland cyclone pathways since 2000. Diagram Marcus Toyne © Qld Govt.

Sometimes these factors can combine to cause a storm surge. During a storm there is often a surge of water higher than the regular tidal range. When the strong wind pushes this mass of water toward the coastline it can cause massive flooding, particularly if it coincides with a high tide. A storm surge can cause extensive damage to coasts and is a serious hazard during coastal storms and cyclones.

### Cyclone Oma

In February 2019 Cyclone Oma had a major impact on sections of Queensland's coast. Though it never made landfall, the high seas and turbulent weather battered the beaches of South East Queensland leaving major erosion in its wake. The photos below illustrate its impacts.



Fort Bribie mine huts. Left photo taken 21 July 2018 (Matthew Nash-Arnold © Qld Govt). Right photo taken on the 26 February 2019 (Brendan McLarty © Qld Govt).



**Fort Bribie northern gun emplacement.** Left photo taken 21 July 2018 (Matthew Nash-Arnold © Qld Govt). Right photo taken on the 26 February 2019 (Brendan McLarty © Qld Govt).

### Climate change challenges

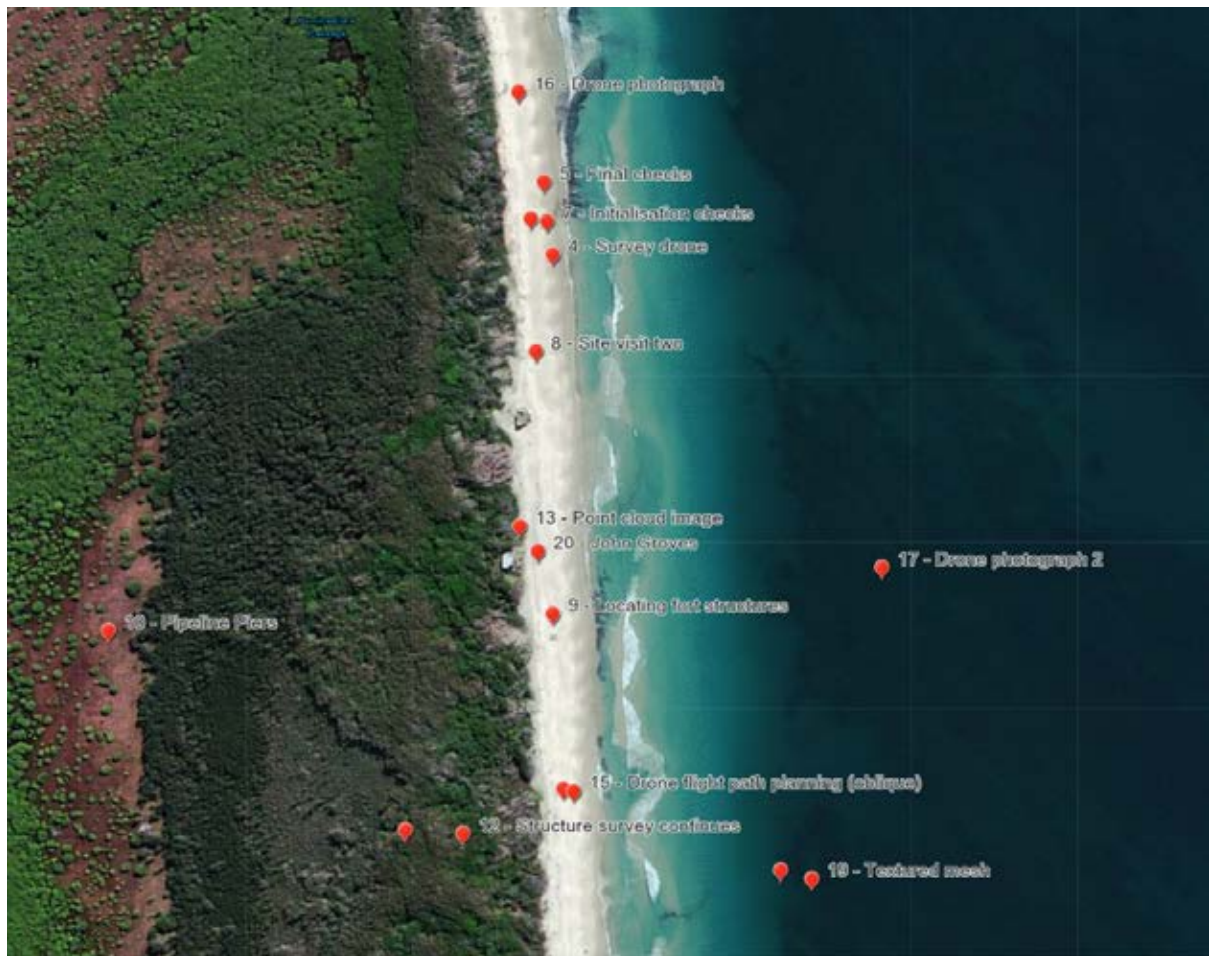
In the future it is anticipated that the intensity and unpredictability of these storm and cyclone events will increase. Combined with sea level rise, they pose significant challenges for protecting our cultural heritage.



