MINISTRY OF INFRASTRUCTURE & SUSTAINABLE ENERGY
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GCCA+SUPA - BANABA TRIP REPORT

13th January 2022

Trip Name	Banaba Trip for the Survey of the Existing RO Storage Shed (Formerly known as the Cargo Shed)		
Participants' name including team leader	Teuea Tebau SUPA National Coordinator leading the team Kaiea Collins – MISE structural engineer Auaio Enota – MISE Cost Estimator Tokiia T – MISE Builder		
Trip sponsor	GCCA+SUPA		
Start date	06/01/2022	**End date**	10/01/2022
Prepared by	Teuea Tebau (compilation) with specific part contribution from the following: Kaiea on specific engineering parts Auaio and Tokiia on specific construction and estimating parts		

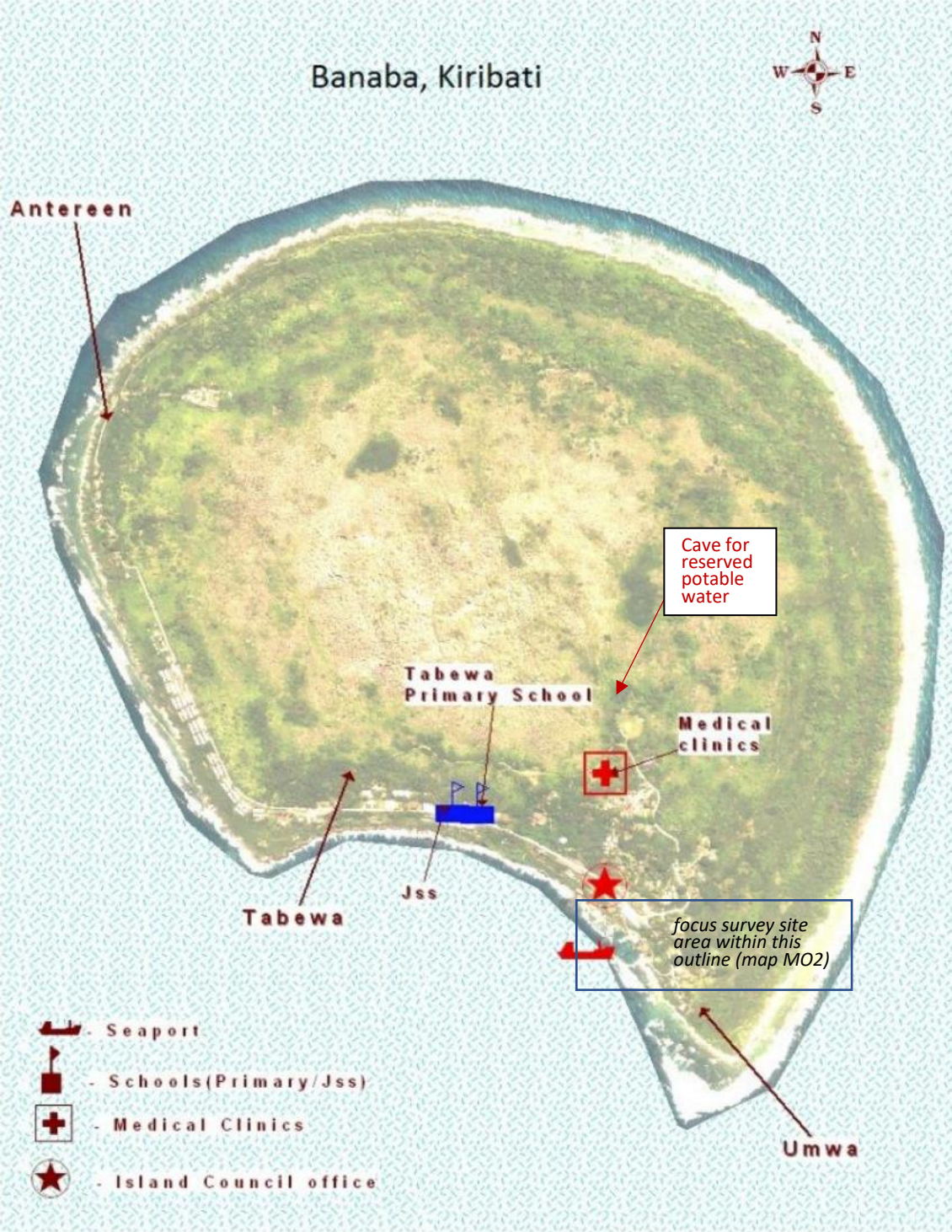
1. Summary

The trip to Banaba commenced on Thursday the 6th of January 2022, with two nights of travel to the island, few hours stay on land during the day doing all the survey work as listed below:

- a visit to the island's existing water infrastructures and survey of the existing RO storage shed (cargo shed), including a preliminary visual inspection and measurements of the civil damaged infrastructures. The latter being done after the completion of the main scope of works.
- a visit to the main water source of potable water (cave well), a visit to the alternative site of the RO proposed warehouse/shed and selected water tanks/storages throughout the island

At the end of the afternoon on Saturday the 8th of January 2022 , the MISE surveying team (including the two SUPA consultants who arrived earlier on the island in December 2021) all hopped back onboard the same vessel MV Tekinati, and travel back to Tarawa for two days arriving back at the Betio wharf on Monday the 10th of January 2022.

Figure M01 - Map of Banaba:



Source: Banaba Island Profile

2. Introduction

The main purpose of the trip is to survey the existing RO storage shed and to determine if the foundation can be retained including identification of the structures to be demolished. Also, to check any alternative site(s) of the new shed.

The GCCA + SUPA project survey team was comprised of four MISE officials:

1. Mr. Teuea Tebau (GCCA + SUPA National Coordinator)
2. Mr. Kaiea Collins (structural engineer)
3. Mr. Auaio Enota (construction estimator)
4. Mr. Tokiia Tebakia (project construction supervisor)

It should be noted too that there are two non-MISE officials already on the island doing consultation on the GCCA + SUPA project prior the MISE surveyors' arrival. These two consultants are:

5. Ms. Alice Tekaieti – GCCA + SUPA Counter-part stationed at USP Teaoraereke
6. Mr. Rikiaua Takeke – KiLGA official invited to join the consultation for GCCA + SUPA project to assist Alice.

The detailed scope of surveying work is outlined below:

- Quick overall site visit of the nominated water infrastructure sites on Banaba.
- Survey (taking measurements) of the existing building RO Shed
- Inspection of the structures by the engineer and their conditions for retention, reuse or complete demolition
- Photographing
- Site plan sketching
- Visual inspection of the overall building by the builder and the estimator to determine the kind of tools etc. needed for demolition
- Cross check the initial costing figures with what actually on site (especially with demolition, site clearances etc.)
- Additional preliminary inspection of the civil works on the island as per the request from Civil Engineering Division.

3. Activities

No.	Activities	Name of counterparts	Additional comments
1	Driven on the council truck to the island's cave water source	Alice and Mikaere	This water is pumped to a poly tank for potable water use, only during the extreme dry weather seasons. Refer photos Fig. A01 to Fig. A03.
2	Then transported to the selected water tank reservoirs for visual	Ditto	One of the tanks recently had a roof collapsed but the rest

	inspection, survey and photographing.		in good condition. Measurement taken for future use in case a roof catchment is to be constructed. Details of this specific tank is: Concrete underground tank, 350mm thick, 6000mm deep (top to bottom) and approx. 9700mm in diameter. Refer photo Figs A06
3	On the motorbike, driven to an alternative site of the RO Unit new proposed Shed	Mikaere only	This alternative site is proposed by the Banabans (as conveyed to Alice during their consultation). This is not MISE nor SUPA's proposal. Refer site photos Figs A04 to A05.
4	Taking measurements of the existing RO Unit storage shed.	Only MISE survey team	Refer sketched plan with measurements (snapshot of the survey sketch book) see Figs A07 and A08
5	Taking photographs	Ditto	Refer selected photos Fig A09 to A11 (more photos with the engineer's report).
6	Taking measurement and photos of the damaged seawall and wharf/jetty piers as reported by the locals.	Ditto	This is done after the main survey of the shed. Refer photos A12 to A17