Storm surge at Inskip Peninsula Recreation Area. Courtesy of © Troy Walton

## Behind the scenes

'Behind the scenes' documents the drone site surveys of Fort Bribie for Anzac Day 2019 commemorations. The surveys were undertaken by Queensland National Park rangers in 2018.



Aerial map locating the position of the drone survey photos and images.

### Image 1: QPWS drone survey support vehicle

Access to the Fort Bribie site can only be achieved by 4WD. Queensland Parks and Wildlife Service's Rangers Mark Cody and Leanne Siebuhr were instrumental in their support, guidance and advice when surveying the site.



QPWS drone survey support vehicle. (Matthew Nash-Arnold © Qld Govt)

## Image 2: 'Drone activity in progress' signage

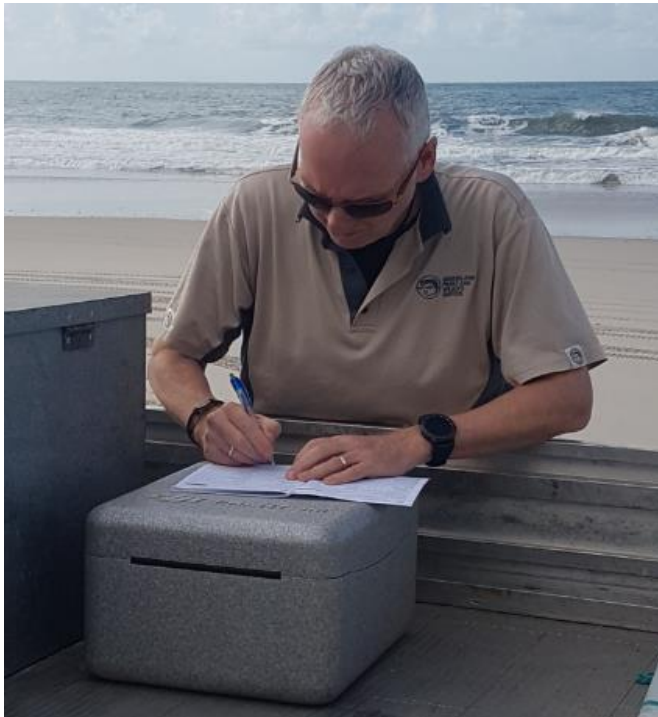
'Drone activity in progress' safety signage during the Fort Bribie structures survey, June 2018. Photo taken looking south towards Woorim. The southern observation post structure can be seen behind QPWS support vehicles.



'Drone activity in progress' signage. Photo Matthew Nash-Arnold © Qld Govt

## Image 3: Drone survey flight log

Drone survey pre-flight log being filled out by drone pilot, Marcus Toyne. (Mark Cody © Qld Govt)



Drone survey flight log. Photo Mark Cody © Qld Govt

#### Image 4: Survey drone

DJI Phantom 4 drone used to perform aerial surveys of the historic fortification buildings. Photograph taken just north of the northern gun emplacement, looking south to Woorim.



**DJI Phantom 4 drone.** Photo Matthew Nash-Arnold © Qld Govt

#### Image 5: Drone Initialisation checks

Marcus Toyne running some pre drone operational checks before launching the aircraft.