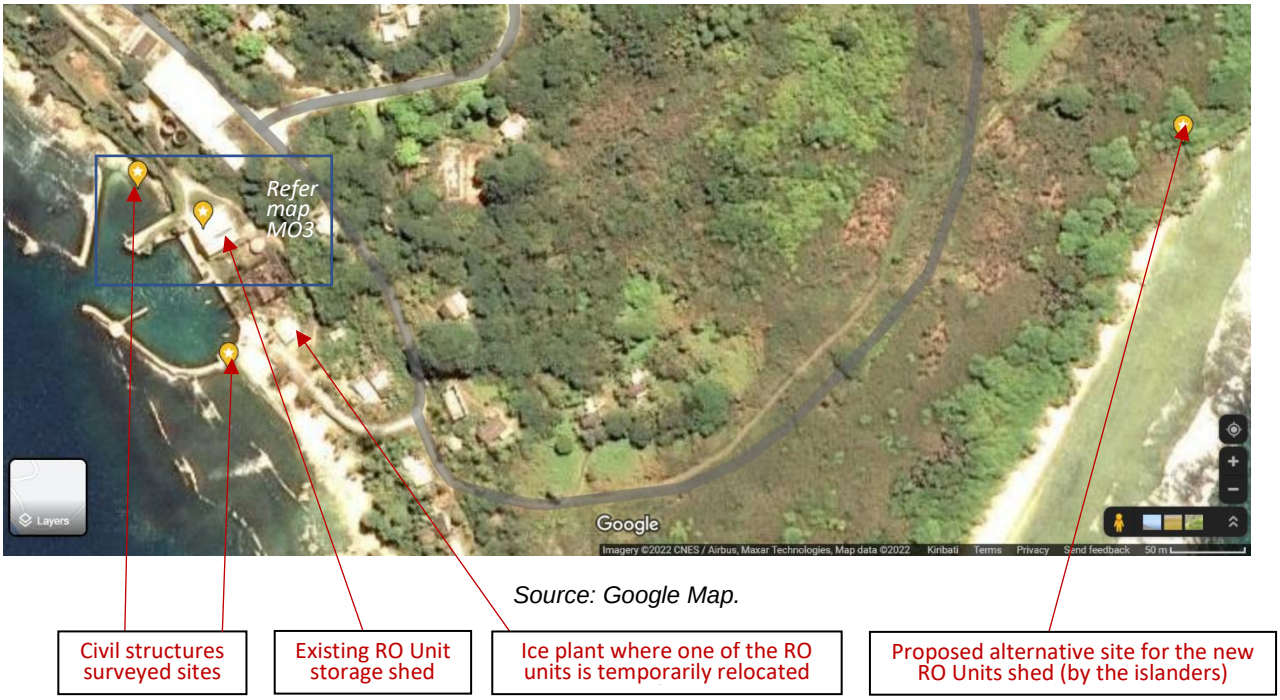
4. Findings/Issues

No.	Issue	Solution	Location/site
1	The existing RO shed roof to wall framing structures deemed to be unsafe and require immediate demolition. Except the floor slab as inspected by the engineer and confirmed to be in really good shape and condition and can be retained for future use.	Demolish the roof to wall framing structures. Retain the foundation and floor slab for the new construction to reuse.	Near the harbor slightly toward the north west, on higher ground. Full detailed descriptions in the Engineer's report attached as Annex 1.

			Location, refer to the site map in Figures M02 and M03.
2	The initial costing on this project was done based on the design entirely, without any prior knowledge of the site and existing building. Hence most of the initial costing figures for demolition, site clearance and tools list and similar were assumed on the limited information.	Review all the costings, material lists, workplans, etc.	Refer to the estimator's and builder's combined summary findings attached with this report in Annex 2
3	One inspected large concrete water tank, reported to have a lid that recently collapsed.	Construct the lid with catchment for direct water collection & storage. This can be anyone's responsibility, the island council, RCL or even through MISE. If SUPA to assist, it may require cost breakdowns and full consent of SPC on the additional work and funds from other SUPA cost savings etc.	Behind the existing RO shed, toward the east. Refer figure MO3.
4	Alternative site of the proposed RO Shed. This is something came out of the consultation that was conducted and facilitated by Alice and Rikiaua. Banabans proposed for this alternative site.	Report to SPC and WSEU MISE however due to short time of the project, for now focus on the existing site. The new site is far away and will incur new scope of works that will result in more funds needed such as for the establishment of new vehicle access roads. The site also a bit rocky and heavy machinery will be needed to level the site which will add more cost, complication and delay to the project overall timeframe. This new site can be explored but may require a new proposal for a new project and new funding.	Further to the east of the main port, refer map figure MO2.
5	The damaged seawall looks very severe. Also, the method and equipment used for surveying	Professional survey team of civil engineers (etc.) needed to assess and	Additional findings beside the main scope of survey

	these civil works may not be as accurate as if it was done properly and professionally by the civil/coastal engineers.	rectify before it continues to get undermined, or further landslides **causing injuries or worst!**	work. The specific civil works locations were inspected based on the indication by the locals consulted at the wharf. Refer map for locations at figure MO2.
6	The damaged (chipped) concrete piers are not critical at the time of the inspection.	Professional survey team of civil engineers (etc.) needed to assess and rectify and to get a more accurate measurements for their designs.	Additional findings beside the main scope of survey work. The specific civil works locations were inspected based on the indication by the locals consulted at the wharf. Refer map for locations at figure MO2.

Figure M02 – Map of the Surveyed Sites



Source: Google Map.

5. Recommendations

- Cautious dismantling (demolition) of the deteriorated structures to avoid injuries or worst. These include the whole roof structures to the wall framing and rest of supports etc. Also completely remove any steel and rusty metal pieces/remains from the retained concrete slab.
- Retain the existing concrete floor slab for reuse with the new proposed building (RO new storage shed as per the approved design). This analysis is detailed in the engineer's recommendations attached with this report.
- Immediate action to the critical civil infrastructure works
- Follow the suggestions of the builder to amend the design to raise the floor slabs by one course (new building only refer to the sketch layout at Annex 3).
- Adjust the design, costing, workplan and other necessary building construction documents based on the findings onsite.

Figure M03 – Map of the Main Surveyed Site

Source: Google Map.