**Drone initialisation checks.** Photo Matthew Nash-Arnold © Qld Govt

### Image 6: Final drone flight checks

Marcus Toyne running some final drone stabilisation and camera operational checks before commencing the survey.



**Drone flight checks.** Photo Matthew Nash-Arnold © Qld Govt

### Image 7: Final flight checks

Final drone stabilisation and camera operational checks before commencing the survey.



**Drone testing.** Photo Matthew Nash-Arnold © Qld Govt

### Image 8: Site visit two

The team returned to Fort Bribie in July to continue the drone survey. Photograph looking south towards number 2 gun emplacement.



Conducting site visit two. Photo Matthew Nash-Arnold © Qld Govt.

### Image 9: Drone flight path planning (overview)

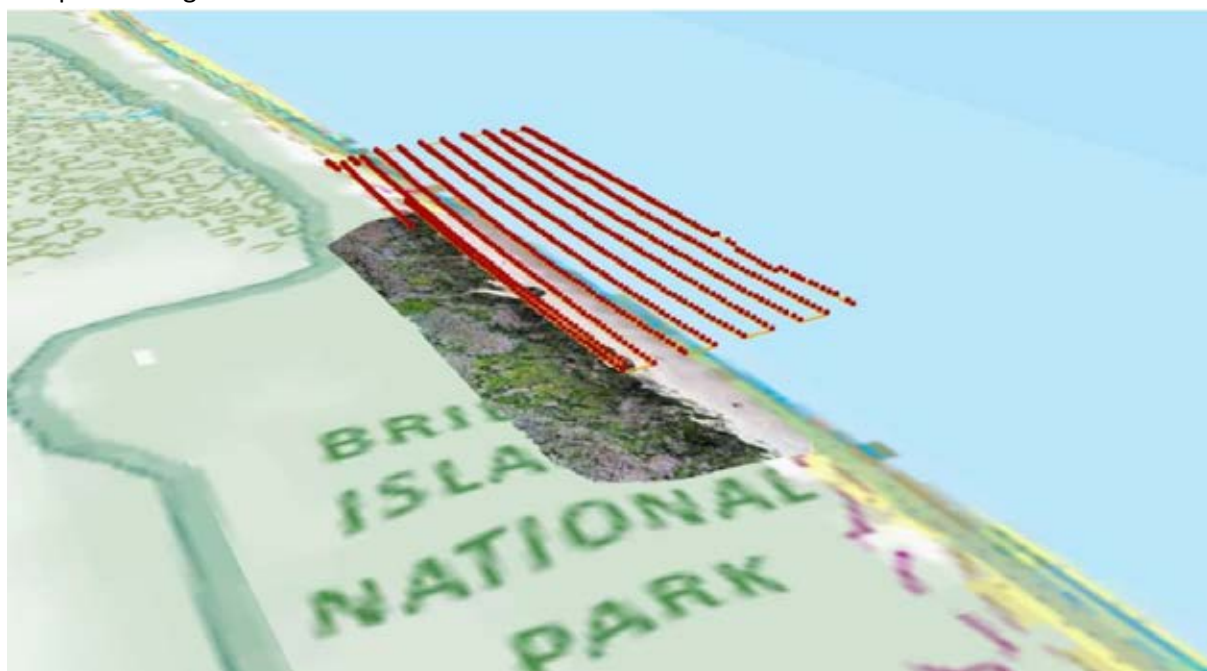
Images are captured by the drone in a series of parallel runs (or lawnmower pattern - yellow lines) with photos taken at regular intervals along each run (red dots) evenly spaced to ensure sufficient overlap to build a composite image.



Drone flight pathways. Diagram Marcus Toyne © Qld Govt.

### Image 10: Drone flight path planning (oblique)

An oblique representation of the parallel drone runs showing designated photograph locations. The composite image can be seen under the drone runs.



An oblique representation of the parallel drone runs. Diagram Marcus Toyne © Qld Govt.



### Image 11: Drone photograph

High quality photograph looking south to Woorim captured from the drone during the site survey. The two gun emplacements can be clearly seen in the photograph, drone altitude is approximately 75 metres.