6. Attachments - Photos

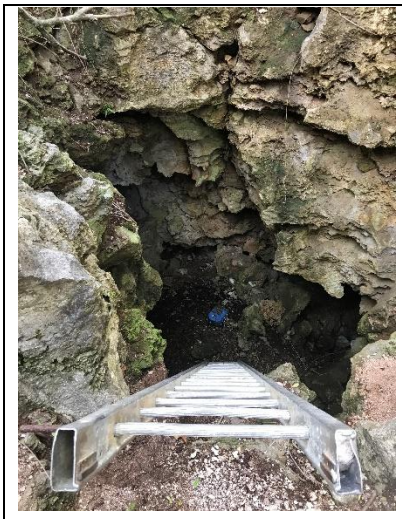


Fig A01 – Entry to the cave

Fig A02 – Well within the cave

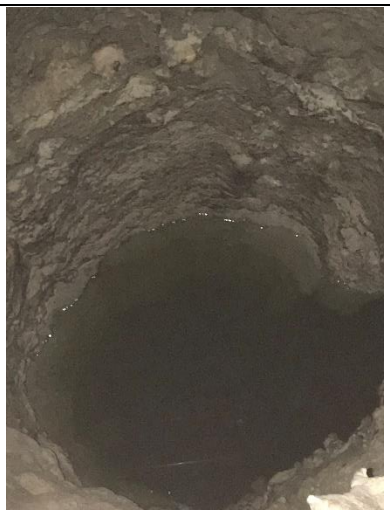


Fig A03 – zoomed in reserved Potable Water source within the cave

Fig A04 – zoomed in reserved Potable

Fig A05 – coordinate location of the proposed site of the desalination plant and the shed.

Fig A06 – Concrete tank reservoir, one of the two near the existing RO Shed (Cargo shed) with a collapsed roof.

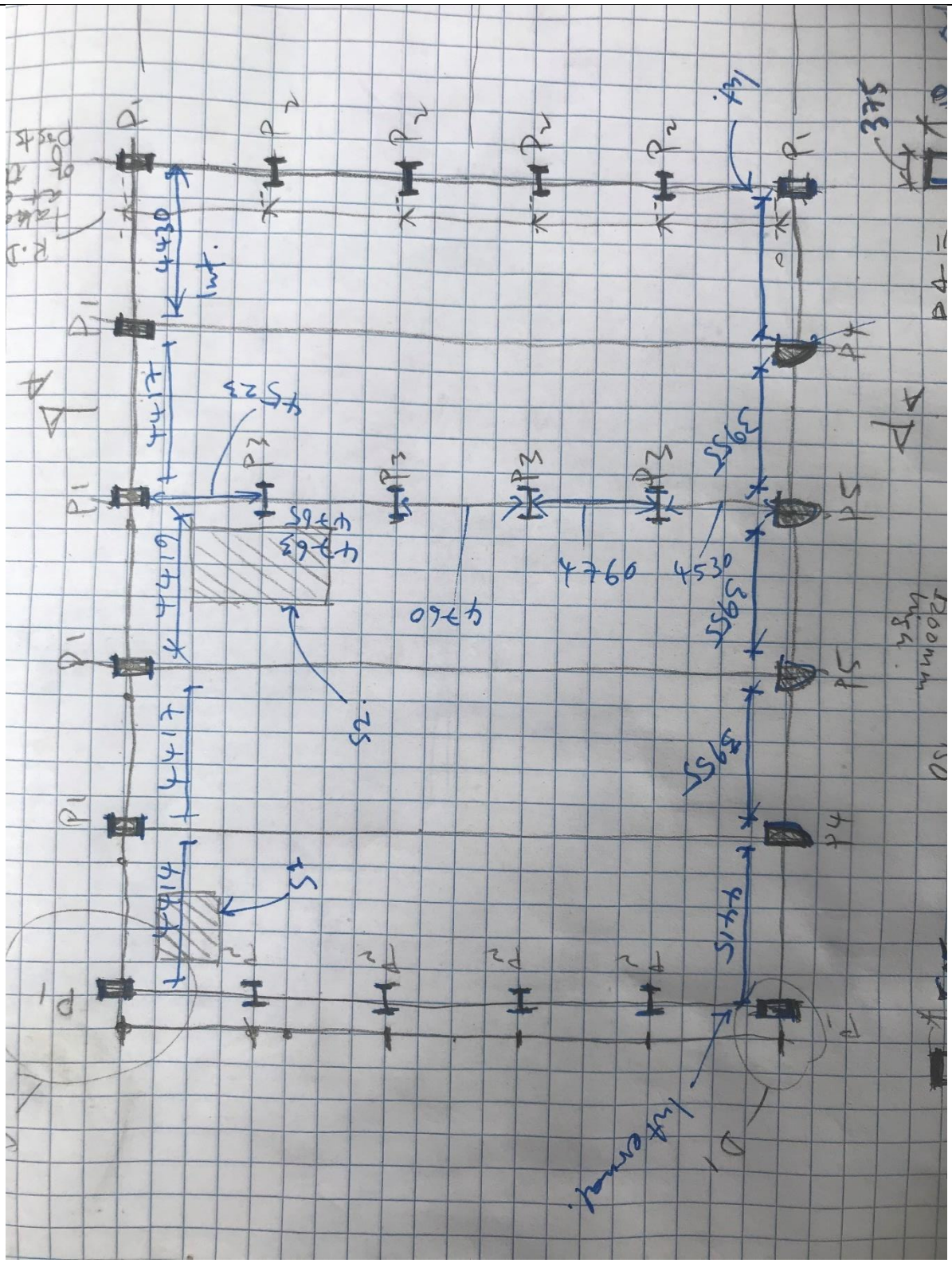


Fig A07 – Survey sketch with measurements of the existing cargo shed

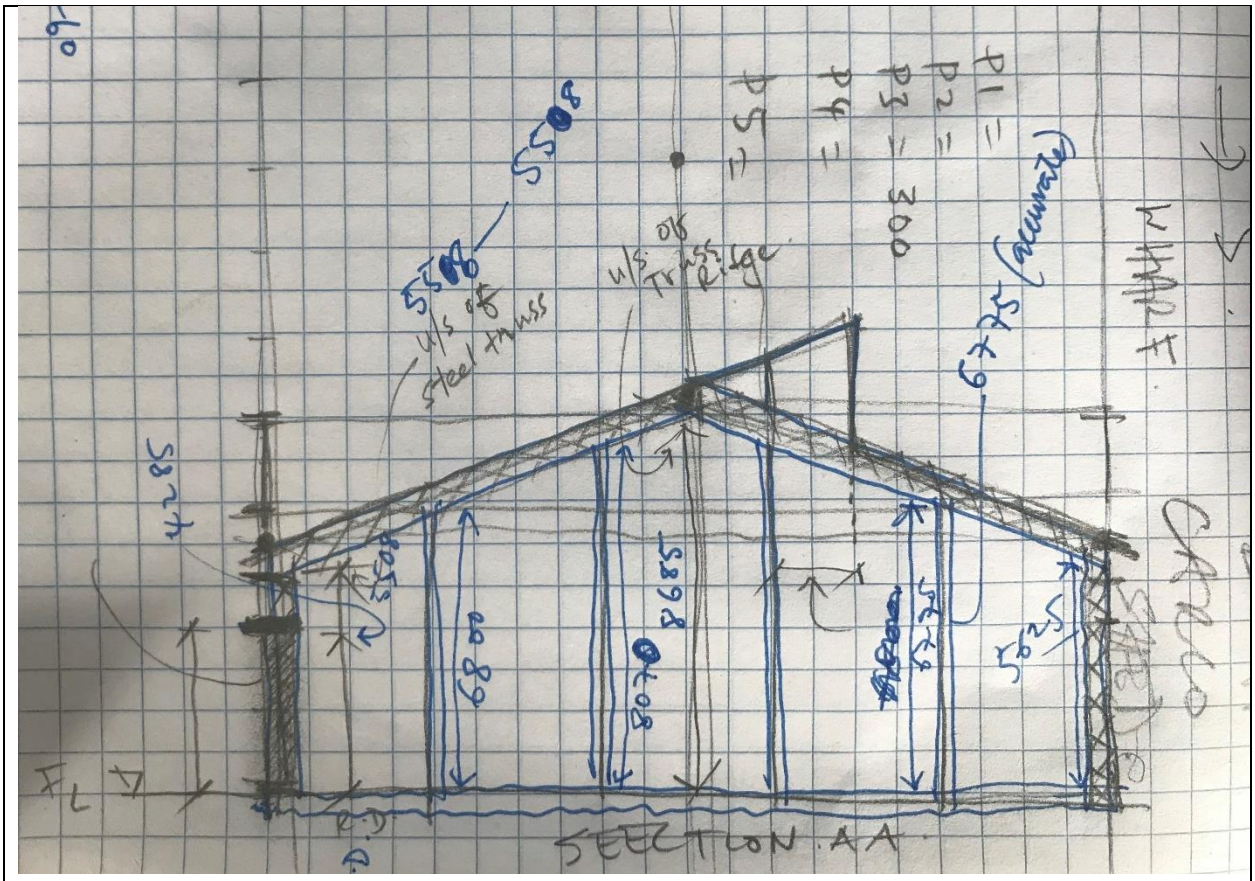


Fig A08 – Cross section sketch showing heights measurements.