Drone's eye view. Photo Marcus Toyne © Qld Govt.

### Image 12: Drone photograph two

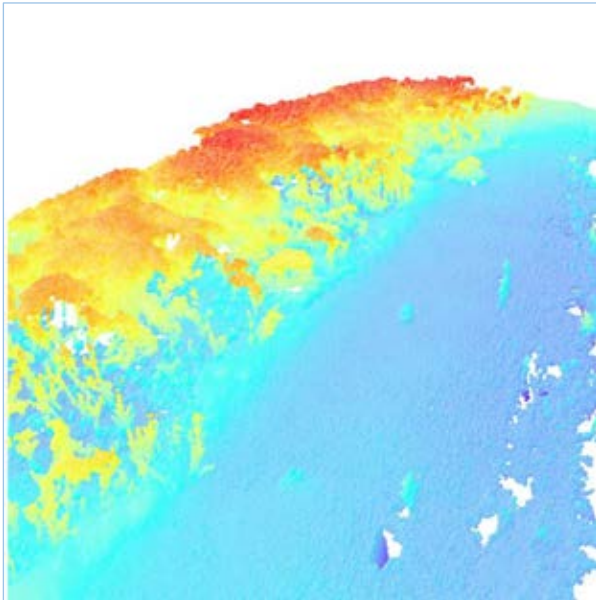
Photo of gun emplacements 1 and 2 taken during drone site survey at approximately 75 metres altitude. Orientation is west, the Glass House Mountains can be seen in the background.



Drone view looking west at beach, fort and Glasshouse Mountains. Photo Marcus Toyne © Qld Govt.

### Image 13: Point cloud diagram

This image shows the point cloud from the series of photos taken by the drone. When you take a series of overlapping aerial photos you can use the difference in them to calculate the height and position of an object. PhoDAR (Photographic Distance And Ranging) takes each point in the overlapping photos and calculates its position relative to all the other points. Using this technique we generated a 3D point cloud of the site.



Point cloud diagram. Marcus Toyne © Qld Govt

### Image 14: Textured mesh

This image shows the result of draping the stitched photos over the point cloud. The point cloud provided a location point for each bit of imagery to be positioned and creates a textured mesh. This in turn has the effect of generating a 3D model of the site. Gun emplacements 1 and 2 can be clearly seen in the 3D mesh model along with support vehicle.



Textured mesh model. Image Marcus Toyne © Qld Govt

### Image 15: Point cloud image

This image is a rendered representation of the Number 1 (southern) gun emplacement which has been generated from the point cloud data collected during the drone surveys.



Textured mesh rendering of the Number 1 gun emplacement. Image Marcus Toyne © Qld Govt.

### Image 16: Locating fort structures

The team used a Trimble R1 GPS device to determine coordinates (to sub metre accuracy) for many of the fort structures. These coordinates were then used to geo-reference the 1945 mapping.



Recording the locations of fort structures. Photo Matthew Nash-Arnold © Qld Govt.

### Image 17: Pipeline Piers

Photo shows the pipe piercing structures that transferred waste liquids from the septic tank to Pumicestone Passage. Photograph orientation is west. Photo Matthew Nash-Arnold © Qld Govt.



Recording the pipeline pier locations. Photo Matthew Nash-Arnold © Qld Govt.

### Image 18: Structure footings survey

GPS surveying to determine coordinates of structure footings.



Recording location of building footings. Photo Matthew Nash-Arnold © Qld Govt.

### Image 19: Structure footings survey continues

The coordination of numerous remaining structures was required to enable the successful geo-referencing of the historic 1945 mapping.



Recording structure footings. Photo Matthew Nash-Arnold © Qld Govt.

### Image 20: John Groves

The team was lucky enough to meet with John Groves during one of the site visits. John provided an invaluable insight regarding the history of Fort Bribie. John and Janice Groves, are the authors of 'Digging deeper into North Bribie Island during World War II', a record of the memories of our servicemen and women stationed on Bribie Island.



John Groves. Photo Marcus Toyne © Qld Govt

© The State of Queensland (Department of Environment and Science), Queensland Government