Fig A09 – leaning wall on the brink of collapsing.

Fig A10 – Hanging sharp steel structures ready to fall anytime.

Fig A11 – snapped and disconnected steel ready to fall anytime.

Fig A12 – view down the collapsed seawall 12m in length, roughly slightly more than 10m deep to the beach level. The collapse causes (what appears to be a) landslide.

Fig A13 – view from the side at the top, same collapsed seawall.

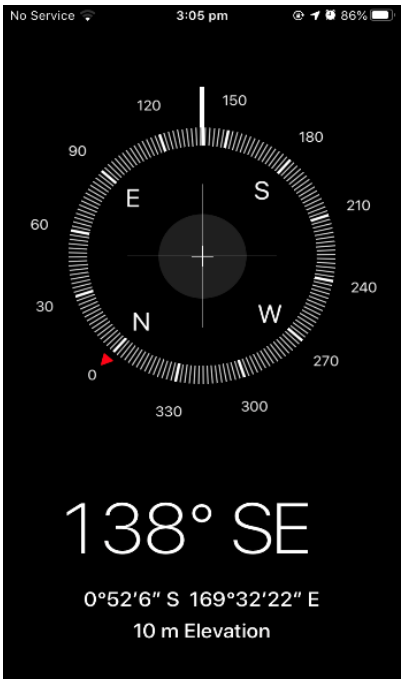


Fig A14 – coordinate location of the collapsed seawall.

Fig A15 – Jetty concrete steps structure ‘chipped’ at the edge. Damage measured length is 3.6m and 1m depth at an angle.

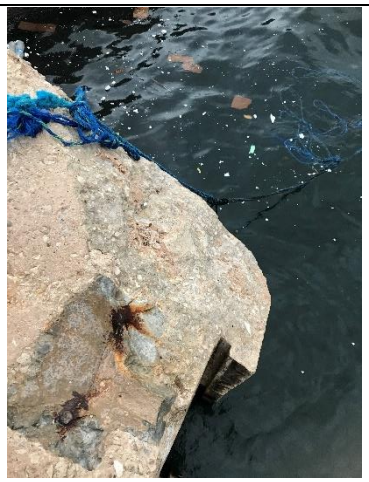


Fig A16 – Another jetty concrete structure ‘chipped’ at the end, one of the top corners. Damage measured length is 1.3m and 1m deep with 1.1m width.

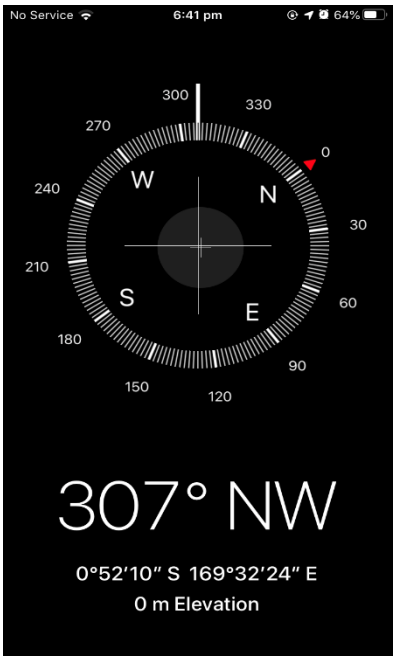


Fig A17 – approx. coordinate location of the damaged jetty structures.